

9 EPS mobility management

9.1 EMM common procedures

9.1.1 Void

9.1.1.1 Void

9.1.1.2 Void

9.1.2 Authentication procedure

9.1.2.1 Authentication accepted

9.1.2.1.1 Test Purpose (TP)

(1)

```
with { a NAS signalling connection existing }
ensure that {
  when { the UE receives an AUTHENTICATION REQUEST message }
  then { the UE responds with a correct AUTHENTICATION RESPONSE message and establishes correct
  EPS security context }
}
```

9.1.2.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.4.2.1 and 5.4.2.3 and TS 33.401, clause 6.1.1.

[TS 24.301, clause 5.4.2.1]

The UE shall support the EPS authentication challenge only if a USIM is present.

An EPS security context is established in the UE and the network when an EPS authentication is successfully performed. During a successful EPS authentication, the CK and IK keys are computed. CK and IK are then used as key material to compute a new key, K_{ASME} . K_{ASME} is stored in the EPS security contexts (see 3GPP TS 33.401 [19]) of both the network and the UE, and is the root for the EPS integrity protection and ciphering key hierarchy.

[TS 24.301, clause 5.4.2.3]

The UE shall respond to an AUTHENTICATION REQUEST message. With the exception of the cases described in subclause 5.4.2.6, the UE shall process the authentication challenge data and respond with an AUTHENTICATION RESPONSE message to the network.

Upon a successful EPS authentication challenge, the new K_{ASME} calculated from the authentication challenge data shall be stored in a new EPS security context.

[TS 33.401, clause 6.1.1]

UE shall compute K_{ASME} from CK, IK, and serving network's identity (SN id) using the KDF as specified in Annex A. SN id binding implicitly authenticates the serving network's identity when the derived keys from K_{ASME} are successfully used.

...

UE shall respond with User authentication response message including RES in case of successful AUTN verification as described in TS 33.102[4] and successful AMF verification as described above. Otherwise UE shall send User authentication reject message with a proper CAUSE value.

9.1.2.1.3 Test description

9.1.2.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (State 1) according to TS 36.508 [18].

9.1.2.1.3.2 Test procedure sequence

Table 9.1.2.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Switch the UE on	-	-	-	-
2	The UE transmits an ATTACH REQUEST including a GUTI and a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	-	-
3	SS transmits an AUTHENTICATION REQUEST message, KSI _{ASME} value is different to the KSI _{ASME} value provided in the ATTACH REQUEST	<--	AUTHENTICATION REQUEST	-	-
4	Check: Does the UE respond with AUTHENTICATION RESPONSE message within 6 seconds and the included RES is equal to the XRES calculated in the SS?	-->	AUTHENTICATION RESPONSE	1	P
5	SS transmits a NAS SECURITY MODE COMMAND message including the KSI _{ASME} of the new EPS security context (as provided in step 3)	<--	SECURITY MODE COMMAND	-	-
6	Check: Does the UE respond with NAS SECURITY MODE COMPLETE message integrity protected and ciphered with the new EPS security context identified by the KSI _{ASME} received in the SECURITY MODE COMMAND message in step 5	-->	SECURITY MODE COMPLETE	1	P
-	EXCEPTION: Steps 7a1 to 7a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	SS responds with ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 9 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
9	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
10a1	Void	-	-	-	-
11	SS releases the RRC connection	-	-	-	-
12	SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
13	Check: Does the UE respond with SERVICE REQUEST message providing KSI _{ASME} value that equals the value provided in the AUTHENTICATION REQUEST message in Step 3, and, integrity protected with new EPS security context?	-->	SERVICE REQUEST	1	P
14-17	Steps 6 to 9 of the generic radio bearer establishment procedure (TS 36.508 4.5.3.3-1) are executed to successfully complete the	-	-	-	-

service request procedure.				
----------------------------	--	--	--	--

9.1.2.1.3.3 Specific message contents

Table 9.1.2.1.3.3-1: AUTHENTICATION RESPONSE (step 4, Table 9.1.2.1.3.2-1)

Derivation Path: 36.508, Table 4.7.2-8			
Information Element	Value/remark	Comment	Condition
Authentication response parameter	RES equal to the XRES calculated in the SS with the parameters provided/indicated in the AUTHENTICATION REQUEST		

9.1.2.2 Void

9.1.2.3 Authentication not accepted by the network / GUTI used / Authentication reject and re-authentication

9.1.2.3.1 Test Purpose (TP)

(1)

```
with { UE having sent an initial NAS message with type of identity GUTI }
ensure that {
  when { as a result of failure of an Authentication procedure initiated by the network the UE
receives an AUTHENTICATION REJECT message }
  then { the UE shall set the update status to EU3 ROAMING NOT ALLOWED, delete the stored GUTI,
TAI list, last visited registered TAI and KSIASME and enter state EMM-DEREGISTERED }
}
```

9.1.2.3.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.4.2.5.

[TS 24.301, clause 5.4.2.5]

Upon receipt of an AUTHENTICATION REJECT message, the UE shall set the update status to EU3 ROAMING NOT ALLOWED, delete the stored GUTI, TAI list, last visited registered TAI and KSI_{ASME}. The USIM shall be considered invalid until switching off the UE or the UICC containing the USIM is removed.

If the AUTHENTICATION REJECT message is received by the UE, the UE shall abort any EMM signalling procedure, stop any of the timers T3410, T3417 or T3430 (if running) and enter state EMM-DEREGISTERED.

9.1.2.3.3 Test description

9.1.2.3.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.1.2.3.3.2 Test procedure sequence

Table 9.1.2.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Switch the UE on	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a GUTI and a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message without integrity protection and ciphering	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits an AUTHENTICATION REJECT message without integrity protection and ciphering	<--	AUTHENTICATION REJECT	-	-
6	SS releases the RRC connection	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
8	Check: Does the test result of CALL generic procedure "Test procedure for no response to paging (for NAS testing)" clause 6.4.2.5 [18] indicates that the UE responds to paging when paged with S-TMSI include GUTI-1 and with CN domain indicator set to "PS"?	-	-	1	-
9	Check: Does the test result of CALL generic procedure "Test procedure for no response to paging (for NAS testing)" clause 6.4.2.5 [18] indicate that the UE responds to paging when paged with IMSI and with CN domain indicator set to "PS"?	-	-	1	-
10	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
11	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
12	Check: Does UE transmit a NOT integrity protected ATTACH REQUEST message including IMSI and a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
13-24	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.1.2.3.3.3 Specific message contents

Table 9.1.2.3.3.3-1a: ATTACH REQUEST (step 2, Table 9.1.2.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	GUTI-1	GUTI allocated in pre-test conditions.	

Table 9.1.2.3.3.3-1: ATTACH REQUEST (step 12, Table 9.1.2.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier	'111'B	no key is available	
Old GUTI or IMSI	IMSI		
Last visited registered TAI	Not Present		

9.1.2.4 Authentication not accepted by the UE / MAC code failure

9.1.2.4.1 Test Purpose (TP)

(1)

```
with { a NAS signalling connection existing }
ensure that {
  when { the UE receives an AUTHENTICATION REQUEST message with invalid MAC code }
  then { the UE shall send an AUTHENTICATION FAILURE message to the network, with the reject cause
#20 "MAC failure" }
}
```

9.1.2.4.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.4.2.6.

[TS 24.301, clause 5.4.2.6]

In an EPS authentication challenge, the UE shall check the authenticity of the core network by means of the AUTN parameter received in the AUTHENTICATION REQUEST message. This enables the UE to detect a false network.

During an EPS authentication procedure, the UE may reject the core network due to an incorrect AUTN parameter (see 3GPP TS 33.401 [19]). This parameter contains three possible causes for authentication failure:

a) MAC code failure:

If the UE finds the MAC code (supplied by the core network in the AUTN parameter) to be invalid, the UE shall send an AUTHENTICATION FAILURE message to the network, with the EMM cause #20 "MAC failure". The UE shall then follow the procedure described in subclause 5.4.2.7, item c.

[TS 24.301, clause 5.4.2.7]

c) Authentication failure (EMM cause #20 "MAC failure"):

The UE shall send an AUTHENTICATION FAILURE message, with EMM cause #20 "MAC failure" according to subclause 5.4.2.6, to the network and start timer T3418 (see example in figure 5.4.2.7.1). Furthermore, the UE shall stop any of the retransmission timers that are running (e.g. T3410, T3417, T3421 or T3430). Upon the first receipt of an AUTHENTICATION FAILURE message from the UE with EMM cause #20 "MAC failure", the network may initiate the identification procedure described in subclause 5.4.4. This is to allow the network to obtain the IMSI from the UE. The network may then check that the GUTI originally used in the authentication challenge corresponded to the correct IMSI. Upon receipt of the IDENTITY REQUEST message from the network, the UE shall send the IDENTITY RESPONSE message.

...

If the GUTI/IMSI mapping in the network was incorrect, the network should respond by sending a new AUTHENTICATION REQUEST message to the UE. Upon receiving the new AUTHENTICATION REQUEST message from the network, the UE shall stop the timer T3418, if running, and then process the challenge information as normal.

9.1.2.4.3 Test description

9.1.2.4.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Switched OFF (State 1) according to TS 36.508 [18].

9.1.2.4.3.2 Test procedure sequence

Table 9.1.2.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Switch the UE on	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	-	-
3	SS transmits an AUTHENTICATION REQUEST message which contains an invalid MAC code	<--	AUTHENTICATION REQUEST	-	-
4	Check: Does the UE respond with an AUTHENTICATION FAILURE message, with reject cause "MAC failure"?	-->	AUTHENTICATION FAILURE	1	P
5	SS transmits an IDENTITY REQUEST message requesting IMSI in the IE Identity type	<--	IDENTITY REQUEST	-	-
6	The UE responds with a correct IDENTITY RESPONSE message providing its IMSI in the IE Mobile Identity	-->	IDENTITY RESPONSE	-	-
7	SS transmits a correct AUTHENTICATION REQUEST message, RAND different to the one send in Step 3	<--	AUTHENTICATION REQUEST	-	-
8	Check: Does the UE respond with a correct AUTHENTICATION RESPONSE message with RES that is equal to the XRES calculated in the SS?	-->	AUTHENTICATION RESPONSE	1	P
9	SS transmits a NAS SECURITY MODE COMMAND message including the KSI_{ASME} of the new EPS security context (as provided in step 8)	<--	SECURITY MODE COMMAND	-	-
10	UE transmits a NAS SECURITY MODE COMPLETE message integrity protected and ciphered with the new EPS security context identified by the KSI_{ASME} received in the SECURITY MODE COMMAND message in step 9	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 11a1 to 11a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
11a 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
11a 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
12	SS responds with ATTACH ACCEPT. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 13 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
13	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
14a 1	Void	-	-	-	-

9.1.2.4.3.3 Specific message contents

Table 9.1.2.4.3.3-1: AUTHENTICATION REQUEST (step 3, Table 9.1.2.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-7			
Information Element	Value/remark	Comment	Condition
Authentication parameter AUTN	Invalid MAC	SS shall calculate the correct MAC value as specified in TS 33.102 and use any different value, e.g. correct_MAC+5.	

Table 9.1.2.4.3.3-2: AUTHENTICATION RESPONSE (step 8, Table 9.1.2.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-8			
Information Element	Value/remark	Comment	Condition
Authentication response parameter	RES equal to the XRES calculated in the SS with the parameters provided/indicated in the AUTHENTICATION REQUEST		

9.1.2.5 Authentication not accepted by the UE / SQN failure

9.1.2.5.1 Test Purpose (TP)

(1)

```

with { a NAS signalling connection existing }
ensure that {
  when { the UE receives an AUTHENTICATION REQUEST message with SQN out of range }
  then { the UE sends an AUTHENTICATION FAILURE message to the network, with EMM cause "synch failure" and a re-synchronization token }
}

```

(2)

```

with { UE having sent an AUTHENTICATION FAILURE message to the network, with EMM cause "synch failure" }
ensure that {
  when { the UE receives a new correct AUTHENTICATION REQUEST message while T3420 is running }
  then { the UE sends a correct AUTHENTICATION RESPONSE message }
}

```

9.1.2.5.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.4.2.6 and 5.4.2.7.

[TS 24.301, clause 5.4.2.6]

In an EPS authentication challenge, the UE shall check the authenticity of the core network by means of the AUTN parameter received in the AUTHENTICATION REQUEST message. This enables the UE to detect a false network.

During an EPS authentication procedure, the UE may reject the core network due to an incorrect AUTN parameter (see 3GPP TS 33.401 [19]). This parameter contains three possible causes for authentication failure:

...

c) SQN failure:

If the UE finds the SQN (supplied by the core network in the AUTN parameter) to be out of range, the UE shall send an AUTHENTICATION FAILURE message to the network, with the EMM cause #21 "synch failure" and a re-synchronization token AUTS provided by the USIM (see 3GPP TS 33.102 [18]). The UE shall then follow the procedure described in subclause 5.4.2.7, item e.

[TS 24.301, clause 5.4.2.7]

e) Authentication failure (EMM cause #21 "synch failure"):

The UE shall send an AUTHENTICATION FAILURE message, with EMM cause #21 "synch failure", to the network and start the timer T3420 (see example in figure 5.4.2.7.2). Furthermore, the UE shall stop any of the retransmission timers that are running (e.g. T3410, T3417, T3421 or T3430). Upon the first receipt of an AUTHENTICATION FAILURE message from the UE with the EMM cause #21 "synch failure", the network shall use the returned AUTS parameter from the authentication failure parameter IE in the AUTHENTICATION FAILURE message, to re-synchronise. The re-synchronisation procedure requires the MME to delete all unused authentication vectors for that IMSI and obtain new vectors from the HSS. When re-synchronisation is complete, the network shall initiate the authentication procedure. Upon receipt of the AUTHENTICATION REQUEST message, the UE shall stop the timer T3420, if running.

...

If the network is validated successfully (a new AUTHENTICATION REQUEST is received which contains a valid SQN and MAC) while T3420 is running, the UE shall send the AUTHENTICATION RESPONSE message to the network and shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430), if they were running and stopped when the UE received the first failed AUTHENTICATION REQUEST message.

9.1.2.5.3 Test description

9.1.2.5.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Switched OFF (State 1) according to TS 36.508 [18].

9.1.2.5.3.2 Test procedure sequence

Table 9.1.2.5.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Switch the UE on	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	-	-
3	SS transmits AUTHENTICATION REQUEST message with the AMF field in the IE "Authentication parameter AUTN" set to "AMF _{FRESYNCH} " value to trigger SQN re-synchronisation procedure in test USIM	<--	AUTHENTICATION REQUEST	-	-
4	Check: Does the UE respond with an AUTHENTICATION FAILURE message, with EMM cause "synch failure"?	-->	AUTHENTICATION FAILURE	1	P
5	SS transmits an IDENTITY REQUEST message requesting IMSI in the IE Identity type	<--	IDENTITY REQUEST	-	-
6	The UE responds with IDENTITY RESPONSE message providing its IMSI in the IE Mobile Identity	-->	IDENTITY RESPONSE	-	-
7	SS transmits AUTHENTICATION REQUEST message (Note 1)	<--	AUTHENTICATION REQUEST	-	-
8	Check: Does the UE respond with AUTHENTICATION RESPONSE message with RES that is equal to the XRES calculated in the SS?	-->	AUTHENTICATION RESPONSE	2	P
9	SS transmits a NAS SECURITY MODE COMMAND message including the KSI _{ASME} of the new EPS security context (as provided in step 8)	<--	SECURITY MODE COMMAND	-	-
10	UE transmits a NAS SECURITY MODE COMPLETE message integrity protected and ciphered with the new EPS security context identified by the KSI _{ASME} received in the SECURITY MODE COMMAND message in step 9	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 11a1 to 11a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
11a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
11a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
12	SS responds with ATTACH ACCEPT. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 13 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
13	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-

14a1	Void	-	-	-	-
Note 1: The SS shall ensure that the AUTHENTICATION REQUEST message sent in step 7 is sent less than (T3420-10%) sec after the message sent in step 4 otherwise it cannot be ensured that the UE will behave as specified in step 8.					

9.1.2.5.3.3 Specific message contents

Table 9.1.2.5.3.3-1: AUTHENTICATION REQUEST (step 3, Table 9.1.2.5.3.2-1)

Derivation Path: 36.508, Table 4.7.2-7			
Information Element	Value/remark	Comment	Condition
Authentication parameter AUTN	AMF field set to "AMF _{RESYNCH} "		

Table 9.1.2.5.3.3-2: AUTHENTICATION FAILURE (step 4, Table 9.1.2.5.3.2-1)

Derivation Path: 36.508, Table 4.7.2-5			
Information Element	Value/remark	Comment	Condition
EMM cause	'0001 0101'B	Synch failure	
Authentication failure parameter	'1111 1111 1111 1111'B	AMF _{RESYNCH} see TS 34.108, 8.1.2.2	

Table 9.1.2.5.3.3-3: AUTHENTICATION RESPONSE (step 8, Table 9.1.2.5.3.2-1)

Derivation Path: 36.508, Table 4.7.2-8			
Information Element	Value/remark	Comment	Condition
Authentication response parameter	RES equal to the XRES calculated in the SS with the parameters provided/indicated in the AUTHENTICATION REQUEST		

9.1.2.6 Abnormal cases / Network failing the authentication check

9.1.2.6.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED state / EMM-CONNECTED mode}
ensure that {
  when { UE receives an AUTHENTICATION REQUEST message but UE deems that the network failed the authentication check }
  then { UE locally release the RRC connection and treat the active cell as barred }
}
```

9.1.2.6.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.4.2.7.

[TS 24.301, clause 5.4.2.7]

It can be assumed that the source of the authentication challenge is not genuine (authentication not accepted by the UE) if any of the following occur:

- after sending the AUTHENTICATION FAILURE message with the EMM cause #20 "MAC failure" the timer T3418 expires;

...

When it has been deemed by the UE that the source of the authentication challenge is not genuine (i.e. authentication not accepted by the UE), the UE shall proceed as described in item f.

...

f) Network failing the authentication check:

If the UE deems that the network has failed the authentication check, then it shall request RRC to locally release the RRC connection and treat the active cell as barred (see 3GPP TS 36.331 [22]). The UE shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430), if they were running and stopped when the UE received the first AUTHENTICATION REQUEST message containing an invalid MAC or SQN.

9.1.2.6.3 Test description

9.1.2.6.3.1 Pre-test conditions

System Simulator:

- Cell A and Cell B are configured according to table 6.3.2.2-1 in TS 36.508 [18]; cell A and Cell B belong to different PLMNs

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to clause [18].

9.1.2.6.3.2 Test procedure sequence

Table 9.1.2.6.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a " Suitable neighbour intra-frequency cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	SS transmits an AUTHENTICATION REQUEST message which contains an invalid MAC code	<--	AUTHENTICATION REQUEST	-	-
5	UE responds with an AUTHENTICATION FAILURE message, with reject cause "MAC failure" .	-->	AUTHENTICATION FAILURE	-	-
6	SS responds nothing and waits for the expiration of T3418.				
6A	The SS configures: - Cell B as the "Serving cell". - Cell A as a " Suitable neighbour intra-frequency cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
8-19	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.1.2.6.3.3 Specific message contents

Table 9.1.2.6.3.3-1: AUTHENTICATION REQUEST (step 3, Table 9.1.2.6.3.2-1)

Derivation Path: 36.508, Table 4.7.2-7			
Information Element	Value/remark	Comment	Condition
Authentication parameter AUTN	Invalid MAC	SS shall calculate the correct MAC value as specified in TS 33.401 and use any different value, e.g. correct_MAC+5.	

Table 9.1.2.6.3.3-2: AUTHENTICATION FAILURE (step 5, Table 9.1.2.6.3.2-1)

Derivation Path: 36.508, Table 4.7.2-5			
Information Element	Value/remark	Comment	Condition
EMM cause	'0001 0100'B	MAC failure	
Authentication failure parameter	Not present		

Table 9.1.2.6.3.3-3: SystemInformationBlockType1(Cell A, Preamble and all steps)

Derivation Path: 36.508 Table 4.4.3.2-3			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
cellBarred	notBarred		
intraFreqReselection	allowed		
}			
}			

9.1.3 Security mode control procedure

9.1.3.1 NAS security mode command accepted by the UE

9.1.3.1.1 Test Purpose (TP)

(1)

```

with { successful completion of EPS authentication and key agreement (AKA) procedure }
ensure that {
  when { UE receives an integrity protected SECURITY MODE COMMAND message including replayed
security capabilities and IMEISV request }
  then { UE sends an integrity protected and ciphered SECURITY MODE COMPLETE message including
IMEISV and starts applying the NAS Security in both UL and DL }
}

```

(2)

```

with { NAS Security Activated and EPS Authentication and key agreement procedure is executed for new
Key generation }
ensure that {
  when { UE receives an integrity protected SECURITY MODE COMMAND message corresponding to NAS count
reset to zero including replayed security capabilities and IMEISV request }
  then { UE sends integrity protected and ciphered SECURITY MODE COMPLETE message with NAS count
set to zero including IMEISV and starts applying the NAS Security in both UL and DL }
}

```

9.1.3.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301 clause 4.4.3.1, 5.4.3.1, 5.4.3.2 and 5.4.3.3.

[TS 24.301, clause 4.4.3.1]

Each EPS NAS security context shall be associated with two separate counters NAS COUNT: one related to uplink NAS messages and one related to downlink NAS messages. The NAS COUNT counters use 24 bit internal representation and are independently maintained by UE and MME. The NAS COUNT shall be constructed as a NAS sequence number (8 least significant bits) concatenated with a NAS overflow counter (16 most significant bits).

When NAS COUNT is input to NAS ciphering or NAS integrity algorithms it shall be considered to be a 32-bit entity which shall be constructed by padding the 24-bit internal representation with 8 zeros in the most significant bits.

During the handover from UTRAN/GERAN to E-UTRAN, if the mapped EPS security context is taken into use, the NAS COUNT values for this EPS security context shall be initialized to zero in the UE and the network for uplink and downlink NAS messages.

The NAS sequence number part of the NAS COUNT shall be exchanged between the UE and the MME as part of the NAS signalling. After each new or retransmitted outbound security protected NAS message, the sender shall increase the NAS COUNT number by one. Specifically, on the sender side, the NAS sequence number shall be increased by one, and if the result is zero (due to wrap around), the NAS overflow counter shall also be incremented by one (see subclause 4.4.3.5). The receiving side shall estimate the NAS COUNT used by the sending side. Specifically, if the estimated NAS sequence number wraps around, the NAS overflow counter shall be incremented by one.

[TS 24.301, clause 5.4.3.1]

The purpose of the NAS security mode control procedure is to take an EPS security context into use, and initialise and start NAS signalling security between the UE and the MME with the corresponding NAS keys and security algorithms.

[TS 24.301, clause 5.4.3.2]

The MME initiates the NAS security mode control procedure by sending a SECURITY MODE COMMAND message to the UE and starting timer T3460 (see example in figure 5.4.3.2.1).

If the security mode control procedure is initiated further to a successful execution of the authentication procedure, the MME shall use the reset downlink NAS COUNT to integrity protect the SECURITY MODE COMMAND message.

The MME shall send the SECURITY MODE COMMAND message unciphered, but shall integrity protect the message with the NAS integrity key based on K_{ASME} or mapped K'_{ASME} indicated by the eKSI included in the message. The MME shall set the security header type of the message to "integrity protected with new EPS security context".

...

The MME shall include the replayed security capabilities of the UE (including the security capabilities with regard to NAS, RRC and UP (user plane) ciphering as well as NAS, RRC integrity, and other possible target network security capabilities, i.e. UTRAN/GERAN if UE included them in the message to network), the replayed nonce_{UE} if the UE included it in the message to the network, the selected NAS ciphering and integrity algorithms and the Key Set Identifier (eKSI).

Additionally, the MME may request the UE to include its IMEISV in the SECURITY MODE COMPLETE message.

NOTE: The AS and NAS security capabilities will be the same, i.e. if the UE supports one algorithm for NAS it is also be supported for AS.

[TS 24.301, clause 5.4.3.3]

Upon receipt of the SECURITY MODE COMMAND message, the UE shall check whether the security mode command can be accepted or not. This is done by performing the integrity check of the message and by checking that the received UE security capabilities and the received nonce_{UE} have not been altered compared to what the UE provided in the initial layer 3 message that triggered this procedure.

If the type of security context flag is set to "native security context" and if the KSI matches a valid native EPS security context held in the UE while the UE has a mapped EPS security context as the current security context, the UE shall take the native EPS security context into use. The UE shall store the native EPS security context, as specified in annex C.

If the security mode command can be accepted, the UE shall reset the uplink NAS COUNT and the UE shall take the new EPS security context into use when:

- a) the SECURITY MODE COMMAND message is received further to a successful execution of the authentication procedure; or
- b) the type of security context flag is set to "mapped security context" in the NAS KSI IE included in the SECURITY MODE COMMAND message.

If the security mode command can be accepted and the eKSI was included in the SECURITY MODE COMMAND message, the UE shall send a SECURITY MODE COMPLETE message integrity protected with the selected NAS integrity algorithm and the NAS integrity key based on the K_{ASME} or mapped K'_{ASME} if the type of security context flag is set to "mapped security context" indicated by the eKSI. If the SECURITY MODE COMMAND message includes the type of security context flag set to "mapped security context" in the NAS KSI IE, $nonce_{MME}$ and $nonce_{UE}$, the UE shall generate K'_{ASME} from both nonces as indicated in 3GPP TS 33.401 [19] and reset the downlink NAS COUNT to check whether the SECURITY MODE COMMAND can be accepted or not. The UE shall cipher the SECURITY MODE COMPLETE message with the selected NAS ciphering algorithm and the NAS ciphering key based on the K_{ASME} or mapped K'_{ASME} indicated by the eKSI. The UE shall set the security header type of the message to "integrity protected and ciphered with new EPS security context".

From this time onwards the UE shall cipher and integrity protect all NAS signalling messages with the selected NAS ciphering and NAS integrity algorithms.

If the MME indicated in the SECURITY MODE COMMAND message that the IMEISV is requested, the UE shall include its IMEISV in the SECURITY MODE COMPLETE message.

9.1. 3.1.3 Test description

9.1.3.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

None.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.1.3.1.3.2 Test procedure sequence

Table 9.1.3.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a SECURITY MODE COMMAND message to activate NAS security. It is integrity protected and includes request to include IMEISV (Note 1).	<--	SECURITY MODE COMMAND	-	-
6	Check: Does the UE transmit a SECURITY MODE COMPLETE message and does it establish the initial security configuration?	-->	SECURITY MODE COMPLETE	1	P
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits an ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
8	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
9	The SS transmits an IDENTITY REQUEST message (Security protected as per the algorithms specified in step 5)	<-	IDENTITY REQUEST	-	-
10	Check: Does the UE transmit an IDENTITY RESPONSE message (Security Protected as per the algorithms specified in step 5)?	->	IDENTITY RESPONSE	1	P
11	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure for new key set generation.	<--	AUTHENTICATION REQUEST	-	-
12	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
13	SS resets UL and DL NAS Count to zero	-	-	-	-
14	The SS transmits a SECURITY MODE COMMAND message to activate NAS security. It is integrity protected and includes request to include IMEISV	<--	SECURITY MODE COMMAND	-	-
15	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	2	P
-	Exception: Steps 16 and 17 are executed 100 times to check UE is applying security correctly.	-	-	-	-

16	The SS transmits an IDENTITY REQUEST message (Security protected as per the algorithms specified in step 14)	<-	IDENTITY REQUEST	-	-
17	Check: Does the UE transmit an IDENTITY RESPONSE message (Security Protected as per the algorithms specified in step 14)?	->	IDENTITY RESPONSE	2	P
18	SS releases the RRC connection	-	-	-	-
19	The UE is brought in state Switched OFF (state 1) according to TS 36.508 [18]	-	-	-	-
20-29	Steps 1 to 10 above are executed again null ciphering algorithm requested in step 5. (Note 1)	-	-	-	-
Note 1: This TC verifies the usage of a not null and the null ciphering algorithms. The type of algorithm is specified in the SECURITY MODE COMMAND and then is applied in the messages that follow accordingly.					

9.1.3.1.3.3 Specific message contents

Table 9.1.3.1.3.3-1: SECURITY MODE COMMAND (Steps 5 and 14, Table 9.1.3.1.3.2-1)

Derivation path: 36.508 [18], table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms			
Type of ciphering algorithm	Set according to PIXIT parameter for default ciphering algorithm if it is set to a value different to EEA0, or, set to any value different to EEA0 otherwise	Non-zero ciphering algorithm	
IMEISV request	Present		

Table 9.1.3.1.3.3-2: SECURITY MODE COMPLETE (Steps 6, 15 and 25, Table 9.1.3.1.3.2-1)

Derivation path: 36.508 [18], table 4.7.2-20			
Information Element	Value/Remark	Comment	Condition
IMEISV	Present		

Table 9.1.3.1.3.3-3: SECURITY MODE COMMAND (Step 24, Table 9.1.3.1.3.2-1)

Derivation path: 36.508 [18], table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms			
Type of ciphering algorithm	EEA0	Zero ciphering algorithm	
IMEISV request	Present		

9.1.3.2 NAS security mode command not accepted by the UE

9.1.3.2.1 Test Purpose (TP)

(1)

```

with { successful completion of EPS authentication and key agreement (AKA) procedure[ ]
ensure that {
  when { UE receives an integrity protected SECURITY MODE COMMAND message including not matching
replayed security capabilities}
  then { UE sends SECURITY MODE REJECT and does not start applying the NAS security in both UL and
DL}
}

```

9.1.3.2.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301 clause 5.4.3.1, 5.4.3.2, 5.4.3.3 and 5.4.3.5.

[TS 24.301, clause 5.4.3.1]

The purpose of the NAS security mode control procedure is to take an EPS security context into use, and initialise and start NAS signalling security between the UE and the MME with the corresponding NAS keys and security algorithms.

[TS 24.301, clause 5.4.3.2]

The MME initiates the NAS security mode control procedure by sending a SECURITY MODE COMMAND message to the UE and starting timer T3460 (see example in figure 5.4.3.2.1).

If the security mode control procedure is initiated further to a successful execution of the authentication procedure, the MME shall use the reset downlink NAS COUNT to integrity protect the SECURITY MODE COMMAND message.

The MME shall send the SECURITY MODE COMMAND message unciphered, but shall integrity protect the message with the NAS integrity key based on K_{ASME} or mapped K'_{ASME} indicated by the eKSI included in the message. The MME shall set the security header type of the message to "integrity protected with new EPS security context".

...

The MME shall include the replayed security capabilities of the UE (including the security capabilities with regard to NAS, RRC and UP (user plane) ciphering as well as NAS, RRC integrity, and other possible target network security capabilities, i.e. UTRAN/GERAN if UE included them in the message to network), the replayed nonce_{UE} if the UE included it in the message to the network, the selected NAS ciphering and integrity algorithms and the Key Set Identifier (eKSI).

Additionally, the MME may request the UE to include its IMEISV in the SECURITY MODE COMPLETE message.

NOTE: The AS and NAS security capabilities will be the same, i.e. if the UE supports one algorithm for NAS it is also be supported for AS.

[TS 24.301, clause 5.4.3.3]

Upon receipt of the SECURITY MODE COMMAND message, the UE shall check whether the security mode command can be accepted or not. This is done by performing the integrity check of the message and by checking that the received UE security capabilities and the received nonce_{UE} have not been altered compared to what the UE provided in the initial layer 3 message that triggered this procedure.

[TS 24.301, clause 5.4.3.5]

If the security mode command cannot be accepted, the UE shall send a SECURITY MODE REJECT message, which shall not be integrity protected. The SECURITY MODE REJECT message contains an EMM cause that typically indicates one of the following cause values:

- #23: UE security capabilities mismatch;
- #24: security mode rejected, unspecified.

Upon receipt of the SECURITY MODE REJECT message, the MME shall stop timer T3460. The MME shall also abort the ongoing procedure that triggered the initiation of the NAS security mode control procedure.

9.1.3.2.3 Test description

9.1.3.2.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.1.3.2.3.2 Test procedure sequence

Table 9.1.3.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security. It is integrity protected and includes un matched replayed security capabilities.	<--	SECURITY MODE COMMAND	-	-
6	Check: Does the UE transmit a NAS SECURITY MODE REJECT message with cause'#23: UE security capabilities mismatch'?	-->	SECURITY MODE REJECT	1	P
7	The SS Transmits an IDENTITY REQUEST message for IMSI (Security not applied)	<-	IDENTITY REQUEST	-	-
8	Check: Does the UE transmit a non security protected IDENTITY RESPONSE message?	->	IDENTITY RESPONSE	1	P
9	The SS transmits a SECURITY MODE COMMAND message to activate NAS security. It is integrity protected and includes request to include IMEISV	<--	SECURITY MODE COMMAND	-	-
10	The UE transmits a SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 10Aa1 to 10Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
10 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
10 A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
11	The SS transmits an ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
12	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-

9.1.3.2.3.3 Specific message contents

Table 9.1.3.2.3.3-1: SECURITY MODE COMMAND (Step 5)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Replayed UE security capabilities	Set to mismatch the security capability of UE under test		

Table 9.1.3.2.3.3-2: SECURITY MODE REJECT (Step 6)

Derivation path: 36.508 table 4.7.2-21			
Information Element	Value/Remark	Comment	Condition
EMM cause	#23		

9.1.3.3 No emergency bearer service / NAS security mode command with EIA0 not accepted by the UE

9.1.3.3.1 Test Purpose (TP)

(1)

```

with { UE not having a PDN connection for emergency bearer services established or not establishing
a PDN connection for emergency bearer }
ensure that {
  when { UE receives a SECURITY MODE COMMAND message indicating the "null integrity protection
algorithm" EIA0 }
  then { UE sends SECURITY MODE REJECT and does not start applying the "null integrity protection
algorithm" EIA0 }
}

```

9.1.3.3.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301 clause 4.4.4.1, 4.4.4.2, 5.4.3.3 and 5.4.3.5.

[TS 24.301, clause 4.4.4.1]

For the UE, integrity protected signalling is mandatory for the NAS messages once a valid EPS security context exists and has been taken into use. For the network, integrity protected signalling is mandatory for the NAS messages once a secure exchange of NAS messages has been established for the NAS signalling connection. Integrity protection of all NAS signalling messages is the responsibility of the NAS. It is the network which activates integrity protection.

The use of "null integrity protection algorithm" EIA0 (see subclause 9.9.3.23) in the current security context is only allowed for an unauthenticated UE. For setting the security header type in outbound NAS messages, the UE and the MME shall apply the same rules irrespective of whether the "null integrity protection algorithm" or any other integrity protection algorithm is indicated in the security context.

[TS 24.301, clause 4.4.4.2]

Except the messages listed below, no NAS signalling messages shall be processed by the receiving EMM entity in the UE or forwarded to the ESM entity, unless the network has established secure exchange of NAS messages for the NAS signalling connection:

- EMM messages:
 - IDENTITY REQUEST (if requested identification parameter is IMSI);
 - AUTHENTICATION REQUEST;
- ...

NOTE: These messages are accepted by the UE without integrity protection, as in certain situations they are sent by the network before security can be activated.

All ESM messages are integrity protected.

Once the secure exchange of NAS messages has been established, the receiving EMM or ESM entity in the UE shall not process any NAS signalling messages unless they have been successfully integrity checked by the NAS. If NAS signalling messages, having not successfully passed the integrity check, are received, then the NAS in the UE shall discard that message. The processing of the SECURITY MODE COMMAND message that has not successfully passed the integrity check is specified in subclause 5.4.3.5. If any NAS signalling message is received as not integrity protected even though the secure exchange of NAS messages has been established by the network, then the NAS shall discard this message.

[TS 24.301, clause 5.4.3.3]

Upon receipt of the SECURITY MODE COMMAND message, the UE shall check whether the security mode command can be accepted or not. This is done by performing the integrity check of the message and by checking that the received replayed UE security capabilities and the received nonce_{UE} have not been altered compared to what the UE provided in the initial layer 3 message that triggered this procedure. However, the UE is not required to perform the checking of the received nonce_{UE} if the UE does not want to re-generate the K'_{ASME} (i.e. the SECURITY MODE COMMAND message is to derive and take into use a mapped EPS security context and the eKSI matches the current EPS security context, if it is a mapped EPS security context). When the UE has a PDN connection for emergency bearer services established or the UE is establishing a PDN connection for emergency bearer services, the UE is not required to locally re-generate the K_{ASME} (i.e. the SECURITY MODE COMMAND message is used to derive and take into use a native EPS security context where the KSI value "000" is included in the NAS key set identifier IE and the EIA0 and EEA0 are included as the selected NAS security algorithms).

The UE shall accept a SECURITY MODE COMMAND message indicating the "null integrity protection algorithm" EIA0 as the selected NAS integrity algorithm only if the message is received for a UE that has a PDN connection for emergency bearer services established or a UE that is establishing a PDN connection for emergency bearer services.

[TS 24.301, clause 5.4.3.5]

If the security mode command cannot be accepted, the UE shall send a SECURITY MODE REJECT message, which shall not be integrity protected. The SECURITY MODE REJECT message contains an EMM cause that typically indicates one of the following cause values:

- #23: UE security capabilities mismatch;
- #24: security mode rejected, unspecified.

9.1.3.3.3 Test description

9.1.3.3.3.1 Pre-test conditions

System Simulator:

- Cell A.

UE:

None.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

Note: The preamble is executed with non-null NAS security algorithms indicated in the PIXT.

9.1.3.3.3.2 Test procedure sequence

Table 9.1.3.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message with SQN out of range and an invalid MAC code, and, "separation bit" in the AMF field of AUTN = 1. Note: The present TC is simulating a man-in-the-middle security threat scenario. The man-in-the-middle is not expected to have these parameters right.	<--	AUTHENTICATION REQUEST	-	-
4	UE transmits an AUTHENTICATION FAILURE message with EMM cause #20 "MAC failure" or EMM cause #21 "synch failure".	-->	AUTHENTICATION FAILURE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message; EIA0 (NULL integrity), EEA0 (NULL ciphering), matched replayed security capabilities. Note: 'matched replayed security capabilities' shall be sent to ensure that the SECURITY MODE REJECT is not sent due to problem with this information.	<--	SECURITY MODE COMMAND	-	-
6	Check: Does the UE transmit a NAS SECURITY MODE REJECT message?	-->	SECURITY MODE REJECT	1	P
7	The SS transmits an IDENTITY REQUEST message for IMSI (Security not applied)	<-	IDENTITY REQUEST	-	-
8	The UE transmits an integrity protected only IDENTITY RESPONSE message.	->	IDENTITY RESPONSE	-	-
-	EXCEPTION: Steps 9a1 to 9a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
9a1	The SS transmits an ESM INFORMATION REQUEST message - no integrity protection applied - to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
9a2	Check: Does the UE transmit an ESM INFORMATION RESPONSE message? Note: The UE is expected to discard the ESM INFORMATION REQUEST message without security protection.	-->	ESM INFORMATION RESPONSE	1	F
10	The SS transmits an ATTACH ACCEPT message- no integrity protection applied. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: Steps 11a1 to 11b13 describe behaviour that depends on the UE action; the "lower case letter" identifies a step sequence that take place if a particular sequential line of behaviour is manifested.	-	-	-	-
11a 1	Check: Does the UE transmit an ATTACH COMPLETE message? Note: The UE is expected to discard the ATTACH ACCEPT message without security protection.	-->	ATTACH COMPLETE	1	F
11b 1	Check: Does the UE transmit an ATTACH REQUEST message? Note 1: After timer T3411 expire the UE is expected to re-attempt to attach.	-->	ATTACH REQUEST	1	P

	Note 2: Steps 11b1 to 11b13 are executed with non-null NAS security algorithms indicated in the PIXIT.				
11b 2- 11b 13	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 [18] sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508 [18].	-	-	-	-

9.1.3.3.3 Specific message contents

Table 9.1.3.3.3-1: AUTHENTICATION REQUEST (Step 3, Table 9.1.3.3.2-1)

Derivation Path: 36.508 [18], Table 4.7.2-7			
Information Element	Value/remark	Comment	Condition
Authentication parameter AUTN	AMF field set to "AMF _{RESYNCH} "		
	Invalid MAC	SS shall calculate the correct MAC value as specified in TS 33.102 [26] and use any different value, e.g. correct_MAC+5.	

Table 9.1.3.3.3-2: AUTHENTICATION FAILURE (Step 4, Table 9.1.3.3.2-1)

Derivation Path: 36.508 [18], Table 4.7.2-5			
Information Element	Value/remark	Comment	Condition
EMM cause	#20	Note 1	
	#21	Note 1	
Note 1: Any of these two values is allowed.			

Table 9.1.3.3.3-3: SECURITY MODE COMMAND (Step 5, Table 9.1.3.3.2-1)

Derivation path: 36.508 [18], table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms			
Type of integrity protection algorithm	EIA0		
Type of ciphering algorithm	EEA0		
NAS key set identifier			
NAS key set identifier	'000'B		
TSC	'0'B	native security context (for KSI _{ASME})	
Spare half octet	'0000'B		

Table 9.1.3.3.3-4: SECURITY MODE REJECT (Step 6, Table 9.1.3.3.2-1)

Derivation path: 36.508 [18], table 4.7.2-21			
Information Element	Value/Remark	Comment	Condition
EMM cause	#23	Note 1	
	#24	Note 1	
Note 1: Any of these two values is allowed.			

9.1.4 Identification procedure

9.1.4.1 Void

9.1.4.2 Identification procedure / IMEI / IMEISV requested

9.1.4.2.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED state / EMM-CONNECTED mode}
ensure that {
  when { UE receives an IDENTITY REQUEST message with IMEI in the IE Identity type }
  then { UE sends an IDENTITY RESPONSE message providing its IMEI }
}
```

(2)

```
with { UE in EMM-REGISTERED state / EMM-CONNECTED mode}
ensure that {
  when { UE receives an IDENTITY REQUEST message with IMEISV in the IE Identity type }
  then { UE sends an IDENTITY RESPONSE message providing its IMEISV }
}
```

9.1.4.2.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.4.4.3.

[TS 24.301, clause 5.4.4.3]

A UE shall be ready to respond to an IDENTITY REQUEST message at any time whilst in EMM-CONNECTED mode.

Upon receipt of the IDENTITY REQUEST message the UE shall send an IDENTITY RESPONSE message to the network. The IDENTITY RESPONSE message shall contain the identification parameters as requested by the network.

9.1.4.2.3 Test description

9.1.4.2.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.1.4.2.3.2 Test procedure sequence

Table 9.1.4.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	SS transmits an IDENTITY REQUEST message requesting IMEI in the IE Identity type.	<--	IDENTITY REQUEST	-	-
2	Check: Does the UE respond with an IDENTITY RESPONSE message providing its IMEI?	-->	IDENTITY RESPONSE	1	P
3	SS transmits an IDENTITY REQUEST message requesting the international mobile equipment identity together with the software version number (IMEISV) in the IE Identity type.	<--	IDENTITY REQUEST	-	-
4	Check: Does the UE respond with an IDENTITY RESPONSE message providing its IMEISV?	-->	IDENTITY RESPONSE	2	P

9.1.4.2.3.3 Specific message contents

Table 9.1.4.2.3.3-1: Message IDENTITY REQUEST (step 1, Table 9.1.4.2.3.2-1)

Derivation Path: 36.508, Table 4.7.2-17			
Information Element	Value/Remark	Comment	Condition
Identity Type	0010	IMEI	

Table 9.1.4.2.3.3-2: IDENTITY RESPONSE (step 2, Table 9.1.4.2.3.2-1)

Derivation path: 36.508, Table 4.7.2-18			
Information Element	Value/Remark	Comment	Condition
Mobile Identity			
Type of identity	010	IMEI	
Identity digits	UE's IMEI		

Table 9.1.4.2.3.3-3: Message IDENTITY REQUEST (step 3, Table 9.1.4.2.3.2-1)

Derivation Path: 36.508, Table 4.7.2-17			
Information Element	Value/Remark	Comment	Condition
Identity Type	0011	IMEISV	

Table 9.1.4.2.3.3-4: IDENTITY RESPONSE (step 4, Table 9.1.4.2.3.2-1)

Derivation path: 36.508, Table 4.7.2-18			
Information Element	Value/Remark	Comment	Condition
Mobile Identity			
Type of identity	011	IMEISV	
Identity digits	UE's IMEISV		

9.1.5 EMM information procedure

9.1.5.1 EMM information procedure

9.1.5.1.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state and UE supporting the EMM information message }
ensure that {
  when { UE receives an EMM Information message }

```

```

    then { UE accepts the message and uses the contents to update appropriate information stored
within the UE }
    }

```

9.1.5.1.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.4.5.3.

[TS 24.301, clause 5.4.5.3]

When the UE (supporting the EMM information message) receives an EMM INFORMATION message, it shall accept the message and optionally use the contents to update appropriate information stored within the UE.

9.1.5.1.3 Test description

9.1.5.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

The UE is equipped with a USIM containing default values (as per TS 36.508) except for those listed in Table 9.1.5.1.3.1-1

Table 9.1.5.1.3.1-1: USIM configuration

USIM field	Priority	Value
EF _{UST}		Services 19 and 51 are not supported

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.1.5.1.3.2 Test procedure sequence

Table 9.1.5.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits an EMM INFORMATION message.	<--	EMM INFORMATION	-	-
2	Check: Does the UE transmit in the next 5 seconds an EMM STATUS message with cause #97 "message type non-existent or not implemented"?	-->	EMM STATUS	1	F
-	EXCEPTION: Steps 3a1 to 3a4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
3a1	IF pc_FullNameNetwork THEN Check: Does the UE associate the "full length name of the network" with the MCC and MNC contained in the last visited tracking area identification and is presented to the MS user at the earliest opportunity? (Note 1)	-	-	1	P
3b1	IF pc_ShortNameNetwork THEN Check: Does the UE associate the "abbreviated name of the network" with the MCC and MNC contained in the last visited tracking area identification and is presented to the MS user at the earliest opportunity? (Note 1)	-	-	1	P
3c1	IF pc_LocalTimeZone THEN Check: Does the UE assume that this time zone applies to the tracking area of the current cell and is presented to the MS user at the earliest opportunity? (Note 2)	-	-	1	P
3d1	IF pc_UniversalAndLocalTimeZone THEN Check: Does the UE assume that this time zone applies to the tracking area of the current cell and is presented to the MS user at the earliest opportunity? (Note 2)	-	-	1	P
Note 1: AT command +COPS is assumed to be used for check.					
Note 2: AT command +CCLK is assumed to be used for check.					

9.1.5.1.3.3 Specific message contents

Table 9.1.5.1.3.3-1: EMM INFORMATION (step 1, Table 9.1.5.1.3.2-1)

Derivation Path: 36.508 table 4.7.2-13			
Information Element	Value/Remark	Comment	Condition
Full name for network	"C63A9BED0CB7CB31D98C56B3DD70" O	"FullName12345678", Note	
Short name for network	"5367B85D8EC966" O	"SName123", Note	
Local time zone	"04" O	"GMT+1", Note	
Universal time and local time zone	"01402131832510" O	"2010 12 April 13:38 52s GMT+1", Note	
Network daylight saving time	"01" O	"+1 hour adjustment for Daylight Saving Time", Note	
Note: Hard coded values have been chosen to allow for consistent/comparable SS behaviour.			

Table 9.1.5.1.3.3-2: Message EMM STATUS (step 2, Table 9.1.5.1.3.2-1)

Derivation path: 36.508 table 4.7.2-14			
Information Element	Value/Remark	Comment	Condition
EMM cause	'0110 0001'B	Message type non-existent or not implemented	

9.1.5.2 EMM information procedure not supported by the UE

9.1.5.2.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state }
ensure that {
  when { UE receives an EMM Information message }
  then { UE ignore the contents of the message and return an EMM STATUS message with cause #97
"message type non-existent or not implemented" }
}

```

9.1.5.2.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.4.5.3.

[TS 24.301, clause 5.4.5.3]

If the UE does not support the EMM information message the UE shall ignore the contents of the message and return an EMM STATUS message with cause #97 "message type non-existent or not implemented".

9.1.5.2.3 Test description

9.1.5.2.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.1.5.2.3.2 Test procedure sequence

Table 9.1.5.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits an EMM INFORMATION message.	<--	EMM INFORMATION	-	-
2	Check: Does the UE transmit an EMM STATUS message with cause #97 "message type non-existent or not implemented".	-->	EMM STATUS	1	P

9.1.5.2.3.3 Specific message contents

Table 9.1.5.2.3.3-1: EMM INFORMATION (step 1, Table 9.1.5.2.3.2-1)

Derivation Path: 36.508 table 4.7.2-13			
Information Element	Value/remark	Comment	Condition
Full name for network	Not present		
Short name for network	Not present		
Local time zone	Not present		
Universal time and local time zone	Not present		
Network daylight saving time	'00'B	No adjustment for Daylight Saving Time	

Table 9.1.5.2.3.3-2: Message EMM STATUS (step 2, Table 9.1.5.2.3.2-1)

Derivation path: 36.508 table 4.7.2-14			
Information Element	Value/Remark	Comment	Condition
EMM cause	'0110 0001'B	Message type non-existent or not implemented	

9.2 EMM specific procedures

9.2.1 Attach procedure

9.2.1.1 Attach procedure for EPS services

9.2.1.1.0 General

NOTE: Although section 9.2.1.1 is specifically dedicated to Attach for EPS services, it contains also a number of TCs that verify UE behaviour in EPS and Combined attach environments. The extension of the scope of these TCs was decided on a later stage and they were kept in the present section to avoid problems with changing TC numbers which would have been the result if the TCs were moved to another section.

9.2.1.1.1 Attach / Success / Valid GUTI

9.2.1.1.1.1 Test Purpose (TP)

(1)

```
with { the UE is switched-off with a valid USIM inserted and the USIM contains a valid GUTI and last visited registered TAI }
ensure that {
  when { UE is powered on in a cell not belonging to the last visited registered TAI and in a different PLMN }
  then { the UE establishes the RRC connection without S-TMSI, with registeredMME and with the RRC establishmentCause set to 'mo-Signalling' }
}
```

(2)

```
with { UE is switched-off with a valid USIM inserted and the USIM contains a valid GUTI and last visited registered TAI }
ensure that {
  when { UE is powered on in a cell not belonging to the last visited registered TAI }
  then { the UE transmits an ATTACH REQUEST message with the EPS attach type set to "EPS attach", including the GUTI and last visited registered TAI copied from the USIM, and, a PDN CONNECTIVITY REQUEST message with the request type set to "initial request" and not including APN }
}
```

(3)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH ACCEPT message with EPS attach result matching the requested service(s), the TAI list the UE is registered to and including an ACTIVATE DEFAULT EPS CONTEXT BEARER message with IE EPS Bearer Identity for the default EPS bearer context activated for the UE }
}
```

```

then { UE accepts the allocated GUTI, deletes the old TAI list and transmits an ATTACH COMPLETE
message, together with ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message and enters EMM-REGISTERED
state }
}

```

9.2.1.1.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.3.1.1, 5.5.1.2.1, 5.5.1.2.2, 5.5.1.2.4, 6.2.2, 6.4.1.3, 6.5.1.2 and Annex D, and TS 36.331, clauses 5.3.3.3 and 5.3.3.4.

[TS 24.301, clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a RRC connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

...

For the routing of the initial NAS message to the appropriate MME, the UE NAS provides the lower layers with either the S-TMSI or the registered globally unique MME identifier (GUMMEI) that consists of the PLMN ID, the MME group ID, and the MME code (see 3GPP TS 23.003 [2]) according to the following rules:

- When the UE is registered in the tracking area of the current cell during the NAS signalling connection establishment, the UE NAS shall provide the lower layers with the S-TMSI, but shall not provide the registered MME identifier to the lower layers. Exceptionally, when the UE in EMM-IDLE mode initiates a tracking area updating or combined tracking area updating procedure for load balancing purposes, the UE NAS shall provide the lower layers with neither S-TMSI nor registered MME identifier.
- When the UE is not registered in the tracking area of the current cell during the NAS signalling connection establishment, the UE NAS does not provide the lower layers with the S-TMSI. Instead,
 - a) if the TIN indicates "GUTI" or "RAT-related TMSI", or the TIN is not available, and the UE holds a valid GUTI, the UE NAS shall provide the lower layers with the MME identifier part of the valid GUTI; or
 - b) if the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE NAS shall provide the lower layers with the MME identifier part of the mapped GUTI, which is generated from the P-TMSI and RAI.

[TS 24.301, clause 5.5.1.1]

The attach procedure is used to attach to an EPC for packet services in EPS.

The attach procedure is used for two purposes:

- by a UE in PS mode of operation to attach for EPS services only; or
- by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for both EPS and non-EPS services.

With a successful attach procedure, a context is established for the UE in the MME, and a default bearer is established between the UE and the PDN GW, thus enabling always-on IP connectivity to the UE. The network may also initiate the activation of dedicated bearers as part of the attach procedure.

...

[TS 24.301, clause 5.5.1.2.1]

This procedure is used by a UE to attach for EPS services only. When the UE initiates the EPS attach procedure, the UE shall indicate "EPS attach" in the EPS attach type IE.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411.

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

...

The UE shall send the ATTACH REQUEST message together with a PDN CONNECTIVITY REQUEST message contained in the ESM message container information element to request PDN connectivity.

...

If a valid NAS security context exists, the UE shall integrity protect the ATTACH REQUEST message combined with the PDN CONNECTIVITY REQUEST message. When the UE does not have a valid NAS security context, the ATTACH REQUEST message combined with the PDN CONNECTIVITY REQUEST message is not integrity protected.

...

[TS 24.301, clause 5.5.1.2.4]

...

If the ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity. The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

...

When the UE receives the ATTACH ACCEPT message combined with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, it shall forward the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to the ESM sublayer. Upon receipt of an indication from the ESM sublayer that the default EPS bearer context has been activated, the UE shall send an ATTACH COMPLETE message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message contained in the ESM message container information element to the network.

...

[TS 24.301, clause 6.2.2]

The UE shall set the PDN type IE in the PDN CONNECTIVITY REQUEST message based on its IP stack configuration as follows:

- a) A UE, which is IPv6 and IPv4 capable and
 - has not been allocated an IP address for this APN, shall set the PDN type IE to IPv4v6.
 - has been allocated an IPv4 address for this APN and received the ESM cause #52, "single address bearers only allowed", and is requesting an IPv6 address, shall set the PDN type IE to IPv6.
 - has been allocated an IPv6 address for this APN and received the ESM cause #52, "single address bearers only allowed", and is requesting an IPv4 address, shall set the PDN type IE to IPv4.
- b) A UE, which is only IPv4 capable, shall set the PDN type IE to IPv4.
- c) A UE, which is only IPv6 capable, shall set the PDN type IE to IPv6.
- d) When the IP version capability of the UE is unknown in the UE (as in the case when the MT and TE are separated and the capability of the TE is not known in the MT), the UE shall set the PDN type IE to IPv4v6.

...

[TS 24.301, clause 6.4.1.3]

Upon receipt of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall send an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message and enter the state BEARER CONTEXT ACTIVE. When the default bearer is activated as part of the attach procedure, the UE shall send the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message together with ATTACH COMPLETE message. When the

default bearer is activated as the response to the stand-alone PDN CONNECTIVITY REQUEST message, the UE shall send the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message alone.

The UE checks the PTI in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to identify the UE requested PDN connectivity procedure to which the default bearer context activation is related (see subclause 6.5.1).

...

[TS 24.301, clause 6.5.1.2]

When the PDN CONNECTIVITY REQUEST message is sent together with an ATTACH REQUEST message, the UE shall not include the APN.

NOTE: If the UE needs to provide PCO which require ciphering or provide an APN, or both, during the attach procedure, the ESM information transfer flag is included in the PDN CONNECTIVITY REQUEST. The MME then at a later stage in the PDN connectivity procedure initiates the ESM information request procedure in which the UE can provide the MME with PCO or APN or both.

...

The UE shall set the request type to "initial request" when the UE is establishing connectivity to a PDN for the first time, i.e. when it is an initial attach to that PDN. The UE shall set the request type to "handover" when the connectivity to a PDN is established upon handover from a non-3GPP access network and the UE was connected to that PDN before the handover to the 3GPP access network.

...

[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
Attach	MO signalling (See Note 1)	"originating signalling"
...		
Note 1: For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or (if the EHPLMN list is not present or is empty) EHPLMN, (if the EHPLMN list is present) the RRC establishment cause will be set to "High priority access AC 11 – 15".		

[TS 36.331, clause 5.3.3.3 “Actions related to transmission of *RRCCConnectionRequest* message”]

The UE shall set the contents of *RRCCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;
 - 2> else
 - 3> draw a random value in the range $0..2^{40}-1$ and set the *ue-Identity* to this value;

NOTE 1 Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 1> Set the *establishmentCause* in accordance with the information received from upper layers;

[TS 36.331 clause 5.3.3.4]

...

The UE shall:

...

1> set the content of *RRCConnectionSetupComplete* message as follows:

2> set the *selectedPLMN-Identity* to the PLMN selected by upper layers (see TS 23.122 [11], TS 24.301 [35]) from the PLMN(s) included in the *plmn-IdentityList* in *SystemInformationBlockType1*;

2> if upper layers provide the 'Registered MME', include and set the *registeredMME* as follows:

3> if the PLMN identity of the 'Registered MME' is different from the PLMN selected by the upper layers:

4> include the *plmnIdentity* in the *registeredMME* and set it to the value of the PLMN identity in the 'Registered MME' received from upper layers;

3> set the *mmegi* and the *mmec* to the value received from upper layers;

...

2> submit the *RRCConnectionSetupComplete* message to lower layers for transmission, upon which the procedure ends;

9.2.1.1.1.3 Test description

9.2.1.1.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is configured to initiate EPS attach;
- The UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell H using default message contents according to TS 36.508 [18].

NOTE: For cell A, (MCC, MNC, TAI) is (MCC stored in EF_{IMSI}, 02, TAI-8).

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.1.3.2 Test procedure sequence

Table 9.2.1.1.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	Check: Does the UE transmit an <i>RRCConnectionRequest</i> message not including S-TMSI and with <i>establishmentCause</i> set to 'mo-Signalling'?	-	-	1	P
3	The SS transmits an <i>RRCConnectionSetup</i> message.	-	-	-	-
4	Check: Does the UE transmit an <i>RRCConnectionSetupComplete</i> message including PLMN ID, MME group ID and MME code with ATTACH REQUEST message including a GUTI and a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	2	P
5	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
6	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
7	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
8	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 9a1 to 9a2 describe behaviour that depends on UE configuration the "lower case letter" identifies a step sequence that take place depending on the last sent by the UE PDN CONNECTIVITY REQUEST message, IE Protocol configuration options setting.	-	-	-	-
9a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
9a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
10	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 11 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
11	Check: Does the UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?	-->	ATTACH COMPLETE	2	P
12	Void	-	-	-	-
13	The SS releases the RRC connection.	-	-	-	-
14	Check: Does the test result of CALL generic procedure [18] clause 6.4.2.4 indicate that the UE is in E-UTRA EMM-REGISTERED state on Cell A?	-	-	3	-

-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-
---	---	---	---	---	---

9.2.1.1.1.3.3 Specific message contents

Table 9.2.1.1.1.3.3-1: Message *RRConnectionRequest* (step 2, Table 9.2.1.1.1.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
RRConnectionRequest ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcConnectionRequest-r8 SEQUENCE {			
ue-Identity CHOICE {			
randomValue	Not checked		
}			
establishmentCause	mo-Signalling		
}			
}			
}			

Table 9.2.1.1.1.3.3-2: Message *RRConnectionSetupComplete* (step 4, Table 9.2.1.1.1.3.2-1)

Derivation path: 36.508 table 4.6.1-18			
Information Element	Value/Remark	Comment	Condition
RRConnectionSetupComplete ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionSetupComplete-r8 SEQUENCE {			
registeredMME {			
plmn-Identity	PLMN ID(MCC as stored in EF _{MSI} on the test USIM card and MNC 02)		
mmegi	1000000000001000	Bit 0 is LSB	
mmec	00000001	Bit 0 is LSB	
}			
}			
}			
}			

Table 9.2.1.1.1.3.3-3: Message ATTACH REQUEST (step 4, Table 9.2.1.1.1.3.2-1)

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI(belonging to PLMN with same MCC as stored in EF _{IMSI} on the test USIM card and MNC 02)	GUTI copied from USIM Old and valid GUTI is included by the UE	
ESM message container	PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN		
Last visited registered TAI	TAI8	GUTI copied from USIM If available, the last TAI is included by UE and will be used to establish a good list of TAIs in subsequent ATTACH ACCEPT message.	

Table 9.2.1.1.1.3.3-4: Void**Table 9.2.1.1.1.3.3-5: Message ATTACH ACCEPT (step 10, Table 9.2.1.1.1.3.2-1)**

Derivation path: TS 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
ESM message container	Contains the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message specified in table 9.2.1.1.1.3.3-6.		

Table 9.2.1.1.1.3.3-6: Void**Table 9.2.1.1.1.3.3-7: Message ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT (step 11, Table 9.2.1.1.1.3.2-1)**

Derivation path: TS 36.508 table 4.7.3-4			
Information Element	Value/Remark	Comment	Condition
EPS bearer identity	Default EBId	Same value as in ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST	
Procedure transaction identity	PTI-0	Same value as in PDN CONNECTIVITY REQUEST	

9.2.1.1.1a Attach Procedure / Success / Last visited TAI, TAI list and equivalent PLMN list handling

9.2.1.1.1a.1 Test Purpose (TP)

(1)

```
with { UE attached to the network with a valid USIM inserted and a valid GUTI }
ensure that {
  when { UE is powered off and then powered on }
  then { the UE transmits an ATTACH REQUEST message with the EPS attach type set to "initial EPS
attach", including GUTI and last visited registered TAI and a PDN CONNECTIVITY REQUEST message with
the request type set to "initial attach" and not including APN }
}
```

(2)

```
with { UE having a valid NAS security context and the UE switched-off }
ensure that {
  when { UE is powered on}
  then { the UE transmits an integrity protected ATTACH REQUEST message combined with the PDN
CONNECTIVITY REQUEST message}
}
```

(3)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH ACCEPT message with EPS attach result matching the requested
service(s), the TAI list the UE is registered to, a set of equivalent PLMNs matching the PLMNs
within the TAI list, and including an ACTIVATE DEFAULT EPS CONTEXT BEARER message with IE EPS Bearer
Identity for the default EPS bearer context activated for the UE }
  then { UE deletes the old TAI list, stores the new TAI list, and does not perform a TAU while
moving within this set of TAs }
}
```

(4)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH ACCEPT message with EPS attach result matching the requested
service(s), the TAI list the UE is registered to, a set of equivalent PLMNs matching the PLMNs
within the TAI list, and including an ACTIVATE DEFAULT EPS CONTEXT BEARER message with IE EPS Bearer
Identity for the default EPS bearer context activated for the UE }
  then { UE deletes the old TAI list, stores the new TAI list, and performs a TAU when moving out
of this set of TAs }
}
```

(5)

```
with { UE has received a set of equivalent PLMNs in an ATTACH ACCEPT message }
ensure that {
  when { the UE has been switched off; then switched on; and then the UE receives an ATTACH_ACCEPT
message with a new set of equivalent PLMNs}
  then { UE deletes the old equivalent PLMN list, and uses the new equivalent PLMN list}
}
```

9.2.1.1.1a.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.3.3, 5.5.1.2.2, 5.5.1.2.4, 6.5.1.2 and 9.9.3.33, and TS 36.304 clause 4.3.

[TS 24.301, clause 5.3.3]

The UE shall store a list of equivalent PLMNs. These PLMNs shall be regarded by the UE as equivalent to each other for PLMN selection and cell selection/re-selection. The same list is used by EMM, GMM and MM.

The UE shall update or delete this list at the end of each attach or tracking area updating procedure. The stored list consists of a list of equivalent PLMNs as downloaded by the network plus the PLMN code of the registered PLMN that downloaded the list. When the UE is switched off, it shall keep the stored list so that it can be used for PLMN selection

after switch on. The UE shall delete the stored list if the USIM is removed. The maximum number of possible entries in the stored list is 16.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see figure 5.5.1.2.2.1).

...

The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

The UE shall send the ATTACH REQUEST message together with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN (see subclause 6.5.1).

...

If a valid NAS security context exists, the UE shall integrity protect the ATTACH REQUEST message combined with the PDN CONNECTIVITY REQUEST message.

...[TS 24.301, clause 5.5.1.2.4]

...

The MME shall assign and include the TAI list the UE is registered to in the ATTACH ACCEPT message. The UE, upon receiving an ATTACH ACCEPT message, shall delete its old TAI list and store the received TAI list.

...

If the ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity and set its TIN to "GUTI". The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

...

The MME may also include a list of equivalent PLMNs in the ATTACH ACCEPT message. Each entry in the list contains a PLMN code (MCC+MNC). The UE shall store the list as provided by the network, after having removed from the list any PLMN code that is already in the list of forbidden PLMNs. In addition, the UE shall add to the stored list the PLMN code of the registered PLMN that sent the list. The UE shall replace the stored list on each receipt of the ATTACH ACCEPT message. If the ATTACH ACCEPT message does not contain a list, then the UE shall delete the stored list.

...

[TS 24.301, clause 5.5.3.2.2, "Normal and periodic tracking area updating procedure initiation"]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

- a) when the UE detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME;

...

[TS 24.301, clause 6.5.1.2, "UE requested PDN connectivity procedure initiation"]

In order to request connectivity to the default PDN, the UE shall not include any APN in the PDN CONNECTIVITY REQUEST message.

...

[TS 24.301, clause 9.9.3.33, "Tracking area identity list"]

...

The Tracking area identity list is a type 4 information element, with a minimum length of 8 octets and a maximum length of 98 octets. The list can contain a maximum of 16 different tracking area identities.

...

The value part of the Tracking area identity list information element consists of one or several partial tracking area identity lists. The length of each partial tracking area identity list can be determined from the 'type of list' field and the 'number of elements' field in the first octet of the partial tracking area identity list.

...

Partial tracking area identity list: Type of list (octet 1) Bits 7 6 0 0 list of TACs belonging to one PLMN, with non-consecutive TAC values 0 1 list of TACs belonging to one PLMN, with consecutive TAC values 1 0 list of TAIs belonging to different PLMNs
--

...

For type of list = "001" and number of elements = k: octet 2 to 4 contain the MCC+MNC, and octet 5 and 6 contain the TAC of the first TAI belonging to the partial list. The TAC values of the other k-1 TAIs are TAC+1, TAC+2, ..., TAC+k-1.
--

...

The MNC shall consist of 2 or 3 digits.

...

[TS 36.304, clause 4.3]

...

suitable cell:

A "suitable cell" is a cell on which the UE may camp on to obtain normal service. Such a cell shall fulfil all the following requirements.

- The cell is part of either:
 - the selected PLMN, or:
 - the registered PLMN, or:
 - a PLMN of the Equivalent PLMN list
 according to the latest information provided by NAS:

...

9.2.1.1.1a.3 Test description

9.2.1.1.1a.3.1 Pre-test conditions

System Simulator:

NOTE: while this test describes the uses of 8 cells, it is intended that this test only requires 2 cells to be active at any one instant.

Table 9.2.1.1.1a-1: Cell TAI values

Cell	MCC	MNC	TAC (hex)	Remark	Freq	List of frequencies in SIB5	Remark
A	001	01	0002	2 digit MNC	f1	f2, f3	HPLMN
I	310	102	0002	3 digit MNC	f3	f1, f2	See Note 1
B	001	01	0001		f1	f2, f3	HPLMN
C	001	01	0027		f1	f2, f3	HPLMN
G	004	07	fff0		f2	f1, f3	See Note 2
H	004	07	fff9		f2	f1, f3	See Note 2
K	316	002	0003	3 digit MNC	f3	f1, f2	See Note 1
E	004	02	0003		f2	f1, f3	See Note 2

Note 1: Cell I and Cell K do not co-exist; the same frequency f3 is used.
Note 2: Cell E and Cells G and H do not co-exist; the same frequency f2 is used.

- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells;
- with the exception of the Physical Cell Identity and the list of frequencies in SIB5, all other parameters for these cells are the same as defined for cell 1 in TS 36.508 [18];
- the power level of cell A is the Serving Cell level defined in table 6.2.2.1-1 of TS 36.508 [18];
- the power levels of cells B to K are set to the Non-suitable Off level defined in table 6.2.2.1-1 of TS 36.508 [18].

Table 9.2.1.1.1a-2: Time instances of cell power level and parameter changes

	Parameter	Unit	Cell A	Cell I	Cell B	Cell C	Cell G	Cell H	Cell K	Cell E
T0	Cell-specific RS EPRE	dBm/15kHz	[-85]	Off	Off	Off	Off	Off	Off	Off
T1	Cell-specific RS EPRE	dBm/15kHz	[-97]	[-85]	Off	Off	Off	Off	Off	Off
T2	Cell-specific RS EPRE	dBm/15kHz	Off	Off	[-85]	Off	Off	Off	Off	Off
T3 (N=3)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	[-97]	[-85]	Off	Off	Off	Off
T3 (N=4)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	[-97]	[-85]	Off	Off	Off
T3 (N=5)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	Off	[-97]	[-85]	Off	Off
T3 (N=6)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	Off	Off	[-97]	[-85]	Off
T3 (N=7)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	Off	Off	Off	[-97]	[-85]
T4	Cell-specific RS EPRE	dBm/15kHz	Off	[-85]	Off	Off	Off	Off	Off	[-97]
T5	Cell-specific RS EPRE	dBm/15kHz	[-85]	Off	Off	Off	Off	Off	Off	[-97]

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.1a.3.2 Test procedure sequence

Table 9.2.1.1.1a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message on cell A including a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST		
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
6	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 7a1 to 7a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7a2	The UE transmits the ESM INFORMATION REQUEST message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	SS responds with ATTACH ACCEPT message including a valid TAI list containing the TAIs of Cell A and Cell I; with PLMN ID of Cell A included in the GUTI; and with the PLMN ID of Cell I included in the Equivalent PLMNs IE. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 9 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
9	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
10	Void	-	-	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	The signal strength of Cell I is raised to that of the Serving Cell and that of Cell A is lowered to that of a Suitable Neighbour Cell as defined in table 6.2.2.1-1 of TS 36.508 [18]. Note: Cell A is still suitable but the UE shall select Cell I				
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
13	Wait 70 seconds for mobile to camp on Cell I				
14	If possible (see ICS) switch off is performed or				

	the USIM is removed. Otherwise the power is removed.				
-	EXCEPTION: Step 15 describes behaviour that depends on the UE capability.				
15	If pc_SwitchOnOff or pc_USIM_Removal then Check: Does the UE send DETACH REQUEST message?	-->	DETACH REQUEST	3	P
16	Cells A and I are set to the Non-suitable "Off" level and Cell B is set to the Serving Cell level.				
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
17	The UE is brought back to operation or the USIM is inserted.				
18	Check: Does the UE send an integrity protected ATTACH REQUEST message (including a PDN CONNECTIVITY REQUEST message) with the last visited TAI correctly indicating the TAI of cell I; the GUTI allocated in step 8 and the KSI _{ASME} allocated in step 3?	-->	ATTACH REQUEST	1, 2	P
18 A	Void	-	-	-	-
18 B	Void	-	-	-	-
-	EXCEPTION: Steps 18a1 to 18a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
18a 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
18a 2	The UE transmits the ESM INFORMATION REQUEST message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
19	The SS sends an ATTACH ACCEPT message allocating 16 TAIs and an aligned set of equivalent PLMNs. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT		
-	EXCEPTION: In parallel to the event described in step 20 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
20	The UE sends ATTACH COMPLETE including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE		
21	Void	-	-		
22	The SS releases the RRC connection.	-	-	-	-
23	The SS waits 5seconds	-	-	-	-
-	EXCEPTION steps 24 to 26 are repeated for N = 3 to N = 7 with cells C,G,H,K,E according to T3 in table 9.2.1.1.1a-2.				
24	Cell power levels are set according to T3 and the value of N.				
25	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message in the next 70 seconds?	-->	TRACKING AREA UPDATE REQUEST	3	F
26	Using the procedure of clause 6.4.2.2 of TS 36.508 [18], Check: Does the UE camp on the strongest			3	P

	cell ?				
27	Cell K is set to the Non-suitable "Off" level. The signal strength of Cell E is lowered to that of a Suitable Neighbour Cell and that of Cell I is raised to the Serving Cell level. Note: the new list of equivalent PLMNs allocated in step 19 means that list of equivalent PLMNs allocated in step 8 should have been deleted. Hence the PLMN of Cell I shall not be selected by a cell reselection process, and the UE shall remain camped on Cell E.				
28	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on cell I in the next 70 seconds?	-->	TRACKING AREA UPDATE REQUEST	5	F
29	Using the procedure of clause 6.4.2.2 of TS 36.508 [18], page the UE on Cells E and I. Check: Does the UE camp on cell E and not on Cell I?			5	P
30	Cell I is set to the Non-suitable "Off" level. The signal strength of Cell A is raised to the Serving Cell level such that the UE shall select Cell A.				
31	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on cell A with the last visited TAI set to the TAI of cell E; the GUTI allocated in step 8 and the KSI _{ASME} allocated in step 3?	-->	TRACKING AREA UPDATE REQUEST	4	P
32	SS responds with TRACKING AREA UPDATE ACCEPT message	<--	TRACKING AREA UPDATE ACCEPT	-	-
33	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.1.1.1a.3.3 Specific message contents

Table 9.2.1.1.1a.3.3-1: Message ATTACH ACCEPT (step 8, Table 9.2.1.1.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list		List of 2 TAIs	
Length of tracking area identity list contents	11	The value in the length field	
Number of elements	00001		
Type of list	010	More than one PLMN	
Partial tracking area identity list	First TAI = TAI of Cell I; Second TAI = TAI of Cell A		
GUTI	MCC=001, MNC=01, MMEGI = 1, MMEC= 1, M-TMSI arbitrarily allocated but compliant to rules of TS 23.003 sub clause 2.8	Includes PLMN ID of cell A	
Equivalent PLMNs	MCC=310, MNC=102	PLMN ID of cell I	

Table 9.2.1.1.1a.3.3-2: Message ATTACH REQUEST (step 18, Table 9.2.1.1.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Sent in SECURITY PROTECTED NAS MESSAGE with valid integrity check			
Old GUTI or IMSI	GUTI allocated in step 8		
NAS key set identifier	KSI allocated in step 3		
Last visited registered TAI	TAI of cell 2		

Table 9.2.1.1.1a.3.3-3: Message ATTACH ACCEPT (step 19, Table 9.2.1.1.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list		Contains 3 separate partial tracking area ID lists	
Length of tracking area identity list contents	32	The decimal value of the value in the length field	
Type of first partial tracking area identity list	010	More than one PLMN	
Number of elements	00010	3 elements	
First TAI	MCC = 004, MNC = 02, TAC = 0003		
Second TAI	MCC = 005, MNC = 002, TAC = 0003		
Third TAI	MCC = 316, MNC = 002, TAC = 0003		
Type of second partial tracking area identity list	001	Consecutive TACs on same PLMN	
Number of consecutive TACS	01001	10 elements	
TAI	MCC = 004 MNC = 07 TAC = fff0	TAI with lowest numbered TAC	
Type of third partial tracking area identity list	000	Individual TACs on same PLMN	
Number of elements	00010	3	
MCC	MCC = 001		
MNC	MNC = 01		
First TAC	TAC = 0001		
Second TAC	TAC = 0005		
Third TAC	TAC = 0027		
GUTI	MCC=001, MNC = 01, MMEGI = 64000, MMEC= 127, M-TMSI arbitrarily allocated but compliant to rules of TS 23.003 sub clause 2.8	Includes PLMN ID of cell B.	
Equivalent PLMNs	MCC=004, MNC=02; MCC=004, MNC=03; MCC=004, MNC=07; MCC=316, MNC=002;	4 equivalent PLMNs	

Table 9.2.1.1.1a.3.3-4: Message TRACKING AREA UPDATE REQUEST (step 37, Table 9.2.1.1.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI allocated in step 19		
NAS key set identifier ASME	Same as allocated in step 3		
Last visited registered TAI	TAI of cell 8		

9.2.1.1.1b Attach Procedure / Success / Last visited TAI, TAI list and equivalent PLMN list handling / Single Frequency operation

9.2.1.1.1b.1 Test Purpose (TP)

Same Test Purpose as in clause 9.2.1.1.1a.1

9.2.1.1.1b.2 Conformance requirements

Same Conformance requirements as in clause 9.2.1.1.1a.2

9.2.1.1.1b.3 Test description

9.2.1.1.1b.3.1 Pre-test conditions

System Simulator:

- Eight intra-frequency cells with the PLMNs identified in the test by the identifiers in Table 9.2.1.1.1b-1.

NOTE: while this test describes the uses of 8 cells, it is intended that this test only requires 2 cells to be active at any one instant.

Table 9.2.1.1.1b-1: Cell TAI values

Cell	MCC	MNC	TAC (hex)	Remark	Freq	Remark
A	001	01	0002	2 digit MNC	f1	HPLMN
L	310	102	0002	3 digit MNC	f1	
B	001	01	0001		f1	HPLMN
C	001	01	0027		f1	HPLMN
G	004	07	fff0		f1	
H	004	07	fff9		f1	
K	316	002	0003	3 digit MNC	f1	
E	004	02	0003		f1	

- System information combination 2 as defined in TS 36.508 [18] clause 4.4.3.1 is used in E-UTRA cells;
- with the exception of the Physical Cell Identity, all other parameters for these cells are the same as defined for cell 1 in TS 36.508 [18];
- the power level of cell A is the Serving Cell level defined in table 6.2.2.1-1 of TS 36.508 [18];
- the power levels of cells B to K are set to the Non-suitable Off level defined in table 6.2.2.1-1 of TS 36.508 [18].

Table 9.2.1.1.1b-2: Time instances of cell power level and parameter changes

	Parameter	Unit	Cell A	Cell L	Cell B	Cell C	Cell G	Cell H	Cell K	Cell E
T0	Cell-specific RS EPRE	dBm/15kHz	-85	Off	Off	Off	Off	Off	Off	Off
T1	Cell-specific RS EPRE	dBm/15kHz	-91	-85	Off	Off	Off	Off	Off	Off
T2	Cell-specific RS EPRE	dBm/15kHz	Off	Off	-85	Off	Off	Off	Off	Off
T3 (N=3)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	-91	-85	Off	Off	Off	Off
T3 (N=4)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	-91	-85	Off	Off	Off
T3 (N=5)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	Off	-91	-85	Off	Off
T3 (N=6)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	Off	Off	-91	-85	Off
T3 (N=7)	Cell-specific RS EPRE	dBm/15kHz	Off	Off	Off	Off	Off	Off	-91	-85
T4	Cell-specific RS EPRE	dBm/15kHz	Off	-85	Off	Off	Off	Off	Off	-91
T5	Cell-specific RS EPRE	dBm/15kHz	-85	Off	Off	Off	Off	Off	Off	-91

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.1b.3.2 Test procedure sequence

Same Test procedure sequence as in clause 9.2.1.1.1a.3.2. Cell I shall be replaced by Cell L.

9.2.1.1.1b.3.3 Specific message contents

Same Specific message contents as in clause 9.2.1.1.1a.3.3. Cell I shall be replaced by Cell L.

9.2.1.1.2 Attach Procedure / Success / With IMSI / GUTI reallocation

9.2.1.1.2.1 Test Purpose (TP)

(1)

```
with { UE in EMM-DEREGISTERED state }
ensure that {
  when { there is no valid GUTI available in UE }
  then { UE sends ATTACH REQUEST message, containing IMSI as the EPS mobile identity }
}
```

(2)

```
with { UE having received reallocated GUTI in the ATTACH ACCEPT message }
ensure that {
  when { UE detaches from the EPS services }
  then { UE sends DETACH REQUEST message, containing GUTI as the EPS mobile identity }
}
```

9.2.1.1.2.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411.

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

[TS 24.301, clause 5.5.1.2.4]

If the attach request is accepted by the network, the MME shall send an ATTACH ACCEPT message to the UE and start timer T3450. The MME shall send the ATTACH ACCEPT message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message contained in the ESM message container information element to activate the default bearer (see subclause 6.4.1). The network may also initiate the activation of dedicated bearers towards the UE by invoking the dedicated EPS bearer context activation procedure (see subclause 6.4.2).

...

The MME shall assign and include the TAI list the UE is registered to in the ATTACH ACCEPT message. The UE, upon receiving an ATTACH ACCEPT message, shall delete its old TAI list and store the received TAI list.

Upon receiving the ATTACH ACCEPT message, the UE shall stop timer T3410.

The GUTI reallocation may be part of the attach procedure. When the ATTACH REQUEST message includes the IMSI, the MME considers the GUTI provided by the UE is invalid, or the GUTI provided by the UE was assigned by another MME, the MME shall allocate a new GUTI to the UE. The MME shall include in the ATTACH ACCEPT message the new assigned GUTI together with the assigned TAI list. In this case the MME shall enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1.

For a shared network, the TAIs included in the TAI list can contain different PLMN identities. The MME indicates the selected core network operator PLMN identity to the UE in the GUTI (see 3GPP TS 23.251). If the ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity. The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

If A/Gb mode or Iu mode is supported in the UE, the UE shall set its TIN to "GUTI" when receiving the ATTACH ACCEPT message.

9.2.1.1.2.3 Test description

9.2.1.1.2.3.1 Pre-test conditions

System Simulator:

- cell A (HPLMN).

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (State 2) according to TS 36.508 [18].

9.2.1.1.2.3.2 Test procedure sequence

Table 9.2.1.1.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits Paging on cell A with IMSI. Upon reception of paging with IMSI the UE shall locally deactivate any EPS bearer context(s), locally detach from EPS and delete the GUTI-1. After local detach the UE shall perform an EPS attach procedure.	-	-	-	-
	EXCEPTION: Steps 1a describes a behaviour which depends on the UE capability	-	-	-	-
1a	IF NOT pc_Automatic_EPS_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
2	Check: Does the UE transmit an ATTACH REQUEST message including IMSI in the EPS mobile identity IE including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
6	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	SS responds with ATTACH ACCEPT message with a new GUTI-2 included in the EPS mobile identity IE. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
8	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
9	Cause UE to detach from the EPS services	-	-	-	-
10	Check: Does the UE transmit a DETACH REQUEST message including GUTI-2 in the EPS mobile identity IE?	-->	DETACH REQUEST	2	P
11	SS responds with DETACH ACCEPT message	<--	DETACH ACCEPT	-	-
12	The SS releases the RRC connection.	-	-	-	-

9.2.1.1.2.3.3 Specific message contents

Table 9.2.1.1.2.3.3-1: ATTACH REQUEST (step 2, Table 9.2.1.1.2.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	IMSI		
Last visited registered TAI	Not present		

Table 9.2.1.1.2.3.3-2: DETACH REQUEST (step 10, Table 9.2.1.1.2.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
GUTI or IMSI	GUTI-2		

9.2.1.1.2a Attach Procedure / AttachWithIMSI configured / Selected PLMN is neither the registered PLMN nor in the list of equivalent PLMNs / Success

9.2.1.1.2a.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode and configured for "AttachWithIMSI" }
ensure that {
  when { UE enters a tracking area in a new PLMN that is neither the registered PLMN nor in the list
of equivalent PLMNs }
  then { UE sends ATTACH REQUEST message, containing IMSI as the EPS mobile identity }
}
```

9.2.1.1.2a.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.2.2, and, TS 24.368 clauses 4 and 5.4.

[TS 24.301, clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

- a) when the UE detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME, unless the UE is configured for "AttachWithIMSI" as specified in 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17] and is entering a tracking area in a new PLMN that is neither the registered PLMN nor in the list of equivalent PLMNs;

[TS 24.368, clause 4]

The NAS configuration MO is used to manage configuration parameters related to NAS functionality for a UE supporting provisioning of such information. The presence and format of the non access stratum configuration file on the USIM is specified in 3GPP TS 31.102 [6].

...

The following nodes and leaf objects are possible in the NAS configuration MO as described in figure 4-1:

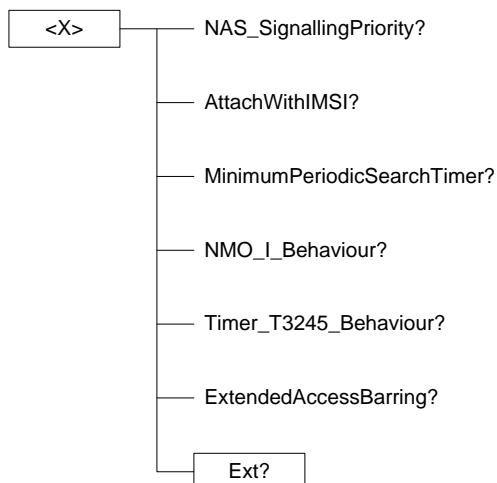


Figure 4-1: The NAS configuration Management Object

[TS 24.368, clause 5.4]

The AttachWithIMSI leaf indicates whether attach with IMSI is performed when moving to a non-equivalent PLMN as specified in 3GPP TS 24.008 [4] and 3GPP TS 24.301 [5].

- Occurrence: ZeroOrOne
- Format: bool
- Access Types: Get, Replace
- Values: 0, 1
 - 0 Indicates that normal behaviour is applied.
 - 1 Indicates that attach with IMSI is performed when moving to a non-equivalent PLMN.

The default value 0 applies if this leaf is not provisioned.

9.2.1.1.2a.3 Test description

9.2.1.1.2a.3.1 Pre-test conditions

System Simulator:

- cell A (HPLMN), cell B a different PLMN.

UE:

- The UE (USIM) is configured to do "AttachWithIMSI"
- The UE is configured to initiate EPS attach.

Preamble:

- The UE is in state Registered, Idle Mode (State 2) according to TS 36.508 [18] on cell A. During the registration a list with 2 equivalent PLMNs is provided however the PLMN of cell B is not among them.

9.2.1.1.2a.3.2 Test procedure sequence

Table 9.2.1.1.2a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell B as the "Serving cell". - Cell A as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	Check: Does the UE transmit an ATTACH REQUEST message including IMSI as the EPS mobile identity? The UE includes a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	1	P
3-14	Steps 5-16 from the UE Registration (State 2) procedure described in TS 36.508 [18], Table 4.5.2.3-1 take place.	-	-	-	-
15	The SS releases the RRC connection.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508 [18].	-	-	-	-

9.2.1.1.2a.3.3 Specific message contents

Table 9.2.1.1.2a.3.3-1: ATTACH REQUEST (step 2, Table 9.2.1.1.2a.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	IMSI		

9.2.1.1.3 Attach Procedure / Success / Request for obtaining the IPv6 address of the home agent

9.2.1.1.3.1 Test Purpose (TP)

(1)

```
with { UE is configured to request the IPv6 address of the Home Agent during Attach procedure }
ensure that {
  when { UE is switched on and has established the RRC connection }
  then { UE transmits an ATTACH REQUEST message and a PDN CONNECTIVITY REQUEST message indicating
a request for DSMIPv6 Home Agent Address in the protocol configuration options }
}
```

(2)

```
with { UE having transmitted an ATTACH REQUEST message and a PDN CONNECTIVITY REQUEST message
indicating a request for DSMIPv6 Home Agent Address in the protocol configuration options }
ensure that {
  when { the SS responds to the ATTACH REQUEST with an IPv6 Home Agent address }
  then { the UE transmits an ATTACH COMPLETE message }
}
```

9.2.1.1.3.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.1.1 and 6.5.1.2, and TS 24.008, clause 10.5.6.3.

[24.301 clause 5.5.1.1]

During the attach procedure, the UE may also obtain the home agent IPv4 and IPv6 addresses.

[24.301 clause 6.5.1.2]

If the UE supports DSMIPv6, the UE may include a request for obtaining the IPv6 address and optionally the IPv4 address of the home agent in the Protocol configuration options IE in the PDN CONNECTIVITY REQUEST message. The UE may also include a request for obtaining the IPv6 Home Network Prefix. The UE shall request the IPv6 Home Network Prefix only if the UE has requested the home agent IPv6 address. The requested home agent address(es) and the Home Network Prefix are related to the APN the UE requested connectivity for.

[24.008 clause 10.5.6.3]

Table 10.5.154/3GPP TS 24.008: *Protocol configuration options* information element

<p>Additional parameters list (octets w+1 to z)</p> <p>The <i>additional parameters list</i> is included when special parameters and/or requests (associated with a PDP context) need to be transferred between the MS and the network. These parameters and/or requests are not related to a specific configuration protocol (e.g. PPP), and therefore are not encoded as the "Packets" contained in the <i>configuration protocol options list</i>.</p> <p>The <i>additional parameters list</i> contains a list of special parameters, each one in a separate container. The type of the parameter carried in a container is identified by a specific <i>container identifier</i>. In this version of the protocol, the following container identifiers are specified:</p> <p>MS to network direction:</p> <ul style="list-style-type: none"> - 0001H (P-CSCF Address Request); - 0002H (IM CN Subsystem Signalling Flag); - 0003H (DNS Server Address Request); - 0004H (Not Supported); - 0005H (MS Support of Network Requested Bearer Control indicator); - 0006H (Reserved); - 0007H (DSMIPv6 Home Agent Address Request); - 0008H (DSMIPv6 Home Network Prefix Request); - 0009H (DSMIPv6 IPv4 Home Agent Address Request); - 000AH (IP address allocation via NAS signalling); and - 000BH (IPv4 address allocation via DHCPv4). <p>Network to MS direction:</p> <ul style="list-style-type: none"> - 0001H (P-CSCF Address); - 0002H (IM CN Subsystem Signalling Flag); - 0003H (DNS Server Address); - 0004H (Policy Control rejection code); - 0005H (Selected Bearer Control Mode); - 0006H (Reserved); - 0007H (DSMIPv6 Home Agent Address) ; - 0008H (DSMIPv6 Home Network Prefix); and - 0009H (DSMIPv6 IPv4 Home Agent Address). <p>If the <i>additional parameters list</i> contains a container identifier that is not supported by the receiving entity the corresponding unit shall be discarded.</p> <p>The <i>container identifier</i> field is encoded as the <i>protocol identifier</i> field and the <i>length of container identifier contents</i> field is encoded as the <i>length of the protocol identifier contents</i> field.</p> <p>When the <i>container identifier</i> indicates P-CSCF Address Request or DNS Server Address Request, the <i>container identifier contents</i> field is empty and the <i>length of container identifier contents</i> indicates a length equal to zero. If the <i>container identifier contents</i> field is not empty, it shall be ignored.</p> <p>When the <i>container identifier</i> indicates IM CN Subsystem Signalling Flag (see 3GPP</p>
--

TS 24.229 [95]), the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored. In Network to MS direction this information may be used by the MS to indicate to the user whether the requested dedicated signalling PDP context was successfully established.

When the *container identifier* indicates P-CSCF Address, the *container identifier contents* field contains one IPv6 address corresponding to a P-CSCF address (see 3GPP TS 24.229 [95]). This IPv6 address is encoded as a 128-bit address according to RFC 3513 [99]. When there is need to include more than one P-CSCF address, then more logical units with *container identifier* indicating P-CSCF Address are used.

When the *container identifier* indicates DNS Server Address, the *container identifier contents* field contains one IPv6 DNS server address (see 3GPP TS 27.060 [36a]). This IPv6 address is encoded as a 128-bit address according to RFC 3513 [99]. When there is need to include more than one DNS server address, then more logical units with *container identifier* indicating DNS Server Address are used.

When the *container identifier* indicates Policy Control rejection code, the *container identifier contents* field contains a Go interface related cause code from the GGSN to the UE (see 3GPP TS 29.207 [100]). The *length of container identifier contents* indicates a length equal to one. If the *container identifier contents* field is empty or its actual length is greater than one octet, then it shall be ignored by the receiver.

When the *container identifier* indicates MS Support of Network Requested Bearer Control indicator, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates Selected Bearer Control Mode, the *container identifier contents* field contains the selected bearer control mode, where '01H' indicates that 'MS only' mode has been selected and '02H' indicates that 'MS/NW' mode has been selected. The *length of container identifier contents* indicates a length equal to one. If the *container identifier contents* field is empty or its actual length is greater than one octet, then it shall be ignored by the receiver.

When the *container identifier* indicates DSMIPv6 Home Agent Address Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates DSMIPv6 Home Network Prefix Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates DSMIPv6 IPv4 Home Agent Address Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates DSMIPv6 Home Agent Address, the *container identifier contents* field contains one IPv6 address corresponding to a DSMIPv6 HA address (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]). This IPv6 address is encoded as a 128-bit address according to IETF RFC 3513 [99].

When the *container identifier* indicates DSMIPv6 Home Network Prefix, the *container identifier contents* field contains one IPv6 Home Network Prefix (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]). This IPv6 prefix is encoded as an IPv6 address according to RFC 3513 [99] followed by 8 bits which specifies the prefix length.

When the *container identifier* indicates DSMIPv6 IPv4 Home Agent Address, the *container identifier contents* field contains one IPv4 address corresponding to a DSMIPv6 IPv4 Home Agent address (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]).

When the *container identifier* indicates IP address allocation via NAS signalling, the

container identifier contents field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates IP address allocation DHCPv4, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

NOTE 1: The *additional parameters list* and the *configuration protocol options list* are logically separated since they carry different type of information. The beginning of the *additional parameters list* is marked by a logical unit, which has an identifier (i.e. the first two octets) equal to a *container identifier* (i.e. it is not a *protocol identifier*).

9.2.1.1.3.3 Test description

9.2.1.1.3.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to [18];

NOTE: Any type of attach is acceptable.

- the UE is configured to request the IPv6 address of the Home Agent in the protocol configuration options IE as part of the Attach / PDN connectivity request procedure.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.3.3.2 Test procedure sequence

Table 9.2.1.1.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message with IE PROTOCOL CONFIGURATION OPTIONS indicating a DSMIPv6 Home Agent Address Request?	-->	ATTACH REQUEST	1	P
3-11	Steps 5 to 13 of the generic test procedure in TS 36.508 Table 4.5.2.3-1 (Attach procedure) are performed on Cell A .	-	-	-	-
12	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message, including the IE PROTOCOL CONFIGURATION OPTIONS indicating a DSMIPv6 Home Agent Address.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 13 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
13	Check: Does the UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?	-->	ATTACH COMPLETE	2	P
14	The SS releases the RRC connection.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.3.3.3 Specific message contents

Table 9.2.1.1.3.3.3-1: Message ATTACH REQUEST (step 2, Table 9.2.1.1.3.3.2-1)

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
ESM message container	PDN CONNECTIVITY REQUEST message as specified in table 9.2.1.1.3.3.3-2.		

Table 9.2.1.1.3.3.3-2: PDN CONNECTIVITY REQUEST (Table 9.2.1.1.3.3.3-1)

Derivation path: TS 36.508 table 4.7.3-20			
Information Element	Value/Remark	Comment	Condition
Protocol configuration options	The IE Protocol configuration options contains a configuration protocol option = '0007H' ("DSMIPv6 Home Agent Address Request", length of contents = 0).		

Table 9.2.1.1.3.3-3: Message ATTACH ACCEPT (step 12, Table 9.2.1.1.3.3-2-1)

Derivation path: TS 36.508 table 4.7.3-1			
Information Element	Value/Remark	Comment	Condition
ESM message container	Contains the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message specified in table 9.2.1.1.3.3-4.		

Table 9.2.1.1.3.3-4: Message ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST (Table 9.2.1.1.3.3-3)

Derivation path: TS 36.508 table 4.7.3-6			
Information Element	Value/Remark	Comment	Condition
Protocol configuration options	The IE Protocol configuration options contains a configuration protocol option = '0007H' ("DSMIPv6 Home Agent Address", non-zero length), with the value set to the IPv6 address of the Home Agent.		

9.2.1.1.4 Attach Procedure / Success / Request for obtaining the IPv4 address of the home agent

9.2.1.1.4.1 Test Purpose (TP)

(1)

```
with { UE is configured to request the DSMIPv6 IPv4 Home Agent Address }
ensure that {
  when { UE is switched on and has established the RRC connection }
  then { UE transmits an ATTACH REQUEST and a PDN CONNECTIVITY REQUEST message indicating a request for DSMIPv6 IPv4 Home Agent Address in the protocol configuration options }
}
```

(2)

```
with { UE having transmitted an ATTACH REQUEST and a PDN CONNECTIVITY REQUEST message indicating a request for DSMIPv6 IPv4 Home Agent Address in the protocol configuration options }
ensure that {
  when { SS responds to the ATTACH REQUEST with a DSMIPv6 IPv4 Home Agent Address }
  then { UE transmits an ATTACH COMPLETE message }
}
```

9.2.1.1.4.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.5.1.1, and 6.5.1.2, and TS 24.008, clause 10.5.6.3.

[24.301 clause 5.5.1.1]

During the attach procedure, the UE may also obtain the home agent IPv4 and IPv6 addresses.

[24.301 clause 6.5.1.2]

If the UE supports DSMIPv6, the UE may include a request for obtaining the IPv6 address and optionally the IPv4 address of the home agent in the Protocol configuration options IE in the PDN CONNECTIVITY REQUEST message. The UE may also include a request for obtaining the IPv6 Home Network Prefix. The UE shall request the IPv6 Home Network Prefix only if the UE has requested the home agent IPv6 address. The requested home agent address(es) and the Home Network Prefix are related to the APN the UE requested connectivity for.

[24.008 clause 10.5.6.3]

Table 10.5.154/3GPP TS 24.008: *Protocol configuration options* information element

<p>Additional parameters list (octets w+1 to z)</p> <p>The <i>additional parameters list</i> is included when special parameters and/or requests (associated with a PDP context) need to be transferred between the MS and the network. These parameters and/or requests are not related to a specific configuration protocol (e.g. PPP), and therefore are not encoded as the "Packets" contained in the <i>configuration protocol options list</i>.</p> <p>The <i>additional parameters list</i> contains a list of special parameters, each one in a separate container. The type of the parameter carried in a container is identified by a specific <i>container identifier</i>. In this version of the protocol, the following container identifiers are specified:</p> <p>MS to network direction:</p> <ul style="list-style-type: none"> - 0001H (P-CSCF Address Request); - 0002H (IM CN Subsystem Signalling Flag); - 0003H (DNS Server Address Request); - 0004H (Not Supported); - 0005H (MS Support of Network Requested Bearer Control indicator); - 0006H (Reserved); - 0007H (DSMIPv6 Home Agent Address Request; - 0008H (DSMIPv6 Home Network Prefix Request); - 0009H (DSMIPv6 IPv4 Home Agent Address Request); - 000AH (IP address allocation via NAS signalling); and - 000BH (IPv4 address allocation via DHCPv4). <p>Network to MS direction:</p> <ul style="list-style-type: none"> - 0001H (P-CSCF Address); - 0002H (IM CN Subsystem Signalling Flag); - 0003H (DNS Server Address); - 0004H (Policy Control rejection code); - 0005H (Selected Bearer Control Mode; - 0006H (Reserved); - 0007H (DSMIPv6 Home Agent Address) ; - 0008H (DSMIPv6 Home Network Prefix); and - 0009H (DSMIPv6 IPv4 Home Agent Address). <p>If the <i>additional parameters list</i> contains a container identifier that is not supported by the receiving entity the corresponding unit shall be discarded.</p> <p>The <i>container identifier</i> field is encoded as the <i>protocol identifier</i> field and the <i>length of container identifier contents</i> field is encoded as the <i>length of the protocol identifier contents</i> field.</p> <p>When the <i>container identifier</i> indicates P-CSCF Address Request or DNS Server Address Request, the <i>container identifier contents</i> field is empty and the <i>length of container identifier contents</i> indicates a length equal to zero. If the <i>container identifier contents</i> field is not empty, it shall be ignored.</p> <p>When the <i>container identifier</i> indicates IM CN Subsystem Signalling Flag (see 3GPP</p>
--

TS 24.229 [95]), the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored. In Network to MS direction this information may be used by the MS to indicate to the user whether the requested dedicated signalling PDP context was successfully established.

When the *container identifier* indicates P-CSCF Address, the *container identifier contents* field contains one IPv6 address corresponding to a P-CSCF address (see 3GPP TS 24.229 [95]). This IPv6 address is encoded as a 128-bit address according to RFC 3513 [99]. When there is need to include more than one P-CSCF address, then more logical units with *container identifier* indicating P-CSCF Address are used.

When the *container identifier* indicates DNS Server Address, the *container identifier contents* field contains one IPv6 DNS server address (see 3GPP TS 27.060 [36a]). This IPv6 address is encoded as a 128-bit address according to RFC 3513 [99]. When there is need to include more than one DNS server address, then more logical units with *container identifier* indicating DNS Server Address are used.

When the *container identifier* indicates Policy Control rejection code, the *container identifier contents* field contains a Go interface related cause code from the GGSN to the UE (see 3GPP TS 29.207 [100]). The *length of container identifier contents* indicates a length equal to one. If the *container identifier contents* field is empty or its actual length is greater than one octet, then it shall be ignored by the receiver.

When the *container identifier* indicates MS Support of Network Requested Bearer Control indicator, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates Selected Bearer Control Mode, the *container identifier contents* field contains the selected bearer control mode, where '01H' indicates that 'MS only' mode has been selected and '02H' indicates that 'MS/NW' mode has been selected. The *length of container identifier contents* indicates a length equal to one. If the *container identifier contents* field is empty or its actual length is greater than one octet, then it shall be ignored by the receiver.

When the *container identifier* indicates DSMIPv6 Home Agent Address Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates DSMIPv6 Home Network Prefix Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates DSMIPv6 IPv4 Home Agent Address Request, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates DSMIPv6 Home Agent Address, the *container identifier contents* field contains one IPv6 address corresponding to a DSMIPv6 HA address (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]). This IPv6 address is encoded as a 128-bit address according to IETF RFC 3513 [99].

When the *container identifier* indicates DSMIPv6 Home Network Prefix, the *container identifier contents* field contains one IPv6 Home Network Prefix (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]). This IPv6 prefix is encoded as an IPv6 address according to RFC 3513 [99] followed by 8 bits which specifies the prefix length.

When the *container identifier* indicates DSMIPv6 IPv4 Home Agent Address, the *container identifier contents* field contains one IPv4 address corresponding to a DSMIPv6 IPv4 Home Agent address (see 3GPP TS 24.303 [124] and 3GPP TS 24.327 [125]).

When the *container identifier* indicates IP address allocation via NAS signalling, the

container identifier contents field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

When the *container identifier* indicates IP address allocation DHCPv4, the *container identifier contents* field is empty and the *length of container identifier contents* indicates a length equal to zero. If the *container identifier contents* field is not empty, it shall be ignored.

NOTE 1: The *additional parameters list* and the *configuration protocol options list* are logically separated since they carry different type of information. The beginning of the *additional parameters list* is marked by a logical unit, which has an identifier (i.e. the first two octets) equal to a *container identifier* (i.e. it is not a *protocol identifier*).

9.2.1.1.4.3 Test description

9.2.1.1.4.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];

NOTE: Any type of attach is acceptable.

- the UE is configured to request the DSMIPv6 IPv4 Home Agent Address in the protocol configuration options IE as part of the Attach / PDN connectivity request procedure.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.4.3.2 Test procedure sequence

Table 9.2.1.1.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	Void	-	-	-	-
3	Void	-	-	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message with IE PROTOCOL CONFIGURATION OPTIONS indicating a DSMIPv6 IPv4 Home Agent Address Request?	-->	ATTACH REQUEST	1	P
5-13	Steps 5 to 13 of the generic test procedure in TS 36.508 Table 4.5.2.3-1 (Attach procedure) are performed on Cell A.	-	-	-	-
14	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message, including the IE PROTOCOL CONFIGURATION OPTIONS indicating a DSMIPv6 IPv4 Home Agent Address	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 11 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
15	Check: Does the UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?	-->	ATTACH COMPLETE	2	P
16	The SS releases the RRC connection.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.4.3.3 Specific message contents

Table 9.2.1.1.4.3.3-1: Void**Table 9.2.1.1.4.3.3-2: Message ATTACH REQUEST (step 4, Table 9.2.1.1.4.3.2-1)**

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
ESM message container	PDN CONNECTIVITY REQUEST message as specified in table 9.2.1.1.4.3.3-3.		

Table 9.2.1.1.4.3.3-3: PDN CONNECTIVITY REQUEST (Table 9.2.1.1.4.3.3-2)

Derivation path: TS 36.508 table 4.7.3-20			
Information Element	Value/Remark	Comment	Condition
Protocol configuration options	The IE Protocol configuration options contains a configuration protocol option = '0009H' ("DSMIPv6 IPv4 Home Agent Address Request", length of contents = 0).		

Table 9.2.1.1.4.3.3-4: Message ATTACH ACCEPT (step 11, Table 9.2.1.1.4.3.2-1)

Derivation path: TS 36.508 table 4.7.3-1			
Information Element	Value/Remark	Comment	Condition
ESM message container	Contains the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message specified in table 9.2.1.1.4.3.3-5.		

Table 9.2.1.1.4.3.3-5: Message ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST (Table 9.2.1.1.4.3.3-4)

Derivation path: TS 36.508 table 4.7.3-6			
Information Element	Value/Remark	Comment	Condition
Protocol configuration options	The IE Protocol configuration options contains a configuration protocol option = '0009H' ("DSMIPv6 IPv4 Home Agent Address", non-zero length), with the value set to the IPv4 address of the Home Agent.		

9.2.1.1.5 Void

9.2.1.1.6 Void

9.2.1.1.7 Attach Procedure / Success / List of equivalent PLMNs in the ATTACH ACCEPT message

9.2.1.1.7.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED-INITIATED state }
ensure that {
  when { the UE receives ATTACH ACCEPT message including a list of equivalent PLMNs }
  then { the UE stores correctly the list and does not consider forbidden PLMNs as equivalent PLMNs }
}
```

(2)

```
with { UE in EMM-REGISTERED-INITIATED state }
ensure that {
  when { the UE receives ATTACH ACCEPT message without a list of equivalent PLMNs }
  then { the UE deletes the stored list and applies a normal PLMN selection process }
}
```

9.2.1.1.7.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.4.

[TS 24.301, clause 5.5.1.2.4]

The MME may also include a list of equivalent PLMNs in the ATTACH ACCEPT message. Each entry in the list contains a PLMN code (MCC+MNC). The UE shall store the list as provided by the network, after having removed from the list any PLMN code that is already in the list of forbidden PLMNs. In addition, the UE shall add to the stored list the PLMN code of the registered PLMN that sent the list. The UE shall replace the stored list on each receipt of the ATTACH ACCEPT message. If the ATTACH ACCEPT message does not contain a list, then the UE shall delete the stored list.

9.2.1.1.7.3 Test description

9.2.1.1.7.3.1 Pre-test conditions

System Simulator:

- Cell A (PLMN1, HPLMN), cell G (PLMN2, visited PLMN), cell I (PLMN3, another visited PLMN) and cell J (PLMN4, another visited PLMN, different than cell I and switched OFF) are configured according to table 6.3.2.2-1 in TS 36.508 [18];
- at most 3 cells are active simultaneously.
- system information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cell A

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE last attempted to register on cell I and received reject cause "forbidden PLMN".

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.7.3.2 Test procedure sequence

Table: 9.2.1.1.7.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell G as a "Non-Suitable cell". - Cell I as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
5	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
6	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
7	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 7Aa1 to 7Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	SS responds with ATTACH ACCEPT message including PLMN2, PLMN3 and PLMN4 in the list of equivalent PLMNs. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
9	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE		
10	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.			-	-
-	EXCEPTION: Step 10a1 describes behaviour that depends on the UE capability.				
10a	If pc_SwitchOnOff or pc_USIM_Removal then UE sends DETACH REQUEST message	-->	DETACH REQUEST		
11	The SS configures: - Cell A as the "Non-Suitable cell". - Cell G as a "Suitable cell". - Cell I as a "Serving cell". Note: Cell I belongs to the forbidden PLMN.	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
12	The UE is brought back to operation or the USIM is inserted.	-	-	-	-

-	EXCEPTION: The behaviour in table 9.2.1.1.7.3.2-2 occurs in parallel with step 13.				
13	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
13 A	Void	-	-	-	-
13 B	Void	-	-	-	-
-	EXCEPTION: Steps 13Aa1 to 13Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
13 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
13 A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
-	EXCEPTION: In parallel to the event described in step 14 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
14	The SS transmits an ATTACH ACCEPT message without the Equivalent PLMNs list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
15	The UE transmits an ATTACH COMPLETE message on Cell G (PLMN2) including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
15 AA	The SS releases the RRC connection.	-	-	-	-
15 A	The SS configures: - Cell A as a "Suitable cell". - Cell G as a "Non-Suitable cell". - Cell I as a "Non-suitable "Off" cell". - Cell J as a "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.1.1.7.3.2-3 occurs in parallel with step 15B.				
15 B	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
15 C	SS responds with TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
15 D	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE		
16-34	Void	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

Table 9.2.1.1.7.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does the UE transmit an ATTACH REQUEST message on Cell I (PLMN3) ?	-->	ATTACH REQUEST	1	F

Table 9.2.1.1.7.3.2-3: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on Cell J (PLMN4)?	-->	TRACKING AREA UPDATE REQUEST	2	F

9.2.1.1.7.3.3 Specific message contents

Table 9.2.1.1.7.3.3-1: SystemInformationBlockType5 for Cell A

Derivation path: 36.508 Table 4.4.3.3-4			
Information Element	Value/Remark	Comment	Condition
SystemInformationBlockType5 ::= SEQUENCE {			
interFreqCarrierFreqList SEQUENCE (SIZE (1..maxFreq)) OF SEQUENCE {	3 entries		
dl-CarrierFreq[1]	Same downlink EARFCN as used for Cell G		
dl-CarrierFreq[2]	Same downlink EARFCN as used for Cell I		
dl-CarrierFreq[2]	Same downlink EARFCN as used for Cell J		
}			
}			

Table 9.2.1.1.7.3.3-2: Message ATTACH ACCEPT (step 8, Table 9.2.1.1.7.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
Equivalent PLMNs	-	Includes MCC and MNC digits for PLMN2, PLMN3 and PLMN4.	

Table 9.2.1.1.7.3.3-3: Message ATTACH ACCEPT (step 14, Table 9.2.1.1.7.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
Equivalent PLMNs	Not present		

9.2.1.1.7a Attach Procedure / Success / List of equivalent PLMNs in the ATTACH ACCEPT message / Single Frequency operation

9.2.1.1.7a.1 Test Purpose (TP)

Same Test Purpose as in clause 9.2.1.1.7.1

9.2.1.1.7a.2 Conformance requirements

Same Conformance requirements as in clause 9.2.1.1.7.2

9.2.1.1.7a.3 Test description

9.2.1.1.7a.3.1 Pre-test conditions

System Simulator:

- Cell A (PLMN1, HPLMN), cell B (PLMN2, visited PLMN), and cell C (PLMN3, another visited PLMN)
- The cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508 [18], and are configured on same frequency f1;
- system information combination 2 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cell A

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE last attempted to register on cell C and received reject cause "forbidden PLMN".

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.7a.3.2 Test procedure sequence

Table: 9.2.1.1.7a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Non-Suitable cell". - Cell C as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
5	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
6	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
7	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 7Aa1 to 7Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	SS responds with ATTACH ACCEPT message including PLMN2, PLMN3 and PLMN4 in the list of equivalent PLMNs. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
9	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE		
10	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.			-	-
-	EXCEPTION: Step 10a1 describes behaviour that depends on the UE capability.				
10a	If pc_SwitchOnOff or pc_USIM_Removal then UE sends DETACH REQUEST message	-->	DETACH REQUEST		
11	The SS configures: - Cell A as the "Non-Suitable cell". - Cell B as a " Non-Suitable cell ". - Cell C as a "Serving cell". Note: Cell C belongs to the forbidden PLMN.	-	-	-	-
12	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
12a	Check: Does the UE transmit an ATTACH REQUEST message in the next 60 seconds on Cell C	-	-	1	F

12b	The SS configures: - Cell A as the "Non-Suitable cell". - Cell B as a "Serving cell". - Cell C as a "Non-Suitable cell".				
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
13	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
-	EXCEPTION: Steps 13Aa1 to 13Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
13 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
13 A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
-	EXCEPTION: In parallel to the event described in step 14 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
14	The SS transmits an ATTACH ACCEPT message without the Equivalent PLMNs list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
15	The UE transmits an ATTACH COMPLETE message on Cell B (PLMN2) including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
15 AA	The SS releases the RRC connection.	-	-	-	-
15 A	The SS configures: - Cell A as a "Serving cell". - Cell B as a "Non-Suitable cell". - Cell C as a "Non-suitable "Off" cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
15 B	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
15 C	SS responds with TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
15 D	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE		
16- 34	Void	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.1.1.7a.3.3 Specific message contents

Table 9.2.1.1.7a.3.3-1: Message ATTACH ACCEPT (step 8, Table 9.2.1.1.7a.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
Equivalent PLMNs	-	Includes MCC and MNC digits for PLMN2, PLMN3 and PLMN4.	

Table 9.2.1.1.7a.3.3-2: Message ATTACH ACCEPT (step 14, Table 9.2.1.1.7a.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
Equivalent PLMNs	Not present		

9.2.1.1.8 Void

9.2.1.1.9 Attach / Rejected / IMSI invalid

9.2.1.1.9.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "Illegal UE" }
  then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state
EMM-DEREGISTERED }
}
```

(2)

```
with { UE receives an ATTACH REJECT message with the reject cause set to "Illegal UE" }
ensure that {
  when { the UE has been switched off, then switched on }
  then { the UE sends an ATTACH REQUEST message with IMSI, including a PDN CONNECTIVITY REQUEST
message }
}
```

9.2.1.1.9.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.5]

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the reject cause value received.

#3 (Illegal UE); or

...

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall consider the USIM as invalid for EPS services and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and enter state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the normal attach procedure is rejected with the GMM cause with the same value.

NOTE: The possibility to configure a UE so that the radio transceiver for a specific RAT is not active, although it is implemented in the UE, is out of scope of the present specification.

...

9.2.1.1.9.3 Test description

9.2.1.1.9.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and If (px_SinglePLMN_Tested = Multi PLMN) cell G:
 - Cell A and Cell B (home PLMN, different TAs),
 - If (px_SinglePLMN_Tested = Multi PLMN), Cell G (another PLMN);
- the different cells may not be simultaneously activated (at most 2 cells are active simultaneously).

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.9.3.2 Test procedure sequence

Table 9.2.1.1.9.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - cell A as the "Serving cell". - cell B as a "Non-Suitable cell". - If present, Cell G as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on cell A.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "Illegal UE" as specified.	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds? Note: Cell B belongs to the same PLMN where the UE was rejected but a different TA	-->	ATTACH REQUEST	1	F
8	The operator initiates an attach by MMI or by AT command.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
10	Void	-	-	-	-
11	Check: Does the test result of CALL generic procedure (TS 36.508 subclause 6.4.2.5) indicate that the UE ignores paging on cell B for PS domain with S-TMSI included in GUTI-1?	-	-	1	-
-	EXCEPTION: Steps 12a1 to 12a4 describe behaviour that depends on the network capability / preference; the "lower case letter" identifies a step sequence that takes place if the network is capable or prefers.	-	-	-	-
12a1	IF (px_SinglePLMN_Tested = Multi PLMN) The SS configures: - Cell A as a "Non-Suitable Off cell". - Cell B as a "Non-Suitable cell". - Cell G as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
12a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds? Note: Cell G belongs to a PLMN which is not the same like the one on which the UE was rejected.	-->	ATTACH REQUEST	1	F
12a3	The user initiates an attach by MMI or by AT command.	-	-	-	-
12a4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
13-15	Void	-	-	-	-
16	if possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.				

16 A	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell". - If present Cell G as a "Non-Suitable off cell".	-	-	-	-
17	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
17 A	The following messages are to be observed on Cell B unless explicitly stated otherwise	-	-	-	-
18	Void	-	-	-	-
19	Check: Does the UE transmit an ATTACH REQUEST message with IMSI-1?	-->	ATTACH REQUEST	2	P
20- 31	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.1.9.3.3 Specific message contents

Table 9.2.1.1.9.3.3-1: Message ATTACH REJECT (steps 4 and 20, Table 9.2.1.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	" Plain NAS message, not security protected "	
EMM cause	00000011	#3 "Illegal UE"	
ESM message container	Not present		

Table 9.2.1.1.9.3.3-2: Message ATTACH REQUEST (step 19, Table 9.2.1.1.9.3.2-1)

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI-1		
ESM message container	PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN		
Last visited registered TAI	Not present		
Old LAI	Not present		
TMSI status	Not present		

9.2.1.1.10 Attach / Rejected / Illegal ME

9.2.1.1.10.1 Test Purpose (TP)

(1)

```

with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "Illegal ME" }
  then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
}

```

(2)

```

with { UE receives an ATTACH REJECT message with the reject cause set to "Illegal ME" }
ensure that {
  when { the UE has been switched off, then switched on }
  then { the UE sends an ATTACH REQUEST message with IMSI, including a PDN CONNECTIVITY REQUEST message }
}

```

9.2.1.1.10.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.5]

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the reject cause value received.

#6 (Illegal ME);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall consider the USIM as invalid for EPS services and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and enter state EMM-DEREGISTERED.

...

9.2.1.1.10.3 Test description

The test description is identical to the one of subclause 9.2.1.1.9 except that in the test procedure and in the specific message contents, the reject cause #3 "Illegal UE" is replaced with the reject cause #6 "Illegal ME".

9.2.1.1.11 Attach / Rejected / EPS services and non-EPS services not allowed

9.2.1.1.11.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "EPS services and non-EPS
services not allowed" }
    then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state
EMM-DEREGISTERED }
}
```

(2)

```
with { UE receives an ATTACH REJECT message with the reject cause set to "EPS services and non-EPS
services not allowed" }
ensure that {
  when { the UE has been switched off, then switched on }
    then { the UE sends an ATTACH REQUEST message with IMSI, including a PDN CONNECTIVITY REQUEST
message }
}
```

(3)

```
with { UE receives an ATTACH REJECT message with the reject cause set to "EPS services and non-EPS
services not allowed" }
ensure that {
  when { the UE has been switched off, then switched on and a UMTS or GSM cell is found }
    then { the UE sends an ATTACH REQUEST message with IMSI }
}
```

9.2.1.1.11.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.5]

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the reject cause value received.

#8 (EPS services and non-EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall consider the USIM as invalid for EPS services and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and enter state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the normal attach procedure is rejected with the GMM cause with the same value.

...

[TS 24.008, clause 4.7.3.2.4]

...

The MS shall then take one of the following actions depending upon the reject cause:

8 (GPRS services and non-GPRS services not allowed);

...

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed.

9.2.1.1.11.3 Test description

The test description is identical to the one of subclause 9.2.1.1.9 with the following exceptions:

9.2.1.1.11.3.1 Pre-test conditions

System Simulator:

- cell A, Cell B (home PLMN, different TAs) and if (p_x_SinglePLMN_Tested = Multi PLMN) Cell G TS 36.508 (another PLMN)
- If (p_x_RATComb_Tested = EUTRA_UTRA OR p_x_RATComb_Tested = EUTRA_GERAN) ;
 - if pc_UTRA AND p_x_RATComb_Tested = EUTRA_UTRA, cell 9 (is configured);
 - if pc_GERAN AND p_x_RATComb_Tested = EUTRA_GERAN, cell 24 (is configured);
 - system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- If (p_x_RATComb_Tested = EUTRA_Only):
 - neither cell 9 nor cell 24 is configured;
 - system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];

- if $pc_UTRA \text{ AND } px_RATComb_Tested = EUTRA_UTRA$, the UE is previously registered on UTRAN cell 9 using default message contents according to TS 36.508 [18].
- if $pc_GERAN \text{ AND } px_RATComb_Tested = EUTRA_GERAN$, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.11.3.2 Test procedure sequence

Table 9.2.1.1.11.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Non-Suitable cell". - If present, Cell G as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "EPS services and non-EPS services not allowed" as specified.	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds? Note: Cell B belongs to the same PLMN where the UE was rejected but a different TA	-->	ATTACH REQUEST	1	F
8	The operator initiates an attach by MMI or by AT command.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
10	Void	-	-	-	-
11	Check: Does the test result of CALL generic procedure (TS 36.508 subclause 6.4.2.5) indicate that the UE ignores paging on cell B for PS domain with S-TMSI included in GUTI-1?	-	-	1	-
-	EXCEPTION: Steps 12a1 to 12a4 describe behaviour that depends on the network capability/ preference; the "lower case letter" identifies a step sequence that takes place if the network is capable or prefers.	-	-	-	-
12a1	IF (px_SinglePLMN_Tested = Multi PLMN) The SS configures: - Cell A as a "Non-Suitable "off" cell". - Cell B as a "Non-Suitable cell". - Cell G as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
12a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds? Note: Cell G belongs to a PLMN which is not the same like the one on which the UE was rejected.	-->	ATTACH REQUEST	1	F
12a3	The user initiates an attach by MMI or by AT command.	-	-	-	-
12a4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
13-15	Void	-	-	-	-
16	If possible (see ICS) switch off is performed or the USIM is removed.	-	-	-	-

	Otherwise the power is removed.				
16 A	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell". -If present, Cell G as a "Non-Suitable off cell".	-	-	-	-
17	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
18	The following message is sent on Cell B.	-	-	-	-
19	Check: Does the UE transmit an ATTACH REQUEST message with IMSI-1?	-->	ATTACH REQUEST	2	P
20	The SS transmits an ATTACH REJECT message with EMM cause = "EPS services and non-EPS services not allowed" as specified.	<--	ATTACH REJECT	-	-
20 A	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Steps 21a1 to 21a10 describe behaviour that depends on the UE capability.	-	-	-	-
21a 1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the SS sets - Cell B as a "Non-Suitable cell". - Cell 24 (GERAN) or Cell 9 (UTRAN) as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 24 or Cell 9 (depending on which cell was set as "Serving cell" in the preceding step) unless explicitly stated otherwise.	-	-	-	-
21a 2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
21a 3	The user initiates an attach by MMI or by AT command.	-	-	-	-
21a 4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
21a 5	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
21a 6	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
-	EXCEPTION: Steps 21a6a1, 21a6a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if pc_AutomaticAttachSwitchON is NOT supported	-	-	-	-
21a 6A a1	IF NOT pc_AutomaticAttachSwitchON	-	Registration on CS	-	-
21a 6A a2	IF NOT pc_AutomaticAttachSwitchON the user initiates an attach by MMI or by AT command.	-	-	-	-
21a 7	Void	-	-	-	-
21a 8	Check: Does the UE transmit an ATTACH REQUEST message with IMSI-1?	-->	ATTACH REQUEST	3	P
22	The attach procedure is completed	-	-	-	-
-	If (px_RATComb_Tested = EUTRA_UTRA OR px_RATComb_Tested = EUTRA_GERAN); At the end of this test procedure sequence, the UE is in end state either U1_IDLE or G1_IDLE E-UTRA connected (E2) according to TS 36.508. Else: At the end of this test procedure sequence, the UE is in end state E-UTRA deregistered (E4) according to TS 36.508.	-	-	-	-

9.2.1.1.11.3.3 Specific message contents

Table 9.2.1.1.11.3.3-1: Message ATTACH REJECT (steps 4 and 20, Table 9.2.1.1.11.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	" Plain NAS message, not security protected "	
EMM cause	00001000	#8 "EPS services and non-EPS services not allowed"	
ESM message container	Not present		

Table 9.2.1.1.11.3.3-2: Message ATTACH REQUEST (step 19, Table 9.2.1.1.11.3.2-1)

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI-1		
ESM message container	PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN		
Last visited registered TAI	Not present		
Old LAI	Not present		
TMSI status	Not present		

Table 9.2.1.1.11.3.3-3: Message ATTACH REQUEST (step 21a8, Table 9.2.1.1.11.3.2-1)

Derivation path: TS 24.008 table 9.4.1			
Information Element	Value/Remark	Comment	Condition
MS network capability	Not checked		
Attach type	Not checked		
GPRS ciphering key sequence number	111	No key is available	
DRX parameter	Not checked		
P-TMSI or IMSI	IMSI-1		
Old routing area identification	Deleted RAI-1	The MNC and the MCC in the coding of the RAI are replaced by the RAC of RAC-1	
MS Radio Access capability	Not checked		
Old P-TMSI signature	Not present		
Requested READY timer Value	Not checked		
TMSI status	Not checked		
PS LCS Capability	Not checked		
Mobile station classmark 2	Not checked		
Mobile station classmark 3	Not checked		
Supported Codecs	Not checked		
UE network capability	Not checked		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

9.2.1.1.12 Attach / Rejected / EPS services not allowed

9.2.1.1.12.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "EPS services not
allowed" }
  then { UE deletes the GUTI and the last visited registered TAI and KSI and considers the USIM as
invalid for EPS services until switching off or the UICC containing the USIM is removed and deletes
the list of equivalent PLMNs and UE enters state EMM-DEREGISTERED }
}
```

9.2.1.1.12.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.1.2.2 and 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411.

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

...

[TS 24.301, clause 5.5.1.2.5]

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the reject cause value received.

#7 (EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and enter state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [6] for the case when the normal attach procedure is rejected with the GMM cause with the same value.

9.2.1.1.12.3 Test description

9.2.1.1.12.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell G:
 - cell A and cell B (HPLMN, different TAs), if (p_x_SinglePLMN_Test_{ed} = Multi PLMN) cell G (another PLMN);

- If ($p_x_RATComb_Tested = EUTRA_UTRA$ OR $p_x_RATComb_Tested = EUTRA_GERAN$) ;
 - if pc_UTRA , AND $p_x_RATComb_Tested = EUTRA_UTRA$ cell 9 (HPLMN, UTRAN);
 - if pc_GERAN AND $p_x_RATComb_Tested = EUTRA_GERAN$, cell 24 (HPLMN, GERAN);
- If ($p_x_RATComb_Tested = EUTRA_Only$):
 - neither cell 9 nor cell 24 is configured;
- system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- the different cells may not be simultaneously activated (at most 2 cells are active simultaneously);

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];
- if pc_UTRA AND $p_x_RATComb_Tested = EUTRA_UTRA$, the UE is previously registered on UTRAN cell 9 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND $p_x_RATComb_Tested = EUTRA_GERAN$, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.12.3.2 Test procedure sequence

Table 9.2.1.1.12.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a " Suitable neighbour cell". - If present, Cell G as a "Non-Suitable Off cell". - If present, Cell 9 or 24 as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The user switches the UE on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "EPS services not allowed".	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	The SS reconfigures: Cell A as a " Suitable neighbour cell". Cell B as the "Serving cell". Note: Cell A and Cell B are in different TAIs – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
8	The user initiates an attach by MMI or by AT command.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
-	EXCEPTION: Steps 10a1 to 10a6 describe behaviour that depends on the UE capability.	-	-	-	-
10a1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the SS configures - Cell A as "Non-suitable Off cell" - Cell B as a " Suitable neighbour cell". - Cell 24 (GERAN) or 9 (UTRAN) as the "Serving cell". Note: Cell B and Cell 24 (GERAN) or 9 (UTRAN) are in different PLMNs	-	-	-	-
10a2	Void	-	-	-	-
-	EXCEPTION: The following messages are to be observed on Cell 24 or Cell 9 (depending on which cell was set as "Serving cell" in the preceding step) unless explicitly stated otherwise.	-	-	-	-
-	EXCEPTION: Depending on UE capabilities the behaviour in table 9.2.1.1.12.3.2-2 occurs in parallel with step 10a3.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.1.1.12.3.2-2 occurs in parallel with step 10a3.	-	-	-	-
10a3	Check: Does the UE transmit an ATTACH REQUEST message in the next 2 minutes?	-->	ATTACH REQUEST	1	F
10a4	The user initiates an attach by MMI or by AT command.	-	-	-	-

10a5	Check : Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
10a6	The SS configures cell 24 or cell 9 as "Non-Suitable Off cell".	-	-	-	-
-	EXCEPTION: Steps 11a1 to 11a4 describe behaviour that depends on the network capability / preference; the "lower case letter" identifies a step sequence that takes place if the network is capable or prefers.	-	-	-	-
11a1	If (px_SinglePLMN_Tested = Multi PLMN) The SS sets: - Cell B as a "Non-Suitable Off cell". - Cell G as the "Serving cell". Note: Cell B and Cell G are different PLMNs.	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
11a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 60 seconds?	-->	ATTACH REQUEST	1	F
11a3	The operator initiates an attach by MMI or by AT command.	-	-	-	-
11a4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
-	At the end of this test procedure sequence, the UE is in end state E-UTRA deregistered (E4) according to TS 36.508.	-	-	-	-

Table 9.2.1.1.12.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1-1a 5 describe a behaviour which depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported.	-	-	-	-
1a1	IF pc_CS THEN the UE transmits a LOCATION UPDATING REQUEST message.	-->	LOCATION UPDATING REQUEST	-	-
-	EXCEPTION: The messages in the next two steps are sent only IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN	-	-	-	-
1a2a 1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE	-	-
1a2a 2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.	-	-
1a3	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
1a4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
1a5	The SS transmits a LOCATION UPDATING ACCEPT message including IMSI-1	<--	LOCATION UPDATING ACCEPT	-	-

9.2.1.1.12.3.3 Specific message contents

Table 9.2.1.1.12.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.1.12.3.2-1)

Derivation path: 36.508 table 4.7.2-3 (This message is transmitted as a "plain NAS message")			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	"Plain NAS message, not security protected"	
EMM cause	00000111	#7 "EPS services not allowed"	
ESM message container	Not present		

Table 9.2.1.1.12.3.3-2: LOCATION UPDATING ACCEPT (step 5, Table 9.2.1.1.12.3.2-2)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity			
IMSI	IMSI-1		

9.2.1.1.13 Attach / Rejected / PLMN not allowed

9.2.1.1.13.1 Test Purpose (TP)

(1)

```

with { the UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { the UE receives an ATTACH REJECT message with the reject cause set to "PLMN not allowed" }
  then { the UE deletes the GUTI, the last visited registered TAI, KSI, the list of equivalent
  PLMNs and UE enters state EMM-DEREGISTERED.PLMN-SEARCH and UE stores the PLMN in the "forbidden PLMN
  list" in the USIM }
}

```

(2)

```

with { the UE is switched off and a PLMN is stored in the "forbidden PLMN list" in the USIM }
ensure that {
  when { the UE is switched on }
  then { the UE doesn't attempt to attach on this PLMN }
}

```

(3)

```

with { the UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden
  PLMN list" }
ensure that {
  when { the UE detects a cell belonging to a PLMN which is not in the "forbidden PLMN list" }
  then { the UE attaches to this PLMN }
}

```

(4)

```

with { the UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden
  PLMN list" }
ensure that {
  when { the forbidden PLMN is selected manually }
  then { the UE attaches to the forbidden PLMN and deletes this PLMN from the USIM }
}

```

9.2.1.1.13.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.1.2.2 and 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure

5.5.1.2.2.1). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411.

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI or IMSI IE as follows:

...

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI or IMSI IE.

...

- Otherwise the UE shall include the IMSI in the Old GUTI or IMSI IE.

...

[TS 24.301, clause 5.5.1.2.5]

If the attach request cannot be accepted by the network, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value.

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the EMM cause value received.

...

#11 (PLMN not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. Additionally, the UE shall delete the list of equivalent PLMNs and reset the attach attempt counter, and enter state EMM-DEREGISTERED.PLMN-SEARCH.

In S1 mode, the UE shall store the PLMN identity in the "forbidden PLMN list" and enter state EMM-DEREGISTERED.PLMN-SEARCH. The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

...

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal attach procedure is rejected with the GMM cause with the same value and no RR connection exists.

9.2.1.1.13.3 Test description

9.2.1.1.13.3.1 Pre-test conditions

System Simulator:

- cell G, cell H (VPLMN, same MCC like HPLMN, different TAs) and cell I (VPLMN, different MCC from HPLMN);
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f1;

- the cells may not be simultaneously activated.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell G using default message contents according to TS 36.508 [18];
- the "forbidden PLMN list" is empty;
- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.13.3.2 Test procedure sequence

Table 9.2.1.1.13.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell G as the "Serving cell". - Cell H as a " Suitable Neighbour cell". - Cell I as a "Non-Suitable Off cell". Note: Cell G and Cell H are in the different TAI – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message including EMM cause = "PLMN not allowed".	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message on cell G or H in the next 30 seconds?	-->	ATTACH REQUEST	1	F
7	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
8	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
10	The SS configures: - Cell G as the "Serving cell" - Cell H as a "Non-Suitable Off cell" - Cell I as a " Suitable neighbour cell".	-	-	-	-
11	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	1, 3	P
12 A-12 M	The attach procedure is completed and the RRC connection is released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
13 - 19	Void	-	-	-	-
20	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 21 describes behaviour that depends on the UE capability.				
21	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmits a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
22	The SS configures: - Cell G as the "Serving cell" - Cell I as a "Non-suitable Off cell". Note: Cell G belongs to the forbidden PLMN.	-	-	-	-
23	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
24	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
25	The user sets the UE in manual PLMN	-	-	-	-

	selection mode or requests a PLMN search.				
26	The user selects PLMN of cell G.	-	-	-	-
27	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	4	P
28-40	The attach procedure is completed and the RRC connection is released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.13.3.3 Specific message contents

Table 9.2.1.1.13.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-3 (Plain NAS message)			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	"No security protection" #11 "PLMN not allowed"	
EMM cause	00001011		
ESM message container	Not present		

Table 9.2.1.1.13.3.3-2: Message ATTACH REQUEST (step 12, Table 9.2.1.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI-1	GUTI has been deleted after receiving ATTACH REJECT at step 5; only IMSI is available. TAI has been deleted after receiving ATTACH REJECT at step 5.	
Last visited registered TAI	Not present		

Table 9.2.1.1.13.3.3-3: Message ATTACH REQUEST (step 27, Table 9.2.1.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI Last visited registered TAI	GUTI allocated in step 18 TAI-9	TAI 9 is allocated on Cell I according to 36.508 table 6.3.2.2-1	

9.2.1.1.13a Attach / Rejected / PLMN not allowed / Single Frequency operation

9.2.1.1.13a.1 Test Purpose (TP)

Same test purpose as in clause 9.2.1.1.13.1

9.2.1.1.13a.2 Conformance requirements

Same conformance requirements as in clause 9.2.1.1.13.2

9.2.1.1.13a.3 Test description**9.2.1.1.13a.3.1** Pre-test conditions**System Simulator:**

- cell A (belongs to TAI-7, visited PLMN, MCC = MCC in USIM MNC=02),
- cell B (belongs to TAI-8, visited PLMN, MCC = MCC in USIM MNC=02)) and
- cell C (belongs to TAI-9, visited PLMN, MCC=002 MNC=101);
- the cells may not be simultaneously activated.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];
- the "forbidden PLMN list" is empty;
- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.13a.3.2 Test procedure sequence

Table 9.2.1.1.13a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a " Suitable Neighbour cell". - Cell C as a "Non-Suitable Off cell". Note: Cell A and Cell B are in the different TAI – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message including EMM cause = "PLMN not allowed".	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message on cell A or B in the next 30 seconds?	-->	ATTACH REQUEST	1	F
7	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
8	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
10	The SS configures: - Cell A as the " Suitable neighbour intrafrequency cell" - Cell B as a "Non-Suitable Off cell" - Cell C as a " Serving cell".	-	-	-	-
11	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	1, 3	P
12 A-12 M	The attach procedure is completed and the RRC connection is released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
13-19	Void	-	-	-	-
20	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 21 describes behaviour that depends on the UE capability.				
21	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmits a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
22	The SS configures: - Cell A as the "Serving cell" - Cell C as a "Non-suitable Off cell". Note: Cell A belongs to the forbidden PLMN.	-	-	-	-
23	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
24	The following messages are to be observed on	-	-	-	-

	Cell A unless explicitly stated otherwise.				
25	The user sets the UE in manual PLMN selection mode or requests a PLMN search.	-	-	-	-
26	The user selects PLMN of cell A.	-	-	-	-
27	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	4	P
28-40	The attach procedure is completed and the RRC connection is released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.13a.3.3 Specific message contents

Table 9.2.1.1.13a.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.1.13a.3.2-1)

Derivation path: 36.508 table 4.7.2-3 (Plain NAS message)			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	"No security protection" #11 "PLMN not allowed"	
EMM cause	00001011		
ESM message container	Not present		

Table 9.2.1.1.13a.3.3-2: Message ATTACH REQUEST (step 12, Table 9.2.1.1.13a.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI-1	GUTI has been deleted after receiving ATTACH REJECT at step 5; only IMSI is available. TAI has been deleted after receiving ATTACH REJECT at step 5.	
Last visited registered TAI	Not present		

Table 9.2.1.1.13a.3.3-3: Message ATTACH REQUEST (step 27, Table 9.2.1.1.13a.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI Last visited registered TAI	GUTI allocated in step 18 TAI-9	TAI 9 is allocated on Cell C according to 36.508 table 6.3.2.2-1	

9.2.1.1.14 Attach / Rejected / Tracking area not allowed

9.2.1.1.14.1 Test Purpose (TP)

(1)

with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {

```

when { UE receives an ATTACH REJECT message with the reject cause set to "Tracking area not
allowed" }
  then { UE sets the EPS update status to E3 ROAMING NOT ALLOWED, UE deletes the GUTI, last
visited registered TAI and KSI, UE enters the state EMM-DEREGISTERED.LIMITED-SERVICE and UE stores
the current TAI in the list of "forbidden tracking areas for regional provision of service" }
}

```

(2)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { serving cell belongs to TAI where UE was rejected }
    then { UE does not attempt to attach on any other cell }
}

```

(3)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { UE re-selects a new cell in the same TAI it was already rejected }
    then { UE does not attempt to attach }
}

```

(4)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { UE enters a cell belonging to a tracking area not in the list of "forbidden tracking areas
for regional provision of service"}
    then { UE attempts to attach with IMSI }
}

```

(5)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the list of "forbidden tracking areas for
regional provision of service" contains more than one TAI}
ensure that {
  when { UE re-selects a cell belonging to one of the TAIs in the list of "forbidden tracking areas
for regional provision of service" }
    then { UE does not attempt to attach }
}

```

(6)

```

with { UE is switched off }
ensure that {
  when { UE is powered on in the cell belonging to the TAI which was in the list of "forbidden
tracking areas for regional provision of service" before the UE was switched off }
    then { UE performs registration on that cell }
}

```

9.2.1.1.14.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.3.2, 5.5.1.2.2, 5.5.1.2.5, 5.2.2.3.2, Annex C and TS 36.304 clause 4.3.

[TS 24.301, clause 5.3.2]

The UE shall store a list of "forbidden tracking areas for roaming", as well as a list of "forbidden tracking areas for regional provision of service". These lists shall be erased when the UE is switched off or when the UICC containing the USIM is removed, and periodically (with a period in the range 12 to 24 hours).

...

In S1 mode, the UE shall update the suitable list whenever an ATTACH REJECT, TRACKING AREA UPDATE REJECT, SERVICE REJECT or DETACH REQUEST message is received with the EMM cause #12 "tracking area not allowed", #13 "roaming not allowed in this tracking area", or #15 "no suitable cells in tracking area".

Each list shall accommodate 40 or more TAIs. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

...

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI or IMSI IE as follows:

...

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI or IMSI IE.

...

The UE shall send the ATTACH REQUEST message together with a PDN CONNECTIVITY REQUEST message contained in the ESM message container information element to request PDN connectivity.

...

[TS 24.301, clause 5.5.1.2.5]

If the attach request cannot be accepted by the network, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value.

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the EMM cause value received.

...

#12 (Tracking area not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. Additionally, the UE shall reset the attach attempt counter.

In S1 mode, the UE shall store the current TAI in the list of "forbidden tracking areas for regional provision of service" and enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

...

[TS 24.301, clause 5.2.2.3.2]

The UE shall perform an attach or combined attach procedure when entering a cell which provides normal service.

[TS 24.301, Annex C (normative)]

The following EMM parameters shall be stored on the USIM if the corresponding file is present:

- GUTI;
- last visited registered TAI;
- EPS update status;
- Allowed CSG list; and

- EPS security context parameters from a full native EPS security context (see 3GPP TS 33.401 [19]).

The presence and format of corresponding files on the USIM is specified in 3GPP TS 31.102 [17].

If the corresponding file is not present on the USIM, these EMM parameters except allowed CSG list are stored in a non-volatile memory in the ME together with the IMSI from the USIM. The allowed CSG list is stored in a non-volatile memory in the ME if the UE supports CSG selection. These EMM parameters can only be used if the IMSI from the USIM matches the IMSI stored in the non-volatile memory; else the UE shall delete the EMM parameters.

...

[TS 36.304, clause 4.3]

...

suitable cell:

...

Following exceptions to these definitions are applicable for UEs:

- camped on a cell that belongs to a registration area that is forbidden for regional provision of service; a cell that belongs to a registration area that is forbidden for regional provision service ([5], [16]) is suitable but provides only limited service.

...

9.2.1.1.14.3 Test description

9.2.1.1.14.3.1 Pre-test conditions

System Simulator:

- cell A (home PLMN) and cell B (home PLMN, another TA) are configured according to table 6.3.2.2-1 in TS 36.508 [18] and belong to the same frequency as specified in TS 36.523-3 [20].
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.14.3.2 Test procedure sequence

Table 9.2.1.1.14.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Suitable Neighbour cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message, EMM cause = "Tracking area not allowed". (The list of "forbidden tracking areas for regional provision of service " in the UE should now contain TAI-1)	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds on Cell A or Cell B?	-->	ATTACH REQUEST	1, 2	F
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
9	The SS reconfigures: Cell A as a "Suitable Neighbour cell", Cell B as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
10	Check: Does the UE transmit the ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1,4	P
11	The SS transmits an ATTACH REJECT message, EMM cause = "Tracking area not allowed". (The list of "forbidden tracking areas for regional provision of service " in the UE should now contain TAI-1 and TAI-2)	<--	ATTACH REJECT	-	-
12	The SS releases the RRC connection.	-	-	-	-
13	The SS reconfigures: Cell A as the "Serving cell". Cell B as a " Suitable Neighbour cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
14	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1, 3, 5	F
15	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
16	The SS reconfigures: Cell A as the "Serving cell", Cell B as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
17	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
18	Void	-	-	-	-
19	Check: Does the UE transmit the ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	1, 6	P

20-32	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.14.3.3 Specific message contents

Table 9.2.1.1.14.3.3-1: Message ATTACH REJECT (steps 4 and 11, Table 9.2.1.1.14.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	"No security protection" #12 "Tracking area not allowed"	
EMM cause	00001100		
ESM message container	Not present		

Table 9.2.1.1.14.3.3-2: Message ATTACH REQUEST (steps 10 and 18 Table 9.2.1.1.14.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI-1	GUTI has been deleted after receiving ATTACH REJECT at step 4; only IMSI is available. TAI has been deleted after receiving ATTACH REJECT at step 4.	
Last visited registered TAI	Not present		

9.2.1.1.15 Attach / Rejected / Roaming not allowed in this tracking area

9.2.1.1.15.1 Test Purpose (TP)

(1)

```
with { the UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { the UE receives an ATTACH REJECT message with the reject cause set to "roaming not allowed in this tracking area" }
  then { the UE sets the EPS update status to EU3 ROAMING NOT ALLOWED and the UE deletes the GUTI, the last visited registered TAI and KSI and the UE enters the state EMM-DEREGISTERED.LIMITED-SERVICE or optionally EMM-DEREGISTERED.PLMN-SEARCH and the UE stores the current TAI in the list of "forbidden tracking areas for roaming" }
}
```

(2)

```
with { the UE is in EMM-DEREGISTERED.LIMITED-SERVICE or EMM-DEREGISTERED.PLMN-SEARCH state and the TAI of the current cell belongs to the list of "forbidden tracking areas for roaming" }
ensure that {
  when { the UE enters a cell belonging to a tracking area not in the list of "forbidden tracking areas for roaming" }
  then { the UE attempts to attach with IMSI }
}
```

(3)

```
with { the UE is in EMM-DEREGISTERED.LIMITED-SERVICE or EMM-DEREGISTERED.PLMN-SEARCH state and the list of "forbidden tracking areas for roaming" contains more than one TAI }
ensure that {
  when { the UE selects a cell belonging to one of the TAIs in the list of "forbidden tracking areas for roaming" }
}
```

```

    then { the UE does not attempt to attach }
  }

```

(4)

```

with { the UE is switched off or the UICC containing the USIM is removed }
ensure that {
  when { UE is powered on in the cell belonging to the TAI which was in the list of "forbidden
tracking areas for roaming" before the UE was switched off or the USIM is inserted again on that
cell }
  then { UE performs registration on that cell }
}

```

(5)

```

with { the UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { the UE receives an ATTACH REJECT message with the reject cause set to "roaming not allowed
in this tracking area" }
  then { the UE performs a PLMN selection }
}

```

9.2.1.1.15.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.3.2, 5.5.1.2.2, 5.5.1.2.5 and in TS 36.304 clause 5.2.4.4.

[TS 24.301, clause 5.3.2]

The UE shall store a list of "forbidden tracking areas for roaming", as well as a list of "forbidden tracking areas for regional provision of service". These lists shall be erased when the UE is switched off or when the UICC containing the USIM is removed, and periodically (with a period in the range 12 to 24 hours).

...

In S1 mode, the UE shall update the suitable list whenever an ATTACH REJECT, TRACKING AREA UPDATE REJECT, SERVICE REJECT or DETACH REQUEST message is received with the EMM cause #12 "tracking area not allowed", #13 "roaming not allowed in this tracking area", or #15 "no suitable cells in tracking area".

Each list shall accommodate 40 or more TAIs. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

...

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message. If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI or IMSI IE as follows:

...

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI or IMSI IE.

...

The UE shall send the ATTACH REQUEST message together with a PDN CONNECTIVITY REQUEST message contained in the ESM message container information element to request PDN connectivity.

...

[TS 24.301, clause 5.5.1.2.5]

If the attach request cannot be accepted by the network, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value.

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the EMM cause value received.

...

#13 (Roaming not allowed in this tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall delete the list of equivalent PLMNs and reset the attach attempt counter.

In S1 mode, the UE shall store the current TAI in the list of "forbidden tracking areas for roaming". Additionally, the UE shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE or optionally EMM-DEREGISTERED.PLMN-SEARCH. The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

...

[TS 36.304 subclause 5.2.4.4]

...

If the highest ranked cell is an intra-frequency or inter-frequency cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300s. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under E-UTRAN control to a frequency for which the timer is running, any limitation on that frequency shall be removed.

...

9.2.1.1.15.3 Test description

9.2.1.1.15.3.1 Pre-test conditions

System Simulator:

- cell C (home PLMN), cell I (visited PLMN) and cell E (same visited PLMN, another TA), but at most two cells are simultaneously activated.

NOTE 1: Cell E shall not use the same frequency as cell I.

NOTE 2: The requirement in 3GPP TS 24.301 to store at least 40 entries in the list of "forbidden tracking areas for roaming" is not fully tested.

NOTE 3: Different types of UE may use different methods to periodically clear the list of forbidden areas (e.g. every day at 12 am) for roaming. If the list is cleared while the test is being run, it may be necessary to re-run the test.

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell I using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.15.3.2 Test procedure sequence

Table 9.2.1.1.15.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell I as the "Serving cell". cell E as a " Non-Suitable Off cell", cell C as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on cell I unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message, EMM cause = "roaming not allowed in this tracking area ". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1,5	F
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1,5	F
-	The following messages are to be observed on Cell E unless explicitly stated otherwise.	-	-	-	-
8A	The SS configures: Cell I as the "Serving cell". Cell E as a "Suitable Neighbour cell", Cell C as a "Non-Suitable Off cell".	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on Cell E as specified? Note: according to TS 24.301, the UE has the choice to enter "LIMITED-SERVICE" or "PLMN- SEARCH" state. But in any case it shall do a PLMN selection. In the first option, the UE shall apply reselection so it will select cell E and then attempt to attach; in the second option it will select the same PLMN again and exclude cells from forbidden TAs so it will select cell E.	-->	ATTACH REQUEST	1, 2	P
10	The SS transmits an ATTACH REJECT message, EMM cause = "roaming not allowed in this tracking area". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9 and TAI-12)	<--	ATTACH REJECT	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message in the next 60 seconds on Cell I or Cell E?	-->	ATTACH REQUEST	1, 3	F
13	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
14	The SS reconfigures: Cell I as the "Serving cell", Cell E as a "Non-Suitable Off cell", Cell C as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
15	The UE is brought back to operation or the	-	-	-	-

	USIM is inserted.				
16	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified.	-->	ATTACH REQUEST	4	P
17	The SS transmits an ATTACH REJECT message, EMM cause = "roaming not allowed in this tracking area ". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
18	The SS reconfigures: Cell I as the "Serving cell", Cell E as a "Non-Suitable Off cell", Cell C as a "Suitable neighbour cell".	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
19	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	5	P
20-32	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.15.3.3 Specific message contents

Table 9.2.1.1.15.3.3-1: Message ATTACH REJECT (steps 4, 10 and 17 in table 9.2.1.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	"Plain NAS message, not security protected" #13 "roaming not allowed in this tracking area "	
EMM cause	00001101		
ESM message container	Not present		

Table 9.2.1.1.15.3.3-2: Message ATTACH REQUEST (steps 9,12, 16 and 19 in table 9.2.1.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI1	GUTI has been deleted after receiving ATTACH REJECT at step 4; only IMSI is available. TAI has been deleted after receiving ATTACH REJECT at step 4.	
Last visited registered TAI	Not present		

9.2.1.1.15a Attach / Rejected / Roaming not allowed in this tracking area / Single Frequency operation

9.2.1.1.15a.1 Test Purpose (TP)

Same test purpose as in clause 9.2.1.1.15a.1.

9.2.1.1.15a.2 Conformance requirements

Same conformance requirements as in clause 9.2.1.1.15a.2

9.2.1.1.15a.3 Test description**9.2.1.1.15a.3.1** Pre-test conditions**System Simulator:**

- Three intra-frequency cells.
- cell C (home PLMN), cell B (visited PLMN, TAI-9) and cell A (same visited PLMN, TAI-12), but at most two cells are simultaneously activated.

NOTE 1: The requirement in 3GPP TS 24.301 to store at least 40 entries in the list of "forbidden tracking areas for roaming" is not fully tested.

NOTE 2: Different types of UE may use different methods to periodically clear the list of forbidden areas (e.g. every day at 12 am) for roaming. If the list is cleared while the test is being run, it may be necessary to re-run the test.

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell B using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.15a.3.2 Test procedure sequence

Table 9.2.1.1.15a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell B as the "Serving cell". cell A as a " Non-Suitable Off cell", cell C as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message, EMM cause = "roaming not allowed in this tracking area ". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	1,5	F
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	1,5	F
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
8A	The SS configures: Cell B as the "Serving cell". Cell A as a "Suitable Neighbour intrafrequency cell", Cell C as a "Non-Suitable Off cell".	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on Cell A as specified? Note: according to TS 24.301, the UE has the choice to enter "LIMITED-SERVICE" or "PLMN- SEARCH" state. But in any case it shall do a PLMN selection. In the first option, the UE shall apply reselection so it will select cell A and then attempt to attach; in the second option it will select the same PLMN again and exclude cells from forbidden TAs so it will select cell A.	-->	ATTACH REQUEST	1, 2	P
10	The SS transmits an ATTACH REJECT message, EMM cause = "roaming not allowed in this tracking area". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9 and TAI-12)	<--	ATTACH REJECT	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on Cell B or Cell A?	-->	ATTACH REQUEST	1, 3	F
13	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
14	The SS reconfigures: Cell B as the "Serving cell", Cell A as a "Non-Suitable Off cell", Cell C as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-

15	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
16	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified.	-->	ATTACH REQUEST	4	P
17	The SS transmits an ATTACH REJECT message, EMM cause = "roaming not allowed in this tracking area". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
18	The SS reconfigures: Cell B as the "Suitable neighbour intrafrequency cell", Cell A as a "Non-Suitable Off cell", Cell C as a "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
19	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	5	P
20-32	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.15a.3.3 Specific message contents

Same specific message contents as clause 9.2.1.1.15.3.3

9.2.1.1.16 Attach / Rejected / EPS services not allowed in this PLMN

9.2.1.1.16.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "EPS services not allowed in this PLMN" }
  then { UE deletes any GUTI, last visited registered TAI, KSI and enters EMM-DEREGISTERED.PLMN-SEARCH state }
}
```

(2)

```
with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state, and a PLMN is stored in the "forbidden PLMNs for GPRS service list" }
ensure that {
  when { UE detects a cell which belongs to a PLMN which is in the "forbidden PLMNs for GPRS service list" }
  then { UE doesn't perform an attach procedure }
}
```

(3)

```
with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state, and a PLMN is stored in the "forbidden PLMNs for GPRS service list" }
ensure that {
  when { UE detects a cell which belongs to a PLMN which is not in the "forbidden PLMNs for GPRS service list" }
  then { UE performs an attach procedure }
}
```

(4)

```
with { UE is switched off when a PLMN is stored in the "forbidden PLMNs for GPRS service list" }
ensure that {
```



```

when { UE is powered on a cell which belongs to this PLMN }
  then { UE performs an attach procedure }
  }

```

(5)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state, and a PLMN is stored in the "forbidden PLMNs
for GPRS service list" }
ensure that {
  when { UE is in the cell which belongs to the rejected PLMN and when that PLMN is selected
manually }
  then { UE performs an attach procedure }
}

```

9.2.1.1.16.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.1.2.5 and TS23.122, clause 3.1.

[TS24.301 clause 5.5.1.2.5]

If the attach request cannot be accepted by the network, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value. If the attach procedure fails due to a default EPS bearer setup failure, an ESM procedure failure, or operator determined barring is applied on default EPS bearer context activation during attach procedure, the MME shall combine the ATTACH REJECT message with a PDN CONNECTIVITY REJECT message contained in the ESM message container information element. In this case the EMM cause value in the ATTACH REJECT message shall be set to #19 "ESM failure".

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the EMM cause value received.

...

#14 (EPS services not allowed in this PLMN);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI.

In S1 mode, the UE shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. Additionally, the UE shall enter state EMM-DEREGISTERED.PLMN-SEARCH. The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6]:

In S101 mode, the UE shall store the PLMN identity provided with the indication from the lower layers to prepare for an S101 mode to S1 mode handover in the list of "forbidden PLMNs for attach in S101 mode" and enter the state EMM-DEREGISTERED.NO-CELL-AVAILABLE.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal attach procedure is rejected with the GMM cause with the same value.

...

[TS23.122 clause 3.1]

...

If a message with cause value "GPRS services not allowed in this PLMN" is received by an MS in response to an GPRS attach, GPRS detach, routing area update, attach or tracking area update request (see 3GPP TS 24.008 [23] and 3GPP TS 24.301 [23A]) from a VPLMN, that VPLMN is added to a list of "forbidden PLMNs for GPRS service" which is stored in the MS and thereafter that VPLMN will not be accessed by the MS for GPRS service when in automatic mode. This list is deleted when the MS is switched off or when the SIM is removed. A PLMN is removed from the list of "forbidden PLMNs for GPRS service" if, after a subsequent manual selection of that PLMN, there is a successful GPRS attach. The maximum number of possible entries in this list is implementation dependant, but must be at least one entry. The HPLMN (if the EHPLMN list is not present or is empty) or an EHPLMN (if the EHPLMN list is present) shall not be stored on the list of "forbidden PLMNs for GPRS service".

...

9.2.1.1.16.3 Test description

9.2.1.1.16.3.1 Pre-test conditions

System Simulator:

- cell G, Cell H and cell I are configured according to Table 6.3.2.2-1 in; [18].
- cell G and Cell H with MCC-1/MNC-2 (visited PLMN, different TAs)
- Cell I with MCC-2/MNC-101 (visited PLMN)
- the cells may not be simultaneously activated;
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508 [18], except replacing f3 with f1.

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell G using default message contents according to TS 36.508 [18];
- the "forbidden PLMNs for GPRS service list" is empty.
- the different cells may not be simultaneously activated (at most 2 cells are active simultaneously).

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.16.3.2 Test procedure sequence

Table 9.2.1.1.16.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell G as the "Serving cell". - Cell H as a "Non-Suitable cell". - Cell I as a "Non-Suitable off cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
2	Void	-	-	-	-
3	The UE is switched on.	-	-	-	-
4	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
5	The SS transmits an ATTACH REJECT message including EMM cause = "EPS services not allowed in this PLMN".	<--	ATTACH REJECT	-	-
6	The SS releases the RRC connection.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	1	F
8	The SS configures: Cell G as a "Non-Suitable cell". Cell H as the "Serving cell". Note: Cell G and Cell H are in the different TAI – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell H unless explicitly stated otherwise.	-	-	-	-
9	Void	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
11	The SS configures: Cell H as a "Non-Suitable off cell". Cell I as the "Serving cell". Note: Cell G and Cell I are different PLMNs.	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
12	Void	-	-	-	-
13	Check: Does the UE transmit an ATTACH REQUEST message including and a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	3	P
13 A	The SS completes the attach procedure successfully and then releases the RRC - connection by executing steps 5 to 17 of UE registration procedure in TS 36.508 clause 4.5.2.3.				
14 - 20	Void	-	-	-	-
21	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
22	The SS configures - Cell I as a "Non-Suitable cell". - Cell G as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
23	The UE is brought back to operation or the USIM is inserted.				
24	Void	-	-	-	-
25	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P

26	The SS transmits an ATTACH REJECT message including EMM cause = "EPS services not allowed in this PLMN".	<--	ATTACH REJECT	-	-
26 A	SS releases the RRC connection.	-	-	-	-
27	The user sets the UE in manual PLMN selection mode or requests a PLMN search.				
28	The user selects PLMN (MCC-1/MNC-2)				
29	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	5	P
30- 42	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.16.3.3 Specific message contents

Table 9.2.1.1.16.3.3-1: Message ATTACH REJECT (step 5, Table 9.2.1.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-3 (Plain NAS message)			
Information Element	Value/Remark	Comment	Condition
EMM cause	00001110	#14 "EPS services not allowed in this PLMN "	
ESM message container	Not present		

Table 9.2.1.1.16.3.3-2: Message ATTACH REQUEST (step 13 and step 29, Table 9.2.1.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI-1	GUTI has been deleted after receiving ATTACH REJECT at step 5 and step25; only IMSI is available.	
Last visited registered TAI	Not present	TAI has been deleted after receiving ATTACH REJECT at step 5 and step26.	

Table 9.2.1.1.16.3.3-3: Message ATTACH REJECT (step 26, Table 9.2.1.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
EMM cause	00001110	#14 "EPS services not allowed in this PLMN "	
ESM message container	Not present		

9.2.1.1.16a Attach / Rejected / EPS services not allowed in this PLMN / Single Frequency operation

9.2.1.1.16a.1 Test Purpose (TP)

Same test purpose as in clause 9.2.1.1.16.1

9.2.1.1.16a.2 Conformance requirements

Same conformance requirements as in clause 9.2.1.1.16.2

9.2.1.1.16a.3 Test description

9.2.1.1.16a.3.1 Pre-test conditions

System Simulator:

- cell A(TAI-7), Cell B(TAI-8) and intra-frequency cells cell C(TAI-9) are configured according to Table 6.3.2.2-1 in; [18].
- cell A and Cell B with MCC-1/MNC-2 (visited PLMN, different TAs)
- Cell C with MCC-2/MNC-101 (visited PLMN)
- the cells may not be simultaneously activated.

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];
- the "forbidden PLMNs for GPRS service list" is empty.
- the different cells may not be simultaneously activated (at most 2 cells are active simultaneously).

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.16a.3.2 Test procedure sequence

Table 9.2.1.1.16a.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Non-Suitable cell". - Cell C as a "Non-Suitable off cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	Void	-	-	-	-
3	The UE is switched on.	-	-	-	-
4	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
5	The SS transmits an ATTACH REJECT message including EMM cause = "EPS services not allowed in this PLMN".	<--	ATTACH REJECT	-	-
6	The SS releases the RRC connection.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	1	F
8	The SS configures: Cell A as a "Non-Suitable cell". Cell B as the "Serving cell". Note: Cell A and Cell B are in the different TAI – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
9	Void	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
11	The SS configures: Cell B as a "Non-Suitable off cell". Cell C as the "Serving cell". Note: Cell A and Cell C are different PLMNs.	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
12	Void	-	-	-	-
13	Check: Does the UE transmit an ATTACH REQUEST message including and a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	3	P
13 A	The SS completes the attach procedure successfully and then releases the RRC - connection by executing steps 5 to 17 of UE registration procedure in TS 36.508 clause 4.5.2.3.				
14 - 20	Void	-	-	-	-
21	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
22	The SS configures - Cell C as a "Non-Suitable cell". - Cell A as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
23	The UE is brought back to operation or the USIM is inserted.				
24	Void	-	-	-	-
25	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P

26	The SS transmits an ATTACH REJECT message including EMM cause = "EPS services not allowed in this PLMN".	<--	ATTACH REJECT	-	-
26 A	SS releases the RRC connection.	-	-	-	-
27	The user sets the UE in manual PLMN selection mode or requests a PLMN search.				
28	The user selects PLMN of cell A				
29	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	5	P
30- 42	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.16a.3.3 Specific message contents

Same specific message contents as in clause 9.2.1.1.16.3.3

9.2.1.1.17 Attach / Rejected / No suitable cells in tracking area

9.2.1.1.17.1 Test Purpose (TP)

(1)

```
with { the UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { the UE receives an ATTACH REJECT message with the EMM cause set to "No suitable cells in
tracking area" }
    then { the UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, UE deletes any GUTI, last
visited registered TAI and KSI and the UE enters the state EMM-DEREGISTERED.LIMITED-SERVICE and the
UE stores the current TAI in the list of "forbidden tracking areas for roaming" }
}
```

(2)

```
with { the UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of
"forbidden tracking areas for roaming" }
ensure that {
  when { the UE re-selects a cell that belongs to the TAI where UE was rejected }
    then { the UE does not attempt to attach }
}
```

(3)

```
with { the UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of
"forbidden tracking areas for roaming" and KSI was deleted }
ensure that {
  when { in the same PLMN, the UE enters a cell which provides normal service and belongs to a
tracking area not in the list of "forbidden tracking areas for roaming" }
    then { the UE attempts to attach with IMSI }
}
```

(4)

```
with { the UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of
"forbidden tracking areas for roaming" }
ensure that {
  when { there are cells in the same PLMN and other PLMN that provide normal service and belong to
tracking areas not in the list of "forbidden tracking areas for roaming" }
    then { UE attempts to attach to the cell in the same PLMN }
}
```

Note: TP 4 is applicable only for Multi PLMN environment

(5)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the list of "forbidden tracking areas for
roaming" contains more than one TAI }
```

```

ensure that {
  when { UE re-selects a cell that belongs to one of the TAIs in the list of "forbidden tracking
areas for roaming" }
    then { UE does not attempt to attach }
}

```

(6)

```

with { UE is switched off }
ensure that {
  when { UE is powered on in the cell belonging to the TAI which was in the list of "forbidden
tracking areas for roaming" before the UE was switched off }
    then { UE attempts to attach }
}

```

9.2.1.1.17.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.3.2, 5.5.1.2.2 and 5.5.1.2.5, and in TS 36.304 clause 5.2.4.4.

[TS 24.301, clause 5.3.2]

The UE shall store a list of "forbidden tracking areas for roaming", as well as a list of "forbidden tracking areas for regional provision of service". These lists shall be erased when the UE is switched off or when the UICC containing the USIM is removed, and periodically (with a period in the range 12 to 24 hours).

...

In S1 mode, the UE shall update the suitable list whenever an ATTACH REJECT, TRACKING AREA UPDATE REJECT, SERVICE REJECT or DETACH REQUEST message is received with the EMM cause #12 "tracking area not allowed", #13 "roaming not allowed in this tracking area", or #15 "no suitable cells in tracking area".

Each list shall accommodate 40 or more TAIs. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

...

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

...

If the UE supports neither A/Gb mode nor Iu mode, the UE shall handle the Old GUTI or IMSI IE in the ATTACH REQUEST message as follows:

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI or IMSI IE as follows:

...

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI or IMSI IE.

...

- Otherwise the UE shall include the IMSI in the Old GUTI or IMSI IE.

...

The UE shall send the ATTACH REQUEST message together with a PDN CONNECTIVITY REQUEST message contained in the ESM message container information element to request PDN connectivity.

...

[TS 24.301, clause 5.5.1.2.5]

If the attach request cannot be accepted by the network, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value.

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the EMM cause value received.

...

#15 (No suitable cells in tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. Additionally, the UE shall reset the attach attempt counter.

In S1 mode, the UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and enter the state EMM-DEREGISTERED.LIMITED-SERVICE. The UE shall search for a suitable cell in another tracking area or in another location area in the same PLMN according to 3GPP TS 36.304 [21].

...

[TS 36.304 subclause 5.2.4.4]

...

If the highest ranked cell is an intra-frequency or inter-frequency cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300s. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under E-UTRAN control to a frequency for which the timer is running, any limitation on that frequency shall be removed.

...

9.2.1.1.17.3 Test description

9.2.1.1.17.3.1 Pre-test conditions

System Simulator:

- cell I, , cell K, cell L and if (p_{x_SinglePLMN_Test} = MultiPLMN) cell J are configured according to table 6.3.2.2-1 in TS 36.508 [18] (maximum 3 cells are simultaneously active):
 - cell I and cell K (visited PLMN, same TA);
 - cell L (same visited PLMN, another TA);
 - If (p_{x_SinglePLMN_Test} = Multi PLMN) cell J (another VPLMN).

NOTE: Different types of UE may use different methods to periodically clear the list of forbidden areas (e.g. every day at 12 am) for roaming. If the list is cleared while the test is being run, it may be necessary to re-run the test.

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell I using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.17.3.2 Test procedure sequence

Table 9.2.1.1.17.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell I as the "Serving cell", Cell K as a "Suitable Neighbour intrafrequency cell", Cell L as a "Non-Suitable Off cell", If present, Cell J as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message, EMM cause = "No suitable cells in tracking area". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell I or Cell K?	-->	ATTACH REQUEST	1	F
7	The SS reconfigures: Cell I as a "Suitable neighbour intrafrequency cell", Cell K as the "Serving cell", Cell L as a "Non-Suitable Off cell", If present, Cell J as a "Non-Suitable Off cell".	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell K or Cell I?	-->	ATTACH REQUEST	2	F
8A	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
9	The SS reconfigures: Cell I as a "Serving cell", Cell K is the "Non-Suitable Off cell", Cell L as a "Non-Suitable Off cell", If present, Cell J as a "Non-Suitable Off cell".	-	-	-	-
9A	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
9B	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
9C	The SS reconfigures: Cell I as a "Suitable Neighbour intrafrequency cell", Cell L as a "Serving cell", If present, Cell J as a "Suitable Neighbour intrafrequency cell".	-	-	-	-
9D	The SS transmits an ATTACH REJECT message, EMM cause = "No suitable cells in tracking area". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
9E	The SS releases the RRC connection.	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified on Cell L?	-->	ATTACH REQUEST	3, 4	P

11	The SS transmits an ATTACH REJECT message, EMM cause = "No suitable cells in tracking area". (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9 and TAI-11)	<--	ATTACH REJECT	-	-
12	The SS releases the RRC connection.	-	-	-	-
13	The SS reconfigures: Cell I as the "Serving cell". Cell K as a "Non-Suitable Off cell", Cell L as a "Suitable Neighbour intrafrequency cell", If present, Cell J as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
14	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	5	F
15	If possible (see ICS) switch off is performed. Otherwise the power is removed.	-	-	-	-
16	The UE is brought back to operation.	-	-	-	-
17	Void	-	-	-	-
18	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	6	P
19-31	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.17.3.3 Specific message contents

Table 9.2.1.1.17.3.3-1: Message ATTACH REJECT (step 4 and 11 Table 9.2.1.1.17.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
Security header type	0000	"No security protection"	
EMM cause	0000 1111	#15 "No suitable cells in tracking area"	
ESM message container	Not present		

Table 9.2.1.1.17.3.3-2: Message ATTACH REQUEST (step 10 Table 9.2.1.1.17.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier	111	"No key is available"	
Old GUTI or IMSI	IMSI-1	GUTI has been deleted after receiving ATTACH REJECT at step 4; only IMSI is available.	
Last visited registered TAI	Not present	TAI has been deleted after receiving ATTACH REJECT at step 4.	

9.2.1.1.18 Attach / Rejected / Not authorized for this CSG

9.2.1.1.18.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to " Not authorized for this
CSG " with integrity protection }
  then { UE shall remove the CSG ID from the allowed CSG list and search for a suitable cell in
the same PLMN }
}
```

(2)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode and the CSG ID is removed from the Allowed CSG
list }
ensure that {
  when { UE detects entering new tracking areas not included in the TAI list }
  then { UE attempts to enter a normal cell and does not choose a cell which not included in the
allowed CSG list }
}
```

9.2.1.1.18.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.5]

#25 (Not authorized for this CSG);

Cause #25 is only applicable when received from a CSG cell. Cause #25 received from a non-CSG cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.6.

If the ATTACH REJECT message with cause #25 was received without integrity protection, then the UE shall discard the message.

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). Additionally, the UE shall reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

The UE shall remove the CSG ID of the cell where the UE has sent the ATTACH REQUEST message from the Allowed CSG list.

The UE shall search for a suitable cell in the same PLMN according to 3GPP TS 36.304 [21].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal attach procedure is rejected with the GMM cause with the same value.

9.2.1.1.18.3 Test description

9.2.1.1.18.3.1 Pre-test conditions

System Simulator:

- cell A (TAC 1, frequency 1, not a CSG cell);
- cell B (TAC 2, frequency 1, is a CSG cell);
- cell D (TAC 3, frequency 1, not a CSG cell).
- System information combination 2 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells A and D;
- System information combination 7 as defined in TS 36.508[18] clause 4.4.3.1 is used in cell B;

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on cell B using manual CSG selection (so the allowed CSG list includes CSG ID of cell B);
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered in E-UTRAN using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.18.3.2 Test procedure sequence

Table 9.2.1.1.18.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as a "Not Suitable cell". - Cell B as a "Serving cell". - Cell D as a "Not Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	UE initiate attach procedure and send ATTACH REQUEST including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "Not authorized for this CSG" with integrity protection.	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	The SS configures: - Cell A as a "Not Suitable cell". - Cell B as a "Serving cell". - Cell D as a "Suitable neighbour intra-frequency cell".	-	-	-	-
-	The following messages are to be observed on Cell D unless explicitly stated otherwise.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message? Note: The UE shall search for a suitable cell in the same PLMN	-->	ATTACH REQUEST	1	P
8	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
9	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
10	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
11	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 12a1 to 12a2 describe behaviour that depends on UE configuration.	-	-	-	-
12a 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
12a 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
13	SS responds with ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 14 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
14	The UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-

14 A	The SS releases the RRC Connection.	-	-	-	-
15	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell". - Cell D as a "Not Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
16	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message in the next 30 seconds?	-->	TRACKING AREA UPDATE REQUEST	2	F
17	The SS configures: - Cell A as a "Serving cell". - Cell B as the "Not Suitable cell". - Cell D as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
18	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
19	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
20	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.1.1.18.3.3 Specific message contents

Table 9.2.1.1.18.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.1.18.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
EMM cause	00011001	#25 " Not authorized for this CSG "	
ESM message container	Not present		

Table 9.2.1.1.18.3.3-2: SystemInformationBlockType1 for Cell A, B, D (Pre-test conditions and all steps in Table 9.2.1.1.18.3.2-1)

Derivation Path: 36.508 clause 4.4.3-2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
csg-Indication	TRUE		Cell B
	FALSE		Cell A
	FALSE		Cell D
csg-Identity	Not present		Cell A
	Not present		Cell D
	'000 0000 0000 0000 0000 0000 0010'B		Cell B

9.2.1.1.19 Attach / Abnormal case / Failure due to non integrity protection

9.2.1.1.19.1 Test Purpose (TP)

(1)

```

with { UE having been initiated an Attach }
ensure that {
  when { UE receives an ATTACH ACCEPT messages without NAS integrity protection before NAS security
mode control procedure being performed }
  then { UE discards this message }
}

```

(2)

```

with { a valid NAS security context exists and the NAS security mode control procedure has been
successfully completed in the network and the UE }
ensure that {
  when { UE receives a valid NAS signalling message without integrity protection }
    then { UE discards this NAS signalling message }
}

```

(3)

```

with { a valid NAS security context exists and the NAS security mode control procedure has been
successfully completed in the network and the UE }
ensure that {
  when { UE receives a valid security protected NAS signalling message with the Message
authentication code set to an incorrect value }
    then { UE discards this NAS signalling message }
}

```

(4)

```

with { a valid NAS security context exists and the NAS security mode control procedure has been
successfully completed in the network and the UE }
ensure that {
  when { UE receives a valid NAS signalling message with integrity protection which require a
response from the UE }
    then { UE sends the response as a security protected NAS message }
}

```

9.2.1.1.19.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 4.4.4.1, 4.4.4.2 and 5.5.2.2.

[TS 24.301, clause 4.4.4.1]

For the UE, integrity protected signalling is mandatory for the NAS messages once a valid EPS security context exists and has been taken into use. For the network, integrity protected signalling is mandatory for the NAS messages once a secure exchange of NAS messages has been established for the NAS signalling connection. Integrity protection of all NAS signalling messages is the responsibility of the NAS. It is the network which activates integrity protection.

...

[TS 24.301, clause 4.4.4.2]

Except the messages listed below, no NAS signalling messages shall be processed by the receiving EMM entity in the UE or forwarded to the ESM entity, unless the secure exchange of NAS messages has been established for the NAS signalling connection:

- EMM messages:
- IDENTITY REQUEST (if requested identification parameter is IMSI);
- AUTHENTICATION REQUEST;
- AUTHENTICATION REJECT;
- ATTACH REJECT;
- DETACH REQUEST;
- DETACH ACCEPT (for non switch off);
- TRACKING AREA UPDATE REJECT;
- SERVICE REJECT.

NOTE: These messages are accepted by the UE without integrity protection, as in certain situations they are sent by the network before security can be activated.

All ESM messages are integrity protected.

Once the secure exchange of NAS messages has been established, the receiving EMM or ESM entity in the UE shall not process any NAS signalling messages unless they have been successfully integrity checked by the NAS. If NAS signalling messages, having not successfully passed the integrity check, are received, then the NAS in the UE shall discard that message. If any NAS signalling message is received as not integrity protected even though the secure exchange of NAS messages has been established by the network, then the NAS shall discard this message.

[TS 24.301, clause 5.5.2.2.1]

...

If the UE is to be switched off, the UE shall:

- delete the current EPS security context stored in the UE as specified in annex C, if it is a mapped EPS security context;
- store the native EPS security context (if it is valid), as specified in annex C; and
- try for a period of 5 seconds to send the DETACH REQUEST message. During this period, the UE may be switched off as soon as the DETACH REQUEST message has been sent.

...

9.2.1.1.19.3 Test description

9.2.1.1.19.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Note: Any type of attach is acceptable.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].
- The NAS integrity algorithm shall be set to a different value than 'EPS integrity algorithm' EIA0 throughout the whole duration of the test.

9.2.1.1.19.3.2 Test procedure sequence

Table 9.2.1.1.19.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message. Note: The ATTACH REQUEST message shall be sent as a security protected NAS message (see TS 24.301 – clause 9.1).	-->	ATTACH REQUEST	-	-
-	EXCEPTION: Steps 2Aa1 to 2Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
2A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
2A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
3	The SS transmits an ATTACH ACCEPT although UE has not successfully completed any NAS security mode control procedure. Note: The ATTACH ACCEPT message is sent as a plain NAS message (see TS 24.301 – clause 9.1).	<--	ATTACH ACCEPT	-	-
4	Check: Does the UE transmit an ATTACH COMPLETE message within the next 3s? Note: The UE is expected to discard the ATTACH ACCEPT message without security protection.	-->	ATTACH COMPLETE	1	F
5	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
6	The UE transmits an AUTHENTICATION RESPONSE message to establish mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
7	The SS transmits a SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
8	The UE transmits a SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
9	The SS transmits an ATTACH ACCEPT without integrity protection. Note: The ATTACH ACCEPT message is sent as a plain NAS message (see TS 24.301 – clause 9.1).	<--	ATTACH ACCEPT	-	-
10	Check: Does the UE transmit an ATTACH COMPLETE message within the next 3s? Note: The UE is expected to discard the ATTACH ACCEPT message without security protection	-->	ATTACH COMPLETE	2	F
11	The SS transmits an ATTACH ACCEPT with integrity protection with the Message authentication code set to an incorrect value.	<--	ATTACH ACCEPT	-	-

	Note: The ATTACH ACCEPT message is sent as a security protected NAS message (see TS 24.301 – clause 9.1).				
12	Check: Does the UE transmit an ATTACH COMPLETE message within the next 3s? Note: The UE is expected to discard the ATTACH ACCEPT message because the integrity check is failed.	-->	ATTACH COMPLETE	3	F
13	The SS transmits an ATTACH ACCEPT message including an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST. Note: The ATTACH ACCEPT message is sent as a security protected NAS message (see TS 24.301 – clause 9.1). Note 1: SS allocates a PDN address of a PDN type which is compliant with the PDN type requested by the UE.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 14 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
14	Check: Does the UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message as specified? Note: The ATTACH COMPLETE message is sent as a security protected NAS message (see TS 24.301 – clause 9.1).	-->	ATTACH COMPLETE	4	P
15	The SS releases the RRC connection.	-	-	-	-
16	Check: Does the test results of test procedure in 36.508 clause 6.4.2.4 indicate that the UE is in E-UTRA EMM-REGISTERED state with S-TMSI-2? Note: This step verifies that the UE has correctly stored the GUTI-4 which was included in the protected ATTACH ACCEPT messages.	-	-	4	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.1.19.3.3 Specific message contents

Table 9.2.1.1.19.3.3-1: Message ATTACH ACCEPT (steps 3 and 9, Table 9.2.1.1.19.3.2-1)

Derivation path: 36.508 table 4.7.2-1 (Plain NAS message)			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2	The SS chooses a value different from GUTI-1.	

Table 9.2.1.1.19.3.3-2: Message SECURITY PROTECTED NAS MESSAGE (step 11, Table 9.2.1.1.19.3.2-1)

Derivation path: 36.508 table 4.7.1-1 with condition CIPHERED			
Information Element	Value/Remark	Comment	Condition
Message authentication code	Incorrect value	The SS chooses an incorrect value which fails integrity checks. (e.g. 00000000)	
NAS message	ATTACH ACCEPT (see table 9.2.1.1.19.3.3-3)		

Table 9.2.1.1.19.3.3-3: Message ATTACH ACCEPT (step 11, Table 9.2.1.1.19.3.2-1)

Derivation path: 36.508 table 4.7.2-1 (Security protected NAS message)			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-3	The SS chooses a value different from GUTI-1 and GUTI-2.	

Table 9.2.1.1.19.3.3-4: Message ATTACH ACCEPT (step 13, Table 9.2.1.1.19.3.2-1)

Derivation path: 36.508 table 4.7.2-1 (Security protected NAS message)			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-4	The SS chooses a value different from GUTI-1, GUTI-2 and GUTI-3.	

9.2.1.1.20 Attach / Abnormal case / Access barred because of access class barring or NAS signalling connection establishment rejected by the network

9.2.1.1.20.1 Test Purpose (TP)

(1)

```
with { UE switched-on, and not yet attached to EPS }
ensure that {
  when { Access is barred for signalling in the cell UE is camping [Access Class barred in System information] }
  then { the UE will not initiate any Attach procedure on the current cell }
}
```

(2)

```
with { UE switched-on, and not yet attached to EPS }
ensure that {
  when { Access is barred for signalling in the cell UE is camping [T302 running due to RRCConnectionReject message reception] }
  then { the UE will not initiate any Attach procedure on the current cell }
}
```

(3)

```
with { UE switched-on, and not yet attached to EPS }
ensure that {
  when { Access is not barred for signalling in the cell UE is camping }
  then { the UE will initiate Attach procedure on the current cell }
}
```

(4)

```
with { UE switched-on, and not yet attached to EPS }
ensure that {
```

```

when { Access was barred for signalling in the cell and UE has reselected an new cell where access
for "signalling" is granted }
  then { the UE will initiate Attach procedure on the new cell }
}

```

9.2.1.1.20.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6 and TS 36.331, clause 5.3.3.2

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

- a) Access barred because of access class barring or NAS signalling connection establishment rejected by the network

If access is barred for "signalling" (see 3GPP TS 36.331 [22]), the attach procedure shall not be started. The UE stays in the current serving cell and applies the normal cell reselection process. The attach procedure is started as soon as possible, i.e. when access for "signalling" is granted on the current cell or when the UE moves to a cell where access for "signalling" is granted.

[TS 36.331, clause 5.3.3.2]

- 1> else (the UE is establishing the RRC connection for mobile originating signalling):
 - 2> if timer T302 or T305 is running:
 - 3> consider access to the cell as barred;
 - 2> else if *SystemInformationBlockType2* includes the *ac-BarringInformation* and the *ac-BarringForMO-Signalling* is present:
 - 3> if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15, which is valid for the UE to use according to TS 22.011 [10] and TS 23.122 [11], and
 - 3> for at least one of these Access Classes the corresponding bit in the *ac-BarringForSpecialAC* contained in *ac-BarringForMO-Signalling* is set to zero:
 - 4> consider access to the cell as not barred;
 - 3> else:
 - 4> draw a random number '*rand*' uniformly distributed in the range: $0 \leq rand < 1$;
 - 4> if '*rand*' is lower than the value indicated by *accessProbabilityFactor* included in *accessBarringForSignalling*:
 - 5> consider access to the cell as not barred;
 - 4> else:
 - 5> consider access to the cell as barred;
 - 2> else:
 - 3> consider access to the cell as not barred;

9.2.1.1.20.3 Test description

9.2.1.1.20.3.1 Pre-test conditions

System Simulator:

- cell I and cell K are configured according to table 6.3.2.2-1 in TS 36.508 [18].
- cell I and cell K belong to TAI-9 (home PLMN)

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell K using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.20.3.2 Test procedure sequence

Table 9.2.1.1.20.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS sets the cell type of cell I to the "Serving cell", set the cell type of cell K to the "Non- Suitable cell", and sets SystemInformationBlockType2 parameters as described below. The UE is switched on.	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
2	Check: For 90 seconds if UE initiates Attach procedure and hence transmits RRC Connection Request?	-	-	1	F
3	The SS transmits a Paging message including systemInfoModification.	-	-	-	-
4	The SS changes SystemInformationBlockType2 parameters to default parameters defined in [18].	-	-	-	-
5	The UE transmits RRC Connection Request	-	-	-	-
6	SS responds with <i>RRCCConnectionReject</i> message with IE <i>waitTime</i> set to 10 seconds (Max Value).	-	-	-	-
7	Check: For 10 seconds if UE initiates Attach procedure and hence transmits RRC Connection Request?	-	-	2	F
8	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	3	P
9	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
10	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
11	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
12	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 12Aa1 to 12Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
12 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
12 Aa 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
13	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message Note: The IP addresses of the UE are not allocated in this test so PDN address is not included in the message.	<--	ATTACH ACCEPT	-	-
14	Check: Does the UE transmit an ATTACH	-->	ATTACH COMPLETE	-	-

	COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?				
15	The SS releases the RRC connection.	-	-	-	-
16	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 16a describes behaviour that depends on the UE capability.				
16a	If pc_SwitchOnOff or pc_USIM_Removal then UE sends DETACH REQUEST message	-->	DETACH REQUEST		
17	The SS sets the cell type of cell I to the "Serving cell", sets the cell type of cell K to the " Non- Suitable cell", and sets SystemInformationBlockType1 and SystemInformationBlockType2 parameters as described below. The UE is brought back to operation or the USIM is inserted.	-	-	-	-
18	Check: for 90 seconds if UE initiates Attach procedure and hence transmits RRC Connection Request?	-	-	1	F
19	The SS sets the cell type of cell K to the "serving cell" and cell I to "suitable Cell".				
-	The following messages are to be observed on Cell K unless explicitly stated otherwise.	-	-	-	-
20	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P
21-32	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.1.20.3

Specific message contents

Table 9.2.1.1.20.3.3-1: SystemInformationBlockType2 for Cell I (step 1 and 17)

Derivation Path: 36.508, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType2 ::= SEQUENCE {			
accessBarringInformation SEQUENCE {			
accessBarringForEmergencyCalls	FALSE		
accessBarringForSignalling SEQUENCE {			
accessProbabilityFactor	p00		
accessBarringTime	s4		
accessClassBarringList SEQUENCE (SIZE (maxAC)) OF SEQUENCE {	5 entries		
accessClassBarring[1]	TRUE		
accessClassBarring[2]	TRUE		
accessClassBarring[3]	TRUE		
accessClassBarring[4]	TRUE		
accessClassBarring[5]	TRUE		
}			
}			
accessBarringForOriginatingCalls	Not present		
}			
}			

Table 9.2.1.1.20.3.3-2: SystemInformationBlockType1 for Cell I (step 17)

Derivation Path: 36.508, Table 4.4.3.2-3			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
intraFreqReselection	allowed		
}			
}			

9.2.1.1.21 Attach / Abnormal case / Success after several attempts due to no network response

9.2.1.1.21.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message and started T3410 timer}
ensure that {
  when { T3410 timer expires }
  then { the UE release NAS signalling connection locally}
}
```

(2)

```
with { UE has sent an ATTACH REQUEST message and T3410 timer expired}
ensure that {
  when { T3411 timer expires and attach attempt counter is less than 5 }
  then { the UE restarts the attach procedure}
```

(3)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { Lower Layer failure (RRC Connection is released) before the ATTACH ACCEPT or ATTACH REJECT
message is received, T3411 has expired and attach attempt counter is less than 5}
  then { the UE restarts the attach procedure }
}
```

9.2.1.1.21.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6 & 10.2

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

...

- b) Lower layer failure or release of the NAS signalling connection before the ATTACH ACCEPT or ATTACH REJECT message is received

The attach procedure shall be aborted, and the UE shall proceed as described below.

- c) T3410 timeout

The UE shall abort the attach procedure and proceed as described below. The NAS signalling connection shall be released locally.

...

For the cases b, c, and d the UE shall proceed as follows:

- Timer T3410 shall be stopped if still running. The attach attempt counter shall be incremented, unless it was already set to 5.

If the attach attempt counter is less than 5:

- timer T3411 is started and the state is changed to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH. When timer T3411 expires the attach procedure shall be restarted.

[TS 24.301, clause 10.2]

Table 10.2.1: EPS mobility management timers – UE side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
...					
T3410	15s	EMM-REGISTERED-INITIATED	ATTACH REQUEST sent	ATTACH ACCEPT received ATTACH REJECT received	Start T3411 or T3402 as described in subclause 5.5.1.2.6
T3411	10s	EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH EMM-REGISTERED.ATTEMPTING-TO-UPDATE	At attach failure due to lower layer failure, T3410 timeout or attach rejected with other EMM cause values than those treated in subclause 5.5.1.2.5. At tracking area updating failure due to lower layer failure, T3430 timeout or TAU rejected with other EMM cause values than those treated in subclause 5.5.3.2.5.	ATTACH REQUEST sent TRACKING AREA UPDATE REQUEST sent	Retransmission of the ATTACH REQUEST or TRACKING AREA UPDATE REQUEST

9.2.1.1.21.3 Test description

9.2.1.1.21.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.21.3.2 Test procedure sequence

Table 9.2.1.1.21.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message.	-->	ATTACH REQUEST	-	-
3	The SS waits 20 seconds (15 seconds T3410 and 5 seconds half of T3411).	-		-	-
4	SS transmits an IDENTITY REQUEST message requesting IMSI in the IE Identity type	<--	IDENTITY REQUEST	-	-
	Exception: In parallel with steps 5 and 6, the parallel behaviour defined in table 9.2.1.1.1.3.2-2 is running.				
5	The SS waits 5 seconds (half of T3411)	-	-	-	-
6	Check: The UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
7	The SS releases the RRC connection.				
8	The SS waits 10 seconds (T3411).				
9	Check: The UE transmits an ATTACH REQUEST message?	-->	ATTACH REQUEST	3	P
10-21	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

Table 9.2.1.1.21.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does the UE send an IDENTITY RESPONSE message?	-->	IDENTITY RESPONSE	1	F

9.2.1.1.21.3.3 Specific message contents

None

9.2.1.1.22 Attach / Abnormal case / Unsuccessful attach after 5 attempts

9.2.1.1.22.1 Test Purpose (TP)

(1)

```

with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { T3411 has expired and attach attempt counter is equal to 5}
  then { the UE stops attach attempts and starts timer T3402 }
}

```

9.2.1.1.22.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6 & 10.2

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

...

- b) Lower layer failure or release of the NAS signalling connection before the ATTACH ACCEPT or ATTACH REJECT message is received

The attach procedure shall be aborted, and the UE shall proceed as described below.

- c) T3410 timeout

The UE shall abort the attach procedure and proceed as described below. The NAS signalling connection shall be released locally.

...

For the cases b, c, and d the UE shall proceed as follows:

- Timer T3410 shall be stopped if still running. The attach attempt counter shall be incremented, unless it was already set to 5.

If the attach attempt counter is less than 5:

- timer T3411 is started and the state is changed to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH. When timer T3411 expires the attach procedure shall be restarted.

If the attach attempt counter is equal to 5:

- the UE shall delete any GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs and KSI, shall set the update status to EU2 NOT UPDATED, and shall start timer T3402. The state is changed to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH or optionally to EMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the abnormal case when a normal attach procedure fails and the attach attempt counter is equal to 5.

[TS 24.301, clause 10.2]

Table 10.2.1: EPS mobility management timers – UE side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
T3402	Default 12 min. NOTE 1	EMM-DEREGISTERED EMM-REGISTERED	At attach failure and the attempt counter is equal to 5. At tracking area updating failure and the attempt counter is equal to 5.	ATTACH REQUEST sent TRACKING AREA UPDATE REQUEST sent	Initiation of the attach procedure or TAU procedure
...					
T3410	15s	EMM-REGISTERED-INITIATED	ATTACH REQUEST sent	ATTACH ACCEPT received ATTACH REJECT received	Start T3411 or T3402 as described in subclause 5.5.1.2.6
T3411	10s	EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH EMM-REGISTERED.ATTEMPTING-TO-UPDATE	At attach failure due to lower layer failure, T3410 timeout or attach rejected with other EMM cause values than those treated in subclause 5.5.1.2.5. At tracking area updating failure due to lower layer failure, T3430 timeout or TAU rejected with other EMM cause values than those treated in subclause 5.5.3.2.5.	ATTACH REQUEST sent TRACKING AREA UPDATE REQUEST sent	Retransmission of the ATTACH REQUEST or TRACKING AREA UPDATE REQUEST
...					
Note 1: The default value of this timer is used if the network does not indicate another value in an EMM signalling procedure.					

9.2.1.1.22.3 Test description

9.2.1.1.22.3.1 Pre-test conditions

System Simulator:

- cell A.

Note: T3402 is set to default (12 min).

UE:

- the UE is configured to initiate EPS attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.22.3.2 Test procedure sequence

Table 9.2.1.1.22.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 1)	-->	ATTACH REQUEST	-	-
3	The SS waits 25 seconds (15 seconds T3410 and 10 seconds T3411).	-		-	-
4	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 2)	-->	ATTACH REQUEST	-	-
5	The SS releases the RRC connection.				
6	The SS waits 10 seconds (T3411).				
7	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 3)	-->	ATTACH REQUEST	-	-
8	The SS waits 25 seconds (15 seconds T3410 and 10 seconds T3411).	-		-	-
9	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 4)	-->	ATTACH REQUEST	-	-
10	The SS releases the RRC connection.				
11	The SS waits 10 seconds (T3411).				
12	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 5)	-->	ATTACH REQUEST		
13	The SS releases the RRC connection.				
14	Check: Does the UE transmit an ATTACH REQUEST message after 12 minutes (default value of T3402, after step 13)?	-->	ATTACH REQUEST	1	P
15-26	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.1.22.3.3 Specific message contents

Table 9.2.1.1.22.3.3-1: Message ATTACH REQUEST (step 14, Table 9.2.1.1.22.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS keyset identifier	111	"No key is available"	
Old GUTI or IMSI	IMSI-1	GUTI has been deleted; only IMSI is available.	
Last visited registered TAI	Not present	TAI has been deleted.	

9.2.1.1.23 Attach / Abnormal case / Repeated rejects for network failures

9.2.1.1.23.1 Test Purpose (TP)

(1)

```

with { UE having valid GUTI, has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to #17 or #22 and attach
attempt counter is less than 5}
    then { UE starts timer T3411 and shall not delete stored GUTI }
    when { Timer T3411 expires}
    then { UE restarts attach procedure }
}

```

(2)

```

with { UE having valid GUTI, has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to #22 and attempt counter
is set to 5}
    then { the UE stops attach attempts and starts timer T3402, shall delete stored GUTI }
}

```

NOTE: Only representative coverage for various abnormal reject causes is provided.

9.2.1.1.23.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.5, 5.5.1.2.6, 9.9.3.9 & 10.2

[TS 24.301, clause 5.5.1.2.5]

If the attach request cannot be accepted by the network, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value. If the attach procedure fails due to a default EPS bearer setup failure, an ESM procedure failure, or operator determined barring is applied on default EPS bearer context activation during attach procedure, the MME shall combine the ATTACH REJECT message with a PDN CONNECTIVITY REJECT message contained in the ESM message container information element. In this case the EMM cause value in the ATTACH REJECT message shall be set to #19 "ESM failure".

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410 and take the following actions depending on the EMM cause value received.

...

Other values are considered as abnormal cases. The behaviour of the UE in those cases is specified in subclause 5.5.1.2.6.

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

...

d) ATTACH REJECT, other EMM cause values than those treated in subclause 5.5.1.2.5

Upon reception of the EMM cause #19, "ESM failure", the UE may set the attach attempt counter to 5. Upon reception of the EMM causes #95, #96, #97, #99 and #111 the UE should set the attach attempt counter to 5.

The UE shall proceed as described below.

...

For the cases b, c, and d the UE shall proceed as follows:

- Timer T3410 shall be stopped if still running. The attach attempt counter shall be incremented, unless it was already set to 5.

If the attach attempt counter is less than 5:

- timer T3411 is started and the state is changed to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH. When timer T3411 expires the attach procedure shall be restarted.

If the attach attempt counter is equal to 5:

- the UE shall delete any GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs and KSI, shall set the update status to EU2 NOT UPDATED, and shall start timer T3402. The state is changed to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH or optionally to EMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the abnormal case when a normal attach procedure fails and the attach attempt counter is equal to 5.

[TS 24.301, clause 9.9.3.9]

Table 9.9.3.9.1: EMM cause information element

Cause value (octet 2)								
Bits								
8	7	6	5	4	3	2	1	
0	0	0	1	0	0	0	1	...
0	0	0	1	0	0	1	0	Network failure
0	0	0	1	0	0	1	1	CS domain not available
0	0	0	1	0	0	1	1	ESM failure
0	0	0	1	0	1	0	0	MAC failure
0	0	0	1	0	1	0	1	Synch failure
0	0	0	1	0	1	1	0	Congestion
0	0	0	1	0	1	1	1	UE security capabilities mismatch
								...
Any other value received by the mobile station shall be treated as 0110 1111, "protocol error, unspecified". Any other value received by the network shall be treated as 0110 1111, "protocol error, unspecified".								

[TS 24.301, clause 10.2]

Table 10.2.1: EPS mobility management timers – UE side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
T3402	Default 12 min. NOTE 1	EMM- DEREGISTERED EMM- REGISTERED	At attach failure and the attempt counter is equal to 5. At tracking area updating failure and the attempt counter is equal to 5.	ATTACH REQUEST sent TRACKING AREA UPDATE REQUEST sent	Initiation of the attach procedure or TAU procedure
...					
T3410	15s	EMM- REGISTERED- INITIATED	ATTACH REQUEST sent	ATTACH ACCEPT received ATTACH REJECT received	Start T3411 or T3402 as described in subclause 5.5.1.2.6
T3411	10s	EMM- DEREGISTERED. ATTEMPTING- TO-ATTACH EMM- REGISTERED. ATTEMPTING- TO-UPDATE	At attach failure due to lower layer failure, T3410 timeout or attach rejected with other EMM cause values than those treated in subclause 5.5.1.2.5. At tracking area updating failure due to lower layer failure, T3430 timeout or TAU rejected with other EMM cause values than those treated in subclause 5.5.3.2.5.	ATTACH REQUEST sent TRACKING AREA UPDATE REQUEST sent	Retransmission of the ATTACH REQUEST or TRACKING AREA UPDATE REQUEST
...					
Note 1: The default value of this timer is used if the network does not indicate another value in an EMM signalling procedure.					

9.2.1.1.23.3 Test description

9.2.1.1.23.3.1 Pre-test conditions

System Simulator:

- cell A.

Note: T3402 is set to default (12 min.).

UE:

- the UE is configured to initiate EPS attach
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.23.3.2 Test procedure sequence

Table 9.2.1.1.23.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 1)	-->	ATTACH REQUEST	-	-
3	The SS transmits an ATTACH REJECT message, EMM cause = Network failure (#17)	<--	ATTACH REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	The SS waits 10 seconds (T3411).	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message? (Attach attempt counter = 2)	-->	ATTACH REQUEST	1	P
7	The SS transmits an ATTACH REJECT message, EMM cause = Network failure (#17)	<--	ATTACH REJECT	-	-
8	The SS releases the RRC connection.	-	-	-	-
9	The SS waits 10 seconds (T3411).	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message? (Attach attempt counter = 3)	-->	ATTACH REQUEST	1	P
11	The SS transmits an ATTACH REJECT message, EMM cause = Congestion (#22)	<--	ATTACH REJECT	-	-
12	The SS releases the RRC connection.	-	-	-	-
13	The SS waits 10 seconds (T3411).	-	-	-	-
14	Check: Does the UE transmit an ATTACH REQUEST message? (Attach attempt counter = 4)	-->	ATTACH REQUEST	-	-
15	The SS transmits an ATTACH REJECT message, EMM cause = Congestion (#22)	<--	ATTACH REJECT	1	-
16	The SS releases the RRC connection.	-	-	-	-
17	The SS waits 10 seconds (T3411).	-	-	-	-
18	The UE transmits an ATTACH REQUEST message. (Attach attempt counter = 5)	-->	ATTACH REQUEST	1	P
19	The SS transmits an ATTACH REJECT message, EMM cause = Congestion (#22)	<--	ATTACH REJECT	-	-
20	The SS releases the RRC connection.	-	-	-	-
21	The SS waits 12 minutes (default value of T3402).	-	-	-	-
22	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
23-34	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.1.23.3.3 Specific message contents

Table 9.2.1.1.23.3.3-1: Message ATTACH REQUEST (step 2, 6, 10 & 14 Table 9.2.1.1.23.2-1)

Derivation path: TS 36.508 table 4.7.2.-4			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier	Any allowed value other than '111'B	"Stored key is available"	
Old GUTI or IMSI	GUTI-1	As stored in USIM	
Last visited registered TAI	TAI-1	Stored TAI.	

Table 9.2.1.1.23.3.3-2: Message ATTACH REJECT (steps 3 & 7 Table 9.2.1.1.23.3.2-1)

Derivation path: 36.508 table 4.7.2.3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	" Plain NAS message, not security protected "	
EMM cause	00010001	#17 " Network failure "	
ESM message container	Not present		

Table 9.2.1.1.23.3.3-3: Message ATTACH REJECT (steps 11, 15 & 19 Table 9.2.1.1.23.3.2-1)

Derivation path: 36.508 table 4.7.2.3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	" Plain NAS message, not security protected "	
EMM cause	00010110	#22 "Congestion "	
ESM message container	Not present		

Table 9.2.1.1.23.3.3-4: Message ATTACH REQUEST (step 22, Table 9.2.1.1.23.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2.4			
Information Element	Value/remark	Comment	Condition
NAS keyset identifier	111	"No key is available"	
Old GUTI or IMSI	IMSI-1	GUTI has been deleted; only IMSI is available.	
Last visited registered TAI	Not present	TAI has been deleted.	

9.2.1.1.24 Attach / Abnormal case / Change of cell into a new tracking area

9.2.1.1.24.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH Request message }
ensure that {
  when { cell change into a new tracking area occurs before the ATTACH procedure is completed }
  then { the UE aborts the ATTACH procedure and re-initiates it immediately in the new tracking area }
}
```

(2)

```
with { UE has sent an ATTACH REQUEST message and received ATTACH ACCEPT message containing GUTI }
ensure that {
  when { UE reselects a cell belonging to a new tracking area }
  then { the UE restarts the attach procedure }
}
```

9.2.1.1.24.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6 and 5.5.1.3.6.

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

...

e) Change of cell into a new tracking area

If a cell change into a new tracking area occurs before the attach procedure is completed, the attach procedure shall be aborted and re-initiated immediately. If a tracking area border is crossed when the ATTACH ACCEPT message has been received but before an ATTACH COMPLETE message is sent, the attach procedure shall be re-initiated. If a GUTI was allocated during the attach procedure, this GUTI shall be used in the attach procedure.

[TS 24.301, clause 5.5.1.3.6]

The UE shall proceed as follows:

...

- otherwise, the abnormal cases specified in subclause 5.5.1.2.6 apply with the following modification.

If the attach attempt counter is incremented according to subclause 5.5.1.2.6 the next actions depend on the value of the attach attempt counter:

9.2.1.1.24.3 Test description

9.2.1.1.24.3.1 Pre-test conditions

System Simulator:

- cells A and B:
 - cell A is the serving cell with TAI 1 (PLMN1+TAC1);
 - cell B is the non-suitable cell with TAI 2 (PLMN1+TAC2).
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells;

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

NOTE: Any type of attach is acceptable.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.24.3.2 Test procedure sequence

Table 9.2.1.1.24.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
0A	The SS configures: - Cell B as a "serving cell" - Cell A as a "non-suitable cell".	-	-	-	-
1	The UE is switched on.	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message in Cell B including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
3	SS does not send ATTACH ACCEPT to the UE and update TAC value in <i>SystemInformationBlockType1</i> .	-		-	-
3A	The SS transmits a <i>Paging</i> message paging occasion including a <i>systemInfoModification</i> . From the beginning of the next modification period the SS transmits a modified <i>SystemInformationBlockType1</i> as specified.	<--	Paging	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message in Cell B including a PDN CONNECTIVITY REQUEST message in the next 12 seconds? Note: Wait time is more than 2.1* modification period for the UE to receive system information and inferior to T3410.	-->	ATTACH REQUEST	1	P
4A	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
5	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
6	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
7	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
	EXCEPTION: Steps 8a to 8b describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
8a	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
8b	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
9	The SS configures: - Cell A as a "serving cell"	-	-	-	-
10	SS is configured to not allocate any UL grant or respond to any PRACH preambles for ATTACH COMPLETE in Cell B.	-	-	-	-
11	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message. GUTI-1 is allocated.	<--	ATTACH ACCEPT	-	-
12	The SS configures:	-	-	-	-

	- Cell B as a "non-suitable cell".				
13	UE transmits <i>RRCConnectionReestablishmentRequest</i> message in Cell A	-	-	-	-
14	SS Sends <i>RRCConnectionReestablishment</i>	-	-	-	-
15	The UE transmits a <i>RRCConnectionReestablishmentComplete</i> message	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
16	Check: Does the UE transmit an ATTACH REQUEST message, containing GUTI 1?	-->	ATTACH REQUEST	2	P
17	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 13 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
18	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
19	The SS releases the RRC connection.	-	-	-	-
NOTE 1: UE already has NAS security context in step 17 and just sending a DL message with Integrity and Ciphering will start enable NAS security.					

9.2.1.1.24.3.3 Specific message contents

Table 9.2.1.1.24.3.3-1: Message ATTACH ACCEPT (step 11, Table 9.2.1.1.24.3.2-1)

Derivation path: TS 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list			
Length of tracking area identity list contents	'0000 0110'B		
Partial tracking area identity list 1			
Number of elements	'0 0000'B		
Type of list	'00'B		
MCC	MCC of cell B		
MNC	MNC of cell B		
TAC 1	TAC-4		
GUTI	GUTI-1		

Table 9.2.1.1.24.3.3-2: SystemInformationBlockType1 for Cell B (From step 3 in Table 9.2.1.1.24.3.2-1)

Derivation Path: 36.508 clause 4.4.3.2-3			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
trackingAreaCode	TAC =4		
}			
}			
}			

Table 9.2.1.1.24.3.3-3: Paging (step 3A, Table 9.2.1.1.24.3.2-1)

Derivation Path: 36.508 Table 4.6.1-7			
Information Element	Value/remark	Comment	Condition
Paging ::= SEQUENCE {			
pagingRecordList	Not present		
systemInfoModification	true		
}			

Table 9.2.1.1.24.3.3-4: Message ATTACH REQUEST (step 16, Table 9.2.1.1.24.3.2-1)

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Last visited registered TAI	TAI of cell B with TAC-4		

9.2.1.1.25 Attach / Abnormal case / Mobile originated detach required

9.2.1.1.25.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED-INITIATED state }
ensure that {
  when { the UE initiates mobile originated detach }
  then { the UE aborts the attach procedure }
}
```

9.2.1.1.25.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6 and 5.5.1.3.6

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

f) Mobile originated detach required

The attach procedure shall be aborted, and the UE initiated detach procedure shall be performed.

[TS 24.301, clause 5.5.1.3.6]

The UE shall proceed as follows:

...

- otherwise, the abnormal cases specified in subclause 5.5.1.2.6 apply with the following modification.

If the attach attempt counter is incremented according to subclause 5.5.1.2.6 the next actions depend on the value of the attach attempt counter:

9.2.1.1.25.3 Test description

9.2.1.1.25.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

None.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.25.3.2 Test procedure sequence

Table 9.2.1.1.25.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message. (NOTE 2)	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
6	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
7	The SS does not respond to ATTACH REQUEST message.	-	-	-	-
7A	Cause UE to initiate detach before the T3410 times out. (NOTE 1)	-	-	-	-
8	Check: Does the UE initiate mobile originated detach and abort the attach procedure while T3410 is running?	-->	DETACH REQUEST	1	P
9	The SS transmits DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
9A	The SS releases the RRC connection.	-	-	-	-
10	Check: Does the test result of CALL generic procedure "Test procedure for no response to paging (for NAS testing)" clause 6.4.2.5 [18] indicates that the UE responds to paging when paged with S-TMSI included in GUTI-1 and with CN domain indicator set to "PS"?	-	-	1	-
11	Void	-	-	-	-

NOTE 1: T3410 value is specified as 15s in TS 24.301.
NOTE 2: Any type of attach is acceptable.

9.2.1.1.25.3.3 Specific message contents

Table 9.2.1.1.25.3.3-1: Message DETACH REQUEST (step 8, Table 9.2.1.1.25.3.2-1)

Derivation path: 36.508 table 4.7.2-11			
Information Element	Value/Remark	Comment	Condition
Detach type			
Type of detach	001 or 011	EPS detach or combined EPS/IMSI detach	
Switch off	0	Normal detach	

9.2.1.1.26 Attach / Abnormal case / Detach procedure collision

9.2.1.1.26.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED-INITIATED state }
ensure that {
  when { UE receives a DETACH REQUEST message and detach type indicates "re-attach not required" }
  then { the UE sends DETACH ACCEPT }
}

```

(2)

```

with { UE in EMM-REGISTERED-INITIATED state }
ensure that {
  when { UE receives a DETACH REQUEST message and detach type indicates "re-attach required" }
  then { the UE continues with ATTACH procedure }
}

```

9.2.1.1.26.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6, 5.5.1.3.6.

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

...

g) Detach procedure collision

If the UE receives a DETACH REQUEST message from the network in state EMM-REGISTERED-INITIATED and the detach type indicates "re-attach not required", the detach procedure shall be progressed and the attach procedure shall be aborted. Otherwise the attach procedure shall be progressed and the DETACH REQUEST message shall be ignored.

[TS 24.301, clause 5.5.1.3.6]

The UE shall proceed as follows:

...

- otherwise, the abnormal cases specified in subclause 5.5.1.2.6 apply with the following modification.

If the attach attempt counter is incremented according to subclause 5.5.1.2.6 the next actions depend on the value of the attach attempt counter:

9.2.1.1.26.3 Test description

9.2.1.1.26.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

None.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.26.3.2 Test procedure sequence

Table 9.2.1.1.26.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message. (NOTE 2)	-->	ATTACH REQUEST	-	-
3	The SS initiates Detach procedure with the Detach Type IE "re-attach not required"	<--	DETACH REQUEST	-	-
4	Check: Does the UE send DETACH ACCEPT message?	-->	DETACH ACCEPT	1	P
5	The SS releases the RRC connection.	-	-	-	-
5A	The SS waits 5 seconds (NOTE 1)	-	-	-	-
6	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
6A	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
7	The UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message . (NOTE 2)	-->	ATTACH REQUEST	-	-
8	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure	<--	AUTHENTICATION REQUEST	-	-
9	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
10	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
11	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 12a1 to 12a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
12a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
12a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
13	The SS initiates Detach procedure with the Detach Type IE "re-attach required"	<--	DETACH REQUEST	-	-
-	EXCEPTION: In parallel with steps 14 to 16, the parallel behaviour defined in table 9.2.1.1.26.3.2-2 is running.	-	-	-	-
14	SS responds with ATTACH ACCEPT message including a valid TAI list. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message. GUTI-1 is allocated.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in steps 15 to 16 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
15	The UE transmits an ATTACH COMPLETE	-->	ATTACH COMPLETE	2	P

	message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?				
16	The SS waits 5 seconds (NOTE 1)	-	-	-	-
17	The SS releases the RRC connection.	-	-	-	-
NOTE 1: The time delay is added to additionally guarantee UE has respected the content of the DETACH REQUEST message.					
NOTE 2: Any type of attach is acceptable.					

Table 9.2.1.1.26.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does the UE send DETACH ACCEPT message?	-->	DETACH ACCEPT	2	F

9.2.1.1.26.3.3 Specific message contents

Table 9.2.1.1.26.3.3-1: Message DETACH REQUEST (step 3, Table 9.2.1.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	'010'B	"re-attach not required"	
EMM cause	'07'H	EPS services not allowed	

Table 9.2.1.1.26.3.3-2: Message DETACH REQUEST (step 13, Table 9.2.1.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	'001'B	"re-attach required"	
EMM cause	NOT PRESENT		

9.2.1.1.27 Attach / Abnormal case / Network reject with Extended Wait Timer

9.2.1.1.27.1 Test Purpose (TP)

(1)

```

with { UE configured for low access priority, has sent an ATTACH REQUEST message with NAS low
priority signalling indication }
ensure that {
  when { UE receives "Extended Wait Time" in the RRCConnectionRelease message }
  then { UE starts timer T3346 and abort the attach procedure }
}

```

(2)

```

with { UE having aborted attach procedure and with timer T3346 running }
ensure that {
  when { Timer T3346 expires }
  then { UE restarts attach procedure }
}

```

9.2.1.1.27.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.6

[TS 24.301, clause 5.5.1.2.6]

The following abnormal cases can be identified:

...

l) "Extended wait time" from the lower layers

If the ATTACH REQUEST message contained the NAS signalling low priority indicator set to "MS is configured for NAS signalling low priority", the UE shall start timer T3346 with the "Extended wait time" value.

In other cases the UE shall ignore the "Extended wait time".

The UE shall abort the attach procedure, reset the attach attempt counter, stay in the current serving cell, change the state to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH and apply the normal cell reselection process.

The UE shall proceed as described below.

m) Timer T3346 is running

The UE shall not start the attach procedure unless the UE is accessing the network with access class 11 – 15 or needs to attach for emergency bearer services. The UE stays in the current serving cell and applies the normal cell reselection process.

NOTE: It is considered an abnormal case if the UE needs to initiate an attach procedure while timer T3346 is running independent on whether timer T3346 was started due to an abnormal case or a non successful case.

The UE shall proceed as described below.

For the cases b, c, and d the UE shall proceed as follows:

- Timer T3410 shall be stopped if still running. The attach attempt counter shall be incremented, unless it was already set to 5.

If the attach attempt counter is less than 5:

- for the cases l and m, the attach procedure is started, if still necessary, when timer T3346 expires or is stopped;
- for all other cases, timer T3411 is started and the state is changed to EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH. When timer T3411 expires the attach procedure shall be restarted, if still required by ESM sublayer.

9.2.1.1.27.3 Test description

9.2.1.1.27.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is configured to initiate EPS attach
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].
- the UE is configured for NAS signalling low priority

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.27.3.2 Test procedure sequence

Table 9.2.1.1.27.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message. (Device properties IE included)	-->	ATTACH REQUEST	-	-
3	The SS releases the RRC connection.	-	The SS includes the IE "Extended Wait Time" in the <i>RRCConnectionRelease</i> message. UE starts timer T3346 with the value 5 seconds	-	-
4	The SS waits 5 seconds (T3346).	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	1,2	P
6-17	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.1.27.3.3 Specific message contents

Table 9.2.1.1.27.3.3-1: Message ATTACH REQUEST (step 2 and 6 Table 9.2.1.1.27.2-1)

Derivation path: TS 36.508 table 4.7.2.-4			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier	Any allowed value other than '111'B	"Stored key is available"	
Old GUTI or IMSI	GUTI-1	As stored in USIM	
Last visited registered TAI	TAI-1	Stored TAI.	
Device properties	1	"MS is configured for NAS signalling low priority"	

Table 9.2.1.1.27.3.3-2: *RRCConnectionRelease* (step 3 Table 9.2.1.1.27.2-1)

Derivation Path: 36.508 Table 4.6.1-15			
Information Element	Value/remark	Comment	Condition
<i>RRCConnectionRelease</i> ::= SEQUENCE {			
<i>criticalExtensions</i> CHOICE {			
c1 CHOICE {			
<i>rrcConnectionRelease-r8</i> SEQUENCE {			
<i>nonCriticalExtension</i> SEQUENCE {		<i>RRCConnectionRelease-v890</i> -IEs	
<i>lateNonCriticalExtension</i>	Not Present		
<i>nonCriticalExtension</i> SEQUENCE {		<i>RRCConnectionRelease-v920</i> -IEs	
<i>cellInfoList-r9</i>	Not Present		
<i>nonCriticalExtension</i> SEQUENCE {		<i>RRCConnectionRelease-v1020</i> -IEs	
<i>extendedWaitTime-r10</i>	5 seconds		
<i>nonCriticalExtension</i>	Not Present		
}			
}			
}			
}			
}			
}			
}			

9.2.1.1.28 Attach / Success / IMS

9.2.1.1.28.1 Test Purpose (TP)

(1)

```

with { the UE is switched-off and supports IMS}
ensure that {
  when { UE is powered on }
  then { the UE transmits an ATTACH REQUEST message and a PDN CONNECTIVITY REQUEST message with
request for SIP signalling }
}

```

(2)

```

with { the UE is switched-off and supports method II for P-CSCF discovery}
ensure that {
  when { UE is powered on }
  then { the UE transmits an ATTACH REQUEST message and a PDN CONNECTIVITY REQUEST message with
method II for P-CSCF discovery }
}

```

(3)

```

with { the UE supports conversational speech }
ensure that {
  when { UE is available for calls }
  then { the UE performs an initial IMS registration }
}

```

9.2.1.1.28.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.229, clauses L.2.2.1 and L.3.1.2. Unless otherwise stated these are Rel-8 requirements.

[TS 24.229, clause L.2.2.1 “EPS bearer context activation and P-CSCF discovery”]

Prior to communication with the IM CN subsystem, the UE shall:

- a) if not attached for EPS services yet, perform an EPS attach procedure as specified in 3GPP TS 24.301 [8J];
- b) ensure that an EPS bearer context used for SIP signalling according to the APN and P-GW selection criteria described in 3GPP TS 23.401 [7B], is available. This EPS bearer context shall remain active throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the deregistration. As a result, the EPS bearer context provides the UE with information that makes the UE able to construct an IPv4 or an IPv6 address;

NOTE 3: The default EPS bearer context can also be used for SIP signalling as well as any other EPS bearer context.

When the EPS bearer context establishment procedure for the SIP signalling is initiated by the UE:

- I. if a default EPS bearer context is not available with the selected P-GW, the UE shall indicate to the network in the PDN CONNECTIVITY REQUEST that the request is for SIP signalling. If the request is authorized, the network establishes a bearer with the appropriate QCI as described in 3GPP TS 24.301 [8J]. The UE may also use this EPS bearer context for DNS and DHCP signalling;
- II. if the default EPS bearer context is available with the selected P-GW, and is to be used for SIP signalling no additional steps are needed;
- III. if the default EPS bearer context is available with the selected P-GW and an EPS bearer for SIP signalling with the correct QCI and TFT is to be established, the UE shall indicate to the network, by setting the IM CN Subsystem Signalling Flag in the Protocol Configuration Options information element in the BEARER RESOURCE ALLOCATION REQUEST message, that the request is for SIP signalling. If the request is authorized, the network either establishes a new dedicated bearer or modifies an existing bearer with the appropriate QCI and TFT as described in 3GPP TS 24.301 [8J]. The general QoS negotiation mechanism is described in 3GPP TS 24.301 [8J].

NOTE 2: An EPS bearer with a QCI value other than the one for signalling can carry both IM CN subsystem signalling and media, in case the media does not need to be authorized by Policy and Charging control mechanisms as defined in 3GPP TS 29.212 [13B] and the media stream is not mandated by the P-CSCF to be carried in a separate EPS bearer.

c) acquire a P-CSCF address(es).

The methods for P-CSCF discovery are:

I. When using IPv4, employ the Dynamic Host Configuration Protocol (DHCP) RFC 2132 [20F], the DHCPv4 options for SIP servers RFC 3361 [35A], and RFC 3263 [27A] as described in subclause 9.2.1. When using IPv6, employ Dynamic Host Configuration Protocol for IPv6 (DHCPv6) RFC 3315 [40], the DHCPv6 options for SIP servers RFC 3319 [41] and DHCPv6 options for Domain Name Servers (DNS) RFC 3646 [56C] as described in subclause 9.2.1.

II. Transfer P-CSCF address(es) within the EPS bearer context activation procedure.

The UE shall indicate the request for a P-CSCF address to the network within the Protocol Configuration Options information element of the PDN CONNECTIVITY REQUEST message or BEARER RESOURCE ALLOCATION REQUEST message.

If the network provides the UE with a list of P-CSCF IPv4 or IPv6 addresses in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message or ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message, the UE shall assume that the list is prioritised with the first address within the Protocol Configuration Options information element as the P-CSCF address with the highest priority.

III. The UE selects a P-CSCF from the list (see 3GPP TS 31.103 [15B]) stored in the ISIM.

IV. The UE selects a P-CSCF from the list in IMS management object.

[TS 24.229, clause L.3.1.2 "Availability for calls"]

A UE shall perform an initial registration as specified in subclause 5.1.1.2, if all the following conditions are met:

- 1) if the UE is operating in one of the following modes of operation (see 3GPP TS 24.301 [8J]):
 - a) PS mode 1;
 - b) CS/PS mode 1 and the UE is attached for EPS-Services only;
- 2) if the UE is capable of receiving any (but not necessarily all) of the media types which the CS domain supports, such that the media type can also be used when accessing the IM CN subsystem using the current IP-CAN;
- 3) if the media type of item 2 is an "audio" media type, and the UE supports codecs suitable for (conversational) speech;
- 4) if the UE determines that its contact has not been bound to a public user identity using the IP-CAN, such that the contact is expected to be used for the delivery of incoming requests in the IM CN subsystem relating to the media of item 2 and item 3;
- 5) if the IMSVoPS indicator, provided by the lower layers (see 3GPP TS 24.301 [8J]), indicates voice is supported; and
- 6) if the procedures to perform the initial registration are enabled (see 3GPP TS 24.305 [8T]).

NOTE: Regardless of any of the above conditions, a UE might attempt to register with the IM CN subsystem at any time.

9.2.1.1.28.3 Test description

9.2.1.1.28.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- The UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.1.28.3.2 Test procedure sequence

Table 9.2.1.1.28.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2-4	Steps 1 to 3 of the generic test procedure for UE registration (TS 36.508 4.5.2.3-1).	-	-	-	-
5	The UE transmits an <i>RRCConnectionSetupComplete</i> message to confirm the successful completion of the connection establishment and to initiate the Attach procedure by including the ATTACH REQUEST message. The PDN CONNECTIVITY REQUEST message is piggybacked in ATTACH REQUEST	-->	RRC: <i>RRCConnectionSetupComplete</i> NAS: ATTACH REQUEST NAS: PDN CONNECTIVITY REQUEST	1,2	P
6-16	Steps 5 to 15 of the generic test procedure for UE registration (TS 36.508 4.5.2.3-1).	-	-	-	-
-	EXCEPTION: In parallel to the event described in step 17 below, if initiated by the UE the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane.	-	-	-	-
-	EXCEPTION: In parallel to the event described in step 16 below the generic procedure for IMS signalling in the U-plane specified in table 9.2.1.1.28.3.2-2 takes place.	-	-	-	-
17	This message includes the ATTACH COMPLETE message. The ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message is piggybacked in ATTACH COMPLETE.	-->	ATTACH COMPLETE ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT	-	-

Table 9.2.1.1.28.3.2-2: Procedure for IMS signalling in the U-plane

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1-9	Registration procedure according TS 34.229-1 [43] subclause C.2 (steps 3-11)	-	-	3	P

9.2.1.1.28.3.3 Specific message contents

Table 9.2.1.1.28.3.3-1: Message PDN CONNECTIVITY REQUEST (step 2, table 9.2.1.1.28.3.2-1)

Derivation Path: TS 36.508 Table 4.7.3-20			
Information Element	Value/remark	Comment	Condition
Protocol configuration options			
Container ID n	'0002'H (IM CN Subsystem Signalling Flag)		
Container ID n	'0001'H (P-CSCF IPv6)	At least one value shall be present.	
Container ID n	'000C'H (P-CSCF IPv4)		

9.2.1.2 Combined attach procedure for EPS services and non-EPS services

9.2.1.2.1 Combined attach procedure / Success / EPS and non-EPS services

9.2.1.2.1.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-DEREGISTERED and is switched off }
ensure that {
  when { UE is powered up or switched on }
  then { UE sends ATTACH REQUEST message with EPS attach type IE 'combined EPS/IMSI attach' }
}
```

(2)

```
with { UE in state EMM-REGISTERED-INITIATED}
ensure that {
  when { UE receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' }
  then { UE sends ATTACH COMPLETE message and enters EMM state EMM-REGISTERED and MM state MM-IDLE }
}
```

(3)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE enters a new tracking area already included in the TAI list }
  then { UE does not send TRACKING AREA UPDATE REQUEST message }
}
```

(4)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE enters a new tracking area not included in the TAI list }
  then { UE sends TRACKING AREA UPDATE REQUEST message with 'EPS update type = combined TA/LA updated ' }
}
```

(5)

```
with { UE in state EMM-DEREGISTERED and is switched off and has a valid TAI value in 'Last visited registered TAI' IE and a valid GUTI}
ensure that {
  when { UE is powered up or switched on }
  then { UE sends ATTACH REQUEST message with EPS attach type IE 'combined EPS/IMSI attach' and with the value in 'Last visited registered TAI' and the valid GUTI}
}
```

9.2.1.2.1.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.1.3.1, 5.5.1.3.4.1 and 5.5.1.3.4.2.

[TS24.301 clause5.5.1.3.1]

The combined EPS attach procedure is used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for both EPS and non-EPS services.

The combined EPS attach procedure is also used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for EPS services if it is already attached for non-EPS services.

When the UE initiates a combined EPS attach procedure, the UE shall indicate "combined EPS/IMSI attach" in the EPS attach type IE.

The combined EPS attach procedure follows the attach procedure for EPS described in subclause 5.5.1.2.

[TS24.301 clause5.5.1.3.2]

If the UE is in EMM state EMM-DEREGISTERED, the UE initiates the combined attach procedure by sending an ATTACH REQUEST message to the network, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the ATTACH REQUEST message.

[TS24.301 clause 5.5.1.3.4.1]

Depending on the value of the EPS attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

- 1) The EPS attach result IE value indicates "combined EPS/IMSI attach": attach for EPS and non-EPS services have been successful.

...

[TS24.301 clause 5.5.1.3.4.2]

The description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

The TMSI reallocation may be part of the combined attach procedure. The TMSI allocated is then included in the ATTACH ACCEPT message, together with the location area identification (LAI). In this case the MME shall start timer T3450 and enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1.

The UE, receiving an ATTACH ACCEPT message, stores the received location area identification, stops timer T3410, resets the location update attempt counter and sets the update status to U1 UPDATED. If the message contains an IMSI, the UE is not allocated any TMSI, and shall delete any TMSI accordingly. If the message contains a TMSI, the UE shall use this TMSI as the new temporary identity. The UE shall delete its old TMSI and shall store the new TMSI. If neither a TMSI nor an IMSI has been included by the network in the ATTACH ACCEPT message, the old TMSI, if any available, shall be kept. The UE, when receiving the ATTACH ACCEPT message combined with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, shall send an ATTACH COMPLETE message combined with an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message to the network after which it shall enter state EMM-REGISTERED and MM state MM-IDLE and set the EPS update status to EU1 UPDATED.

9.2.1.2.1.3 Test description

9.2.1.2.1.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell C are configured according to Table 6.3.2.2-1 in [18]:
 - cell A belongs to TAI-1 (home PLMN);
 - cell B belongs to TAI-2 (home PLMN, another TAC);
 - cell C belongs to TAI-3 (home PLMN, another TAC).
- The different cells may not be simultaneously activated (at most 2 cells are active simultaneously).
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells;

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.1.3.2 Test procedure sequence

Table 9.2.1.2.1.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Non-Suitable cell". - Cell C as a "Non-Suitable Off cell". cell	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is powered up or switched on.			-	-
3	Check: Does the UE send an ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN. EPS attach type = "combined EPS/IMSI attach"?	-->	ATTACH REQUEST	1	P
4	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
5	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
6	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
7	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 7Aa1 to 7Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
9	Check: Does the UE send ATTACH COMPLETE message with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?	-->	ATTACH COMPLETE	2	P
10	The SS releases the RRC connection.			-	-
11	Void				
12	Void				
12 Aa 1	Void				
13	Void				
14	Void				
14 A	Void				
14 B	Void				
15	Void				
16	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell". - Cell C as a "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on	-	-	-	-

	Cell B unless explicitly stated otherwise.				
17	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message in the next 30 seconds?	-	-	3	F
18	Void				
19	Void				
19 Aa 1	Void				
19 B	Void				
19 C	Void				
19 D	Void				
19 E	Void				
20	The SS configures: - Cell A as a "Non-Suitable Off cell". - Cell B as a "Non-Suitable cell". - Cell C as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
21	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	4	P
22	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
23	The UE transmits a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	-	-
24	The SS releases the RRC connection.	-	-	-	-
25	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 26 describes behaviour that depends on the UE capability.				
26	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmit a DETACH REQUEST.	-->	DETACH REQUEST	-	-
27	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
28	Check: Does the UE send ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN.	-->	ATTACH REQUEST	5	P
29- 30	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3. NOTE: For the content of the ATTACH ACCEPT message to be used in the UE registration procedure in TS 36.508 clause 4.5.2.3 see Table 9.2.1.2.1.3.3-8 below	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.2.1.3.3 Specific message contents

Table 9.2.1.2.1.3.3-1: Message ATTACH REQUEST (step 3, Table 9.2.1.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
EPS attach type	'0010'B	"combined EPS/IMSI attach"	
Old GUTI or IMSI	GUTI-1		
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not Present		

Table 9.2.1.2.1.3.3-2: Message ATTACH ACCEPT (step 8, Table 9.2.1.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	'010'B	"Combined EPS/IMSI attach"	
TAI list			
Number of elements	'00001'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1 TAC 2	PLMN= MCC/MNC TAC 1=1 TAC 2=2	"PLMN is set to the same MCC/MNC stored in EF _{IMSI} " "TAI-1" "TAI-2"	
GUTI	GUTI-2		
LAI	LAI-1		
MS identity	TMSI-1		

Table 9.2.1.2.1.3.3-3: Void**Table 9.2.1.2.1.3.3-4: Void****Table 9.2.1.2.1.3.3-5: Message TRACKING AREA UPDATE REQUEST (step 21, Table 9.2.1.2.1.3.2-1)**

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type EPS update type value	'001'B	"Combined TALA updating"	
Old GUTI	GUTI-2	"Old GUTI is included by UE if valid, IMSI otherwise"	
Old location area identification	LAI-1		
TMSI status	Not Present		

Table 9.2.1.2.1.3.3-6: Message TRACKING AREA UPDATE ACCEPT (step 22, Table 9.2.1.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	'001'B	"combined TAI/LA updated"	
GUTI	GUTI-3		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-3		
Location area identification	LAI-3		
MS identity	TMSI-3		

Table 9.2.1.2.1.3.3-7: Message ATTACH REQUEST (step 28, Table 9.2.1.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
EPS attach type	'0010'B	"combined EPS/IMSI attach"	
Old GUTI or IMSI	GUTI-3		
Last visited registered TAI	TAI-3		
Old location area identification	LAI-3		
TMSI status	Not Present		

Table 9.2.1.2.1.3.3-8: Message ATTACH ACCEPT (For the UE registration procedure in TS 36.508 clause 4.5.2.3)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	'010'B	"Combined EPS/IMSI attach"	
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-3		
GUTI	GUTI-3		

9.2.1.2.1b Combined attach procedure / Success / SMS only

9.2.1.2.1b.1 Test Purpose (TP)

(1)

```
with { UE operating in CS/PS mode 1, in state EMM-REGISTERED-INITIATED}
ensure that {
  when { UE receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' and
  Additional update result IE 'SMS only' and indicating that IMS voice over PS sessions is not
  supported }
}
```

```

    then { UE automatically disables the E-UTRA capability and performs a registration to UTRAN cell
    or GERAN cell (depending on the UE capability) }
  }

```

(2)

```

with { UE operating in CS/PS mode 2, in state EMM-REGISTERED and state MM-IDLE}
ensure that {
  when { UE receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' and
  Additional update result IE 'SMS only' and indicating that IMS voice over PS sessions is not
  supported and SS sends Paging message with PS domain }
  then { UE sends SERVICE REQUEST message }
}

```

(3)

```

with { UE operating in CS/PS mode 2 and configured to use IMS voice, in state EMM-REGISTERED and
state MM-IDLE}
ensure that {
  when { UE receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' and
  Additional update result IE 'SMS only' and indicating that IMS voice over PS sessions is not
  supported and the user initiates an IMS voice call }
  then { UE does not initiate an IMS voice call}
}

```

(4)

```

with { UE operating in CS/PS mode 1" }
ensure that {
  when { receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' and
  Additional update result IE 'SMS only' and indicating that IMS voice over PS sessions is not
  supported }
  then { UE does not set the E-UTRA support bit in the relevant RRC messages}
}

```

9.2.1.2.1b.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 4.3.1, 4.5, 5.5.1.3.1, 5.5.1.3.4.1 5.5.1.3.4.2 and 5.6.2.4.

[TS 24.301 clause 4.3.1]

The behaviour of the UE in CS/PS mode 1 of operation, upon failure to access the CS domain or upon reception of a "CS fallback not preferred" or "SMS only" indication, will depend on the availability of voice over IMS. In the present document, "IMS voice not available" refers to one of the following conditions:

- the UE is not configured to use IMS;
- the UE is not configured to use IMS voice, i.e. when the voice domain preference for E-UTRAN, as defined in 3GPP TS 24.167 [13B], indicates that voice communication services are allowed to be invoked only over the CS domain;
- the UE is configured to use IMS voice, but the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are not supported; or
- the UE is configured to use IMS voice, the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are supported, but the upper layers indicate that the UE is not available for voice calls in the IMS.

[TS 24.301 clause 4.5]

When the UE supporting the A/Gb and/or Iu mode together with the S1 mode needs to stay in A/Gb or Iu mode, in order to prevent unwanted handover or cell reselection from UTRAN/GERAN to E-UTRAN, the UE shall disable the E-UTRA capability.

- The UE shall not set the E-UTRA support bits of the MS Radio Access capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12a), the E-UTRA support bits of Mobile Station Classmark 3 IE (see 3GPP TS 24.008 [13], subclause 10.5.1.7) and the ISR support bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message after it selects GERAN or UTRAN; and

- the UE NAS layer shall indicate the access stratum layer(s) of disabling of the E-UTRA capability.

NOTE: The UE can only disable the E-UTRAN capabilities when in EMM-IDLE mode.

The UE shall enable the E-UTRA capability again in the following cases:

- the UE mode of operation changes from CS/PS mode 1 of operation to CS/PS mode 2 of operation;
- the UE mode of operation changes from PS mode 1 of operation to PS mode 2 of operation;
- the UE powers off and powers on again; or
- for the PLMN selection purpose.

[TS24.301 clause 5.5.1.3.1]

The combined attach procedure is used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for both EPS and non-EPS services, or both EPS services and "SMS only".

The combined attach procedure is also used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for EPS services if it is already IMSI attached for non-EPS services.

When the UE initiates a combined attach procedure, the UE shall indicate "combined EPS/IMSI attach" in the EPS attach type IE.

The combined attach procedure follows the attach procedure for EPS described in subclause 5.5.1.2.

[TS24.301 clause 5.5.1.3.2]

If the UE is in EMM state EMM-DEREGISTERED, the UE initiates the combined attach procedure by sending an ATTACH REQUEST message to the network, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the ATTACH REQUEST message.

If the UE initiates a combined attach procedure for EPS services and "SMS only", the UE shall indicate "SMS only" in the Additional update type IE.

[TS24.301 clause 5.5.1.3.4.1]

Depending on the value of the EPS attach result IE received in the ATTACH ACCEPT message, the following different cases can be distinguished:

- 1) The EPS attach result IE value indicates "combined EPS/IMSI attach": attach for EPS and non-EPS services, or for EPS services and "SMS only" have been successful.

...

[TS24.301 clause 5.5.1.3.4.2]

The description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services or "SMS only" applies.

...

If the UE requested "SMS only" in the Additional update type IE, the network shall indicate "SMS only" in the Additional update result IE.

If the ATTACH ACCEPT message includes the Additional update result IE with value "SMS only" or "CS Fallback not preferred", a UE operating in CS/PS mode 1 with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

If the ATTACH ACCEPT message includes the Additional update result IE with value "SMS only", a UE operating in CS/PS mode 2 shall not attempt to use CS fallback for mobile originating services.

....

[TS24.301 clause 5.6.2.4]

The network shall initiate the paging procedure when it receives an incoming mobile terminating SMS to the UE that is IMSI attached for non-EPS services or for "SMS only", and no NAS signalling connection exists.

To initiate the procedure for SMS when no NAS signalling connection exists, the EMM entity in the network requests the lower layer to start paging (see 3GPP TS 36.413 [23]). The paging message shall include a CN domain indicator set to "PS". The paging procedure is performed according to subclause 5.6.2.2.1. The MME shall not start timer T3413 for this procedure.

9.2.1.2.1b.3 Test description

9.2.1.2.1b.3.1 Pre-test conditions

System Simulator:

- Cell A is configured according to Table 6.3.2.2-1 in [18].
- If pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, Cell 5;
- If pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN then, Cell 24;
 - Cell 24 belongs to LAI-1 and RAI-1(home PLMN)
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

Note: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

UE:

- The UE is configured to initiate combined EPS/IMSI attach and to be voice centric (UE operates in CS/PS mode 1). If the UE does not support to be configured voice centric initiate combined EPS/IMSI attach and to be data centric (UE operates in CS/PS mode 2).
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- The UE is in state Switched OFF (state 1) according to [18].

9.2.1.2.1b.3.2 Test procedure sequence

Table 9.2.1.2.1b.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
	The following messages are sent and shall be received on cell A.				
1	Set the cell type of cell A to the "Serving cell". Set the cell type of cell 5 or cell 24 to the "Non-Suitable cell".	-	-	-	-
2	The UE is powered up or switched on.			-	-
2A1	UE sends RRCConnectionRequest message	-	-	-	-
2A2	SS sends RRCConnectionSetup message	-	-	-	-
2A3	Set the cell type of cell 5 or cell 24 to "Suitable neighbour cell".	-	-	-	-
3	UE sends ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN. EPS attach type = "combined EPS/IMSI attach".	-->	ATTACH REQUEST	-	-
4	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
5	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
6	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
7	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 7Aa1 to 7Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7Aa1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7Aa2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
9	Void	-	-	-	-
10	Void	-	-	-	-
-	EXCEPTION: Steps 11a1 to 11b3a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
11a1	IF the UE is configured in <i>CS/PS mode 1 of operation</i> THEN perform actions specified in Table 9.2.1.2.1b.3.2-2.				
11a2 a1- 11a2 a4	Void	-	-	-	-
11a3 - 11a6	Void	-	-	-	-
11b0	ELSE The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
11b1	SS releases the RRC connection	-	-	-	-

11b2	Check: Does the UE respond to paging on cell A with S-TMSI in GUTI-2 for PS domain?(Generic Procedure TS36.508 6.4.2.4)	-	-	2	P
-	EXCEPTION: Steps 11b3a1 to 11b3a2 describe behaviour that depends on the UE capability.				
11b3 a1	IF pc_VoLTE THEN an IMS voice call is initiated (see Note 1)	-	-	-	-
11b3 a2	Check: Does the UE send RRC CONNECTION REQUEST message?	-->	RRC CONNECTION REQUEST	3	F
Note 1: The request is assumed to be triggered by AT command D.					

Table 9.2.1.2.1b.3.2-2: CS/PS mode 1 of operation with "IMS voice not available" behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1 to 1c2 depend on UE release. IF UE is Release 8, Release 9 or Release 10 steps 1a1 to 1b3 are considered. Steps 1a1 to 1b3 are optional and depend on UE implementation. They shall be executed if the UE sends an ATTACH COMPLETE with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message OR a DETACH REQUEST message during [2] seconds. The "lower case letter" identifies a step sequence that takes place if a particular condition specified in the first step is met. Note: UE may also locally release the established NAS signalling connection and start 2G/3G search immediately. ELSE IF UE is Release 11 onward, steps 1c1 and 1c2 are executed.	-	-	-	-
1a1	IF UE sent an ATTACH COMPLETE message with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
-	EXCEPTION: Steps 1a2a1 to 1a2a2 are optional and depend on UE implementation; the second "lower case letter" identifies a step sequence that takes place if the condition is met.	-	-	-	-
1a2a1	IF UE sends a DETACH REQUEST message during [2] seconds.	-->	DETACH REQUEST	-	-
1a2a2	SS sends a DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
1a3	SS releases the RRC connection	-	-	-	-
1b1	IF UE sent a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
1b2	SS sends a DETACH ACCEPT message. Note: It is not explicitly defined what the network should do if the UE did not send ATTACH COMPLETE.	<--	DETACH ACCEPT	-	-
1b3	SS releases the RRC connection	-	-	-	-
1c1	The UE transmits an ATTACH COMPLETE message with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
1c2	SS releases the RRC connection	-	-	-	-
2	Void	-	-	-	-
-	The following messages shall be received on Cell 5 or Cell 24	-	-	-	-
-	EXCEPTION: Steps 3a1 to 3a3 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
3a1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA THEN Check: Does the UE send RRC CONNECTION REQUEST on Cell 5?	-->	RRC CONNECTION REQUEST	4	P
3a2	The SS transmits an RRC CONNECTION SETUP message on Cell 5.	<--	RRC CONNECTION SETUP	-	-
3a3	Check: Does the UE transmit a RRC CONNECTION SETUP COMPLETE message on Cell 5?	-->	RRC CONNECTION SETUP COMPLETE	4	P
-	EXCEPTION: Steps 4a1 to 4b5 depend on UE implementation; the "lower case letter"	-	-	-	-

	identifies a step sequence that takes place if the condition is met.				
4a1	IF UE did not sent DETACH REQUEST in step 1a2a1 or 1b1 AND UE transmits a ROUTING AREA UPDATE REQUEST message during [2] seconds THEN check contents of ROUTING AREA UPDATE REQUEST	-->	ROUTING AREA UPDATE REQUEST	1	P
-	EXCEPTION: step 4a1Aa1 to 4a1Aa2 take place if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN		-	-	-
4a1A a1	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message. from Cell 24	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
4a1A a2	The UE transmits a AUTHENTICATION AND CIPHERING RESPONSE message on Cell 24	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
4a2	The SS transmits a ROUTING AREA UPDATE ACCEPT message.	<--	ROUTING AREA UPDATE ACCEPT	-	-
4a3	The UE transmits a ROUTING AREA UPDATE COMPLETE message.	-->	ROUTING AREA UPDATE COMPLETE	-	-
4b1	ELSE check: Does the UE transmit an ATTACH REQUEST message?.	-->	ATTACH REQUEST	1	P
4b2	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
4b3	The UE transmits a AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
4b4	The SS transmits an ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
4b5	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-

9.2.1.2.1b.3.3 Specific message contents

Table 9.2.1.2.1b.3.3-1: Message ATTACH REQUEST (step 3, Table 9.2.1.2.1b.3.2-1)

Derivation path: 36.508 table 4.7.2.-4			
Information Element	Value/Remark	Comment	Condition
EPS attach type	'0010'B	"combined EPS/IMSI attach"	
Old GUTI or IMSI	GUTI-1		
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not Present		

Table 9.2.1.2.1b.3.3-2: Message ATTACH ACCEPT (step 8, Table 9.2.1.2.1b.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	'010'B	"Combined EPS/IMSI attach"	
GUTI	GUTI-2		
EPS network feature support	'0000 0000'B	IMS voice over PS session in S1 mode NOT supported	
Additional update result	'10'B0000	SMS only	

Table 9.2.1.2.1b.3.3-3: Message RRC Connection Request (step 3 a1, Table 9.2.1.2.1b.3.2-2)

Derivation path: 34.108 sub-clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
Pre-redirectio info	Not present OR value as specified below		
> Support of E-UTRA FDD	False	E-UTRA FDD not supported	
> Support of E-UTRA TDD	False	E-UTRA TDD not supported	

Table 9.2.1.2.1b.3.3-4: Message RRC Connection Setup Complete (step 3 a3, Table 9.2.1.2.1b.3.2-2)

Derivation path: 34.108 sub-clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
UE radio access capability		The UE shall not indicate support for E-UTRAN	
>UE multi-mode/multi-RAT capability	Not present OR value as specified below		
>> Multi-RAT capability			
>>> Support of Inter-RAT PS Handover to E-UTRA FDD	Not present		
>>> Support of E-UTRA TDD	Not present		
>>> Support of Inter-RAT PS Handover to E-UTRA TDD	Not present		
>>> EUTRA Feature Group Indicators	Not checked		

Table 9.2.1.2.1b.3.3-5: Message ROUTING AREA UPDATE REQUEST (step4 a1, Table 9.2.1.2.1b.3.2-2)

Derivation path: 36.508 table 4.7B.2-1			
Information Element	Value/Remark	Comment	Condition
MS Radio Access capability		The UE shall not indicate support for E-UTRAN	
MS RA capability value part			
Access capabilities			
E-UTRA FDD support :	'0'B		
E-UTRA TDD support	'0'B		
GERAN to E-UTRA support in GERAN packet transfer mode	'00'B		
UE network capability	Not Present	UE does not support S1 mode any more	

Table 9.2.1.2.1b.3.3-6: Message ATTACH REQUEST (step4 b1, Table 9.2.1.2.1b.3.2-2)

Derivation path: 36.508 table 4.7B.2-6			
Information Element	Value/Remark	Comment	Condition
MS Radio Access capability		The UE shall not indicate support for E-UTRAN	
MS RA capability value part			
Access capabilities			
E-UTRA FDD support :	'0'B		
E-UTRA TDD support	'0'B		
GERAN to E-UTRA support in GERAN packet transfer mode	'00'B		
UE network capability	Not Present	UE does not support S1 mode any more	

9.2.1.2.1c Combined attach procedure / Success / EPS and CS Fallback not preferred

9.2.1.2.1c.1 Test Purpose (TP)

(1)

```

with { UE operating in CS/PS mode 1 in state EMM-REGISTERED-INITIATED}
ensure that {
  when { UE receives ATTACH ACCEPT message with "EPS network feature support" IE indicating that
"IMS voice over PS session in SI mode NOT supported" and "Additional update result" IE indicating
"CS Fallback not preferred"}
  then { UE attempts to register on UTRAN cell and automatically disables its E-UTRAN capability.}
}

```

(2)

```

with { UE operating in CS/PS mode 1 in OFF state after having its E-UTRAN capability disabled}
ensure that {
  when { UE is switched on }
  then { UE re-enables its E-UTRA capability and registers on the E-UTRAN cell}
}

```

(3)

```

with { UE operating in CS/PS mode 1 }
ensure that {
  when { UE receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' and
Additional update result IE 'CS Fallback not preferred' and with "EPS network feature support" IE
indicating that "IMS voice over PS session in SI mode NOT supported"}
  then { UE does not set the E-UTRA support bit in the relevant NAS and AS messages}
}

```

9.2.1.2.1c.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 4.3.1, 4.5 and 5.5.1.3.4.2.

[TS 24.301 clause 4.3.1]

The behaviour of the UE in CS/PS mode 1 of operation, upon failure to access the CS domain or upon reception of a "CS fallback not preferred" or "SMS only" indication, will depend on the availability of voice over IMS. In the present document, "IMS voice not available" refers to one of the following conditions:

- the UE is not configured to use IMS;
- the UE is not configured to use IMS voice, i.e. when the voice domain preference for E-UTRAN, as defined in 3GPP TS 24.167 [13B], indicates that voice communication services are allowed to be invoked only over the CS domain;
- the UE is configured to use IMS voice, but the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are not supported; or
- the UE is configured to use IMS voice, the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are supported, but the upper layers indicate that the UE is not available for voice calls in the IMS.

[TS 24.301 clause 4.5]

When the UE supporting the A/Gb and/or Iu mode together with the S1 mode needs to stay in A/Gb or Iu mode, in order to prevent unwanted handover or cell reselection from UTRAN/GERAN to E-UTRAN, the UE shall disable the E-UTRA capability.

- The UE shall not set the E-UTRA support bits of the MS Radio Access capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12a), the E-UTRA support bits of Mobile Station Classmark 3 IE (see 3GPP TS 24.008 [13], subclause 10.5.1.7) and the ISR support bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message after it selects GERAN or UTRAN; and
- the UE NAS layer shall indicate the access stratum layer(s) of disabling of the E-UTRA capability.

NOTE: The UE can only disable the E-UTRAN capabilities when in EMM-IDLE mode.

The UE shall enable the E-UTRA capability again in the following cases:

- the UE mode of operation changes from CS/PS mode 1 of operation to CS/PS mode 2 of operation;
- the UE mode of operation changes from PS mode 1 of operation to PS mode 2 of operation;
- the UE powers off and powers on again; or
- for the PLMN selection purpose.

[TS 24.301 clause 5.5.1.3.4.2]

If the UE requested "SMS only" in the Additional update type IE, the network shall indicate "SMS only" in the Additional update result IE.

If the ATTACH ACCEPT message includes the Additional update result IE with value "SMS only" or "CS Fallback not preferred", a UE operating in CS/PS mode 1 with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

If the ATTACH ACCEPT message includes the Additional update result IE with value "SMS only", a UE operating in CS/PS mode 2 shall not attempt to use CS fallback for mobile originating services.

If the ATTACH ACCEPT message includes the Additional update result IE with value "CS Fallback not preferred", this indicates to a UE operating in CS/PS mode 2 that it is attached for EPS and non-EPS services and that it can use CS fallback.

9.2.1.2.1c.3 Test description

9.2.1.2.1c.3.1 Pre-test conditions

System Simulator:

- cell A and cell 5 and both belong to PLMN1;
- System information combination 4 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is configured to be voice centric
- The HPLMN is PLMN1
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.1c.3.2 Test procedure sequence

Table 9.2.1.2.1c.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
-	Cell A is set to "Serving cell" and Cell 5 is set to "Non suitable cell"	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
1	The UE is powered up or switched on.	-	-	-	-
2	UE sends RRCConnectionRequest message	-	-	-	-
3	SS sends RRCConnectionSetup message	-	-	-	-
4	Set the cell type of cell 5 to "Suitable neighbour cell".	-	-	-	-
5	UE sends ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN. EPS attach type = "combined EPS/IMSI attach".	-->	ATTACH REQUEST	-	-
5	UE sends ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN. EPS attach type = "combined EPS/IMSI attach".	-->	ATTACH REQUEST	-	-
6	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
7	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
8	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
9	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 9a1 to 9a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
9a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
9a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
10	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
11	Perform actions specified in Table 9.2.1.2.1c.3.2-2	-	-	-	-
-	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 12 describes behaviour that depends on the UE capability.	-	-	-	-
12a	If pc_SwitchOnOff or pc_USIM_Removal	-->	DETACH REQUEST	-	-

	then the UE transmits a DETACH REQUEST.				
13	Set the cell type of cell 5 to "Non suitable".				
14	The UE is brought back to operation or the USIM is inserted .	-	-		
15	Check: Does the UE send <i>RRCConnectionRequest</i> on Cell A?	-	-	2	P
16-30	Steps 3-17 of the registration procedure described in TS 36.508 table 4.5.2.3-1 are performed.	-	-	-	-

Table 9.2.1.2.1c.3.2-2: CS/PS mode 1 of operation with “IMS voice not available” behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Step 1a1 to 1d3 are optional and depend on UE implementation. The "lower case letter" identifies a step sequence that takes place if a particular condition specified in the first step is met within [2] seconds.	-	-	-	-
1a1	IF UE sent an ATTACH COMPLETE message with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
-	EXCEPTION: Steps 1a2a1 to 1a2a2 are optional and depend on UE implementation; the second "lower case letter" identifies a step sequence that takes place if the condition is met..	-	-	-	-
1a2a1	IF UE sends a DETACH REQUEST message during [2] seconds.	-->	DETACH REQUEST	-	-
1a2a2	SS sends a DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
1a3	SS releases the RRC connection	-	-	-	-
1a4	Check: Does the UE send RRC CONNECTION REQUEST on Cell 5?	-	-	1,3	P
1a5	The SS sends RRC CONNECTION SETUP	-	-	-	-
1a6	The UE sends RRC CONNECTION SETUP COMPLETE	-	-	3	-
1a7	Perform actions specified in Table 9.2.1.2.1c.3.2-3				
1b1	IF UE sent a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
1b2	SS sends a DETACH ACCEPT message. Note: It is not explicitly defined what the network should do if the UE did not send ATTACH COMPLETE.	<--	DETACH ACCEPT	-	-
1b3	SS releases the RRC connection	-	-	-	-
1b4	Check: Does the UE send RRC CONNECTION REQUEST on Cell 5?	-	-	1,3	P
1b5	The SS sends RRC CONNECTION SETUP	-	-	-	-
1b6	The UE sends RRC CONNECTION SETUP COMPLETE	-	-	3	-
1b7	Perform actions specified in Table 9.2.1.2.1c.3.2-3				
1c1	IF the UE moved straight to UTRAN and sent an RRC CONNECTION REQUEST message on cell 5.	-	-	3	P
1c2	The SS sends RRC CONNECTION SETUP	-	-	-	-
1c3	The UE sends RRC CONNECTION SETUP COMPLETE	-	-	3	-
1c4	Perform actions specified in Table 9.2.1.2.1c.3.2-3				

Table 9.2.1.2.1c.3.2-3: Registration on UTRAN cell behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1 to 1b5 depend on UE implementation; the "lower case letter" identifies a step sequence that takes place if the condition is met..	-	-	-	-
1a1	IF UE did not sent DETACH REQUEST in step 1a2a1 or 1b1 in Table 9.2.1.2.1c.3.2-2 AND UE transmits a ROUTING AREA UPDATE REQUEST message during [2] seconds THEN check contents of ROUTING AREA UPDATE REQUEST	-->	ROUTING AREA UPDATE REQUEST	3	P
1a2	The SS transmits a ROUTING AREA UPDATE ACCEPT message.	<--	ROUTING AREA UPDATE ACCEPT	-	-
1a3	The UE transmits a ROUTING AREA UPDATE COMPLETE message.	-->	ROUTING AREA UPDATE COMPLETE	-	-
1b1	ELSE check: Does the UE transmit an ATTACH REQUEST message?.	-->	ATTACH REQUEST	3	P
1b2	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
1b3	The UE transmits a AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
1b4	The SS transmits an ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
1b5	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-

9.2.1.2.1c.3.3 Specific message contents

Table 9.2.1.2.1c.3.3-1: Message ATTACH ACCEPT (step 10, Table 9.2.1.2.1c.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	'010'B	"Combined EPS/IMSI attach"	
ESM message container	ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to activate the default bearer	There is no message piggybacked in it.	
EPS network feature support	'0000 0000'B	IMS voice over PS session in S1 mode NOT supported	
Additional update result	'01'b	"CS Fallback not preferred"	

Table 9.2.1.2.1c.3.3-2: Message RRC Connection Request (steps 1a4, 1b4 and 1c1 Table 9.2.1.2.1c.3.2-2)

Derivation path: 34.108 sub-clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
Pre-redirectio info		Optional IE, but if transmitted it should have the below values	
> Support of E-UTRA FDD	False	E-UTRA FDD not supported	
> Support of E-UTRA TDD	False	E-UTRA TDD not supported	

Table 9.2.1.2.1c.3.3-3: Message RRC Connection Setup Complete (steps 1b6 and 1c3 Table 9.2.1.2.1c.3.2-2)

Derivation path: 34.108 sub-clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
UE radio access capability		The UE shall not indicate support for E-UTRAN	
>UE multi-mode/multi-RAT capability			
>> Multi-RAT capability			
>>> Support of Inter-RAT PS Handover to E-UTRA FDD	Not present		
>>> Support of E-UTRA TDD	Not present		
>>> Support of Inter-RAT PS Handover to E-UTRA TDD	Not present		
>>> EUTRA Feature Group Indicators	Not checked		

Table 9.2.1.2.1c.3.3-4: Message ROUTING AREA UPDATE REQUEST (step 1a1, Table 9.2.1.2.1c.3.2-3)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
MS Radio Access capability		The UE shall not indicate support for E-UTRAN	
MS RA capability value part			
Access capabilities			
E-UTRA FDD support :	'0'B		
E-UTRA TDD support	'0'B		
GERAN to E-UTRA support in GERAN packet transfer mode	'00'B		
UE network capability	Not Present	UE does not support S1 mode any more	

Table 9.2.1.2.1c.3.3-5: Message ATTACH REQUEST (step 1b1, Table 9.2.1.2.1c.3.2-3)

Derivation path: 24.008 table 9.4.1			
Information Element	Value/Remark	Comment	Condition
MS Radio Access capability		The UE shall not indicate support for E-UTRAN	
MS RA capability value part			
Access capabilities			
E-UTRA FDD support :	'0'B		
E-UTRA TDD support	'0'B		
UE network capability	Not Present	UE does not support S1 mode any more	
GERAN to E-UTRA support in GERAN packet transfer mode	'00'B		

9.2.1.2.1d Combined attach procedure / Success / EPS and CS Fallback not preferred/data centric UE

9.2.1.2.1d.1 Test Purpose (TP)

(1)

```

with { UE operating in CS/PS mode 2 in state EMM-REGISTERED-INITIATED}
ensure that {
  when { UE receives ATTACH ACCEPT message with "EPS network feature support" IE indicating that
"IMS voice over PS session in S1 mode NOT supported" and "Additional update result" IE indicating
"CS Fallback not preferred"}
  then { UE stays on the E-UTRAN cell}
}

```

(2)

```

with { UE operating in CS/PS mode 2 }
ensure that {
  when receives a TRACKING AREA UPDATE ACCEPT message with "EPS network feature support" IE
  indicating that "IMS voice over PS session in S1 mode NOT supported" and "Additional update result"
  IE indicating "CS Fallback not preferred" }
  then { The UE is able to initiate an MO-CS fallback call }
}

```

(3)

```

with { UE operating in CS/PS mode 2 }
ensure that {
  when receives a ATTACH ACCEPT message with "EPS network feature support" IE indicating that "IMS
  voice over PS session in S1 mode NOT supported" and "Additional update result" IE indicating "CS
  Fallback not preferred" }
  then { The UE is able to receive MT CS fallback call }
}

```

9.2.1.2.1d.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 4.3.1, 4.5 and 5.5.1.3.4.2.

[TS 24.301 clause 4.3.1]

The behaviour of the UE in CS/PS mode 1 of operation, upon failure to access the CS domain or upon reception of a "CS fallback not preferred" or "SMS only" indication, will depend on the availability of voice over IMS. In the present document, "IMS voice not available" refers to one of the following conditions:

- the UE is not configured to use IMS;
- the UE is not configured to use IMS voice, i.e. when the voice domain preference for E-UTRAN, as defined in 3GPP TS 24.167 [13B], indicates that voice communication services are allowed to be invoked only over the CS domain;
- the UE is configured to use IMS voice, but the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are not supported; or
- the UE is configured to use IMS voice, the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are supported, but the upper layers indicate that the UE is not available for voice calls in the IMS.

[TS 24.301 clause 4.5]

The UE shall enable the E-UTRA capability again in the following cases:

- the UE mode of operation changes from CS/PS mode 1 of operation to CS/PS mode 2 of operation;
- the UE mode of operation changes from PS mode 1 of operation to PS mode 2 of operation;
- the UE powers off and powers on again; or
- for the PLMN selection purpose.

[TS 24.301 clause 5.5.1.3.4.2]

If the UE requested "SMS only" in the Additional update type IE, the network shall indicate "SMS only" in the Additional update result IE.

If the ATTACH ACCEPT message includes the Additional update result IE with value "SMS only" or "CS Fallback not preferred", a UE operating in CS/PS mode 1 with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

If the ATTACH ACCEPT message includes the Additional update result IE with value "SMS only", a UE operating in CS/PS mode 2 shall not attempt to use CS fallback for mobile originating services.

If the ATTACH ACCEPT message includes the Additional update result IE with value "CS Fallback not preferred", this indicates to a UE operating in CS/PS mode 2 that it is attached for EPS and non-EPS services and that it can use CS fallback.

9.2.1.2.1d.3 Test description

9.2.1.2.1d.3.1 Pre-test conditions

System Simulator:

- cell A and cell 5

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is configured to be data centric
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Table 9.2.1.2.1d.3.1–1: Void

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.1d.3.2 Test procedure sequence

Table 9.2.1.2.1d.3.2-1: Void

Table 9.2.1.2.1d.3.2-2: Void

Table 9.2.1.2.1d.3.2-3: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	The following messages are to be observed on Cell A unless explicitly stated otherwise. Cell A is configured as the Serving Cell and Cell 5 is configured as a Non-Suitable Cell	-	-	-	-
1	The UE is powered up or switched on.	-	-	-	-
2-16	Steps 2-16 of the registration procedure described in TS 36.508 table 4.5.2.3-1 are performed.	-	-	-	-
16A	Cell 5 is configured as a Suitable Neighbour Cell	-	-	-	-
17	Check: Does the UE try to access the UTRAN cell (cell 5) in the next 90s?	-	-	1	F
18	The SS transmits a <i>Paging</i> message to the UE on Cell A using S-TMSI with CN domain indicator set to "CS"	-	-	-	-
-	EXCEPTION: Step 19a1 describes behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
19a1	IF the UE needs to request upper layer input before accepting the CS fallback, the incoming CS call is accepted at the UE through MMI or AT command.	-	-	-	-
20	The UE transmits an <i>RRConnectionRequest</i> message on Cell A.	-	-	-	-
21	The SS transmits an <i>RRConnectionSetup</i> message on Cell A.	-	-	-	-
22	Check: Does the UE transmit an <i>RRConnectionSetupComplete</i> message containing an EXTENDED SERVICE REQUEST?	-->	EXTENDED SERVICE REQUEST	3	P
23	The SS transmits an <i>RRConnectionRelease</i> message on Cell 1 with IE <i>redirectionInformation</i> including <i>UTRA-CarrierFreq</i> of Cell 5.	-	-	-	-
23A	Cell A is configured as the Non-Suitable Cell	-	-	-	-
24-42	Steps 1-19 of the procedure described in TS 36.508 table 6.4.3.7.1-1 TS 36.508. A CS call is set up in the UTRAN cell.	-	-	-	-
42A-42F	The CS call is terminated. CC Disconnect procedure described in TS 36.5.23-3 table 10.1.3.1-1	-	-	-	-
42G	Cell A is configured as the Serving Cell	-	-	-	-
43-48	Steps 2-7 of the tracking area updating procedure on cell A as described in TS 36.508 table 4.5A.2.1-1 are performed	-	-	-	-
-	A CS call is initiated.	-	-	-	-
49	The UE transmits an <i>RRConnectionRequest</i> message on Cell A.	-	-	-	-
50	The SS transmits an <i>RRConnectionSetup</i> message on Cell	-	-	-	-

	A.				
51	Check: Does the UE transmit an <i>RRCConnectionSetupComplete</i> message containing an EXTENDED SERVICE REQUEST message?	-->	EXTENDED SERVICE REQUEST	2	P
52	The SS transmits an <i>RRCConnectionRelease</i> message on Cell 1 with IE <i>redirectionInformation</i> including <i>UTRA-CarrierFreq</i> of Cell 5.	-	-	-	-
53-71	Steps 1-19 of the procedure described in TS 36.508 table 6.4.3.7.2-1. ACS call is set up in the UTRAN cell.	-	-	-	-

9.2.1.2.1d.3.3 Specific message contents

Table 9.2.1.2.1d.3.3-1: Message ATTACH ACCEPT (step 14, Table 9.2.1.2.1d.3.2-3)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	'010'B	"Combined EPS/IMSI attach"	
ESM message container	Empty	There is no message piggybacked in it.	
EPS network feature support	'0000 0000'B	IMS voice over PS session in S1 mode NOT supported	
Additional update result	'01'b	"CS Fallback not preferred"	

Table 9.2.1.2.1d.3.3-2: Message Paging (step 18, Table 9.2.1.2.1d.3.2-3)

Derivation Path: 36.508 clause 4.6.1-7			
Information Element	Value/remark	Comment	Condition
Paging ::= SEQUENCE {			
pagingRecordList SEQUENCE (SIZE (1..maxPageRec)) OF SEQUENCE {	1 entry		
ue-Identity[1] CHOICE {			
s-TMSI	Set to the value of the S-TMSI of the UE		
}			
cn-Domain[1]	cs		
}			
}			

Table 9.2.1.2.1d.3.3-3: *RRCConnectionRelease* (steps 23 and 44 Table 9.2.1.2.1d.3.2-3)

Derivation Path: 36.508 Table 4.6.1-15			
Information Element	Value/remark	Comment	Condition
<i>RRCConnectionRelease</i> ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionRelease-r8 SEQUENCE {			
redirectedCarrierInfo ::= CHOICE {			
utra-FDD	Downlink UARFCN of cell 5		UTRA-FDD
utra-TDD	Downlink UARFCN of cell 5		UTRA-TDD
}			
}			
}			
}			

Table 9.2.1.2.1d.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 45, Table 9.2.1.2.1d.3.2-3)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS update result	'001'B	"Combined T/TA updating"	
EPS network feature support	'0000 0000'B	IMS voice over PS session in S1 mode NOT supported	
Additional update result	'01'b	"CS Fallback not preferred"	

Table 9.2.1.2.1d.3.3-5: Message TRACKING AREA UPDATE REQUEST (step 44, Table 9.2.1.2.1d.3.2-3)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
EPS update type Value	'010'B	"Combined T/TA updating with IMSI attach"	
Old P-TMSI Signature	Any Value		
Additional GUTI	Any Value		
Nonce	Any Value		

9.2.1.2.2 Combined attach procedure / Success / EPS services only / IMSI unknown in HSS

9.2.1.2.2.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-DEREGISTERED and is switched off }
ensure that {
  when { the UE is powered up or switched on }
  then { the UE transmits an ATTACH REQUEST message with the EPS attach type set to "combined EPS/IMSI attach" and enters EMM-REGISTERED-INITIATED state }
}
```

(2)

```
with { UE in state EMM-REGISTERED-INITIATED }
ensure that {
  when { the UE receives an ATTACH ACCEPT message with EPS attach result set to "EPS only" and EMM cause set to "IMSI unknown in HSS" }
  then { the UE transmits an ATTACH COMPLETE message, the UE sets the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and enters EMM-REGISTERED.NORMAL-SERVICE state and MM IDLE state. The USIM shall be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed }
}
```

(3)

```
with { UE in E-UTRA EMM-REGISTERED.NORMAL-SERVICE state and MM IDLE state and USIM is invalidated by network for non-EPS services }
ensure that {
  when { SS sends DETACH REQUEST message with the Detach type IE "re-attach required" }
  then { the UE sends DETACH ACCEPT message, and then the UE sends ATTACH REQUEST message with EPS attach type set to 'EPS attach', including the value in 'Last visited registered TAI' and the valid GUTI and initiates an attach procedure }
}
```

(4)

```
with { UE in EMM-REGISTERED.NORMAL-SERVICE state and MM IDLE state and USIM is invalidated by network for non-EPS services }
ensure that {
  when { the UE is switch off and then powered up or switched on }
  then { the UE sends ATTACH REQUEST message with EPS attach type IE 'combined EPS/IMSI attach' }
}
```

(5)

```

with { UE in EMM-REGISTERED-INITIATED state }
ensure that {
  when { the UE receives ATTACH ACCEPT message with EPS attach result 'combined EPS/IMSI attach' }
  then { UE sends ATTACH COMPLETE message and enters EMM-REGISTERED.NORMAL-SERVICE state and MM
  IDLE state }
}

```

9.2.1.2.2.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 4.3, 5.5.1.2.2, 5.5.1.2.4, 5.5.1.3.1, 5.5.1.3.2, 5.5.1.3.4.1, 5.5.1.3.4.2, and 5.5.1.3.4.3.

[TS24.301 clause 4.3]

A UE attached for EPS services may operate in one of the following operation modes:

...

- CS/PS mode 1 of operation: the UE registers to both EPS and non-EPS services, and UE's usage setting is "voice centric"; and
- CS/PS mode 2 of operation: the UE registers to both EPS and non-EPS services, and UE's usage setting is "data centric" or the UE has no CS voice capability.

A UE configured to use CS fallback, shall operate in CS/PS mode 1 or CS/PS mode 2. Such UE may also be configured to use IMS, in which case the voice domain preference as defined in 3GPP TS 24.167 [13B] shall be used for the selection of the domain for originating voice communication services.

...

[TS 24.301, clause 5.5.1.2.2]

In state EMM-DEREGISTERED, the UE initiates the attach procedure by sending an ATTACH REQUEST message to the MME, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411.

...

- The UE shall include in the ATTACH REQUEST message a valid GUTI together with the last visited registered TAI, if available. If there is no valid GUTI available, the UE shall include the IMSI in the ATTACH REQUEST message.

...

[TS 24.301, clause 5.5.1.2.4]

If the attach request is accepted by the network, the MME shall send an ATTACH ACCEPT message to the UE and start timer T3450. The MME shall send the ATTACH ACCEPT message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message contained in the ESM message container information element to activate the default bearer (see subclause 6.4.1). The network may also initiate the activation of dedicated bearers towards the UE by invoking the dedicated EPS bearer context activation procedure (see subclause 6.4.2).

...

The MME shall assign and include the TAI list the UE is registered to in the ATTACH ACCEPT message. The UE, upon receiving an ATTACH ACCEPT message, shall delete its old TAI list and store the received TAI list.

Upon receiving the ATTACH ACCEPT message, the UE shall stop timer T3410.

The GUTI reallocation may be part of the attach procedure. When the ATTACH REQUEST message includes the IMSI, or the MME considers the GUTI provided by the UE is invalid, or the GUTI provided by the UE was assigned by another MME, the MME shall allocate a new GUTI to the UE. The MME shall include in the ATTACH ACCEPT

message the new assigned GUTI together with the assigned TAI list. In this case the MME shall enter state EMM - COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1.

...

If the ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity. The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

If A/Gb mode or Iu mode is supported in the UE, the UE shall set its TIN to "GUTI" when receiving the ATTACH ACCEPT message.

...

When the UE receives the ATTACH ACCEPT message combined with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, it shall forward the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to the ESM sublayer. Upon receipt of an indication from the ESM sublayer that the default EPS bearer context has been activated, the UE shall send an ATTACH COMPLETE message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message contained in the ESM message container information element to the network.

Additionally, the UE shall reset the attach attempt counter and tracking area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED.

...

Upon receiving an ATTACH COMPLETE message, the MME shall stop timer T3450, enter state EMM-REGISTERED and consider the GUTI sent in the ATTACH ACCEPT message as valid.

[TS 24.301, clause 5.5.1.3.1]

The combined attach procedure is used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for both EPS and non-EPS services.

The combined attach procedure is also used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for EPS services if it is already IMSI attached for non-EPS services.

When the UE initiates a combined attach procedure, the UE shall indicate "combined EPS/IMSI attach" in the EPS attach type IE.

The combined attach procedure follows the attach procedure for EPS described in subclause 5.5.1.2.

[TS 24.301, clause 5.5.1.3.2]

If the UE is in EMM state EMM-DEREGISTERED, the UE initiates the combined attach procedure by sending an ATTACH REQUEST message to the network, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the ATTACH REQUEST message.

[TS 24.301, clause 5.5.1.3.4.1]

Depending on the value of the EPS attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

...

- 2) The EPS attach result IE value indicates "EPS only": attach for EPS services has been successful but attach for non-EPS services has failed.

[TS 24.301, clause 5.5.1.3.4.2]

The description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

...

[TS 24.301, clause 5.5.1.3.4.3]

Apart from the actions on the tracking area updating attempt counter, the description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

The UE receiving the ATTACH ACCEPT message takes one of the following actions depending on the EMM cause value:

#2 (IMSI unknown in HSS)

The UE shall stop T3410 if still running and shall reset the tracking area updating attempt counter. The UE shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The UE shall enter state EMM-REGISTERED.NORMAL-SERVICE. The new MM state is MM IDLE. The USIM shall be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed.

...

Other EMM cause values and the case that no EMM cause IE was received are considered as abnormal cases. The combined attach procedure shall be considered as failed for EPS and non-EPS services. The behaviour of the UE in those cases is specified in subclause 5.5.1.3.6.

[TS 24.301, clause 5.5.2.3.2]

When receiving the DETACH REQUEST message and the detach type indicates "re-attach required", the UE shall deactivate the EPS bearer context(s) including the default EPS bearer context locally without peer-to-peer signalling between the UE and the MME. The UE shall then send a DETACH ACCEPT message to the network and enter state EMM-DEREGISTERED. Furthermore, the UE shall, after the completion of the detach procedure, and the existing NAS signalling connection has been released, initiate an attach or combined attach or combined attach procedure

NOTE 1: When detach type indicates "re-attach required", user interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

A UE which receives a DETACH REQUEST message with detach type indicating "re-attach required" or "re-attach not required" and no EMM cause IE, is detached only for EPS services.

...

If the detach type indicates "IMSI detach" or "re-attach required", then the UE shall ignore the EMM cause IE if received.

9.2.1.2.2.3 Test description

9.2.1.2.2.3.1 Pre-test conditions

System Simulator:

- Cell A.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.2.3.2 Test procedure sequence

Table 9.2.1.2.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is powered up or switched on.	-	-	-	-
2	The UE transmits ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN with EPS attach type set to "combined EPS/IMSI attach"	-->	ATTACH REQUEST	1	P
3	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
6	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits ATTACH ACCEPT message with EPS Attach result IE set to "EPS only" and EMM cause set to "IMSI unknown in HSS", including the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message as specified.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 8 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
8	Check: Does the UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message as specified?	-->	ATTACH COMPLETE	2	P
9 - 12	Void	-	-	-	-
13	The SS sends DETACH REQUEST message with Detach Type set to "re-attach required"	<--	DETACH REQUEST	-	-
14	Check: Does the UE send DETACH ACCEPT message?	-->	DETACH ACCEPT	3	P
15	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 15a describes a behaviour which depends on the UE capability	-	-	-	-
15a	IF NOT pc_Automatic_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
16	Check: Does the UE send ATTACH REQUEST message with EPS attach type set to "EPS attach", including the PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	3	P

17	The SS sends ATTACH ACCEPT message including the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 15 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
18	Check: Does the UE send ATTACH COMPLETE message?	-->	ATTACH COMPLETE	3	P
19	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 19a describes behaviour that depends on the UE capability.				
19a	If pc_SwitchOnOff or pc_USIM_Removal then UE sends DETACH REQUEST message	-->	DETACH REQUEST		
20	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
21	Check: Does the UE transmit ATTACH REQUEST message with EPS attach type set to "combined EPS/IMSI attach", including PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P
22	The SS transmits ATTACH ACCEPT message with EPS Attach result IE set to "combined EPS/IMSI attach", including the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 20 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
23	Check: Does the UE transmit an ATTACH COMPLETE message including the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?	-->	ATTACH COMPLETE	5	P
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

NOTE: It is assumed in the test procedure sequence that the UE initially has a valid GUTI, hence it is included in ATTACH REQUEST message in step 2. However, it is not important for the test procedure sequence.

9.2.1.2.2.3.3 Specific message contents

Table 9.2.1.2.2.3.3-1: Message ATTACH REQUEST (step 2, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-1		
EPS attach type	010	"combined EPS/IMSI attach"	
ESM message container	PDN CONNECTIVITY REQUEST message		
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.1.2.2.3.3-2: Message ATTACH ACCEPT (step 7, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	001	"EPS only" The SS accepts Combined attach for EPS services only.	
ESM message container	ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message		
GUTI	GUTI-2	The SS assigns a new GUTI	
LAI	Not present		
MS identity	Not Present	No TMSI is assigned	
EMM cause	00000010	#2 "IMSI unknown in HSS"	

Table 9.2.1.2.2.3.3-3: Message DETACH REQUEST (step 13, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	001	"re-attach required"	

Table 9.2.1.2.2.3.3-4: Message ATTACH REQUEST (step 16, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-2		
EPS attach type	001	"EPS attach"	
ESM message container	PDN CONNECTIVITY REQUEST message		
Last visited registered TAI	TAI-1		
Old location area identification	Not present		
TMSI status	Not present		

Table 9.2.1.2.2.3.3-5: Message ATTACH ACCEPT (step 17, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	001	"EPS only "	
ESM message container	ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message		
GUTI	Not present	The SS doesn't assign a new GUTI	

Table 9.2.1.2.2.3.3-6: Message ATTACH REQUEST (step 21, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-2		
EPS attach type	010	"combined EPS/IMSI attach"	
ESM message container	PDN CONNECTIVITY REQUEST message		
Last visited registered TAI	TAI-1		
Old location area identification	Not present		
TMSI status	0	no valid TMSI available	

Table 9.2.1.2.2.3.3-7: Message ATTACH ACCEPT (step 22, Table 9.2.1.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	010	"Combined EPS/IMSI attach"	
ESM message container	ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message		
GUTI	Not present	The SS doesn't assign a new GUTI	

9.2.1.2.3 Successful combined attach procedure / EPS service only / MSC temporarily not reachable

9.2.1.2.3.1 Test Purpose (TP)

(1)

```
with { the UE has sent a combined ATTACH REQUEST message }
ensure that {
  when { the UE receives an ATTACH ACCEPT message with EPS attach result set to "EPS only" and EMM reject cause set to "MSC temporarily not reachable" or "Network failure" and including an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message with IE EPS Bearer Identity matching the ATTACH REQUEST message and including a PDN address, an APN and an uplink TFT }
  then { UE transmits an ATTACH COMPLETE message, containing the EPS bearer identity, together with ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message and the UE resets the attach attempt counter and the UE increments tracking area updating attempt counter and starts timer T3411 and enters EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM state }
}
```

(2)

```
with { the UE is in E-UTRA EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM state }
ensure that {
  when { timer T3411 expires or timer T3402 expires }
  then { the UE initiates a combined tracking area update procedure indicating "combined TA/LA updating with IMSI attach" }
}
```

(3)

```
with { the UE is in E-UTRA EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM state }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT with EPS update result set to "EPS only" and EMM reject cause set to "MSC temporarily not reachable" or "Network failure" }
  then { UE increments tracking area updating attempt counter unless it was already set to 5 and starts timer T3411 if tracking area updating attempt counter is less than 5 or starts timer T3402 if tracking area updating attempt counter is equal to 5 }
}
```


9.2.1.2.3.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.1.2.4, 5.5.1.3.1, 5.5.1.3.2, 5.5.1.3.4.1, 5.5.1.3.4.2, 5.5.1.3.4.3, and 5.5.3.3.4.3.

[TS 24.301, clause 5.5.1.2.4]

If the attach request is accepted by the network, the MME shall send an ATTACH ACCEPT message to the UE and start timer T3450. The MME shall send the ATTACH ACCEPT message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message contained in the ESM message container information element to activate the default bearer (see subclause 6.4.1). The network may also initiate the activation of dedicated bearers towards the UE by invoking the dedicated EPS bearer context activation procedure (see subclause 6.4.2).

If the attach request is accepted by the network, the MME shall delete the stored UE radio capability information, if any.

If the UE has included the UE network capability IE or the MS network capability IE or both in the ATTACH REQUEST message, the MME shall store all octets received from the UE, up to the maximum length defined for the respective information element.

NOTE: This information is forwarded to the new MME during inter-MME handover or to the new SGSN during inter-system handover to A/Gb mode or Iu mode.

The MME shall assign and include the TAI list the UE is registered to in the ATTACH ACCEPT message. The UE, upon receiving an ATTACH ACCEPT message, shall delete its old TAI list and store the received TAI list.

Upon receiving the ATTACH ACCEPT message, the UE shall stop timer T3410.

The GUTI reallocation may be part of the attach procedure. When the ATTACH REQUEST message includes the IMSI, or the MME considers the GUTI provided by the UE is invalid, or the GUTI provided by the UE was assigned by another MME, the MME shall allocate a new GUTI to the UE. The MME shall include in the ATTACH ACCEPT message the new assigned GUTI together with the assigned TAI list. In this case the MME shall enter state EMM - COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1.

...

If the ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity. The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

If A/Gb mode or Iu mode is supported in the UE, the UE shall set its TIN to "GUTI" when receiving the ATTACH ACCEPT message.

...

When the UE receives the ATTACH ACCEPT message combined with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, it shall forward the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to the ESM sublayer. Upon receipt of an indication from the ESM sublayer that the default EPS bearer context has been activated, the UE shall send an ATTACH COMPLETE message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message contained in the ESM message container information element to the network.

Additionally, the UE shall reset the attach attempt counter and tracking area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED.

...

Upon receiving an ATTACH COMPLETE message, the MME shall stop timer T3450, enter state EMM-REGISTERED and consider the GUTI sent in the ATTACH ACCEPT message as valid.

[TS 24.301, clause 5.5.1.3.1]

The combined attach procedure is used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for both EPS and non-EPS services.

The combined attach procedure is also used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for EPS services if it is already IMSI attached for non-EPS services.

When the UE initiates a combined attach procedure, the UE shall indicate "combined EPS/IMSI attach" in the EPS attach type IE.

The combined attach procedure follows the attach procedure for EPS described in subclause 5.5.1.2.

[TS 24.301, clause 5.5.1.3.2]

If the UE is in EMM state EMM-DEREGISTERED, the UE initiates the combined attach procedure by sending an ATTACH REQUEST message to the network, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the ATTACH REQUEST message.

[TS 24.301, clause 5.5.1.3.4.1]

Depending on the value of the EPS attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

- 1) The EPS attach result IE value indicates "combined EPS/IMSI attach": attach for EPS and non-EPS services have been successful.
- 2) The EPS attach result IE value indicates "EPS only": attach for EPS services has been successful but attach for non-EPS services has failed.

[TS 24.301, clause 5.5.1.3.4.2]

The description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

...

[TS 24.301, clause 5.5.1.3.4.3]

Apart from the actions on the tracking area updating attempt counter, the description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

The UE receiving the ATTACH ACCEPT message takes one of the following actions depending on the EMM cause value:

...

#16 (MSC temporarily not reachable);

#17 (Network failure); or

The UE shall stop timer T3410 if still running. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

If the tracking area updating attempt counter is less than 5:

- the UE shall start timer T3411, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3411 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered.

If the tracking area updating attempt counter is equal to 5:

- a UE operating in CS/PS mode 2 of operation shall start timer T3402, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3402 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered;

- a UE operating in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures. The UE shall disable the E-UTRA capability (see subclause 4.5).

NOTE 1: It is up to the UE implementation when to enable E-UTRAN radio access technology selection.

...

Other EMM cause values and the case that no EMM cause IE was received are considered as abnormal cases. The combined attach procedure shall be considered as failed for EPS and non-EPS services. The behaviour of the UE in those cases is specified in subclause 5.5.1.3.6.

[TS 24.301, clause 5.5.3.3.4.3]

Apart from the actions on the tracking area updating attempt counter, the description for tracking area for EPS services as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location updating for non-EPS services applies.

The UE receiving the TRACKING AREA UPDATE ACCEPT message takes one of the following actions depending on the EMM cause value:

...

#16 (MSC temporarily not reachable);

#17 (Network failure); or

The UE shall stop timer T3430 if still running. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

If the tracking area updating attempt counter is less than 5:

- the UE shall start timer T3411, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3411 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again.

If the tracking area updating attempt counter is equal to 5:

- a UE operating in CS/PS mode 2 of operation shall start timer T3402, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3402 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again;
- a UE operating in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures. The UE shall disable the E-UTRA capability (see subclause 4.5).

NOTE 1: It is up to the UE implementation when to enable E-UTRAN radio access technology selection.

...

9.2.1.2.3.3 Test description

9.2.1.2.3.3.1 Pre-test conditions

System Simulator:

- cell A.

Note: T3402 is set to default (12 min.).

UE:

- the UE is configured to initiate combined EPS/IMSI attach;

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.3.3.2 Test procedure sequence

The sequence is executed for execution counter k = 1, 2.

Table 9.2.1.2.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits a combined ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified.	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
6	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits an ATTACH ACCEPT message with EPS attach result indicating "EPS only" and EMM cause indicating according to specific message contents and with IE EPS Bearer Identity set to default EPS bearer context. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT. Note 1: SS allocates a PDN address of a PDN type which is compliant with from the PDN type requested by the UE.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 8 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
8	Check: Does the UE transmit an ATTACH COMPLETE message including a ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message as specified?	-->	ATTACH COMPLETE	1	P
9	The SS releases the RRC connection. Note: Tracking area updating attempt counter=1	-	-	-	-
10	Check1: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with "combined TA/LA updating with IMSI attach"? Check2: Is the time between the previous	-->	TRACKING AREA UPDATE REQUEST	1,2	P

	ATTACH ACCEPT and TRACKING AREA UPDATE REQUEST equal to T3411?				
11	SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating "TA updated" and EMM cause indicating according to specific message contents.	<--	TRACKING AREA UPDATE ACCEPT	-	-
11 A	The SS releases the RRC connection. Note: Tracking area updating attempt counter=2	-	-	-	-
12	Check1: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with "combined TA/LA updating with IMSI attach"? Check2: Is the time between the previous TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE REQUEST equal to T3411?	-->	TRACKING AREA UPDATE REQUEST	2,3	P
13	SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating "TA updated" and EMM cause indicating according to specific message contents.	<--	TRACKING AREA UPDATE ACCEPT	-	-
13 A	The SS releases the RRC connection. Note: Tracking area updating attempt counter=3	-	-	-	-
14	Check1: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with "combined TA/LA updating with IMSI attach"? Check2: Is the time between the previous TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE REQUEST equal to T3411?	-->	TRACKING AREA UPDATE REQUEST	2,3	P
15	SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating "TA updated" and EMM cause indicating according to specific message contents	<--	TRACKING AREA UPDATE ACCEPT	-	-
15 A	The SS releases the RRC connection. Note: Tracking area updating attempt counter=4	-	-	-	-
16	Check1: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with "combined TA/LA updating with IMSI attach"? Check2: Is the time between the previous TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE REQUEST equal to T3411?	-->	TRACKING AREA UPDATE REQUEST	2,3	P
-	EXCEPTION: Steps 17a1 to 17b2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that takes place according to UE mode of operation	-	-	-	-
17 a1	IF the UE is configured to operate in CS/PS mode 2, then SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating "TA updated" and EMM cause indicating according to specific message contents.	<--	TRACKING AREA UPDATE ACCEPT	-	-
17a 2	The SS releases the RRC connection. Note: Tracking area updating attempt counter=5	-	-	-	-
17a 3	Check1: Does the UE send TRACKING AREA UPDATE REQUEST message with "combined TA/LA updating with IMSI attach"? Check2: Is the time between the previous TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE REQUEST equal to T3402?	-->	TRACKING AREA UPDATE REQUEST	2,3	P

	Note: Tracking area updating attempt counter is reset				
17a 4	SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating "combined TALA updated " according to default message contents.	<--	TRACKING AREA UPDATE ACCEPT	-	-
17a 5	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
17a 6	The SS releases the RRC connection.	-	-	-	-
17a 7	Check: Does the result of test procedure in 36.508 clause 6.4.2.4 indicate that the UE answer to paging with S-TMSI-1 (associated with GUTI-1) for PS domain?	-	-	3	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-
17b 1	ELSE SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating "combined TALA updated".	<--	TRACKING AREA UPDATE ACCEPT	-	-
17b 2	The UE transmits a TRACKING AREA UPDATE COMPLETE message Note: Tracking area updating attempt counter is reset.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-
18- 20	Void	-	-	-	-

9.2.1.2.3.3.3 Specific message contents

Table 9.2.1.2.3.3.3-1: Message ATTACH REQUEST (step 2, Table 9.2.1.2.3.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
EPS attach type	010	"combined EPS/IMSI attach"	
Old GUTI or IMSI	GUTI-1		
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.1.2.3.3.3-2: Message ATTACH ACCEPT (step 7, Table 9.2.1.2.3.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
EPS attach result	001	"EPS only"	
GUTI	Not present		
Location area identification	Not present	SS doesn't provide LAI	
MS identity	Not Present	SS doesn't provide TMSI	
EMM cause	00010000 for k=1 or 00010001 for k=2	#16 (MSC temporarily not reachable) for k=1 #17 (Network failure) for k=2	

Table 9.2.1.2.3.3.3-3: Message TRACKING AREA UPDATE REQUEST (steps 10-12-14-16-17a3, Table 9.2.1.2.3.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type	010	"combined TA/LA updating with IMSI attach"	
Old GUTI	GUTI-1		
Old P-TMSI signature	Not present	This IE is included when the UE holds a valid P-TMSI signature.	
Additional GUTI	Not present	TIN = 'GUTI'	
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.1.2.3.3.3-4: Message TRACKING AREA UPDATE ACCEPT (steps 11-13-15, Table 9.2.1.2.3.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
EPS update result	000	"TA updated" SS accepts Combined TAU for EPS services only.	
GUTI	Not present		
Location area identification	Not present	SS doesn't provide LAI	
MS identity	Not Present	SS doesn't provide TMSI	
EMM cause	00010000 for k=1 or 00010001 for k=2	#16 (MSC temporarily not reachable) for k=1 #17 (Network failure) for k=2	

Table 9.2.1.2.3.3.3-5: Message TRACKING AREA UPDATE ACCEPT (steps 17a1, Table 9.2.1.2.3.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
EPS update result	000	"TA updated" SS accepts Combined TAU for EPS services only.	
GUTI	Not present		
Location area identification	Not present	SS doesn't provide LAI	
MS identity	Not Present	SS doesn't provide TMSI	
EMM cause	00010000 for k=1 or 00010001 for k=2	#16 (MSC temporarily not reachable) for k=1 #17 (Network failure) for k=2	
T3402	'000 01111'B	30 seconds	

9.2.1.2.4 Successful combined attach procedure / EPS service only / CS domain not available

9.2.1.2.4.1 Test Purpose (TP)

(1)

```
with { UE is switched-off }
ensure that {
  when { UE is powered on and a valid GUTI is available }
  then { the UE transmits an ATTACH REQUEST message with the EPS attach type set to "combined EPS/IMSI attach", including GUTI, last visited registered TAI and a PDN CONNECTIVITY REQUEST message with the request type set to "initial attach" }
}
```

(2)

```
with { UE has sent a combined ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH ACCEPT message including EPS attach result set to "EPS only" and EMM reject cause set to "CS domain not available" and including an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message with IE EPS Bearer Identity matching the PDN CONNECTIVITY REQUEST message }
  then { UE transmits ATTACH COMPLETE message, containing the EPS bearer identity, including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message and sets the update status to U2 NOT UPDATED and enters EMM-REGISTERED state }
}
```

(3)

```
with { The UE received an ATTACH ACCEPT message with EPS attach result set to "EPS only" and EMM cause set to "CS domain not available" }
ensure that {
  when { UE enters a TA where it is not registered and which belongs to the PLMN where the UE received the EMM cause "CS domain not available" }
  then { UE initiates a normal tracking area update procedure indicating "TA updating" without valid LAI, TMSI, GSM ciphering key, UMTS integrity key, UMTS ciphering key or ciphering key sequence number }
}
```

(4)

```
with { The UE received an ATTACH ACCEPT message with EPS attach result set to "EPS only" and EMM cause set to "CS domain not available" }
ensure that {
  when { UE is powered up or switched on }
  then { UE initiates a combined attach procedure indicating "combined EPS/IMSI attach" }
}
```

9.2.1.2.4.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.1.2.4, 5.5.1.3.1, 5.5.1.3.2, 5.5.1.3.4.1, 5.5.1.3.4.2 and 5.5.1.3.4.3, and TS 24.008, clause 4.1.2.2.

[TS 24.301, clause 5.5.1.2.4]

If the attach request is accepted by the network, the MME shall send an ATTACH ACCEPT message to the UE and start timer T3450. The MME shall send the ATTACH ACCEPT message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message contained in the ESM message container information element to activate the default bearer (see subclause 6.4.1). The network may also initiate the activation of dedicated bearers towards the UE by invoking the dedicated EPS bearer context activation procedure (see subclause 6.4.2).

If the attach request is accepted by the network, the MME shall delete the stored UE radio capability information, if any.

If the UE has included the UE network capability IE or the MS network capability IE or both in the ATTACH REQUEST message, the MME shall store all octets received from the UE, up to the maximum length defined for the respective information element.

NOTE: This information is forwarded to the new MME during inter-MME handover or to the new SGSN during inter-system handover to A/Gb mode or Iu mode.

The MME shall assign and include the TAI list the UE is registered to in the ATTACH ACCEPT message. The UE, upon receiving an ATTACH ACCEPT message, shall delete its old TAI list and store the received TAI list.

Upon receiving the ATTACH ACCEPT message, the UE shall stop timer T3410.

The GUTI reallocation may be part of the attach procedure. When the ATTACH REQUEST message includes the IMSI, or the MME considers the GUTI provided by the UE is invalid, or the GUTI provided by the UE was assigned by another MME, the MME shall allocate a new GUTI to the UE. The MME shall include in the ATTACH ACCEPT message the new assigned GUTI together with the assigned TAI list. In this case the MME shall enter state EMM - COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1.

...

If the ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity. The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

If A/Gb mode or Iu mode is supported in the UE, the UE shall set its TIN to "GUTI" when receiving the ATTACH ACCEPT message.

...

When the UE receives the ATTACH ACCEPT message combined with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, it shall forward the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to the ESM sublayer. Upon receipt of an indication from the ESM sublayer that the default EPS bearer context has been activated, the UE shall send an ATTACH COMPLETE message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message contained in the ESM message container information element to the network.

Additionally, the UE shall reset the attach attempt counter and tracking area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED.

...

Upon receiving an ATTACH COMPLETE message, the MME shall stop timer T3450, enter state EMM-REGISTERED and consider the GUTI sent in the ATTACH ACCEPT message as valid.

[TS 24.301, clause 5.5.1.3.1]

The combined attach procedure is used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for both EPS and non-EPS services.

The combined attach procedure is also used by a UE in CS/PS mode 1 or CS/PS mode 2 of operation to attach for EPS services if it is already IMSI attached for non-EPS services.

When the UE initiates a combined attach procedure, the UE shall indicate "combined EPS/IMSI attach" in the EPS attach type IE.

The combined attach procedure follows the attach procedure for EPS described in subclause 5.5.1.2.

[TS 24.301, clause 5.5.1.3.2]

...

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the ATTACH REQUEST message.

[TS 24.301, clause 5.5.1.3.4.1]

Depending on the value of the EPS attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

- 1) The EPS attach result IE value indicates "combined EPS/IMSI attach": attach for EPS and non-EPS services have been successful.

- 2) The EPS attach result IE value indicates "EPS only": attach for EPS services has been successful but attach for non-EPS services has failed.

[TS 24.301, clause 5.5.1.3.4.2]

The description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

...

[TS 24.301, clause 5.5.1.3.4.3]

Apart from the actions on the tracking area updating attempt counter, the description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

The UE receiving the ATTACH ACCEPT message takes one of the following actions depending on the EMM cause value:

...

#18 (CS domain not available)

The UE shall stop timer T3410 if still running, shall reset the tracking area updating attempt counter, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.NORMAL-SERVICE.

The UE shall set the update status to U2 NOT UPDATED.

A UE in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

A UE in CS/PS mode 2 of operation may provide a notification to the user or the upper layers that the CS domain is not available.

...

The UE shall not attempt combined attach or combined tracking area update procedure with current PLMN until switching off the UE or the UICC containing the USIM is removed.

Other EMM cause values and the case that no EMM cause IE was received are considered as abnormal cases. The combined attach procedure shall be considered as failed for EPS and non-EPS services. The behaviour of the UE in those cases is specified in subclause 5.5.1.3.6.

[TS 24.008, clause 4.1.2.2]

In parallel with the sublayer states described in subclause 4.1.2.1 and which control the MM sublayer protocol, an update status exists.

The update status pertains to a specific subscriber embodied by a SIM/USIM. This status is defined even when the subscriber is not activated (SIM/USIM removed or connected to a switched-off ME). It is stored in a non volatile memory in the SIM/USIM. The update status is changed only as a result of a location updating procedure attempt (with the exception of an authentication failure and of some cases of CM service rejection). In some cases, the update status is changed as a result of a GPRS attach, GPRS routing area update, service request or network initiated GPRS detach procedure.

...

U2 NOT UPDATED

The last location updating attempt made failed procedurally (no significant answer was received from the network, including the cases of failures or congestion inside the network).

For this status, the SIM/USIM does not contain any valid LAI, TMSI, GSM ciphering key, UMTS integrity key, UMTS ciphering key or ciphering key sequence number. For compatibility reasons, all these fields must be set to the "deleted" value at the moment the status is set to NOT UPDATED. However the presence of other values shall not be considered an error by the mobile station. The "Location update status" stored on the SIM/USIM shall be "not updated".

...

9.2.1.2.4.3 Test description

9.2.1.2.4.3.1 Pre-test conditions

System Simulator:

- cell A (TAI-1, home PLMN) and cell B (TAI-2, home PLMN).
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells;

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS.36.508 [18].

9.2.1.2.4.3.2 Test procedure sequence

Table 9.2.1.2.4.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Serving cell" Set the cell type of cell B to the "Non-suitable cell"	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	Check : Does the UE transmit a combined ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
4	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
5	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
6	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
7	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 7Aa1 to 7Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
7A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
7A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8	SS responds with ATTACH ACCEPT message with IE EPS Bearer Identity set to default EPS bearer context. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 9 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
-	EXCEPTION: In parallel to the event described in step 9 below the generic procedure for IMS signalling in the U-plane specified in TS 36.508 subclause 4.5A.3 takes place if requested by the UE	-	-	-	-
9	Check: Does the UE transmit an ATTACH COMPLETE message including a ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message as specified?	-->	ATTACH COMPLETE	2	P
10	The SS releases the RRC connection.	-	-	-	-
10 A	Wait 15 seconds for UE to camp on Cell A (UE might attempt to select GERAN or UTRAN cells)	-	-	-	-
11	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.2	-	-	2	-

	indicate that the UE is in E-UTRA RRC_IDLE state on Cell A ?				
12	Set the cell type of cell B to the "Serving cell" Set the cell type of cell A to the "Non-suitable cell"	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
13	Check: Does the UE transmit TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	3	P
14	SS responds with TRACKING AREA UPDATE ACCEPT message	<--	TRACKING AREA UPDATE ACCEPT	-	-
15	UE sends TRACKING AREA UPDATE COMPLETE	-->	TRACKING AREA UPDATE COMPLETE	-	-
16	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 16a describes behaviour that depends on the UE capability.				
16a	If pc_SwitchOnOff or pc_USIM_Removal then UE sends DETACH REQUEST message	-->	DETACH REQUEST		
17	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
18	Check : Does the UE transmit a combined ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P
19	SS responds with ATTACH ACCEPT message with IE EPS Bearer Identity set to default EPS bearer context. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 20 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
20	Check: Does the UE transmit an ATTACH COMPLETE message including a ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message as specified?	-->	ATTACH COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508 but attached for EPS services only.	-	-	-	-

9.2.1.2.4.3.3 Specific message contents

Table 9.2.1.2.4.3.3-1: Message ATTACH REQUEST (step 3, Table 9.2.1.2.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
EPS attach type	010	"combined EPS/IMSI attach"	
Old GUTI or IMSI	GUTI-1		
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.1.2.4.3.3-2: Message ATTACH ACCEPT (step 8, Table 9.2.1.2.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
EPS attach result	001	"EPS only"	
GUTI	Not Present		
Location area identification	Not present	SS doesn't provide LAI	
MS identity	Not Present	SS doesn't provide TMSI	
EMM cause	00010010	#18 "CS domain not available"	

Table 9.2.1.2.4.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 13, Table 9.2.1.2.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type	000	TA updating	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1	If available, the last TAI is included by UE and will be used to establish a good list of TAIs in subsequent ATTACH ACCEPT message.	
Old location area identification	Not present	Entering in U2 NOT UPDATED state, UE deletes LAI	
TMSI status	Not present		

Table 9.2.1.2.4.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 14, Table 9.2.1.2.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
EPS update result	000	"TA only"	
GUTI	GUTI-2		
Location area identification	Not present	SS doesn't provide LAI	
MS identity	Not Present	SS doesn't provide TMSI	
EMM cause	00010010	#18 "CS domain not available"	

Table 9.2.1.2.4.3.3-5: Message ATTACH REQUEST (step 18, Table 9.2.1.2.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
EPS attach type	010	"combined EPS/IMSI attach"	
Old GUTI or IMSI	GUTI-2		
Last visited registered TAI	TAI-2		
Old location area identification	Not present		
TMSI status	0	"no valid TMSI available"	

Table 9.2.1.2.4.3-6: Message ATTACH ACCEPT (step 19, Table 9.2.1.2.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
EPS attach result	010	"Combined EPS/IMSI attach"	
GUTI	GUTI-2		
Location area identification	LAI-2		
MS identity	TMSI-2		

9.2.1.2.5 Combined attach / Rejected / IMSI invalid

9.2.1.2.5.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'Illegal UE' }
  then { UE deletes GUTI, last visited registered TAI and KSI and considers the USIM as invalid
for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
}
```

(2)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'Illegal UE' }
  then { UE deletes P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number, TMSI, LAI
and ciphering key sequence number }
}
```

9.2.1.2.5.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.3.5 and TS 24.008, clause 4.7.3.2.4.

[TS 24.301, clause 5.5.1.3.5]

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

#3 (Illegal UE);

...

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and eKSI.

The UE shall consider the USIM as invalid for EPS and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

[TS 24.008, clause 4.7.3.2.4]

The MS shall then take one of the following actions depending upon the reject cause:

3 (Illegal MS);

...

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed.

9.2.1.2.5.3 Test description

9.2.1.2.5.3.1 Pre-test conditions

System Simulator:

- cell A and cell B;
- if `pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA`, cell 5 (, LAI-1 and RAI-1;home PLMN) ;
- if `pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN`, Cell 24 (, LAI-1 and RAI-1.home PLMN);
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

Note: Setting `px_RATComb_Tested = EUTRA_Only` is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];
- if `pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA`, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if `pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN`, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.5.3.2 Test procedure sequence

Table 9.2.1.2.5.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell", - Cell B as a "Non-Suitable cell", - Cell 5 or Cell 24 as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with the EMM cause set to 'Illegal UE'.	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	The SS configures: - Cell A as a "Non-Suitable cell". - Cell B as the "Serving cell".	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell B or on Cell A?	-->	ATTACH REQUEST	1	F
-	EXCEPTION: Steps 8a1 to 8a6 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
8a1	The SS configures: - Cell B as a "Non-Suitable cell", - Cell 5 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 5 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
8a2	Void	-	-	-	-
8a3	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
8a4	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
8a5	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
-	EXCEPTION: Steps 8a5a1, 8a5a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if pc_AutomaticAttachSwitchON is NOT supported	-	-	-	-
8a5A a1	IF NOT pc_AutomaticAttachSwitchON	-	Registration on CS	-	-
8a5A a2	IF NOT pc_AutomaticAttachSwitchON the user initiates an attach by MMI or by AT command.	-	-	-	-
8a6	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
8b1	Void	-	-	-	-
9	Void	-	-	-	-
10	The SS configures: - Cell A as the "Serving cell", - Cell B as a "Non-Suitable cell", - Cell 5 or Cell 24 as a "Cell Off".	-	-	-	-
-	The following messages are to be observed on	-	-	-	-

	Cell A unless explicitly stated otherwise.				
-	Void				
11	Void	-	-	-	-
11a1	Void	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	1	P
13-14	Void	-	-	-	-
15a1-15a9	Void	-	-	-	-
16-27	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-
Note 1: Void.					
Note 2: Switching off, USIM removal, or power removal shall be done before T3310 and T3311 expire (30 seconds) so that the UE does not retransmit ATTACH REQUEST message.					

9.2.1.2.5.3.3 Specific message contents

Table 9.2.1.2.5.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.2.5.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 0011'B	Illegal UE	

Table 9.2.1.2.5.3.3-2: Message ATTACH REQUEST (step 12, Table 9.2.1.2.5.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI-1		
Last visited registered TAI	Not present		
Old location area identification	Not present		
TMSI status	'0'B	no valid TMSI available	

Table 9.2.1.2.5.3.3-3: Message ATTACH REQUEST (step 8a6, Table 9.2.1.2.5.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.1			
Information Element	Value/remark	Comment	Condition
MS network capability	Any allowed value		
Attach type	'011'B	Combined GPRS/IMSI attach	
GPRS ciphering key sequence number	'111'B	No key is available (MS to network)	
DRX parameter	Any allowed value		
P-TMSI or IMSI	IMSI-1		
Old routing area identification	All bits of octets 5 and 6 are set to 1, except bit 1 of octet 6 which is set to 0. Other bits are not checked.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
Requested READY timer value	Not present or any allowed value		
TMSI status	'0'B	no valid TMSI available	
PS LCS Capability	Not present or any allowed value		
Mobile station classmark 2	Not present or any allowed value		
Mobile station classmark 3	Not present or any allowed value		
Supported Codecs	Not present or any allowed value		
UE network capability	Not present or any allowed value		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

9.2.1.2.6 Combined attach / Rejected / Illegal ME

9.2.1.2.6.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'Illegal ME' }
  then { UE deletes GUTI, last visited registered TAI and KSI and considers the USIM as invalid
for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
}
```

(2)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'Illegal ME' }
  then { UE deletes P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number, TMSI, LAI
and ciphering key sequence number }
}
```

9.2.1.2.6.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.3.5 and TS 24.008, clause 4.7.3.2.4.

[TS 24.301, clause 5.5.1.3.5]

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#6 (Illegal ME); or

...

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and eKSI.

The UE shall consider the USIM as invalid for EPS and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

[TS 24.008, clause 4.7.3.2.4]

The MS shall then take one of the following actions depending upon the reject cause:

...

6 (Illegal ME), or

...

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed.

9.2.1.2.6.3 Test description

The test description is identical to the one of subclause 9.2.1.2.5 except that the reject cause #3 "illegal UE" is replaced with reject cause #6 "Illegal ME"

9.2.1.2.7 Combined attach / Rejected / EPS services and non-EPS services not allowed

9.2.1.2.7.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'EPS services and non-EPS
services not allowed' }
  then { UE deletes GUTI, last visited registered TAI and KSI and considers the USIM as invalid
for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
}
```

(2)

```
with { UE has sent an ATTACH REQUEST }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'EPS services and non-EPS
services not allowed' }
  then { UE deletes P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number, TMSI, LAI
and ciphering key sequence number }
}
```

9.2.1.2.7.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.3.5 and TS 24.008, clause 4.7.3.2.4.

[TS 24.301, clause 5.5.1.3.5]

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#8 (EPS services and non-EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and eKSI.

The UE shall consider the USIM as invalid for EPS and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

[TS 24.008, clause 4.7.3.2.4]

The MS shall then take one of the following actions depending upon the reject cause:

...

#8 (GPRS services and non-GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed.

9.2.1.2.7.3 Test description

The test description is identical to the one of subclause 9.2.1.2.5 except that the reject cause #3 "illegal UE" is replaced with reject cause #8 "EPS services and non-EPS services not allowed"

9.2.1.2.8 Combined attach / Rejected / EPS services not allowed

9.2.1.2.8.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "EPS services not
allowed" }
  then { UE considers the USIM as invalid for EPS services and enters state EMM-DEREGISTERED and
UE does not attempt to attach on any other cell }
}
```

9.2.1.2.8.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.3.5.

[TS 24.301, clause 5.5.1.3.5]

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#7 (EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and eKSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

A UE which is not yet IMSI attached for non-EPS services shall select GERAN or UTRAN radio access technology and perform an IMSI attach for non-EPS services, using the MM IMSI attach procedure as described in 3GPP TS 24.008 [13]. The UE shall not reselect E-UTRAN radio access technology until switching off or the UICC containing the USIM is removed.

A UE which is already IMSI attached for non-EPS services is still IMSI attached for non-EPS services in the network. The UE shall select GERAN or UTRAN radio access technology and shall proceed with the appropriate MM specific procedure according to the MM service state. The UE shall not reselect E-UTRAN radio access technology until switching off or the UICC containing the USIM is removed.

NOTE: Some interaction is required with the access stratum to disable E-UTRAN cell reselection.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

9.2.1.2.8.3 Test description

9.2.1.2.8.3.1 Pre-test conditions

System Simulator:

- cell A and cell B;
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 5 (home PLMN);
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (home PLMN);
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

Note: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.8.3.2 Test procedure sequence

Table 9.2.1.2.8.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Suitable neighbour cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "EPS services not allowed" as specified.	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
5A	The SS configures Cell 5 or Cell 24 as a "Suitable neighbour cell".	-	-	-	-
-	EXCEPTION: Steps 6a1 to 6a5 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
6a1	The following messages are sent and shall be received on cell 5 or Cell 24.	-	-	-	-
6a2	Check: Does the UE transmit a LOCATION UPDATING REQUEST message on Cell 5 or Cell 24?	-->	LOCATION UPDATING REQUEST	1	P
-	EXCEPTION: The messages in the next two steps are sent only on Cell 24	-	-	-	-
6a2A a1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE		
-	EXCEPTION: The next step describes behaviour that depends on UE capability.	-	-	-	-
6a2A a2	IF pc_UTRA THEN the UE transmits a Utran <i>Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.		
6a3	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
6a4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
6a5	The SS transmits a LOCATION UPDATING ACCEPT message with Location updating type = "IMSI attach" as specified in 3GPP TS 24.008.	<--	LOCATION UPDATING ACCEPT	-	-
7	The SS configures: - Cell 5 or Cell 24 as a "Non-Suitable cell". - Cell A as the "Suitable neighbour cell". - Cell B as the "Suitable neighbour cell".	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell A or on Cell B?	-->	ATTACH REQUEST	1	F
-	At the end of this test procedure sequence, the UE is in end state E-UTRA deregistered (E4) according to TS 36.508.	-	-	-	-

9.2.1.2.8.3.3 Specific message contents

Table 9.2.1.2.8.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.2.8.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 0111'B	EPS services not allowed	

Table 9.2.1.2.8.3.3-2: LOCATION UPDATING REQUEST (step 6a2, Table 9.2.1.2.8.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-4			
Information Element	Value/remark	Comment	Condition
Location updating type	IMSI attach Note 1	Rel8, Rel9, Rel10	
	Normal attach	Note 1	
Note 1: Depending on the Release, one or any of these values is allowed.			

Table 9.2.1.2.8.3.3-3: LOCATION UPDATING ACCEPT (step 6a5, Table 9.2.1.2.8.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity	Not present		

9.2.1.2.9 Combined attach / Rejected / PLMN not allowed

9.2.1.2.9.1 Test Purpose (TP)

(1)

```

with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "PLMN not allowed" }
  then { UE deletes the GUTI, the last visited registered TAI and KSI and UE deletes the list of
equivalent PLMNs and UE enters state EMM-DEREGISTERED.PLMN-SEARCH and UE stores the PLMN in the
"forbidden PLMN list" }
}

```

(2)

```

with { UE is switched off and a PLMN is stored in the "forbidden PLMN list" }
ensure that {
  when { UE is powered on this PLMN }
  then { UE does not attempt to attach on the cell }
}

```

(3)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden PLMN
list" }
ensure that {
  when { UE enters a PLMN which is not in the "forbidden PLMN list" }
  then { UE attempts to attach on the cell }
}

```

(4)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden PLMN
list" }
ensure that {
  when { the forbidden PLMN is selected manually }
  then { UE attaches to the forbidden PLMN and deletes this PLMN from the forbidden PLMN list on
the USIM}
}

```

9.2.1.2.9.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in : TS 24.301, clause 5.5.1.3.5.

[TS 24.301, clause 5.5.1.3.5]

...

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#11 (PLMN not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, and KSI, and reset the attach attempt counter. The UE shall delete the list of equivalent PLMNs and enter the state EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the PLMN identity in the "forbidden PLMN list".

The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value and no RR connection exists.

...

9.2.1.2.9.3 Test description

9.2.1.2.9.3.1 Pre-test conditions

System Simulator:

- cell G, cell H (VPLMN, same MCC like HPLMN, different TAs) and cell I (VPLMN, different MCC from HPLMN);
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f1;
- if pc_UTRA AND , px_RATComb_Tested = EUTRA_ UTRA N, cell 9 (belongs to RAI-1, same PLMN as cell G, Non-suitable off);
- if pc_GERAN px_RATComb_Tested = EUTRA_ GERAN, cell 24 (belongs to RAI-1, same PLMN as cell G, Non-suitable off); - the cells may not be simultaneously activated.
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

Note: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell G using default message contents according to TS 36.508 [18];
- the "forbidden PLMN list" is empty.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.9.3.2 Test procedure sequence

Table 9.2.1.2.9.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell G as the "Serving cell". - Cell H as a " Suitable Neighbour cell". - Cell I as a "Non-Suitable Off cell". Note: Cell G and Cell H are in the different TAI – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "PLMN not allowed".	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-	ATTACH REQUEST	1	F
7	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
8	The UE is brought back to operation or the USIM is inserted. The UE is powered on or switched on.	-	-	-	-
8A	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	2	F
-	EXCEPTION: Steps 9a1 to 9a3 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
9a1	The SS configures: - Cell H as a "Non-Suitable off cell". - Cell G as a "Non-Suitable cell". - Cell 9 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) as the "Serving cell". Note: Cell G, Cell 9 and Cell 24 are in the same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell 9 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
9a2	Void	-	-	-	-
9a3	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	2	F
10	The SS configures: Cell 9 or Cell 24 as a "Non-Suitable off cell". Cell I as a " Serving cell". Note: Cell G belongs to PLMN different from PLMN belonging to Cell I.	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
11	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	1,3	P
12-23,	The attach procedure is completed by executing steps 5 to 17 of the UE registration	-	-	-	-

23A	procedure in TS 36.508 sub clause 4.5.2.3.				
24	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 25 describes behaviour that depends on the UE capability.				
25	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmits a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
26	The SS configures: - Cell G as the "Serving cell" - Cell I as a "Non-suitable cell". Note: Cell G belongs to the forbidden PLMN.	-	-	-	-
27	The UE is brought back to operation or the USIM is inserted	-	-	-	-
28	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
29	The user sets the UE in manual PLMN selection mode or requests a PLMN search.	-	-	-	-
30	The user selects PLMN of cell G.	-	-	-	-
31	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	4	P
32-44	The attach procedure is completed and the RRC connection is released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.2.9.3.3 Specific message contents

Table 9.2.1.2.9.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.2.9.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1011'B	PLMN not allowed	

Table 9.2.1.2.9.3.3-2: Message ATTACH REQUEST (step 11, Table 9.2.1.2.9.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI1		
Last visited registered TAI	Not present		

Table 9.2.1.2.9.3.3-3: Message ATTACH REQUEST (step 31, Table 9.2.1.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI allocated in step 21		
Last visited registered TAI	TAI allocated in step 21		

9.2.1.2.10 Combined attach / Rejected / Tracking area not allowed

9.2.1.2.10.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "Tracking area not
allowed" }
  then { UE deletes the GUTI, last visited registered TAI and KSI, UE enters the state EMM-
DEREGISTERED.LIMITED-SERVICE and UE stores the current TAI in the list of "forbidden tracking areas
for regional provision of service" }
}
```

(2)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service" }
ensure that {
  when { serving cell belongs to TAI where UE was rejected }
  then { UE does not attempt to attach on any cell }
}
```

(3)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service" }
ensure that {
  when { UE re-selects a new cell in the same TAI it was rejected }
  then { UE does not attempt to attach on the cell }
}
```

(4)

```
with { UE is switched off }
ensure that {
  when { UE is powered on in the cell belonging to the TAI which was in the list of "forbidden
tracking areas for regional provision of service" before the UE was switched off }
  then { UE attempts to attach on the cell }
}
```

9.2.1.2.10.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.3.5.

[TS 24.301, clause 5.5.1.3.5]

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#12 (Tracking area not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

The UE shall store the current TAI in the list of "forbidden tracking areas for regional provision of service".

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

9.2.1.2.10.3 Test description

9.2.1.2.10.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell M.
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.10.3.2 Test procedure sequence

Table 9.2.1.2.10.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as the "Serving cell". - Cell B as a "Suitable neighbour cell". - Cell M as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "Tracking area not allowed".	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds on Cell A or Cell B?	-	ATTACH REQUEST	1,2	F
7	The SS configures: - Cell A as the "Non-Suitable cell". - Cell B as a "Non-Suitable cell". - Cell M as a "Serving cell".	-	-	-	-
8	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds on Cell M?	-	ATTACH REQUEST	3	F
-	The following messages are to be observed on Cell M unless explicitly stated otherwise.	-	-	-	-
9	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
10	The UE is brought back to operation or the USIM is inserted	-	-	-	-
11	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	1,4	P
12-23	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.2.10.3.3 Specific message contents

Table 9.2.1.2.10.3.3-1: Message ATTACH REJECT (step 4, Table 9.2.1.2.10.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1100'B	Tracking Area not allowed	

Table 9.2.1.2.10.3.3-2: Message ATTACH REQUEST (step 11, Table 9.2.1.2.10.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI1		
Last visited registered TAI	Not present		

9.2.1.2.11 Combined attach / Rejected / Roaming not allowed in this tracking area

9.2.1.2.11.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to "Roaming not allowed in this tracking area" }
  then { UE sets the EPS update status to E3 ROAMING NOT ALLOWED and UE deletes the GUTI, the last visited registered TAI and KSI and UE enters the state EMM-DEREGISTERED.LIMITED-SERVICE or optionally EMM-DEREGISTERED.PLMN-SEARCH and UE stores the current TAI in the list of "forbidden tracking areas for roaming" and deletes the TMSI, the LAI and the ciphering key sequence number }
}
```

(2)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE or EMM-DEREGISTERED.PLMN-SEARCH state and the current TAI is in the list of "forbidden tracking areas for roaming" }
ensure that {
  when { UE re-selects a new cell in the same TA where it was rejected }
  then { UE does not attempt to attach }
}
```

(3)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE or EMM-DEREGISTERED.PLMN-SEARCH state and the TAI of the current cell belongs to the list of "forbidden tracking areas for roaming" }
ensure that {
  when { UE enters a cell belonging to a tracking area not in the list of "forbidden tracking areas for roaming" }
  then { UE attempts to attach with IMSI }
}
```

(4)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE or EMM-DEREGISTERED.PLMN-SEARCH state and the list of "forbidden tracking areas for roaming" contains more than one TAI }
ensure that {
  when { UE selects a cell belonging to one of the TAIs in the list of "forbidden tracking areas for roaming" }
  then { UE does not attempt to attach }
}
```

(5)

```
with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to "Roaming not allowed in this tracking area" }
  then { UE deletes RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number and sets the GPRS update status to G3 ROAMING NOT ALLOWED }
}
```


(6)

```

with { UE is switched off or the UICC containing the USIM is removed }
ensure that {
  when { UE is powered on in the cell belonging to the TAI which was in the list of "forbidden
tracking areas for roaming" before UE was switched off or the USIM is inserted again on that cell }
  then { UE performs registration on that cell }
}

```

(7)

```

with { a cell of the HPLMN is available }
ensure that {
  when { UE performs a PLMN selection }
  then { UE returns to a cell of the HPLMN }
}

```

9.2.1.2.11.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.3.2 and 5.5.1.3.5 and TS 24.008, clause 4.7.3.2.4.

[TS 24.301, clause 5.3.2]

The UE shall store a list of "forbidden tracking areas for roaming", as well as a list of "forbidden tracking areas for regional provision of service". These lists shall be erased when the UE is switched off or when the UICC containing the USIM is removed, and periodically (with a period in the range 12 to 24 hours). One or more tracking areas is removed from the list of "forbidden tracking areas for roaming" in the UE, as well as the list of "forbidden tracking areas for regional provision of service" if, after a subsequent procedure e.g. attach procedure, tracking area updating procedure and GUTI reallocation procedure, one or more tracking areas in the lists is received from the network.

In S1 mode, the UE shall update the suitable list whenever an ATTACH REJECT, TRACKING AREA UPDATE REJECT, SERVICE REJECT or DETACH REQUEST message is received with the EMM cause #12 "tracking area not allowed", #13 "roaming not allowed in this tracking area", or #15 "no suitable cells in tracking area".

Each list shall accommodate 40 or more TAIs. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

[TS 24.301, clause 5.5.1.3.5]

If the attach request can neither be accepted by the network for EPS nor for non-EPS services, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value. If the attach procedure fails due to a default EPS bearer setup failure or an ESM procedure failure, the MME shall combine the ATTACH REJECT message with a PDN CONNECTIVITY REJECT message. In this case the EMM cause value in the ATTACH REJECT message shall be set to #19, "ESM failure".

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#13 (Roaming not allowed in this tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. The UE shall delete the list of equivalent PLMNs and reset the attach attempt counter. Additionally the UE enter the state EMM-DEREGISTERED.LIMITED-SERVICE or optionally EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the current TAI in the list of "forbidden tracking areas for roaming".

The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

...

[TS 24.008, clause 4.7.3.2.4]

If the attach request can neither be accepted by the network for GPRS nor for non-GPRS services, an ATTACH REJECT message is transferred to the MS. The MS receiving the ATTACH REJECT message stops timer T3310, and for all causes except #12, #14, #15 and #25 deletes the list of "equivalent PLMNs".

The MS shall then take one of the following actions depending upon the reject cause:

...

13 (Roaming not allowed in this location area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the GPRS attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, reset the location update attempt counter and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

...

9.2.1.2.11.3 Test description

9.2.1.2.11.3.1 Pre-test conditions

System Simulator:

- cell I and cell K (visited PLMN, same TA);
- cell L (same visited PLMN, another TA);
- cell C (home PLMN);
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f2;
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 9 (only active when stated):
 - same PLMN like visited PLMN above;
 - RAI-1 (RAC & LAC values chosen by SS);
 - System information indicate that NMO 1 is used;
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (only active when stated):
 - same PLMN like visited PLMN above;
 - RAC-1 (RAC & LAC values chosen by SS);
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE 1: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

NOTE 2: Cell K is present to confirm that UE does not attempt attach to the cell in same TAI after reject from the SS.

NOTE 3: Cell C is present to confirm that UE does attempt attach to the cell in HPLMN after reject from the SS.

NOTE 4: The requirement in 3GPP TS 24.301 to store at least 40 entries in the list of "forbidden tracking areas for roaming" is not fully tested.

NOTE 5: Different types of UE may use different methods to periodically clear the list of forbidden areas (e.g. every day at 12 am) for roaming. If the list is cleared while the test is being run, it may be necessary to re-run the test.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell I using default message contents according to TS 36.508 [18];
- if $pc_UTRA \text{ AND } px_RATComb_Tested = EUTRA_UTRA$, the UE is previously registered on UTRAN cell 9 using default message contents according to TS 36.508 [18].
- if $pc_GERAN \text{ AND } px_RATComb_Tested = EUTRA_GERAN$, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.11.3.2 Test procedure sequence

Table 9.2.1.2.11.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell I as the "Serving cell", Cell K as a "Non-Suitable cell", Cell L as a "Non-Suitable "off" cell", Cell C as a "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with the EMM cause set to "Roaming not allowed in this tracking area" on Cell I. (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell I?	-->	ATTACH REQUEST	1,4	F
7	The SS reconfigures: Cell I as a "Suitable cell", Cell K as the "Serving cell", Cell L as a "Non-Suitable "off" cell", Cell C as a "Non-Suitable cell".	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on any cell?	-->	ATTACH REQUEST	2	F
9	The SS reconfigures: Cell I as a "Non-Suitable "off" cell", Cell K as a "Suitable cell", Cell L as the "Serving cell", Cell C as a "Non-Suitable cell".	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on Cell L?	-->	ATTACH REQUEST	3	P
11	The SS transmits an ATTACH REJECT message with the EMM cause set to "Roaming not allowed in this tracking area" on Cell L. (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9 and TAI-11)	<--	ATTACH REJECT	-	-
12	The SS releases the RRC connection.	-	-	-	-
13	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell L or Cell K?	-->	ATTACH REQUEST	1,4	F
14	The SS reconfigures: Cell I as a "Serving cell", Cell K as a " Non-Suitable "off" cell", Cell L as a "Suitable cell", Cell C as the "Non-Suitable cell".	-	-	-	-
15	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on any cell?	-->	ATTACH REQUEST	2,4	F
-	EXCEPTION: Steps 16a1 to 16a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
16a1	The SS reconfigures: Cell I as "Serving cell",	-	-	-	-

	Cell L as "Non-suitable "off" cell", Cell 9 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) as "Suitable cell".				
16a2	Check: Does the UE transmit an ATTACH REQUEST message without P-TMSI, P-TMSI signature, RAI, TMSI on Cell 9 or Cell 24?	-->	ATTACH REQUEST	5	P
16a3	The SS transmits an ATTACH REJECT message with the GMM cause set to "Roaming not allowed in this location area" on Cell 9 or Cell 24.	<--	ATTACH REJECT	-	-
17	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
18	The SS reconfigures: Cell I as the "Serving cell", Cell K as a "Non-Suitable cell", Cell 9 or Cell 24 as a "Non-Suitable "off" cell", Cell C as a "Non-Suitable cell".	-	-	-	-
19	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
20	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on Cell I?	-->	ATTACH REQUEST	6	P
21	The SS transmits an ATTACH REJECT message with the EMM cause set to "Roaming not allowed in this tracking area" on Cell I. (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
21A	The SS releases the RRC connection.	-	-	-	-
22	The SS reconfigures: Cell I as the "Serving cell", Cell K as a "Non-Suitable cell", Cell C as a "Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
23	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	7	P
24- 35	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.2.11.3.3 Specific message contents

Table 9.2.1.2.11.3.3-1: Message ATTACH REJECT (step 4, step 11 and step 21, Table 9.2.1.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1101'B	Roaming not allowed in this tracking area	

Table 9.2.1.2.11.3.3-2: Message ATTACH REQUEST (step 10, step 20 and step23, Table 9.2.1.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI-1		
Last visited registered TAI	Not present		
Old location area identification	Not present		
TMSI status	'0'B	no valid TMSI available	

Table 9.2.1.2.11.3.3-3: Message ATTACH REQUEST (step 16a2, Table 9.2.1.2.11.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.1			
Information Element	Value/remark	Comment	Condition
MS network capability	Any allowed value		
Attach type	'011'B	Combined GPRS/IMSI attach	
GPRS ciphering key sequence number	'111'B	No key is available (MS to network)	
DRX parameter	Any allowed value		
P-TMSI or IMSI	IMSI-1		
Old routing area identification	All bits of octets 5 and 6 are set to 1, except bit 1 of octet 6 which is set to 0. Other bits are not checked.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
Requested READY timer value	Not present or any allowed value		
TMSI status	'0'B	no valid TMSI available	
PS LCS Capability	Not present or any allowed value		
Mobile station classmark 2	Not present or any allowed value		
Mobile station classmark 3	Not present or any allowed value		
Supported Codecs	Not present or any allowed value		
UE network capability	Not present or any allowed value		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

Table 9.2.1.2.11.3.3-4: Message ATTACH REJECT (step 16a3, Table 9.2.1.2.11.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.4			
Information Element	Value/remark	Comment	Condition
GMM cause	'0000 1101'B	Roaming not allowed in this location area	
T3302 value	Not present		

9.2.1.2.12 Combined attach / Rejected / EPS services not allowed in this PLMN

9.2.1.2.12.1 Test Purpose (TP)

(1)

```

with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "EPS services not allowed
in this PLMN" }
    then { UE deletes any GUTI, last visited registered TAI, KSI and enters EMM-DEREGISTERED.PLMN-
SEARCH state}
}

```

(2)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state, and a PLMN is stored in the "forbidden PLMNs
for GPRS service list" }
ensure that {
  when { UE detects a cell which belongs to a PLMN which is in the "forbidden PLMNs for GPRS service
list" }
    then { UE doesn't perform an attach procedure }
}

```

(3)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state, and a PLMN is stored in the "forbidden PLMNs
for GPRS service list" }
ensure that {
  when { UE detects a cell which belongs to a PLMN which is not in the "forbidden PLMNs for GPRS
service list" }
    then { UE performs an attach procedure }
}

```

(4)

```

with { UE is switched off when a PLMN is stored in the "forbidden PLMNs for GPRS service list" }
ensure that {
  when { UE is powered on a cell which belongs to this PLMN }
    then { UE performs an attach procedure }
}

```

(5)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state, and a PLMN is stored in the "forbidden PLMNs
for GPRS service list" }
ensure that {
  when { UE is in the cell which belongs to the rejected PLMN and when that PLMN is selected
manually }
    then { UE performs an attach procedure }
}

```

9.2.1.2.12.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.4.4.3.

[TS 24.301, clause 5.5.1.3.5]

If the attach request can neither be accepted by the network for EPS nor for non-EPS services, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value. If the attach procedure fails due to a default EPS bearer setup failure or an ESM procedure failure, the MME shall combine the ATTACH REJECT message with a PDN CONNECTIVITY REJECT message. In this case the EMM cause value in the ATTACH REJECT message shall be set to #19, "ESM failure".

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#14 (EPS services not allowed in this PLMN);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. Additionally the UE shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list.

A UE operating in CS/PS mode 1 which is not yet IMSI attached for non-EPS services may select GERAN or UTRAN radio access technology and perform an IMSI attach for non-EPS services, using the MM IMSI attach procedure as described in 3GPP TS 24.008 [13]. In this case the UE shall not reselect E-UTRAN radio access technology for the duration the UE is on the PLMN or an equivalent PLMN.

A UE operating in CS/PS mode 1 which is already IMSI attached for non-EPS services in the network is still IMSI attached for non-EPS services in the network. The UE may select GERAN or UTRAN radio access technology and proceed with the appropriate MM specific procedure according to the MM service state. In this case the UE shall not reselect E-UTRAN radio access technology for the duration the UE is on the PLMN or an equivalent PLMN.

A UE in CS/PS mode 1 of operation may perform a PLMN selection according to 3GPP TS 23.122 [6].

A UE operating in CS/PS mode 2 which is already IMSI attached for non-EPS services in the network is still IMSI attached for non-EPS services in the network.

A UE operating in CS/PS mode 2 of operation shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

9.2.1.2.12.3 Test description

9.2.1.2.12.3.1 Pre-test conditions

System Simulator:

- cell G, Cell H and cell I are configured according to Table 6.3.2.2-1 in; [18].
- cell G and Cell H with MCC-1/MNC-2 (visited PLMN, different TAs)
- Cell I with MCC-2/MNC-101 (visited PLMN);
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508 [18], except replacing f3 with f1
- the cells may not be simultaneously activated.

UE:

- the UE is configured to initiate Combined attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell G using default message contents according to TS 36.508 [18];
- the "forbidden PLMNs for GPRS service list" is empty.
- the different cells may not be simultaneously activated (at most 2 cells are active simultaneously).

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.12.3.2 Test procedure sequence

Table 9.2.1.2.12.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell G as the "Serving cell". - Cell H as a "Non-Suitable cell". - Cell I as a "Non-Suitable off cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message including EMM cause = "EPS services not allowed in this PLMN".	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	1	F
7	The SS configures: Cell G as a "Non-Suitable cell". Cell H as the "Serving cell". Note: Cell G and Cell H are in the different TAI – same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell H unless explicitly stated otherwise.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
9	The SS configures: Cell H as a "Non-Suitable off cell". Cell I as the "Serving cell". Note: Cell G and Cell I are different PLMNs.	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	1,3	P
11-23	The SS completes the attach procedure successfully and then releases the RRC - connection by executing steps 5 to 17 of UE registration procedure in TS 36.508 clause 4.5.2.3.				
24	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
25	The SS configures - Cell I as a "Non-Suitable cell". - Cell G as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
26	The UE is brought back to operation or the USIM is inserted.				
27	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P
28	The SS transmits an ATTACH REJECT message including EMM cause = "EPS services not allowed in this PLMN".	<--	ATTACH REJECT	-	-
29	SS releases the RRC connection.	-	-	-	-
30	The user sets the UE in manual PLMN selection mode or requests a PLMN search.				

	The user selects PLMN (MCC-1/MNC-2)				
31	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message as specified?	-->	ATTACH REQUEST	5	P
32-44	The attach procedure is completed and the RRC connection released by executing steps 5 to 17 of the UE registration procedure in TS 36.508 clause 4.5.2.3.	-	-	-	-
45	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.1.2.12.3.3 Specific message contents

Table 9.2.1.2.12.3.3-1: Message ATTACH REQUEST (step 3, Table 9.2.1.2.12.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI Last visited registered TAI Old location area identification TMSI status	GUTI-1 TAI-1 LAI-1 Not Present		

Table 9.2.1.2.12.3.3-2: Message ATTACH REJECT (step 4 and 28, Table 9.2.1.2.12.3.2-1)

Derivation path: 36.508 table 4.7.2-3 (Plain NAS message)			
Information Element	Value/Remark	Comment	Condition
EMM cause	00001110	#14 "EPS services not allowed in this PLMN "	
ESM message container	Not present		

Table 9.2.1.2.12.3.3-3: Message ATTACH REQUEST (step 10 and step 31, Table 9.2.1.2.12.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI-1	GUTI has been deleted after receiving ATTACH REJECT at step 5 and step28; only IMSI is available.	
Last visited registered TAI	Not present	TAI has been deleted after receiving ATTACH REJECT at step 5 and step29.	

9.2.1.2.13 Combined attach / Rejected / No suitable cells in tracking area

9.2.1.2.13.1 Test Purpose (TP)

(1)

```

with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'No Suitable Cells In
tracking area' }
    then { UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, deletes any GUTI, last visited
registered TAI and KSI, resets the attach attempt counter, enters the state EMM-
DEREGISTERED.LIMITED-SERVICE and stores the current TAI in the list of "forbidden tracking areas for
roaming" }
}

```

(2)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI is in the list of
"forbidden tracking areas for roaming" }
ensure that {
  when { UE re-selects a cell that belongs to the TAI where UE was rejected }
    then { UE does not attempt to attach }
}

```

(3)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI is in the list of
"forbidden tracking areas for roaming" and KSI was deleted }
ensure that {
  when { in the same PLMN, UE enters a cell which provides normal service and belongs to the
tracking area not in the list of "forbidden tracking areas for roaming" }
    then { UE attempts to attach with IMSI indicated that no key is available }
}

```

(4)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI is in the list of
"forbidden tracking areas for roaming" }
ensure that {
  when { there are cells in the same PLMN and other PLMN that provide normal service and belong to
the tracking area not in the list of "forbidden tracking areas for roaming" }
    then { UE attempts to attach to the cell in the same PLMN }
}

```

(5)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the list of "forbidden tracking areas for
roaming" contains more than one TAI }
ensure that {
  when { UE re-selects a cell that belongs to one of the TAIs in the list of "forbidden tracking
areas for roaming" }
    then { UE does not attempt to attach }
}

```

(6)

```

with { UE has sent an ATTACH REQUEST message }
ensure that {
  when { UE receives an ATTACH REJECT message with the EMM cause set to 'No Suitable Cells In
tracking area' }
    then { UE deletes RAI, P-TMSI, P-TMSI signature, GPRS ciphering key sequence number, TMSI, LAI
and ciphering key sequence number }
}

```

(7)

```

with { UE is switched off }
ensure that {
  when { UE is powered on in the cell belonging to the TAI which was in the list of "forbidden
tracking areas for roaming" before UE was switched off }
    then { UE attempts to attach }
}

```

}

9.2.1.2.13.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.3.2 and 5.5.1.3.5 and TS 24.008, clause 4.7.3.2.4.

[TS 24.301, clause 5.3.2]

The UE shall store a list of "forbidden tracking areas for roaming", as well as a list of "forbidden tracking areas for regional provision of service". These lists shall be erased when the UE is switched off or when the UICC containing the USIM is removed, and periodically (with a period in the range 12 to 24 hours). One or more tracking areas is removed from the list of "forbidden tracking areas for roaming" in the UE, as well as the list of "forbidden tracking areas for regional provision of service" if, after a subsequent procedure e.g. attach procedure, tracking area updating procedure and GUTI reallocation procedure, one or more tracking areas in the lists is received from the network.

In S1 mode, the UE shall update the suitable list whenever an ATTACH REJECT, TRACKING AREA UPDATE REJECT, SERVICE REJECT or DETACH REQUEST message is received with the EMM cause #12 "tracking area not allowed", #13 "roaming not allowed in this tracking area", or #15 "no suitable cells in tracking area".

Each list shall accommodate 40 or more TAIs. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

[TS 24.301, clause 5.5.1.3.5]

If the attach request can neither be accepted by the network for EPS nor for non-EPS services, the MME shall send an ATTACH REJECT message to the UE including an appropriate EMM cause value. If the attach procedure fails due to a default EPS bearer setup failure or an ESM procedure failure, the MME shall combine the ATTACH REJECT message with a PDN CONNECTIVITY REJECT message. In this case the EMM cause value in the ATTACH REJECT message shall be set to #19, "ESM failure".

Upon receiving the ATTACH REJECT message, the UE shall stop timer T3410, enter MM state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#15 (No suitable cells in tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI and KSI. Additionally the UE shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

The UE shall store the current TAI in the list of "forbidden tracking areas for roaming".

The UE shall search for a suitable cell in another tracking area or in another location area in the same PLMN according to 3GPP TS 36.304 [21].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined attach procedure is rejected with the GMM cause with the same value.

...

[TS 24.008, clause 4.7.3.2.4]

...

The MS shall then take one of the following actions depending upon the reject cause:

...

15 (No Suitable Cells In Location Area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the GPRS attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, reset the location update attempt counter and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

...

9.2.1.2.13.3 Test description

9.2.1.2.13.3.1 Pre-test conditions

System Simulator:

- cell I and cell K (visited PLMN, same TA);
- cell E (same visited PLMN, another TA);
- cell J (another VPLMN);
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 8 (only active when stated):
 - same PLMN like visited PLMN above;
 - RAI-1 (RAC & LAC values chosen by SS);
 - system information indicates that NMO 1 is used;
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (only active when stated):
 - same PLMN like visited PLMN above;
 - RAC-1 (RAC & LAC values chosen by SS);
 - system information indicates that NMO 1 is used;
 - maximum 3 cells are simultaneously active.
- System information combination 10 as defined in TS 36.508 [18] clause 4.4.3.1 is used in E-UTRA cells.
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508 [18], except replacing f4 with f1.

NOTE 1: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

NOTE 2: Cell E is present to confirm that UE searches in the same PLMN after reject from the SS.

NOTE 3: Cell K is present to confirm that UE shall not attempt attach to the cell in same TAI it was once rejected from.

NOTE 4: The requirement in 3GPP TS 24.301 to store at least 40 entries in the list of "forbidden tracking areas for roaming" is not fully tested.

NOTE 5: Different types of UE may use different methods to periodically clear the list of forbidden areas (e.g. every day at 12 am) for roaming. If the list is cleared while the test is being run, it may be necessary to re-run the test.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell I using default message contents according to TS 36.508 [18];
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, the UE is previously registered on UTRAN cell 8 using default message contents according to TS 36.508 [18].

- if `pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN`, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.13.3.2 Test procedure sequence

Table 9.2.1.2.13.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell I as the "Serving cell", Cell K as a "Suitable cell", Cell E as a "Non-Suitable cell", Cell J as a "Non-Suitable" off" cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with the EMM cause set to 'No suitable cells in tracking area' on Cell I. (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	The SS reconfigures: Cell I as a "Suitable cell", Cell K as the "Serving cell", Cell E as a "Non-Suitable cell", Cell J as a "Non-Suitable" off" cell".	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on Cell K or Cell I?	-->	ATTACH REQUEST	2	F
7A	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
7B	The SS configures: Cell I as the "Serving cell", Cell K as a "Suitable cell",	-	-	-	-
7C	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
7D	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
7E	The SS transmits an ATTACH REJECT message with the EMM cause set to 'No suitable cells in tracking area' on Cell I. (The list of "forbidden tracking areas for roaming" in the UE should now contain TAI-9)	<--	ATTACH REJECT	-	-
8	The SS reconfigures: Cell K as a "Non-Suitable "off" cell", Cell E as a "Suitable cell", Cell J as a "Suitable cell".	-	-	-	-
8A	The SS releases the RRC connection.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on Cell E? Note: Cell J is present to ensure the UE doesn't attempt to attach in a cell with a different PLMN	-->	ATTACH REQUEST	1, 3, 4, 6	P
9A	The SS reconfigures: Cell J as a "Non-Suitable "off" cell".	-	-	-	-
10	The SS transmits an ATTACH REJECT message with the EMM cause set to 'No suitable cells in tracking area' on Cell E. (The list of "forbidden tracking areas for	<--	ATTACH REJECT	-	-

	roaming" in the UE should now contain TAI-9 and TAI-12)				
11	The SS releases the RRC connection	-	-	-	-
12	The SS reconfigures: Cell I as the "Serving cell", Cell K as a "Non-Suitable cell", Cell E as a "Suitable cell".	-	-	-	-
13	Check: Does the UE transmit the ATTACH REQUEST message in the next 30 seconds on Cell I?	-->	ATTACH REQUEST	5	F
-	EXCEPTION: Steps 14a1 to 14a4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
14a1	The SS configures: Cell I as a "Non-Suitable cell", Cell E as a "Non-Suitable cell", Cell J and Cell K as a "Non-Suitable "off" cell". Cell 8 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) as the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 8 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
14a2	Void	-	-	-	-
14a3	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	6	P
14a4	The SS transmits an ATTACH REJECT message with the GMM cause set to 'No Suitable Cells In Location Area'.	<--	ATTACH REJECT	-	-
14a5	The SS releases the RRC connection	-	-	-	-
14A	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
15	The SS reconfigures: Cell I as the "Serving cell", Cell K as a "Non-Suitable "off" cell", Cell E as a "Non-Suitable cell", Cell J as a "Non-Suitable "off" cell", Cell 8 or Cell 24 as the "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
16	Void	-	-	-	-
17	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
18	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	7	P
19-30	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.2.13.3.3 Specific message contents

Table 9.2.1.2.13.3.3-1: Message ATTACH REJECT (step 4 and step 10, Table 9.2.1.2.13.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1111'B	No Suitable Cells In tracking area	

Table 9.2.1.2.13.3.2: Message ATTACH REQUEST (step 9 and step 18, Table 9.2.1.2.13.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI-1		
Last visited registered TAI	Not present		
Old location area identification	Not present		
TMSI status	'0'B	no valid TMSI available	

Table 9.2.1.2.13.3.3: Message ATTACH REQUEST (step 14a3, Table 9.2.1.2.13.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.1			
Information Element	Value/remark	Comment	Condition
MS network capability	Any allowed value		
Attach type	'011'B	Combined GPRS/IMSI attach	
GPRS ciphering key sequence number	'111'B	No key is available (MS to network)	
DRX parameter	Any allowed value		
P-TMSI or IMSI	IMSI-1		
Old routing area identification	All bits of octets 5 and 6 are set to 1, except bit 1 of octet 6 which is set to 0. Other bits are not checked.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
Requested READY timer value	Not present or any allowed value		
TMSI status	'0'B	no valid TMSI available	
PS LCS Capability	Not present or any allowed value		
Mobile station classmark 2	Not present or any allowed value		
Mobile station classmark 3	Not present or any allowed value		
Supported Codecs	Not present or any allowed value		
UE network capability	Not present or any allowed value		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

Table 9.2.1.2.13.3.4: Message ATTACH REJECT (step 14a4, Table 9.2.1.2.13.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.4			
Information Element	Value/remark	Comment	Condition
GMM cause	'0000 1111'B	No Suitable Cells In Location Area	
T3302 value	Not present		

9.2.1.2.14 Combined attach / Rejected / Not authorized for this CSG

9.2.1.2.14.1 Test Purpose (TP)

(1)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on a CSG cell }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "Not authorized for this CSG" and without integrity protection }
  then { UE discards this message }
}
```

(2)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on a CSG cell which is contained in the Allowed CSG list }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "Not authorized for this CSG" and with integrity protection }
  then { UE removes the CSG ID from the Allowed CSG list }
}
```

(3)

```
with { UE has sent an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message on a CSG cell }
ensure that {
  when { UE receives an ATTACH REJECT message with the reject cause set to "Not authorized for this CSG" and with integrity protection }
  then { UE searches for a suitable cell in the same PLMN }
}
```

9.2.1.2.14.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.1.2.5.

[TS 24.301, clause 5.5.1.2.5]

...

#25 (Not authorized for this CSG);

Cause #25 is only applicable when received from a CSG cell. Cause #25 received from a non-CSG cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.6.

If the ATTACH REJECT message with cause #25 was received without integrity protection, then the UE shall discard the message.

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). Additionally, the UE shall reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

The UE shall remove the CSG ID of the cell where the UE has sent the ATTACH REQUEST message from the Allowed CSG list.

The UE shall search for a suitable cell in the same PLMN according to 3GPP TS 36.304 [21].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal attach procedure is rejected with the GMM cause with the same value.

9.2.1.2.14.3 Test description

9.2.1.2.14.3.1 Pre-test conditions

System Simulator:

- cell A (TAC-1, frequency 1, not a CSG cell);

- cell B (TAC-2, frequency 1, a CSG cell whose CSG Identity is included in Allowed CSG list);
- cell G (another PLMN, frequency 2 and not a CSG cell).
- System information combination 7 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is previously registered on cell B using manual CSG selection (so the allowed CSG list includes CSG ID of cell B);
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.14.3.2 Test procedure sequence

Table 9.2.1.2.14.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as a "Not Suitable cell". - Cell B as a "Serving cell". - Cell G as a "Not Suitable cell".	-	-	-	-
2	The UE is switched on.	-	-	-	-
3	UE initiates attach procedure and sends ATTACH REQUEST including a PDN CONNECTIVITY REQUEST message on cell B.	-->	ATTACH REQUEST	-	-
4	The SS transmits an ATTACH REJECT message with EMM cause = "Not authorized for this CSG" without integrity protection.	<--	ATTACH REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message on Cell B after the expiry of timer T3410 and T3411? Note 1: IF UE initiate ATTACH procedure again, it can prove that this UE has discard the unprotected ATTACH REJECT message. Note 2: Default value of T3410 is 15s; default value of T3411 is 10s. In this TC, the network will wait for total 30 seconds.	-->	ATTACH REQUEST	1	P
7	The SS transmits an ATTACH REJECT message with EMM cause = ""Not authorized for this CSG" with integrity protection.	<--	ATTACH REJECT	-	-
8	The SS releases the RRC connection.	-	-	-	-
9	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed. The UE is brought back to operation or the USIM is inserted .	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message on Cell B in the next 90 seconds?	-->	ATTACH REQUEST	2	F
11	The SS configures: - Cell B as a "Not Suitable cell". - Cell G as a "Serving cell". - Cell A as a "Suitable cell".				
12	Check: Does the UE transmit an ATTACH REQUEST message on Cell A?	-->	ATTACH REQUEST	3	P
13-24	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.2.14.3.3 Specific message contents

Table 9.2.1.2.14.3.3-1: Message ATTACH REQUEST (step 3, step 6, step 12, Table 9.2.1.2.14.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	GUTI-1		
Last visited registered TAI	TAI-1		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.1.2.14.3.3-2: Message ATTACH REJECT (step 4, Table 9.2.1.2.14.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
Security header type	'0000'B	" Plain NAS message, not security protected "	
EMM cause	'00011001'B	#25 " Not authorized for this CSG"	

Table 9.2.1.2.14.3.3-3: Message ATTACH REJECT (step 7, Table 9.2.1.2.14.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00011001'B	#25 " Not authorized for this CSG"	

Table 9.2.1.2.14.3.3-4: SystemInformationBlockType1 for Cell A, B, G (Pre-test conditions and all steps in Table 9.2.1.2.14.3.2-1)

Derivation Path: 36.508 clause 4.4.3.2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
csg-Indication	TRUE		Cell B
	FALSE		Cell G
	FALSE		Cell A
csg-Identity	Not present		Cell A
	'000 0000 0000 0000 0000 0000 0010'B		Cell B
	Not present		Cell G

9.2.1.2.15 Combined attach / Abnormal case / Handling of the EPS attach attempt counter

9.2.1.2.15.1 Test Purpose (TP)

(1)

```
with { UE has detected T3410 expiry after sending an ATTACH REQUEST message and has the attach attempt counter set to the value less than five }
ensure that {
  when { UE detects T3411 expiry }
  then { UE restarts the attach procedure }
}
```

(2)

```
with { UE has sent an ATTACH REQUEST message and has the attach attempt counter set to five }
ensure that {
  when { UE detects T3410 expiry }
  then { UE deletes GUTI, TAI list, last visited registered TAI and KSI }
}
```

(3)

```
with { UE has sent an ATTACH REQUEST message and has the attach attempt counter set to five }
ensure that {
  when { UE detects T3410 expiry }
  then { UE deletes LAI, TMSI, ciphering key sequence number, RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number }
}
```

9.2.1.2.15.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.1.1, 5.5.1.2.6 and 5.5.1.3.6 and TS 24.008, clause 4.7.3.1.5.

[TS 24.301, clause 5.5.1.1]

...

An attach attempt counter is used to limit the number of subsequently rejected attach attempts. The attach attempt counter shall be incremented as specified in subclause 5.5.1.2.6. Depending on the value of the attach attempt counter, specific actions shall be performed. The attach attempt counter shall be reset when:

- the UE is powered on;
- a USIM is inserted;
- an attach or combined attach procedure is successfully completed;
- a combined attach procedure is completed for EPS services only with cause #2, #16, #17, #18 or #22;
- an attach or combined attach procedure is rejected with cause #11, #12, #13, #14, #15 or #25; or
- a network initiated detach procedure is completed with cause #11, #12, #13, #14, #15 or #25.

Additionally the attach attempt counter shall be reset when the UE is in sub state EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH and:

- a new tracking area is entered; or
- T3402 expires.

[TS 24.301, clause 5.5.1.3.2]

If the UE is in EMM state EMM-DEREGISTERED, the UE initiates the combined attach procedure by sending an ATTACH REQUEST message to the network, starting timer T3410 and entering state EMM-REGISTERED-INITIATED (see example in figure 5.5.1.2.2.1).

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the ATTACH REQUEST message.

If the UE initiates a combined attach procedure for EPS services and "SMS only", the UE shall indicate "SMS only" in the Additional update type IE.

[TS 24.301, clause 5.5.1.3.6]

...

If the attach attempt counter is incremented according to subclause 5.5.1.2.6 the next actions depend on the value of the attach attempt counter:

- if the update status is U1 UPDATED and the attach attempt counter is less than 5, then the UE shall keep the update status to U1 UPDATED, the new MM state is MM IDLE sub state NORMAL SERVICE;
- if the attach attempt counter is less than 5 and, additionally, the update status is different from U1 UPDATED, then the UE shall delete any LAI, TMSI, ciphering key sequence number and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. The MM state remains MM LOCATION UPDATING PENDING; or
- if the attach attempt counter is equal to 5, then the UE shall delete any LAI, TMSI, ciphering key sequence number and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. A UE operating in CS/PS mode 1 of operation shall select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures.

NOTE: It is up to the UE implementation when to enable E-UTRAN radio access technology selection.

[TS 24.008, clause 4.7.3.1.5]

...

If the GPRS attach attempt counter is greater than or equal to 5:

- the MS shall delete any RAI, P-TMSI, P-TMSI signature, list of equivalent PLMNs, and GPRS ciphering key sequence number, shall set the GPRS update status to GU2 NOT UPDATED, shall start timer T3302. The state is changed to GMM-DEREGISTERED. ATTEMPTING-TO-ATTACH or optionally to GMM-DEREGISTERED.PLMN-SEARCH (see subclause 4.2.4.1.2) in order to perform a PLMN selection according to 3GPP TS 23.122 [14].

...

9.2.1.2.15.3 Test description

9.2.1.2.15.3.1 Pre-test conditions

System Simulator:

- cell A;
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, cell 5 (only active when stated):
 - same PLMN like visited PLMN above;
 - RAI-1 (RAC & LAC values chosen by SS);
 - System information indicates that NMO 1 is used;
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, cell 24 (only active when stated):
 - same PLMN like visited PLMN above;
 - RAC-1 (RAC & LAC values chosen by SS);
 - System information indicates that NMO 1 is used;
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting px_RATComb_Testcd = EUTRA_Only is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18];
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.1.2.15.3.2 Test procedure sequence

Table 9.2.1.2.15.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS reconfigures: Cell A as "Serving cell", Cell 5 or Cell 24 as "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is powered on or switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
4	Wait for 25s to ensure that T3410 and T3411 expire and the UE releases locally the NAS signalling connection. NOTE 1: The attach attempt counter is 1.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
6	Wait for 25s to ensure that T3410 and T3411 expire and the UE releases locally the NAS signalling connection. NOTE 2: The attach attempt counter is 2.	-	-	-	-
7	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
8	Wait for 25s to ensure that T3410 and T3411 expire and the UE releases locally the NAS signalling connection. NOTE 3: The attach attempt counter is 3.	-	-	-	-
9	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
10	Wait for 25s to ensure that T3410 and T3411 expire and the UE releases locally the NAS signalling connection. NOTE 4: The attach attempt counter is 4.	-	-	-	-
11	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
12	Wait for 15s to ensure that T3410 expire and the UE releases locally the NAS signalling connection. NOTE 5: The attach attempt counter is 5.	-	-	-	-
-	EXCEPTION: Steps 13a1 to 13a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
13a1	The SS reconfigures: Cell A as "Non-suitable cell", Cell 5 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) as "Serving cell".	-	-	-	-
13a2	Check: Does the UE transmit an ATTACH REQUEST message without P-TMSI, P-TMSI signature, RAI, TMSI on Cell 5 or Cell 24?	-->	ATTACH REQUEST	3	P
13A1	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
	EXCEPTION: Step 13Aa1 describes behaviour that depends on the UE capability.				
13Aa1	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmits a DETACH REQUEST	-->	DETACH REQUEST	-	-

	message				
14	The SS reconfigures: Cell A as "Serving cell", Cell 5 or Cell 24 as "Non-Suitable Off cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
15	Void	-	-	-	-
16	The UE is brought back to operation or the USIM is inserted. NOTE 6: The attach attempt counter is reset.	-	-	-	-
17- 26	Void	-	-	-	-
27	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST?	-->	ATTACH REQUEST	2	P
28- 49	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.1.2.15.3.3 Specific message contents

Table 9.2.1.2.15.3.3-1: Message ATTACH REQUEST (step 13a2, Table 9.2.1.2.15.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.1			
Information Element	Value/remark	Comment	Condition
MS network capability	Any allowed value		
Attach type	'011'B	Combined GPRS/IMSI attach	
GPRS ciphering key sequence number	'111'B	No key is available (MS to network)	
DRX parameter	Any allowed value		
P-TMSI or IMSI	IMSI-1		
Old routing area identification	All bits of octets 5 and 6 are set to 1, except bit 1 of octet 6 which is set to 0. Other bits are not checked.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
Requested READY timer value	Not present or any allowed value		
TMSI status	'0'B	no valid TMSI available	
PS LCS Capability	Not present or any allowed value		
Mobile station classmark 2	Not present or any allowed value		
Mobile station classmark 3	Not present or any allowed value		
Supported Codecs	Not present or any allowed value		
UE network capability	Not present or any allowed value		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

Table 9.2.1.2.15.3.3-2: Message ATTACH REQUEST (step 27, Table 9.2.1.2.15.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI-1		
Last visited registered TAI	Not present		
Old location area identification	Not present		
TMSI status	'0'B	no valid TMSI available	

9.2.2 Detach procedure

9.2.2.1 UE initiated detach procedure

9.2.2.1.1 UE initiated detach / UE switched off

9.2.2.1.1.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED state }
ensure that {
  when { the UE is switched off }
  then { the UE establishes the RRC connection with the RRC establishmentCause set to 'mo-Signalling' and sends DETACH REQUEST message, keeps the native security context, and deactivates the EPS bearer context(s) locally }
}
```

9.2.2.1.1.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.3.1.1, 5.5.2.2.1, 5.5.2.2.2 and Annex D and TS 36.331 clause 5.3.3.3.

[TS 24.301 clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a NAS signalling connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

[TS24.301 clause 5.5.2.2.1]

The detach procedure is initiated by the UE by sending a DETACH REQUEST message. The Detach type IE included in the message indicates whether detach is due to a "switch off" or not. The Detach type IE also indicates whether the detach is for EPS services only, for non-EPS services only, or for both. If the UE has a mapped EPS security context as the current EPS security context, the UE shall set the type of security context flag to "mapped security context". Otherwise, the UE shall set the type of security context flag to "native security context".

...

If the UE is to be switched off, the UE shall try for a period of 5 seconds to send the DETACH REQUEST message. During this period, the UE may be switched off as soon as the DETACH REQUEST message has been sent.

After the last DETACH REQUEST message is sent, the UE shall proceed as follows:

- if the current EPS security context is a native EPS security context, then the UE shall store the current EPS security context as specified in annex C and mark it as valid;
- else if the current EPS security context is a mapped EPS security context and a non-current full native EPS security context exists, then the UE shall store the non-current EPS security context as specified in annex C and mark it as valid, and finally the UE shall delete any mapped EPS security context or partial native EPS security context.

[TS24.301 clause 5.5.2.2.2]

When the DETACH REQUEST message is received by the network, the network shall send a DETACH ACCEPT message to the UE and store the current EPS security context, if the Detach type IE does not indicate "switch off". Otherwise, the procedure is completed when the network receives the DETACH REQUEST message. On reception of a DETACH REQUEST message indicating "switch off", the MME shall delete the current EPS security context, if it is a mapped EPS security context.

The network and the UE shall deactivate the EPS bearer context(s) for this UE locally without peer-to-peer signalling between the UE and the MME.

The UE, when receiving the DETACH ACCEPT message, shall stop timer T3421.

The UE is marked as inactive in the network for EPS services. State EMM-DEREGISTERED is entered in the network.

The UE in PS mode of operation shall enter the EMM-DEREGISTERED state.

The UE in CS/PS mode 1 or CS/PS mode 2 of operation shall set the update status to U2 NOT UPDATED, disable E-UTRAN and select GERAN or UTRAN access technology and enter the EMM-NULL state.

[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
...		
Detach	MO signalling (See Note 1)	"originating signalling"
...		
Note 1: For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".		

[TS 36.331, clause 5.3.3.3]

...

The UE shall set the contents of *RRCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;
 - 2> else
 - 3> draw a random value and set the *ue-Identity* to this value;

NOTE 1: Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 1> Set the *establishmentCause* in accordance with the information received from upper layers;

9.2.2.1.1.3 Test description

9.2.2.1.1.3.1 Pre-test conditions

System Simulator:

- cell A (HPLMN).

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (State 2) according to TS 36.508 [18].

9.2.2.1.1.3.2 Test procedure sequence

Table 9.2.2.1.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause switch off	-	-	-	-
2	Check: Does the UE transmit an <i>RRCCONNECTIONREQUEST</i> message with <i>establishmentCause</i> set to 'mo-Signalling' followed by a DETACH REQUEST with the Detach Type IE indicating 'switch off'?	-->	DETACH REQUEST	1	P
2A	The SS releases the RRC connection.	-	-	-	-
3-7	Void	-	-	-	-
8	The UE is switched on	-	-	-	-
9	Check: Does the UE transmit ATTACH REQUEST message using <i>KSI_{ASME}</i> of the previously allocated EPS native security context?	-->	ATTACH REQUEST	1	P
10-21	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.2.1.1.3.3 Specific message contents

Table 9.2.2.1.1.3.3-1: Message *RRCCONNECTIONREQUEST* (step 2, Table 9.2.2.1.1.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
<i>RRCCONNECTIONREQUEST</i> ::= SEQUENCE {			
<i>criticalExtensions</i> CHOICE {			
<i>rrcConnectionRequest-r8</i> SEQUENCE {			
<i>establishmentCause</i>	mo-Signalling		
}			
}			
}			

Table 9.2.2.1.1.3.3-2: Message ATTACH REQUEST (step 9, Table 9.2.2.1.1.3.2-1)

Derivation path: 36.508 table 4.7.2-4 (Security protected NAS message)			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier TSC	native security context (for <i>KSI_{ASME}</i>)		

9.2.2.1.2 UE initiated detach / USIM removed from the UE

9.2.2.1.2.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED }
ensure that {
  when { the USIM is removed from the UE }
  then { the UE sends DETACH REQUEST message and indicates that the detach is for both EPS services
and non-EPS services or for EPS services depending on the EPS attach type used }
}

```

9.2.2.1.2.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.2.2.1 and 5.5.2.2.3.

[TS24.301 clause 5.5.2.2.1]

The detach procedure is initiated by the UE by sending a DETACH REQUEST message. The Detach type IE included in the message indicates whether detach is due to a "switch off" or not. The Detach type IE also indicates whether the detach is for EPS services only, for non-EPS services only, or for both. If the UE has a mapped EPS security context as the current EPS security context, the UE shall set the type of security context flag to "mapped security context". Otherwise, the UE shall set the type of security context flag to "native security context".

If the UE has a valid GUTI, the UE shall populate the GUTI or IMSI IE with the valid GUTI. If the UE does not have a valid GUTI, the UE populates the GUTI or IMSI IE with its IMSI.

If the detach is not due to switch off and the UE is in the state EMM-REGISTERED or EMM-REGISTERED-INITIATED, timer T3421 shall be started in the UE after the DETACH REQUEST message has been sent. If the detach type indicates that the detach is for non-EPS services only the UE shall enter the state EMM-REGISTERED.IMSI-DETACH-INITIATED, otherwise the UE shall enter the state EMM-DEREGISTERED-INITIATED. If the detach type indicates that the detach is for non-EPS services or both EPS and non-EPS services, the UE shall enter the state MM IMSI DETACH PENDING.

[TS24.301 clause 5.5.2.2.3]

When the DETACH REQUEST message is received by the network, a DETACH ACCEPT message shall be sent to the UE, if the Detach type IE value indicates that the detach request has not been sent due to switching off. Depending on the value of the Detach type IE the following applies:

- combined EPS/IMSI detach:

The UE is marked as inactive in the network for EPS and for non-EPS services. The states EMM-DEREGISTERED and MM-NULL are entered in both the UE and the network.

9.2.2.1.2.3 Test description

9.2.2.1.2.3.1 Pre-test conditions

System Simulator:

- cell A (HPLMN).

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (State 2) according to TS 36.508 [18]

9.2.2.1.2.3.2 Test procedure sequence

Table 9.2.2.1.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause removal of USIM from the UE without powering down	-	-	-	-
2	Check: Does the UE transmit a DETACH REQUEST with the Detach Type IE indicating "normal detach" or "power off" detach and "combined EPS/IMSI detach" or "EPS detach" depending on the UE configuration?	-->	DETACH REQUEST	1	P
-	EXCEPTION: Step 2a describe behaviour that depends on the UE implementation	-	-	-	-
2a	If in step 2 normal detach is performed SS responds with DETACH ACCEPT message	<--	DETACH ACCEPT	-	-
3	Check: Does the test result of generic procedure in TS 36.508 subclause 6.4.2.5 indicate that the UE does not respond to paging when paged with S-TMSI included in GUTI-1 and with CN domain indicator set to "PS"?	-	-	1	-

9.2.2.1.2.3.3 Specific message contents

Table 9.2.2.1.2.3.3-1: DETACH REQUEST (step 2, Table 9.2.2.1.2.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001	EPS detach	EPSONlyAttach
	011	combined EPS/IMSI detach	CombinedAttach
Switch off	Not checked		
GUTI or IMSI	GUTI-1		

9.2.2.1.3 UE initiated detach / EPS capability of the UE is disabled

9.2.2.1.3.1 Test Purpose (TP)

(1)

```

with { CS/PS mode 1 UE or CS/PS mode 2 UE in EMM-REGISTERED state }
ensure that {
  when { EPS capability of the UE is disabled by disabling it's EPS services }
  then { UE sends the DETACH REQUEST message on the cell registered and indicates that the detach
is for EPS services }
}

```

(2)

```

with { CS/PS mode 1 UE or CS/PS mode 2 UE }
ensure that {
  when { EPS capability of the UE is disabled by disabling it's EPS services }
  then { UE selects GERAN or UTRAN radio access technology in order to enable the UE to continue to
obtain CS services }
}

```

9.2.2.1.3.2 Conformance requirements

References: The conformance requirement covered in the present TC is specified in: 3GPP TS 24.301 clause 5.5.2.1 and clauses 5.5.2.2

[TS 24.301, clause 5.5.2.1]

...

The detach procedure with appropriate detach type shall be invoked by the UE if the UE is switched off, the USIM card is removed from the UE or the UE has disabled EPS services or the UE wishes to detach for non-EPS services.

...

If the detach procedure for EPS services is performed, the EPS bearer context(s) for this particular UE are deactivated locally without peer-to-peer signalling between the UE and the MME.

Upon successful completion of the detach procedure, if the UE and the MME enter the EMM-DEREGISTERED state, the UE and the MME shall delete any mapped EPS security context or partial native EPS security context.

If the UE supports A/Gb mode or Iu mode, the UE shall store the TIN in the non-volatile memory in the ME, as described in annex C, for a subsequent attach procedure.

[TS 24.301, clause 5.5.2.2.1]

The detach procedure is initiated by the UE by sending a DETACH REQUEST message. The Detach type IE included in the message indicates whether detach is due to a "switch off" or not. The Detach type IE also indicates whether the detach is for EPS services only, for non-EPS services only, or for both. If the UE has a mapped EPS security context as the current EPS security context, the UE shall set the type of security context flag to "mapped security context". Otherwise, the UE shall set the type of security context flag to "native security context".

If the UE has a valid GUTI, the UE shall populate the GUTI or IMSI IE with the valid GUTI. If the UE does not have a valid GUTI, the UE populates the GUTI or IMSI IE with its IMSI.

If the detach is not due to switch off and the UE is in the state EMM-REGISTERED or EMM-REGISTERED-INITIATED, timer T3421 shall be started in the UE after the DETACH REQUEST message has been sent. If the detach type indicates that the detach is for non-EPS services only the UE shall enter the state EMM-REGISTERED.IMSI-DETACH-INITIATED, otherwise the UE shall enter the state EMM-DEREGISTERED-INITIATED. If the detach type indicates that the detach is for non-EPS services or both EPS and non-EPS services, the UE shall enter the state MM IMSI DETACH PENDING.

...

[TS 24.301, clause 5.5.2.2.2]

...

The network and the UE shall deactivate the EPS bearer context(s) for this UE locally without peer-to-peer signalling between the UE and the MME.

The UE, when receiving the DETACH ACCEPT message, shall stop timer T3421.

The UE is marked as inactive in the network for EPS services. State EMM-DEREGISTERED is entered in the network.

The UE in PS mode of operation shall enter the EMM-DEREGISTERED state.

The UE in CS/PS mode 1 or CS/PS mode 2 of operation shall set the update status to U2 NOT UPDATED, disable E-UTRAN and select GERAN or UTRAN access technology and enter the EMM-NULL state.

9.2.2.1.3.3 Test description

9.2.2.1.3.3.1 Pre-test conditions

System Simulator:

- Cell A.
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 5 (home PLMN, RAI-1, NMO 1) is set to "Suitable cell";
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (home PLMN, RAI-1, NMO 1) is set to "Suitable cell";
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting `px_RATComb_Tested = EUTRA_Only` is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach .

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.2.1.3.3.2 Test procedure sequence

Table 9.2.2.1.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause UE to disable the EPS services.	-	-	-	-
2	Check: Does the UE transmit a DETACH REQUEST message with the Detach type IE indicating "EPS detach" and "normal detach".	-->	DETACH REQUEST	1	P
3	The SS responds the DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
3A	The SS releases the RRC connection.	-	-	-	-
4	Void	-	-	-	-
-	EXCEPTION: Steps 5a1 to 5b6 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
5a1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA THEN	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.2.1.3.3.2-2 may occur in parallel with step 5a2.	-	-	-	-
5a2	Check: Does the UE send RRC CONNECTION REQUEST on Cell 5?	-->	-	1	P
5a3	The SS sends RRC CONNECTION SETUP	<--	-	-	-
5a4	The UE sends RRC CONNECTION SETUP COMPLETE	-->	-	1	P
5a5	Check: Does the UE transmit a LOCATION UPDATING REQUEST on Cell 5?	-->	LOCATION UPDATING REQUEST	2	P
5a6	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
5a7	The UE transmits an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
5a8	The SS transmits a LOCATION UPDATING ACCEPT message on Cell 5.	<--	LOCATION UPDATING ACCEPT	-	-
5a9	The UE transmits an TMSI REALLOCATION COMPLETE message	-->	TMSI REALLOCATION COMPLETE	-	-
5b1	ELSE IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN	-	-	-	-
5b2	Check: Does the UE transmit a LOCATION UPDATING REQUEST on Cell 24?	-->	LOCATION UPDATING REQUEST	2	P
5b2 A	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE		
-	EXCEPTION: Step 5b2B describes behaviour that depends on UE capability.	-	-	-	-
5b2 B	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.		
5b3	The SS transmits an AUTHENTICATION REQUEST message.	<--	AUTHENTICATION REQUEST	-	-
5b4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
5b5	The SS transmits a LOCATION UPDATING ACCEPT message on Cell 24.	<--	LOCATION UPDATING ACCEPT	-	-
5b5 A	The UE transmits an TMSI REALLOCATION COMPLETE message	-->	TMSI REALLOCATION COMPLETE	-	-
5b6	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST on Cell 24?	-->	ROUTING AREA UPDATE REQUEST	2	F

Table: 9.2.2.1.3.3.2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST on Cell 5?	-->	ROUTING AREA UPDATE REQUEST	2	F

9.2.2.1.3.3.3 Specific message contents

Table 9.2.2.1.3.3.3-1: DETACH REQUEST (steps 2 in Table 9.2.2.1.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001	EPS detach only	
Switch off	0	normal detach	
GUTI or IMSI	GUTI-1		

Table 9.2.2.1.3.3.3-2: Message RRC Connection Request (step 5a2 in Table 9.2.2.1.3.3.2-1)

Derivation path: 34.108 sub-clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
Pre-redirect info		Optional IE, but if transmitted it should have the below values	
> Support of E-UTRA FDD	False	E-UTRA FDD not supported	
> Support of E-UTRA TDD	False	E-UTRA TDD not supported	

Table 9.2.2.1.3.3.3-3: Message RRC Connection Setup Complete (step 5a4 in Table 9.2.2.1.3.3.2-1)

Derivation path: 34.108 sub-clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
UE radio access capability		The UE shall not indicate support for E-UTRAN	
>UE multi-mode/multi-RAT capability			
>> Multi-RAT capability			
>>> Support of Inter-RAT PS Handover to E-UTRA FDD	Not present		
>>> Support of E-UTRA TDD	Not present		
>>> Support of Inter-RAT PS Handover to E-UTRA TDD	Not present		
>>> EUTRA Feature Group Indicators	Not checked		

9.2.2.1.4 UE initiated detach / detach for non-EPS services

9.2.2.1.4.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state }
ensure that {
  when { UE is detached for non-EPS services }
  then { UE sends the DETACH REQUEST message on the cell registered and indicates a IMSI detach }
}

```

9.2.2.1.4.2 Conformance requirements

References: The conformance requirement covered in the present TC is specified in: 3GPP TS 24.301 clauses 5.5.2.1, 5.5.2.2.1 and 5.5.2.2.3.

[TS 24.301, clause 5.5.2.1]

...

The detach procedure with appropriate detach type shall be invoked by the UE if the UE is switched off, the USIM card is removed from the UE or the UE has disabled EPS services or the UE wishes to detach for non-EPS services.

[TS 24.301, clause 5.5.2.2.1]

The detach procedure is initiated by the UE by sending a DETACH REQUEST message (see example in figure 5.5.2.2.1.1). The Detach type IE included in the message indicates whether detach is due to a "switch off" or not. The Detach type IE also indicates whether the detach is for EPS services only, for non-EPS services only, or for both. If the UE has a mapped EPS security context as the current EPS security context, the UE shall set the type of security context flag to "mapped security context". Otherwise, the UE shall set the type of security context flag to "native security context".

If the UE has a valid GUTI, the UE shall populate the GUTI or IMSI IE with the valid GUTI. If the UE does not have a valid GUTI, the UE populates the GUTI or IMSI IE with its IMSI.

If the detach is not due to switch off and the UE is in the state EMM-REGISTERED or EMM-REGISTERED-INITIATED, timer T3421 shall be started in the UE after the DETACH REQUEST message has been sent. If the detach type indicates that the detach is for non-EPS services only the UE shall enter the state EMM-REGISTERED.IMSI-DETACH-INITIATED, otherwise the UE shall enter the state EMM-DEREGISTERED-INITIATED. If the detach type indicates that the detach is for non-EPS services or both EPS and non-EPS services, the UE shall enter the state MM IMSI DETACH PENDING.

[TS 24.301, clause 5.5.2.2.3]

When the DETACH REQUEST message is received by the network, a DETACH ACCEPT message shall be sent to the UE, if the Detach type IE value indicates that the detach request has not been sent due to switching off. Depending on the value of the Detach type IE the following applies:

- combined EPS/IMSI detach:

The UE is marked as inactive in the network for EPS and for non-EPS services. The states EMM-DEREGISTERED and MM-NULL are entered in both the UE and the network.

- IMSI detach:

The UE is marked as inactive in the network for non-EPS services. The states MM-NULL and EMM-REGISTERED are entered in both the UE and the network.

9.2.2.1.4.3 Test description

9.2.2.1.4.3.1 Pre-test conditions

System Simulator:

- Cell A is set to "Serving cell";
- Cell B is set to "Non-Suitable cell"

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.2.1.4.3.2 Test procedure sequence

Table 9.2.2.1.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause UE to initiate detach for non-EPS services.	-	-	-	-
2	Check: Does the UE transmit a DETACH REQUEST message with the Detach type IE indicating "IMSI detach" and "normal detach".	-->	DETACH REQUEST	1	P
3	The SS responds with DETACH ACCEPT message.	-	DETACH ACCEPT	-	-
3A	The SS releases the RRC Connection.	-	-	-	-
4	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
5	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
6	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
7	The UE transmits a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	-	-

9.2.2.1.4.3.3 Specific message contents

Table 9.2.2.1.4.3.3-1: DETACH REQUEST (step 2 in Table 9.2.2.1.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	010	IMSI detach	
Switch off	0	normal detach	

Table 9.2.2.1.4.3.3-2: TRACKING AREA UPDATE REQUEST (step 5 in Table 9.2.2.1.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type value	'000'B	TA updating	

9.2.2.1.5 Void

9.2.2.1.6 UE initiated detach / Abnormal case / Local detach after 5 attempts due to no network response

9.2.2.1.6.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state }
ensure that {
  when { the UE receives no response to the UE initiated DETACH REQUEST }
  then { the UE re-transmits the DETACH REQUEST up to 4 times on the expiry of timer T3421 }
}

```

(2)

```

with { UE in EMM-REGISTERED state }
ensure that {
  when { the UE receives no response to the UE initiated DETACH REQUEST }
  then { the UE aborts the detach procedure and perform local detach on the 5th expiry of timer T3421 }
}

```

9.2.2.1.6.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.2.2.

[TS 24.301, clause 5.5.2.2.1]

The detach procedure is initiated by the UE by sending a DETACH REQUEST message. The Detach type IE included in the message indicates whether detach is due to a "switch off" or not. The Detach type IE also indicates whether the detach is for EPS services only, for non-EPS services only, or for both. If the UE has a mapped EPS security context as the current EPS security context, the UE shall set the type of security context flag to "mapped security context". Otherwise, the UE shall set the type of security context flag to "native security context".

If the UE has a valid GUTI, the UE shall populate the GUTI or IMSI IE with the valid GUTI. If the UE does not have a valid GUTI, the UE populates the GUTI or IMSI IE with its IMSI.

If the detach is not due to switch off and the UE is in the state EMM-REGISTERED or EMM-REGISTERED-INITIATED, timer T3421 shall be started in the UE after the DETACH REQUEST message has been sent. If the detach type indicates that the detach is for non-EPS services only the UE shall enter the state EMM-REGISTERED.IMSI-DETACH-INITIATED, otherwise the UE shall enter the state EMM-DEREGISTERED-INITIATED. If the detach type indicates that the detach is for non-EPS services or both EPS and non-EPS services, the UE shall enter the state MM IMSI DETACH PENDING.

[TS 24.301, clause 5.5.2.2.4 c)]

The following abnormal cases can be identified:

...

c) T3421 timeout

On the first four expiries of the timer, the UE shall retransmit the DETACH REQUEST message and shall reset and restart timer T3421. On the fifth expiry of timer T3421, the detach procedure shall be aborted and the UE shall change to state:

- EMM-REGISTERED.NORMAL-SERVICE and MM-NULL if "IMSI detach" was requested;
- EMM-DEREGISTERED if "EPS detach" was requested;
- EMM-DEREGISTERED and MM-NULL if "combined EPS/IMSI detach" was requested.

[TS 24.301, clause 5.1.3.2.2.2]

In the state EMM-DEREGISTERED, no EMM context has been established and the UE location is unknown to an MME and hence it is unreachable by an MME. In order to establish an EMM context, the UE shall start the attach or combined attach procedure (see subclause 5.5.1).

9.2.2.1.6.3 Test description

9.2.2.1.6.3.1 Pre-test conditions

System Simulator:

- cell A (HPLMN).

UE:

none.

Preamble:

- the UE is in state Registered, Idle Mode (State 2) according to TS 36.508 [18].

9.2.2.1.6.3.2 Test procedure sequence

Table 9.2.2.1.6.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause UE to initiate detach.	-	-	-	-
2	The UE transmits a DETACH REQUEST message? The UE starts timer T3421.	-->	DETACH REQUEST	-	-
3	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
4	Check: When the timer T3421 expires does the UE re-transmit DETACH REQUEST message. Timer T3421 is re-started (1 st expiry).	-->	DETACH REQUEST	1	P
5	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
6	Check: When the timer T3421 expires does the UE re-transmit DETACH REQUEST message. Timer T3421 is re-started (2 nd expiry).	-->	DETACH REQUEST	1	P
7	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
8	Check: When the timer T3421 expires does the UE re-transmit DETACH REQUEST message. Timer T3421 is re-started (3 rd expiry).	-->	DETACH REQUEST	1	P
9	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
10	Check: When the timer T3421 expires does the UE re-transmit DETACH REQUEST message. Timer T3421 is re-started (4 th expiry).	-->	DETACH REQUEST	1	P
11	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
12	When the timer T3421 expires the UE aborts the detach procedure and performs a local detach (5 th expiry).	-	-	2	P
13	The SS starts the EPS bearer context modification procedure using the previously allocated EPS bearer identity	<--	MODIFY EPS BEARER CONTEXT REQUEST	-	-
14	Check: Does the UE transmit a MODIFY EPS BEARER CONTEXT ACCEPT message within the next 10s?	-->	MODIFY EPS BEARER CONTEXT ACCEPT	2	F
15	Void	-	-	-	-
16a 1	Void	-	-	-	-

Note: T3421 value is specified as 15s in TS 24.301.

9.2.2.1.6.3.3 Specific message contents

Table 9.2.2.1.6.3.3-1: DETACH REQUEST (steps 2, 4, 6, 8 and 10 Table 9.2.2.1.6.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001 or 011	EPS detach or combined EPS/IMSI detach	
Switch off	0	normal detach	
GUTI or IMSI	GUTI-1		

Table 9.2.2.1.6.3.3-2: Void

9.2.2.1.7 UE initiated detach / Abnormal case / Detach procedure collision

9.2.2.1.7.1 Test Purpose (TP)

(1)

```

with { UE in EMM-DEREGISTERED-INITIATED state }
ensure that {
  when { the UE receives the DETACH REQUEST message from the network }
  then { the UE aborts the UE initiated detach procedure and completes the network initiated detach procedure }
}

```

(2)

```

with { UE in EMM-DEREGISTERED state }
ensure that {
  when { the UE has completed the network initiated detach procedure with re-attach required and the UE supports re-attach after DETACH collision }
  then { the UE initiates the attach procedure }
}

```

(3)

```

with { UE in EMM-DEREGISTERED state }
ensure that {
  when { the UE has completed the network initiated detach procedure with re-attach required and the UE does not support re-attach after DETACH collision }
  then { the UE does not initiate the attach procedure }
}

```

9.2.2.1.7.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.2.2.4 and 5.5.2.3.2.

[TS 24.301, clause 5.5.2.2.4]

The following abnormal cases can be identified:

...

d) Detach procedure collision

If the UE receives a DETACH REQUEST message before the UE initiated detach procedure has been completed, it shall treat the message as specified in subclause 5.5.2.3.2 with the following modification: if the DETACH REQUEST message received by the UE contains detach type "re-attach required", and the UE initiated detach procedure is with detach type "EPS detach" or "combined EPS/IMSI detach", the UE need not initiate the attach or combined attach procedure.

[TS 24.301, clause 5.5.2.3.2]

When receiving the DETACH REQUEST message and the detach type indicates "re-attach required", the UE shall deactivate the EPS bearer context(s) including the default EPS bearer context locally without peer-to-peer signalling between the UE and the MME. The UE shall then send a DETACH ACCEPT message to the network and enter state EMM-DEREGISTERED. Furthermore, the UE shall, after the completion of the detach procedure, and the existing NAS signalling connection has been released, initiate an attach or combined attach procedure.

NOTE 1: When detach type indicates "re-attach required", user interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

9.2.2.1.7.3 Test description

9.2.2.1.7.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (State 2) according to TS 36.508 [18].

9.2.2.1.7.3.2 Test procedure sequence

Table 9.2.2.1.7.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause UE to initiate detach.	-	-	-	-
2	The UE transmits a DETACH REQUEST message. The UE starts timer T3421.	-->	DETACH REQUEST	-	-
3	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
4	With T3421 still running the SS shall send DETACH REQUEST message with the Detach type IE indicating "re-attach required".	<--	DETACH REQUEST	-	-
5	Check: Does the UE transmit a DETACH ACCEPT message?	-->	DETACH ACCEPT	1	P
6	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 7a1-7b1 describe a behaviour which depends on the UE capability	-	-	-	-
7a1	Void				
7a2	IF pc_Re_Attach_AfterDetachColl THEN Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	2	P
7a3-7a14	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
7a15	Cause UE to initiate detach.	-	-	-	-
7a16	The UE transmits a DETACH REQUEST with the Detach Type IE indicating "normal detach" and "combined EPS/IMSI detach" or "EPS detach" depending on the UE configuration .	-->	DETACH REQUEST	-	-
7a17	The SS responds with DETACH ACCEPT message	<--	DETACH ACCEPT	-	-
7a18	The SS releases the RRC connection	-	-	-	-
7b1	ELSE Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message in the next 30s?	-->	ATTACH REQUEST	3	F
-	At the end of this test procedure sequence, the UE is in end state E-UTRA deregistered (E4) according to TS 36.508.	-	-	-	-

9.2.2.1.7.3.3 Specific message contents

Table 9.2.2.1.7.3.3-1: DETACH REQUEST (steps 2 and 7a16 Table 9.2.2.1.7.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001 or 011	EPS detach or combined EPS/IMSI detach	
Switch off	0	normal detach	
GUTI or IMSI	GUTI-1		

Table 9.2.2.1.7.3.3-2: DETACH REQUEST (step 4 Table 9.2.2.1.7.3.2-1)

Derivation Path: 36.508, Table 4.7.2-12			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001	re-attach required	

Table 9.2.2.1.7.3.3-3: Message ATTACH REQUEST (step 7a2, Table 9.2.2.1.7.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
EPS attach type	0001 or 0010	EPS attach or combined EPS/IMSI attach	

9.2.2.1.8 UE initiated detach / Abnormal case / Detach and EMM common procedure collision

9.2.2.1.8.1 Test Purpose (TP)

(1)

```
with { UE in EMM-DEREGISTERED-INITIATED state due to switch off }
ensure that {
  when { the UE receives an EMM common procedure message from the network }
  then { the UE ignores the message and continues the detach procedure }
}
```

(2)

```
with { UE in EMM-DEREGISTERED-INITIATED state due to normal detach }
ensure that {
  when { the UE receives GUTI REALLOCATION COMMAND from the network }
  then { the UE ignores the message and continues the detach procedure }
}
```

(3)

```
with { UE in EMM-DEREGISTERED-INITIATED state due to normal detach }
ensure that {
  when { the UE receives AUTHENTICATION REQUEST, SECURITY MODE COMMAND or IDENTITY REQUEST message from the network }
  then { the UE responds to the message and then continues the detach procedure }
}
```

9.2.2.1.8.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.2.2.4.

[TS 24.301, clause 5.5.2.2.4]

The following abnormal cases can be identified:

...

e) Detach and EMM common procedure collision

Detach containing cause "switch off":

- If the UE receives a message used in an EMM common procedure before the detach procedure has been completed, this message shall be ignored and the detach procedure shall continue

Detach containing other causes than "switch off":

- If the UE receives a GUTI REALLOCATION COMMAND, an EMM STATUS or an EMM INFORMATION message before the detach procedure is completed, this message shall be ignored and the detach procedure shall continue.
- If the UE receives an AUTHENTICATION REQUEST, SECURITY MODE COMMAND or IDENTITY REQUEST message before the detach procedure has been completed, the UE shall respond to it as described in subclause 5.4.2, 5.4.3 and 5.4.4 respectively and the detach procedure shall continue.

9.2.2.1.8.3 Test description

9.2.2.1.8.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (State 2) according to TS 36.508[18].

9.2.2.1.8.3.2 Test procedure sequence

Table 9.2.2.1.8.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Cause switch off.	-	-	-	-
2	The UE transmits a DETACH REQUEST message with the Detach type IE indicating "switch off".	-->	DETACH REQUEST	-	-
3	The SS transmits a GUTI REALLOCATION COMMAND message.	<--	GUTI REALLOCATION COMMAND	-	-
4	Check: Does the UE transmit an GUTI REALLOCATION COMPLETE message?	-->	GUTI REALLOCATION COMPLETE	1	F
5	Check: Does the test result of generic procedure in TS 36.508 subclause 6.4.2.5 indicate that the UE does not respond to paging when paged with S-TMSI included in GUTI-1 and with CN domain indicator set to "PS"?	-	-	1	-
6	The UE is switched on and performs an ATTACH procedure.	-	-	-	-
7	Cause UE to initiate detach.	-	-	-	-
8	The UE transmits a DETACH REQUEST message? The UE starts timer T3421.	-->	DETACH REQUEST	2	P
9	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
10	With T3421 still running the SS shall send GUTI REALLOCATION COMMAND.	<--	GUTI REALLOCATION COMMAND	-	-
11	Check: Does the UE transmit a GUTI REALLOCATION COMPLETE message?	-->	GUTI REALLOCATION COMPLETE	2	F
12	SS responds with DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
13	The SS releases the RRC connection.	-	-	-	-
14	Cause UE to initiate attach. The generic procedure in 36.508 clause 4.5.2.3-1 is executed so as to complete the attach procedure (Note).	-	-	-	-
15	Cause UE to initiate detach.	-	-	-	-
16	The UE transmits a DETACH REQUEST message? The UE starts timer T3421.	-->	DETACH REQUEST	-	-
17	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
18	With T3421 still running the SS shall send AUTHENTICATION REQUEST.	<--	AUTHENTICATION REQUEST	-	-
19	Check: Does the UE transmit an AUTHENTICATION RESPONSE message?	-->	AUTHENTICATION RESPONSE	3	P
20	SS responds with DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
21	The SS releases the RRC connection.	-	-	-	-
22	Cause UE to initiate attach. The generic procedure in 36.508 clause 4.5.2.3-1 is executed so as to complete the attach procedure (Note).	-	-	-	-
23	Cause UE to initiate detach.	-	-	-	-
24	The UE transmits a DETACH REQUEST message? The UE starts timer T3421.	-->	DETACH REQUEST	-	-
25	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
26	With T3421 still running the SS shall send SECURITY MODE COMMAND.	<--	SECURITY MODE COMMAND	-	-
27	Check: Does the UE transmit a SECURITY MODE COMPLETE message?	-->	SECURITY MODE COMPLETE	3	P
28	SS responds with DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
29	The SS releases the RRC connection.	-	-	-	-
30	Cause UE to initiate attach. The generic	-	-	-	-

	procedure in 36.508 clause 4.5.2.3-1 is executed so as to complete the attach procedure (Note).				
31	Cause UE to initiate detach.	-	-	-	-
32	The UE transmits a DETACH REQUEST message? The UE starts timer T3421.	-->	DETACH REQUEST	-	-
33	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
34	With T3421 still running the SS shall send IDENTITY REQUEST.	<--	IDENTITY REQUEST	-	-
35	Check: Does the UE transmit an IDENTITY RESPONSE message?	-->	IDENTITY RESPONSE	3	P
36	SS responds with DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
37	The SS releases the RRC connection.	-	-	-	-
Note: The request is triggered by either of the following AT commands, depending on UE capability: - IF pc_KeepEpsBearerParametersAfterNormalDetach THEN AT command AT+CGATT=1, or - ELSE AT command AT+CGDCONT=1,"IP" followed by AT+CGACT=1					

9.2.2.1.8.3.3 Specific message contents

Table 9.2.2.1.8.3.3-1: DETACH REQUEST (steps 8, 16, 24 and 32 Table 9.2.2.1.8.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001 or 011	EPS detach or combined EPS/IMSI detach	
Switch off	0	normal detach	

Table 9.2.2.1.8.3.3-2: GUTI REALLOCATION COMMAND (step 3 Table 9.2.2.1.8.3.2-1)

Derivation Path: 36.508, Table 4.7.2-15			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-2		
TAI list	Not present		

Table 9.2.2.1.8.3.3-3: GUTI REALLOCATION COMMAND (step 10 Table 9.2.2.1.8.3.2-1)

Derivation Path: 36.508, Table 4.7.2-15			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-3		
TAI list	Not present		

Table 9.2.2.1.8.3.3-4: Message ATTACH REQUEST (steps 14, 22 and 30, Table 9.2.2.1.8.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
EPS attach type	0001 or 0010	EPS attach or combined EPS/IMSI attach	

9.2.2.1.9 UE initiated detach / Abnormal case / Change of cell into a new tracking area

9.2.2.1.9.1 Test Purpose (TP)

(1)

```
with { UE in EMM-DEREGISTERED-INITIATED state }
ensure that {
  when { the UE changes into a new tracking area that is not in the stored TAI list }
  then { the UE aborts the detach procedure and initiates a Tracking Area Updating procedure }
```

```

}
```

(2)

```

with { UE in EMM-TRACKING-AREA-UPDATING-INITIATED state }
ensure that {
  when { the UE receives TRACKING AREA UPDATE ACCEPT message }
  then { the UE re-initiates the detach procedure after completing the Tracking Area Updating
  procedure }
}
```

9.2.2.1.9.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.2.2.4.

[TS 24.301, clause 5.5.2.2.4]

The following abnormal cases can be identified:

...

- b) Lower layer failure or release of the NAS signalling connection before reception of DETACH ACCEPT message

The detach procedure shall be aborted, and the UE shall enter state:

- EMM-REGISTERED.NORMAL-SERVICE and MM-NULL if "IMSI detach" was requested;
- EMM-DEREGISTERED if "EPS detach" was requested;
- EMM-DEREGISTERED and MM-NULL if "combined EPS/IMSI detach" was requested.

...

- f) Change of cell into a new tracking area

If a cell change into a new tracking area that is not in the stored TAI list occurs before the UE initiated detach procedure is completed, the detach procedure shall be aborted and re-initiated after successfully performing a tracking area updating procedure. If the detach procedure was initiated due to removal of the USIM, the UE shall abort the detach procedure and enter the state EMM-DEREGISTERED.

9.2.2.1.9.3 Test description

9.2.2.1.9.3.1 Pre-test conditions

System Simulator:

- cell A belongs to TAI-1 (home PLMN) is set to "Serving cell"
- cell B belongs to TAI-2 (home PLMN) is set to "Non-Suitable cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) state Registered, Idle mode (State 2) according to [18].

9.2.2.1.9.3.2 Test procedure sequence

Table 9.2.2.1.9.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
1	Cause UE to initiate detach.	-	-	-	-
2	The UE transmits a DETACH REQUEST message. The UE starts timer T3421.	-->	DETACH REQUEST	-	-
3	The SS does not respond to the DETACH REQUEST message.	-	-	-	-
4	Set the cell type of cell A to the "Suitable neighbour cell". Set the cell type of cell B to the "Serving cell". Note: T3421 value is specified as 15s in TS 24.301 and it is assumed that SS can configure cells within this time.	-	-	-	-
4A	The SS transmits an <i>RRCCONNECTIONRECONFIGURATION</i> message on Cell A to order the UE to perform intra frequency handover to Cell B.	<--	-	-	-
4B	The UE transmits an <i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i> message on Cell B to confirm the successful completion of the intra frequency handover.	-->	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
5	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
6	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
7	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	-	-
8	The UE transmits a DETACH REQUEST message.	-->	DETACH REQUEST	2	P
9	SS responds with DETACH ACCEPT message	<--	DETACH ACCEPT	-	-
10	Check: Does the test result of generic procedure in TS 36.508 subclause 6.4.2.5 indicate that the UE does not respond to paging when paged with S-TMSI included in GUTI-2 and with CN domain indicator set to "PS"?	-	-	-	-

9.2.2.1.9.3.3 Specific message contents

Table 9.2.2.1.9.3.3-1: DETACH REQUEST (step 2, Table 9.2.2.1.9.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001 or 011	EPS detach or combined EPS/IMSI detach	
Switch off	0	normal detach	
GUTI or IMSI	GUTI-1		

Table 9.2.2.1.9.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 6, Table 9.2.2.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		

Table 9.2.2.1.9.3.3-3: RRCConnectionReconfiguration (step 4a, Table 9.2.2.1.9.3.2-1)

Derivation Path: 36.508, Table 4.6.1-8, condition HO			
Information Element	Value/Remark	Comment	Condition
RRCConnectionReconfiguration ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE{			
rrcConnectionReconfiguration-r8 SEQUENCE {			
mobilityControlInfo SEQUENCE {	MobilityControlInfo-HO		
targetPhysCellId	PhysicalCellIdentity of Cell B (see 36.508 clause 4.6.5)		
carrierFreq	Not present		
}			
}			
}			
}			
}			

Table 9.2.2.1.9.3.3-4: Message TRACKING AREA UPDATE REQUEST (step 5, Table 9.2.2.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
Active Flag	Any allowed value		
EPS bearer context status	Not present or (octet 3 = '00100000'B and octet 4 = '00000000'B) or (octet 3 = '00000000'B and octet 4 = '00000000'B)		

Table 9.2.2.1.9.3.3-5: DETACH REQUEST (step 8, Table 9.2.2.1.9.3.2-1)

Derivation Path: 36.508, Table 4.7.2-11			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	001 or 011	EPS detach or combined EPS/IMSI detach	
Switch off	0	normal detach	
GUTI or IMSI	GUTI-2		

9.2.2.1.10 UE initiated detach / Mapped security context

9.2.2.1.10.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED state }
ensure that {
  when { the UE sent the last DETACH REQUEST }
  then { the UE delete the mapped security context }
}
```

9.2.2.1.10.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.2.1.

[TS 24.301, clause 5.5.2.1]

Upon successful completion of the detach procedure, if the UE and the MME enter the EMM-DEREGISTERED state, the UE and the MME shall delete any mapped EPS security context or partial native EPS security context.

9.2.2.1.10.3 Test description

9.2.2.1.10.3.1 Pre-test conditions

System Simulator:

- Cell A and Cell 5.
- System information combination 4 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cell;

UE:

None.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.2.1.10.3.2 Test procedure sequence

Table 9.2.2.1.10.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U-S	Message		
-	The SS configures: - Cell 5 as a "Non-Suitable Off cell". - Cell A as the "Serving cell".	-	-	-	-
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message.	-->	ATTACH REQUEST	-	-
3	The SS transmits an ATTACH REJECT message with EMM cause = "EPS services and non-EPS services not allowed" as specified.	<--	ATTACH REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
6	The SS configures: - Cell A as a "Non-Suitable Off cell". - Cell 5 as the "Serving cell".	-	-	-	-
7	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
8	The UE transmits an ATTACH REQUEST message on Cell 5	-->	ATTACH REQUEST		
9	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST		
10	The UE transmits an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE		
11	SS responds with ATTACH ACCEPT message including P-TMSI-1 and RAI-1.	<--	ATTACH ACCEPT	-	-
12	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
13	The activation of a PDP context is triggered by MMI or AT command.	-	-	-	-
14	Generic test procedure in TS 34.108 subclause 7.2.4.2.3 is performed on Cell 5. NOTE: The UE performs Radio Bearer Establishment in a UTRAN cell.	-	-	-	-
15	The SS releases the RRC connection.	-	-	-	-
16	The SS configures: - Cell A as the "Serving cell". - Cell 5 as a "Non-Suitable cell".	-	-	-	-
17 - 24	Generic test procedure in TS 36.508 subclause 6.4.2.7A-1 is performed. (step 1 to 8)	-	-	-	-
25	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 25 describes behaviour that depends on the UE capability.				
26	If pc_SwitchOnOff or pc_USIM_Removal then UE send DETACH REQUEST message.	-->	DETACH REQUEST	-	-
27	The SS configures: - Cell A as the "Serving cell". - Cell 5 as a "Non-Suitable Off cell".	-	-	-	-
28	The UE is brought back to operation or the USIM is inserted. The following message shall be received on cell A.	-	-	-	-
29	Cause UE to initiate attach Check: Does the UE send ATTACH REQUEST message	-->	ATTACH REQUEST	1	P
30-	The attach procedure is completed by	-	-	-	-

41	executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.				
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.2.1.10.3.3 Specific message contents

Table 9.2.1.1.10.3.3-1: Message ATTACH REJECT (steps 3, Table 9.2.2.1.10.3.2-1)

Derivation path: 36.508 table 4.7.2-3			
Information Element	Value/Remark	Comment	Condition
Security header type	0000	" Plain NAS message, not security protected "	
EMM cause	00001000	#8 "EPS services and non-EPS services not allowed"	
ESM message container	Not present		

Table 9.2.2.1.10.3.3-2: ATTACH REQUEST (step 29, Table 9.2.2.1.10.3.2-1)

Information Element	Value/remark	Comment	Condition
NAS key set identifier	'11'	no key is available	

9.2.2.2 Network initiated detach procedure

9.2.2.2.1 NW initiated detach / Re-attach required

9.2.2.2.1.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state }
ensure that {
  when { SS sends DETACH REQUEST message with the Detach type IE "re-attach required" }
  then { UE sends DETACH ACCEPT message and UE initiates an attach procedure with the current EPS security context }
}

```

9.2.2.2.1.2 Conformance requirements

References: The conformance requirement covered in the present TC is specified in: 3GPP TS 24.301 clauses 5.5.2.3.2.

[TS24.301 clause5.5.2.3.2]

When receiving the DETACH REQUEST message and the detach type indicates "re-attach required", the UE shall deactivate the EPS bearer context(s) including the default EPS bearer context locally without peer-to-peer signalling between the UE and the MME. The UE shall then send a DETACH ACCEPT message to the network and enter state EMM-DEREGISTERED. Furthermore, the UE shall, after the completion of the detach procedure, and the existing NAS signalling connection has been released, initiate an attach or combined attach procedure.

NOTE 1: When detach type indicates "re-attach required", user interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

A UE which receives a DETACH REQUEST message with detach type indicating "re-attach required" or "re-attach not required" and no EMM cause IE, is detached only for EPS services.

...If the detach type indicates "IMSI detach" or "re-attach required" then the UE shall ignore the EMM cause IE if received.

9.2.2.2.1.3 Test description

9.2.2.2.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.2.2.2.1.3.2 Test procedure sequence

Table 9.2.2.2.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	The SS initiates Detach procedure with the Detach Type IE "re-attach required"	<--	DETACH REQUEST	-	-
2	Check: Does the UE send DETACH ACCEPT message?	-->	DETACH ACCEPT	1	P
3	The SS releases RRC connection.				
-	EXCEPTION: Step 3a describes a behaviour which depends on the UE capability	-	-	-	-
3a	IF NOT pc_Automatic_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
4	Check: Does the UE send ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
-	EXCEPTION: Steps 4Aa1 to 4Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
4Aa1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
4Aa2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
5	The SS sends ATTACH ACCEPT to assign the new GUTI (GUTI-2). The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
6	Check: Does the UE send ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message?	-->	ATTACH COMPLETE	1	P

9.2.2.2.1.3.3 Specific message contents

Table 9.2.2.2.1.3.3-1: Message DETACH REQUEST (step 1, Table 9.2.2.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	'001'B	"re-attach required"	

Table 9.2.2.2.1.3.3-2: Message ATTACH REQUEST (step 4, Table 9.2.2.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier			
TSC	'0'B	native security context	
NAS key set identifier	The value is a same value to be allocated by SS in Preamble.		
Old GUTI or IMSI	GUTI-1		

NOTE: This message is sent within the SECURITY NAS PROTECTED MESSAGE in Table 9.2.2.2.1.3.3-3.

Table 9.2.2.2.1.3.3-3: Message SECURITY PROTECTED NAS MESSAGE (step 4, Table 9.2.2.2.1.3.2-1)

Derivation Path: 36.508 Table 4.7.1-1			
Information Element	Value/remark	Comment	Condition
Security header type	'0001'B	Integrity protected	
NAS message	'01000001'B	"ATTACH REQUEST"	

Table 9.2.2.2.1.3.3-4: Message ATTACH ACCEPT (step 5, Table 9.2.2.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list			
Length of tracking area identity list contents	'00000110'B	6 octets	
Number of elements	'00000'B	1 element	
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
Partial tracking area identity list	TAI-1		
GUTI	GUTI-2		

9.2.2.2.2 NW initiated detach / IMSI detach

9.2.2.2.2.1 Test Purpose (TP)

(1)

```
with { UE in EMM-REGISTERED state }
ensure that {
  when { UE receives DETACH REQUEST message with the Detach type IE = "IMSI detach" }
  then { UE sends TRACKING AREA UPDATE REQUEST message with EPS update type IE = "Combined TA/LA updating with IMSI attach" }
}
```

(2)

```
with { UE in EMM-TRACKING-AREA-UPDATING-INITIATED state }
ensure that {
  when { UE receives TRACKING AREA UPDATE ACCEPT message }
  then { UE enters EMM-REGISTERED and enters MM IDLE and sends TRACKING AREA UPDATE COMPLETE message }
}
```

9.2.2.2.2.2 Conformance requirements

References: The conformance requirement covered in the present TC is specified in: 3GPP TS 24.301 clauses 5.5.2.3.2.

[TS24.301 clause 5.5.2.3.2]

...

When receiving the DETACH REQUEST message and the Detach type IE indicates "IMSI detach", the UE shall not deactivate the EPS bearer context(s) including the default EPS bearer context. The UE shall set the MM update status to U2 NOT UPDATED. A UE may send a DETACH ACCEPT message to the network, and shall re-attach to non-EPS services by performing the combined tracking area updating procedure according to subclause 5.5.3.3, sending a TRACKING AREA UPDATE REQUEST message with EPS update type IE indicating "combined TA/LA updating with IMSI attach".

...

If the detach type IE indicates "IMSI detach" or "re-attach required", then the UE shall ignore the EMM cause IE if received.

...

9.2.2.2.3 Test description

9.2.2.2.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.2.2.2.3.2 Test procedure sequence

Table 9.2.2.2.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	Force the SS to initiate Detach procedure with the Detach Type IE "IMSI detach"	<--	DETACH REQUEST	-	-
2	The UE may send DETACH ACCEPT message.(Optional)	-->	DETACH ACCEPT	-	-
3	Check: Does the UE send TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
4	Void	-	-	-	-
5	Void	-	-	-	-

6	The SS sends TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
7	Check: Does the UE send TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	2	P
8	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Steps 9 to 9E take place only if the UE supports CS fallback (pc_CS_fallback is true)	-	-	-	-
9	Check: Does the UE respond to paging on cell A with S-TMSI2 for CS domain?	-	-	-	-
-	EXCEPTION: Step 9Aa1 describes behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
9Aa1	IF the UE needs to request upper layer input before accepting the CS fallback (see ICS), the incoming CS call is accepted at the UE through MMI or AT command.	-	-	-	-
9B	The UE sends EXTENDED SERVICE REQUEST message?	-->	EXTENDED SERVICE REQUEST	-	-
9C	The SS transmits SERVICE REJECT with cause #39 'CS domain temporarily not available' with T3442 = 60s.	<--	SERVICE REJECT	-	-
9D	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.2.2.3.2-2 may occur in parallel with step 9E.	-	-	-	-
9E	The SS waits for 60 seconds (T3442)	-	-	-	-
10	Check: Does the UE respond to paging on cell A with S-TMSI2 for PS domain? Generic Procedure (TS36.508 subclause 6.4.2.4)	-	-	2	-

Table 9.2.2.2.3.2-2: Parallel Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
2	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
3	The SS releases the RRC connection.	-	-	-	-

9.2.2.2.3.3 Specific message contents

Table 9.2.2.2.3.3-1: Message DETACH REQUEST (step 1, Table 9.2.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	'011'B	"IMSI detach"	
EMM cause	Not present		

Table 9.2.2.2.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 3, Table 9.2.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
EPS update type value	'010'B	"Combined TALA updating with IMSI attach"	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.2.2.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 6, Table 9.2.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
Partial tracking area identity list			
MCC MNC TAC 1	TAI-1		
Location area identification	LAI-1		
MS identity	TMSI-1		

Table 9.2.2.2.3.3-4: Message EXTENDED SERVICE REQUEST (step 9B, Table 9.2.2.2.3.2-1)

Derivation Path: 36.508 table 4.7.2.-14A			
Information Element	Value/remark	Comment	Condition
M-TMSI	M-TMSI1	"M-TMSI1 is a part of GUTI-1"	

Table 9.2.2.2.3.3-5: Message SERVICE REJECT (step 9C, Table 9.2.2.2.3.2-1)

Derivation Path: 36.508 table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0010 0111'B	#39 'CS domain temporarily not available'	
T3442 value	'0010 0001'B	1 minute	

Table 9.2.2.2.3.3-6 Message TRACKING AREA UPDATE ACCEPT (step 2, Table 9.2.2.2.3.2-2)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	Not present		
MS identity	Not present		

9.2.2.2.3 to 9.2.2.2.13 Void

9.2.2.2.14 NW initiated detach / Abnormal case / EMM cause not included

9.2.2.2.14.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state }
ensure that {
  when { UE receives a DETACH REQUEST message with the Detach type IE "re-attach not required" and
with no EMM cause IE included }
  then { UE delete any GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs, KSI,
set the update status to EU2 NOT UPDATED and start timer T3402. when T3402 expired, the UE attempts
to attach again }
}

```

9.2.2.2.14.2 Conformance requirements

References: The conformance requirement covered in the present TC is specified in: 3GPP TS 24.301 clauses 5.5.2.3.4.

[TS24.301 clause 5.5.2.3.4]

The following abnormal cases can be identified:

...

- b) DETACH REQUEST, other EMM cause values than those treated in subclause 5.5.2.3.2 or no EMM cause IE is included, and the Detach type IE indicates "re-attach not required".

The UE shall delete any GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs, KSI, shall set the update status to EU2 NOT UPDATED and shall start timer T3402. The UE may enter the state EMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [6]; otherwise the UE shall enter the state EMM-DEREGISTERED.ATTEMPTING-TO-ATTACH.

9.2.2.2.14.3 Test description

9.2.2.2.14.3.1 Pre-test conditions

System Simulator:

- cell I (VPLMN and set as a serving cell) configured according to table 6.3.2.2-3 in TS 36.508 [18].

UE:

None.

Preamble:

- the UE is in state Generic RB established (state 3) on cell I according to TS 36.508 [18];
- T3402 in the UE is set to 2 minutes.

9.2.2.2.14.3.2 Test procedure sequence

Table 9.2.2.2.14.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	SS initiates Detach procedure with the Detach Type IE "re-attach not required" and no EMM cause IE included	<--	DETACH REQUEST	-	-
2	The UE transmits a DETACH ACCEPT message on Cell I. Note: Now UE should start timer T3402	-->	DETACH ACCEPT	-	-
3	The SS releases the RRC connection.	-	-	-	-
4	Check: When the timer T3402 expires does the UE transmit ATTACH REQUEST message on cell I?	-->	ATTACH REQUEST	1	P
5-16	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.2.2.14.3.3 Specific message contents

Table 9.2.2.2.14.3.3-1: Message DETACH REQUEST (step 1, Table 9.2.2.2.14.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	'010'B	"re-attach not required"	
EMM cause	Not present		

Table 9.2.2.2.14.3.3-2: Message ATTACH REQUEST (step 4, Table 9.2.2.2.14.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI1		
Last visited registered TAI	Not present		

Table 9.2.2.2.14.3.3-3: Message ATTACH ACCEPT (preamble, 9.2.2.2.14.3.1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
T3402 value	2 minute	The default value is 12 minutes, use 2 minute to shorten the whole TC execute time	

9.2.3 Tracking area updating procedure (S1 mode only)

9.2.3.1 Normal and periodic tracking area updating

9.2.3.1.1 Normal tracking area update / Accepted

9.2.3.1.1.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE detects entering a new tracking area already included in the TAI list }
  then { UE does not send TRACKING AREA UPDATE REQUEST message }
}
```

(2)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE detects entering a new tracking area not included in the TAI list }
  then { UE sends TRACKING AREA UPDATE REQUEST message with 'EPS update type = TA updating' }
}
```

(3)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode and has a valid TAI value }
ensure that {
  when { UE detects entering a new tracking area not included in the TAI list }
  then { UE sends TRACKING AREA UPDATE REQUEST message with the TAI value in 'Last visited registered TAI' IE }
}
```

9.2.3.1.1.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.1, 5.5.3.2.2 and 5.5.3.2.4.

[TS24.301 clause5.5.3.1]

The tracking area updating procedure is always initiated by the UE and is used for the following purposes:

- normal tracking area updating to update the registration of the actual tracking area of a UE in the network;

...

[TS24.301 clause5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

- a) when the UE detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME;

...

After sending the TRACKING AREA UPDATE REQUEST message to the MME, the UE shall start timer T3430 and enter state EMM-TRACKING-AREA-UPDATING-INITIATED (see example in figure 5.5.3.2.2). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411. If timer T3442 is currently running, the UE shall stop timer T3442.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

[TS24.301 clause5.5.3.2.4]

...

Upon receiving a TRACKING AREA UPDATE ACCEPT message, the UE shall stop timer T3430, reset the routing area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED. If the message contains a GUTI, the UE shall use this GUTI as new temporary identity for EPS services and shall store the new GUTI. If no GUTI was included by the MME in the TRACKING AREA UPDATE ACCEPT message, the old GUTI shall be used. If the UE receives a new TAI list in the TRACKING AREA UPDATE ACCEPT message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

...

If the TRACKING AREA UPDATE ACCEPT message contained a GUTI, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI.

9.2.3.1.1.3 Test description

9.2.3.1.1.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non- Suitable cell";
- cell D (belongs to TAI-4, home PLMN) is set to "Non- Suitable cell".

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.1.3.2 Test procedure sequence

Table 9.2.3.1.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
	The following messages are sent and shall be received on cell B.	-	-	-	-
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the " Serving cell"	-	-	-	-
2	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2, 3	P
3	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
4	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	2	P
5	The SS releases the RRC connection.			-	-
6	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.4 indicate that the UE is in EMM-REGISTERED state on cell B with Paging UE-Identity=S-TMSI2 and with CN domain indicator set to "PS"?	-	-	2	-
7	Set the cell type of cell B to the "Non-Suitable cell". Set the cell type of cell D to the " Serving cell"	-	-	-	-
8	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message in the next 30 seconds?	-	-	1	F
9	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.4 indicate that the UE is in EMM-REGISTERED state on cell D with Paging UE-Identity=S-TMSI1 and with CN domain indicator set to "PS"?	-	-	1	-
	The following messages are sent and shall be received on cell A.	-	-	-	-
10	Set the cell type of cell D to the "Non-Suitable cell". Set the cell type of cell A to the " Serving cell"	-	-	-	-
11	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2, 3	P
12	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
13	The UE transmits a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	-	-
14	The SS releases the RRC connection.	-	-	-	-

9.2.3.1.1.3.3 Specific message contents

Table 9.2.3.1.1.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.1.1.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1	"Old GUTI is included by UE if valid, IMSI otherwise"	
Last visited registered TAI TAI	1		

Table 9.2.3.1.1.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 3, Table 9.2.3.1.1.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00001000'B		
Partial tracking area identity list			
Number of elements	'00001'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= MCC/MNC TAC 1=2 TAC 2=4	"PLMN is set to the same MCC/MNC stored in EF _{imsi} " "TAI-2" "TAI-4"	

Table 9.2.3.1.1.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 11, Table 9.2.3.1.1.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-2		
Last visited registered TAI	TAI-4		

Table 9.2.3.1.1.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 12, Table 9.2.3.1.1.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-3		
TAI list			
Length of tracking area identity list contents	'00001000'B		
Partial tracking area identity list			
Number of elements	'00001'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= MCC/MNC TAC 1=1 TAC 2=2	"PLMN is set to the same MCC/MNC stored in EF _{imsi} " "TAI-1" "TAI-2"	

9.2.3.1.2 Void

9.2.3.1.3 Void

9.2.3.1.4 Normal tracking area update / List of equivalent PLMNs in the TRACKING AREA UPDATE ACCEPT message

9.2.3.1.4.1 Test Purpose (TP)

(1)

```

with { UE in EMM-TRACKING-AREA-UPDATING-INITIATED state }
ensure that {
  when { the UE receives TRACKING AREA UPDATE ACCEPT message including a list of equivalent PLMNs }
  then { the UE stores correctly the list and considers a forbidden PLMN if the forbidden PLMN is
included in the equivalent list }

```

```
}

```

(2)

```
with { UE in EMM-TRACKING-AREA-UPDATING-INITIATED state }
ensure that {
  when { the UE receives TRACKING AREA UPDATE ACCEPT message without a list of equivalent PLMNs }
  then { the UE deletes the stored list and applies a normal PLMN selection process }
}
```

9.2.3.1.4.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.2.4.

[TS 24.301, clause 5.5.3.2.4]

The MME may also include of list of equivalent PLMNs in the TRACKING AREA UPDATE ACCEPT message. Each entry in the list contains a PLMN code (MCC+MNC). The UE shall store the list as provided by the network, after having removed from the list any PLMN code that is already in the list of forbidden PLMNs. In addition, the UE shall add to the stored list the PLMN code of the registered PLMN that sent the list. The UE shall replace the stored list on each receipt of the TRACKING AREA UPDATE ACCEPT message. If the TRACKING AREA UPDATE ACCEPT message does not contain a list, then the UE shall delete the stored list.

9.2.3.1.4.3 Test description

9.2.3.1.4.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, PLMN1);
- cell B (belongs to TAI-2, PLMN1);
- cell C (belongs to TAI-3, PLMN2);
- cell D (belongs to TAI-4, PLMN3);
- system information combination 2 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cell B and C.

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE last attempted to register on cell D and received reject cause "forbidden PLMN" (so the "forbidden PLMN list" contains PLMN3).

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508[18].

9.2.3.1.4.3.2 Test procedure sequence

Table 9.2.3.1.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell". Set the cell type of cell C to the " Non-Suitable off cell". Set the cell type of cell D to the " Non-Suitable off cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	Void	-	-	-	-
4	Void	-	-	-	-
5	SS responds with a TRACKING AREA UPDATE ACCEPT message including PLMN2 and PLMN3 in the list of equivalent PLMNs.	<--	TRACKING AREA UPDATE ACCEPT	-	-
6	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
6A	SS Releases the RRC Connection.	-	-	-	-
7	Set the cell type of cell A to the "Non-Suitable off cell". Set the cell type of cell B to the "Non-Suitable cell". Set the cell type of cell C to the " Suitable cell".	-	-	-	-
8	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on cell C (PLMN2)?	-->	TRACKING AREA UPDATE REQUEST	1	P
9	Void.	-	-	-	-
10	Void.	-	-	-	-
11	The SS transmits a TRACKING AREA UPDATE ACCEPT message including PLMN1 and PLMN3 in the list of equivalent PLMNs.	<--	TRACKING AREA UPDATE ACCEPT	-	-
12	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
12A	SS Releases the RRC Connection.	-	-	-	-
13	Set the cell type of cell C to the "Non-Suitable cell". Set the cell type of cell D to the " Serving cell". Note: Cell D (PLMN3) belongs to the forbidden PLMN.	-	-	-	-
14	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on cell D (PLMN3) in next 30 seconds?	-->	TRACKING AREA UPDATE REQUEST	1	F
15	The UE is switched to manual PLMN selection mode and is made to select PLMN3 in order to remove PLMN3 in the forbidden PLMN list in the UE.	-	-	-	-
16	The UE transmits a TRACKING AREA UPDATE REQUEST message on cell D (PLMN3).	-->	TRACKING AREA UPDATE REQUEST	-	-
17	Void	-	-	-	-
18	Void	-	-	-	-
19	The SS transmits a TRACKING AREA UPDATE ACCEPT message without the list of equivalent PLMNs.	<--	TRACKING AREA UPDATE ACCEPT	-	-
20	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	1	P
20A	SS releases the RRC connection	-	-	-	-
21	The UE is switched back to automatic PLMN selection mode.	-	-	-	-
21	SS waits for 5 minutes to allow UE to complete	-	-	-	-

A	automatic PLMN search				
22	Set the cell type of cell D to "Non-Suitable cell". Set the cell type of cell B to "Serving cell". Set the cell type of cell C to "Suitable neighbour intra-frequency cell".	-	-	-	-
23	Void	-	-	-	-
24	Void	-	-	-	-
24 A	Void	-	-	-	-
25	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on Cell B (PLMN1)?	-->	TRACKING AREA UPDATE REQUEST	2	P
26	Void	-	-	-	-
27	SS responds with TRACKING AREA UPDATE ACCEPT message	<--	TRACKING AREA UPDATE ACCEPT	-	-
28	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.1.4.3.3 Specific message contents

Table 9.2.3.1.4.3.3-1: Void

Table 9.2.3.1.4.3.3-2: Void

Table 9.2.3.1.4.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 5, Table 9.2.3.1.4.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
Equivalent PLMNs	-	Includes MCC and MNC digits for PLMN2 and PLMN3.	

Table 9.2.3.1.4.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 11, Table 9.2.3.1.4.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
Equivalent PLMNs	-	Includes MCC and MNC digits for PLMN1 and PLMN3.	

Table 9.2.3.1.4.3.3-5: Void

Table 9.2.3.1.4.3.3-6: Void

9.2.3.1.5 Periodic tracking area update / Accepted

9.2.3.1.5.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { the periodic tracking area updating timer T3412 expires }
  then { UE sends TRACKING AREA UPDATE REQUEST message with EPS update type = 'Periodic updating ' }
}
```

(2)

```
with { UE in 'out of E-UTRAN coverage' and the periodic tracking area updating timer T3412 expires }
```

```

ensure that {
  when { the UE enters E-UTRAN coverage }
  then { UE configured for EPS attach sends TRACKING AREA UPDATE REQUEST message with EPS update
type = 'Periodic updating' and the UE configured for combined EPS / IMSI attach sends TRACKING AREA
UPDATE REQUEST message with EPS update type = 'combined TA/LA updating with IMSI attach' }
}

```

9.2.3.1.5.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS23.401 clause 4.3.5.2 and TS 24.301 clauses 5.3.5, 5.5.3.2.1, 5.5.3.2.2 and 5.5.3.2.4.

[TS23.401 clause 4.3.5.2]

...

An EMM-REGISTERED UE performs periodic Tracking Area Updates with the network after the expiry of the periodic TAU timer.

If the UE is out of E-UTRAN coverage (including the cases when the UE is camped on 2G/3G cells) when its periodic TAU update timer expires, and ISR is activated the UE shall start the E-UTRAN Deactivate ISR timer. After the E-UTRAN Deactivate ISR timer expires the UE shall deactivate ISR by setting its TIN to "P-TMSI". The EMM-REGISTERED UE shall remember it has to perform a Tracking Area Update when it next returns to E-UTRAN coverage.

[TS24.301 clause 5.3.5]

Periodic tracking area updating is used to periodically notify the availability of the UE to the network. The procedure is controlled in the UE by the periodic tracking area update timer (timer T3412). The value of timer T3412 is sent by the network to the UE in the ATTACH ACCEPT message and can be sent in the TRACKING AREA UPDATE ACCEPT message. The UE shall apply this value in all tracking areas of the list of tracking areas assigned to the UE, until a new value is received.

The timer T3412 is reset and started with its initial value, when the UE goes from EMM-CONNECTED to EMM-IDLE mode. The timer T3412 is stopped when the UE enters EMM-CONNECTED mode or EMM-DEREGISTERED state.

When timer T3412 expires, the periodic tracking area updating procedure shall be started and the timer shall be set to its initial value for the next start.

...

If the UE is attached to both EPS and non-EPS services, and if timer T3412 expires or timer T3423 expires when the UE is in EMM-REGISTERED.NO-CELL-A VAILABLE state, then the UE shall initiate the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" when the UE returns to EMM-REGISTERED.NORMAL-SERVICE state.

...

If the UE is in another state than EMM-REGISTERED.NORMAL-SERVICE when the timer expires the periodic tracking area updating procedure is delayed until the UE returns to EMM-REGISTERED.NORMAL-SERVICE.

...

The mobile reachable timer shall be reset and started with its initial value, when the MME releases the NAS signalling connection for the UE. The mobile reachable timer shall be stopped when a NAS signalling connection is established for the UE.

....

[TS24.301 clause 5.5.3.2.1]

The periodic tracking area updating procedure is controlled in the UE by timer T3412. When timer T3412 expires, the periodic tracking area updating procedure is started. Start and reset of timer T3412 is described in subclause 5.5.3.2.

[TS24.301 clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

...

- b) when the periodic tracking area updating timer T3412 expires;

...

After sending the TRACKING AREA UPDATE REQUEST message to the MME, the UE shall start timer T3430 and enter state EMM-TRACKING-AREA-UPDATING-INITIATED (see example in figure 5.5.3.2.2). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411. If timer T3442 is currently running, the UE shall stop timer T3442.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

When the tracking area updating procedure is initiated in EMM-IDLE mode, the UE may also include an EPS bearer context status IE in the TRACKING AREA UPDATE REQUEST message, indicating which EPS bearer contexts are active in the UE.

[TS24.301 clause5.5.3.2.4]

...

Upon receiving a TRACKING AREA UPDATE ACCEPT message, the UE shall stop timer T3430, reset the routing area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED. If the message contains a GUTI, the UE shall use this GUTI as new temporary identity for EPS services and shall store the new GUTI. If no GUTI was included by the MME in the TRACKING AREA UPDATE ACCEPT message, the old GUTI shall be used. If the UE receives a new TAI list in the TRACKING AREA UPDATE ACCEPT message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

...

If the TRACKING AREA UPDATE ACCEPT message contained a GUTI, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI.

9.2.3.1.5.3 Test description

9.2.3.1.5.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.1.5.3.2 Test procedure sequence

Table 9.2.3.1.5.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is powered up or switched on.	-		-	-
2	The UE transmits an ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN	-->	ATTACH REQUEST	-	-
3	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
4	The UE responds to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
5	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
6	The UE responds to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits an ATTACH ACCEPT message with GUTI-1 and with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
8	The UE transmits an ATTACH COMPLETE message with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
9	The SS releases the RRC connection.			-	-
10	The SS waits 6minutes. (Expire of T3412)	-			
11	Check: Does the UE send TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	1	P
12	The SS sends TRACKING AREA UPDATE ACCEPT.	<--	TRACKING AREA UPDATE ACCEPT	-	-
13	The UE sends TRACKING AREA UPDATE COMPLETE message .	-->	TRACKING AREA UPDATE COMPLETE	-	-
14	The SS releases the RRC connection.			-	-
15	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.4 indicate that the UE is in EMM-REGISTERED state on cell A with PagingUE-Identity = S-TMSI2 and with CN domain indicator set to "PS"?	-		1	-
16	Set the cell type of cell A to the "non-Suitable cell".	-		-	-
17	The SS waits 8minutes.	-		-	-
18	Set the cell type of cell A to the "Serving cell".	-		-	-
19	Check: Does the UE send TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
20	The SS sends TRACKING AREA UPDATE ACCEPT.	<--	TRACKING AREA UPDATE ACCEPT	-	-
21	The UE sends TRACKING AREA UPDATE COMPLETE message .	-->	TRACKING AREA UPDATE COMPLETE	-	-
22	The SS releases the RRC connection.	-	-	-	-
23	Check: Does the test result of generic test	-	-	2	-

	procedure in TS 36.508 subclause 6.4.2.4 indicate that the UE is in EMM-REGISTERED state in cell A with PagingUE-Identity = S-TMSI3 and with CN domain indicator set to "PS"?				
--	---	--	--	--	--

9.2.3.1.5.3.3 Specific message contents

Table 9.2.3.1.5.3.3-1: Message ATTACH ACCEPT (step 7, Table 9.2.3.1.5.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
T3412 value			
Unit	'010'	"value is incremented in multiples of decihours"	
Timer value	'00001'	"6 minutes"	
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-1		
GUTI	GUTI-1		

Table 9.2.3.1.5.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 11, Table 9.2.3.1.5.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type EPS update type value	'011'B	"Periodic updating"	
Old GUTI	GUTI-1		

Table 9.2.3.1.5.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 12, Table 9.2.3.1.5.3.2-1)

Derivation path: 36.508 table 4.7.2-24 with condition TA_only.			
Information Element	Value/Remark	Comment	Condition
T3412 value			
Unit	'010'	"value is incremented in multiples of decihours"	
Timer value	'00001'	"6 minutes"	
GUTI TAI list	GUTI-2		
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-1		

Table 9.2.3.1.5.3.3-4: Message TRACKING AREA UPDATE REQUEST (step 19, Table 9.2.3.1.5.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type EPS update type value	'011'B	"Periodic updating"	TA_only
	'010'B	"combined TA/LA updating with IMSI attach"	combined_TA_LA
Old GUTI	GUTI-2		

Table 9.2.3.1.5.3.3-5: Message TRACKING AREA UPDATE ACCEPT (step 20, Table 9.2.3.1.5.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI TAI list	GUTI-3		
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-1		

9.2.3.1.5a Periodic tracking area update / Accepted / Per-device timer

9.2.3.1.5a.1 Test Purpose (TP)

(1)

with { UE in state EMM-REGISTERED and EMM-IDLE mode with timer T3412 'normal' and extended values being allocated by the NWK during attach procedure }
ensure that {

```

when { timer T3412 extended value expires }
  then { UE sends TRACKING AREA UPDATE REQUEST message with EPS update type = 'Periodic updating' }
}

```

(2)

```

with { UE in state EMM-REGISTERED and EMM-IDLE mode with timer T3412 'normal' and extended values
being allocated by the NWK during TAU procedure }
ensure that {
  when { timer T3412 extended value expires }
    then { UE sends TRACKING AREA UPDATE REQUEST message with EPS update type = 'Periodic updating' }
}

```

9.2.3.1.5a.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.3.5, 5.5.1.2.4 and 5.5.3.2.4.

[TS 24.301 clause 5.3.5]

Periodic tracking area updating is used to periodically notify the availability of the UE to the network. The procedure is controlled in the UE by the periodic tracking area update timer (timer T3412). The value of timer T3412 is sent by the network to the UE in the ATTACH ACCEPT message and can be sent in the TRACKING AREA UPDATE ACCEPT message. The UE shall apply this value in all tracking areas of the list of tracking areas assigned to the UE, until a new value is received.

The UE indicates in the MS network feature support IE whether it supports the T3412 extended value.

...

When a UE is not attached for emergency bearer services, and timer T3412 expires, the periodic tracking area updating procedure shall be started and the timer shall be set to its initial value for the next start.

...

If the network includes T3412 extended value IE in the ATTACH ACCEPT message or TRACKING AREA UPDATE ACCEPT message, the network shall use T3412 extended value IE as the value of timer T3412.

[TS 24.301 clause 5.5.1.2.4]

If the attach request is accepted by the network, the MME shall send an ATTACH ACCEPT message to the UE and start timer T3450. The MME shall send the ATTACH ACCEPT message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message contained in the ESM message container information element to activate the default bearer (see subclause 6.4.1). The network may also initiate the activation of dedicated bearers towards the UE by invoking the dedicated EPS bearer context activation procedure (see subclause 6.4.2).

...

If the ATTACH ACCEPT message contains a T3412 extended value IE, then the UE shall use the value in T3412 extended value IE as periodic tracking area update timer (T3412). If the ATTACH ACCEPT message does not contain T3412 extended value IE, then the UE shall use the value in T3412 value IE as periodic tracking area update timer (T3412).

[TS24.301 clause 5.5.3.2.4]

If the tracking area update request has been accepted by the network, the MME shall send a TRACKING AREA UPDATE ACCEPT message to the UE. If the MME assigns a new GUTI for the UE, a GUTI shall be included in the TRACKING AREA UPDATE ACCEPT message. In this case, the MME shall start timer T3450 and enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1. The MME may include a new TAI list for the UE in the TRACKING AREA UPDATE ACCEPT message.

...

If the TRACKING AREA UPDATE ACCEPT message contains T3412 extended value IE, then the UE shall use the T3412 extended value IE as periodic tracking area update timer (T3412). If the TRACKING AREA UPDATE ACCEPT contains T3412 value IE, but not T3412 extended value IE, then the UE shall use value in T3412 value IE as periodic tracking area update timer (T3412). If neither T3412 value IE nor T3412 extended value IE is included, the UE

shall use the value currently stored, e.g. from a prior ATTACH ACCEPT or TRACKING AREA UPDATE ACCEPT message.

9.2.3.1.5a.3 Test description

9.2.3.1.5a.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

None.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.1.5a.3.2 Test procedure sequence

Table 9.2.3.1.5a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is powered up or switched on.	-		-	-
2	The UE transmits an ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN	-->	ATTACH REQUEST	-	-
3	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
4	The UE responds to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
5	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
6	The UE responds to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits an ATTACH ACCEPT message with GUTI-1 and with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message. SS assigns both a "normal" and an extended values for the T3412 timer.	<--	ATTACH ACCEPT	-	-
8	The UE transmits an ATTACH COMPLETE message with the ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
9	The SS releases the RRC connection.			-	-
10	The SS waits 6minutes. (Expire of T3412 extended value)	-			
11	Check: Does the UE send TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	1	P
12	The SS sends TRACKING AREA UPDATE ACCEPT. SS assigns both a "normal" and an extended values for the T3412 timer.	<--	TRACKING AREA UPDATE ACCEPT	-	-
13	The UE sends TRACKING AREA UPDATE COMPLETE message .	-->	TRACKING AREA UPDATE COMPLETE	-	-
14	The SS releases the RRC connection.			-	-
15	The SS waits 8 minutes. (Expire of T3412 extended value)	-		-	-
16	Check: Does the UE send TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	2	P
17	The SS sends TRACKING AREA UPDATE ACCEPT. The SS assigns T3412 'normal' and extended values. the extended value is different to the one assigned in the ATTACH ACCEPT message in step 7.	<--	TRACKING AREA UPDATE ACCEPT	-	-
18	The UE sends TRACKING AREA UPDATE COMPLETE message .	-->	TRACKING AREA UPDATE COMPLETE	-	-
19	The SS releases the RRC connection.			-	-

9.2.3.1.5a.3.3 Specific message contents

Table 9.2.3.1.5a.3.3-1: Message ATTACH ACCEPT (step 7, Table 9.2.3.1.5a.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
T3412 value			
Unit	'010'B	value is incremented in multiples of 1 minute	
Timer value	'00100'B	"4 minutes"	
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-1		
GUTI	GUTI-1		
T3412 extended value			
Unit	'010'B	value is incremented in multiples of 1 minute	
Timer value	'00110'B	"6 minutes"	

Table 9.2.3.1.5a.3.3-2: Message TRACKING AREA UPDATE REQUEST (steps 11 and 16, Table 9.2.3.1.5a.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type EPS update type value	'011'B	"Periodic updating"	
Old GUTI	GUTI-1		

Table 9.2.3.1.5a.3.3-3: Message TRACKING AREA UPDATE ACCEPT (steps 12 and 17, Table 9.2.3.1.5a.3.2-1)

Derivation path: 36.508 table 4.7.2-24 with condition TA_only.			
Information Element	Value/Remark	Comment	Condition
T3412 value			
Unit	'010'B	value is incremented in multiples of 1 minute	
Timer value	'00100'B	"4 minutes"	
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-1		
T3412 extended value			
Unit	'010'B	value is incremented in multiples of 1 minute	
Timer value	'01000'B	"8 minutes"	

9.2.3.1.6 Normal tracking area update / UE with ISR active moves to E-UTRAN

9.2.3.1.6.1 Test Purpose (TP)

(1)

```
with { ISR activated UE in state EMM-REGISTERED and ECM_IDLE mode }
ensure that {
  when { ISR activated UE reselects from E-UTRAN to UTRAN/GERAN cell belonging to the RA where the
  UE is registered }
  then { UE does not send ROUTING AREA UPDATE REQUEST message }
}
```

(2)

```
with { ISR activated UE in state EMM-REGISTERED and ECM_IDLE mode }
ensure that {
  when { ISR activated UE reselects from E-UTRAN to UTRAN/GERAN cell belonging to a RA which is not
  the RA where the UE is registered }
  then { UE sends ROUTING AREA UPDATE REQUEST message }
}
```

(3)

```
with { ISR activated UE in state GMM-REGISTERED and PMM_IDLE mode }
ensure that {
  when { ISR activated UE reselects from UTRAN/GERAN to E-UTRAN cell belonging to one of the TAs of
  the list of TAs where the UE is registered }
  then { UE does not send TRACKING AREA UPDATE REQUEST message }
}
```

(4)

```
with { ISR activated UE in state GMM-REGISTERED and PMM_IDLE mode }
ensure that {
  when { ISR activated UE reselects from UTRAN/GERAN to E-UTRAN cell belonging to a TA which is not
  in the list of TAs where the UE is registered }
  then { UE sends TRACKING AREA UPDATE REQUEST message }
}
```

```

    }

(5)

with { ISR activated UE has a stored TIN value = "RAT-related TMSI" }
ensure that {
    when { SS sends a Paging with "P-TMSI" to ISR activated UE on UTRAN/GERAN cell }
    then { UE responds to the paging message }
}

```

```

(6)

with { ISR activated UE has a stored TIN value = "RAT-related TMSI" }
ensure that {
    when { SS sends a Paging with "GUTI" to ISR activated UE on E-UTRAN cell }
    then { UE responds to the paging message }
}

```

9.2.3.1.6.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS23.401 clause 4.3.5.6, 3GPP TS24.008 clauses 4.7.5.1.1 and 4.7.5.1.3 and 3GPP TS 24.301 clauses 5.5.3.2.2 and 5.5.3.2.4.

[TS23.401 clause 4.3.5.6]

The Idle mode Signalling Reduction (ISR) function provides a mechanism to limit signalling during inter-RAT cell-reselection in idle mode (ECM-IDLE, PMM-IDLE, GPRS STANDBY states).

NOTE: The Idle mode Signalling Reduction function is mandatory for E-UTRAN UEs that support GERAN and/or UTRAN and optional for core network. The UE's ISR capability in the UE Network Capability element is for test purpose.

ISR is activated by decision of the CN nodes and shall be explicitly signalled to the UE as "ISR activation" in the RAU and TAU signalling. The UE may have valid MM parameters both from MME and from SGSN. The "Temporary Identity used in Next update" (TIN) is a parameter of the UE's MM context, which identifies the UE identity that the UE shall indicate in the next RAU Request or TAU Request message. The TIN also identifies the status of ISR activation in the UE.

The TIN can take one of the three values, "P-TMSI", "GUTI" or "RAT-related TMSI". The UE shall set the TIN when receiving an Attach Accept, a TAU Accept or RAU Accept message according to the rules in table 4.3.5.6-1.

Table 4.3.5.6-1: Setting of the TIN

Message received by UE	Current TIN value stored by UE	TIN value to be set by the UE when receiving message
Attach Accept via E-UTRAN (never indicates ISR activation)	Any value	GUTI
Attach Accept via GERAN/UTRAN (never indicates ISR activation)	Any value	P-TMSI
TAU Accept not indicating ISR	Any value	GUTI
TAU Accept indicating ISR	GUTI P-TMSI or RAT-related TMSI	GUTI RAT-related TMSI
RAU Accept not indicating ISR	Any value	P-TMSI
RAU Accept indicating ISR	P-TMSI GUTI or RAT-related TMSI	P-TMSI RAT-related TMSI

When ISR activation is indicated by the RAU/TAU Accept message but the UE shall not set the TIN to "RAT-related TMSI" is a special situation. Here the UE has deactivated ISR due to special situation handling. By maintaining the old TIN value the UE remembers to use the RAT specific TMSI indicated by the TIN when updating with the CN node of the other RAT.

Only if the TIN is set to "RAT-related TMSI" ISR behaviour is enabled for the UE, i.e. the UE can change between all registered areas and RATs without any update signalling and it listens for paging on the RAT it is camped on. If the TIN is set to "RAT-related TMSI", the UE's P-TMSI and RAI as well as its GUTI and TAI(s) shall remain registered with the network and shall remain valid in the UE.

Table 4.3.5.6-1: Old temporary UE Identity that the UE shall indicate in TAU/RAU Request (as old GUTI or as old P-TMSI/RAI)

Message to be sent by UE	TIN value: P-TMSI	TIN value: GUTI	TIN value: RAT-related TMSI
TAU Request	GUTI mapped from P-TMSI/RAI	GUTI	GUTI
RAU Request	P-TMSI/RAI	P-TMSI/RAI mapped from GUTI	P-TMSI/RAI
Attach Request via E-UTRAN	GUTI mapped from P-TMSI/RAI	GUTI	GUTI
Attach Request via GERAN/UTRAN	P-TMSI/RAI	P-TMSI/RAI mapped from GUTI	P-TMSI/RAI

Table 4.3.5.2-1 shows which temporary identity the UE shall indicate in a Tracking or Routing Area Update Request of in an Attach Request message, when the UE stores these as valid parameters.

Situations may occur that cause unsynchronized state information in the UE, MME and SGSN. Such special situations trigger a deactivation of ISR locally in the UE.

...

[TS24.008 clause 4.7.5.1.1]

...

If the MS supports S1 mode, the MS shall handle the P-TMSI IE as follows:

- If the TIN indicates "GUTI" and the MS holds a valid GUTI, the MS shall map the GUTI into a P-TMSI, P-TMSI signature and RAI as specified in 3GPP TS 23.003 [4]. The MS shall include the mapped RAI in the Old routing area identification IE and the mapped P-TMSI signature in the P-TMSI signature IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the mapped P-TMSI in the P-TMSI IE. Additionally, in Iu mode and A/Gb mode, if the MS holds a valid P-TMSI and RAI, the MS shall indicate the P-TMSI in the Additional mobile identity IE and the RAI in the Additional old routing area identification IE.
- If the TIN indicates "P-TMSI" or "RAT-related TMSI" and the MS holds a valid P-TMSI and RAI, the MS shall indicate the RAI in the Old routing area identification IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the P-TMSI in the P-TMSI IE.

...

[TS24.008 clause 4.7.5.1.3]

...

In order to indicate to the MS that the GUTI and TAI list assigned to the MS remain registered with the network and are valid in the MS, the network shall indicate in the Update result IE in the ROUTING AREA UPDATE ACCEPT message that ISR is activated.

If the ROUTING AREA UPDATE ACCEPT message contains

- i) no indication that ISR is activated, an MS supporting S1 mode shall set the TIN to "P-TMSI"; or
- ii) an indication that ISR is activated, the MS shall regard the available GUTI and TAI list as valid and registered with the network. If the TIN currently indicates "GUTI", the MS shall set the TIN to "RAT-related TMSI".

[TS24.301 clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

...

If the UE supports neither A/Gb mode nor Iu mode, the UE shall include a valid GUTI in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

[TS24.301 clause 5.5.3.2.4]

The network may also indicate in the EPS update result IE in the TRACKING AREA UPDATE ACCEPT message that ISR is active. If the TRACKING AREA UPDATE ACCEPT message contains:

- i) no indication that ISR is activated, the UE shall set the TIN to "GUTI";
- ii) an indication that ISR is activated, the UE shall regard a previously assigned P-TMSI and RAI as valid and registered with the network. If the TIN currently indicates "P-TMSI", the UE shall set the TIN to "RAT-related TMSI".

9.2.3.1.6.3 Test description

9.2.3.1.6.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Non-Suitable cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non-Suitable cell";
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, cell 5 and cell 7 (belong to RAI-1, home PLMN) are configured;
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, cell 24 and cell 25 are configured;
- cell 5 / cell 24 belong to RAI-1 (home PLMN) as specified TS34.123-1 clause 12 and is set to "Serving cell";
- cell 7 / cell 25 belong to RAI-2 (home PLMN) as specified TS34.123-1 clause 12 and is set to "Non-Suitable "off" cell";
- system information indicate that NMO 1 is used.
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

Note: Setting px_RATComb_Testcd = EUTRA_Only is not allowed.

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.1.6.3.2 Test procedure sequence

Table 9.2.3.1.6.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on.	-	-	-	-
-	The following messages are sent on Cell 5 or 24	-	-	-	-
2	The UE transmits an ATTACH REQUEST message on Cell 5 or 24	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
4	The UE transmits an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
5	SS responds with ATTACH ACCEPT message including P-TMSI-1 (TIN set to P-TMSI) and RAI-1.	<--	ATTACH ACCEPT	-	-
6	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
7	The UE transmits an ACTIVATE PDP CONTEXT REQUEST message	-->	ACTIVATE PDP CONTEXT REQUEST	-	-
8	The SS responds with an ACTIVATE PDP CONTEXT ACCEPT message	<--	ACTIVATE PDP CONTEXT ACCEPT	-	-
9	Set the cell type of cell 5 or 24 to the "Non-Suitable cell". Set the cell type of cell A to the "Serving cell".	-	-	-	-
10	The UE sends TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
11	The SS sends TRACKING AREA UPDATE ACCEPT including GUTI-1(TIN set to RAT-related TMSI) and TAI-1.	<--	TRACKING AREA UPDATE ACCEPT	-	-
12	The UE sends TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
12 A	The SS releases the RRC connection.	-	-	-	-
13	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell 5 or 24 to the "Serving cell".	-	-	-	-
14	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message in the next 90 seconds on cell 5 or 24?	-->	ROUTING AREA UPDATE REQUEST	1	F
15	SS transmits Paging for PS domain on Cell 5/24.	<--	<i>Paging</i>	-	-
15 A	Check: Does the UE transmit a Paging response?	-->	<i>RRCCConnectionRequest</i>	5	P
15 B	SS sends RRCCConnectionReject	<--	<i>RRCCConnectionReject</i>	-	-
16	Set the cell type of cell 5 or 24 to the "Non-Suitable cell". Set the cell type of cell A to the "Serving cell".	-	-	-	-
17	Check: Does the UE send TRACKING AREA UPDATE REQUEST message in the next 90 seconds.	-->	TRACKING AREA UPDATE REQUEST	3	F
18	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.4 indicate that the UE is in EMM-REGISTERED state on cell A with PagingUE-Identity = S-TMSI1 and with CN domain indicator set to "PS"?	-	-	3, 6	-
18 A	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell 5 or 24 to the "Serving cell".	-	-	-	-
18 B	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message in the	-->	ROUTING AREA UPDATE REQUEST	1	F

	next 90 seconds on cell 5 or 24?				
19	Set the cell type of cell 5 or 24 to the "Non-Suitable off cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
20	Check: Does the UE send TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	4	P
21	The SS sends TRACKING AREA UPDATE ACCEPT including GUTI-2 and TAI-2.	<--	TRACKING AREA UPDATE ACCEPT	-	-
22	The UE sends TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
22 A	The SS releases the RRC connection.	-	-	-	-
23	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.4 indicate that the UE is in EMM-REGISTERED state on cell B with PagingUE-Identity = S-TMSI2 and with CN domain indicator set to "PS"?	-	-	6	-
24	Set the cell type of cell A to the "Non-Suitable "off" cell". Set the cell type of cell B to the "Non-Suitable cell". Set the cell type of cell 7 or 25 to the "Serving cell".	-	-	-	-
25	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message with P-TMSI and RAI on cell 7 or 25?	-->	ROUTING AREA UPDATE REQUEST	2	P
26	The SS sends ROUTING AREA UPDATE ACCEPT message with P-TMSI-2 and RAI-2.	<--	ROUTING AREA UPDATE ACCEPT	-	-
27	The UE sends ROUTING AREA UPDATE COMPLETE message.	-->	ROUTING AREA UPDATE COMPLETE	-	-

9.2.3.1.6.3.3 Specific message contents

Table 9.2.3.1.6.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 10, Table 9.2.3.1.6.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	Mapped from the P-TMSI and RAI allocated in step 5		
Old P-TMSI signature	Any allowed value		
Nonce _{UE}	Any allowed value		

Table 9.2.3.1.6.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 11, Table 9.2.3.1.6.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	'100'B	"TA updated and ISR activated"	TA only
	'101'B	"combined TA/LA updated and ISR activated"	combined_TA_LA
T3412 value	Not present	(Note)	
GUTI	GUTI-1		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-1		
Note: This is to allow the UE to apply the default timer, and avoid Rel-10 and higher releases impact on the UE behaviour which is not part of the TPs			

Table 9.2.3.1.6.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 20, Table 9.2.3.1.6.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1		

Table 9.2.3.1.6.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 21, Table 9.2.3.1.6.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	'001'B	"TA updated and ISR activated"	TA only
	'101'B	"combined TA/LA updated and ISR activated"	combined_TA_LA
T3412 value	Not present	(Note)	
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAI-2		
Note: This is to allow the UE to apply the default timer, and avoid Rel-10 and higher releases impact on the UE behaviour which is not part of the TPs			

Table 9.2.3.1.6.3.3-5: Message ROUTING AREA UPDATE ACCEPT (step 26, Table 9.2.3.1.6.3.2-1)

Derivation path: 36.508, table 4.7B.2-2			
Information Element	Value/remark	Comment	Condition
Update result	100	"RA updated and ISR activated"	TA_only
	101	"combined RALA updated and ISR activated"	combined_TA_LA
Periodic RA update timer	'01001001'B	Activated with default T3312 value of 54 min as TS 24.008, Table 11.3a (Note)	
Note: The timer is specified to avoid Rel-10 and higher releases impact on the UE behaviour which is not part of the TPs			

Table 9.2.3.1.6.3.3-6: Message ATTACH ACCEPT (step 5, Table 9.2.3.1.6.3.2-1)

Derivation path: 36.508, table 4.7B.2-7			
Information Element	Value/Remark	Comment	Condition
Periodic RA update timer	'01001001'B	Activated with default T3312 value of 54 min as TS 24.008, Table 11.3a (Note)	
Note: The timer is specified to avoid Rel-10 and higher releases impact on the UE behaviour which is not part of the TPs			

9.2.3.1.7 Void

9.2.3.1.8 UE receives an indication that the RRC connection was released with cause "load balancing TAU required"

9.2.3.1.8.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-CONNECTED mode}
ensure that {
  when { UE receives RRC CONNECTION RELEASE message with cause "load balancing TAU required" and
  enters EMM-REGISTERED and EMM-IDLE mode}
  then { UE sends TRACKING AREA UPDATE REQUEST message with EPS update type = "TA updating" }
}
```

(2)

```
with { UE in state EMM-REGISTERED and EMM-CONNECTED mode}
ensure that {
  when { UE receives RRC CONNECTION RELEASE message with cause "load balancing TAU required" and
  enters EMM-REGISTERED and EMM-IDLE mode}
  then { the UE encodes the RRC parameters in the RRC Connection Establishment messages correctly
  (i.e. in the RRCConnectionRequest message, the ue-Identity is set random-Value; and, in the
  RRCConnectionSetupComplete message the registeredMME is not included) }
}
```

9.2.3.1.8.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 23.401 clause 4.3.7.3, 3GPP TS 24.301 clauses 5.3.1.1, 5.5.3.1, 5.5.3.2.2 and 5.5.3.2.4, and 3G PP TS 36.331 clauses and 5.3.3.3 and 5.3.3.4].

[TS 23.401 clause 4.3.7.3]

...

To off-load ECM-CONNECTED mode UEs, the MME initiates the S1 Release procedure with release cause "load balancing TAU required" (clause 5.3.5). The S1 and RRC connections are released and the UE initiates a TAU but provides neither the S-TMSI nor the GUMMEI to eNodeB in the RRC establishment.

...

[TS 24.301 clause 5.3.1.1]

...

When the UE is registered in the tracking area of the current cell during the NAS signalling connection establishment, the UE NAS shall provide the lower layers with the S-TMSI, but shall not provide the registered MME identifier to the lower layers. Exceptionally, when the UE in EMM-IDLE mode initiates a tracking area updating or combined tracking area updating procedure for load balancing purposes, the UE NAS shall provide the lower layers with neither S-TMSI nor registered MME identifier.

...

[TS24.301 clause5.5.3.1]

The tracking area updating procedure is always initiated by the UE and is used for the following purposes:

...

- MME load balancing;

...

[TS24.301 clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

...

- e) when the UE receives an indication from the lower layers that the RRC connection was released with cause "load balancing TAU required";

...

...

[TS24.301 clause 5.5.3.2.4]

If the tracking area update request has been accepted by the network, the MME shall send a TRACKING AREA UPDATE ACCEPT message to the UE. If the MME assigns a new GUTI for the UE, a GUTI shall be included in the TRACKING AREA UPDATE ACCEPT message. In this case, the MME shall start timer T3450 and enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1. The MME may include a new TAI list for the UE in the TRACKING AREA UPDATE ACCEPT message.

...

Upon receiving a TRACKING AREA UPDATE ACCEPT message, the UE shall stop timer T3430, reset the tracking area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED. If the message contains a GUTI, the UE shall use this GUTI as new temporary identity for EPS services and shall store the new GUTI. If no GUTI was included by the MME in the TRACKING AREA UPDATE ACCEPT message, the old GUTI shall be used. If the UE receives a new TAI list in the TRACKING AREA UPDATE ACCEPT message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

...

If the TRACKING AREA UPDATE ACCEPT message contained a GUTI, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI.

[TS 36.331 clause 5.3.3.3]

The UE shall set the contents of *RRCCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;
 - 2> else:
 - 3> draw a random value in the range $0..2^{40}-1$ and set the *ue-Identity* to this value;

...

[TS 36.331 clause 5.3.3.4]

...

- 1> set the content of *RRCCConnectionSetupComplete* message as follows:

...

- 2> if upper layers provide the 'Registered MME', include and set the *registeredMME* as follows:
 - 3> if the PLMN identity of the 'Registered MME' is different from the PLMN selected by the upper layers:
 - 4> include the *plmnIdentity* in the *registeredMME* and set it to the value of the PLMN identity in the 'Registered MME' received from upper layers;
 - 3> set the *mmegi* and the *mmec* to the value received from upper layers;
- 2> if upper layers provided the 'Registered MME':
 - 3> include and set the *gummei-Type* to the value provided by the upper layers;

...

9.2.3.1.8.3 Test description

9.2.3.1.8.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.2.3.1.8.3.2 Test procedure sequence

Table 9.2.3.1.8.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits <i>RRCCConnectionRelease</i> with cause "load balancing TAU required".	-	-	-	-
1A	Check: Does the UE send an <i>RRCCConnectionRequest</i> with the <i>ue-Identity</i> set to "random-Value"?	-->	<i>RRCCConnectionRequest</i>	1	P
1B	The SS responds with <i>RRCCConnectionSetup</i> .	<--	<i>RRCCConnectionSetup</i>	-	-
1C	Check: Does the UE send an <i>RRCCConnectionSetupComplete</i> without the <i>registeredMME IE</i> ?	-->	<i>RRCCConnectionSetupComplete</i>	1	P
2	Check: Does the UE send TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	1	P
3	The SS sends TRACKING AREA UPDATE ACCEPT. (Note 1)	<--	TRACKING AREA UPDATE ACCEPT	-	-
4	The UE sends TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

Note 1: The SS assigns a different MME Identifier (MMEI) value in a GUTI.

9.2.3.1.8.3.3 Specific message contents

Table 9.2.3.1.8.3.3-1: Message TRACKING AREA UPDATE ACCEPT (step 3, Table 9.2.3.1.8.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		

Table 9.2.3.1.8.3.3-2: Message RRCCConnectionRequest (step 1A, Table 9.2.3.1.8.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
<i>RRCCConnectionRequest</i> ::= SEQUENCE {			
<i>criticalExtensions</i> CHOICE {			
<i>rrcConnectionRequest-r8</i> SEQUENCE {			
<i>ue-Identity</i> CHOICE {			
<i>random-Value</i>	Any allowed value		
}			
<i>establishmentCause</i>	Mo-Signalling		
}			
}			

Table 9.2.3.1.8.3.3-3: Message RRCConnectionSetupComplete (step 1C, Table 9.2.3.1.8.3.2-1)

Derivation path: 36.508 table 4.6.1-18			
Information Element	Value/Remark	Comment	Condition
RRCConnectionSetupComplete ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionSetupComplete-r8 SEQUENCE {			
selectedPLMN-Identity	1		
registeredMME	Not present		
dedicatedInfoNAS	See table 9.2.3.1.8.3.3-3		
nonCriticalExtension SEQUENCE {}			
}			
}			
}			
}			

9.2.3.1.9 Normal tracking area update / Correct handling of CSG list

9.2.3.1.9.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { Manual CSG ID selection is requested }
  then { UE sends TRACKING AREA UPDATE REQUEST message with 'EPS update type = TA updating' }
}
```

(2)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode; and UE's Allowed CSG list is not empty }
ensure that {
  when { UE detects suitable E-UTRAN CSG cell previously visited }
  then { UE reselects the suitable previously visited E-UTRAN CSG cell and sends TRACKING AREA
UPDATE REQUEST message with 'EPS update type = TA updating' }
}
```

9.2.3.1.9.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS24.301, clauses 5.5.3.1, 5.5.3.2.2 and 5.5.3.2.4.

[TS 24.301, clause 5.5.3.1]

The tracking area updating procedure is always initiated by the UE and is used for the following purposes:

- normal tracking area updating to update the registration of the actual tracking area of a UE in the network;
- ...
- to indicate to the network that the UE has selected a CSG cell whose CSG identity is not included in the UE's Allowed CSG list.

[TS 24.301, clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

- a) when the UE detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME;
- ...
- k) when due to manual CSG selection the UE has selected a CSG cell whose CSG identity is not included in the UE's Allowed CSG list;

...

After sending the TRACKING AREA UPDATE REQUEST message to the MME, the UE shall start timer T3430 and enter state EMM-TRACKING-AREA-UPDATING-INITIATED (see example in figure 5.5.3.2.2). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411. If timer T3442 is currently running, the UE shall stop timer T3442.

If the UE supports neither A/Gb mode nor Iu mode, the UE shall include a valid GUTI in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE. If a P-TMSI signature is associated with the P-TMSI, the UE shall include it in the Old P-TMSI signature IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

.....

[TS 24.301, clause 5.5.3.2.4]

If the tracking area update request has been accepted by the network, the MME shall send a TRACKING AREA UPDATE ACCEPT message to the UE. If the MME assigns a new GUTI for the UE, a GUTI shall be included in the TRACKING AREA UPDATE ACCEPT message. In this case, the MME shall start timer T3450 and enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1. The MME may include a new TAI list for the UE in the TRACKING AREA UPDATE ACCEPT message.

...

Upon receiving a TRACKING AREA UPDATE ACCEPT message, the UE shall stop timer T3430, reset the tracking area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED. If the message contains a GUTI, the UE shall use this GUTI as new temporary identity for EPS services and shall store the new GUTI. If no GUTI was included by the MME in the TRACKING AREA UPDATE ACCEPT message, the old GUTI shall be used. If the UE receives a new TAI list in the TRACKING AREA UPDATE ACCEPT message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

...

If the UE has initiated the tracking area updating procedure due to manual CSG selection and receives a TRACKING AREA UPDATE ACCEPT message, the UE shall check if the CSG ID of the cell where the UE has sent the TRACKING AREA UPDATE REQUEST message is contained in the Allowed CSG list. If not, the UE shall add that CSG ID to the Allowed CSG list.

If the TRACKING AREA UPDATE ACCEPT message contained a GUTI, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI.

Upon receiving a TRACKING AREA UPDATE COMPLETE message, the MME shall stop timer T3450, and shall consider the GUTI sent in the TRACKING AREA UPDATE ACCEPT message as valid.

...

9.2.3.1.9.3 Test description

9.2.3.1.9.3.1 Pre-test conditions

System Simulator:

- Cell A (belongs to TAI-1, home PLMN, not a CSG cell) is set to "Serving cell";
- Cell B (belongs to TAI-3, home PLMN, is a CSG cell) is set to "Non-Suitable cell";

- Cell D (belongs to TAI-4, home PLMN, not a CSG cell) is set to "Non- Suitable cell".
- System information combination 2 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells A and D
- System information combination 7 as defined in TS 36.508[18] clause 4.4.3.1 is used in cell B;

UE:

- the UE is configured to initiate EPS attach;
- pc_Allowed_CSG_list, the UE's Allowed CSG list is empty.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on Cell A according to TS 36.508 [18].

9.2.3.1.9.3.2 Test procedure sequence

Table 9.2.3.1.9.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as a "Not Suitable cell". - Cell B as a "Serving cell". - Cell D as a "Not Suitable "Off" cell".	-	-	-	-
2	The UE performs manual CSG ID selection and CSG Identity ('000 0000 0000 0000 0000 0000 0010'B) is selected manually.	-	-	-	-
3	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on Cell B?	-->	TRACKING AREA UPDATE REQUEST	1	P
4	The SS transmits a TRACKING AREA UPDATE ACCEPT message. NOTE: UE shall add the selected CSG ID as indicate in step 2 to UE's Allowed CSG list.	<--	TRACKING AREA UPDATE ACCEPT	-	-
5	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message on Cell B?	-->	TRACKING AREA UPDATE COMPLETE	1	P
6	The SS releases the RRC connection.	-	-	-	-
7	The SS configures: - Cell A as a "Not Suitable "Off" cell". - Cell B as a "Not Suitable cell". - Cell D as a "Serving cell".	-	-	-	-
8	The UE transmits a TRACKING AREA UPDATE REQUEST message on Cell D.	-->	TRACKING AREA UPDATE REQUEST	-	-
9	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
10	The UE transmits a TRACKING AREA UPDATE COMPLETE message on Cell D.	-->	TRACKING AREA UPDATE COMPLETE	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	The SS configures: - Cell B as a "Serving cell". - Cell D as a "Not Suitable cell".	-	-	-	-
13	Check: Does the UE camped on Cell B within 6 min and transmits a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
14	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
15	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message on Cell C?	-->	TRACKING AREA UPDATE COMPLETE	2	P

9.2.3.1.9.3.3 Specific message contents

Table 9.2.3.1.9.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 3, Table 9.2.3.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1	"Old GUTI is included by UE if valid, IMSI otherwise"	
Last visited registered TAI	TAI-1		

Table 9.2.3.1.9.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 4, Table 9.2.3.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= MCC/MNC TAC 1=2	"PLMN is set to the same MCC/MNC stored in EF _{IMSI} " "TAI-2"	

Table 9.2.3.1.9.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 8, Table 9.2.3.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-2	"Old GUTI is included by UE if valid, IMSI otherwise"	
Last visited registered TAI	TAI-2		

Table 9.2.3.1.9.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 9, Table 9.2.3.1.9.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-3		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= MCC/MNC TAC 1=4	"PLMN is set to the same MCC/MNC stored in EF _{IMSI} " "TAI-4"	

Table 9.2.3.1.9.3.3-5: Message TRACKING AREA UPDATE REQUEST (step 13, Table 9.2.3.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-3		
Last visited registered TAI	TAI-4		

Table 9.2.3.1.9.3.3-6: Message TRACKING AREA UPDATE ACCEPT (step 14, Table 9.2.3.1.9.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= MCC/MNC TAC 1=2	"PLMN is set to the same MCC/MNC stored in EF _{IMSI} " "TAI-2"	

9.2.3.1.9a Normal tracking area update / NAS signalling connection recovery

9.2.3.1.9a.1 Test Purpose (TP)

(1)

```

with { UE in state EMM-REGISTERED and EMM-CONNECTED }
ensure that {
  when { UE receives an indication of "RRC Connection failure" from the lower layers }
  then { UE initiates the tracking area updating procedure }
}

```

9.2.3.1.9a.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.1, 5.5.3.2.2 and 5.5.3.3.2 and TS 36.331, clause 5.3.7.8 and 5.3.12.

[TS 24.301, clause 5.5.3.1]

The tracking area updating procedure is always initiated by the UE and is used for the following purposes:

...

- recovery from certain error cases (for details see subclauses 5.5.3.2.2 and subclause 5.5.3.3.2);

[TS 24.301, clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

...

- i) when the UE receives an indication of "RRC Connection failure" from the lower layers and has no signalling or user uplink data pending (i.e. when the lower layer requests NAS signalling connection recovery);

...

For all cases except case b, the UE shall set the EPS update type IE to "TA updating". For case b, the UE shall set the EPS update type IE to "periodic updating".

[TS 24.301, clause 5.5.3.3.2]

The UE operating in CS/PS mode 1 or CS/PS mode 2, in state EMM-REGISTERED, shall initiate the combined tracking area updating procedure:

...

- j) when the UE receives an indication of "RRC Connection failure" from the lower layers and has no signalling or user uplink data pending (i.e. when the lower layer requests NAS signalling connection recovery);

...

To initiate a combined tracking area updating procedure the UE sends the message TRACKING AREA UPDATE REQUEST to the network, starts timer T3430 and changes to state EMM-TRACKING-AREA-UPDATING-INITIATED. The value of the EPS update type IE in the message shall indicate "combined TA/LA updating" unless explicitly specified otherwise.

[TS 36.331, clause 5.3.7.8]

Upon receiving the *RRCConnectionReestablishmentReject* message, the UE shall:

- 1> perform the actions upon leaving RRC_CONNECTED as specified in 5.3.12, with release cause 'RRC connection failure';

[TS 36.331, clause 5.3.12]

Upon leaving RRC_CONNECTED, the UE shall:

...

- 1> indicate the release of the RRC connection to upper layers together with the release cause;

9.2.3.1.9a.3 Test description

9.2.3.1.9a.3.1 Pre-test conditions

System Simulator:

- cell A and cell B (same TA); Cell B is configured to belong to TAI-1;
- cell A is "Serving cell" and cell B is "non-Suitable cell".

UE:

none.

Preamble:

- the UE is in state Generic RB Established (state 3) on cell A according to TS 36.508 [18].

9.2.3.1.9a.3.2 Test procedure sequence

Table 9.2.3.1.9a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "Non-Suitable "Off" cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits an <i>RRCConnectionReestablishmentRequest</i> .	-	-	-	-
3	The SS transmits an <i>RRCConnectionReestablishmentReject</i> .	-	-	-	-
4	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST with the EPS update type set to 'TA updating' or 'combined TA/LA updating' in the next 10 seconds?	-->	TRACKING AREA UPDATE REQUEST	1	P
5	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.1.9a.3.3 Specific message contents

Table 9.2.3.1.9a.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 4, Table 9.2.3.1.9a.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.9a.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 5, Table 9.2.3.1.9a.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	Not present		
MS identity	Not present		

9.2.3.1.10 Normal tracking area update / Rejected / IMSI invalid

9.2.3.1.10.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to 'Illegal UE' }
  then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
}

```

(2)

```

with { The UE is in the state EMM-DEREGISTERED }
ensure that {
  when { UE is powered up }
  then { UE send ATTACH REQUEST message with Old GUTI or IMSI IE = 'IMSI' }
}

```

9.2.3.1.10.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause 5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

#3 (Illegal UE); or

....

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI and ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off or the UICC containing the USIM is removed.

9.2.3.1.10.3 Test description

9.2.3.1.10.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non-suitable cell";
- If (px_SinglePLMN_Test = Multi PLMN) cell G (belongs to TAI-7, visited PLMN) is set to "Non-suitable cell";
- If (px_RATComb_Test = EUTRA_UTRA OR px_RATComb_Test = EUTRA_GERAN);
- if pc_UTRA AND px_RATComb_Test = EUTRA_UTRA, cell 9 (UTRAN, belong to RAI-1) is set to "Non-suitable "off" cell";
- if pc_GERAN AND px_RATComb_Test = EUTRA_GERAN, cell 24 (GERAN, belong to RAI-1) is set to "Non-suitable "off" cell";
- system information combination 10 as defined in TS 36.508 [18] clause 4.4.3.1 is applied in E-UTRA cells;
- If (px_RATComb_Test = EUTRA_Only):
 - neither cell 9 nor cell 24 is configured;
 - system information combination 1 as defined in TS 36.508 [18] clause 4.4.3.1 is applied in E-UTRA cells.

UE:

- the UE is configured to initiate EPS attach;
- if pc_UTRA AND px_RATComb_Test = EUTRA_UTRA, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND px_RATComb_Test = EUTRA_GERAN, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.10.3.2 Test procedure sequence

Table 9.2.3.1.10.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "Illegal UE" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Set the cell type of cell A to the "Serving cell". Set the cell type of cell B to the "Non-Suitable cell".	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell A? Note: Cell A belongs to the same PLMN where the UE was rejected but a different TAC	-->	ATTACH REQUEST	1	F
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell A?	-->	ATTACH REQUEST	1	F
-	EXCEPTION: Steps 9a to 12a describe behaviour that depends on the network capability / preference; the "lower case letter" identifies a step sequence that takes place if the network is capable or prefers.	-	-	-	-
9a	Set the cell type of cell A to the " Non-Suitable cell". Set the cell type of cell G to the "Serving cell".	-	-	-	-
10a	If (px_SinglePLMN_Test = Multi PLMN) Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell G? Note: Cell G belongs to a PLMN which is not the same like the one on which the UE was rejected.	-->	ATTACH REQUEST	1	F
11a	The user initiates an attach by MMI or by AT command.	-	-	-	-
12a	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell G?	-->	ATTACH REQUEST	1	F
13	If present, set the cell type of cell G to the "Non-Suitable "off" cell". If present, set the cell type of cell 9 or 24 to the "Serving cell".				
	EXCEPTION: Steps 14a1 to 14a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
14a1	IF pc_UTRA AND px_RATComb_Test = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Test = EUTRA_GERAN THEN the user initiates an attach by MMI or by AT command.	-	-	-	-

14a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell 9 or 24?	-->	ATTACH REQUEST	1	F
15	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
16	Set the cell type of cell A to the "Serving cell". If present, set the cell type of cell G to the "Non-Suitable cell". If present, set the cell type of cell 9 or 24 to the "Non-Suitable "off" cell".	-	-	-	-
17	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
18	Check: Does the UE transmit an ATTACH REQUEST message on cell A?	-->	ATTACH REQUEST	2	P
19-30	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.1.10.3.3 Specific message contents

Table 9.2.3.1.10.3.3-1: Void

Table 9.2.3.1.10.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.10.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	00000011	#3 "Illegal UE"	

Table 9.2.3.1.10.3.3-3: Message ATTACH REQUEST (step 18, Table 9.2.3.1.10.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI		

9.2.3.1.11 Normal tracking area update / Rejected / Illegal ME

9.2.3.1.11.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to "Illegal ME"
}
  then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
```

(2)

```
with { The UE is in the state EMM-DEREGISTERED }
ensure that {
  when { UE is powered up }
  then { UE send ATTACH REQUEST message with Old GUTI or IMSI IE = ''IMSI'' }
```

9.2.3.1.11.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#6 (Illegal ME);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI and ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off or the UICC containing the USIM is removed.

9.2.3.1.11.3 Test description

The test description is identical to the one of subclause 9.2.3.1.10 except that the reject cause #3 "Illegal UE" is replaced with the reject cause #6 "Illegal ME".

9.2.3.1.12 Normal tracking area update / Rejected / EPS service not allowed

9.2.3.1.12.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to 'EPS
service not allowed' }
  then { UE considers the USIM as invalid for EPS services and enters state EMM-DEREGISTERED }
```

(2)

```
with { The UE is in the state EMM-DEREGISTERED }
ensure that {
  when { UE is powered up or switched on }
  then { UE sends ATTACH REQUEST message with 'Old GUTI or IMSI IE = 'IMSI'' }
```

9.2.3.1.12.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#7 (EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall

consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.1.12.3 Test description

The test description is identical to the one of subclause 9.2.3.1.10 except that the reject cause #3 "illegal UE" is replaced with reject cause #7 "EPS services not allowed".

9.2.3.1.12.3.2 Test procedure sequence

Same test procedure as in clause 9.2.3.1.10.3.2 with the following exception:

Depending on UE capabilities the behaviour in table 9.2.3.1.12.3.2-1 occurs in parallel with step 14a2

Table 9.2.3.1.12.3.2-1: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1-1a 5 describe a behaviour which depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported.	-	-	-	-
1a1	IF pc_CS THEN the UE transmits a LOCATION UPDATING REQUEST message.	-->	LOCATION UPDATING REQUEST	-	-
-	EXCEPTION: The messages in the next two steps are sent only IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN	-	-	-	-
1a2a 1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE	-	-
1a2a 2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.	-	-
1a3	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
1a4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
1a5	The SS transmits a LOCATION UPDATING ACCEPT message including IMSI-1	<--	LOCATION UPDATING ACCEPT	-	-

9.2.3.1.12.3.3 Specific message contents

Table 9.2.3.1.12.3.3-1: LOCATION UPDATING ACCEPT (step 5, Table 9.2.3.1.12.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity			
IMSI	IMSI-1		

9.2.3.1.13 Normal tracking area update / Rejected / UE identity cannot be derived by the network

9.2.3.1.13.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to 'UE
identity cannot be derived by the network' }
}
```

then { UE deletes any GUTI, last visited registered TAI, TAI list and KSI and enters the state EMM-DEREGISTERED and subsequently, UE automatically initiates the attach procedure }

9.2.3.1.13.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#9 (UE identity cannot be derived by the network);

The UE shall set the EPS update status to EU2 NOT UPDATED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

Subsequently, the UE shall automatically initiate the attach procedure.

NOTE 2: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.1.13.3 Test description

9.2.3.1.13.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non-suitable cell";
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.13.3.2 Test procedure sequence

Table 9.2.3.1.13.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = " UE identity cannot be derived by the network " as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
-	EXCEPTION: Steps 4-17-4a1 describes the behaviour that depends on UE behaviour (Note 1).	-	-	-	-
4	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 4a1 describes a behaviour which depends on the UE capability	-	-	-	-
4a1	IF NOT pc_Automatic_EPS_Re_Attach , the user initiates an attach by MMI or by AT command.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message on cell B?	-->	ATTACH REQUEST	1	P
6-17	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

Note 1: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second then the existing RRC Connection is released.

9.2.3.1.13.3.3 Specific message contents

Table 9.2.3.1.13.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1		
Old P-TMSI signature	Absent or any allowed value		

Table 9.2.3.1.13.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00001001'B	#9 "UE identity cannot be derived by the network"	

Table 9.2.3.1.13.3.3-3: Message ATTACH REQUEST (step 5, Table 9.2.3.1.13.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI		
Old P-TMSI signature	Not present		
Last visited registered TAI	Not present		

Table 9.2.3.1.13.3.3-4: Message ATTACH REJECT (step 6, Table 9.2.3.1.13.3.2-1)

Derivation Path: 36.508 table 4.7.2-3			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1111'B	#15 "No suitable cells in tracking area"	

9.2.3.1.14 Normal tracking area update / Rejected / UE implicitly detached

9.2.3.1.14.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to ''UE
implicitly detached'' }
  then { UE enters the state EMM-DEREGISTERED.NORMAL-SERVICE and sends ATTACH REQUEST message}
```

9.2.3.1.14.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#10 (Implicitly detached);

The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.NORMAL-SERVICE. The UE shall delete any mapped EPS security context or partial native EPS security context. The UE shall perform a new attach procedure.

NOTE 3: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM state as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.1.14.3 Test description

9.2.3.1.14.3.1 Pre-test conditions

System Simulator:

- cell A belongs to TAI-1, home PLMN is set to "Serving cell";
- cell B belongs to TAI-2, home PLMN is set to "Non- Suitable cell";
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.14.3.2 Test procedure sequence

Table 9.2.3.1.14.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "UE implicitly detached" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
-	EXCEPTION: Steps 3a1-3a2 describes the behaviour that depends on UE behaviour (Note 1).	-	-	-	-
3a1	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 3a2 describes a behaviour which depends on the UE capability	-	-	-	-
3a2	IF NOT pc_Automatic_EPS_Re_Attach , the user initiates an attach by MMI or by AT command.	-	-	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message on cell B?	-->	ATTACH REQUEST	1	P
5-16	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-
Note 1: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second, existing RRC Connection is released.					

9.2.3.1.14.3.3 Specific message contents

Table 9.2.3.1.14.3.3-1: Void**Table 9.2.3.1.14.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.14.3.2-1)**

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00001010'B	#10 "UE implicitly detached"	

Table 9.2.3.1.14.3.3-3: Message ATTACH REQUEST (step 4, Table 9.2.3.1.14.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-1		
Last visited registered TAI	TAI-1		

9.2.3.1.15 Normal tracking area update / Rejected / PLMN not allowed

9.2.3.1.15.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to "PLMN not allowed" }

```

```

    then { UE deletes the GUTI, the last visited registered TAI and KSI and UE deletes the list of
    equivalent PLMNs and UE enters state EMM-DEREGISTERED.PLMN-SEARCH and UE stores the PLMN in the
    "forbidden PLMN list" }
  }

```

(2)

```

with { UE is switched off having a PLMN stored in the "forbidden PLMN list" }
ensure that {
  when { UE is powered up on this PLMN }
  then { UE doesn't perform an attach procedure }
}

```

(3)

```

with { UE in EMM-DEREGISTERED.PLMN-SEARCH state having a PLMN stored in the "forbidden PLMN list" }
ensure that {
  when { UE enters a cell which is not in the "forbidden PLMN list" }
  then { UE initiates an attach procedure }
}

```

(4)

```

with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state having a PLMN stored in the "forbidden PLMN
list" }
ensure that {
  when { UE is in a forbidden PLMN cells and when the PLMN is selected manually }
  then { UE initiates an attach procedure }
}

```

9.2.3.1.15.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#11 (PLMN not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset the tracking area updating attempt counter, delete the list of equivalent PLMNs and enter the state EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the PLMN identity in the "forbidden PLMN list".

The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and routing area updating attempt counter and the MM parameters update status, TMSI, LAI, ciphering key sequence number and the location update attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value and no RR connection exists.

9.2.3.1.15.3 Test description

9.2.3.1.15.3.1 Pre-test conditions

System Simulator:

- cell G (belongs to TAI-7, visited PLMN) and is set to "Serving cell";
- cell H (belongs to TAI-8, visited PLMN) is set to "Non-suitable cell";
- cell I (belongs to TAI-9, visited PLMN) is set to "Non-suitable "off" cell";
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f1;
- If (px_RATComb_Tested = EUTRA_UTRA OR px_RATComb_Tested = EUTRA_GERAN);
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 9 (UTRAN, belongs to RAI-1) is set to "Non-suitable "off" cell";
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (GERAN, belongs to RAI-1) is set to "Non-suitable "off" cell".
- system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- If (px_RATComb_Tested = EUTRA_Only):
 - neither cell 9 nor cell 24 is configured;
 - system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell G according to TS 36.508 [18].

9.2.3.1.15.3.2 Test procedure sequence

Table 9.2.3.1.15.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell G to the "Non-Suitable cell". Set the cell type of cell H to the "Serving cell". Note: cell G and cell H are in the same PLMN.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell H.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "PLMN not allowed".	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell H?	-->	ATTACH REQUEST	1	F
6	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
7	Set the cell type of cell G to the "Serving cell". Set the cell type of cell H to the "Non-Suitable cell". Note: cell G and cell H are in the same PLMN.	-	-	-	-
8	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell G?	-->	ATTACH REQUEST	2	F
10	The user initiates an attach by MMI or by AT command.	-	-	-	-
11	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell G?	-->	ATTACH REQUEST	2	F
12	Set the cell type of cell G to the "Non-Suitable cell". If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 9 to the "Serving cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Serving cell". Note: Cell G and Cell 9 or 24 are in the same PLMN.	-	-	-	-
-	EXCEPTION: Steps 13a1 to 13a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
13a 1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the user initiates an attach by MMI or by AT command.	-	-	-	-
13a 2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell 9 or 24?	-->	ATTACH REQUEST	1	F
14	The following messages are sent and shall be received on cell I.	-	-	-	-
15	If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 9 to the "Non-Suitable cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Non-Suitable cell". Set the cell type of cell I to the "Serving cell", Set the cell type of cell H to the "Non-Suitable "off" cell".	-	-	-	-

	Note: cell 9 or 24 and cell I are in different PLMNs.				
16	Check: Does the UE transmit ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN?	-->	ATTACH REQUEST	3	P
17	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
18	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
19	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
20	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 20Aa1 to 20Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
20 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
20 Aa 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
21	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
22	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
23	The SS releases the RRC connection.	-	-	-	-
24	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 25 describes behaviour that depends on the UE capability.				
25	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmit a DETACH REQUEST.	-->	DETACH REQUEST	-	-
26	The following messages are sent and shall be received on cell G.	-	-	-	-
27	Set the cell type of cell G to the "Serving cell". Set the cell type of cell I to the "Non-Suitable cell". Note: Cell G belongs to the forbidden PLMN.	-	-	-	-
28	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
29	The UE is switched to manual PLMN selection mode and is made to select the forbidden PLMN.	-	-	-	-
30	Check: Does the UE transmit ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN?	-->	ATTACH REQUEST	4	P
31- 42	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.1.15.3.3 Specific message contents

Table 9.2.3.1.15.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-7		

Table 9.2.3.1.15.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00001011'B	#11 " PLMN not allowed "	

Table 9.2.3.1.15.3.3-3: Message ATTACH REQUEST (step 16, Table 9.2.3.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI		
Old P-TMSI signature	Not present		
Last visited registered TAI	Not present		

Table 9.2.3.1.15.3.3-4: Message ATTACH ACCEPT (step 21, Table 9.2.3.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC	'002'B	"TAI-9"	
MNC	'101'B	"TAI-9"	
TAC 1	'1'B	"TAI-9"	
GUTI	GUTI-9		

Table 9.2.3.1.15.3.3-5: Message ATTACH REQUEST (step 30, Table 9.2.3.1.15.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-9		
Last visited registered TAI	TAI-9		

9.2.3.1.15a Normal tracking area update / Rejected / PLMN not allowed / Single Frequency operation

9.2.3.1.15a.1 Test Purpose (TP)

Same test purpose as in clause 9.2.3.1.15.1

9.2.3.1.15a.2 Conformance requirements

Same conformance requirements as in clause 9.2.3.1.15.2

9.2.3.1.15a.3 Test description

9.2.3.1.15a.3.1 Pre-test conditions

System Simulator:

- Three intra-frequency E-UTRA cells Cell A, Cell B, and Cell C;
- cell A (belongs to TAI-7, visited PLMN, MCC = MCC in USIM MNC=02) and is set to "Serving cell";
- cell B (belongs to TAI-8, visited PLMN, MCC = MCC in USIM MNC=02) is set to "Non-suitable cell";
- cell C (belongs to TAI-9, visited PLMN, MCC=002 MNC=101) is set to "Non-suitable "off" cell";
- If (p_x_RATComb_Tested = EUTRA_UTRA OR p_x_RATComb_Tested = EUTRA_GERAN);
- if p_c_UTRA AND p_x_RATComb_Tested = EUTRA_UTRA, cell 5 (UTRAN, belongs to RAI-1) is set to "Non-suitable "off" cell";
- if p_c_GERAN AND p_x_RATComb_Tested = EUTRA_GERAN, cell 24 (GERAN, belongs to RAI-1) is set to "Non-suitable "off" cell".
- system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- If (p_x_RATComb_Tested = EUTRA_Only):
- neither cell 5 nor cell 24 is configured;
- system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.15a.3.2 Test procedure sequence

Table 9.2.3.1.15a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell". Note: cell A and cell B are in the same PLMN.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "PLMN not allowed".	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell B?	-->	ATTACH REQUEST	1	F
6	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
7	Set the cell type of cell A to the "Serving cell". Set the cell type of cell B to the "Non-Suitable cell". Note: cell A and cell B are in the same PLMN.	-	-	-	-
8	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell A?	-->	ATTACH REQUEST	2	F
10	The user initiates an attach by MMI or by AT command.	-	-	-	-
11	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell A?	-->	ATTACH REQUEST	2	F
12	Set the cell type of cell A to the "Non-Suitable cell". If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 5 to the "Serving cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Serving cell". Note: Cell A and Cell 5 or 24 are in the same PLMN.	-	-	-	-
-	EXCEPTION: Steps 13a1 to 13a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
13a 1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the user initiates an attach by MMI or by AT command.	-	-	-	-
13a 2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell 5 or 24?	-->	ATTACH REQUEST	1	F
14	The following messages are sent and shall be received on cell C.	-	-	-	-
15	If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 5 to the "Non-Suitable cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Non-Suitable cell". Set the cell type of cell C to the "Serving cell", Set the cell type of cell B to the "Non-Suitable "off" cell".	-	-	-	-

	Note: cell 5 or 24 and cell C are in different PLMNs.				
16	Check: Does the UE transmit ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN?	-->	ATTACH REQUEST	3	P
17	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
18	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
19	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
20	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 20Aa1 to 20Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
20 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
20 Aa 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
21	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
22	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
23	The SS releases the RRC connection.	-	-	-	-
24	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 25 describes behaviour that depends on the UE capability.				
25	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmit a DETACH REQUEST.	-->	DETACH REQUEST	-	-
26	The following messages are sent and shall be received on cell A.	-	-	-	-
27	Set the cell type of cell A to the " Serving cell". Set the cell type of cell C to the " Non-Suitable cell". Note: Cell A belongs to the forbidden PLMN.	-	-	-	-
28	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
29	The UE is switched to manual PLMN selection mode and is made to select the forbidden PLMN.	-	-	-	-
30	Check: Does the UE transmit ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN?	-->	ATTACH REQUEST	4	P
31- 42	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.1.15a.3.3 Specific message contents

Same specific message contents as in clause 9.2.3.1.15.3.3

9.2.3.1.16 Normal tracking area update / Rejected / Tracking area not allowed

9.2.3.1.16.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to 'Tracking
area not allowed ' ' }
  then { shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset
the tracking area updating attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-
SERVICE and store the current TAI in the list of "forbidden tracking areas for regional provision of
service" }
```

(2)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and has a TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { UE is in the serving cell which the UE is rejected }
  then { UE does not attempt an attach procedure on any other cell}
}
```

(3)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { UE enters a new cell in the same TAI it was rejected }
  then { UE does not initiate an attach procedure}
}
```

(4)

```
with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { UE enters a new cell with different TAI without in the list of "forbidden tracking areas
for regional provision of service"}
  then { UE initiates attach procedure with IMSI }
}
```

(5)

```
with { UE is switched off }
ensure that {
  when { UE is powered on and enters the cell with "forbidden tracking areas for regional provision
of service" before the UE was switched off }
  then { UE initiates attach procedure on the cell }
```

9.2.3.1.16.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.5.

[TS24.301 clause5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#12 (Tracking area not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

The UE shall store the current TAI in the list of "forbidden tracking areas for regional provision of service".

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.1.16.3 Test description

9.2.3.1.16.3.1 Pre-test conditions

System Simulator:

- cell A (belong to TAI-1, home PLMN) are set to "Non-suitable cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Serving cell";
- cell C (belongs to TAI-3, visited PLMN) is set to "Non-suitable cell";
- cell M (belongs to TAI-1, home PLMN) are set to "Non-suitable "off" cell"

UE:

- The UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell B according to TS 36.508 [18].

9.2.3.1.16.3.2 Test procedure sequence

Table 9.2.3.1.16.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to "Serving cell". Set the cell type of cell B to "Non-Suitable cell". Set the cell type of cell C to "Suitable neighbour intra-frequency cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "Tracking area not allowed" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell C?	-->	ATTACH REQUEST	2	F
5A	Set the cell type of cell B to the "Non-Suitable "off" cell". Set the cell type of cell M to the " Non-Suitable cell ". Set the cell type of cell C to the " Non-Suitable cell ".				
6	The user initiates an attach by MMI or by AT command.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell A?	-->	ATTACH REQUEST	1	F
8	Set the cell type of cell A to the " Non-Suitable cell ". Set the cell type of cell M to the "Serving cell".	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell M?	-->	ATTACH REQUEST	3	F
10	Set the cell type of cell C to the "Serving cell". Set the cell type of cell M to the "Non-Suitable cell ".	-	-	-	-
11	Check: Does the UE transmit an ATTACH REQUEST on cell C including a PDN CONNECTIVITY REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P
12	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
13	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
14	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
15	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 15Aa1 to 15Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
15 Aa 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
15 Aa 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-

16	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
17	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
18	The SS releases the RRC connection.	-	-	-	-
19	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 20 describes behaviour that depends on the UE capability.				
20	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmit a DETACH REQUEST.	-->	DETACH REQUEST	-	-
21	The following messages are sent and shall be received on cell A.	-	-	-	-
22	Set the cell type of cell A to the " Serving cell". Set the cell type of cell C to the " Non-Suitable cell".	-	-	-	-
23	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
24	The UE transmits ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN.	-->	ATTACH REQUEST	5	P
25-36	The attach procedure is completed executing steps 5 to 16 of the UE registration procedure in TS 36.508 clause 4.5.2.3	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.1.16.3.3 Specific message contents

Table 9.2.3.1.16.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-7		

Table 9.2.3.1.16.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00001100'B	#12 "Tracking area not allowed"	

Table 9.2.3.1.16.3.3-3: Message ATTACH REQUEST (step 11, Table 9.2.3.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI		
Last visited registered TAI	Not present		

Table 9.2.3.1.16.3.3-4: Message ATTACH ACCEPT (step 16, Table 9.2.3.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= MCC/02 TAC 1=1	"MCC is set to the same MCC stored in EF _{IMSI} " "TAI-7"	
GUTI	GUTI-7		

Table 9.2.3.1.16.3.3-5: Message ATTACH REQUEST (step 24, Table 9.2.3.1.16.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-7		
Last visited registered TAI	TAI-7		

9.2.3.1.17 Normal tracking area update / Rejected / Roaming not allowed in this tracking area

9.2.3.1.17.1 Test Purpose (TP)

(1)

```
with { the UE has sent TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { the UE receives TRACKING AREA UPDATE REJECT message with the reject cause set to "roaming not allowed in this tracking area" }
  then { the UE sets the EPS update status to EU3 ROAMING NOT ALLOWED and the UE deletes the last visited registered TAI and the UE enters the state EMM-REGISTERED.PLMN-SEARCH and the UE stores the current TAI in the list of "forbidden tracking areas for roaming" }
}
```

(2)

```
with { the UE is in EMM-REGISTERED.PLMN-SEARCH state and the current TAI in the list of "forbidden tracking areas for roaming"}
ensure that {
  when { the serving cell belongs to TAI where UE was rejected }
  then { the UE does not attempt to send TRACKING AREA UPDATE REQUEST message }
}
```

(3)

```
with { the UE is in EMM-REGISTERED.PLMN-SEARCH state and the TAI of the current cell belongs to the list of "forbidden tracking areas for roaming"}
ensure that {
  when { the UE enters a cell belonging to same PLMN and TAI not in the list of "forbidden tracking areas for roaming"}
  then { the UE sends TRACKING AREA UPDATE REQUEST message }
}
```

(4)

```
with { the UE is in EMM-REGISTERED.PLMN-SEARCH state and the TAI of the current cell belongs to the list of "forbidden tracking areas for roaming"}
ensure that {
  when { the UE enters a cell belonging to another PLMN }
  then { the UE sends TRACKING AREA UPDATE REQUEST message }
}
```


(5)

```

with { the UE, which A/Gb mode or Iu mode is supported by the UE, in EMM-DEREGISTERED.PLMN-SEARCH
state and the list of "forbidden tracking areas for roaming" contains more than one TAI }
ensure that {
  when { the UE move to UTRAN or GERAN cell }
  then { the UE sends ROUTING AREA UPDATE REQUEST message }

```

9.2.3.1.17.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.2.5.
[TS 24.301, clause 5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#13 (Roaming not allowed in this tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete the list of equivalent PLMNs. The UE shall reset the tracking area updating attempt counter and shall change to state EMM-REGISTERED.PLMN-SEARCH.

The UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and shall remove the current TAI from the stored TAI list if present.

The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

...

9.2.3.1.17.3 Test description

9.2.3.1.17.3.1 Pre-test conditions

System Simulator:

- cell K (belongs to TAI-9, visited PLMN) is set to "Serving cell";
- cell L (belongs to TAI-11, same visited PLMN) is set to "Non-suitable cell";
- If (p_x_SinglePLMN_Test_{ed} = Multi PLMN) cell J (belongs to TAI-10, another visited PLMN) is set to "Non-suitable "off" cell";
- If (p_x_RATComb_Test_{ed} = EUTRA_UTRA OR p_x_RATComb_Test_{ed} = EUTRA_GERAN) ;
- if p_c_UTRA AND p_x_RATComb_Test_{ed} = EUTRA_UTRA, cell 9 (belongs to TAI-8, visited PLMN) is set to "Non-suitable "off" cell";
- if p_c_GERAN AND p_x_RATComb_Test_{ed} = EUTRA_GERAN, cell 24 (belongs to TAI-8, visited PLMN) is set to "Non-suitable "off" cell";
- system information indicate that NMO 1 is used;
 - system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- If (p_x_RATComb_Test_{ed} = EUTRA_Only):
 - neither cell 9 nor cell 24 is configured;

- system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell K according to TS 36.508 [18].

9.2.3.1.17.3.2 Test procedure sequence

Table 9.2.3.1.17.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell K to the "Suitable neighbour intra-frequency cell". Set the cell type of cell L to the "Serving cell".	-	-	-	-
2	The UE transmits TRACKING AREA UPDATE REQUEST on Cell L.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "Roaming not allowed in this tracking area" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.				
5	Set the cell type of cell K to the "Serving cell". Set the cell type of cell L to the "Suitable neighbour intra-frequency cell".	-	-	-	-
6	Void	-	-	-	-
7	Check: Does the UE transmit TRACKING AREA UPDATE REQUEST message on cell K?	-->	TRACKING AREA UPDATE REQUEST	1, 3	P
8	The SS transmits TRACKING AREA UPDATE REJECT message with EMM cause = "Roaming not allowed in this tracking area" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
9	The SS releases the RRC connection.				
10	Set the cell type of cell K to the "Non-Suitable cell". If present, set the cell type of cell 9 or 24 to the "Serving cell". Note: Cell K and cell 9 or 24 are in the same PLMN.	-	-	-	-
	EXCEPTION: Steps 11a1 to 11a3 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
11a 1	Check: Does the UE transmit ROUTING AREA UPDATE REQUEST message on cell 9 or 24?	-->	ROUTING AREA UPDATE REQUEST	5	P
11a 2	The SS transmits a ROUTING AREA UPDATE REJECT message with cause = "Roaming not allowed in this tracking area" as specified.	<--	ROUTING AREA UPDATE REJECT	-	-
11a 3	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Steps 12a1 to 12a4 describe behaviour that depends on the network capability / preference; the "lower case letter" identifies a step sequence that takes place if the network is capable or prefers.	-	-	-	-
12 a1	If (px_SinglePLMN_Test = Multi PLMN) If present, set the cell type of cell 9 or 24 to the "Non-Suitable cell". Set the cell type of cell L to the "Non-Suitable "off" cell". Set the cell type of cell J to the "Serving cell". Note: cell 9 or 24 and cell J are in different PLMNs.	-	-	-	-
12a 2	Check: Does the UE transmit TRACKING AREA REQUEST message on cell J?	-->	TRACKING AREA UPDATE REQUEST	1, 4	P
12a 3	The SS sends TRACKING AREA ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
12a 4	The UE transmits TRACKING AREA COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-

-	If (p_x_SinglePLMN_Test = Multi PLMN): At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508. Else: At the end of this test procedure sequence, the UE is in end state E-UTRA deregistered (E4) according to TS 36.508.	-	-	-	-
---	--	---	---	---	---

9.2.3.1.17.3.3 Specific message contents

Table 9.2.3.1.17.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, 7 and 12a2, Table 9.2.3.1.17.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-9		

Table 9.2.3.1.17.3.3-2: TRACKING AREA UPDATE REJECT (step 3 and 8, Table 9.2.3.1.17.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1101'B	Roaming not allowed in this tracking area	

9.2.3.1.18 Normal tracking area update / Rejected / EPS services not allowed in this PLMN

9.2.3.1.18.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to 'EPS
services not allowed in this PLMN' }
  then { UE deletes the GUTI, the last visited registered TAI and KSI and UE deletes the list of
equivalent PLMNs and UE enters state EMM-DEREGISTERED.PLMN-SEARCH and UE stores the PLMN in the
"forbidden PLMNs for GPRS service" }
```

(2)

```
with { UE in E-UTRA EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden PLMNs
for GPRS service" }
ensure that {
  when { UE enters a cell which is in the "forbidden PLMNs for GPRS service" }
  then { UE doesn't perform an attach procedure }
}
```

(3)

```
with { UE in EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden PLMNs for
GPRS service" }
ensure that {
  when { UE enters a cell which is not in the "forbidden PLMNs for GPRS service" }
  then { UE initiates an attach procedure }
}
```

(4)

```
with { UE is switched off and a PLMN is stored in the 'forbidden PLMNs for GPRS service' }
ensure that {
  when { UE is power ON in a cell with forbidden PLMNs for GPRS service }
  then { UE initiates an attach procedure }
```

9.2.3.1.18.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.2.5.

[TS 24.301, clause 5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#14 (EPS services not allowed in this PLMN);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). Furthermore the UE shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list.

The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

...

9.2.3.1.18.3 Test description

9.2.3.1.18.3.1 Pre-test conditions

System Simulator:

- cell G belongs to TAI-7(visited PLMN) and is set to "Serving cell";
- cell H belongs to TAI-8(visited PLMN, another TAC) and is set to "Non-suitable cell";
- cell I belongs to TAI-9(visited PLMN, another PLMN) and is set to "Non-suitable "off" cell";
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f1;
- If (p_x_RATComb_Tested = EUTRA_UTRA OR p_x_RATComb_Tested = EUTRA_GERAN);
- if p_c_UTRA AND p_x_RATComb_Tested = EUTRA_UTRA, cell 9 (belongs to TAI-8, visited PLMN) is set to "Non-suitable "off" cell";
- if p_c_GERAN AND p_x_RATComb_Tested = EUTRA_GERAN, cell 24 (belongs to TAI-8, visited PLMN) is set to "Non-suitable "off" cell";
- system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
 - system information indicate that NMO 1 is used;
- If (p_x_RATComb_Tested = EUTRA_Only):
 - neither cell 9 nor cell 24 is configured;
 - system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell G according to TS 36.508 [18].

9.2.3.1.18.3.2 Test procedure sequence

Table 9.2.3.1.18.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell G to the "Non-Suitable cell". Set the cell type of cell H to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell H.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "EPS services not allowed in this PLMN" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell H?	-->	ATTACH REQUEST	1	F
6	Set the cell type of cell G to the "Serving cell". Set the cell type of cell H to the "Non-Suitable cell". Note: cell G and cell H are in the same PLMN.	-	-	-	-
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell G?	-->	ATTACH REQUEST	2	F
9	Set the cell type of cell G to the "Non-Suitable cell". Set the cell type of cell H to the "Non-Suitable "off" cell". If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 9 to the "Serving cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Serving cell". Note: Cell G and Cell 9 or 24 are in the same PLMN.	-	-	-	-
-	EXCEPTION: Steps 10a1 to 10a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
10a 1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the user initiates an attach by MMI or by AT command.	-	-	-	-
-	EXCEPTION: Depending on UE capabilities the behaviour in table 9.2.3.1.18.3.2-2 occurs in parallel with step 10a2.	-	-	-	-
10a 2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell 9 or 24?	-->	ATTACH REQUEST	1	F
-	The following messages are sent and shall be received on cell I.	-	-	-	-
11	If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 9 to the "Non-Suitable cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Non-Suitable cell". Set the cell type of cell I to the "Serving cell". Note: cell 9 or 24 and cell I are in different PLMNs.	-	-	-	-
12	Check: Does the UE send ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to	-->	ATTACH REQUEST	3	P

	request PDN connectivity to the default PDN?				
13	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
14	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
15	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
16	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 17a1 to 17a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
17a 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
17a 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
18	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 19 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
19	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
20	The SS releases the RRC connection.	-	-	-	-
21	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 22 describes behaviour that depends on the UE capability.	-	-	-	-
22	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmit a DETACH REQUEST.	-->	DETACH REQUEST	-	-
-	The following messages are sent and shall be received on cell G.	-	-	-	-
23	Set the cell type of cell G to the "Serving cell". Set the cell type of cell I to the "Non-Suitable cell". Note: Cell G belongs to the forbidden PLMNs for GPRS service.	-	-	-	-
24	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
25	Check: Does the UE send ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN?	-->	ATTACH REQUEST	4	P
26- 37	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

Table 9.2.3.1.18.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1-1a 5 describe a behaviour which depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported.	-	-	-	-
1a1	IF pc_CS THEN the UE transmits a LOCATION UPDATING REQUEST message.	-->	LOCATION UPDATING REQUEST	-	-
-	EXCEPTION: The messages in the next two steps are sent only IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN	-	-	-	-
1a2a 1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE	-	-
1a2a 2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.	-	-
1a3	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
1a4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
1a5	The SS transmits a LOCATION UPDATING ACCEPT message including IMSI-1	<--	LOCATION UPDATING ACCEPT	-	-

9.2.3.1.18.3.3 Specific message contents

Table 9.2.3.1.18.3.3-1: Void

Table 9.2.3.1.18.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.18.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'0000 1110'B	#14 "EPS services not allowed in this PLMN"	

Table 9.2.3.1.18.3.3-3: Message ATTACH REQUEST (step 12, Table 9.2.3.1.18.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI		
Last visited registered TAI	Not present		

Table 9.2.3.1.18.3.3-4: Message ATTACH ACCEPT (step 18, Table 9.2.3.1.18.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
TAI list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	PLMN= 002/101 TAC 1=1	"TAI-9"	
GUTI	GUTI-9		

Table 9.2.3.1.18.3.3-5: Message ATTACH REQUEST (step 25, Table 9.2.3.1.18.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	GUTI-9		
Last visited registered TAI	TAI-9		

Table 9.2.3.1.18.3.3-6: LOCATION UPDATING ACCEPT (step 5, Table 9.2.3.1.18.3.2-2)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity			
IMSI	IMSI-1		

9.2.3.1.18a Normal tracking area update / Rejected / EPS services not allowed in this PLMN / Single Frequency operation

9.2.3.1.18a.1 Test Purpose (TP)

Same test purpose as in clause 9.2.3.1.18.1

9.2.3.1.18a.2 Conformance requirements

Same conformance requirements as in clause 9.2.3.1.18.2

9.2.3.1.18a.3 Test description

9.2.3.1.18a.3.1 Pre-test conditions

System Simulator:

- Three intra-frequency E-UTRA cells Cell A, Cell B, and Cell C;
- cell A belongs to TAI-7(visited PLMN, MCC = MCC in USIM MNC=02) and is set to "Serving cell";
- cell B belongs to TAI-8(visited PLMN, MCC = MCC in USIM MNC=02 another TAC) and is set to "Non-suitable cell";
- cell C belongs to TAI-9(visited PLMN, MCC=002 MNC=101) and is set to "Non-suitable "off" cell";
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 5 (belongs to RAI-8, visited PLMN) is set to "Non-suitable "off" cell";
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (belongs to RAI-8, visited PLMN) is set to "Non-suitable "off" cell";
- system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- system information indicate that NMO 1 is used;
- If (px_RATComb_Tested = EUTRA_Only):
- neither cell 5 nor cell 24 is configured;
- system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.18a.3.2 Test procedure sequence

Table 9.2.3.1.18a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "EPS services not allowed in this PLMN" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.				
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell B?	-->	ATTACH REQUEST	1	F
6	Set the cell type of cell A to the "Serving cell". Set the cell type of cell B to the "Non-Suitable cell". Note: cell A and cell B are in the same PLMN.	-	-	-	-
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on cell A?	-->	ATTACH REQUEST	2	F
9	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Non-Suitable "off" cell". If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 5 to the "Serving cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Serving cell". Note: Cell A and Cell 5 or 24 are in the same PLMN.	-	-	-	-
	EXCEPTION: Steps 10a1 to 10a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
10a 1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the user initiates an attach by MMI or by AT command.	-	-	-	-
-	EXCEPTION: Depending on UE capabilities the behaviour in table 9.2.3.1.18a.3.2-2 occurs in parallel with step 10a2				
10a 2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell 5 or 24?	-->	ATTACH REQUEST	1	F
	The following messages are sent and shall be received on cell C.	-	-	-	-
11	If px_RATComb_Tested = EUTRA_UTRA set the cell type of cell 5 to the "Non-Suitable cell" or if px_RATComb_Tested = EUTRA_GERAN set cell 24 to the "Non-Suitable cell". Set the cell type of cell C to the "Serving cell". Note: cell 5 or 24 and cell C are in different PLMNs.	-	-	-	-
12	Check: Does the UE send ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to	-->	ATTACH REQUEST	3	P

	request PDN connectivity to the default PDN?				
13	The SS starts an authentication procedure	<--	AUTHENTICATION REQUEST	-	-
14	The UE responds properly to the authentication procedure	-->	AUTHENTICATION RESPONSE	-	-
15	The SS starts a NAS security mode command procedure to perform NAS integrity protection.	<--	SECURITY MODE COMMAND	-	-
16	The UE responds properly to the NAS security mode command procedure	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 17a1 to 17a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
17a 1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
17a 2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
18	The SS sends ATTACH ACCEPT message with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 19 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.				
19	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
20	The SS releases the RRC connection.	-	-	-	-
21	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 22 describes behaviour that depends on the UE capability.				
22	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmit a DETACH REQUEST.	-->	DETACH REQUEST	-	-
	The following messages are sent and shall be received on cell A.				
23	Set the cell type of cell A to the " Serving cell". Set the cell type of cell C to the " Non-Suitable cell". Note: Cell A belongs to the forbidden PLMNs for GPRS service.				
24	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
25	Check: Does the UE send ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN?	-->	ATTACH REQUEST	4	P
26- 37	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

Table 9.2.3.1.18a.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1-1a 5 describe a behaviour which depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported.	-	-	-	-
1a1	IF pc_CS THEN the UE transmits a LOCATION UPDATING REQUEST message.	-->	LOCATION UPDATING REQUEST	-	-
-	EXCEPTION: Steps 1a2a1 to 1a2a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
1a2a 1	IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE	-	-
-	EXCEPTION: Step 1a2a2 describes behaviour that depends on the UE capability.	-	-	-	-
1a2a 2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.	-	-
1a3	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
1a4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
1a5	The SS transmits a LOCATION UPDATING ACCEPT message including IMSI-1	<--	LOCATION UPDATING ACCEPT	-	-

9.2.3.1.18a.3.3 Specific message contents

Same specific message contents as in clause 9.2.3.1.18.3.3

Table 9.2.3.1.18a.3.3-1: LOCATION UPDATING ACCEPT (step 1a5, Table 9.2.3.1.18.3.2-2)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity			
IMSI	IMSI-1		

9.2.3.1.19 Normal tracking area update / Rejected / No suitable cells in tracking Area

9.2.3.1.19.1 Test Purpose (TP)

(1)

```

with { UE is sending a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'No Suitable
Cells In tracking area' }
  then { UE selects a suitable cell in another tracking area in the same PLMN and performs the
tracking area updating procedure and UE does not select a suitable cell in another PLMN}
}

```

9.2.3.1.19.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.2.5.

[TS 24.301, clause 5.5.3.2.5]

If the tracking area updating cannot be accepted by the network, the MME sends a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, and take the following actions depending on the EMM cause value received.

...

#15 (No suitable cells in tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

The UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and shall remove the current TAI from the stored TAI list if present.

The UE shall search for a suitable cell in another tracking area or in another location area in the same PLMN according to 3GPP TS 36.304 [21].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

...

9.2.3.1.19.3 Test description

9.2.3.1.19.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non-suitable cell";
- If (px_SinglePLMN_Tested = Multi PLMN) cell G (belongs to TAI-7, visited PLMN) is set to "Non-suitable cell".

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.1.19.3.2 Test procedure sequence

Table 9.2.3.1.19.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell". If present, set the cell type of Cell G to the "Serving cell".	-	-	-	-
-	The following messages are sent and shall be received on Cell B.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'No Suitable Cells In tracking area'.	<--	TRACKING AREA UPDATE REJECT	-	-
3A	Set the cell type of Cell A to the "Serving cell". Set the cell type of Cell B to the "Suitable neighbour Intra Frequency cell".				
4	The SS releases the RRC connection.	-	-	-	-
4A	Void				
-	The following messages are sent and shall be received on Cell A.	-	-	-	-
5	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
6	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
7	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.1.19.3.3 Specific message contents

Table 9.2.3.1.19.3.3-1: TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.19.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1111'B	No Suitable Cells In tracking area	

Table 9.2.3.1.19.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 5, Table 9.2.3.1.19.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1		

9.2.3.1.20 Normal tracking area update / Rejected / Not authorized for this CSG

9.2.3.1.20.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to "Not
authorized for this CSG" and with integrity protection }
  then { UE removes the CSG ID from the Allowed CSG list }
}

```

(2)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to "Not
authorized for this CSG" and with integrity protection }
  then { UE searches for a suitable cell in the same PLMN and sent a TRACKING AREA UPDATE REQUEST
message }
}

```

9.2.3.1.20.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.2.5]

#25 (Not authorized for this CSG);

EMM cause #25 is only applicable when received from a CSG cell. EMM cause #25 received from a non-CSG cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.3.2.6.

If the TRACKING AREA UPDATE REJECT message with EMM cause #25 was received without integrity protection, then the UE shall discard the message.

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

If the CSG ID of the cell where the UE has sent the TRACKING AREA UPDATE REQUEST message is contained in the Allowed CSG list, the UE shall remove the entry corresponding to this CSG ID from the Allowed CSG list.

If the CSG ID of the cell where the UE has sent the TRACKING AREA UPDATE REQUEST message is contained in the Operator CSG list, the UE shall apply the procedures defined in 3GPP TS 23.122 [6] subclause 3.1A.

The UE shall search for a suitable cell in the same PLMN according to 3GPP TS 36.304 [21].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the normal routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.1.20.3 Test description

9.2.3.1.20.3.1 Pre-test conditions

System Simulator:

- cell A (TAI-1, frequency 1, HPLMN, not a CSG cell) is set to "Serving cell";
- cell B (TAI-2, frequency 1, HPLMN, is a CSG cell) is set to "Non-suitable off cell";
- cell D (TAI-4, frequency 1, HPLMN, not a CSG cell) is set to "Non-suitable off cell".
- System information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is used in Cell A and Cell D.
- System information combination 7 as defined in TS 36.508[18] clause 4.4.3.1 is used in Cell B.

UE:

- the UE is previously registered on cell B using manual CSG selection (so the allowed CSG list includes CSG ID of cell B).

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18]

9.2.3.1.20.3.2 Test procedure sequence

Table 9.2.3.1.20.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as a "Not Suitable cell". - Cell B as a "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits an TRACKING AREA UPDATE REJECT message with EMM cause = "Not authorized for this CSG" with integrity protection.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an TRACKING AREA UPDATE REQUEST message on Cell B in the next 30 seconds?	-->	TRACKING AREA UPDATE REQUEST	1	F
6	The SS configures: - Cell A as a "Not Suitable off cell". - Cell B as a "Not Suitable cell". - Cell D as a "Suitable cell".	-	-	-	-
7	Check: Does the UE transmit an TRACKING AREA UPDATE REQUEST message in the next 30 seconds on Cell D?	-->	TRACKING AREA UPDATE REQUEST	2	P
8	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
9	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
9A	The SS releases the RRC connection.	-	-	-	-
10	The SS configures: - Cell A as a "Not Suitable off cell". - Cell B as a "Serving cell". - Cell D as a "Not Suitable cell".	-	-	-	-
11	Check: Does the UE transmit an TRACKING AREA UPDATE REQUEST message in the next 30 seconds on Cell B?	-->	TRACKING AREA UPDATE REQUEST	1	F

9.2.3.1.20.3.3 Specific message contents

Table 9.2.3.1.20.3.3-1: TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.1.20.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1		
Old P-TMSI signature	P-TMSI Signature-1		

Table 9.2.3.1.20.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.20.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'00011001'B	#25 " Not authorized for this CSG"	

Table 9.2.3.1.20.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 7, Table 9.2.3.1.20.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1		
Old P-TMSI signature	P-TMSI Signature-1		

Table 9.2.3.1.20.3.3-4: SystemInformationBlockType1 for Cell A, B, CD (Pre-test conditions and all steps in Table 9.2.3.1.20.3.2-1)

Derivation Path: 36.508 clause 4.4.3.2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
csg-Indication	TRUE		Cell B
	FALSE		Cell A
	FALSE		Cell CD
csg-Identity	Not present		Cell A
	'000 0000 0000 0000 0000 0000 0010'B		Cell B
	Not present		Cell CD
}			
}			

Table 9.2.3.1.20.3.3-5: Message TRACKING AREA UPDATE ACCEPT (step 8, Table 9.2.3.1.20.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		

Table 9.2.3.1.20.3.3-6: SystemInformationBlockType4 for cell B (Pre-test conditions and all steps, Table 9.2.3.1.20.3.2-1)

Derivation Path: 36.508 clause 4.4.3.3, Table 4.4.3.3-3			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType4 ::= SEQUENCE {			
csg-PhysCellIdRange ::= SEQUENCE {			
Start	2		
Range	Not present	The UE shall apply value 1 in case the field is absent, in which case only the physical cell identity value indicated by start applies.	
}			
}			

9.2.3.1.21 Void

9.2.3.1.22 Normal tracking area update / Abnormal case / access barred due to access class control or NAS signalling connection establishment rejected by the network

9.2.3.1.22.1 Test Purpose (TP)

(1)

```
with { The UE is in the state EMM-REGISTERED }
ensure that {
  when { Access is barred for signalling in the cell UE is camping [Access Class barred in System information] }
  then { the UE will not initiate the tracking area updating procedure on the current cell }
}
```

(2)

```
with { The UE is in the state EMM-REGISTERED }
ensure that {
```

```

when { Access is barred for signalling in the cell UE is camping [T302 running due to
RRCConnectionReject message reception] }
  then { the UE will not initiate the tracking area updating procedure on the current cell }
}

```

(3)

```

with { The UE is in the state EMM-REGISTERED }
ensure that {
  when { Access is not barred for signalling in the cell UE is camping }
    then { the UE will initiate the tracking area updating procedure on the current cell }
}

```

(4)

```

with { The UE is in the state EMM-REGISTERED }
ensure that {
  when { Access was barred for signalling in the cell and UE has reselected a new cell where access
for "signalling" is granted }
    then { the UE will initiate the tracking area updating procedure on the new cell }
}

```

9.2.3.1.22.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.2.6 and TS 36.331, clause 5.3.3.2

[TS 24.301, clause 5.5.3.2.6]

The following abnormal cases can be identified:

- a) Access barred because of access class barring or NAS signalling connection establishment rejected by the network

If access is barred for "signalling" (see 3GPP TS 36.331 [22]), the tracking area updating procedure shall not be started. The UE stays in the current serving cell and applies the normal cell reselection process. The tracking area updating procedure is started as soon as possible and if still necessary, e.g. when access for "signalling" is granted on the current cell or when the UE moves to a cell where access for "signalling" is granted.

[TS 36.331, clause 5.3.3.2]

...

- 1> else (the UE is establishing the RRC connection for mobile originating signalling):
 - 2> if timer T302 or T305 is running:
 - 3> consider access to the cell as barred;
 - 2> else if *SystemInformationBlockType2* includes the *ac-BarringInfo* and the *ac-BarringForMO-Signalling* is present:
 - 3> if the UE has one or more Access Classes, as stored on the USIM, with a value in the range 11..15, which is valid for the UE to use according to TS 22.011 [10] and TS 23.122 [11], and
 - 3> for at least one of these Access Classes the corresponding bit in the *ac-BarringForSpecialAC* contained in *ac-BarringForMO-Signalling* is set to zero:
 - 4> consider access to the cell as not barred;
 - 3> else:
 - 4> draw a random number '*rand*' uniformly distributed in the range: $0 \leq rand < 1$;
 - 4> if '*rand*' is lower than the value indicated by *ac-BarringFactor* included in *ac-BarringForMO-Signalling*:
 - 5> consider access to the cell as not barred;

4> else:

5> consider access to the cell as barred;

2> else:

3> consider access to the cell as not barred;

9.2.3.1.22.3 Test description

9.2.3.1.22.3.1 Pre-test conditions

System Simulator:

- cell A and cell B are configured according to table 6.3.2.2-1 in TS 36.508 [18].
- cell A belongs to TAI-1 (home PLMN)
- cell B belongs to TAI-2 (home PLMN)
- cell D belongs to TAI-4 (home PLMN)

UE:

None;

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell B according to TS 36.508 [18].

9.2.3.1.22.3.2 Test procedure sequence

Table 9.2.3.1.22.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS sets the cell type of cell A to the "Serving cell", sets the cell type of cell B to the " Non-Suitable cell", and sets SystemInformationBlockType2 parameters as described below.	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	Check: for 60 seconds if UE initiates the tracking area updating procedure on cell A?	-	-	1	F
3	The SS transmits a Paging message including systemInfoModification.	-	-	-	-
4	The SS changes SystemInformationBlockType2 parameters to default parameters defined in [18].	-	-	-	-
5	The UE transmits RRC Connection Request	-	-	-	-
6	SS responds with <i>RRCConnectionReject</i> message with IE <i>waitTime</i> set to 10 seconds(Max Value).	-	-	-	-
7	Check: for 10 seconds if UE initiates the tracking area updating procedure and hence transmits RRC Connection Request?	-	-	2	F
8	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST?	-->	TRACKING AREA UPDATE REQUEST	3	P
9	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
10	The UE sends TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
10 A	The SS releases the RRC connection.	-	-	-	-
11	The SS set SystemInformationBlockType1 and SystemInformationBlockType2 parameters as described below.	-	-	-	-
12	Void	-	-	-	-
13	The SS sets the cell type of cell B to the "serving cell", cell A to "non-suitable off Cell" , and cell D to "Suitable neighbour intra-frequency cell".	-	-	-	-
13 A	Check: For 60 seconds if the UE initiates the tracking area update procedure on Cell B?	-	-	1	F
13 B	The SS sets the cell type of cell B to "Suitable neighbour intra-frequency cell" and cell D to "serving cell"	-	-	-	-
-	The following messages are to be observed on Cell D unless explicitly stated otherwise.	-	-	-	-
14	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST?	-->	TRACKING AREA UPDATE REQUEST	4	P
15	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
16	The UE sends TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508	-	-	-	-

9.2.3.1.22.3.3 Specific message contents

Table 9.2.3.1.22.3.3-1: SystemInformationBlockType2 for Cell A (step 1, Table 9.2.3.1.22.3.2-1)

Derivation Path: 36.508, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType2 ::= SEQUENCE {			
accessBarringInformation SEQUENCE {			
accessBarringForEmergencyCalls	FALSE		
accessBarringForSignalling SEQUENCE {			
accessProbabilityFactor	p00		
accessBarringTime	s4		
accessClassBarringList SEQUENCE (SIZE (maxAC)) OF SEQUENCE {	5 entries		
accessClassBarring[1]	TRUE		
accessClassBarring[2]	TRUE		
accessClassBarring[3]	TRUE		
accessClassBarring[4]	TRUE		
accessClassBarring[5]	TRUE		
}			
}			
accessBarringForOriginatingCalls	Not present		
}			
}			

Table 9.2.3.1.22.3.3-2: SystemInformationBlockType2 for Cell B (step 11, Table 9.2.3.1.22.3.2-1)

Derivation Path: 36.508, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType2 ::= SEQUENCE {			
accessBarringInformation SEQUENCE {			
accessBarringForEmergencyCalls	FALSE		
accessBarringForSignalling SEQUENCE {			
accessProbabilityFactor	p00		
accessBarringTime	s4		
accessClassBarringList SEQUENCE (SIZE (maxAC)) OF SEQUENCE {	5 entries		
accessClassBarring[1]	TRUE		
accessClassBarring[2]	TRUE		
accessClassBarring[3]	TRUE		
accessClassBarring[4]	TRUE		
accessClassBarring[5]	TRUE		
}			
}			
accessBarringForOriginatingCalls	Not present		
}			
}			

Table 9.2.3.1.22.3.3-3: SystemInformationBlockType1 for Cell B (step 11, Table 9.2.3.1.22.3.2-1)

Derivation Path: 36.508, Table 4.4.3.2-3			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
intraFreqReselection	allowed		
}			
}			

9.2.3.1.23 Normal tracking area update / Abnormal case / Success after several attempts due to no network response / TA belongs to TAI list and status is UPDATED / TA does not belong to TAI list or status is not UPDATED

9.2.3.1.23.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Periodic updating' and has the tracking area updating attempt counter set to the value less than four, the TAI of the current serving cell is included in the TAI list and the update status is equal to EU1 UPDATED }
ensure that {
  when { UE detects release of the NAS signalling connection }
  then { UE keeps the update status to EU1 UPDATED, enters state EMM-REGISTERED.NORMAL-SERVICE and starts timer T3411 }
}
```

(2)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Periodic updating', has the tracking area updating attempt counter set to the value less than four, has detected T3430 expiry, the TAI of the current serving cell is included in the TAI list and the update status is equal to EU1 UPDATED }
ensure that {
  when { UE detects T3411 expiry }
  then { UE initiates the tracking area updating procedure }
}
```

(3)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'TA updating' or 'combined TA/LA updating' and has the tracking area updating attempt counter set to the value less than four and the TAI of the current serving cell is not included in the TAI list or the update status is different to EU1 UPDATED }
ensure that {
  when { UE detects release of the NAS signalling connection }
  then { UE starts timer T3411, sets the update status to EU2 NOT UPDATED and changes to state EMM-REGISTERED.ATTEMPTING-TO-UPDATE }
}
```

(4)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'TA updating' or 'combined TA/LA updating', has the tracking area updating attempt counter set to the value less than four, has detected T3430 expiry and the TAI of the current serving cell is not included in the TAI list or the update status is different to EU1 UPDATED }
ensure that {
  when { UE detects T3411 expiry }
  then { UE initiates the tracking area updating procedure }
}
```

9.2.3.1.23.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.1, 5.5.3.2.6 and 5.5.3.3.6.

[TS 24.301, clause 5.5.3.1]

A tracking area updating attempt counter is used to limit the number of subsequently rejected tracking area update attempts. The tracking area updating attempt counter shall be incremented as specified in subclause 5.5.3.2.6.

Depending on the value of the tracking area updating attempt counter, specific actions shall be performed. The tracking area updating attempt counter shall be reset when:

- an attach or combined attach procedure is successfully completed;
- a normal or periodic tracking area updating or a combined tracking area updating procedure is successfully completed; or

- a normal or periodic tracking area updating or a combined tracking area updating procedure is rejected with EMM cause #11, #12, #13, #14, #15 or #25.

Additionally the tracking area updating attempt counter shall be reset when the UE is in substate EMM-REGISTERED.ATTEMPTING-TO-UPDATE or EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM, and:

- a new tracking area is entered; or
- timer T3402 expires.

[TS 24.301, clause 5.5.3.2.6]

The following abnormal cases can be identified:

...

- b) Lower layer failure or release of the NAS signalling connection before the TRACKING AREA UPDATE ACCEPT or TRACKING AREA UPDATE REJECT message is received

The tracking area updating procedure shall be aborted, and the UE shall proceed as described below.

- c) T3430 timeout

The UE shall abort the procedure and proceed as described below. The NAS signalling connection shall be released locally.

...

For the cases b, c, d, e, and f, the UE shall stop any ongoing transmission of user data.

For the cases b, c and d the UE shall proceed as follows:

Timer T3430 shall be stopped if still running. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

If the tracking area updating attempt counter is less than 5, and the TAI of the current serving cell is included in the TAI list and the EPS update status is equal to EU1 UPDATED:

- the UE shall keep the EPS update status to EU1 UPDATED and enter state EMM-REGISTERED.NORMAL-SERVICE. The UE shall start timer T3411.

If in addition the TRACKING AREA UPDATE REQUEST indicated "periodic updating", the timer T3411 may be stopped when the UE enters EMM-CONNECTED mode.

If timer T3411 expires the tracking area updating procedure is triggered again.

If the tracking area updating attempt counter is less than 5, and the TAI of the current serving cell is not included in the TAI list or the EPS update status is different to EU1 UPDATED:

- the UE shall start timer T3411, shall set the EPS update status to EU2 NOT UPDATED and change to state EMM-REGISTERED.ATTEMPTING-TO-UPDATE. When timer T3411 expires the tracking area updating procedure is triggered again.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GPRS update status as specified in 3GPP TS 24.008 [13] for the abnormal case when a normal or periodic routing area updating procedure fails and the routing area updating attempt counter is less than 5 and the GPRS update status is different from GU1 UPDATED.

[TS 24.301, clause 5.5.3.3.6]

If the tracking area updating attempt counter is incremented according to subclause 5.5.3.2.6 the next actions depend on the value of the tracking area updating attempt counter.

- if the update status is U1 UPDATED and the tracking area updating attempt counter is less than 5, then the UE shall keep the update status to U1 UPDATED, the new MM state is MM IDLE substate NORMAL SERVICE;

- if the tracking area updating attempt counter is less than 5 and, additionally, the update status is different from U1 UPDATED UE shall delete any LAI, TMSI, ciphering key sequence number and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. The MM state remains MM LOCATION UPDATING PENDING; or
- if the tracking area updating attempt counter is equal to 5, the UE shall delete any LAI, TMSI, ciphering key sequence number and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. A UE operating in CS/PS mode 1 of operation shall select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures.

9.2.3.1.23.3 Test description

9.2.3.1.23.3.1 Pre-test conditions

System Simulator:

- cell A and cell B
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.1.23.3.2 Test procedure sequence

Table 9.2.3.1.23.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "Serving cell". Set the cell type of Cell B to the "Suitable neighbour intra-frequency cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is powered on or switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message. The PDN CONNECTIVITY REQUEST message is piggybacked in ATTACH REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
5	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
6	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
7	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 8a1 to 8a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred after NAS SECURITY MODE COMPLETE message.	-	-	-	-
8a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
8a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
8A	The SS activates UE radio bearer test mode.	-	-	-	-
9	The SS responds with an ATTACH ACCEPT message with the T3412 value indicating 6 min. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 10 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
10	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message. NOTE: The tracking area updating attempt counter is reset.	-->	ATTACH COMPLETE	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	Wait for 6 min to ensure that T3412 expires.	-	-	-	-
13	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
14	The SS releases the RRC connection. NOTE: The tracking area updating attempt counter is 1.	-	-	-	-

15	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
16	Check: Does the UE transmit a SERVICE REQUEST message?	-->	SERVICE REQUEST	1	P
17	The SS transmits a SERVICE REJECT message with EMM cause set to "Congestion".	<--	SERVICE REJECT	-	-
18	The SS releases the RRC connection.	-	-	-	-
19	Wait for 10s after step 14 to ensure that T3411 expires.	-	-	-	-
-	EXCEPTION: Steps 19Aa1 to 19Aa4 describes behaviour depending on UE behaviour; the "lower case letter" identifies a step sequence that take place if the UE does not transmit any TRACKING AREA UPDATE REQUEST message	-	-	-	-
19Aa1	IF the UE does not transmit any TRACKING AREA UPDATE REQUEST message THEN wait for 6 min to ensure that T3412 expires.	-	-	-	-
19Aa2	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
19Aa3	The SS releases the RRC connection.	-	-	-	-
19Aa4	Wait for 10s after step 19Aa3 to ensure that T3411 expires.	-	-	-	-
20	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'?	-->	TRACKING AREA UPDATE REQUEST	2	P
21	The SS transmits a TRACKING AREA UPDATE ACCEPT message. NOTE: The tracking area updating attempt counter is reset.	<--	TRACKING AREA UPDATE ACCEPT	-	-
22	The SS releases the RRC connection.	-	-	-	-
22A	Generic test procedure in TS 36.508 subclause 4.5.3A.3 is performed. NOTE: The UE performs the establishment of the new data radio bearer associated with the default EPS bearer context.	-	-	-	-
22B	Generic test procedure in TS 36.508 subclause 4.5.4.3 is performed. NOTE: The UE enters the UE test loop mode.	-	-	-	-
22C	The SS transmits one IP packet to the UE on the DRB associated with the default EPS bearer context.	-	-	-	-
22D	Wait for 1 s after the IP packet has been transmitted in step 22C. (Note 1)	-	-	-	-
22E	The SS releases the RRC connection.	-	-	-	-
23	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
24	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating' or 'combined TALA updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
24A	Wait for 15s after step 24 to ensure that T3430 expires.	-	-	-	-
25	The SS releases the RRC connection. NOTE: The tracking area updating attempt counter is 1.	-	-	-	-
26	Void	-	-	-	-
27	Check: Does the UE transmit a SERVICE REQUEST message within 5s?	-->	SERVICE REQUEST	3	F
28	Wait for 10s after step 25 to ensure that T3411 expires.	-	-	-	-

29	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating' or 'combined TALA updating'?	-->	TRACKING AREA UPDATE REQUEST	4	P
30	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
-	EXCEPTION: Step 31 and Step 32a1 can occur in any order.	-	-	-	-
31	The UE transmits a TRACKING AREA UPDATE COMPLETE message. NOTE: The tracking area updating attempt counter is reset.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	EXCEPTION: Step 32a1 describes behaviour that depends on UE implementation; the "lower case letter" identifies a step sequence that takes place if the UE has user data pending.	-	-	-	-
32a1	IF the UE has user data pending THEN the UE loops back the IP packet received in step 22C on the DRB associated with the default EPS bearer context on Cell B within 5s.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-
Note 1: The 1 second delay is used to secure that the UE have received and forwarded the IP Packet transmitted by the SS in step 22C to the UE test loop function before the <i>RRConnectionRelease</i> message is sent by the SS in step 22E.					

9.2.3.1.23.3.3 Specific message contents

Table 9.2.3.1.23.3.3-0: ACTIVATE TEST MODE (step 8A, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7A-1, condition UE TEST LOOP MODE B

Table 9.2.3.1.23.3.3-1: Message ATTACH ACCEPT (step 9, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
T3412 value		6 minutes	
Timer value	'0 0001'B		
Unit	'010'B	value is incremented in multiples of decihours	
GUTI	GUTI-1		

Table 9.2.3.1.23.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 13, step 19Aa2 and step 20, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type Value	'011'B	Periodic updating	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.23.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 21, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	Not present		
MS identity	Not present		

Table 9.2.3.1.23.3.3-3A: CLOSE UE TEST LOOP (step 22B, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7A-3, condition UE TEST LOOP MODE B			
Information Element	Value/remark	Comment	Condition
UE test loop mode B LB setup			
IP PDU delay	'0001 0100'B	20seconds	

Table 9.2.3.1.23.3.3-4: Message TRACKING AREA UPDATE REQUEST (step 24, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.23.3.3-5: Message TRACKING AREA UPDATE REQUEST (step 29, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
"Active" flag	Any allowed value	The UE may set this flag due to failing SERVICE REQUEST procedure.	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.23.3.3-6: Message TRACKING AREA UPDATE ACCEPT (step 30, Table 9.2.3.1.23.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-2		

9.2.3.1.24 Void

9.2.3.1.25 Normal tracking area update / Abnormal case / Failure after 5 attempts due to no network response

9.2.3.1.25.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message and has the tracking area updating attempt
counter set to four }
ensure that {
  when { UE detects release of the NAS signalling connection }
  then { UE starts timer T3402, sets the update status to EMM-REGISTERED.ATTEMPTING-TO-UPDATE, changes to state EMM-
REGISTERED.ATTEMPTING-TO-UPDATE or optionally to EMM-REGISTERED.PLMN-SEARCH in order to perform a
PLMN selection }
}

```

9.2.3.1.25.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.1 and 5.5.3.2.6.

[TS 24.301, clause 5.5.3.1]

A tracking area updating attempt counter is used to limit the number of subsequently rejected tracking area update attempts. The tracking area updating attempt counter shall be incremented as specified in subclause 5.5.3.2.6.

Depending on the value of the tracking area updating attempt counter, specific actions shall be performed. The tracking area updating attempt counter shall be reset when:

- an attach or combined attach procedure is successfully completed;
- a normal or periodic tracking area updating or a combined tracking area updating procedure is successfully completed; or
- a normal or periodic tracking area updating or a combined tracking area updating procedure is rejected with EMM cause #11, #12, #13, #14, #15 or #25.

Additionally the tracking area updating attempt counter shall be reset when the UE is in substate EMM-REGISTERED.ATTEMPTING-TO-UPDATE or EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM, and:

- a new tracking area is entered; or
- timer T3402 expires.

[TS 24.301, clause 5.5.3.2.6]

The following abnormal cases can be identified:

...

- b) Lower layer failure or release of the NAS signalling connection before the TRACKING AREA UPDATE ACCEPT or TRACKING AREA UPDATE REJECT message is received

The tracking area updating procedure shall be aborted, and the UE shall proceed as described below.

...

For the cases b, c, d, e, and f, the UE shall stop any ongoing transmission of user data.

For the cases b, c and d the UE shall proceed as follows:

Timer T3430 shall be stopped if still running. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

...

If the tracking area updating attempt counter is equal to 5:

- the UE shall start timer T3402, shall set the EPS update status to EU2 NOT UPDATED, shall delete the list of equivalent PLMNs and shall change to state EMM-REGISTERED.ATTEMPTING-TO-UPDATE or optionally to EMM-REGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GPRS update status as specified in 3GPP TS 24.008 [13] for the abnormal case when a normal or periodic routing area updating procedure fails and the routing area updating attempt counter is equal to 5.

9.2.3.1.25.3 Test description

9.2.3.1.25.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, PLMN1);
- cell B (belongs to TAI-2, PLMN1);
- cell C (belongs to TAI-7, PLMN2);

UE:

- the UE is configured to initiate EPS attach;

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.1.25.3.2 Test procedure sequence

Table 9.2.3.1.25.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "Serving cell". Set the cell type of Cell B to the "non-Suitable cell". Set the cell type of Cell C to the "non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE is powered on or switched on.	-	-	-	-
3	The UE transmits an ATTACH REQUEST message. The PDN CONNECTIVITY REQUEST message is piggybacked in ATTACH REQUEST message.	-->	ATTACH REQUEST	-	-
4	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
5	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
6	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
7	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 8a1 to 8a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred after NAS SECURITY MODE COMPLETE message.	-	-	-	-
8a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
8a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
9	SS responds with ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 10 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
10	The UE transmit an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message. NOTE 1: The tracking area updating attempt counter is reset.	-->	ATTACH COMPLETE	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	Wait for 6 min to ensure that T3412 expires.	-	-	-	-
13	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
14	Wait for T3430 and T3411 (25s) expiry. NOTE 2: The tracking area updating attempt counter is 1.	-	-	-	-

15	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
16	Wait for T3430 and T3411 (25s) expiry. NOTE 3: The tracking area updating attempt counter is 2.	-	-	-	-
17	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
18	Wait for T3430 and T3411 (25s) expiry. NOTE 4: The tracking area updating attempt counter is 3.	-	-	-	-
19	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
20	Wait for T3430 and T3411 (25s) expiry. NOTE 5: The tracking area updating attempt counter is 4.	-	-	-	-
21	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'Periodic updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
22	The SS releases the RRC connection. NOTE 6: The tracking area updating attempt counter is 5.	-	-	-	-
23	Wait for 12 min to ensure that T3402 expires.	-	-	-	-
24	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'? NOTE 7: The tracking area updating attempt counter is reset.	-->	TRACKING AREA UPDATE REQUEST	1	P
25	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
26	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
27	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'. NOTE 8: The tracking area updating attempt counter is reset.	-->	TRACKING AREA UPDATE REQUEST	-	-
28	Wait for T3430 and T3411 (25s) expiry. NOTE 9: The tracking area updating attempt counter is 1.	-	-	-	-
29	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
30	Wait for T3430 and T3411 (25s) expiry. NOTE 10: The tracking area updating attempt counter is 2.	-	-	-	-
31	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
32	Wait for T3430 and T3411 (25s) expiry. NOTE 11: The tracking area updating attempt counter is 3.	-	-	-	-
33	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
34	Wait for T3430 and T3411 (25s) expiry. NOTE 12: The tracking area updating attempt counter is 4.	-	-	-	-
35	The UE transmits a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'.	-->	TRACKING AREA UPDATE REQUEST	-	-
36	The SS releases the RRC connection.	-	-	-	-

	NOTE 13: The tracking area updating attempt counter is 5 and reset.				
37	Set the cell type of Cell B to the "non-Suitable cell". Set the cell type of Cell C to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
38	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with the EPS update type value set to 'TA updating'?	-->	TRACKING AREA UPDATE REQUEST	1	P
39	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
40	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.1.25.3.3 Specific message contents

Table 9.2.3.1.25.3.3-1: Message ATTACH ACCEPT (step 9, Table 9.2.3.1.25.3.2-1)

Derivation Path: 36.508, Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
T3412 value		6 minutes	
Timer value	'0 0001'B		
Unit	'010'B	value is incremented in multiples of decihours	
GUTI	GUTI-1		

Table 9.2.3.1.25.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 13, step 15, step 17, step 19 and step 21, Table 9.2.3.1.25.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type Value	'011'B	Periodic updating	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.25.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 24, step 27, step 29, step 31, step 33, step 35 and step 38, Table 9.2.3.1.25.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type value	'000'B	TA updating	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.25.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 25, Table 9.2.3.1.25.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	Not present		

Table 9.2.3.1.25.3.3-5: Message TRACKING AREA UPDATE ACCEPT (step 39, Table 9.2.3.1.25.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-3		

9.2.3.1.26 Normal tracking area update / Abnormal case / TRACKING AREA UPDATE REJECT

9.2.3.1.26.1 Test Purpose (TP)

(1)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with reject cause #95"semantically
incorrect message" }
  then { the UE sets the tracking area updating attempt counter to 5, starts timer T3402, and
performs tracking area updating on the expiry of timers T3402}
```

(2)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with reject cause #96" invalid mandatory
information" }
  then { the UE sets the tracking area updating attempt counter to 5, starts timer T3402, and
performs tracking area updating on the expiry of timers T3402}
```

(3)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with reject cause #97"message type non-
existent or not implemented" }
  then { the UE sets the tracking area updating attempt counter to 5, starts timer T3402, and
performs tracking area updating on the expiry of timers T3402}
```

(4)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with reject cause #99"information element
non-existent or not implemented" }
  then { the UE sets the tracking area updating attempt counter to 5, starts timer T3402, and
performs tracking area updating on the expiry of timers T3402}
```

(5)

```
with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with reject cause #111"protocol error,
unspecified" }
  then { the UE sets the tracking area updating attempt counter to 5, starts timer T3402, and
performs tracking area updating on the expiry of timers T3402}
```

9.2.3.1.26.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.6.

[TS24.301 clause5.5.3.2.6]

...

d) TRACKING AREA UPDATE REJECT, other causes than those treated in subclause 5.5.3.2.5

Upon reception of the EMM causes #95, #96, #97, #99 and #111 the UE should set the tracking area updating attempt counter to 5. The UE shall proceed as described below.

If the tracking area updating attempt counter is equal to 5:

- the UE shall start timer T3402, shall set the EPS update status to EU2 NOT UPDATED, shall delete the list of equivalent PLMNs and shall change to state EMM-REGISTERED.ATTEMPTING-TO-UPDATE or optionally to EMM-REGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [6].

9.2.3.1.26.3 Test description

9.2.3.1.26.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- the UE is configured to initiate EPS attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18] except for those shown in table 9.2.3.1.26.3.3-6;

9.2.3.1.26.3.2 Test procedure sequence

Table 9.2.3.1.26.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The SS waits for T3412 to elapse.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause #95"semantically incorrect message" as specified.(Note)	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: When the timer T3402 expires does the UE re-transmit TRACKING AREA UPDATE REQUEST message on cell A?	-->	TRACKING AREA UPDATE REQUEST	1	P
6	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
7	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
7A	The SS releases the RRC connection.	-	-	-	-
8	The SS waits for T3412 to elapse.	-	-	-	-
9	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
10	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause #96" invalid mandatory information" as specified. (Note)	<--	TRACKING AREA UPDATE REJECT	-	-
11	The SS releases the RRC connection.	-	-	-	-
12	Check: When the timer T3402 expires does the UE re-transmit TRACKING AREA UPDATE REQUEST message on cell A?	-->	TRACKING AREA UPDATE REQUEST	2	P
13	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
14	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
14A	The SS releases the RRC connection.	-	-	-	-
15	The SS waits for T3412 to elapse	-	-	-	-
16	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
17	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause #97"message type non-existent or not implemented".(Note)	<--	TRACKING AREA UPDATE REJECT	-	-
18	The SS releases the RRC connection.	-	-	-	-
19	Check: When the timer T3402 expires does the UE re-transmit TRACKING AREA UPDATE REQUEST message on cell A?	-->	TRACKING AREA UPDATE REQUEST	3	P
20	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
21	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
21A	The SS releases the RRC connection.	-	-	-	-
22	The SS waits for T3412 to elapse.	-	-	-	-
23	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
24	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause #99"information element non-existent or not implemented" as specified. (Note)	<--	TRACKING AREA UPDATE REJECT	-	-
25	The SS releases the RRC connection.	-	-	-	-
26	Check: When the timer T3402 expires does the UE re-transmit TRACKING AREA UPDATE REQUEST message on cell A?	-->	TRACKING AREA UPDATE REQUEST	4	P

27	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
28	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
28A	The SS releases the RRC connection.	-	-	-	-
29	The SS waits for T3412 to elapse.	-	-	-	-
30	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
31	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause #111 "protocol error, unspecified" as specified. (Note)	<--	TRACKING AREA UPDATE REJECT	-	-
32	The SS releases the RRC connection.	-	-	-	-
33	Check: When the timer T3402 expires does the UE re-transmit TRACKING AREA UPDATE REQUEST message on cell A?	-->	TRACKING AREA UPDATE REQUEST	5	P
34	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
35	the UE transmit a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-
Note:	Upon reception of TRACKING AREA UPDATE REJECT message with EMM causes #95, #96, #97, #99 and #111, timer T3402 shall be started.				

9.2.3.1.26.3.3 Specific message contents

Table 9.2.3.1.26.3.3-1: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	01011111	#95 "semantically incorrect message "	

Table 9.2.3.1.26.3.3-2: Message TRACKING AREA UPDATE REJECT (step 10, Table 9.2.3.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	01100000	#96 "invalid mandatory information "	

Table 9.2.3.1.26.3.3-3: Message TRACKING AREA UPDATE REJECT (step 17, Table 9.2.3.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	01100001	#97 " message type non-existent or not implemented "	

Table 9.2.3.1.26.3.3-4: Message TRACKING AREA UPDATE REJECT (step 24, Table 9.2.3.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	01100011	#99 " information element non-existent or not implemented "	

Table 9.2.3.1.26.3.3-5: Message TRACKING AREA UPDATE REJECT (step 31, Table 9.2.3.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	01101111	#111 " protocol error, unspecified "	

Table 9.2.3.1.26.3.3-6: Message ATTACH ACCEPT (For the UE registration procedure in TS 36.508 clause 4.5.2.3)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
T3412 value		1 minute	
Timer value	'00001'B		
Unit	'001'B		
T3402 value		30 seconds	
Timer value	'01111'B		
Unit	'000'B		

Table 9.2.3.1.26.3.3-7: Message TRACKING AREA UPDATE ACCEPT (steps 6,13,20,27,34, Table 9.2.3.1.26.3.2-1)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
T3412 value		1 minute	
Timer value	'00001'B		
Unit	'001'B		
T3402 value		30 seconds	
Timer value	'01111'B		
Unit	'000'B		

Table 9.2.3.1.26.3.3-8: Message TRACKING AREA UPDATE REQUEST (steps 2,9,16,23,30 Table 9.2.3.1.26.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type Value	'011'B	Periodic updating	

9.2.3.1.27 Normal tracking area update / Abnormal case / Change of cell into a new tracking area

9.2.3.1.27.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
  when { cell change into a new tracking area occurs before the tracking area updating procedure is completed }
  then { UE aborts the tracking area updating procedure and re-initiates it in the new tracking area immediately }
}

```

9.2.3.1.27.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.6, and 5.5.3.3.6.

[TS 24.301 clause 5.5.3.2.6]

The following abnormal cases can be identified:

...

e) Change of cell into a new tracking area

If a cell change into a new tracking area occurs before the tracking area updating procedure is completed, the tracking area updating procedure shall be aborted and re-initiated immediately. The UE shall set the EPS update status to EU2 NOT UPDATED.

[TS 24.301 clause 5.5.3.3.6]

The UE shall proceed as follows:

...

- otherwise, the abnormal cases specified in subclause 5.5.3.2.6 apply with the following modification.

If the tracking area updating attempt counter is incremented according to subclause 5.5.3.2.6 the next actions depend on the value of the tracking area updating attempt counter.

9.2.3.1.27.3 Test description

9.2.3.1.27.3.1 Pre-test conditions

System Simulator:

- cell A, cell B.

UE:

None.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to 36.508 [18].

9.2.3.1.27.3.2 Test procedure sequence

Table 9.2.3.1.27.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B (Note 1).	-->	TRACKING AREA UPDATE REQUEST	-	-
3	SS does not send TRACKING AREA UPDATE ACCEPT to the UE and update TAC value in <i>SystemInformationBlockType1</i> .	-	-	-	-
4	The SS transmits a <i>Paging</i> message paging occasion including a <i>systemInfoModification</i> .	<--	<i>Paging</i>	-	-
5	From the beginning of the next modification period the SS transmits a modified <i>SystemInformationBlockType1</i> as specified.	-	-	-	-
6	Check: Does the UE transmit TRACKING AREA UPDATE REQUEST message on cell B in the next 12 seconds? Note: Wait time is more than 2.1* modification period for the UE to receive system information and inferior to T3430.	-->	TRACKING AREA UPDATE REQUEST	1	P
7	SS responds with TRACKING AREA UPDATE ACCEPT message	<--	TRACKING AREA UPDATE ACCEPT	-	-
8	UE sends TRACKING AREA UPDATE COMPLETE	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-
Note 1: Any type of tracking area update is acceptable.					

9.2.3.1.27.3.3 Specific message contents

Table 9.2.3.1.27.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, step 6, Table 9.2.3.1.27.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		

Table 9.2.3.1.27.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 7, 9.2.3.1.27.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-3		
TAI list			
Length of tracking area identity list contents	'00000110'B		
Partial tracking area identity list			
Number of elements	'00000'B		
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
MCC MNC TAC 1	TAC =4	"PLMN is set to the same MCC/MNC stored in EF _{imsi} " "TAI-4"	

Table 9.2.3.1.27.3.3-3: SystemInformationBlockType1 for Cell B (From step 3 in Table 9.2.3.1.27.3.2-1)

Derivation Path: 36.508 clause 4.4.3.2-3			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
trackingAreaCode	TAC =4		
}			
}			

Table 9.2.3.1.27.3.3-4: Paging (step 4, Table 9.2.3.1.27.3.2-1)

Derivation Path: 36.508 Table 4.6.1-7			
Information Element	Value/remark	Comment	Condition
Paging ::= SEQUENCE {			
pagingRecordList	Not present		
systemInfoModification	true		
}			

9.2.3.1.28 Normal tracking area update / Abnormal case / Tracking area updating and detach procedure collision

9.2.3.1.28.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message}
ensure that {
    when { UE receives a DETACH REQUEST message before the tracking area updating procedure has been completed }
        then { the tracking area updating procedure shall be aborted and the detach procedure shall be progressed }
}

```

9.2.3.1.28.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.5.3.2.6 and 5.5.3.3.6.

[TS24.301 clause5.5.3.2.6]

The following abnormal cases can be identified:

...

f) Tracking area updating and detach procedure collision

If the UE receives a DETACH REQUEST message before the tracking area updating procedure has been completed, the tracking area updating procedure shall be aborted and the detach procedure shall be progressed.

[TS 24.301 clause 5.5.3.3.6]

The UE shall proceed as follows:

...

- otherwise, the abnormal cases specified in subclause 5.5.3.2.6 apply with the following modification.

If the tracking area updating attempt counter is incremented according to subclause 5.5.3.2.6 the next actions depend on the value of the tracking area updating attempt counter.

9.2.3.1.28.3 Test description

9.2.3.1.28.3.1 Pre-test conditions

System Simulator:

- cell A, cell B.
- System information combination 3 as defined in TS 36.508 [18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

None.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on Cell A according to 36.508 [18].

9.2.3.1.28.3.2 Test procedure sequence

Table 9.2.3.1.28.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B (Note 1).	-->	TRACKING AREA UPDATE REQUEST	-	-
3	SS does not send TRACKING AREA UPDATE ACCEPT to the UE.	-	-	-	-
4	The SS transmits a DETACH REQUEST message with Detach type = 're-attach not required' on Cell B. Note: this message should be sent before timer T3430 expired.	<--	DETACH REQUEST	-	-
5	Check: Does the UE transmit a DETACH ACCEPT message on Cell B in the next 6 seconds? Note: the default value for timer T3422 is 6 seconds	-->	DETACH ACCEPT	1	P
6	The SS releases the RRC connection.	-	-	-	-
7	Check: Does the test result of CALL generic procedure "Test procedure for no response to paging (for NAS testing)" defined in clause 6.4.2.5 of TS36.508 indicates that the UE does not respond to paging when paged with S-TMSI1 and with CN domain indicator set to "PS" on Cell B?	-	-	1	-

Note 1: Any type of tracking area update is acceptable.

9.2.3.1.28.3.3 Specific message contents

Table 9.2.3.1.28.3.3-1: Message DETACH REQUEST (step 4, Table 9.2.3.1.28.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	'010'B	"re-attach not required"	
EMM cause	'00001100'B	"Tracking area not allowed"	

9.2.3.2 Combined tracking area updating

9.2.3.2.1 Combined tracking area update / Successful

9.2.3.2.1.1 Test Purpose (TP)

(1)

```

with { a combined EPS/IMSI attached UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE enters a tracking area included in the TAI list }
  then { UE does not transmit a TRACKING AREA UPDATE REQUEST message }
}

```

(2)

```

with { a combined EPS/IMSI attached UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE enters a tracking area not included in the TAI list }
  then { UE transmits a TRACKING AREA UPDATE REQUEST message with "EPS update type = combined TA/LA updating" }
}

```

(3)

```

with { UE has sent a combined TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message containing a GUTI and/or a mobile identity }
  then { UE transmits a TRACKING AREA UPDATE COMPLETE message and enters EMM-REGISTERED state }
}

```

9.2.3.2.1.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.3.1, 5.5.3.2.2, 5.5.3.2.4, 5.5.3.3.1, 5.5.3.3.2, 5.5.3.3.4.1 and 5.5.3.3.4.2.

[TS24.301 clause 5.5.3.1]

The tracking area updating procedure is always initiated by the UE and is used for the following purposes:

- ...- combined tracking area updating to update the registration of the actual tracking area for a UE in CS/PS mode 1 or CS/PS mode 2 of operation;

...

[TS24.301 clause 5.5.3.2.2]

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

- a) when the UE detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME;

...

After sending the TRACKING AREA UPDATE REQUEST message to the MME, the UE shall start timer T3430 and enter state EMM-TRACKING-AREA-UPDATING-INITIATED (see example in figure 5.5.3.2.2). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411. If timer T3442 is currently running, the UE shall stop timer T3442.

...

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

...

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

If a UE has uplink user data pending when it initiates the tracking area updating procedure, or uplink signalling not related to the tracking area updating procedure, it may also set an "active" flag in the TRACKING AREA UPDATE REQUEST message to indicate the request to establish the user plane to the network and to keep the NAS signalling connection after the completion of the tracking area updating procedure.

If the UE has a current EPS security context, the UE shall include the eKSI (either KSI_{ASME} or KSI_{SGSN}) in the NAS Key Set Identifier IE in the TRACKING AREA UPDATE REQUEST message. Otherwise, the UE shall set the NAS Key Set Identifier IE to the value "no key is available". If the UE has a current EPS security context, the UE shall integrity protect the TRACKING AREA UPDATE REQUEST message with the current EPS security context. Otherwise the UE shall not integrity protect the TRACKING AREA UPDATE REQUEST message.

...

When the tracking area updating procedure is initiated in EMM-IDLE mode, the UE may also include an EPS bearer context status IE in the TRACKING AREA UPDATE REQUEST message, indicating which EPS bearer contexts are active in the UE.

...

[TS24.301 clause 5.5.3.2.4]

...

Upon receiving a TRACKING AREA UPDATE ACCEPT message, the UE shall stop timer T3430, reset the routing area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED. If the message contains a GUTI, the UE shall use this GUTI as new temporary identity for EPS services and shall store the new GUTI. If no GUTI was included by the MME in the TRACKING AREA UPDATE ACCEPT message, the old GUTI shall be used. If the UE receives a new TAI list in the TRACKING AREA UPDATE ACCEPT message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

...

If the TRACKING AREA UPDATE ACCEPT message contained a GUTI, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI.

...

[TS24.301 clause 5.5.3.3.1]

Within a combined tracking area updating procedure the messages TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE COMPLETE carry information for the tracking area updating and the location area updating.

The combined attach procedure basically follows the normal tracking area updating procedure described in subclause 5.5.3.2.

[TS24.301 clause 5.5.3.3.2]

...

To initiate a combined tracking area updating procedure the UE sends the message TRACKING AREA UPDATE REQUEST to the network, starts timer T3430 and changes to state EMM-TRACKING-AREA-UPDATING-INITIATED. The value of the EPS update type IE in the message shall indicate "combined TA/LA updating" unless explicitly specified otherwise.

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the TRACKING AREA UPDATE REQUEST message.

[TS24.301 clause 5.5.3.3.4.1]

Depending on the value of the EPS update result IE received in the TRACKING AREA UPDATE ACCEPT message, two different cases can be distinguished:

- 1) The EPS update result IE value indicates "combined TA/LA updated": Tracking and location area updating is successful;

...

A TRACKING AREA UPDATE COMPLETE message shall be returned to the network if the TRACKING AREA UPDATE ACCEPT message contains a GUTI and/or a mobile identity.

[TS24.301 clause 5.5.3.3.4.2]

The description for normal tracking area update as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location area updating applies.

The TMSI reallocation may be part of the combined tracking area updating procedure. The TMSI allocated is then included in the TRACKING AREA UPDATE ACCEPT message together with the location area identification (LAI). In this case the MME shall change to state EMM-COMMON-PROCEDURE-INITIATED and shall start the timer T3450 as described in subclause 5.4.1. The LAI may be included in the TRACKING AREA UPDATE ACCEPT message without TMSI.

The UE, receiving a TRACKING AREA UPDATE ACCEPT message, stores the received location area identification, resets the location update attempt counter, sets the update status to U1 UPDATED and enters MM state MM IDLE.

...

How to handle the old TMSI stored in the UE depends on the mobile identity included in the TRACKING AREA UPDATE ACCEPT message.

- If the TRACKING AREA UPDATE ACCEPT message contains an IMSI, the UE is not allocated any TMSI, and shall delete any old TMSI accordingly.
- If the TRACKING AREA UPDATE ACCEPT message contains a TMSI, the UE shall use this TMSI as new temporary identity. The UE shall delete its old TMSI and shall store the new TMSI. In this case, a TRACKING AREA UPDATE COMPLETE message is returned to the network to confirm the received TMSI.
- If neither a TMSI nor an IMSI has been included by the network in the TRACKING AREA UPDATE ACCEPT message, the old TMSI, if any is available, shall be kept.

...

9.2.3.2.1.3 Test description

9.2.3.2.1.3.1 Pre-test conditions

System Simulator:

- cell A, cell C and cell D (HPLMN, different TAs);
- at most 2 cells are active simultaneously.
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.1.3.2 Test procedure sequence

Table 9.2.3.2.1.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
	The following messages are sent and shall be received on cell C.	-	-	-	-
1-13	Void	-	-	-	-
14	Set the cell type of cell A to the "non-Suitable neighbour cell ". Set the cell type of cell C to the " Serving cell"	-	-	-	-
15	Check: Does the UE transmit a combined TRACKING AREA UPDATE REQUEST message as specified?	-->	TRACKING AREA UPDATE REQUEST	2	P
16	The SS sends TRACKING AREA UPDATE ACCEPT message including GUTI, TMSI and LAI. The TAI list includes TAI for cell C and cell D.	<--	TRACKING AREA UPDATE ACCEPT	-	-
17	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	2,3	P
18	The SS releases the RRC connection.	-	-	-	-
19	Check: Does the test results of generic procedure in TS 36.508 [18] subclause 6.4.2.4 indicate that the UE is in E-UTRA EMM-REGISTERED state on cell C with PagingUE-Identity = S-TMSI2?	-	-	2	-
	The following messages are sent and shall be received on cell D.	-	-	-	-
20	Set the cell type of cell A to the "non-Suitable off cell ". Set the cell type of cell C to the "Suitable neighbour cell". Set the cell type of cell D to the " Serving cell"	-	-	-	P
20 A	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message in the next 30 seconds?	-->	TRACKING AREA UPDATE REQUEST	1	F
20 B	Check: Does the test results of generic procedure in TS 36.508 [18] subclause 6.4.2.4 indicate that the UE is in E-UTRA EMM-REGISTERED state on cell D with PagingUE-Identity = S-TMSI2?	-	-	1	
20 C	Set the cell type of cell A to the "Serving cell". Set the cell type of cell C to the "Non-suitable off cell". Set the cell type of cell D to the "Suitable neighbour cell".				
	The following messages are sent and shall be received on cell A.				
21	Check: Does the UE transmit a combined TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
22	The SS sends TRACKING AREA UPDATE ACCEPT message. Note: GUTI not present and MS identity present	<--	TRACKING AREA UPDATE ACCEPT	-	-
23	Check: Does the UE send TRACKING AREA UPDATE COMPLETE message?	-->	TRACKING AREA UPDATE COMPLETE	2,3	P
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

NOTE 1: It is assumed in the test procedure sequence that the UE initially has a valid GUTI.

NOTE 2: NAS security procedures are not checked in this TC.

9.2.3.2.1.3.3 Specific message contents

Table 9.2.3.2.1.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 15, Table 9.2.3.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier	KSI sent during the test case preamble in step 7.		
TSC	'0'B	native security context (for KSI _{ASME})	
Old GUTI	GUTI-1	GUTI-1 was allocated in cell A during the preamble	
Last visited registered TAI	TAI-1	TAI of cell A	
Old location area identification	LAI-1	LAI received in the ATTACH ACCEPT message in the preamble	
TMSI status	Not Present	Valid TMSI available	

Table 9.2.3.2.1.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 16, Table 9.2.3.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00001000'B	8 octets	
Type of list	'00'B	"list of TACs belonging to one PLMN, with non-consecutive TAC values"	
Number of elements	'00001' B	2 elements	
Partial tracking area identity list	PLMN = MCC/MNC stored in EF _{TMSI} TAC 1 = 3 TAC 2 = 4	TAI-3 and TAI-4	

Table 9.2.3.2.1.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 21, Table 9.2.3.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-2		
Last visited registered TAI	TAI-4		
Old location area identification	LAI-2		
TMSI status	Not present	Valid TMSI available	

Table 9.2.3.2.1.3.3-4: Message TRACKING AREA UPDATE ACCEPT (step 22, Table 9.2.3.2.1.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	Not present	The SS doesn't assign a new GUTI	
TAI list			
Length of tracking area identity list contents	'00000110'B	6 octets	
Type of list	'00'B	One PLMN with non-consecutive TACs	
Number of elements	'00000'B	1 element	
Partial tracking area identity list	PLMN = MCC/MNC stored in EF _{IMSI} TAC 1 = TAC-1	TAI-1	
LAI	LAI-1		
MS identity	TMSI-3	SS provides a new TMSI	

9.2.3.2.1a Combined tracking area update / Successful / Check of last visited TAI and handling of TAI list, LAI and TMSI

9.2.3.2.1a.1 Test Purpose (TP)

(1)

```
with { a combined EPS/IMSI attached UE has sent a combined TRACKING AREA UPDATE REQUEST message with
EPS update type set to 'Combined TA/LA updating', including a last visited registered TAI }
ensure that {
  when { the UE receives a TRACKING AREA UPDATE ACCEPT message containing a new TAI list, a location
area information(LAI) and a TMSI as the mobile identity }
  then { the UE shall delete its old TMSI and shall store the new TMSI and transmits a TRACKING
AREA UPDATE COMPLETE message and enters EMM-REGISTERED state }
}
```

(2)

Void

(3)

```
with { UE in state GMM-REGISTERED mode }
ensure that {
  when { the UE receives a Paging message including an ue-Identity set to an unmatched TMSI i.e.
other than the one allocated to the UE at the UE registration procedure }
  then { the UE doesn't establish an RRC connection to answer the paging }
}
```

(4)

```
with { UE in state GMM-REGISTERED mode }
ensure that {
  when { the UE receives a Paging message including an ue-Identity set to the TMSI which was
allocated to the UE }
  then { the UE establishes an RRC connection to answer the paging and the TMSI and the location
area information(LAI) as Initial UE Identity are included in RRCConnectionRequest message }
}
```

(5)

```
with { a combined EPS/IMSI attached UE has sent a combined TRACKING AREA UPDATE REQUEST message with
EPS update type set to 'Combined TA/LA updating with IMSI attach ', including a last visited
registered TAI }
ensure that {
  when { the UE receives a TRACKING AREA UPDATE ACCEPT message containing a new TAI list, a location
area information(LAI) (Neither a TMSI nor an IMSI as the mobile identity is included) }
  then { the UE shall keep the old TMSI if any available and enters EMM-REGISTERED state }
}
```

(6)

Void

(7)

Void

(8)

```

with { a combined EPS/IMSI attached UE has sent a combined TRACKING AREA UPDATE REQUEST message with
EPS update type set to 'Combined TA/LA updating with IMSI attach ', including a last visited
registered TAI }
ensure that {
  when { the UE receives a TRACKING AREA UPDATE ACCEPT message containing a new TAI list, a location
area information(LAI) and an IMSI as the mobile identity }
    then { the UE shall delete any old TMSI and enters EMM-REGISTERED state }
}

```

(9)

Void

(10)

```

with { UE in state GMM-REGISTERED mode }
ensure that {
  when { the UE receives a Paging message including an ue-Identity set to a TMSI }
    then { the UE doesn't establish an RRC connection to answer the paging }
}

```

9.2.3.2.1a.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.3.3.1, 5.5.3.3.2, 5.5.3.3.4.1 and 5.5.3.3.4.2; TS 24.008, clause 4.4.1.

[TS24.301 clause 5.5.3.3.1]

Within a combined tracking area updating procedure the messages TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE COMPLETE carry information for the tracking area updating and the location area updating.

The combined tracking area updating procedure follows the normal tracking area updating procedure described in subclause 5.5.3.2.

[TS24.301 clause 5.5.3.3.2]

The UE operating in CS/PS mode 1 or CS/PS mode 2, in state EMM-REGISTERED, shall initiate the combined tracking area updating procedure:

- a) when the UE that is attached for both EPS and non-EPS services detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME;
- b) when the UE that is attached for EPS services wants to perform an attach for non-EPS services. In this case the EPS update type IE shall be set to "Combined TA/LA updating with IMSI attach";
- c) when the UE performs an intersystem change from A/Gb mode to S1 mode and the EPS services were previously suspended in A/Gb mode;
- d) when the UE performs an intersystem change from A/Gb or Iu mode to S1 mode and the UE previously performed a location area update procedure in A/Gb or Iu mode, in order to re-establish the S-GW association;
- e) when the UE enters EMM-REGISTERED.NORMAL-SERVICE and the UE's TIN indicates "P-TMSI";
- f) when the UE receives an indication from the lower layers that the RRC connection was released with cause "load balancing TAU required";
- g) when the UE deactivated EPS bearer context(s) locally while in EMM-REGISTERED.NO-CELL-AVAILABLE, and then returns to EMM-REGISTERED.NORMAL-SERVICE;
- h) when the UE changes the UE core network capability information or the UE specific DRX parameter or both;
- i) when the UE receives an indication of "RRC Connection failure" from the lower layers and has no user uplink data pending; or

- j) when the UE has selected a CSG cell whose CSG identity is not included in the UE's Allowed CSG list.

To initiate a combined tracking area updating procedure the UE sends the message TRACKING AREA UPDATE REQUEST to the network, starts timer T3430 and changes to state EMM-TRACKING-AREA-UPDATING-INITIATED. The value of the EPS update type IE in the message shall indicate "combined TA/LA updating" unless explicitly specified otherwise.

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the TRACKING AREA UPDATE REQUEST message.

[TS24.301 clause 5.5.3.3.4.1]

Depending on the value of the EPS update result IE received in the TRACKING AREA UPDATE ACCEPT message, two different cases can be distinguished:

- 1) The EPS update result IE value indicates "combined TA/LA updated": Tracking and location area updating is successful;
- 2) The EPS update result IE value indicates "TA updated": Tracking area updating is successful, but location area updating is not successful.

A TRACKING AREA UPDATE COMPLETE message shall be returned to the network if the TRACKING AREA UPDATE ACCEPT message contains a GUTI or a mobile identity or both.

[TS24.301 clause 5.5.3.3.4.2]

The description for normal tracking area update as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location area updating applies.

The TMSI reallocation may be part of the combined tracking area updating procedure. The TMSI allocated is then included in the TRACKING AREA UPDATE ACCEPT message together with the location area identification (LAI). In this case the MME shall change to state EMM-COMMON-PROCEDURE-INITIATED and shall start the timer T3450 as described in subclause 5.4.1. The LAI may be included in the TRACKING AREA UPDATE ACCEPT message without TMSI.

The UE, receiving a TRACKING AREA UPDATE ACCEPT message, stores the received location area identification, resets the location update attempt counter, sets the update status to U1 UPDATED and enters MM state MM IDLE.

How to handle the old TMSI stored in the UE depends on the mobile identity included in the TRACKING AREA UPDATE ACCEPT message.

- If the TRACKING AREA UPDATE ACCEPT message contains an IMSI, the UE is not allocated any TMSI, and shall delete any old TMSI accordingly.
- If the TRACKING AREA UPDATE ACCEPT message contains a TMSI, the UE shall use this TMSI as new temporary identity. The UE shall delete its old TMSI and shall store the new TMSI. In this case, a TRACKING AREA UPDATE COMPLETE message is returned to the network to confirm the received TMSI.
- If neither a TMSI nor an IMSI has been included by the network in the TRACKING AREA UPDATE ACCEPT message, the old TMSI, if any is available, shall be kept.

The network receiving a TRACKING AREA UPDATE COMPLETE message stops timer T3450, changes to state EMM-REGISTERED and considers the new TMSI as valid.

[TS 24.008 clause 4.4.1]

The location updating procedure is a general procedure which is used for the following purposes:

.....

- indicating to the network that the MS, configured to use CS fallback and SMS over SGs, or SMS over SGs only, has entered a GERAN or UTRAN cell in NMO II or III, after intersystem change from S1 mode to Iu or A/Gb mode, the TIN indicates "GUTI" and the location area of the current cell is the same as the stored location area; or

NOTE 1: The location updating procedure can be delayed when the intersystem change is due to CS fallback. In this case, the MS has to remember that it has to perform a location updating procedure after the RR connection is released, if the MS is still in GERAN/UTRAN.

.....

The normal location updating procedure shall also be started if the MS is configured to use CS fallback and SMS over SGs, or SMS over SGs only, and the TIN indicates "RAT-related TMSI",

- when the periodic tracking area update timer T3412 expires and the network operates in network operation mode II or III; or
- when the MS enters a GERAN or UTRAN cell in network operation mode II or III and the E-UTRAN deactivate ISR timer T3423 is running.

NOTE 2: The timers T3412 and T3423 are specified in 3GPP TS 24.301 [120].

The normal location updating procedure shall also be started when the MS, configured to use CS fallback and SMS over SGs, or SMS over SGs only, enters a GERAN or UTRAN cell in network operation mode II or III and the E-UTRAN deactivate ISR timer T3423 has expired.

If the MS, configured to use CS fallback and SMS over SGs, enters a GERAN or UTRAN cell in network operation mode II or III, after intersystem change from S1 mode to Iu or A/Gb mode due to CS fallback, and the location area of the current cell is not available, the MS should initiate the location updating procedure.

.....

In the case that the mobile station is initiating an emergency call but, due to cell re-selection or redirection by the network, it moves to a different LAI then the mobile station may delay the location updating procedure in the new LA until after the emergency call is completed.

9.2.3.2.1a.3 Test description

9.2.3.2.1a.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1) is set to "Serving cell";
- cell B (belongs to TAI-2) is set to "Non-suitable cell";
- System information combination 9 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.
 - cell 5 (UTRA FDD or UTRA TDD, belongs to LAI-3) is set to "Non-suitable "off" cell".
 - cell 7 (UTRA FDD or UTRA TDD, as exception contains LAI-4) is set to "Non-suitable cell".
 - UTRAN is NOT using Gs interface. (NMO in System Information Block 1 indicates NMO II).

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) with condition CombinedAttach on Cell A according to [18].

9.2.3.2.1a.3.2 Test procedure sequence

Table 9.2.3.2.1a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	The following messages are sent and shall be received on Cell B.	-	-	-	-
1	Set cell type of Cell A to the "non-Suitable cell" Set cell type of Cell B to the "Serving cell".	-	-	-	-
2	Check: Does the UE transmit a combined TRACKING AREA UPDATE REQUEST message with Last visited registered TAI set to TAI-1?	-->	TRACKING AREA UPDATE REQUEST	1	P
3	The SS sends TRACKING AREA UPDATE ACCEPT message including with LAI set to LAI-2, including a new TMSI (TMSI-2) as MS identity.	<--	TRACKING AREA UPDATE ACCEPT	-	-
4	Check: Does the UE send TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	1	P
5	The SS releases the RRC connection.	-	-	-	-
-	The following messages are sent and shall be received on Cell 7.	-	-	-	-
6	Set cell type of Cell B to the "non-Suitable cell" Set cell type of Cell 7 to the "Serving cell".	-	-	-	-
7	The UE performs Cell Reselection from Cell B (E-UTRAN cell) to Cell 7 (UTRAN cell).	-	-	-	-
8	Void	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.3.2.1a.3.2-2 occurs in parallel with steps 9-9B.	-	-	-	-
9	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message?	-->	ROUTING AREA UPDATE REQUEST	-	-
9A	The SS transmits a ROUTING AREA UPDATE ACCEPT message	<--	ROUTING AREA UPDATE ACCEPT	-	-
9B	The UE transmits a ROUTING AREA UPDATE COMPLETE message	-->	ROUTING AREA UPDATE COMPLETE	-	-
10	The SS send Paging message including an unmatched identity.	<--	<i>Paging</i>	-	-
11	Check: Does the UE transmit <i>RRConnectionRequest</i> to answer the Paging?	-->	<i>RRConnectionRequest</i>	3	F
12	The SS send Paging message including a matched identity (<i>UE Identity</i> = TMSI-2).	<--	<i>Paging</i>	-	-
13	Check: Does the test results of Mobile terminated establishment of Radio Resource Connection [5] indicate that the UE transmit <i>RRConnectionRequest</i> with Initial UE identity set to TMSI-2 and LAI-2 to answers on Paging message?	-	-	4	P
13a	The UE sends a PAGING RESPONSE message	-->	PAGING RESPONSE	-	-
14	The SS releases the RRC connection.	-	-	-	-
-	The following messages are sent and shall be received on Cell A.	-	-	-	-
15	Set cell type of Cell 7 to the "non-Suitable cell" Set cell type of Cell A to the "Serving cell".	-	-	-	-
16	The UE performs Cell Reselection from Cell 7 (UTRAN cell) to Cell A (E-UTRAN cell).	-	-	-	-
17	Check: Does the UE transmit a combined TRACKING AREA UPDATE REQUEST message with Last visited registered TAI set to TAI-2?	-->	TRACKING AREA UPDATE REQUEST	5	P
18	The SS sends TRACKING AREA UPDATE ACCEPT message with LAI set to LAI-1, not including MS identity.	<--	TRACKING AREA UPDATE ACCEPT	-	-
19	The SS releases the RRC connection.	-	-	-	-

-	The following messages are sent and shall be received on Cell 5.	-	-	-	-
20	Set cell type of Cell A to the "non-Suitable cell. Set cell type of Cell 7 to the "non-Suitable "off" cell". Set cell type of Cell 5 to the "Serving cell".	-	-	-	-
21	The UE performs Cell Reselection from Cell A (E-UTRAN cell) to Cell 5(UTRAN cell).	-	-	-	-
22	Void	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.3.2.1a.3.2-3 occurs in parallel with steps 23-23B.	-	-	-	-
23	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message?	-->	ROUTING AREA UPDATE REQUEST	-	-
23 A	The SS transmits a ROUTING AREA UPDATE ACCEPT message	<--	ROUTING AREA UPDATE ACCEPT	-	-
23 B	The UE transmits a ROUTING AREA UPDATE COMPLETE message	-->	ROUTING AREA UPDATE COMPLETE	-	-
24	The SS send Paging message including a matched identity (<i>UE Identity</i> = TMSI-2).	<--	<i>Paging</i>	-	-
25	Check: Does the test results of Mobile terminated establishment of Radio Resource Connection [5] indicate that the UE transmit <i>RRCConnectionRequest</i> with Initial UE identity set to TMSI-2 and LAI-1 to answers on Paging message?	-	-	4	P
25a	The UE sends a PAGING RESPONSE message	-->	PAGING RESPONSE	-	-
26	The SS releases the RRC connection.	-	-	-	-
-	The following messages are sent and shall be received on Cell B.	-	-	-	-
27	Set cell type of Cell 5 to the "non-Suitable cell" Set cell type of Cell B to the "Serving cell".	-	-	-	-
28	The UE performs Cell Reselection from Cell 5(UTRAN cell) to Cell B (E-UTRAN cell).	-	-	-	-
29	Check: Does the UE transmit a combined TRACKING AREA UPDATE REQUEST message with Last visited registered TAI set to TAI-1?	-->	TRACKING AREA UPDATE REQUEST	8	P
30	The SS sends TRACKING AREA UPDATE ACCEPT message with LAI set to LAI-2, including the IMSI as MS identity.	<--	TRACKING AREA UPDATE ACCEPT	-	-
-	EXCEPTION: Step 30a is optional for Release 8 to Release 10 UE implementation, from release 11 onwards, UE shall not send this message.	-	-	-	-
30a	The UE sends a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
31	The SS releases the RRC connection.	-	-	-	-
-	The following messages are sent and shall be received on Cell 7.	-	-	-	-
32	Set cell type of Cell B to the "non-Suitable cell". Set cell type of Cell A to the "non-Suitable "off" cell". Set cell type of Cell 7 to the "Serving cell".	-	-	-	-
33	The UE performs Cell Reselection from Cell B (E-UTRAN cell) to Cell 7 (UTRAN cell).	-	-	-	-
34	Void	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.3.2.1a.3.2-3 occurs in parallel with steps 35-35B.	-	-	-	-
35	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message?	-->	ROUTING AREA UPDATE REQUEST	-	-
35 A	The SS transmits a ROUTING AREA UPDATE ACCEPT message	<--	ROUTING AREA UPDATE ACCEPT	-	-
35 B	The UE transmits a ROUTING AREA UPDATE COMPLETE message	-->	ROUTING AREA UPDATE COMPLETE	-	-

36	The SS sends Paging message including a TMSI.	<--	<i>Paging</i>	-	-
37	Check: Does the UE transmit <i>RRConnectionRequest</i> to answer the Paging?	-->	<i>RRConnectionRequest</i>	10	F

Table: 9.2.3.2.1a.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does UE perform Location updating procedure?	-->	LOCATION UPDATING REQUEST	-	-
2	The SS transmits an AUTHENTICATION REQUEST message.	<--	AUTHENTICATION REQUEST	-	-
3	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
4	The SS transmits a LOCATION UPDATING ACCEPT message.	<--	LOCATION UPDATING ACCEPT	-	-

Table: 9.2.3.2.1a.3.2-3: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does UE perform Location updating procedure?	-->	LOCATION UPDATING REQUEST	-	-
2	The SS transmits a LOCATION UPDATING ACCEPT message.	<--	LOCATION UPDATING ACCEPT	-	-

9.2.3.2.1a.3.3 Specific message contents

Table 9.2.3.2.1a.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1	Old GUTI is included by UE if valid, IMSI otherwise.	
Last visited registered TAI	TAI-1	If available, the last TAI is included by UE and will be used to establish a good list of TAIs in subsequent ATTACH ACCEPT message.	
Old LAI	LAI-1		
TMSI status	Not present		

Table 9.2.3.2.1a.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 3, Table 9.2.3.2.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
T3412 value	Not present		
GUTI	Not present	This IE may be included to assign a new GUTI	
TAI list			
Length of tracking area identity list contents	00000110	6 octets	
Number of elements	00000	1 element	
Type of list	00	One PLMN with non-consecutive TACs	
MCC MNC TAC 1	TAI-2		
LAC	2 (LAI-2)		
MS identity	TMSI-2		
T3402 value	Not present		
Equivalent PLMNs	Not present		
EMM cause	Not present		

Table 9.2.3.2.1a.3.3-3: Message PAGING TYPE 1 (step 10, Table 9.2.3.2.1a.3.2-1)

Derivation path: 34.108 sec 7.1.2.4.1			
Information Element	Value/Remark	Comment	Condition
Paging record list			
Paging record			
CN originator			
Paging cause CN domain identity UE identity	Terminating Speech Call CS domain TMSI other than TMSI-2		

Table 9.2.3.2.1a.3.3-4: Message PAGING TYPE 1 (step 12, Table 9.2.3.2.1a.3.2-1)

Derivation path: 34.108 sec 7.1.2.4.1			
Information Element	Value/Remark	Comment	Condition
Paging record list			
Paging record			
CN originator			
Paging cause CN domain identity UE identity	Terminating Speech Call CS domain TMSI-2		

Table 9.2.3.2.1a.3.3-5: Message RRC CONNECTION REQUEST (step 13, Table 9.2.3.2.1a.3.2-1)

Derivation path: 34.108 sec 9.1.1			
Information Element	Value/Remark	Comment	Condition
Initial UE identity			
TMSI(GSM-MAP) LAI (GSM-MAP)	TMSI-2 LAI-4		
Establishment cause	Terminating Conversational Call		

Table 9.2.3.2.1a.3.3-6 Message TRACKING AREA UPDATE REQUEST (step 17, Table 9.2.3.2.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1	Old GUTI is included by UE calculated by using UTRAN P-TMSI.	
Last visited registered TAI	TAI-2	If available, the last TAI is included by UE and will be used to establish a good list of TAIs in subsequent ATTACH ACCEPT message.	
Old LAI	LAI-4		
TMSI status	Not present		
EPS update type	010	combined TA/LA updating with IMSI attach	
Nonce _{UE}	Any allowed value		
Old P-TMSI signature	Present		
Additional GUTI	GUTI-1		

Table 9.2.3.2.1a.3.3-7: Message TRACKING AREA UPDATE ACCEPT (step 18, Table 9.2.3.2.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
T3412 value	Not present		
GUTI	Not present	This IE may be included to assign a new GUTI	
TAI list			
Length of tracking area identity list contents	00000110	6 octets	
Number of elements	00000	1 element	
Type of list	00	One PLMN with non-consecutive TACs	
MCC MNC TAC 1	TAI-1		
LAC	1 (LAI-1)		
MS identity	Not present		
T3402 value	Not present		
Equivalent PLMNs	Not present		
EMM cause	Not present		

Table 9.2.3.2.1a.3.3-8: Message PAGING TYPE 1 (step 24, Table 9.2.3.2.1a.3.2-1)

Derivation path: 34.108 sec 7.1.2.4.1			
Information Element	Value/Remark	Comment	Condition
Paging record list			
Paging record			
CN originator			
Paging cause CN domain identity UE identity	Terminating Speech Call CS domain TMSI-2		

Table 9.2.3.2.1a.3.3-9: Message RRC CONNECTION REQUEST (step 25, Table 9.2.3.2.1a.3.2-1)

Derivation path: 34.108 sec 9.1.1			
Information Element	Value/Remark	Comment	Condition
Initial UE identity			
TMSI(GSM-MAP) LAI (GSM-MAP)	TMSI-2 LAI-3		
Establishment cause	Terminating Conversational Call		

Table 9.2.3.2.1a.3.3-10: Message TRACKING AREA UPDATE REQUEST (step 29, Table 9.2.3.2.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1	Old GUTI is included by UE calculated by using UTRAN P-TMSI.	
Last visited registered TAI	TAI-1	If available, the last TAI is included by UE and will be used to establish a good list of TAIs in subsequent ATTACH ACCEPT message.	
Old LAI	LAI-3		
TMSI status	Not present		
EPS update type	010	combined TA/LA updating with IMSI attach	
Nonce _{UE}	Any allowed value		
Old P-TMSI signature	Present		
Additional GUTI	GUTI-1		

Table 9.2.3.2.1a.3.3-11: Message TRACKING AREA UPDATE ACCEPT (step 30, Table 9.2.3.2.1a.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	001	"combined TA/LA"	
T3412 value	Not present		
GUTI	Not present	This IE may be included to assign a new GUTI	
TAI list			
Length of tracking area identity list contents	00000110	6 octets	
Number of elements	00000	1 element	
Type of list	00	One PLMN with non-consecutive TACs	
MCC MNC TAC 1	TAI-2		
LAC	2(LAI-2)		
MS identity	IMSI		
T3402 value	Not present		
Equivalent PLMNs	Not present		
EMM cause	Not present		

Table 9.2.3.2.1a.3.3-12: Message PAGING TYPE 1 (step 36, Table 9.2.3.2.1a.3.2-1)

Derivation path: 34.108 sec 7.1.2.4.1			
Information Element	Value/Remark	Comment	Condition
Paging record list			
Paging record			
CN originator			
Paging cause CN domain identity UE identity	Terminating Speech Call CS domain TMSI (any value)		

Table 9.2.3.2.1a.3.3-13: LOCATION UPDATING REQUEST (step 1, Table 9.2.3.2.1a.3.2-2 and step 1, Table 9.2.3.2.1a.3.2-3)

Derivation Path: TS 36.508 Table 4.7B.2-4			
Information Element	Value/remark	Comment	Condition
Location updating type	Normal location updating		

Table 9.2.3.2.1a.3.3-14: LOCATION UPDATING ACCEPT (step 4, Table 9.2.3.2.1a.3.2-2 and step 2, Table 9.2.3.2.1a.3.2-3)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity	Not present		

9.2.3.2.1b Combined tracking area update / Success / SMS only**9.2.3.2.1b.1 Test Purpose (TP)**

(1)

```

with { UE, operating in CS/PS mode 1, has sent a combined TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message containing a GUTI and/or a mobile
identity and Additional update result IE 'SMS only'}
  then { UE automatically disable the E-UTRAN capability and performs a registration to UTRAN cell
or GERAN cell (depending on the UE capability) }
}

```

(2)

```

with { UE, operating in CS/PS mode 2, in state EMM-REGISTERED and state MM-IDLE}
ensure that {
  when { UE receives TRACKING AREA UPDATE ACCEPT message with EPS attach result 'combined EPS/IMSI
attach' and Additional update result IE 'SMS only' and SS sends Paging message with PS domain }
  then { UE sends SERVICE REQUEST message }
}

```

(3)

```

with { UE operating in CS/PS mode 2 and configured to use IMS voice, in state EMM-REGISTERED and
state MM-IDLE}
ensure that {
  when { UE receives TRACKING AREA UPDATE ACCEPT message with EPS attach result 'combined EPS/IMSI
attach' and Additional update result IE 'SMS only' and the user initiates an IMS voice call}
  then { UE does not initiate an IMS voice call}
}

```

(4)

```

with { UE operating in CS/PS mode 1}
ensure that {
  when { UE receives TRACKING AREA UPDATE ACCEPT message with EPS updatereult 'combined EPS/IMSI
attach' and Additional update result IE 'SMS only'}
  then { UE does not set the E-UTRA support bit in the relevant NAS and AS messages}
}

```

9.2.3.2.1b.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 4.3.1, 4.5, 4.3.1, 4.5, 5.5.3.3.1, 5.5.3.3.2, 5.5.3.3.4.1, 5.5.3.3.4.2 and 5.6.2.4.

[TS 24.301 clause 4.3.1]

The behaviour of the UE in CS/PS mode 1 of operation, upon failure to access the CS domain or upon reception of a "CS fallback not preferred" or "SMS only" indication, will depend on the availability of voice over IMS. In the present document, "IMS voice not available" refers to one of the following conditions:

- the UE is not configured to use IMS;
- the UE is not configured to use IMS voice, i.e. when the voice domain preference for E-UTRAN, as defined in 3GPP TS 24.167 [13B], indicates that voice communication services are allowed to be invoked only over the CS domain;
- the UE is configured to use IMS voice, but the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are not supported; or
- the UE is configured to use IMS voice, the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are supported, but the upper layers indicate that the UE is not available for voice calls in the IMS.

[TS24.301 clause 4.5]

When the UE supporting the A/Gb and/or Iu mode together with the S1 mode needs to stay in A/Gb or Iu mode, in order to prevent unwanted handover or cell reselection from UTRAN/GERAN to E-UTRAN, the UE shall disable the E-UTRA capability.

- The UE shall not set the E-UTRA support bits of the MS Radio Access capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12a), the E-UTRA support bits of Mobile Station Classmark 3 IE (see 3GPP TS 24.008 [13], subclause 10.5.1.7) and the ISR support bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message after it selects GERAN or UTRAN; and
- the UE NAS layer shall indicate the access stratum layer(s) of disabling of the E-UTRA capability.

NOTE: The UE can only disable the E-UTRAN capabilities when in EMM-IDLE mode.

The UE shall enable the E-UTRA capability again in the following cases:

- the UE mode of operation changes from CS/PS mode 1 of operation to CS/PS mode 2 of operation;
- the UE mode of operation changes from PS mode 1 of operation to PS mode 2 of operation;
- the UE powers off and powers on again; or
- for the PLMN selection purpose.

[TS24.301 clause 5.5.3.3.1]

Within a combined tracking area updating procedure the messages TRACKING AREA UPDATE ACCEPT and TRACKING AREA UPDATE COMPLETE carry information for the tracking area updating and the location area updating.

The combined tracking area updating procedure follows the normal tracking area updating procedure described in subclause 5.5.3.2.

[TS24.301 clause 5.5.3.3.2]

...

To initiate a combined tracking area updating procedure the UE sends the message TRACKING AREA UPDATE REQUEST to the network, starts timer T3430 and changes to state EMM-TRACKING-AREA-UPDATING-INITIATED. The value of the EPS update type IE in the message shall indicate "combined TA/LA updating" unless explicitly specified otherwise.

If the UE initiates the combined tracking area updating procedure for EPS services and "SMS only", the UE shall indicate "SMS only" in the Additional update Type IE.

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the TRACKING AREA UPDATE REQUEST message.

[TS24.301 clause 5.5.3.3.4.1]

Depending on the value of the EPS update result IE received in the TRACKING AREA UPDATE ACCEPT message, the following different cases can be distinguished:

- 1) The EPS update result IE value indicates "combined TA/LA updated": Tracking and location area updating is successful for EPS and non-EPS services, or for EPS services and "SMS only";

...

A TRACKING AREA UPDATE COMPLETE message shall be returned to the network if the TRACKING AREA UPDATE ACCEPT message contains a GUTI or a mobile identity or both.

[TS24.301 clause 5.5.3.3.4.2]

The description for normal tracking area update as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location area updating applies.

The TMSI reallocation may be part of the combined tracking area updating procedure. The TMSI allocated is then included in the TRACKING AREA UPDATE ACCEPT message together with the location area identification (LAI). In this case the MME shall change to state EMM-COMMON-PROCEDURE-INITIATED and shall start the timer T3450 as described in subclause 5.4.1. The LAI may be included in the TRACKING AREA UPDATE ACCEPT message without TMSI.

The UE, receiving a TRACKING AREA UPDATE ACCEPT message, stores the received location area identification, resets the location update attempt counter, sets the update status to U1 UPDATED and enters MM state MM IDLE.

...

If the UE requested "SMS only" in the Additional update type IE, the network shall indicate "SMS only" in the Additional update result IE.

If the TRACKING AREA UPDATE ACCEPT message includes the Additional update result IE with value "SMS only" or "CS Fallback not preferred", a UE operating in CS/PS mode 1 with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

If the TRACKING AREA UPDATE ACCEPT message includes the Additional update result IE with value "SMS only", a UE operating in CS/PS mode 2 shall not attempt to use CS fallback for mobile originating services.

...

[TS24.301 clause 5.6.2.4]

The network shall initiate the paging procedure when it receives an incoming mobile terminating SMS to the UE that is IMSI attached for non-EPS services or for "SMS only", and no NAS signalling connection exists.

To initiate the procedure for SMS when no NAS signalling connection exists, the EMM entity in the network requests the lower layer to start paging (see 3GPP TS 36.413 [23]). The paging message shall include a CN domain indicator set to "PS". The paging procedure is performed according to subclause 5.6.2.2.1. The MME shall not start timer T3413 for this procedure.

9.2.3.2.1b.3 Test description

9.2.3.2.1b.3.1 Pre-test conditions

System Simulator:

- Cell A and Cell B are configured according to Table 6.3.2.2-1 in [18].
- Cell A belongs to TAI-1(home PLMN) is set to "Serving Cell".
- Cell B belongs to TAI-2(home PLMN and another TAC) is set to "Non-Suitable cell"
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 5 (belongs to LAI-1 and RAI-1, home PLMN) is set to the " Non-Suitable cell";
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (belongs to LAI-1 and RAI-1, home PLMN); is set to the " Non-Suitable cell";
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

UE:

- The UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- The UE is in state Registered, Idle Mode (state 2) on cell A according to [18].

9.2.3.2.1b.3.2 Test procedure sequence

Table 9.2.3.2.1b.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
	The following messages are sent and shall be received on Cell B	-	-	-	-
1	Set the cell type of cell A to the "Non-Suitable cell". Set the cell type of cell B to the "Serving cell". Set the cell type of cell 5 or cell 24 to "Suitable neighbour cell".				
2	UE transmits a combined TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS sends TRACKING AREA UPDATE ACCEPT message including GUTI, TMSI and LAI. The TAI list includes TAI for cell C and cell D.	<--	TRACKING AREA UPDATE ACCEPT	-	-
4	Void			-	-
5	Void			-	-
-	EXCEPTION: Steps 6a1 to 6b4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
6a1	IF <i>CS/PS mode 1 of operation is configured</i> on the UE THEN perform actions specified in Table 9.2.3.2.1b.3.2-2.				
6a2-6a6	Void				
6b1	ELSE the UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
6b1A1	The SS releases the RRC connection.	-	-	-	-
6b2	Check: Does the UE respond to paging on cell B with S-TMSI in GUTI-2 for PS domain?(Generic Procedure TS36.508 6.4.2.4)	-	-	2	-
-	EXCEPTION: Steps 6b3a1 to 6b3a2 describe behaviour that depends on the UE capability.	-	-	-	-
6b3a1	IF <i>pc_VoLTE</i> THEN an IMS voice call is initiated (see Note 1)	-	-	-	-
6b3a2	Check: Does the UE send RRC CONNECTION REQUEST message?	-->	RRC CONNECTION REQUEST	3	F
Note 1: The request may be triggered by AT command D.					

Table 9.2.3.2.1b.3.2-2: CS/PS mode 1 of operation behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Step 1a1 to 1b2 are optional and depend on UE implementation. They shall be executed if the UE sends a TRACKING AREA UPDATE COMPLETE or a DETACH REQUEST message during [2] seconds. The "lower case letter" identifies a step sequence that takes place if a particular condition specified in the first step is met.	-	-	-	-
1a1	IF UE sent a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	EXCEPTION: Steps 1a2a1 to 1a2a2 are optional and depend on UE implementation; the second "lower case letter" identifies a step sequence that takes place if the condition is met..	-	-	-	-
1a2a1	IF UE sends a DETACH REQUEST message during [2] seconds.	-->	DETACH REQUEST	-	-
1a2a2	SS sends a DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
1b1	IF UE sent a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
1b2	SS sends a DETACH ACCEPT message.	<--	DETACH ACCEPT	-	-
2	The SS releases the RRC connection.				
-	The following messages are to be observed on Cell 5 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
-	EXCEPTION: Step 3a1 to 3b5 are optional and depend on UE implementation. The "lower case letter" identifies a step sequence that takes place if a particular condition specified in the first step is met.				
3a1	IF UE did not sent DETACH REQUEST in step 1a2a1 or 1b1 AND UE transmits a ROUTING AREA UPDATE REQUEST message during [2] seconds THEN check contents of ROUTING AREA UPDATE REQUEST	-->	ROUTING AREA UPDATE REQUEST	1,4	P
-	EXCEPTION: step 3a1Aa1 to 3a1Aa2 take place if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN	-	-	-	-
3a1Aa1	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message from Cell 24	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
3a1Aa2	The UE transmits a AUTHENTICATION AND CIPHERING RESPONSE message on Cell 24	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
3a2	The SS transmits a ROUTING AREA UPDATE ACCEPT message.	<--	ROUTING AREA UPDATE ACCEPT	-	-
3a3	The UE transmits a ROUTING AREA UPDATE COMPLETE message.	-->	ROUTING AREA UPDATE COMPLETE	-	-
3b1	ELSE check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	1,4	P
-	EXCEPTION: Step 3b2 to 3b3 are performed if UE sent a DETACH REQUEST in step 1a2a1 or 1b1	-	-	-	-
3b2	The SS transmits an AUTHENTICATION	<--	AUTHENTICATION AND	-	-

	AND CIPHERING REQUEST message.		CIPHERING REQUEST		
3b3	The UE transmits a AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
3b4	The SS transmits an ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
3b5	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-

9.2.3.2.1b.3.3 Specific message contents

Table 9.2.3.2.1b.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.1b.3.2-1)

Derivation path: 36.508 table 4.7.2-27 with condition CombinedAttach			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-1	GUTI-1 was allocated in cell A during the preamble	
Last visited registered TAI	TAI-1	TAI of cell A	
Old location area identification	LAI-1	LAI received in the ATTACH ACCEPT message in the preamble	
TMSI status	0	no valid TMSI available	

Table 9.2.3.2.1b.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 3, Table 9.2.3.2.1b.3.2-1)

Derivation path: 36.508 table 4.7.2-24 with condition CombinedAttach			
Information Element	Value/Remark	Comment	Condition
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	'00000110'B	6 octets	
Type of list	'B0"list of TACs belonging to one PLMN, with non-consecutive TAC values"0		
Number of elements	'00000'	1 elements	
Partial tracking area identity list	PLMN = MCC/MNC stored in EF _{IMSI} TAC 1 = 2	TAI-2	
Additional update result	'10'B	SMS only	

Table 9.2.3.2.1b.3.3-3: Void

Table 9.2.3.2.1b.3.3-4: Message ROUTING AREA UPDATE REQUEST (step 3a1, Table 9.2.3.2.1b.3.2-2)

Derivation path: 36.508 table 4.7B.2-1			
Information Element	Value/Remark	Comment	Condition
MS Radio Access capability		The UE shall not indicate support for E-UTRAN	
MS RA capability value part			
Access capabilities			
E-UTRA FDD support :	'0'B		
E-UTRA TDD support	'0'B		
GERAN to E-UTRA support in GERAN packet transfer mode	'00'B		
UE network capability	Not Present	UE does not support S1 mode any more	

Table 9.2.3.2.1b.3.3-5: Message ATTACH REQUEST (step 3b1, Table 9.2.3.2.1b.3.2-2)

Derivation path: 36.508 table 4.7B.2-6			
Information Element	Value/Remark	Comment	Condition
MS Radio Access capability		The UE shall not indicate support for E-UTRAN	
MS RA capability value part			
Access capabilities			
E-UTRA FDD support :	'0'B		
E-UTRA TDD support	'0'B		
GERAN to E-UTRA support in GERAN packet transfer mode	'00'B		
UE network capability	Not Present	UE does not support S1 mode any more	

9.2.3.2.1c Combined tracking area update / Success / CS Fallback not preferred

9.2.3.2.1c.1 Test Purpose (TP)

(1)

```
with { UE operating in CS/PS mode 2 in state EMM-REGISTERED-INITIATED}
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message with "EPS network feature support" IE
indicating that "IMS voice over PS session in S1 mode NOT supported" and "Additional update result"
IE indicating "CS Fallback not preferred"}
  then { UE stays on the E-UTRAN cell.}
}
```

(2)

```
with { UE operating in CS/PS mode 2}
ensure that {
  when receives a TRACKING AREA UPDATE ACCEPT message with "EPS network feature support" IE
indicating that "IMS voice over PS session in S1 mode NOT supported" and "Additional update result"
IE indicating "CS Fallback not preferred" }
  then { The UE is able to initiate an MO-CS fallback call}
}
```

(3)

```
with { UE operating in CS/PS mode 2}
ensure that {
  when receives a TRACKING AREA UPDATE ACCEPT message with "EPS network feature support" IE
indicating that "IMS voice over PS session in S1 mode NOT supported" and "Additional update result"
IE indicating "CS Fallback not preferred" }
  then { The UE is able to receive MT CS fallback call}
}
```

9.2.3.2.1c.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 4.3.1 and 5.5.3.3.4.2.

[TS 24.301 clause 4.3.1]

The behaviour of the UE in CS/PS mode 1 of operation, upon failure to access the CS domain or upon reception of a "CS fallback not preferred" or "SMS only" indication, will depend on the availability of voice over IMS. In the present document, "IMS voice not available" refers to one of the following conditions:

- the UE is not configured to use IMS;
- the UE is not configured to use IMS voice, i.e. when the voice domain preference for E-UTRAN, as defined in 3GPP TS 24.167 [13B], indicates that voice communication services are allowed to be invoked only over the CS domain;
- the UE is configured to use IMS voice, but the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are not supported; or
- the UE is configured to use IMS voice, the network indicates in the ATTACH ACCEPT message or the TRACKING AREA UPDATE ACCEPT message that IMS voice over PS sessions are supported, but the upper layers indicate that the UE is not available for voice calls in the IMS.

[TS 24.301 clause 5.5.3.3.4.2]

If the TRACKING AREA UPDATE ACCEPT message includes the Additional update result IE with value "SMS only" or "CS Fallback not preferred", a UE operating in CS/PS mode 1 with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

If the TRACKING AREA UPDATE ACCEPT message includes the Additional update result IE with value "SMS only", a UE operating in CS/PS mode 2 shall not attempt to use CS fallback for mobile originating services.

If the TRACKING AREA UPDATE ACCEPT message includes the Additional update result IE with value "CS Fallback not preferred", this indicates to a UE operating in CS/PS mode 2 that it is attached for EPS and non-EPS services and that it can use CS fallback.

9.2.3.2.1c.3 Test description

9.2.3.2.1c.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell 5;

System information combination 9 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells

UE:

- the UE is configured to initiate combined EPS/IMSI attach;
- the UE is configured to be data centric.
- the UE is previously registered on cell 5.
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell A using default message contents according to TS 36.508 [18].

Preamble:

- if possible, the UE is configured to operate in CS/PS mode 2
- The UE is in state Registered, Idle mode (state 2) on Cell A (serving cell) according to [18].

9.2.3.2.1c.3.2 Test procedure sequence

Table 9.2.3.2.1c.3.2-1 illustrates the downlink power levels and other changing parameters to be applied for the cells at various time instants of the test execution. Configurations marked "T1" is applied at the point indicated in the Main behaviour description in Table 9.2.3.2.1c.3.2-2.

Table 9.2.3.2.1c.3.2-1: instances of cell power level and parameter changes

	Parameter name	Unit	Cell A	Cell B	Cell 5
T1	RS EPRE	dBm/15kHz	-91	-85	
	CPICH_Ec	dBm/3.84 MHz			-70
	P-CCPCH	dBm/1.28 MHz			-70
T2	RS EPRE	dBm/15kHz	-115	-115	
	CPICH_Ec	dBm/3.84 MHz			-70
	P-CCPCH	dBm/1.28 MHz			-70
T3	RS EPRE	dBm/15kHz	-91	-85	
	CPICH_Ec	dBm/3.84 MHz			-70
	P-CCPCH	dBm/1.28 MHz			-70
T4	RS EPRE	dBm/15kHz	OFF	OFF	
	CPICH_Ec	dBm/3.84 MHz			-70
	P-CCPCH	dBm/1.28 MHz			-70

Table 9.2.3.2.1c.3.2-2: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	SS adjust the cell power levels according to row T1 in table 9.2.3.2.1c.3.2-1.			-	-
2-7	Steps 2-7 of the tracking area updating procedure on cell B as described in TS 36.508 table 4.5A.2.1-1 are performed.			-	-
8	Check: Does the UE try to access the UTRAN cell (cell 5) in the next 90s?			1	F
10-13	Steps 1-4 of the procedure in table 13.1.4.3.2-2 are performed.	-	-	-	-
-	The UE accepts CS fallback	-	-	-	-
14	Check: Does the UE transmit an <i>RRConnectionSetupComplete</i> message containing an EXTENDED SERVICE REQUEST with message content set the same as in step 5 table 13.1.4.3.2-2?	-->	<i>RRConnectionSetupComplete</i> NAS: EXTENDED SERVICE REQUEST	3	P
15-26	Steps 5A-19 of the procedure described in table 13.1.4.3.2-2 are performed. SS then adjusts the cell power levels according to row T2 in table 9.2.3.2.1c.3.2-1.	-	-	-	-
26A	CS disconnect procedure defined in TS 36.523-3 table 10.1.3.1-1 is performed. SS then adjusts the cell power levels according to row T3 in table 9.2.3.2.1c.3.2-1 so ensure UE reselects cell B.	-	-	-	-
26B-26G	Steps 2-7 of the tracking area updating procedure on cell B as described in TS 36.508 table 4.5A.2.1-1 are performed.	-	-	-	-
27-27B	Steps 1-3 of the procedure in table 13.1.2.3.2-1. (A CS call is initiated) are performed	-	-	-	-
28	Check: Does the UE transmit EXTENDED SERVICE REQUEST message with the content set as in step 4 of table 13.1.2.3.2-1?	-->	EXTENDED SERVICE REQUEST	2	P
29-33	Steps 8-12 of the procedure in table 13.1.2.3.2-1 are performed.	-	-	-	-
34	SS adjusts cell levels according to row T4 of table 9.2.3.2.1c.3.2-1.				
-	The UE is in end state UTRA CS fallback (U4).	-	-	-	-

9.2.3.2.1c.3.3 Specific message contents

Table 9.2.3.2.1c.3.3-1: Message TRACKING AREA UPDATE ACCEPT (steps 5 and 26C, Table 9.2.3.2.1c.3.2-2)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS update result	'001'B	"combined TA/LA updated"	
EPS network feature support	'0000 0000'B	IMS voice over PS session in S1 mode NOT supported	
Additional update result	'01'b	"CS Fallback not preferred"	

Table 9.2.3.2.1c.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 26B, Table 9.2.3.2.1c.3.2-2)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
EPS update type Value	'010'B	"Combined TA/LA updating with IMSI attach"	
Old P-TMSI Signature	Any Value		
Additional GUTI	Any Value		
Nonce	Any Value		

9.2.3.2.2 Combined tracking area update / Successful for EPS services only / IMSI unknown in HSS

9.2.3.2.2.1 Test Purpose (TP)

(1)

```

with { UE has sent a combined TRACKING AREA UPDATE REQUEST message with EPS update type set to
'Combined TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message with EPS update result set to "TA
updated" and EMM cause set to "IMSI unknown in HSS" }
  then { UE considers the USIM as invalid for non-EPS services and enters EMM-REGISTERED.NORMAL-
SERVICE state and MM idle state }
}

```

9.2.3.2.2.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clauses 5.5.3.3.4.3.

[TS24.301 clause 5.5.3.3.4.3]

Apart from the actions on the tracking area updating attempt counter, the description for tracking area for EPS services as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location updating for non-EPS services applies.

The UE receiving the TRACKING AREA UPDATE ACCEPT message takes one of the following actions depending on the EMM cause value:

#2 (IMSI unknown in HSS)

The UE shall stop T3430 if still running and shall reset the tracking area updating attempt counter. The UE shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The UE shall enter state EMM-REGISTERED.NORMAL-SERVICE. The new MM state is MM IDLE. The USIM shall be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed.

...

9.2.3.2.2.3 Test description

9.2.3.2.2.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1) is set to "Serving cell";
- cell B (belongs to TAI-2) is set to "Non-suitable cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined attach

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.2.3.2 Test procedure sequence

Table 9.2.3.2.2.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of cell A to the "non-Suitable cell". Set the cell type of cell B to the "Serving cell".	-	-	-	-
-	The following messages are sent and shall be received on cell B.				
2	The UE transmits a combined TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result set to "TA updated" and EMM cause set to "IMSI unknown in HSS"	<--	TRACKING AREA UPDATE ACCEPT	-	-
3A	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	<--	-	-	-
6	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
7	The SS transmits a DETACH REQUEST message with Detach Type set to "re-attach required"	<--	DETACH REQUEST	-	-
8	The UE sends a DETACH ACCEPT message.	-->	DETACH ACCEPT	-	-
9	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 9a describes a behaviour which depends on the UE capability	-	-	-	-
9a	IF NOT pc_Automatic_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
10	Check: Does the UE send ATTACH REQUEST message with EPS attach type set to "EPS attach", including a PDN CONNECTIVITY REQUEST message ?	-->	ATTACH REQUEST	1	P
11-22	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3. NOTE: For the content of the ATTACH ACCEPT message to be used in the UE registration procedure in TS 36.508 clause 4.5.2.3 see Table 9.2.3.2.2.3.3-5 below	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.2.2.3.3 Specific message contents

Table 9.2.3.2.2.3.3-1: Message TRACKING AREA UPDATE REQ (step 2, Table 9.2.3.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	001	"combined TA/LA updating"	
Old GUTI	GUTI-1	Old GUTI is included by UE if valid, IMSI otherwise.	
Last visited registered TAI	TAI-1	If available, the last TAI is included by UE and will be used to establish a good list of TAIs in subsequent ATTACH ACCEPT message.	
Old P-TMSI signature	Not present		
Old LAI	LAI-1		
TMSI status	Not present		

Table 9.2.3.2.2.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 3, Table 9.2.3.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	000	"TA updated"	
T3412 value	Not present		
GUTI	GUTI-2		
TAI list			
Length of tracking area identity list contents	00000110	6 octets	
Number of elements	00000	1 element	
Type of list	00	One PLMN with non-consecutive TACs	
MCC MNC TAC 1	TAI-2		
LAC	Not present		
MS identity	Not present		
T3402 value	Not present		
Equivalent PLMNs	Not present		
EMM cause	00000010	"IMSI unknown in HSS"	

Table 9.2.3.2.2.3.3-3: Message DETACH REQUEST (step 7, Table 9.2.3.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-12			
Information Element	Value/Remark	Comment	Condition
Detach type	001	"re-attach required"	

Table 9.2.3.2.2.3.3-4: Message ATTACH REQUEST (step 10, Table 9.2.3.2.2.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
EPS attach type	001	"EPS attach"	

Table 9.2.3.2.3.3-5: Message ATTACH ACCEPT (For the UE registration procedure in TS 36.508 clause 4.5.2.3)

Derivation path: 36.508 table 4.7.2-1			
Information Element	Value/Remark	Comment	Condition
EPS attach result	'001'B	"EPS only"	

9.2.3.2.3 Combined tracking area update / Successful for EPS services only / MSC temporarily not reachable

9.2.3.2.3.1 Test Purpose (TP)

(1)

```
with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating' or 'Combined TA/LA updating with IMSI attach' and having the tracking area updating attempt counter set to the value less than four }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message with the EPS update result set to 'TA updated' and the EMM cause set to 'MSC temporarily not reachable' or 'Network failure' }
  then { UE sends TRACKING AREA UPDATE REQUEST message after T3411 expiry }
}
```

(2)

```
with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating with IMSI attach', having the tracking area updating attempt counter set to four and operating in CS/PS mode 2 of operation }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message with the EPS update result set to 'TA updated' and the EMM cause set to 'MSC temporarily not reachable' or 'Network failure' }
  then { UE sends TRACKING AREA UPDATE REQUEST message after T3402 expiry }
}
```

(3)

```
with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating with IMSI attach', having the tracking area updating attempt counter set to four and operating in CS/PS mode 1 of operation }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message with the EPS update result set to 'TA updated' and the EMM cause set to 'MSC temporarily not reachable' or 'Network failure' }
  then { UE attempts to select GERAN or UTRAN radio access technology }
}
```

9.2.3.2.3.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.4.3, TS 24.301, clause 4.5.

[TS 24.301, clause 5.5.3.3.4.3]

Apart from the actions on the tracking area updating attempt counter, the description for tracking area for EPS services as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location updating for non-EPS services applies.

...

#16 (MSC temporarily not reachable); or

#17 (Network failure)

The UE shall stop timer T3430 if still running. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

If the tracking area updating attempt counter is less than 5:

- the UE shall start timer T3411, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3411 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again.

If the tracking area updating attempt counter is equal to 5:

- a UE operating in CS/PS mode 2 of operation shall start timer T3402, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3402 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again;
- a UE operating in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures. The UE shall disable the E-UTRA capability (see subclause 4.5).

...

[TS 24.301, clause 4.5]

When the UE supporting the A/Gb and/or Iu mode together with the S1 mode needs to stay in A/Gb or Iu mode, in order to prevent unwanted handover or cell reselection from UTRAN/GERAN to E-UTRAN, the UE shall disable the E-UTRA capability.

- The UE shall not set the E-UTRA support bits of the MS Radio Access capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12a), the E-UTRA support bits of Mobile Station Classmark 3 IE (see 3GPP TS 24.008 [13], subclause 10.5.1.7) and the ISR support bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message after it selects GERAN or UTRAN;
- the UE shall use the same value of the EPC capability bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message;
- the UE NAS layer shall indicate the access stratum layer(s) of disabling of the E-UTRA capability ; and
- the UE shall change the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message after it selects GERAN or UTRAN if any capability bit is subject to change after disabling of the UE's E-UTRA capability. NOTE: The UE can only disable the E-UTRAN capabilities when in EMM-IDLE mode.

The UE shall enable the E-UTRA capability again in the following cases:

- the UE mode of operation changes from CS/PS mode 1 of operation to CS/PS mode 2 of operation;
- the UE mode of operation changes from PS mode 1 of operation to PS mode 2 of operation; or
- the UE powers off and powers on again.

...

9.2.3.2.3.3 Test description

9.2.3.2.3.3.1 Pre-test conditions

System Simulator:

- cell A and cell B;
- if pc_UTRA AND $px_RATComb_Tested = EUTRA_UTRA$, cell 5 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- if pc_GERAN AND $px_RATComb_Tested = EUTRA_GERAN$, cell 24 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting `px_RATComb_Tested = EUTRA_Only` is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.2.3.3.2 Test procedure sequence

The sequence is executed for execution counter $k = 1, 2$.

Table 9.2.3.2.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
0	Set the cell type of Cell A to the "Serving cell". Set the cell type of Cell B to the "non-Suitable cell". Set the cell type of Cell 5 or Cell 24 to the "non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
0A	The UE is switched on or the USIM is inserted or the UE is powered on.	-	-	-	-
0B	Generic test procedure in TS 36.508 subclause 4.5.2.3 is performed. NOTE: The UE performs an ATTACH procedure and the RRC connection is released.	-	-	-	-
1	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	-	-
3	Void	-	-	-	-
4	Void	-	-	-	-
5	The SS transmits a TRACKING AREA UPDATE ACCEPT message. Note: T3411 is started on the UE	<--	TRACKING AREA UPDATE ACCEPT	-	-
6	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
7	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: The step 8 to 13 shall be repeated 3 times.	-	-	-	-
8	Wait for 10s for T3411 to expire.	-	-	-	-
9	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message at the time when T3411 expired?	-->	TRACKING AREA UPDATE REQUEST	1	P
10	Void	-	-	-	-
11	Void	-	-	-	-
12	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
13	The SS releases the RRC connection.	-	-	-	-
13A1	Set the cell type of cell 5 or cell 24 to "Suitable neighbour cell" and wait for 10s for T3411 to expire.	-	-	-	-
13A2	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message at the time when T3411 expired?	-->	TRACKING AREA UPDATE REQUEST	1	P
13A3	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
14-19	Void	-	-	-	-
-	EXCEPTION: Steps 20a1 to 20b17 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that takes place according to UE mode of operation.	-	-	-	-
20a1	IF the UE is configured to operate in CS/PS mode 2 THEN the SS releases the RRC connection. Note: T3402 is started on the UE.	-	-	-	-
20a2	The SS waits for 30 sec for T3402 to expire.	-	-	-	-
20a3	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
20a4	The SS transmits a TRACKING AREA	<--	TRACKING AREA UPDATE	-	-

	UPDATE ACCEPT message.		ACCEPT		
20a5	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
20a6	The SS releases the RRC connection.	-	-	-	-
20a7	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 20a8 describes behaviour that depends on the UE capability.				
20a8	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmits a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
20b1 - 20b1 6	Void	-	-	-	-
20b1 7	IF the UE is configured in CS/PS mode 1 of operation with "IMS voice not available" THEN perform actions specified in Table 9.2.3.2.3.3.2-2	-	-	-	-
21	Void	-	-	-	-

Table 9.2.3.2.3.3.2-2: CS/PS mode 1 of operation behaviour

-	EXCEPTION: Step 1a1 to 1a2 are optional and depend on UE implementation. They shall be executed if the UE sends a DETACH REQUEST message during [2] seconds. The "lower case letter" identifies a step sequence that takes place if a particular condition specified is met.	-	-	-	-
1a1	UE sends a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
1a2	The SS transmits a DETACH COMPLETE message.	<--	DETACH COMPLETE	-	-
2	The SS releases the RRC connection.	-	-	-	-
-	The following messages are to be observed on Cell 5 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
-	EXCEPTION: Step 3a1 to 3b5 are optional and depend on UE implementation. The "lower case letter" identifies a step sequence that takes place if a particular condition specified in the first step is met.	-	-	-	-
3a1	IF UE has not sent a DETACH REQUEST in step 1a1 AND sends a ROUTING AREA UPDATE REQUEST message during [2] seconds THEN check contents of ROUTING AREA UPDATE REQUEST.	-->	ROUTING AREA UPDATE REQUEST	3	P
-	EXCEPTION: step 3a1Aa1 to 3a1Aa2 take place if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN	-	-	-	-
3a1Aa1	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message on Cell 24	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
3a1Aa2	The UE transmits an AUTHENTICATION AND CIPHERING RESPONSE message on Cell 24	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
3a2	The SS transmits a ROUTING AREA UPDATE ACCEPT message.	<--	ROUTING AREA UPDATE ACCEPT	-	-
3a3	The UE transmits a ROUTING AREA UPDATE COMPLETE message.	-->	ROUTING AREA UPDATE COMPLETE	-	-
3b1	ELSE Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	3	P
-	EXCEPTION: Step 3b2 to 3b3 are performed if UE sent a DETACH REQUEST in step 1a1	-	-	-	-
3b2	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
3b3	The UE transmits a AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
3b4	The SS transmits an ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
3b5	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Step 6 describes behaviour that depends on the UE capability.	-	-	-	-
6	If pc_SwitchOnOff or pc_USIM_Removal then the UE transmits a DETACH REQUEST message	-->	DETACH REQUEST	-	-

9.2.3.2.3.3.3 Specific message contents

Table 9.2.3.2.3.3.3-1: TRACKING AREA UPDATE ACCEPT (step 5, Table 9.2.3.2.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-2		
EPS update result	000	"TA updated"	
EMM cause	'0001 0000'B for k=1 or '0001 0001'B for k=2	MSC temporarily not reachable for k=1 Network failure for k=2	

Table 9.2.3.2.3.3.3-2: TRACKING AREA UPDATE REQUEST (step 9 and 20a3, Table 9.2.3.2.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type value	'010'B	Combined TA/LA updating with IMSI attach	

Table 9.2.3.2.3.3.3-3: TRACKING AREA UPDATE ACCEPT (step 12, and 13A3 Table 9.2.3.2.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
EPS update result	000	"TA updated"	
GUTI	Not present		
EMM cause	'0001 0000'B for k=1 or '0001 0001'B for k=2	MSC temporarily not reachable for k=1 Network failure for k=2	
T3402	'000 01111'B	30 seconds	
EPS network feature support	0000 0000'B	IMS voice over PS session in S1 mode not supported	

Table 9.2.3.2.3.3.3-4: TRACKING AREA UPDATE ACCEPT (step 20a4, Table 9.2.3.2.3.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	Not present		
Location area identification	LAI-1		
MS identity	TMSI-1		

Table 9.2.3.2.3.3.3-5: Message ROUTING AREA UPDATE REQUEST (step 3a1, Table 9.2.3.2.3.3.2-2)

Derivation path: 36.508 table 4.7B.2-1			
Information Element	Value/Remark	Comment	Condition
UE network capability	Not Present	UE does not support S1 mode any more	

Table 9.2.3.2.3.3.3-6: Message ATTACH REQUEST (step 3b1, Table 9.2.3.2.3.3.2-2)

Derivation path: 36.508 table 4.7B.2-6			
Information Element	Value/Remark	Comment	Condition
UE network capability	Not Present	UE does not support S1 mode any more	

Table 9.2.3.2.3.3.3-7: DETACH REQUEST (step 1a1, Table 9.2.3.2.3.3.2-2)

Derivation path: 36.508 table 4.7.2-11, condition EPS_only			
--	--	--	--

9.2.3.2.4 Combined tracking area update / Successful for EPS services only / CS domain not available

9.2.3.2.4.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE ACCEPT message with the EPS update result set to 'TA
updated' and the EMM cause set to 'CS domain not available' }
  then { UE transmits TRACKING AREA UPDATE COMPLETE message and set the update status to U2 NOT
UPDATED and enters EMM-REGISTERED state }
}

```

(2)

```

with { UE receives a TRACKING AREA UPDATE ACCEPT message with the EPS update result set to 'TA
updated' and the EMM cause set to 'CS domain not available' }
ensure that {
  when { UE enters a new tracking area }
  then { UE initiates the tracking area updating procedure with EPS update type as "TA updating" }
}

```

9.2.3.2.4.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.4.3.

[TS 24.301, clause 5.5.3.3.4.3]

...

#18 (CS domain not available)

The UE shall stop timer T3430 if still running, shall reset the tracking area updating attempt counter, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.NORMAL-SERVICE.

The UE shall set the update status to U2 NOT UPDATED.

A UE in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the selected PLMN or equivalent PLMN. The UE shall disable the E-UTRA capability (see subclause 4.5). If the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN or UTRAN radio access technology.

A UE in CS/PS mode 2 of operation may provide a notification to the user or the upper layers that the CS domain is not available.

The UE shall not attempt combined attach or combined tracking area updating procedure with current PLMN until switching off the UE or the UICC containing the USIM is removed.

9.2.3.2.4.3 Test description

9.2.3.2.4.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell"
- cell B (belongs to TAI-2, home PLMN) is set to "Non-suitable cell."
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined attach

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.4.3.2 Test procedure sequence

Table 9.2.3.2.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell B to the "Serving cell". Set the cell type of Cell A to the "non-Suitable cell".	-	-	-	-
-	The following messages are sent and shall be received on Cell B.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
4	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	1	P
5	The SS releases the RRC connection.	-	-	-	-
5A	Wait 15 seconds for UE to camp on Cell B (UE might attempt to select GERAN or UTRAN cells)	-	-	-	-
6	Void	-	-	-	-
6A	Void	-	-	-	-
7	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.2 indicate that the UE is in state Registered, Idle Mode on Cell B?	-	-	1	P
8	Set the cell type of Cell A to the "Serving cell". Set the cell type of Cell B to the "non-Suitable cell".	-	-	-	-
9	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with EPS update type as "TA updating"?	-->	TRACKING AREA UPDATE REQUEST	2	P
10	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
11	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is PS attached in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.2.4.3.3 Specific message contents

Table 9.2.3.2.4.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.4.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
EPS update type Value	'001'B	"combined TA/LA updating"	

Table 9.2.3.2.4.3.3-2: TRACKING AREA UPDATE ACCEPT (step 3, Table 9.2.3.2.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-2		
EMM cause	'00010010'B	"CS domain not available"	
EPS update result	'000'B	"TA updated"	

Table 9.2.3.2.4.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 9, Table 9.2.3.2.4.3.2-1)

Derivation path: 36.508 table 4.7.2-27 with condition TA_only.			
--	--	--	--

Table 9.2.3.2.4.3.3-4: TRACKING AREA UPDATE ACCEPT (step 10, Table 9.2.3.2.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24 with condition TA_only.			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-1		

9.2.3.2.5 Combined tracking area update / Rejected / IMSI invalid

9.2.3.2.5.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Illegal UE' }
  then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state EMM-DEREGISTERED }
}

```

(2)

```

with { The UE is in the state EMM-DEREGISTERED }
ensure that {
  when { UE is powered up }
  then { UE send ATTACH REQUEST message with Old GUTI or IMSI IE = ''IMSI'' }
}

```

9.2.3.2.5.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

#3 (Illegal UE);

...

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and eKSI.

The UE shall consider the USIM as invalid for EPS and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.2.5.3 Test description

9.2.3.2.5.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell C;
- if `pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA`, cell 9 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- if `pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN`, cell 24 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- cell A is "Serving cell" and cell B, cell C, cell 9 and cell 24 are "Non-suitable "off" cell".
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting `px_RATComb_Tested = EUTRA_Only` is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.5.3.2 Test procedure sequence

Table 9.2.3.2.5.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "non-Suitable "off" cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Illegal UE'.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Set the cell type of Cell B to the "non-Suitable "off" cell". Set the cell type of Cell C to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
-	EXCEPTION: Steps 7a1 to 7a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
7a1	The SS sets the cell type of the cell other than Cell 9 and Cell 24 to the "non-Suitable "off" cell" and sets the cell type of Cell 9 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 9 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
7a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
8	Set the cell type of the cell other than Cell A to the "non-Suitable "off" cell". Set the cell type of Cell A to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
10	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
11	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message on cell A?	-->	ATTACH REQUEST	2	P
13-24	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.2.5.3.3 Specific message contents

Table 9.2.3.2.5.3.3-1: TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.5.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 0011'B	Illegal UE	

Table 9.2.3.2.5.3.3-2: Message ATTACH REQUEST (step 12, Table 9.2.3.2.5.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	IMSI		

9.2.3.2.6 Combined tracking area update / Rejected / Illegal ME

9.2.3.2.6.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Illegal ME' }
  then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state
EMM-DEREGISTERED }
}

```

(2)

```

with { The UE is in the state EMM-DEREGISTERED }
ensure that {
  when { UE is powered up }
  then { UE send ATTACH REQUEST message with Old GUTI or IMSI IE = ''IMSI'' }
}

```

9.2.3.2.6.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#6 (Illegal ME); or

...

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and eKSI.

The UE shall consider the USIM as invalid for EPS and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.2.6.3 Test description

The test description is identical to the one of subclause 9.2.3.2.5 except that the reject cause #3 "Illegal UE" is replaced with the reject cause #6 "Illegal ME".

9.2.3.2.7 Combined tracking area update / Rejected / EPS services and non-EPS services not allowed

9.2.3.2.7.1 Test Purpose (TP)

(1)

```
with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'EPS services
and non-EPS services not allowed' }
    then { UE considers the USIM as invalid for EPS services and non-EPS services and enters state
EMM-DEREGISTERED }
}
```

(2)

```
with { The UE is in the state EMM-DEREGISTERED }
ensure that {
  when { UE is powered up }
    then { UE send ATTACH REQUEST message with Old GUTI or IMSI IE = ''IMSI'' }
```

9.2.3.2.7.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

...

#3 (Illegal UE);

#6 (Illegal ME); or

#8 (EPS services and non-EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and KSI.

The UE shall consider the USIM as invalid for EPS and non-EPS services until switching off or the UICC containing the USIM is removed. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI and ciphering key sequence number, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

...

9.2.3.2.7.3 Test description

The test description is identical to the one of subclause 9.2.3.2.5 except that the reject cause #3 "Illegal UE" is replaced with the reject cause #8 "EPS services and non-EPS services not allowed".

9.2.3.2.8 Combined tracking area update / Rejected / EPS services not allowed

9.2.3.2.8.1 Test Purpose (TP)

(1)

```
with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
```

```

ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'EPS services
not allowed' }
    then { UE considers the USIM as invalid for EPS services and enters state EMM-DEREGISTERED }
}

```

(2)

```

with { UE in CS/PS mode 1 or CS/PS mode 2 of operation and have been IMSI attached for non-EPS
services }
ensure that {
  when { UE sends a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA
updating' and receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'EPS services
not allowed' }
    then { The UE shall still IMSI attached for non-EPS services }
}

```

9.2.3.2.8.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#7 (EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and KSI. The UE shall consider then USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.

A UE in CS/PS mode 1 or CS/PS mode 2 of operation is still IMSI attached for non-EPS services. The UE shall set the update status to U2 NOT UPDATED, shall select GERAN or UTRAN radio access technology and proceed with appropriate MM specific procedure according to the MM service state. The UE shall not reselect E-UTRAN radio access technology until switching off or the UICC containing the USIM is removed.

NOTE: Some interaction is required with the access stratum to disable E-UTRAN cell reselection.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.2.8.3 Test description

9.2.3.2.8.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non-suitable cell";
- cell G (belongs to TAI-7, visited PLMN) is set to "Non-suitable off cell";
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, cell 9 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, cell 24 (belongs to LAI-1 and RAI-1, home PLMN) is configured;

- Set the cell type of cell 9 or cell 24 to the " Non-Suitable off cell ".
- the different cells may not be simultaneously activated.
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting `px_RATComb_Tested = EUTRA_Only` is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.8.3.2 Test procedure sequence

Table 9.2.3.2.8.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell A as the "non-Suitable cell". Cell B as the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell B.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to as "EPS services not allowed" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	The SS configures: Cell A as the "Serving cell". Cell B as the "non-Suitable cell".	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell A? Note: Cell A belongs to the same PLMN where the UE was rejected but a different TAI	-->	ATTACH REQUEST	1	F
7	The user initiates an attach by MMI or by AT command.	-	-	-	-
8	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell A?	-->	ATTACH REQUEST	1	F
9	The SS configures: Cell A as the "non-Suitable cell", Cell B as the "non-Suitable "off" cell". Cell G as the "Serving cell".	-	-	-	-
10	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell G? Note: Cell G belongs to a PLMN which is not the same like the one on which the UE was rejected.	-->	ATTACH REQUEST	1	F
11	The user initiates an attach by MMI or by AT command.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell G?	-->	ATTACH REQUEST	1	F
13	The SS configures: Cell G as the "Serving cell". Cell 9 or 24 as the "Suitable cell".	-	-	-	-
	EXCEPTION: Steps 14a1 to 14a5 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
14a1	The following messages are sent and shall be received on Cell 9 (px_RATComb_Tested = EUTRA_UTRA) or 24 (px_RATComb_Tested = EUTRA_GERAN).	-	-	-	-
14a2	Check: Does the UE transmit a LOCATION UPDATING REQUEST message on Cell 9 or 24?	-->	LOCATION UPDATING REQUEST	2	P
-	EXCEPTION: The messages in the next two steps are sent only on Cell 24	-	-	-	-
14a2 Aa1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE		

-	EXCEPTION: The next step describes behaviour that depends on UE capability.	-	-	-	-
14a2 Aa2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.		
14a3	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
14a4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
14a5	The SS transmits a LOCATION UPDATING ACCEPT message with Location updating type = "IMSI attach" as specified in 3GPP TS 24.008.	<--	LOCATION UPDATING ACCEPT	-	-
15	The SS configures: Cell G as the "Serving cell". Cell 9 or 24 as the "non-Suitable cell".	-	-	-	-
16	The user initiates attach by MMI or by AT command.	-	-	-	-
17	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell G?	-->	ATTACH REQUEST	1	F

9.2.3.2.8.3.3 Specific message contents

Table 9.2.3.2.8.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.8.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
EPS update type Value	'001'B	" combined TA/LA updating "	
Old GUTI	GUTI-1		

Table 9.2.3.2.8.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.8.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00000111'B	"EPS services not allowed"	

Table 9.2.3.2.8.3.3-3: LOCATION UPDATING REQUEST (step 14a2, Table 9.2.3.2.8.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-4			
Information Element	Value/remark	Comment	Condition
Location updating type	IMSI attach		

Table 9.2.3.2.8.3.3-4: LOCATION UPDATING ACCEPT (step 14a5, Table 9.2.3.2.8.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity	Not present		

9.2.3.2.9 Combined tracking area update / Rejected / UE identity cannot be derived by the network

9.2.3.2.9.1 Test Purpose (TP)

(1)

with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating' }

```

ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'UE identity
cannot be derived by the network' }
  then { UE deletes GUTI, last visited registered TAI, TAI list and KSI, enters the state EMM-
DEREGISTERED, subsequently, automatically initiates the attach procedure and is still IMSI attached
for non-EPS services }
}

```

(2)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'UE identity
cannot be derived by the network' }
  then { UE deletes P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number }
}

```

9.2.3.2.9.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5 and TS 24.008, clause 4.7.5.2.4.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#9 (UE identity cannot be derived by the network);

The UE shall set the EPS update status to EU2 NOT UPDATED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and eKSI. The UE shall delete the list of equivalent PLMNs and enter the state EMM-DEREGISTERED.

Subsequently, the UE shall automatically initiate the attach procedure.

NOTE 2: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

A UE in CS/PS mode 1 or CS/PS mode 2 of operation is still IMSI attached for non-EPS services. The UE shall set the update status to U2 NOT UPDATED.

[TS 24.008, clause 4.7.5.2.4]

The MS shall then take different actions depending on the received reject cause:

...

#9 (MS identity cannot be derived by the network);

The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to subclause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.

9.2.3.2.9.3 Test description

9.2.3.2.9.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- cell B (belongs to TAI-2, home PLMN) is set to "Non-suitable cell";
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, cell 5 (belongs to TAI-1, home PLMN) is set to "Non-Suitable cell";
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, cell 24 (belongs to TAI-1, home PLMN) is set to "Non-Suitable cell";
- System information combination 10a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting px_RATComb_Testcd = EUTRA_Only is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.9.3.2 Test procedure sequence

Table 9.2.3.2.9.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "Non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause set to "UE identity cannot be derived by the network".	<--	TRACKING AREA UPDATE REJECT	-	-
-	EXCEPTION: Steps 3a1-3a2 describes the behaviour that depends on UE behaviour (Note 2).	-	-	-	-
3a1	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 3a2 describes a behaviour which depends on the UE capability	-	-	-	-
3a2	IF NOT pc_Automatic_EPS_Re_Attach , the user initiates an attach by MMI or by AT command.	-	-	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	P
4Aa1	Void	-	-	-	-
-		-	-	-	-
4Aa13	Void	-	-	-	-
-	EXCEPTION: Steps 5a1 to 5a28 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
5a1	The SS sets the cell type of Cell B to the "non-Suitable cell" and sets the cell type of Cell 5 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 5 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
5a2	Void	-	-	-	-
5a3	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
5a4-5a24	Void	-	-	-	-
5a25	Void	-	-	-	-
-		-	-	-	-
5a28	Void	-	-	-	-
5a29	The SS transmits an ATTACH REJECT message	<--	ATTACH REJECT	-	-
-	At the end of this test procedure sequence, the UE is in end state UTRA deregistered (U6) or GERAN deregistered (G5) according to TS 36.508.	-	-	-	-
Note 2: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second, existing RRC Connection is released.					

9.2.3.2.9.3.3 Specific message contents

Table 9.2.3.2.9.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.9.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
Old GUTI	GUTI-1		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.3.2.9.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.9.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1001'B	UE identity cannot be derived by the network	

Table 9.2.3.2.9.3.3-3: Message ATTACH REQUEST (step 4, Table 9.2.3.2.9.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI		
Old P-TMSI signature	Not present		
Last visited registered TAI	Not present		
Old location area identification	Not Present or LAI-1		
TMSI status	Not present or any allowed value		

Table 9.2.3.2.9.3.3-4: Message ATTACH REQUEST (step 5a3, Table 9.2.3.2.9.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.1			
Information Element	Value/remark	Comment	Condition
MS network capability	Any allowed value		
Attach type	'011'B	Combined GPRS/IMSI attach	
GPRS ciphering key sequence number	'111'B	No key is available (MS to network)	
DRX parameter	Any allowed value		
P-TMSI or IMSI	IMSI-1		
Old routing area identification	All bits of octets 5 and 6 are set to 1, except bit 1 of octet 6 which is set to 0. Other bits are not checked.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
Requested READY timer value	Not present or any allowed value		
TMSI status	Not present or any allowed value		
PS LCS Capability	Not present or any allowed value		
Mobile station classmark 2	Not present or any allowed value		
Mobile station classmark 3	Not present or any allowed value		
Supported Codecs	Not present or any allowed value		
UE network capability	Not present or any allowed value		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

Table 9.2.3.2.9.3.3-5: Message ATTACH REJECT (step 5a29, Table 9.2.3.2.9.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.4			
Information Element	Value/remark	Comment	Condition
GMM cause	'00001000'B	GPRS services and non-GPRS services not allowed	

9.2.3.2.10 Combined tracking area update / Rejected / UE implicitly detached

9.2.3.2.10.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Implicitly detached' }
  then { UE sends an ATTACH REQUEST message }
}

```

9.2.3.2.10.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#10 (Implicitly detached);

The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.NORMAL-SERVICE. The UE shall perform a new attach procedure.

NOTE 3: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

...

9.2.3.2.10.3 Test description

9.2.3.2.10.3.1 Pre-test conditions

System Simulator:

- cell A and cell B;
- cell A is set to the "Serving cell" and cell B is set to the "non-Suitable cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to 36.508 [18].

9.2.3.2.10.3.2 Test procedure sequence

Table 9.2.3.2.10.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Implicitly detached'.	<--	TRACKING AREA UPDATE REJECT	-	-
-	EXCEPTION: Steps 3a1-3a2 describes the behaviour that depends on UE behaviour (Note 1).	-	-	-	-
3a1	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 3a2 describes a behaviour which depends on the UE capability	-	-	-	-
3a2	IF NOT pc_Automatic_EPS_Re_Attach , the user initiates an attach by MMI or by AT command.	-	-	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
5-16	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-
Note 1: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second, existing RRC Connection is released.					

9.2.3.2.10.3.3 Specific message contents

Table 9.2.3.2.10.3.3-1: TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.10.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1010'B	Implicitly detached	

9.2.3.2.11 Combined tracking area update / Rejected / PLMN not allowed

9.2.3.2.11.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'PLMN not allowed' }
  then { UE deletes GUTI, last visited registered TAI, TAI list and KSI, enters the state EMM-DEREGISTERED.PLMN-SEARCH, stores the PLMN identity in the "forbidden PLMN list" }
}

```

(2)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'PLMN not allowed' }
  then { UE deletes P-TMSI, P-TMSI signature, TMSI, RAI, LAI, ciphering key sequence number GPRS ciphering key sequence number }
}

```



```

    }

```

(3)

```

with { UE is switched off and a PLMN is stored in the "forbidden PLMN list" }
ensure that {
  when { UE is powered on this PLMN }
  then { UE doesn't perform an attach procedure }
}

```

(4)

```

with { UE in EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden PLMN list" }
ensure that {
  when { UE enters a cell belonging to a PLMN which is not in the "forbidden PLMN list" }
  then { UE initiates an attach procedure }
}

```

(5)

```

with { UE in EMM-DEREGISTERED.PLMN-SEARCH state and a PLMN is stored in the "forbidden PLMN list" }
ensure that {
  when { UE is in a forbidden PLMN cells and when the PLMN is selected manually }
  then { UE initiates an attach procedure }
}

```

9.2.3.2.11.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5, TS 24.008, clause 4.7.5.2.4, and TS 23.122, clause 4.4.3.1.2.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#11 (PLMN not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and eKSI, and reset the tracking area updating attempt counter. The UE shall delete the list of equivalent PLMNs and enter the state EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the PLMN identity in the "forbidden PLMN list".

The UE shall then perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and the location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value and no RR connection exists.

[TS 24.008, clause 4.7.5.2.4]

11 (PLMN not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, TMSI, RAI, LAI, ciphering key

sequence number GPRS ciphering key sequence number, and reset the routing area updating attempt counter and the location update attempt counter.

[TS 23.122, clause 4.4.3.1.2]

The user may select his desired PLMN and the MS then initiates registration on this PLMN using the access technology chosen by the user for that PLMN or using the highest priority available access technology for that PLMN, if the associated access technologies have a priority order. (This may take place at any time during the presentation of PLMNs). For such a registration, the MS shall ignore the contents of the "forbidden LAs for roaming", "forbidden TAs for roaming", "forbidden LAs for regional provision of service", "forbidden TAs for regional provision of service", "forbidden PLMNs for GPRS service" and "forbidden PLMNs" lists.

9.2.3.2.11.3 Test description

9.2.3.2.11.3.1 Pre-test conditions

System Simulator:

- cell G (belongs to TAI-7, visited PLMN) is set to "Serving cell";
- cell H (belongs to TAI-8, visited PLMN) is set to "Non-suitable cell";
- cell I (belongs to TAI-9, visited PLMN, another PLMN) is set to "Non-suitable off cell";
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f1;
- if $pc_UTRA \text{ AND } px_RATComb_Tested = EUTRA_UTRA$, cell 9 (belongs to LAI-1 and RAI-1, visited PLMN) is configured;
- if $pc_GERAN \text{ AND } px_RATComb_Tested = EUTRA_GERAN$, cell 24 (belongs to LAI-1 and RAI-1, visited PLMN) is configured;
- Set the cell type of cell 5 or cell 24 to the " Non-Suitable cell ".
- cell G, cell 9 and cell 24 are in same PLMN.
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting $px_RATComb_Tested = EUTRA_Only$ is not allowed.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.
- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell G using default message contents according to TS 36.508 [18];

Preamble:

- UE is in state Registered, Idle Mode (state 2) on Cell G according to [18].

9.2.3.2.11.3.2 Test procedure sequence

Table 9.2.3.2.11.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell G to the "Non-Suitable cell". Set the cell type of Cell H to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell H unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'PLMN not allowed'.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
6	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
7	Set the cell type of Cell G to the "Serving cell". Set the cell type of Cell H to the "Non-Suitable cell". NOTE: Cell G and Cell H are in the same PLMN.	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
8	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
9	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	3	F
-	EXCEPTION: Steps 10a1 to 10a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported	-	-	-	-
10a1	The cell type of Cell G and Cell I to the "non-Suitable cell", the cell type of Cell H to "non-Suitable off" cell" and sets the cell type of Cell 9 (px_RATComb_Tested = EUTRA_UTRA) or Cell 24 (px_RATComb_Tested = EUTRA_GERAN) to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 9 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
10a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
11	Set the cell type of Cell I to the "Serving cell". Set the cell type of Cell 9 or Cell 24 to the "non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell I unless explicitly stated otherwise.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1, 2, 4	P
13-21	Steps 5 to 13 of the generic test procedure in TS 36.508 subclause 4.5.2.3 are performed. NOTE: The UE performs an ATTACH procedure.	-	-	-	-
22	The SS responds with an ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 23 below the generic procedure for IP	-	-	-	-

	address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.				
23	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-
24	The SS releases the RRC connection.	-	-	-	-
25	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
26	The UE transmits a DETACH REQUEST message.	-->	DETACH REQUEST	-	-
26A	The SS releases the RRC connection.	-	-	-	-
27	Set the cell type of Cell G to the "Serving cell". Set the cell type of Cell I to the "Non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell G unless explicitly stated otherwise.	-	-	-	-
28	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
29	The UE is switched to manual PLMN selection mode and is made to select the forbidden PLMN cell.	-	-	-	-
30	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	5	P
31-43	Steps 5 to 17 of the generic test procedure in TS 36.508 subclause 4.5.2.3 are performed. NOTE: The UE performs an ATTACH procedure and the RRC connection is released.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA idle (E1) according to TS 36.508.	-	-	-	-

9.2.3.2.11.3.3 Specific message contents

Table 9.2.3.2.11.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
Old GUTI	GUTI-7		
Old location area identification	LAI-1		
TMSI status	Not present		

Table 9.2.3.2.11.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1011'B	PLMN not allowed	

Table 9.2.3.2.11.3.3-3: Message ATTACH REQUEST (step 12, Table 9.2.3.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI-1		
Old P-TMSI signature	Not present		
Additional GUTI	Not present		
Last visited registered TAI	Not present		
Old location area identification	Not present		
TMSI status	'0'B	no valid TMSI available	

Table 9.2.3.2.11.3.3-4: Message ATTACH ACCEPT (step 22, Table 9.2.3.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-9		
Location area identification	LAI-9		
MS identity	TMSI-9		

Table 9.2.3.2.11.3.3-5: Message ATTACH REQUEST (step 30, Table 9.2.3.2.11.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	GUTI-9		
Old P-TMSI signature	Not present		
Additional GUTI	Not present		
Last visited registered TAI	TAI-9		
Old location area identification	LAI-9		
TMSI status	Not present		

9.2.3.2.12 Combined tracking area update / Rejected / Tracking area not allowed

9.2.3.2.12.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Tracking Area
not allowed' }
  then { UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, deletes any GUTI, last visited
registered TAI, TAI List and KSI, enters the state EMM-DEREGISTERED.LIMITED-SERVICE and stores the
current TAI in the list of "forbidden tracking areas for regional provision of service" }
}

```

(2)

```

with { UE in EMM-DEREGISTERED.LIMITED-SERVICE state having the list of "forbidden tracking areas for
regional provision of service" }
ensure that {
  when { serving cell belongs to TAI where UE was rejected }
  then { UE does not attempt to attach }
}

```

(3)

```

with { UE in EMM-DEREGISTERED.LIMITED-SERVICE state having the list of "forbidden tracking areas for
regional provision of service" }

```

```

ensure that {
  when { UE reselects a new cell which belongs to the TAI in the list of "forbidden tracking areas
for regional provision of service" }
    then { UE does not attempt to attach }
}

```

(4)

```

with { UE is powered off or switched off }
ensure that {
  when { UE is powered on or switched on in the cell belonging to the TAI which was in the list of
"forbidden tracking areas for regional provision of service" before the UE was powered off or
switched off }
    then { UE attempts to attach }
}

```

(5)

```

with { UE is in EMM-DEREGISTERED.LIMITED-SERVICE state and the current TAI in the list of "forbidden
tracking areas for regional provision of service"}
ensure that {
  when { UE reselects a new cell which does not belong to any of the TAI in the list of "forbidden
tracking areas for regional provision of service"}
    then { UE initiates attach procedure with IMSI }
}

```

9.2.3.2.12.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#12 (Tracking area not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI List and KSI. The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

The UE shall store the current TAI in the list of "forbidden tracking areas for regional provision of service".

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and the location update attempt counter, and the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

...

9.2.3.2.12.3 Test description

9.2.3.2.12.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell M;
- cell A is set to the "Non-suitable", and cell B set to the "Serving cell" and cell M is set to the "non-Suitable cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell B according to TS 36.508 [18].

9.2.3.2.12.3.2 Test procedure sequence

Table 9.2.3.2.12.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell B to the "Non-suitable". Set the cell type of Cell A to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'Tracking Area not allowed'.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
4A	The user initiates an attach by MMI or by AT command.	-	-	-	-
5	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds on Cell A?	-->	ATTACH REQUEST	1,2	F
6	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell M to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell M unless explicitly stated otherwise.	-	-	-	-
7	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	3	F
8	Set the cell type of Cell B to the "Serving cell". Set the cell type of Cell M to the "non-Suitable cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
8A	Check: Does the UE transmit an ATTACH REQUEST message on cell B including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1,5	P
8B-8N	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
9	Void	-	-	-	-
10	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
	EXCEPTION: Step 10Aa1 describes behaviour that depends on the UE capability.				
10Aa1	If pc_SwitchOnOff or pc_USIM_Removal then UE sends DETACH REQUEST message	-->	DETACH REQUEST	-	-
	Set the cell type of cell A to the "Serving cell". Set the cell type of cell B to the "Non-Suitable cell".				
11	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
12	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	4	P
13-24	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.2.12.3.3 Specific message contents

Table 9.2.3.2.12.3.3-1: TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.12.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1100'B	Tracking Area not allowed	

Table 9.2.3.2.12.3.3-2: ATTACH REQUEST (step 8A, Table 9.2.3.2.12.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI of the UE		
Last visited registered TAI	Not present		

Table 9.2.3.2.12.3.3-3: ATTACH REQUEST (step 12, Table 9.2.3.2.12.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
Old GUTI or IMSI	GUTI-2		
Last visited registered TAI	TAI-2		

Note: GUTI-2 and TAI-2 are GUTI and TAI allocated when the UE registered at Cell B in the preamble.

9.2.3.2.13 Combined tracking area update / Rejected / Roaming not allowed in this tracking area

9.2.3.2.13.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating' }
ensure that {
  when { the UE receives TRACKING AREA UPDATE REJECT message with the reject cause set to "roaming not allowed in this tracking area" }
    then { the UE sets the EPS update status to EU3 ROAMING NOT ALLOWED and the UE deletes the last visited registered TAI and the UE enters the state EMM-REGISTERED.PLMN-SEARCH and the UE stores the current TAI in the list of "forbidden tracking areas for roaming" }
}

```

(2)

```

with { the UE is in EMM-REGISTERED.PLMN-SEARCH state and the current TAI in the list of "forbidden tracking areas for roaming" }
ensure that {
  when { the serving cell belongs to TAI where UE was rejected }
    then { the UE does not attempt to send TRACKING AREA UPDATE REQUEST message }
}

```

(3)

```

with { the UE is in EMM-REGISTERED.PLMN-SEARCH state and the TAI of the current cell belongs to the list of "forbidden tracking areas for roaming" }
ensure that {
  when { the UE enters a cell belonging to same PLMN and TAI not in the list of "forbidden tracking areas for roaming" }
    then { the UE sends TRACKING AREA UPDATE REQUEST message with EPS update type set to "combined TA/LA updating with IMSI attach" }
}

```

(4)

```

with { the UE is in EMM-REGISTERED.PLMN-SEARCH state and the TAI of the current cell belongs to the
list of "forbidden tracking areas for roaming" }
ensure that {
  when { the UE enters a cell belonging to another PLMN }
  then { the UE sends TRACKING AREA UPDATE REQUEST message with EPS update type set to "combined
TA/LA updating with IMSI attach" }
}

```

(5)

```

with { the UE, which A/Gb mode or Iu mode is supported by the UE, in EMM-DEREGISTERED.PLMN-SEARCH
state and the list of "forbidden tracking areas for roaming" contains more than one TAI }
ensure that {
  when { the UE move to UTRAN or GERAN cell }
  then { the UE sends ROUTING AREA UPDATE REQUEST message }
}

```

9.2.3.2.13.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#13 (Roaming not allowed in this tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete the list of equivalent PLMNs. The UE shall reset the tracking area updating attempt counter and shall change to state EMM-REGISTERED.PLMN-SEARCH.

The UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and shall remove the current TAI from the stored TAI list if present.

The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

The UE shall indicate the Update type IE "combined TA/LA updating with IMSI attach" when performing the tracking area updating procedure following the PLMN selection.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status and the location update attempt counter, and the GMM parameters GMM state, GPRS update status and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

...

9.2.3.2.13.3 Test description

9.2.3.2.13.3.1 Pre-test conditions

System Simulator:

- cell E (belongs to TAI-12, visited PLMN) is set to "Serving cell";
- cell I (belongs to TAI-9, same visited PLMN) is set to "Non-suitable cell";
- cell B (belongs to TAI-2, another visited PLMN) is set to "Non-suitable off cell";
- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except that cell E and cell I are on different frequencies;

- if `pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA`, cell 9 (belongs to RAI-8, visited PLMN) is set to "Non-suitable cell";
- if `pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN`, cell 24 (belongs to RAI-8, visited PLMN) is set to "Non-suitable cell";
- system information indicate that NMO 1 is used.
- System information combination 10 a as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting `px_RATComb_Tested = EUTRA_Only` is not allowed.

UE:

- The UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell E according to TS 36.508 [18].

9.2.3.2.13.3.2 Test procedure sequence

Table 9.2.3.2.13.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell E to the "Suitable cell". Set the cell type of Cell I to the "Serving cell".	-	-	-	-
2	The UE transmits TRACKING AREA UPDATE REQUEST on Cell I.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "Roaming not allowed in this tracking area" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.				
5	Void	-	-	-	-
6	Void	-	-	-	-
7	Check: Does the UE transmit TRACKING AREA UPDATE REQUEST message on cell E?	-->	TRACKING AREA UPDATE REQUEST	1, 3	P
8	The SS transmits TRACKING AREA UPDATE REJECT message with EMM cause = "Roaming not allowed in this tracking area" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
9	The SS releases the RRC connection.				
10	Set the cell type of Cell E and Cell B to the "Non-Suitable cell", set the cell type of cell I to the "Non-Suitable "off" cell". Set the cell type of cell 9 or 24 to the "Serving cell". Note: Cell E and Cell 9 or 24 are in the same PLMN.	-	-	-	-
	EXCEPTION: Steps 11a1 to 11a3 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
11a 1	Check: Does the UE transmit ROUTING AREA UPDATE REQUEST message on cell 9 or 24?	-->	ROUTING AREA UPDATE REQUEST	5	P
11a 2	The SS transmits a ROUTING AREA UPDATE REJECT message with cause = "Roaming not allowed in this routing area " as specified.	<--	ROUTING AREA UPDATE REJECT	-	-
11a 3	The SS releases the RRC connection.				
12	Set the cell type of cell 9 or 24 to the " Non-Suitable cell". Set the cell type of cell B to the "Serving cell". Note: cell 9 or 24 and cell B are in different PLMNs.	-	-	-	-
13	Check: Does the UE transmit TRACKING AREA REQUEST message on cell B?	-->	TRACKING AREA UPDATE REQUEST	1, 4	P
14	The SS sends TRACKING AREA ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
15	The UE transmits TRACKING AREA COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.2.13.3.3 Specific message contents

Table 9.2.3.2.13.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.13.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old GUTI	GUTI-7		

Table 9.2.3.2.13.3.3-2: TRACKING AREA UPDATE REJECT (step 3 and 8, Table 9.2.3.2.13.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1101'B	Roaming not allowed in this tracking area	

Table 9.2.3.2.13.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 7 and 13, Table 9.2.3.2.13.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type value	'010'B	Combined TA/LA updating with IMSI attach	

Table 9.2.3.2.13.3.3-4: Message ROUTING AREA UPDATE REQUEST (step 11a1, Table 9.2.3.2.13.3.2-1)

Derivation Path: 36.508, Table 4.7B.2-1			
Information Element	Value/remark	Comment	Condition
Update type	'010'B	Combined RA/LA updating with IMSI attach	

9.2.3.2.14 Combined tracking area update / Rejected / EPS services not allowed in the PLMN

9.2.3.2.14.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'EPS services not allowed in this PLMN' }
  then { UE deletes any GUTI, last visited registered TAI, TAI List and eKSI, and UE stores the PLMN identity in the "forbidden PLMNs for GPRS service" list }
}

```

(2)

```

with { UE is in EMM-DEREGISTERED.PLMN-SEARCH state }
ensure that {
  when { UE detects a E-UTRAN cell which belongs to the same PLMN which is stored in the "forbidden PLMNs for GPRS service" list }
  then { UE does not attempt to access on this cell }
}

```

(3)

```

with { UE is IMSI attached for non-EPS services and is in EMM-DEREGISTERED.PLMN-SEARCH state and one PLMN stored in the "forbidden PLMNs for GPRS service" list }

```

```

ensure that {
  when { UE update status is U2 NOT UPDATED and detects a new GERAN or UTRAN cell which belongs to
the PLMN }
  then { UE initiates location update procedure in this GERAN or UTRAN cell }
}

```

(4)

```

with { UE is in EMM-DEREGISTERED.PLMN-SEARCH state }
ensure that {
  when { UE detects a E-UTRAN cell which belongs to another PLMN which is not stored in the
"forbidden PLMNs for GPRS service" list }
  then { UE attempts to access on this cell }
}

```

9.2.3.2.14.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#14 (EPS services not allowed in this PLMN);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). Furthermore the UE shall delete any GUTI, last visited registered TAI, TAI List and eKSI. The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-DEREGISTERED.PLMN-SEARCH.

The UE shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list.

The UE operating in CS/PS mode 1 or CS/PS mode 2 of operation is still IMSI attached for non-EPS services and shall set the update status to U2 NOT UPDATED.

A UE operating in CS/PS mode 1 of operation may select GERAN or UTRAN radio access technology and proceed with the appropriate MM specific procedure according to the MM service state. In this case the UE shall not reselect E-UTRAN radio access technology for the duration the UE is on the PLMN or equivalent PLMN.

A UE in CS/PS mode 1 of operation may perform a PLMN selection according to 3GPP TS 23.122 [6].

A UE operating in CS/PS mode 2 of operation shall perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.2.14.3 Test description

9.2.3.2.14.3.1 Pre-test conditions

System Simulator:

- cell G (visited PLMN) is set to "Serving cell";
- cell H (visited PLMN,) is set to "Non-suitable cell";
- cell I (another visited PLMN) is set to "Non-suitable off cell";

- the cells are configured according to Table 6.3.2.2-1 and Table 6.3.2.2-3 in 36.508[18], except replacing f3 with f1 for cell J, and replacing f3 with f1 for cell I in Table 6.3.2.2-3 in 36.508[18];
- if pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA, cell 9 (visited PLMN) is set to "Non-Suitable cell";
- if pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN, cell 24 (visited PLMN) is set to "Non-Suitable cell";
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting px_RATComb_Tested = EUTRA_Only is not allowed.

UE:

- the UE is configured to initiate combined attach

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell G according to TS 36.508 [18].

9.2.3.2.14.3.2 Test procedure sequence

Table 9.2.3.2.14.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: Cell G as the "non-Suitable cell". Cell H as the "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST on Cell H.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to as "EPS services not allowed in this PLMN" as specified.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	The SS configures: Cell H as the "non-Suitable cell". Cell G as the "Serving cell".	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds on cell G?	-->	ATTACH REQUEST	1, 2	F
7	The SS configures: Cell G and Cell I as a "non-Suitable cell". Cell H as "non-Suitable "off" cell" Cell 9 or 24 as the "Serving cell".	-	-	-	-
	EXCEPTION: Steps 8a1 to 8a4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
8a1	The following messages are sent and shall be received on Cell 9 or 24. Check: Does the UE transmit a LOCATION UPDATING REQUEST message on Cell 9 or cell 24?	-->	LOCATION UPDATING REQUEST	3	P
-	EXCEPTION: The messages in the next two steps are sent only on Cell 24	-	-	-	-
8a1A a1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE		
-	EXCEPTION: The next step describes behaviour that depends on UE capability.	-	-	-	-
8a1A a2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.		
8a2	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
8a3	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
8a4	The SS transmits a LOCATION UPDATING ACCEPT message.	<--	LOCATION UPDATING ACCEPT	-	-
9	The SS configures: Cell I as the "Serving cell". Cell 9 or 24 as the "non-Suitable cell".	-	-	-	-
10	Check: Does the UE transmit ATTACH REQUEST message with a PDN CONNECTIVITY REQUEST message to request PDN connectivity to the default PDN on cell I?	-->	ATTACH REQUEST	1, 4	P
11- 22	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-

9.2.3.2.14.3.3 Specific message contents

Table 9.2.3.2.14.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.14.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type			
EPS update type Value	'001'B	"combined TA/LA updating "	
Old GUTI	GUTI-7		

Table 9.2.3.2.14.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.14.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EMM cause	'00001110'B	" EPS services not allowed in this PLMN "	

Table 9.2.3.2.14.3.3-3: Message ATTACH REQUEST (step 10, Table 9.2.3.2.14.3.2-1)

Derivation path: 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
Old GUTI or IMSI	IMSI		
Last visited registered TAI	Not present		

Table 9.2.3.2.14.3.3-4: LOCATION UPDATING REQUEST (step 8a1, Table 9.2.3.2.14.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-4			
Information Element	Value/remark	Comment	Condition
Location updating type	Normal update		

Table 9.2.3.2.14.3.3-5: LOCATION UPDATING ACCEPT (step 8a4, Table 9.2.3.2.14.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity	Not present		

9.2.3.2.15 Combined tracking area update / Rejected / No suitable cells in tracking area

9.2.3.2.15.1 Test Purpose (TP)

(1)

```

with { UE having sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'No Suitable
Cells In tracking area' }
  then { UE selects a suitable cell in another tracking area in the same PLMN and performs the
tracking area updating procedure with EPS update type set to 'combined TA/LA updating with IMSI
attach' }
}

```

9.2.3.2.15.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

If the combined tracking area updating cannot be accepted by the network, the MME shall send a TRACKING AREA UPDATE REJECT message to the UE including an appropriate EMM cause value.

Upon receiving the TRACKING AREA UPDATE REJECT message, the UE shall stop timer T3430, stop any transmission of user data, enter state MM IDLE, and take the following actions depending on the EMM cause value received.

...

#15 (No suitable cells in tracking area);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

The UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and shall remove the current TAI from the stored TAI list if present.

The UE shall search for a suitable cell in another tracking area or in another location area in the same PLMN according to 3GPP TS 36.304 [21].

The UE shall indicate the Update type IE "combined TA/LA updating with IMSI attach" when performing the tracking area updating procedure.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status and the location update attempt counter, and the GMM parameters GMM state, GPRS update status and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.2.15.3 Test description

9.2.3.2.15.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell C;
- cell A is set to the "Serving cell" and cell B and cell C is set to the "Non-suitable cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.15.3.2 Test procedure sequence

Table 9.2.3.2.15.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell". Set the cell type of Cell C to the "Suitable neighbour cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with the EMM cause set to 'No Suitable Cells In tracking area'.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
-	The following messages are to be observed on Cell C unless explicitly stated otherwise.	-	-	-	-
5	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'combined TA/LA updating with IMSI attach'?	-->	TRACKING AREA UPDATE REQUEST	1	P
6	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
7	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.2.15.3.3 Specific message contents

Table 9.2.3.2.15.3.3-1: TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.15.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1111'B	No Suitable Cells In tracking area	

Table 9.2.3.2.15.3.3-2: TRACKING AREA UPDATE REQUEST (step 5, Table 9.2.3.2.15.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type value	'010'B	Combined TA/LA updating with IMSI attach	

9.2.3.2.16 Combined tracking area update / Rejected / Not authorized for this CSG

9.2.3.2.16.1 Test Purpose (TP)

(1)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to "Not
authorized for this CSG" and with integrity protection }
  then { UE removes the CSG ID from the Allowed CSG list }
}

```

(2)

```

with { UE has sent a TRACKING AREA UPDATE REQUEST message with EPS update type set to 'Combined
TA/LA updating' }
ensure that {
  when { UE receives a TRACKING AREA UPDATE REJECT message with the reject cause set to "Not
authorized for this CSG" and with integrity protection }
  then { UE searches for a suitable cell in the same PLMN and sent a TRACKING AREA UPDATE REQUEST
message with EPS update type set to ' combined TA/LA updating with IMSI attach ' }
}

```

9.2.3.2.16.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.3.5.

[TS 24.301, clause 5.5.3.3.5]

#25 (Not authorized for this CSG);

Cause #25 is only applicable when received from a CSG cell. Cause #25 received from a non-CSG cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.3.3.6.

If the TRACKING AREA UPDATE REJECT message with cause #25 was received without integrity protection, then the UE shall discard the message.

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). The UE shall reset the tracking area updating attempt counter and shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

If the CSG ID of the cell where the UE has sent the TRACKING AREA UPDATE REQUEST message is contained in the Allowed CSG list, the UE shall remove the CSG ID from the Allowed CSG list.

If the CSG ID of the cell where the UE has sent the TRACKING AREA UPDATE REQUEST message is contained in the Operator CSG list, the UE shall apply the procedures defined in 3GPP TS 23.122 [6] subclause 3.1A.

The UE shall search for a suitable cell in the same PLMN according to 3GPP TS 36.304 [21].

The UE shall indicate the Update type IE "combined TA/LA updating with IMSI attach" when performing the tracking area updating procedure.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status and the location update attempt counter, and the GMM parameters GMM state, GPRS update status and routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the combined routing area updating procedure is rejected with the GMM cause with the same value.

9.2.3.2.16.3 Test description

9.2.3.2.16.3.1 Pre-test conditions

System Simulator:

- cell A (TAI-1, frequency 1, HPLMN, not a CSG cell) is set to "Serving cell";
- cell B (TAI-2, frequency 1, HPLMN, is a CSG cell) is set to "Non-suitable cell";
- cell C (TAI-3, frequency 1, HPLMN, not a CSG cell) is set to "Non-suitable off cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is previously registered on cell B using manual CSG selection (so the allowed CSG list includes CSG ID of cell B).

Preamble:

- the UE is in state Registered, Idle mode (state 2) with condition CombinedAttach on cell A according to TS 36.508 [18]

9.2.3.2.16.3.2 Test procedure sequence

Table 9.2.3.2.16.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS configures: - Cell A as a "Not Suitable cell". - Cell B as a "Serving cell".	-	-	-	-
2	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
3	The SS transmits a TRACKING AREA UPDATE REJECT message with EMM cause = "Not authorized for this CSG" with integrity protection.	<--	TRACKING AREA UPDATE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit an TRACKING AREA UPDATE REQUEST message on Cell B in the next 30 seconds?	-->	TRACKING AREA UPDATE REQUEST	1	F
6	The SS configures: - Cell A as a "Not Suitable off cell". - Cell B as a "Not Suitable cell". - Cell C as a "Suitable cell".	-	-	-	-
7	Check: Does the UE transmit an TRACKING AREA UPDATE REQUEST message on Cell C?	-->	TRACKING AREA UPDATE REQUEST	2	P
8	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
9	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
9A	The SS releases the RRC connection.	-	-	-	-
10	The SS configures: - Cell A as a "Not Suitable off cell". - Cell B as a "Serving cell". - Cell C as a "Not Suitable cell".	-	-	-	-
11	Check: Does the UE transmit an TRACKING AREA UPDATE REQUEST message in the next 30 seconds on Cell B?	-->	TRACKING AREA UPDATE REQUEST	1	F

9.2.3.2.16.3.3 Specific message contents

Table 9.2.3.2.16.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, Table 9.2.3.2.16.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	'001'B	"combined T/TA updating"	

Table 9.2.3.2.16.3.3-2: Message TRACKING AREA UPDATE REJECT (step 3, Table 9.2.3.2.16.3.2-1)

Derivation Path: 36.508, Table 4.7.2-26			
Information Element	Value/remark	Comment	Condition
EMM cause	'00011001'B	#25 "Not authorized for this CSG"	

Table 9.2.3.2.16.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 7, Table 9.2.3.2.16.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	'010'B	" combined TA/LA updating with IMSI attach "	

Table 9.2.3.2.16.3.3-4: SystemInformationBlockType1 for Cell A, B, C (Pre-test conditions and all steps in Table 9.2.3.2.16.3.2-1)

Derivation Path: 36.508 clause 4.4.3.2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
csg-Indication	TRUE		Cell B
	FALSE		Cell A
	FALSE		Cell C
csg-Identity	Not present		Cell A
	'000 0000 0000 0000		Cell B
	0000 0000 0010'B		Cell C
	Not present		Cell C
}			
}			

9.2.3.2.17 Combined tracking area update / Abnormal case / handling of the EPS tracking area updating attempt counter

9.2.3.2.17.1 Test Purpose (TP)

(1)

```

with { UE has initiated combined tracking area updating procedure and has the tracking area updating
attempt counter less than 5 }
ensure that {
  when { UE detects release of the NAS signalling connection and in a EPS update status different to
EUI UPDATED and update status is U1 UPDATED }
  then { UE starts timer T3411, does not delete any LAI, TMSI, ciphering key sequence number and
list of equivalent PLMNs and set the update status to U2 NOT UPDATED }
}

```

(2)

```

with { UE has initiated combined tracking area updating procedure and has the tracking area updating
attempt counter equal to 5 }
ensure that {
  when { UE detects release of the NAS signalling connection }
  then { UE starts timer T3402, deletes any LAI, TMSI, ciphering key sequence number and list of
equivalent PLMNs and set the update status to U2 NOT UPDATED }
}

```

9.2.3.2.17.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clause 5.5.3.1, clause 5.5.3.2.6 and clause 5.5.3.3.6.

[TS 24.301, clause 5.5.3.1]

...

A tracking area updating attempt counter is used to limit the number of subsequently rejected tracking area update attempts. The tracking area updating attempt counter shall be incremented as specified in subclause 5.5.3.2.6. Depending on the value of the tracking area updating attempt counter, specific actions shall be performed. The tracking area updating attempt counter shall be reset when:

- an attach or combined attach procedure is successfully completed;
- a normal or periodic tracking area updating or a combined tracking area updating procedure is successfully completed; or
- a normal or periodic tracking area updating or a combined tracking area updating procedure is rejected with EMM cause #11, #12, #13, #14, #15 or #25.

Additionally the tracking area updating attempt counter shall be reset when the UE is in substate EMM-REGISTERED.ATTEMPTING-TO-UPDATE or EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM, and:

- a new tracking area is entered; or
- timer T3402 expires.

[TS 24.301, clause 5.5.3.2.6]

The following abnormal cases can be identified:

...

c) T3430 timeout

The UE shall abort the procedure and proceed as described below. The NAS signaling connection shall be released locally.

...

For the cases b, c and d the UE shall proceed as follows:

Timer T3430 shall be stopped if still running. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

If the tracking area updating attempt counter is less than 5, and the TAI of the current serving cell is included in the TAI list and the EPS update status is equal to EU1 UPDATED:

- the UE shall keep the EPS update status to EU1 UPDATED and enter state EMM-REGISTERED.NORMAL-SERVICE. The UE shall start timer T3411. When timer T3411 expires the tracking area updating procedure is triggered again.

If the tracking area updating attempt counter is less than 5, and the TAI of the current serving cell is not included in the TAI list or the EPS update status is different to EU1 UPDATED:

- the UE shall start timer T3411, shall set the EPS update status to EU2 NOT UPDATED and change to state EMM-REGISTERED.ATTEMPTING-TO-UPDATE. When timer T3411 expires the tracking area updating procedure is triggered again.

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GPRS update status as specified in 3GPP TS 24.008 [13] for the abnormal case when a normal or periodic routing area updating procedure fails and the routing area updating attempt counter is less than 5 and the GPRS update status is different from GU1 UPDATED.

If the tracking area updating attempt counter is equal to 5:

- the UE shall start timer T3402, shall set the EPS update status to EU2 NOT UPDATED, shall delete the list of equivalent PLMNs and shall change to state EMM-REGISTERED.ATTEMPTING-TO-UPDATE or optionally to EMM-REGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [6].

If A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GPRS update status as specified in 3GPP TS 24.008 [13] for the abnormal case when a normal or periodic routing area updating procedure fails and the routing area updating attempt counter is equal to 5.

[TS 24.301, clause 5.5.3.3.6]

...

If the tracking area updating attempt counter is incremented according to subclause 5.5.3.2.6 the next actions depend on the value of the tracking area updating attempt counter.

- if the update status is U1 UPDATED and the tracking area updating attempt counter is less than 5, then the UE shall keep the update status to U1 UPDATED, the new MM state is MM IDLE substate NORMAL SERVICE;
- if the tracking area updating attempt counter is less than 5 and, additionally, the update status is different from U1 UPDATED UE shall delete any LAI, TMSI, ciphering key sequence number and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. The MM state remains MM LOCATION UPDATING PENDING; or
- if the tracking area updating attempt counter is equal to 5, the UE shall delete any LAI, TMSI, ciphering key sequence number and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. A UE operating in CS/PS mode 1 of operation shall select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures.

9.2.3.2.17.3 Test description

9.2.3.2.17.3.1 Pre-test conditions

System Simulator:

- cell A and cell B.
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE is configured to initiate combined attach in DATA Centric mode

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.2.17.3.2 Test procedure sequence

Table 9.2.3.2.17.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are sent and shall be received on Cell B.	-	-	-	-
2	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
3	Wait for 25s to ensure that T3430 and T3411 expire. NOTE 1: The tracking area updating attempt counter is 1.	-	-	-	-
4	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
5	Wait for 25s to ensure that T3430 and T3411 expire. NOTE 2: The tracking area updating attempt counter is 2.	-	-	-	-
6	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
7	Wait for 25s to ensure that T3430 and T3411 expire. NOTE 3: The tracking area updating attempt counter is 3.	-	-	-	-
8	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
9	Wait for 25s to ensure that T3430 and T3411 expire. NOTE 4: The tracking area updating attempt counter is 4.	-	-	-	-
10	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	1	P
11	The SS releases the RRC connection. NOTE 5: The tracking area updating attempt counter is 5 and reset.	-	-	-	-
12	Wait for 12 min to ensure that T3402 expires.	-	-	-	-
13	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message?	-->	TRACKING AREA UPDATE REQUEST	2	P
14	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
15	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.2.17.3.3 Specific message contents

Table 9.2.3.2.17.3.3-1: Message TRACKING AREA UPDATE REQUEST (step 2, step 4, step 6, step 8, step 10, Table 9.2.3.2.17.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type Value	'001'B	"combined TA/LA updating"	
Old GUTI	GUTI-1		
Last visited registered TAI	TAI-1		
Old LAI	LAI-1		
TMSI Status	Not Present		

Table 9.2.3.2.17.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 13, Table 9.2.3.2.17.3.2-1)

Derivation Path: 36.508, Table 4.7.2-27			
Information Element	Value/remark	Comment	Condition
EPS update type			
EPS update type Value	'001'B	"combined TA/LA updating"	
Old GUTI	GUTI-1		
Old location area identification	Not present		
TMSI status	0	no valid TMSI available	

Table 9.2.3.2.17.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 14, Table 9.2.3.2.17.3.2-1)

Derivation Path: 36.508, Table 4.7.2-24			
Information Element	Value/remark	Comment	Condition
GUTI	GUTI-2		

9.2.3.3 lu mode to S1 mode inter-system change in idle mode

9.2.3.3.1 First lu mode to S1 mode inter-system change after attach

9.2.3.3.1.1 Test Purpose (TP)

(1)

```
with { the UE is powered on in UTRAN with a USIM containing valid EPS identities and EPS security context and has attached in UTRAN and activated a PDP context }
ensure that {
  when { the UE reselects a E-UTRAN cell }
  then { the UE transmits a TRACKING AREA UPDATE REQUEST message including eKSI stored in the USIM, old GUTI mapped from RAI and P-TMSI, GPRS ciphering sequence number, nonceUE and the UE radio capability information update needed IE, the message is integrity protected using the EPS security context stored in the USIM and encapsulated in an RRCConnectionSetupComplete message with registeredMME set to the MME part of the mapped GUTI }
```

(2)

```
with { the UE has performed a TAU procedure in EUTRAN after initial registration at power on in UTRAN }
ensure that {
  when { the UE reselects a UTRAN cell }
  then { the UE transmits a ROUTING AREA UPDATE REQUEST message including P-TMSI and P-TMSI signature mapped from GUTI, previously allocated P-TMSI as additional mobile identity, RAI where P-TMSI was allocated as additional old routing area identification, eKSI allocated in UTRAN as GPRS ciphering key sequence number, the message is encapsulated in an INITIAL DIRECT TRANSFER message including IDNSS mapped from P-TMSI }
```

(3)

```
with { the UE has performed a TAU procedure in EUTRAN after initial registration at power on in UTRAN and has transmitted a ROUTING AREA UPDATE REQUEST message and received an AUTHENTICATION AND CIPHERING REQUEST message }
ensure that {
  when { the UE receives a SECURITY MODE COMMAND message }
  then { the UE transmits a SECURITY MODE COMPLETE and starts performing ciphering an integrity protection using new CK and IK }
```

(4)

```
with { the UE has performed initial registration at power on in UTRAN and has EPS security context }
ensure that {
  when { UE performs a TAU procedure in E-UTRAN }
  then { the UE starts performing ciphering an integrity protection using EPS security context }
```

NOTE: ISR considered not in the scope of this test case, so it is never activated.

9.2.3.3.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 23.003 clause 2.8.2.1, 2.8.2.2, TS 23.401 clauses 5.3.1.1, 5.3.3.1, 5.3.3.3 and Annex D; TS 25.331 clauses 8.1.8.2 and 10.3.1.6 (on IDNNS); TS 24.008 [NAS message contents]; TS 24.301 clause 5.5.3.2.2; and TS 36.331 clauses 5.3.3.3 and 5.3.3.4.

[TS 23.003, clause 2.8.2.1]

The mapping of the GUTI shall be done to the combination of RAI of GERAN / UTRAN and the P-TMSI:

E-UTRAN <MCC> maps to GERAN/UTRAN <MCC>

E-UTRAN <MNC> maps to GERAN/UTRAN <MNC>

E-UTRAN <MME Group ID> maps to GERAN/UTRAN <LAC>

E-UTRAN <MME Code> maps to GERAN/UTRAN <RAC> and is also copied into the 8 most significant bits of the NRI field within the P-TMSI;

E-UTRAN <M-TMSI> maps as follows:

- 6 bits of the E-UTRAN <M-TMSI> starting at bit 29 and down to bit 24 are mapped into bit 29 and down to bit 24 of the GERAN/UTRAN <P-TMSI>;
- 16 bits of the E-UTRAN <M-TMSI> starting at bit 15 and down to bit 0 are mapped into bit 15 and down to bit 0 of the GERAN/UTRAN <P-TMSI>;
- and the remaining 8 bits of the E-UTRAN <M-TMSI> are mapped into the 8 MBS bits of the <P-TMSI signature> field.

For UTRAN, the 10-bit long NRI bits are masked out from the P-TMSI and also supplied to the RAN node as IDNNS (Intra Domain NAS Node Selector). However, the RAN configured NRI length should not exceed 8 bits.

[TS 23.003, clause 2.8.2.2]

The mapping of P-TMSI (TLLI) and RAI in GERAN/UTRAN to GUTI in E-UTRAN shall be performed as follows:

GERAN/UTRAN <MCC> maps to E-UTRAN <MCC>

GERAN/UTRAN <MNC> maps to E-UTRAN <MNC>

GERAN/UTRAN <LAC> maps to E-UTRAN <MME Group ID>

GERAN/UTRAN <RAC> maps into bit 23 and down to bit 16 of the M-TMSI

The 8 most significant bits of GERAN/UTRAN <NRI> map to the MME code.

GERAN/UTRAN <P-TMSI> maps as follows:

- 6 bits of the GERAN/UTRAN <P-TMSI> starting at bit 29 and down to bit 24 are mapped into bit 29 and down to bit 24 of the E-UTRAN <M-TMSI>;
- 16 bits of the GERAN/UTRAN <P-TMSI> starting at bit 15 and down to bit 0 are mapped into bit 15 and down to bit 0 of the E-UTRAN <M-TMSI>.

The values of <LAC> and <MME group id> shall be disjoint, so that they can be differentiated. The most significant bit of the <LAC> shall be set to zero; and the most significant bit of <MME group id> shall be set to one. Based on this definition, the most significant bit of the <MME group id> can be used to distinguish the node type, i.e. whether it is an MME or SGSN.

[TS 24.301 clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a RRC connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

...

[TS 23.401, clause 5.3.3.1, step 2, "Tracking Area Update procedure with Serving GW change"]

...

If the UE's TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and related RAI then these two elements are indicated as the old GUTI.

...

[TS 23.401, clause 5.3.3.3, step 2, "Routeing Area Update with MME interaction and without S-GW change"]

...

If the UE's internal TIN indicates "GUTI" and the UE holds a valid GUTI then the UE indicates the GUTI as the old P-TMSI and old RAI

...

[TS 24.301, clause 5.5.3.2.2 "Normal and periodic tracking area updating procedure initiation"]

...

If the UE supports A/Gb mode or Iu mode, the UE shall handle the GUTI as follows:

- if the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the old GUTI IE. If a P-TMSI signature is associated with the P-TMSI, the UE shall include it in the Old P-TMSI signature IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: Mapping the P-TMSI and RAI to the GUTI is specified in Annex H of 3GPP TS 23.401 [10].

- if the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

If the UE has a current EPS security context, the UE shall include the eKSI (either KSI_{ASME} or KSI_{SGSN}) in the NAS Key Set Identifier IE in the TRACKING AREA UPDATE REQUEST message. Otherwise, the UE shall set the NAS Key Set Identifier IE to the value "no key is available". If the UE has a current EPS security context, the UE shall integrity protect the TRACKING AREA UPDATE REQUEST message with the current EPS security context. Otherwise the UE shall not integrity protect the TRACKING AREA UPDATE REQUEST message.

...

When the tracking area updating procedure is initiated in EMM-IDLE mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode and the TIN is set to "P-TMSI", the UE shall include the GPRS ciphering key sequence number applicable for A/Gb mode or Iu mode and a $nonce_{UE}$ in the TRACKING AREA UPDATE REQUEST message.

...

If the UE initiates the first tracking area updating procedure following an attach in A/Gb mode or Iu mode, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

...[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
Tracking Area Update	MO signalling (See Note 1)	"originating signalling"
Note 1: For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".		

[TS 36.331, clause 5.3.3.3]

The UE shall set the contents of *RRCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;
 - 2> else
 - 3> draw a random value in the range $0..2^{40}-1$ and set the *ue-Identity* to this value;

NOTE 1 Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 1> Set the *establishmentCause* in accordance with the information received from upper layers;

[TS 36.331, clause 5.3.3.4]

...

- 1> set the content of *RRCConnectionSetupComplete* message as follows:
 - 2> set the *selectedPLMN-Identity* to the PLMN selected by upper layers (see TS 23.122 [11], TS 24.301 [35]) from the PLMN(s) included in the *plmn-IdentityList* in *SystemInformationBlockType1*;
 - 2> if upper layers provide the 'Registered MME', set the *registeredMME* as follows:
 - 3> if the PLMN identity of the 'Registered MME' is different from the PLMN selected by the upper layers:
 - 4> include the *plmnIdentity* in the *registeredMME* and set it to the value of the PLMN identity in the 'Registered MME' received from upper layers;
 - 3> set the *mmegi* and the *mmec* to the value received from upper layers;
 - 2> set the *dedicatedInfoNAS* to include the information received from upper layers;

...

[TS 24.008, clause 4.7.5]

This procedure is used for:

...

- S1 mode to Iu mode or S1 mode to A/Gb mode intersystem change and ISR is not activated;

...

[TS 24.008, clause 4.7.5.1.1]

To initiate the normal routing area updating procedure, the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-AREA-UPDATING-INITIATED.

If the MS supports S1 mode, the MS shall handle the P-TMSI IE as follows:

- If the TIN indicates "GUTI" and the MS holds a valid GUTI, the MS shall map the GUTI into a P-TMSI, P-TMSI signature and RAI as specified in 3GPP TS 23.003 [4]. The MS shall include the mapped RAI in the Old routing area identification IE and the mapped P-TMSI signature in the P-TMSI signature IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the mapped P-TMSI in the P-TMSI IE. Additionally, in Iu mode and A/Gb mode, if the MS holds a valid P-TMSI and RAI, the MS shall indicate the P-TMSI in the Additional mobile identity IE and the RAI in the Additional old routing area identification IE.

...

If the routing area updating procedure is initiated by the MS due to an S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in idle mode and the TIN indicates "GUTI", the MS shall derive a UMTS security context for the PS domain from the current EPS security context as described in the subclause 4.7.7.10. The ROUTING AREA UPDATE REQUEST message shall include a P-TMSI signature filled with a NAS token as specified in 3GPP TS 33.401 [19]. Furthermore, the MS shall indicate the eKSI value, which is associated with the derived UMTS security keys, in the CKSN field of the GPRS GSM ciphering key sequence number IE in the ROUTING AREA UPDATE REQUEST message.

NOTE: When the MS includes a P-TMSI signature filled with a NAS token, 8 bits of the NAS token will be filled with bits from the M-TMSI (see 3GPP TS 23.003 [4]).

If the routing area updating procedure is initiated by the MS due to the S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in connected mode, the MS shall derive a UMTS security context for the PS domain from the current EPS security context as described in the subclause 4.7.7.10. Furthermore, the MS shall indicate the eKSI value, which is associated with the derived UMTS security keys, in the CKSN field of the GPRS GSM ciphering key sequence number IE in the ROUTING AREA UPDATE REQUEST message.

[TS 25.331, clause 8.1.8.2]

...

The UE shall, in the INITIAL DIRECT TRANSFER message:

- 1> set the IE "NAS message" as received from upper layers; and
- 1> set the IE "CN domain identity" as indicated by the upper layers; and
- 1> set the IE "Intra Domain NAS Node Selector" as follows:
 - 2> derive the IE "Intra Domain NAS Node Selector" from TMSI/PTMSI, IMSI, or IMEI; and
 - 2> provide the coding of the IE "Intra Domain NAS Node Selector" according to the following priorities:
 1. derive the routing parameter for IDNNS from TMSI (CS domain) or PTMSI (PS domain) whenever a valid TMSI/PTMSI is available;
 2. base the routing parameter for IDNNS on IMSI when no valid TMSI/PTMSI is available;
 3. base the routing parameter for IDNNS on IMEI only if no (U)SIM is inserted in the UE.
- 1> if the UE, on the existing RRC connection, has received a dedicated RRC message containing the IE "Primary PLMN Identity" in the IE "CN Information Info":
 - 2> set the IE "PLMN identity" in the INITIAL DIRECT TRANSFER message to the latest PLMN information received via dedicated RRC signalling. If NAS has indicated the PLMN towards which a signalling connection is requested, and this PLMN is not in agreement with the latest PLMN information received via dedicated RRC signalling, then the initial direct transfer procedure shall be aborted, and NAS shall be informed.
- 1> if the UE, on the existing RRC connection, has not received a dedicated RRC message containing the IE "CN Information Info", and if the IE "Multiple PLMN List" was broadcast in the cell where the current RRC connection was established:

- 2> set the IE "PLMN identity" in the INITIAL DIRECT TRANSFER message to the PLMN chosen by higher layers [5, 25] amongst the PLMNs in the IE "Multiple PLMN List" broadcast in the cell where the RRC connection was established.
- 1> if the IE "Activated service list" within variable MBMS_ACTIVATED_SERVICES includes one or more MBMS services with the IE "Service type" set to "Multicast" and;
- 1> if the IE "CN domain identity" as indicated by the upper layers is set to "CS domain" and;
- 1> if the variable ESTABLISHED_SIGNALLING_CONNECTIONS does not include the CN domain identity 'PS domain':
 - 2> include the IE "MBMS joined information";
 - 2> include the IE "P-TMSI" within the IE "MBMS joined information" if a valid PTMSI is available.
- 1> if the UE is in CELL_FACH state and the IE "CN domain identity" as indicated by the upper layers is set to "CS domain":
 - 2> if the value of the variable ESTABLISHMENT_CAUSE is set to "Originating Conversational Call" or "Emergency Call":
 - 3> set the value of the IE "Call type" to "speech", "video" or "other" according to the call being initiated.
- 1> if the variable ESTABLISHMENT_CAUSE is initialised:
 - 2> set the IE "Establishment cause" to the value of the variable ESTABLISHMENT_CAUSE;
 - 2> clear the variable ESTABLISHMENT_CAUSE.
- 1> calculate the START according to subclause 8.5.9 for the CN domain as set in the IE "CN Domain Identity"; and
- 1> include the calculated START value for that CN domain in the IE "START".

9.2.3.3.1.3 Test description

9.2.3.3.1.3.1 Pre-test conditions

System Simulator:

- cell A, cell B and cell 5 (UTRA cell in LAI-1/RAI-1);
- cell 5 is configured as Serving cell, cell A as Non-Suitable cell.
- System information combination 4 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: For Cell 5, power levels are defined in TS 34.108 subclause 6.1.5 (FDD) or 6.1.6 (TDD).

UE:

- the UE is previously registered on E-UTRAN, and when on E-UTRAN, the UE is last authenticated and registered on cell B using default message contents according to TS 36.508 [18].

Note: Cell B belongs to TAI-2 (unlike cell A).

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.3.1.3.2 Test procedure sequence

Table 9.2.3.3.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message on Cell 5	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
4	The UE transmits an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
5	Void	-	-	-	-
6	Void	-	-	-	-
7	Void	-	-	-	-
8	SS responds with ATTACH ACCEPT message including P-TMSI-1 and RAI-1.	<--	ATTACH ACCEPT	-	-
9	The UE transmits an ATTACH COMPLETE message.	-->	ATTACH COMPLETE	-	-
10	The activation of a PDP context is triggered by MMI or AT command.	-	-	-	-
11	Void	-	-	-	-
12	The SS establishes a radio bearer associated with the requested PDP context.	-	-	-	-
13	The SS releases the RRC connection.	-	-	-	-
14	Cell A is configured as the Serving Cell, Cell 5 is configured as a Suitable Neighbour Cell.	-	-	-	-
15	Check: Does the UE transmit an RRCConnectionRequest with the <i>InitialUE-Identity</i> set to "randomValue" and the <i>establishmentCause</i> set to <i>MO-signalling</i> ?	-	-	1	P
16	The SS responds with RRCConnectionSetup.	-	-		
17	Check: Does the UE transmit an RRCConnectionSetupComplete message with the <i>mmegi</i> and <i>mmec</i> are set to the values derived from the mapped RAI and P-TMSI, and containing a TRACKING AREA UPDATE REQUEST message as described in the specific message contents? Check2: Does the UE transmit a TRACKING AREA UPDATE REQUEST message integrity protected using IK derived from K_{ASME} ?	-->	TRACKING AREA UPDATE REQUEST	1, 4	P
18	The SS responds with a TRACKING AREA UPDATE ACCEPT allocating a new GUTI and TAI list. This message is ciphered and integrity protected using CK and IK derived from K_{ASME} .	<--	TRACKING AREA UPDATE ACCEPT	-	-
18 A	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message ciphered and integrity protected using CK and IK derived from K_{ASME} .	-->	TRACKING AREA UPDATE COMPLETE	4	P
19	The SS releases the RRC connection	-	-	-	-
20	Void	-	-	-	-
21	Cell 5 is configured as the Serving Cell and Cell A is configured as a Non-Suitable Cell as defined in table 6.2.2.1-1 of TS 36.508 [18].	-	-	-	-
22	Void	-	-	-	-
23	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message as specified in the specific message contents included in an INITIAL DIRECT TRANSFER message with <i>intraDomainNasNodeSelector</i> mapped from GUTI allocated in step 18?	-->	ROUTING AREA UPDATE REQUEST	2	P
23 AA	The SS sends an AUTHENTICATION AND CIPHERING REQUEST message to perform a UMTS AKA procedure.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-

23 AB	The UE sends an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
23 A	The SS sends a SECURITY MODE COMMAND message to activate integrity protection and ciphering. This message is integrity protected using new IK.	-	-	-	-
23 B	Check: Does the UE transmit a SECURITY MODE COMPLETE message integrity protected using new IK?	-	-	3	P
24	The SS transmits a ROUTING AREA UPDATE ACCEPT message (no new P-TMSI nor RAI). This message is ciphered and integrity protected using CK and IK derived at step 23AA.	<--	ROUTING AREA UPDATE ACCEPT	-	-
25	After the activation time indicated at step 23A, the SS transmits a UE CAPABILITY ENQUIRY message requesting the UE E-UTRAN capability. This message is ciphered and integrity protected using CK and IK derived at step 23AA.	-	-	-	-
26	Check: Does the UE transmit a UE CAPABILITY INFORMATION message? Note: the purpose of this message is to show that the UE uses CK and IK derived at step 23AA, and not the CK and IK allocated at step 4.	-	-	3	P
27	The SS transmits a UE CAPABILITY INFORMATION CONFIRM message.	-	-	-	-
28	The SS releases the RRC connection	-	-	-	-

9.2.3.3.1.3.3 Specific message contents

Table 9.2.3.3.1.3.3-1: Message RRCConnectionRequest (step 15, Table 9.2.3.3.1.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
RRCConnectionRequest ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcConnectionRequest-r8 SEQUENCE {			
ue-Identity CHOICE {			
random-Value	Any allowed value		
}			
establishmentCause	Mo-Signalling		
}			
}			
}			

Table 9.2.3.3.1.3.3-2: Message RRCConnectionSetupComplete (step 17, Table 9.2.3.3.1.3.2-1)

Derivation path: 36.508 table 4.6.1-18			
Information Element	Value/Remark	Comment	Condition
RRCConnectionSetupComplete ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionSetupComplete-r8 SEQUENCE {			
selectedPLMN-Identity	1		
registeredMME {			
plmn-Identity	Not present		
mmegi	LAC sent to the UE in step 8		
mmec	Bit 23 to bit 16 of P-TMSI sent to the UE in step 8		
}			
dedicatedInfoNAS	See table 9.2.3.3.1.3.3-3		
nonCriticalExtension SEQUENCE {}			
}			
}			
}			
Details to be added			

Table 9.2.3.3.1.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 17, Table 9.2.3.3.1.3.2-1)

Derivation path: 36.508 table 4.7.2-24 with condition UNCIPHERED (the message is integrity protected using the key stored in the USIM).			
Information Element	Value/Remark	Comment	Condition
EPS update type	000 or 001	'TA updating' or 'combined TALA updating'	
NAS key set identifier			
NAS key set identifier	The valid NAS key set identifier stored in the USIM		
TSC	'0'B	native security context (for KSI _{ASME})	
Old GUTI or IMSI			
Type of identity	110	GUTI	
MNC/MCC	Mobile Country Code and Mobile Network Code stored in EF _{IMSI} on the test USIM		
MME Group ID	LAI allocated at step 8		
MME Code	Bit 23 to bit 16 of P-TMSI allocated at step 8		
M-TMSI	Value is specified bit by bit below: - bit 31 and bit 30: FFS - bit 29 to bit 24: bit 29 to bit 24 of P-TMSI allocated at step 8 - bit 23 to bit 16: RAC allocated at step 8 - bit 15 to bit 0: bit 15 to bit 0 of P-TMSI allocated at step 8		
GPRS ciphering key sequence number	GPRS ciphering key sequence number allocated at step 3		
Old P-TMSI signature	P-TMSI signature allocated at step 8		
Additional GUTI	GUTI-1		
Nonce _{UE}	Any allowed value (must be present)		
UE network capability	Any allowed value (must be present)		
Last visited registered TAI	TAI stored in the test USIM		
UE radio capability information update needed	1	UE radio capability information update needed	
MS network capability	Any allowed value (must be present)		
Old location area identification	Not present if "EPS update type" is 'TA updating', LAI-1 is "EPS update type" is 'combined TALA updating'		
TMSI status	Not present		

Table 9.2.3.3.1.3.3-4: INITIAL DIRECT TRANSFER (step 23, Table 9.2.3.3.1.3.2-1)

Derivation path: 34.108 clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
InitialDirectTransfer ::= SEQUENCE {			
cn-DomainIdentity	ps-domain		
intraDomainNasNodeSelector SEQUENCE {			
version CHOICE {			
release99 SEQUENCE {			
gsm-Map-IDNNS SEQUENCE {			
routingbasis CHOICE {			
tMSIofsamePLMN {			
routingparameter	bit 23 to bit 14 of P-TMSI mapped from GUTI allocated to UE in step 18		
}			
}			
}			
}			
}			
}			
nas-Message	See table 9.2.3.3.1.3.3-5		
}			

Table 9.2.3.3.1.3.3-5: Message ROUTING AREA UPDATE REQUEST (step 23, Table 9.2.3.3.1.3.2-1)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
Update type	000 or 001	RA updating or Combined RA/LA updating	
GPRS ciphering key sequence number	eKSI stored on the test USIM		
Old routing area identification	GUTI-1 right shifted by 32bits		
MS Radio Access capability	Not checked		
Old P-TMSI signature	Value is specified bit by bit below: - bit 23 to bit 16: bit 23 to bit 16 of M-TMSI allocated in step 18 - bit 15 to bit 0: FFS		
Requested READY timer value	Not checked		
DRX parameter	Not checked		
TMSI status	Not present		
P-TMSI	Value is specified bit by bit below: - bit 31 and bit 30: 1 - bit 29 to bit 24: bit 29 to bit 24 of M-TMSI allocated in step 18 - bit 23 to bit 16: MME code allocated in step 18 - bit 15 to bit 0: bit 15 to bit 0 of M-TMSI allocated in step 18		
MS network capability	Not checked		
PDP context status	Not checked		
PS LCS Capability	Not checked		
MBMS context status	Not checked		
UE network capability	Any allowed value		
Additional mobile identity	P-TMSI allocated in step 8		
Additional old routing area identification	RAI-1		
Mobile station classmark 2	Not checked		
Mobile station classmark 3	Not checked		
Supported Codecs	Not checked		

9.2.3.3.2 lu mode to S1 mode intersystem change / ISR is active / Expiry of T3312 in E-UTRAN or T3412 in UTRAN and further intersystem change

9.2.3.3.2.1 Test Purpose (TP)

(1)

```
with { the UE is camped on a E-UTRAN cell, ISR is active, T3312 has expired, T3323 hasn't expired }
ensure that {
  when { UE enters a UTRAN cell belonging to the RA where the UE was last updated }
  then { the UE performs a RAU procedure including the UE P-TMSI and RAI }
}
```

(2)

```
with { the UE is camped on a E-UTRAN cell, ISR is active, T3312 and T3323 have expired }
ensure that {
  when { UE enters a UTRAN cell belonging to the RA where the UE was last updated }
  then { the UE performs a RAU procedure including mapped identities from E-UTRAN and additional P-TMSI and old RAI }
}
```

(3)

```

with { the UE operating in PS mode 1 or PS mode 2, is camped on a UTRAN cell, ISR is active, T3412
has expired, T3423 hasn't expired }
ensure that {
  when { UE enters a E-UTRAN cell in a TA belonging to the current TA list }
    then { the UE performs a TAU procedure including the UE GUTI and last visited TAI }
}

```

(4)

```

with { the UE operating in PS mode 1 or PS mode 2, is camped on a UTRAN cell, ISR is active, T3412
and T3423 have expired }
ensure that {
  when { the UE enters a E-UTRAN cell in a TA belonging to the current TA list }
    then { the UE performs a TAU procedure including mapped GUTI from UTRAN, P-TMSI signature and
additional GUTI }
}

```

9.2.3.3.2.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301 clauses 5.3.5 and 5.5.3.2.2 and TS 24.008 clauses 4.7.2.2 and 4.7.5.1.1.

[24.301, clause 5.3.5]

If ISR is activated, the UE shall keep both the periodic tracking area update timer (timer T3412) and the periodic routing area update timer (timer T3312). The two separate timers run in the UE for updating MME and SGSN independently. If the periodic tracking area update timer expires and the UE cannot initiate the tracking area updating procedure, as it is in state EMM-REGISTERED.NO-CELL-A VAILABLE, the UE shall start the E-UTRAN deactivate ISR timer T3423. The UE shall initiate the tracking area updating procedure and stop the timer T3423 when it enters state EMM-REGISTERED.NORMAL-SERVICE before timer T3423 expires. After expiry of timer T3423 the UE shall set its TIN to "P-TMSI" in order to initiate the tracking area updating procedure when it returns to state EMM-REGISTERED.NORMAL-SERVICE.

If the UE is attached to both EPS and non-EPS services, and if timer T3412 expires or timer T3423 expires when the UE is in EMM-REGISTERED.NO-CELL-A VAILABLE state, then the UE shall initiate the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" when the UE returns to EMM-REGISTERED.NORMAL-SERVICE state.

[24.301, clause 5.5.3.2.2]

If the UE supports neither A/Gb mode nor Iu mode, the UE shall include a valid GUTI in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE. If a P-TMSI signature is associated with the P-TMSI, the UE shall include it in the Old P-TMSI signature IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

[24.008, clause 4.7.2.2]

If ISR is activated, the MS shall keep both the periodic tracking area update timer (timer T3412) and the periodic routing area update timer (timer T3312). The two separate timers run in the MS for updating MME and SGSN independently. If the periodic routing area update timer expires and the MS is in state GMM-REGISTERED.NO-CELL-A VAILABLE, the MS shall set its TIN to "RAT-related TMSI" and start the GERAN/UTRAN Deactivate ISR timer T3323. The MS shall initiate the routing area updating procedure and stop the timer T3323 when the MS enters the state GMM-REGISTERED.NORMAL-SERVICE before timer T3323 expires. After expiry of timer T3323 the MS shall deactivate ISR by setting its TIN to "GUTI" and initiate the routing area updating procedure when the MS enters the state GMM-REGISTERED.NORMAL-SERVICE.

...

If the MS is both IMSI attached for GPRS and non-GPRS services, and if the MS lost coverage of the registered PLMN and timer T3312 expires or timer T3323 expires, then:

- a) if the MS returns to coverage in a cell that supports GPRS and that indicates that the network is in network operation mode I, then the MS shall either perform the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach"; or
- b) if the MS returns to coverage in a cell in the same RA that supports GPRS and that indicates that the network is in network operation mode II or III, then the MS shall perform the periodic routing area updating procedure indicating "Periodic updating"; or
- c) if the MS was both IMSI attached for GPRS and non-GPRS services in network operation mode I and the MS returns to coverage in a cell in the same LA that does not support GPRS, then the MS shall perform the periodic location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and that indicates that the network is in network operation mode I; or
- d) if the MS returns to coverage in a new RA the description given in subclause 4.7.5 applies.

If the MS is both IMSI attached for GPRS and non-GPRS services in a network that operates in network operation mode I, and if the MS has camped on a cell that does not support GPRS, and timer T3312 expires or timer T3323 expires, then the MS shall start an MM location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and indicates that the network is in operation mode I.

If timer T3312 expires or timer T3323 expires during an ongoing CS connection, then a MS operating in MS operation mode B shall treat the expiry of T3312 when the MM state MM-IDLE is entered, analogous to the descriptions for the cases when the timer expires out of coverage or in a cell that does not support GPRS.

In A/Gb mode, timer T3312 and timer T3323 shall not be stopped when a GPRS MS enters state GMM-REGISTERED.SUSPENDED.

[24.008, clause 4.7.5.1.1]

If the MS supports S1 mode, the MS shall handle the P-TMSI IE as follows:

- If the TIN indicates "GUTI" and the MS holds a valid GUTI, the MS shall map the GUTI into a P-TMSI, P-TMSI signature and RAI as specified in 3GPP TS 23.003 [4]. The MS shall include the mapped RAI in the Old routing area identification IE and the mapped P-TMSI signature in the P-TMSI signature IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the mapped P-TMSI in the P-TMSI IE. Additionally, in Iu mode and A/Gb mode, if the MS holds a valid P-TMSI and RAI, the MS shall indicate the P-TMSI in the Additional mobile identity IE and the RAI in the Additional old routing area identification IE.
- If the TIN indicates "P-TMSI" or "RAT-related TMSI" and the MS holds a valid P-TMSI and RAI, the MS shall indicate the RAI in the Old routing area identification IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the P-TMSI in the P-TMSI IE.

9.2.3.3.2.3 Test description

9.2.3.3.2.3.1 Pre-test conditions

System Simulator:

- cell A and cell 5 (HPLMN);
- cell 5 indicates NMO I .
- System information combination 4 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

none.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18] and with M-TMSI = 9a26319c (arbitrary value chosen for this test case).

9.2.3.3.2.3.2 Test procedure sequence

Table 9.2.3.3.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
2	The UE transmits a ROUTING AREA UPDATE message on cell 5.	-->	ROUTING AREA UPDATE REQUEST	-	-
3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5 with T3312 set to 1 minute and T3323 set to 2 minutes.	<--	ROUTING AREA UPDATE ACCEPT	-	-
4	The UE transmits a ROUTING AREA UPDATE COMPLETE message on Cell 5.	-->	ROUTING AREA UPDATE COMPLETE	-	-
4A	The SS releases the RRC connection.	-	-	-	-
5	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
-	EXCEPTION: Steps 5Aa1 to 5Aa4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place according to UE mode of operation.	-	-	-	-
5A a1	IF CS/PS mode 1 or CS/PS mode 2 of operation is configured on the UE and px_AttachTypeTested is set to COMBINED_ATTACH THEN the UE transmits a TRACKING AREA UPDATE REQUEST message on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
5A a2	The SS transmits a TRACKING AREA UPDATE ACCEPT message on Cell A.	<--	TRACKING AREA UPDATE ACCEPT	-	-
5A a3	The UE transmits a TRACKING AREA UPDATE COMPLETE message on Cell A.	-->	TRACKING AREA UPDATE COMPLETE	-	-
5A a4	The SS releases the RRC connection.	-	-	-	-
6	90s after step 3, the SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
7	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message on Cell 5 in the time period between expiry of T3312 – started upon RRC Connection Release after step 4A – and before expiry of T3323 – which was started when T3312 expired?	-->	ROUTING AREA UPDATE REQUEST	1	P
8	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5 with T3312 set to 1 minute and T3323 set to 1 minute.	<--	ROUTING AREA UPDATE ACCEPT	-	-
8A	The SS releases the RRC connection.	-	-	-	-
9	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
-	EXCEPTION: Steps 9Aa1 to 9Aa4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place according to UE mode of operation.	-	-	-	-
9A a1	IF CS/PS mode 1 or CS/PS mode 2 of operation is configured on the UE and px_AttachTypeTested is set to COMBINED_ATTACH THEN the UE transmits a TRACKING AREA UPDATE REQUEST message on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
9A a2	The SS transmits a TRACKING AREA UPDATE ACCEPT message on Cell A.	<--	TRACKING AREA UPDATE ACCEPT	-	-
9A	The UE transmits a TRACKING AREA	-->	TRACKING AREA UPDATE	-	-

a3	UPDATE COMPLETE message on Cell A.		COMPLETE		
9A a4	The SS releases the RRC connection.	-	-	-	-
10	150s after step 8, the SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
11	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message on Cell 5 after both timers expired, T3312 which was started after step 8A and T3323 which was started upon expiry of T3312?	-->	ROUTING AREA UPDATE REQUEST	2	P
12	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5.	<--	ROUTING AREA UPDATE ACCEPT	-	-
12 A	The SS releases the RRC connection.	-	-	-	-
13	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
14	The UE transmits a TRACKING AREA UPDATE REQUEST message	-->	TRACKING AREA UPDATE REQUEST	-	-
15	The SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating that ISR is active, T3412 set to 1 minute and T3423 set to 2 minutes.	<--	TRACKING AREA UPDATE ACCEPT	-	-
16	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	EXCEPTION: Steps 16A to 24 describe behaviour that is performed if PS mode 1 or PS mode 2 of operation is configured on the UE.	-	-	-	-
16 A	The SS releases the RRC connection.	-	-	-	-
17	The SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
17 Aa 1	Void	-	-	-	-
17 Aa 2	Void	-	-	-	-
18	90s after step 16, the SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
19	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on Cell A in the time period between expiry of T3412 – started upon RRC Connection Release after step 16A – and before expiry of T3423 – which was started when T3412 expired?	-->	TRACKING AREA UPDATE REQUEST	3	P
20	The SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating that ISR is active, T3412 set to 1 minute and T3423 set to 1 minute.	<--	TRACKING AREA UPDATE ACCEPT	-	-
20 A	The SS releases the RRC connection.	-	-	-	-
21	The SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
21 Aa 1	Void	-	-	-	-
21 Aa 2	Void	-	-	-	-
22	150s after step 20, the SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell	-	-	-	-

	5 to "Non-suitable cell".				
23	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on Cell A after both timers expired, T3412 which was started after step 20A and T3423 which was started upon expiry of T3412?	-->	TRACKING AREA UPDATE REQUEST	4	P
24	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2_T3440) according to TS 36.508.	-	-	-	-

9.2.3.3.2.3.3 Specific message contents

Table 9.2.3.3.2.3.3-1: Message ROUTING AREA UPDATE ACCEPT (step 3, table 9.2.3.3.2.3.2-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
Update result	100	RA updated and ISR activated	TA only
	001	combined RA/LA updated	combined_TA_LA
Periodic RA update timer	00100001	1 minute	
Routing area identification	See 36.508 table 4.4.4-2	RAI of Cell 5	
P-TMSI signature	Not present		
Allocated P-TMSI	efb1ee97	TMSI is an arbitrary value chosen different from M-TMSI in the preamble	
T3323 value	00100010	2 minutes	

Table 9.2.3.3.2.3.3-2: Message ROUTING AREA UPDATE REQUEST (step 7, table 9.2.3.3.2.3.2-1)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
Update type	011	Periodic updating	TA only
	001 or 010	Combined RA/LA updating or combined RA/LA updating with IMSI attach	combined_TA_LA
GPRS ciphering key sequence number	Any allowed value		
Old routing area identification	RAI of Cell 5 according to 36.508 table 4.4.4-2	The UE includes the RAI from UTRAN	
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
P-TMSI	Same value like allocated at step 3, see table 9.2.3.3.2.3.3-1	The UE includes the P-TMSI assigned from UTRAN	
UE network capabilities	Not present		Update Type = periodic updating
	Any allowed value		Update Type <> periodic updating
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

Table 9.2.3.3.2.3-3: Message ROUTING AREA UPDATE ACCEPT (step 8, table 9.2.3.3.2.3-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
Update result	100	RA updated and ISR activated	TA only
	001	combined RA/LA updated	combined_TA_LA
Periodic RA update timer	00100001	1 minute	
Routing area identification	See 36.508 table 4.4.4-2	RAI of Cell 5	
P-TMSI signature	Not present		
Allocated P-TMSI	Not present		
T3323 value	00100001	1 minute	

Table 9.2.3.3.2.3-4: Message ROUTING AREA UPDATE REQUEST (step 11, table 9.2.3.3.2.3-1)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
Update type	000	RA updating	TA only
	010	combined RA/LA updating with IMSI attach	combined_TA_LA
GPRS ciphering key sequence number	Any allowed value		
Old routing area identification	TAI of cell A	The value is the same as the RAI of cell 5	
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Any allowed value		
P-TMSI	da01319c	Mapped from M-TMSI and MME code assigned in the preamble (start with 11 and MME code in 2 nd most significant byte).	
Additional mobile identity	Same value like allocated at step 3, see table 9.2.3.3.2.3.3-1		
Additional routing area identification	RAI of cell 5	The value is the same as the TAI of cell A	

Table 9.2.3.3.2.3-5: Message ROUTING AREA UPDATE ACCEPT (step 12, table 9.2.3.3.2.3-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
Update result	000	RA updated	TA only
	001	combined RA/LA updated	combined_TA_LA
Periodic RA update timer	01010101	54 minutes	
Routing area identification	See 36.508 table 4.4.4-2	RAI of Cell 5	
P-TMSI signature	Not present		
Allocated P-TMSI	Not present		

Table 9.2.3.3.2.3-6: Message TRACKING AREA UPDATE REQUEST (step 14, table 9.2.3.3.2.3-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	Any allowed value		
Additional GUTI	Any allowed value		
Nonce _{UE}	Any allowed value		

Table 9.2.3.3.2.3.3-7: Message TRACKING AREA UPDATE ACCEPT (step 15, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	100	TA updated and ISR activated	TA_only
	101	combined TALA updated and ISR activated	combined_TA_LA
T3412 value	00100001	1 minute	
T3423 value	00100010	2 minutes	
GUTI			
M-TMSI	9a26319c	Same value like in preamble, different from P-TMSI	

Table 9.2.3.3.2.3.3-8: Message TRACKING AREA UPDATE REQUEST (step 19, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	Any allowed value		
Old GUTI	Same GUTI as in step 15 see table 9.2.3.3.2.3.3-7		TA_Only
Last visited registered TAI	RAI of cell 5	The value is the same as the TAI of cell A	
Nonce _{UE}	Not Present		TA_only
Additional GUTI	Not present		TA_only

Table 9.2.3.3.2.3.3-9: Message TRACKING AREA UPDATE ACCEPT (step 20, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	100	TA updated and ISR activated	TA_only
T3412 value	00100001	1 minute	
GUTI	Not present		
MS identity	Not present		
T3423 value	00100001	1 minute	

Table 9.2.3.3.2.3.3-10: Message TRACKING AREA UPDATE REQUEST (step 23, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	Any allowed value		
Old GUTI			
M-TMSI	ef01ee97	Mapped from P-TMSI assigned in the preamble and RAI of cell 5 (start with 11 and RAI in 2 nd most significant byte).	
Nonce _{UE}	Any allowed value		
Last visited registered TAI	RAI of cell 5		
Additional GUTI	Same GUTI as in step 15 see table 9.2.3.3.2.3.3-7		

Table 9.2.3.3.2.3.3-11: Message TRACKING AREA UPDATE ACCEPT (step 24, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	000	TA updated	TA_only
T3412 value	01010101	54 minutes	
GUTI	Not present		
MS identity	Not present		

Table 9.2.3.3.2.3.3-12: Message TRACKING AREA UPDATE REQUEST (steps 5Aa1 and 9Aa1, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS Update Type	010	combined RA/LA updating with IMSI attach	Combined TA/LA
GPRS ciphering key sequence number	Any allowed value		
Additional GUTI	Not present or any allowed value		
Nonce _{UE}	Any allowed value		

Table 9.2.3.3.2.3.3-13: Message TRACKING AREA UPDATE ACCEPT (steps 5Aa2 and 9Aa2, table 9.2.3.3.2.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	101	combined TA/LA updated and ISR activated	

9.2.3.3.3 lu mode to S1 mode intersystem change / Periodic TAU and RAU/ ISR activated, T3423 expired

9.2.3.3.3.1 Test Purpose (TP)

(1)

```
with { the UE is camped on a E-UTRAN cell, ISR is active, T3312 has expired }
ensure that {
  when { UE enters a UTRAN cell belonging to the RA where the UE was last updated }
  then { the UE performs a RAU procedure }
}
```

(2)

```
with { the UE is camped on a UTRAN cell, ISR is active, T3412 and T3423 have expired }
ensure that {
  when { the UE enters a E-UTRAN cell in a TA belonging to the current TA list }
  then { the UE performs a TAU procedure including mapped GUTI from UTRAN, P-TMSI signature and additional GUTI}
}
```

9.2.3.3.3.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301 clauses 5.3.5 and 5.5.3.2.2 and TS 24.008 clauses 4.7.2.2 and 4.7.5.1.1.

[24.301, clause 5.3.5]

If ISR is activated, the UE shall keep both the periodic tracking area update timer (timer T3412) and the periodic routing area update timer (timer T3312). The two separate timers run in the UE for updating MME and SGSN independently. If the periodic tracking area update timer expires and the UE cannot initiate the tracking area updating procedure, as it is in state EMM-REGISTERED.NO-CELL-AVAILABLE, the UE shall start the E-UTRAN deactivate ISR timer T3423. The UE shall initiate the tracking area updating procedure and stop the timer T3423 when it enters

state EMM-REGISTERED.NORMAL-SERVICE before timer T3423 expires. After expiry of timer T3423 the UE shall set its TIN to "P-TMSI" in order to initiate the tracking area updating procedure when it returns to state EMM-REGISTERED.NORMAL-SERVICE.

If the UE is attached to both EPS and non-EPS services, and if timer T3412 expires or timer T3423 expires when the UE is in EMM-REGISTERED.NO-CELL-A VAILABLE state, then the UE shall initiate the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" when the UE returns to EMM-REGISTERED.NORMAL-SERVICE state.

[24.301, clause 5.5.3.2.2]

...

If the UE supports neither A/Gb mode nor Iu mode, the UE shall include a valid GUTI in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message.

If the UE supports A/Gb mode or Iu mode, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE. If a P-TMSI signature is associated with the P-TMSI, the UE shall include it in the Old P-TMSI signature IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

[24.008, clause 4.7.2.2]

If ISR is activated, the MS shall keep both the periodic tracking area update timer (timer T3412) and the periodic routing area update timer (timer T3312). The two separate timers run in the MS for updating MME and SGSN independently. If the periodic routing area update timer expires and the MS is in state GMM-REGISTERED.NO-CELL-A VAILABLE, the MS shall set its TIN to "RAT-related TMSI" and start the GERAN/UTRAN Deactivate ISR timer T3323. The MS shall initiate the routing area updating procedure and stop the timer T3323 when the MS enters the state GMM-REGISTERED.NORMAL-SERVICE before timer T3323 expires. After expiry of timer T3323 the MS shall deactivate ISR by setting its TIN to "GUTI" and initiate the routing area updating procedure when the MS enters the state GMM-REGISTERED.NORMAL-SERVICE.

...

If the MS is both IMSI attached for GPRS and non-GPRS services, and if the MS lost coverage of the registered PLMN and timer T3312 expires or timer T3323 expires, then:

- a) if the MS returns to coverage in a cell that supports GPRS and that indicates that the network is in network operation mode I, then the MS shall either perform the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach"; or
- b) if the MS returns to coverage in a cell in the same RA that supports GPRS and that indicates that the network is in network operation mode II or III, then the MS shall perform the periodic routing area updating procedure indicating "Periodic updating"; or
- c) if the MS was both IMSI attached for GPRS and non-GPRS services in network operation mode I and the MS returns to coverage in a cell in the same LA that does not support GPRS, then the MS shall perform the periodic location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and that indicates that the network is in network operation mode I; or
- d) if the MS returns to coverage in a new RA the description given in subclause 4.7.5 applies.

If the MS is both IMSI attached for GPRS and non-GPRS services in a network that operates in network operation mode I, and if the MS has camped on a cell that does not support GPRS, and timer T3312 expires or timer T3323 expires, then the MS shall start an MM location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and indicates that the network is in operation mode I.

If timer T3312 expires or timer T3323 expires during an ongoing CS connection, then a MS operating in MS operation mode B shall treat the expiry of T3312 when the MM state MM-IDLE is entered, analogous to the descriptions for the cases when the timer expires out of coverage or in a cell that does not support GPRS.

In A/Gb mode, timer T3312 and timer T3323 shall not be stopped when a GPRS MS enters state GMM-REGISTERED.SUSPENDED.

[24.008, clause 4.7.5.1.1]

...

If the MS supports S1 mode, the MS shall handle the P-TMSI IE as follows:

- If the TIN indicates "GUTI" and the MS holds a valid GUTI, the MS shall map the GUTI into a P-TMSI, P-TMSI signature and RAI as specified in 3GPP TS 23.003 [4]. The MS shall include the mapped RAI in the Old routing area identification IE and the mapped P-TMSI signature in the P-TMSI signature IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the mapped P-TMSI in the P-TMSI IE. Additionally, in Iu mode and A/Gb mode, if the MS holds a valid P-TMSI and RAI, the MS shall indicate the P-TMSI in the Additional mobile identity IE and the RAI in the Additional old routing area identification IE.
- If the TIN indicates "P-TMSI" or "RAT-related TMSI" and the MS holds a valid P-TMSI and RAI, the MS shall indicate the RAI in the Old routing area identification IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the P-TMSI in the P-TMSI IE.

9.2.3.3.3.3 Test description

9.2.3.3.3.3.1 Pre-test conditions

System Simulator:

- cell A and cell 5 (HPLMN);
- cell 5 indicates NMO I.
- System information combination 4 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

none.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18] and with M-TMSI = 9a26319c (arbitrary value chosen for this test case).

9.2.3.3.3.2 Test procedure sequence

Table 9.2.3.3.3.2-1: Main Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
2	The UE transmits a ROUTING AREA UPDATE message on cell 5.	-->	ROUTING AREA UPDATE REQUEST	-	-
3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5 with T3312 set to 1 minute and T3323 set to 2 minutes.	<--	ROUTING AREA UPDATE ACCEPT	-	-
4	The UE transmits a ROUTING AREA UPDATE COMPLETE message on Cell 5.	-->	ROUTING AREA UPDATE COMPLETE	-	-
5	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
-	EXCEPTION: Steps 5Aa1 to 5Aa4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place according to UE mode of operation.	-	-	-	-
5A a1	IF CS/PS mode 1 or CS/PS mode 2 of operation is configured on the UE and px_AttachTypeTested is set to COMBINED_ATTACH THEN the UE transmits a TRACKING AREA UPDATE REQUEST message on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
5A a2	The SS transmits a TRACKING AREA UPDATE ACCEPT message on Cell A.	<--	TRACKING AREA UPDATE ACCEPT	-	-
5A a3	The UE transmits a TRACKING AREA UPDATE COMPLETE message on Cell A.	-->	TRACKING AREA UPDATE COMPLETE	-	-
5A a4	The SS releases the RRC connection.	-	-	-	-
6	90s after step 3, the SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
7	Check: After T3312 started after Step 4 expires and before T3323 expires, does the UE transmit a ROUTING AREA UPDATE REQUEST message on Cell 5?	-->	ROUTING AREA UPDATE REQUEST	1	P
8	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5	<--	ROUTING AREA UPDATE ACCEPT	-	-
9	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
10	The UE transmits a TRACKING AREA UPDATE REQUEST message	-->	TRACKING AREA UPDATE REQUEST	-	-
11	The SS transmits a TRACKING AREA UPDATE ACCEPT message with EPS update result indicating that ISR is active, T3412 set to 1 minute and T3423 set to 1 minute.	<--	TRACKING AREA UPDATE ACCEPT	-	-
11 A	The SS releases the RRC connection.	-	-	-	-
12	The SS sets the cell type of Cell 5 to "Serving Cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
-	EXCEPTION: Steps 12Aa1 to 12Aa2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place according to UE mode of operation.	-	-	-	-
12 Aa 1	IF CS/PS mode 1 or CS/PS mode 2 of operation is configured on the UE and px_AttachTypeTested is set to	-->	ROUTING AREA UPDATE REQUEST	-	-

	COMBINED_ATTACH THEN Check: After T3412 started after Step 11A expires and before T3423 expires, does the UE transmit a ROUTING AREA UPDATE REQUEST message on Cell 5?				
12 Aa 2	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5	<--	ROUTING AREA UPDATE ACCEPT	-	-
13	150s after step 12, the SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
14	Check: After T3412 started after Step 11 A and T3423 started at Step 13 expire, does the UE transmit a TRACKING AREA UPDATE REQUEST message on Cell A?	-->	TRACKING AREA UPDATE REQUEST	2	P
15	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
-	The UE is in end state E-UTRA connected (E2_T3440).	-	-	-	-

9.2.3.3.3.3.3 Specific message contents

Table 9.2.3.3.3.3.3-1: Void

Table 9.2.3.3.3.3.3-2: Message ROUTING AREA UPDATE ACCEPT (step 3, table 9.2.3.3.3.3.2-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
Update result	100	RA updated and ISR activated	TA only
	001	combined RA/LA updated	combined_TA_LA
Periodic RA update timer	00100001	1 minute	
Routing area identification	See 36.508 table 4.4.4-2	RAI of Cell 5	
P-TMSI signature	Not present		
Allocated P-TMSI RAI TMSI	See 36.508 table 4.4.4-2 efb1ee97	TMSI is an arbitrary value chosen different from M-TMSI in the preamble	
T3323 value	00100010	2 minutes	

Table 9.2.3.3.3.3.3-3: Message ROUTING AREA UPDATE REQUEST (step 7 table 9.2.3.3.3.3.2-1)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
Update type	011	Periodic updating	TA_only
	010	combined RA/LA updating with IMSI attach	combined_TA_LA
GPRS ciphering key sequence number	Any allowed value		
Old routing area identification	RAI of Cell 5 according to 36.508 table 4.4.4-2	The UE includes the RAI from UTRAN	
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
P-TMSI	Same value like allocated at step 3, see table 9.2.3.3.3.3.3-1	The UE includes the P-TMSI assigned from UTRAN	
UE network capability	Not Present		TA_only
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

Table 9.2.3.3.3.3-4: Message ROUTING AREA UPDATE ACCEPT (step 8, table 9.2.3.3.3.2-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
Update result	000	RA updated	TA_only
	001	combined RA/LA updated	combined_TA_LA
Periodic RA update timer	01010101	126 minutes	
Routing area identification	See 36.508 table 4.4.4-2	RAI of Cell 5	
P-TMSI signature	Not present		
Allocated P-TMSI	Not present		

Table 9.2.3.3.3.3-5: Message TRACKING AREA UPDATE REQUEST (step 10, table 9.2.3.3.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	Any allowed value		
Additional GUTI	Any allowed value		
Nonce _{UE}	Any allowed value		

Table 9.2.3.3.3.3-6: Message TRACKING AREA UPDATE ACCEPT (step 11, table 9.2.3.3.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	100	TA updated and ISR activated	TA_only
	101	combined TALA updated and ISR activated	combined_TA_LA
T3412 value	00100001	1 minute	
GUTI	Not present		
MS identity	Not present		
T3423 value	00100001	1 minute	

Table 9.2.3.3.3.3-7: Message TRACKING AREA UPDATE REQUEST (step 14, table 9.2.3.3.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	Any allowed value		
Old GUTI			
M-TMSI	EFB1EE97	Mapped from P-TMSI assigned in the preamble and RAI of cell 5 (start with 11 and RAI in 2 nd most significant byte).	
Last visited registered TAI	RAI of cell 5		
Additional GUTI	Same GUTI as assigned in the preamble		
Nonce _{UE}	Any allowed value		

Table 9.2.3.3.3.3-8: Message TRACKING AREA UPDATE ACCEPT (step 15, table 9.2.3.3.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	000	TA updated	TA_only
	001	combined TALA updated	combined_TA_LA
T3412 value	01010101	126 minutes	
GUTI	Not present		
MS identity	Not present		

Table 9.2.3.3.3.3-9: Message TRACKING AREA UPDATE REQUEST (step 5Aa1, table 9.2.3.3.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	010	combined TA/LA updating with IMSI attach	
GPRS ciphering key sequence number	Any allowed value		
Additional GUTI	Not present or any allowed value		
Nonce _{UE}	Any allowed value		

Table 9.2.3.3.3.3-10: Message TRACKING AREA UPDATE ACCEPT (step 5Aa2, table 9.2.3.3.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	101	combined TA/LA updated and ISR activated	

Table 9.2.3.3.3.3-11: Message ROUTING AREA UPDATE ACCEPT (step 12Aa2, table 9.2.3.3.3.2-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
Update result	001	combined RA/LA updated	
Periodic RA update timer	01010101	126 minutes	
Routing area identification	See 36.508 table 4.4.4-2	RAI of Cell 5	
P-TMSI signature	Not present		
Allocated P-TMSI	Not present		

9.2.3.3.4 First S1 mode to lu mode inter-system change after attach

9.2.3.3.4.1 Test Purpose (TP)

(1)

with { the UE powered on in E-UTRAN with a USIM containing valid E-UTRAN NAS and Security parameters including a valid GUTI, and has successfully performed a combined EPS/IMSI attach, established PDN connectivity, and performed TRACKING AREA UPDATE REQUEST }

ensure that {

when { the UE reselects UTRAN configured in MNO=II and TIN is set to the temporary ID belonging to the currently used RAT (i.e. ISR not active) }

then { the UE transmits a LOCATION UPDATING REQUEST to the MSC/VLR and derives the IDNNS from the MSC/VLR TMSI, and transmits a ROUTING AREA UPDATE REQUEST message including P-TMSI, P-TMSI signature including the NAS token, and RAI mapped from GUTI, the old routing area identification mapped from the RAI, the GPRS ciphering key sequence number indicating the eKSI associated with the EPS security context. Old P-TMSI signature and Old routing area identification are mapped from the GUTI. The message is encapsulated in an INITIAL DIRECT TRANSFER message including IDNSS mapped from GUTI, START value set to 0 and PLMN identity }

(2)

with { the UE camped on E-UTRAN and has a valid GUTI and P-TMSI }

ensure that {

when { the UE reselects UTRAN and receives a new P-TMSI as part of the RAU procedure }

then { the UE uses the new P-TMSI (and not GUTI or old P-TMSI) for subsequent IDNNS network access (e.g. via the Service Request procedure) }

(3)

with { the UE has performed a RAU procedure in UTRAN after initial registration at power on in E-UTRAN }

ensure that {

when { the UE reselects a E-UTRAN cell with the same LA as previously selected }

```

then { the UE transmits a TRACKING AREA UPDATE REQUEST message including eKSI stored in the
USIM, old GUTI mapped from RAI and P-TMSI, GPRS ciphering sequence number, nonceUE. The UE encodes
the RRC parameters in the RRC Connection Establishment messages correctly (i.e. in the
RRCConnectionRequest message, the ue-Identity is set to s-TMSI or "Random value" for pre-Rel-12 UE,
or set to randomValue from Rel-12 and onwards UE. The establishmentCause is set to MO-signalling;
and, in the RRCConnectionSetupComplete message the selectedPLMN-identity, mmegi and mmec indicate
the value of the registered MME when ue-Identity is set to randomValue (e.g. as retrieved from the
USIM at power-on, or, as received in the last TRACKING AREA UPDATE ACCEPT message) }
}

```

(4)

```

with { the UE has transmitted a ROUTING AREA UPDATE REQUEST message after initial registration at
power on in E-UTRAN }
ensure that {
  when { the UE receives a SECURITY MODE COMMAND message }
  then { the UE transmits a SECURITY MODE COMPLETE and starts performing ciphering an integrity
protection using CK' and IK' derived from KASME and UL NAS COUNT }
}

```

(5)

```

with { the UE has received an AUTHENTICATION AND CIPHERING REQUSET message after it has performed
ciphering an integrity protection using CK' and IK' derived from KASME and UL NAS COUNT }
ensure that {
  when { the UE receives a SECURITY MODE COMMAND message }
  then { the UE transmits a SECURITY MODE COMPLETE and starts performing ciphering an integrity
protection using new CK and IK }
}

```

NOTE: ISR considered not in the scope of this test case, so it is never activated.

9.2.3.3.4.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 23.003 clause 2.8.2.1, 2.8.2.2, TS 23.401 Annex J.2; TS 24.301 clause 5.5.3.2.2 and Annex D; TS 25.331 clauses 8.1.8.2, 8.1.8.3 (on IDNNS) and 8.3.8.2; TS 24.008 clause 4.7.5.1.1 and 4.7.5.1.3; TS 23.236 clause 5.1; and TS 36.331 clauses 5.3.3.3 and 5.3.3.4.

[TS 23.003, clause 2.8.2.1]

The mapping of the GUTI shall be done to the combination of RAI of GERAN / UTRAN and the P-TMSI:

E-UTRAN <MCC> maps to GERAN/UTRAN <MCC>

E-UTRAN <MNC> maps to GERAN/UTRAN <MNC>

E-UTRAN <MME Group ID> maps to GERAN/UTRAN <LAC>

E-UTRAN <MME Code> maps to GERAN/UTRAN <RAC> and is also copied into the 8 most significant bits of the NRI field within the P-TMSI;

E-UTRAN <M-TMSI> maps as follows:

- 6 bits of the E-UTRAN <M-TMSI> starting at bit 29 and down to bit 24 are mapped into bit 29 and down to bit 24 of the GERAN/UTRAN <P-TMSI>;
- 16 bits of the E-UTRAN <M-TMSI> starting at bit 15 and down to bit 0 are mapped into bit 15 and down to bit 0 of the GERAN/UTRAN <P-TMSI>;
- and the remaining 8 bits of the E-UTRAN <M-TMSI> are mapped into the 8 MBS bits of the <P-TMSI signature> field.

For UTRAN, the 10-bit long NRI bits are masked out from the P-TMSI and also supplied to the RAN node as IDNNS (Intra Domain NAS Node Selector). However, the RAN configured NRI length should not exceed 8 bits.

[TS 23.003, clause 2.8.2.2]

The mapping of P-TMSI (TLLI) and RAI in GERAN/UTRAN to GUTI in E-UTRAN shall be performed as follows:

GERAN/UTRAN <MCC> maps to E-UTRAN <MCC>

GERAN/UTRAN <MNC> maps to E-UTRAN <MNC>

GERAN/UTRAN <LAC> maps to E-UTRAN <MME Group ID>

GERAN/UTRAN <RAC> maps into bit 23 and down to bit 16 of the M-TMSI

The 8 most significant bits of GERAN/UTRAN <NRI> map to the MME code.

GERAN/UTRAN <P-TMSI> maps as follows:

- 6 bits of the GERAN/UTRAN <P-TMSI> starting at bit 29 and down to bit 24 are mapped into bit 29 and down to bit 24 of the E-UTRAN <M-TMSI>;
- 16 bits of the GERAN/UTRAN <P-TMSI> starting at bit 15 and down to bit 0 are mapped into bit 15 and down to bit 0 of the E-UTRAN <M-TMSI>.

The values of <LAC> and <MME group id> shall be disjoint, so that they can be differentiated. The most significant bit of the <LAC> shall be set to zero; and the most significant bit of <MME group id> shall be set to one. Based on this definition, the most significant bit of the <MME group id> can be used to distinguish the node type, i.e. whether it is an MME or SGSN.

[TS 23.401, Annex J.2 "Usage of TIN"]

...

When ISR is not active the TIN is always set to the temporary ID belonging to the currently used RAT. This guarantees that always the most recent context data are used, which means during inter-RAT changes there is always context transfer from the CN node serving the last used RAT. The UE identities, old GUTI IE and additional GUTI IE, indicated in the next TAU Request message, and old P-TMSI IE and additional P-TMSI/RAI IE, indicated in the next RAU Request message depend on the setting of TIN and are specified in table 4.3.5.6-2.

[TS 24.301, clause 5.5.3.2.2 "Normal and periodic tracking area updating procedure initiation"]

...

If the UE supports A/Gb mode or Iu mode, the UE shall handle the GUTI as follows:

- if the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the old GUTI IE. If a P-TMSI signature is associated with the P-TMSI, the UE shall include it in the Old P-TMSI signature IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.
- if the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

If the UE has a current EPS security context, the UE shall include the eKSI (either KSI_{ASME} or KSI_{SGSN}) in the NAS Key Set Identifier IE in the TRACKING AREA UPDATE REQUEST message. Otherwise, the UE shall set the NAS Key Set Identifier IE to the value "no key is available". If the UE has a current EPS security context, the UE shall integrity protect the TRACKING AREA UPDATE REQUEST message with the current EPS security context. Otherwise the UE shall not integrity protect the TRACKING AREA UPDATE REQUEST message.

...

When the tracking area updating procedure is initiated in EMM-IDLE mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode and the TIN is set to "P-TMSI", the UE shall include the GPRS ciphering key sequence number applicable for A/Gb mode or Iu mode and a $nonce_{UE}$ in the TRACKING AREA UPDATE REQUEST message.

...

If the UE initiates the first tracking area updating procedure following an attach in A/Gb mode or Iu mode, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

...[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
...		
Tracking Area Update	MO signalling (See Note 1)	"originating signalling"
...		
Note 1: For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".		

[TS 36.331, clause 5.3.3.3]

The UE shall set the contents of *RRCCONNECTIONREQUEST* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;
 - 2> else
 - 3> draw a random value in the range $0..2^{40}-1$ and set the *ue-Identity* to this value;

NOTE 1: Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 1> Set the *establishmentCause* in accordance with the information received from upper layers;

[TS 36.331, clause 5.3.3.4]

...

- 1> set the content of *RRCCONNECTIONSETUPCOMPLETE* message as follows:
 - 2> set the *selectedPLMN-Identity* to the PLMN selected by upper layers (see TS 23.122 [11], TS 24.301 [35]) from the PLMN(s) included in the *plmn-IdentityList* in *SystemInformationBlockType1*;
 - 2> if upper layers provide the 'Registered MME', set the *registeredMME* as follows:
 - 3> if the PLMN identity of the 'Registered MME' is different from the PLMN selected by the upper layers:
 - 4> include the *plmnIdentity* in the *registeredMME* and set it to the value of the PLMN identity in the 'Registered MME' received from upper layers;
 - 3> set the *mmegi* and the *mmec* to the value received from upper layers;
 - 2> set the *dedicatedInfoNAS* to include the information received from upper layers;

...

[TS 24.008, clause 4.7.5.1.1]

To initiate the normal routing area updating procedure, the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-AREA-UPDATING-INITIATED.

If the MS supports S1 mode, the MS shall handle the P-TMSI IE as follows:

- If the TIN indicates "GUTI" and the MS holds a valid GUTI, the MS shall map the GUTI into a P-TMSI, P-TMSI signature and RAI as specified in 3GPP TS 23.003 [4]. The MS shall include the mapped RAI in the Old routing area identification IE and the mapped P-TMSI signature in the P-TMSI signature IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the mapped P-TMSI in the P-TMSI IE. Additionally, in Iu mode and A/Gb mode, if the MS holds a valid P-TMSI and RAI, the MS shall

indicate the P-TMSI in the Additional mobile identity IE and the RAI in the Additional old routing area identification IE.

...

If the routing area updating procedure is initiated by the MS due to an S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in idle mode and the TIN indicates "GUTI", the message ROUTING AREA UPDATE REQUEST shall include a P-TMSI signature filled with a NAS token as specified in 3GPP TS 33.401 [119]. In the GPRS ciphering key sequence number IE the MS shall indicate the value of the eKSI associated with the current EPS security context.

NOTE: When the MS includes a P-TMSI signature filled with a NAS token, 8 bits of the NAS token will be filled with bits from the M-TMSI (see 3GPP TS 23.003 [4]).

If the routing area updating procedure is initiated by the MS due to the S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in connected mode, the MS shall derive CK' and IK' from K_{ASME} and from the NAS downlink COUNT value indicated by lower layers as specified in 3GPP TS 33.401 [119]. If the routing area updating procedure is initiated by the MS due to the S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in idle mode when the TIN indicates "GUTI", the MS shall derive CK' and IK' from the K_{ASME} and the NAS downlink COUNT value corresponding to the NAS token derived as specified in 3GPP TS 33.401 [119]. The MS shall indicate the eKSI value in the CKSN field of the GPRS ciphering key sequence number IE in the ROUTING AREA UPDATE REQUEST message. Then, the MS shall reset the START value and store the mapped UMTS security context replacing the established UMTS security context.

[TS 24.008, clause 4.7.5.1.3]

...

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contained any of:

- a P-TMSI;
- Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322 [19b]); or
- a request for the provision of Inter RAT handover information or E-UTRAN inter RAT handover information or both.

If Receive N-PDU Numbers were included, the Receive N-PDU Numbers values valid in the MS, shall be included in the ROUTING AREA UPDATE COMPLETE message.

If the network has requested the provision of Inter RAT handover information or E-UTRAN inter RAT handover information or both, the MS shall return a ROUTING AREA UPDATE COMPLETE message including the Inter RAT handover information IE or E-UTRAN inter RAT handover information IE or both to the network.

NOTE 1: In Iu mode, after a routing area updating procedure, the mobile station can initiate Service Request procedure to request the resource reservation for the active PDP contexts if the resources have been released by the network or send upper layer message (e.g. ACTIVATE PDP CONTEXT REQUEST) to the network via the existing PS signalling connection.

In Iu mode, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message. If the network wishes to release the PS signalling connection, the network shall indicate "no follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message.

After that in Iu mode, the mobile station shall act according to the follow-on proceed flag included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).

[TS 23.236, clause 5.1 "MS Functions"]

...

In Iu mode the MS provides the IDNNS to the RNC in the access stratum part of the *RRC_initial_DT* message as described in TS 25.331 [5].

If the MS is E-UTRAN capable, then TS 23.401 [22], TS 23.060 [2] and TS 23.003 [18] define rules as to how the MS shall select and encode the identity to place in the P-TMSI/TLI parameters used in the Routing Area Update procedure. For the PS domain, the E-UTRAN capable MS shall use this P-TMSI parameter to derive the UTRAN IDNNS parameter. For the CS domain, the E-UTRAN temporary identities shall not be used to derive the IDNNS: instead the MS shall use its (MSC supplied) TMSI, if that TMSI is valid, to derive the IDNNS.

...

When the MS in Iu mode replies to IMSI paging, it shall derive IDNNS from (P)TMSI if a valid one is available. If (P)TMSI is not available, the MS shall derive IDNNS from IMSI.

[TS 25.331, clause 8.1.8.2]

In the UE, the initial direct transfer procedure shall be initiated, when the upper layers request establishment of a signalling connection. This request also includes a request for the transfer of a NAS message.

Upon initiation of the initial direct transfer procedure the UE shall:

- 1> set the variable ESTABLISHMENT_CAUSE to the cause for establishment indicated by upper layers.

Upon initiation of the initial direct transfer procedure when the UE is in idle mode, the UE shall:

- 1> perform an RRC connection establishment procedure, according to subclause 8.1.3;

NOTE: If an RRC connection establishment is ongoing, this procedure continues unchanged, i.e. it is not interrupted.

- 1> if the RRC connection establishment procedure was not successful:
 - 2> if the establishment cause for the failed RRC connection establishment was set to "MBMS reception" and a different cause value is stored in the variable "ESTABLISHMENT_CAUSE":
 - 3> UE-AS (RRC) initiates a new RRC connection establishment procedure, using the establishment cause as contained in the variable ESTABLISHMENT_CAUSE.
 - 2> otherwise:
 - 3> indicate failure to establish the signalling connection to upper layers and end the procedure.
- 1> when the RRC connection establishment procedure is completed successfully:
 - 2> continue with the initial direct transfer procedure as below.

...

The UE shall, in the INITIAL DIRECT TRANSFER message:

- 1> set the IE "NAS message" as received from upper layers; and
- 1> set the IE "CN domain identity" as indicated by the upper layers; and
- 1> set the IE "Intra Domain NAS Node Selector" as follows:
 - 2> derive the IE "Intra Domain NAS Node Selector" from TMSI/PTMSI, IMSI, or IMEI; and
 - 2> provide the coding of the IE "Intra Domain NAS Node Selector" according to the following priorities:
 - 1. derive the routing parameter for IDNNS from TMSI (CS domain) or PTMSI (PS domain) whenever a valid TMSI/PTMSI is available;
 - 2. base the routing parameter for IDNNS on IMSI when no valid TMSI/PTMSI is available;
 - 3. base the routing parameter for IDNNS on IMEI only if no (U)SIM is inserted in the UE.
- 1> if the UE, on the existing RRC connection, has received a dedicated RRC message containing the IE "Primary PLMN Identity" in the IE "CN Information Info":

- 2> set the IE "PLMN identity" in the INITIAL DIRECT TRANSFER message to the latest PLMN information received via dedicated RRC signalling. If NAS has indicated the PLMN towards which a signalling connection is requested, and this PLMN is not in agreement with the latest PLMN information received via dedicated RRC signalling, then the initial direct transfer procedure shall be aborted, and NAS shall be informed.
- 1> if the UE, on the existing RRC connection, has not received a dedicated RRC message containing the IE "CN Information Info" , and if the IE "Multiple PLMN List" was broadcast in the cell where the current RRC connection was established:
 - 2> set the IE "PLMN identity" in the INITIAL DIRECT TRANSFER message to the PLMN chosen by higher layers [5, 25] amongst the PLMNs in the IE "Multiple PLMN List" broadcast in the cell where the RRC connection was established.

[TS 25.331, clause 8.1.8.3]

On reception of the INITIAL DIRECT TRANSFER message the NAS message should be routed using the IE "CN Domain Identity". UTRAN may also use the IE "Intra Domain NAS Node Selector" and the IE "PLMN identity" for routing among the CN nodes for the addressed CN domain.

If no signalling connection exists towards the chosen node, then a signalling connection is established.

When the UTRAN receives an INITIAL DIRECT TRANSFER message, it shall not affect the state of any other ongoing RRC procedures, when not stated otherwise elsewhere.

The UTRAN should:

- 1> set the START value for the CN domain indicated in the IE "CN domain identity" to the value of the IE "START".

[TS 25.331, clause 8.3.8.2]

When the UE makes an inter-RAT cell reselection to UTRAN according to the criteria specified in [4], it shall initiate this procedure. The inter-RAT cell reselection made by the UE may use system information broadcast from the source radio access technology or UE dedicated information.

If the NAS procedures associated with inter-system change specified in [5] require the establishment of an RRC connection, the UE shall:

- 1> set the variable ESTABLISHMENT_CAUSE to "Inter-RAT cell reselection";
- NOTE: This value of ESTABLISHMENT_CAUSE has priority over the cause requested by upper layers.
- 1> initiate an RRC connection establishment procedure as specified in subclause 8.1.3;
- 1> after initiating an RRC connection establishment:
 - 2> release all resources specific to the other radio access technology.

If the NAS procedures associated with inter-system change specified in [5] do not require the establishment of an RRC connection, the UE shall:

- 1> enter idle mode in the target cell without accessing the cell; and
- 1> release all resources specific to the other radio access technology.

9.2.3.3.4.3 Test description

9.2.3.3.4.3.1 Pre-test conditions

System Simulator:

- cell A is configured as Serving cell, cell 5 as Non-Suitable cell;
- cell 5 (belongs to LAI-2) is operating in network operation mode II (No Gs interface present);
- cell A has the absolute priorities set to LTE.

- System information combination 4 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: For cell 5, power levels are defined in TS 34.108 subclause 6.1.5 (FDD) or 6.1.6 (TDD).

UE:

- the UE is previously registered on UTRAN, and when on UTRAN, the UE is last registered on cell 5 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Registered Idle Mode (state 2) in cell A according to TS 36.508 [18].

9.2.3.3.4.3.2 Test procedure sequence

Table 9.2.3.3.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The signal strength of Cell 5 is raised to that of the Serving Cell and that of Cell A is lowered to that of a non-Suitable Neighbour Cell as defined in table 6.2.2.1-1 of TS 36.508 [18].	-	-	-	-
2	Void	-	-	-	-
3	Void	-	-	-	-
4	Void	-	-	-	-
-	EXCEPTION: The behaviour in table 9.2.3.3.4.3.2-2 occurs in parallel with step 5	-	-	-	-
5	Check: Does the UE transmit a ROUTING AREA UPDATE REQUEST message on Cell 5 as specified in the specific message contents included in an INITIAL DIRECT TRANSFER message with <i>intraDomainNasNodeSelector</i> mapped from GUTI-1? The required RRC Connection is established using Establishment Cause set to inter-RAT cell-selection.	-->	ROUTING AREA UPDATE REQUEST	1	P
5A	The SS sends a SECURITY MODE COMMAND message to activate integrity protection and ciphering. This message is integrity protected using IK' derived from K _{ASME} and UL NAS COUNT.	-	-	-	-
5B	Check: Does the UE transmit a SECURITY MODE COMPLETE message integrity protected using IK' derived from K _{ASME} and UL NAS COUNT?	-	-	4	P
6	The SS transmits a ROUTING AREA UPDATE ACCEPT message with Update result = "RA updated" and new P-TMSI allocated with a different NRI (=IDNNS) to that in the GUTI and the P-TMSI that was stored on the USIM. This message is ciphered and integrity protected using CK' and IK' derived from K _{ASME} and UL NAS COUNT.	<--	ROUTING AREA UPDATE ACCEPT	-	-
7	Check: Does the UE transmit a ROUTING AREA UPDATE COMPLETE message ciphered and integrity protected using CK' and IK' derived from K _{ASME} and UL NAS COUNT?	-->	ROUTING AREA UPDATE COMPLETE	4	P
8	The SS releases the RRC connection	-	-	-	-
9	The SS transmits Paging with new P-TMSI allocated in step 6 on cell 5	<--	Page	-	-
10	Check: Does the UE send a Service Request to access the PS domain using IDNNS mapped from the P-TMSI allocated in step 6?	-->	SERVICE REQUEST	2	P
10 A	The SS sends an AUTHENTICATION AND CIPHERING REQUEST message to perform a UMTS AKA procedure.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
10 B	The UE sends an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
11	The SS sends a SECURITY MODE COMMAND message to activate integrity protection and ciphering. This message is integrity protected using new IK.	-	-	-	-
11 A	Check: Does the UE transmit a SECURITY MODE COMPLETE message integrity protected using new IK?	-	-	5	-
11 B	The SS transmits a UE CAPABILITY ENQUIRY message requesting the UE E-	-	-	5	P

	UTRAN capability. This message is ciphered and integrity protected using new CK and IK. Check: Does the UE transmit a UE CAPABILITY INFORMATION message? Note: the purpose of this message is to show that the UE uses new CK and IK, and not CK' and IK' used in step 7.				
11 C	SS transmits a UE CAPABILITY INFORMATION CONFIRM message	<--	UE CAPABILITY INFORMATION CONFIRM	-	-
12	The SS releases the RRC connection	-	-	-	-
12 A	Cell A is configured as the Serving cell and cell 5 is configured as a Suitable Neighbour Cell.	-	-	-	-
12 B	Check: Does the UE transmit an RRCConnectionRequest with the <i>ue-Identity</i> set for pre-Rel-12 UE to s-TMSI or "random value", and for Rel-12 and onwards UE set to randomValue, the <i>establishmentCause</i> set to <i>MO-signalling</i> ?	-->	RRCConnectionRequest	3	P
13	The SS responds with RRCConnectionSetup.	<--	RRCConnectionSetup	-	-
14	Check: Does the UE transmit an RRCConnectionSetupComplete message with the <i>mme-gi</i> and <i>mme-c</i> set to the values derived from the mapped RAI and P-TMSI and with the <i>gummei</i> type set to mapped when randomValue is included in step 12B, otherwise without the registeredMME included, and containing a TRACKING AREA UPDATE REQUEST message?	-->	RRCConnectionSetupComplete (TRACKING AREA UPDATE REQUEST)	3	P
15	The SS responds with a TRACKING AREA UPDATE ACCEPT message	<--	TRACKING AREA UPDATE ACCEPT	-	-
15 A	UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
16	The SS releases the RRC connection.	-	-	-	-

Table: 9.2.3.3.4.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
	EXCEPTION: Steps 1a1 to 1a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if the UE is configured in PS/CS mode of operation.				
1a1	Check: The UE transmits a LOCATION UPDATING REQUEST on cell 5 to the MSC as specified in the specific message contents included in an INITIAL DIRECT TRANSFER message with <i>intraDomainNasNodeSelector</i> mapped from MSC TMSI allocated in the ATTACH ACCEPT message (step 14 table 4.5.2.3-1 of TS 36.508 [18]).	-->	LOCATION UPDATING REQUEST	1	P
1a2	The SS transmits a LOCATION UPDATING ACCEPT message.	<--	LOCATION UPDATING ACCEPT	-	-

9.2.3.3.4.3.3 Specific message contents

Table 9.2.3.3.4.3.3-1: Void

Table 9.2.3.3.4.3.3-2: Void

Table 9.2.3.3.4.3.3-2A: INITIAL DIRECT TRANSFER (step 1a1, Table 9.2.3.3.4.3.2-2)

Derivation path: 25.331 clause 11			
Information Element	Value/Remark	Comment	Condition
InitialDirectTransfer ::= SEQUENCE {			
cn-DomainIdentity	cs-domain		
intraDomainNasNodeSelector SEQUENCE {			
version CHOICE {			
release99 SEQUENCE {			
gsm-Map-IDNNS SEQUENCE {			
routingbasis CHOICE {			
tMSIofsamePLMN {			
Routingparameter	bit 23 to bit 14 of TMSI allocated in pre-test		
}			
}			
}			
}			
}			
nas-Message	See table 9.2.3.3.4.3.3-5		
measuredResultsOnRACH	Not checked		
v3a0NonCriticalExtensions SEQUENCE {			
initialDirectTransfer-v3a0ext SEQUENCE {			
start-Value	Any		
}			
laterNonCriticalExtensions SEQUENCE {			
initialDirectTransfer-r3-add-ext	Not checked		
v590NonCriticalExtension SEQUENCE {			
initialDirectTransfer-v590ext SEQUENCE {			
establishmentCause	Registration or Not present		
}			
}			
v690NonCriticalExtensions	Not checked		
}			
}			
}			
}			
}			
}			

Table 9.2.3.3.4.3.3-3: LOCATION UPDATING REQUEST (step 1a1, Table 9.2.3.3.4.3.2-2)

Derivation path: 24.008 table 9.2.17			
Information Element	Value/Remark	Comment	Condition
Update type	1000	LA updating	
Ciphering key sequence number	eKSI stored on the test USIM		
Location area identification	PLMN= MCC/MNC TAC 1=1	"PLMN is set to the same MCC/MNC stored in EF _{IMS1} " "TA1-1"	
Mobile identity	TMSI-1	Allocated in preamble	

Table 9.2.3.3.4.3.3-3A: LOCATION UPDATING ACCEPT (step 4, Table 9.2.3.3.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity	Not present		

Table 9.2.3.3.4.3.3-4: INITIAL DIRECT TRANSFER (step 5, Table 9.2.3.3.4.3.2-1)

Derivation path: 25.331 clause 11			
Information Element	Value/Remark	Comment	Condition
InitialDirectTransfer ::= SEQUENCE {			
cn-DomainIdentity	ps-domain		
intraDomainNasNodeSelector SEQUENCE {			
version CHOICE {			
release99 SEQUENCE {			
gsm-Map-IDNNS SEQUENCE {			
routingbasis CHOICE {			
tMSIofsamePLMN {			
Routingparameter	bit 23 to bit 14 of P-TMSI mapped from GUTI allocated to UE in pre-test		
}			
}			
}			
}			
}			
}			
nas-Message	See table 9.2.3.3.4.3.3-5		
measuredResultsOnRACH	Not checked		
v3a0NonCriticalExtensions SEQUENCE {			
initialDirectTransfer-v3a0ext SEQUENCE {			
start-Value	Any		
}			
laterNonCriticalExtensions SEQUENCE {			
initialDirectTransfer-r3-add-ext	Not checked		
v590NonCriticalExtension SEQUENCE {			
initialDirectTransfer-v590ext SEQUENCE {			
establishmentCause	Registration or Not present		
}			
v690NonCriticalExtensions	Not checked		
}			
}			
}			
}			
}			
}			

Table 9.2.3.3.4.3-5: Message ROUTING AREA UPDATE REQUEST (step 5, Table 9.2.3.3.4.3.2-1)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
Update type	000	RA updating	
GPRS ciphering key sequence number	eKSI stored on the test USIM		
Old routing area identification	GUTI-1 right shifted by 32bits		
MS Radio Access capability	Not checked		
Old P-TMSI signature	Mapped from GUTI-1		
Requested READY timer value	Not checked		
DRX parameter	Not checked		
TMSI status	Not present		
P-TMSI	Value is specified bit by bit below: - bit 31 and bit 30: 1 - bit 29 to bit 24: bit 29 to bit 24 of M-TMSI allocated in preamble - bit 23 to bit 16: MME code allocated in preamble - bit 15 to bit 0: bit 15 to bit 0 of M-TMSI allocated in preamble		
MS network capability	Not checked		
PDP context status	Not checked		
PS LCS Capability	Not checked		
MBMS context status	Not checked		
UE network capability	Any allowed value		
Additional mobile identity	P-TMSI allocated in pre-test		
Additional old routing area identification	RAI-1		
Mobile station classmark 2	Not checked		
Mobile station classmark 3	Not checked		
Supported Codecs	Not checked		

Table 9.2.3.3.4.3-6: Message SERVICE REQUEST (step 10, Table 9.2.3.3.4.3.2-1)

Derivation path: 24.008 table 9.4.20			
Information Element	Value/Remark	Comment	Condition
Ciphering key sequence number	FFS		
Service Type	010 (Paging Response)		
P-TMSI	P-TMSI allocated in step 6.		

Table 9.2.3.3.4.3-6A: SECURITY MODE COMMAND (step 11, Table 9.2.3.3.4.3.2-1)

Derivation path: 34.108 clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
RRC transaction identifier	Arbitrarily selects an integer between 0 and 3		
Integrity check info			
- Message authentication code	Set to MAC-I value computed by the SS. The first/ leftmost bit of the bit string contains the most significant bit of the MAC-I.		
- RRC Message Sequence Number	Set to an arbitrarily selected integer between 0 and 15		
Security capability	Set same value as originally sent by UE in the RRC CONNECTION SETUP COMPLETE message in step 10.		
Ciphering mode info			
- Ciphering mode command	Start/restart		
- Ciphering algorithm	Set one of the algorithms supported by the UE as indicated in the IE "security capability" in the RRC CONNECTION SETUP COMPLETE message in step 10.		
- Ciphering activation time for DPCH	Not Present		
- Radio bearer downlink ciphering activation time info			
- Radio bearer activation time			
- RB identity	1		
- RLC sequence number	Current RLC SN stored in the SS		
- RB identity	2		
- RLC sequence number	Current RLC SN stored in the SS +2		
- RB identity	3		
- RLC sequence number	Current RLC SN stored in the SS		
- RB identity	4		
- RLC sequence number	Current RLC SN stored in the SS		
Integrity protection mode info			
- Integrity protection mode command	startIntegrityProtection		
- Integrity protection initialisation number	Arbitrary selects 32 bits number for FRESH		
- Integrity protection algorithm	Set one of the algorithms supported by the UE as indicated in the IE "security capability" in the RRC CONNECTION SETUP COMPLETE message in step 10.		
CN domain identity	PS		
UE system specific security capability	Not present		not GSM
UE system specific security capability			GSM
- Inter-RAT UE security capability			
- CHOICE system	GSM		
- GSM security capability	Set the same as the algorithms supported by the UE as indicated in the IE "UE system specific capability" in the		

	RRC CONNECTION SETUP COMPLETE message in step 10.		
--	---	--	--

Condition	Explanation
GSM	UE supporting GSM

Table 9.2.3.3.4.3-6B: SECURITY MODE COMPLETE (step 11 A , Table 9.2.3.3.4.3.2-1)

Derivation path: 34.108 clause 9.1.1			
Information Element	Value/Remark	Comment	Condition
RRC transaction identifier	The value of this IE is checked to see that it matches the value of the same IE transmitted in the downlink SECURITY MODE COMMAND message.		
Integrity check info			
- Message authentication code	This IE is checked to see if it is present. The value is compared against the XMAC-I value computed by SS. The first/ leftmost bit of the bit string contains the most significant bit of the MAC-I.		
- RRC Message Sequence Number	The value is used by SS to compute the XMAC-I value.		
Uplink integrity protection activation info			
- RRC message sequence number list			
- RRC message sequence number	Check to see if the RRC SN for RB 0 is present		
- RRC message sequence number	Check to see if the RRC SN for RB 1 is present		
- RRC message sequence number	Check to see if the RRC SN for RB 2 is present		
- RRC message sequence number	Check to see if the RRC SN for RB 3 is present		
- RRC message sequence number	Check to see if the RRC SN for RB 4 is present		
Radio bearer uplink ciphering activation time info			
- Radio bearer activation time			
- RB Identity	1		
- RLC sequence number	Check to see if the RLC SN for RB1 is present		
- RB Identity	2		
- RLC sequence number	Check to see if the RLC SN for RB2 is present		
- RB Identity	3		
- RLC sequence number	Check to see if the RLC SN for RB3 is present		
- RB Identity	4		
- RLC sequence number	Check to see if the RLC SN for RB4 is present		

Table 9.2.3.3.4.3.3-7: Message RRCConnectionRequest (step 12 B, Table 9.2.3.3.4.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
RRCConnectionRequest ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcConnectionRequest-r8 SEQUENCE {			
ue-Identity CHOICE {			
s-TMSI	Received from upper layer NAS	Rel-8 to Rel-11 inclusive	
randomValue	Any allowed value	Rel-8 and onwards	
}			
establishmentCause	Mo-Signalling		
}			
}			
}			

Table 9.2.3.3.4.3.3-8: Message RRCConnectionSetupComplete (step 14, Table 9.2.3.3.4.3.2-1)

Derivation path: 36.508 table 4.6.1-18			
Information Element	Value/Remark	Comment	Condition
RRCConnectionSetupComplete ::= SEQUENCE {			
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionSetupComplete-r8 SEQUENCE {			
selectedPLMN-Identity	1		
registeredMME	Not present	Shall be absent if the upper layers provided s-TMSI in RRCConnectionRequest message in step 12B for pre-Rel-12 UE	
registeredMME {		Present only when the ue-Identity in step 12B is set to randomValue	
plmn-Identity	Not present		
Mmegi	LAC sent to the UE in step 6		
Mmec	Bit 23 to bit 16 of P-TMSI sent to the UE in step 6		
}			
dedicatedInfoNAS	See table 9.2.3.3.4.3.3-9		
nonCriticalExtension SEQUENCE {			
nonCriticalExtension SEQUENCE {			
gummei-Type-r10	mapped	Present when the registeredMME is included	
}			
}			
}			
}			
}			
}			

Table 9.2.3.3.4.3.3-9: Message TRACKING AREA UPDATE REQUEST (step 14, Table 9.2.3.3.4.3.2-1)

Derivation path: 36.508 table 4.7.2-27 with condition UNCIPHERED (the message is integrity protected using the key stored in the USIM).			
Information Element	Value/Remark	Comment	Condition
EPS update type	000 or 010	'TA updating' or 'combined TALA updating with IMSI attach'	
NAS key set identifier			
NAS key set identifier	The valid NAS key set identifier stored in the USIM		
TSC	'0'B	native security context (for KSI _{ASME})	
Old GUTI or IMSI			
Type of identity	110	GUTI	
MNC/MCC	Mobile Country Code and Mobile Network Code stored in EF _{IMSI} on the test USIM		
MME Group ID	LAI allocated at step 8		
MME Code	Bit 23 to bit 16 of P-TMSI allocated at step 8		
M-TMSI	Value is specified bit by bit below: - bit 31 and bit 30: FFS - bit 29 to bit 24: bit 29 to bit 24 of P-TMSI allocated at step 8 - bit 23 to bit 16: RAC allocated at step 8 - bit 15 to bit 0: bit 15 to bit 0 of P-TMSI allocated at step 8		
GPRS ciphering key sequence number	GPRS ciphering key sequence number allocated at step 10A		
Old P-TMSI signature	P-TMSI signature allocated at step 8		
Additional GUTI	GUTI-1		
Nonce _{UE}	Any allowed value (must be present)		
UE network capability	Any allowed value (must be present)		
Last visited registered TAI	TAI stored in the test USIM		
MS network capability	Any allowed value (must be present)		
Old location area identification	Not present if "EPS update type" is 'TA updating', LAI-2 is "EPS update type" is 'combined TALA updating'		
TMSI status	Not present		

9.2.3.3.5 Periodic routing area update

9.2.3.3.5.1 Test Purpose (TP)

(1)

```
with { UE is camped on an E-UTRAN cell or in ECM-CONNECTED state and ISR is activated }
ensure that {
  when { UE performs E-UTRA RRC state transitions }
```

```

    then { UE keeps the periodic routing area update timer T3312 running }
  }

```

(2)

```

with { UE is camped on an E-UTRAN cell or ECM-CONNECTED state and ISR is activated }
ensure that {
  when { the periodic routing area update timer T3312 expires }
  then { UE does not change RAT }
}

```

(3)

```

with { UE is in state GMM-REGISTERED.NO-CELL-AVAILABLE and ISR is activated and the periodic routing
area update timer T3312 expires }
ensure that {
  when { UE enters the state GMM-REGISTERED.NORMAL-SERVICE }
  then { UE initiates the routing area updating procedure }
}

```

9.2.3.3.5.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.008, clause 4.7.2.2 and TS 23.401, clause 4.3.5.2.

[TS 24.008, clause 4.7.2.2]

If ISR is activated, the MS shall keep both the periodic tracking area update timer (timer T3412) and the periodic routing area update timer (timer T3312). The two separate timers run in the MS for updating MME and SGSN independently. If the periodic routing area update timer expires and the MS is in state GMM-REGISTERED.NO-CELL-AVAILABLE, the MS shall set its TIN to "RAT-related TMSI" and start the GERAN/UTRAN Deactivate ISR timer T3323. The MS shall initiate the routing area updating procedure and stop the timer T3323 when the MS enters the state GMM-REGISTERED.NORMAL-SERVICE before timer T3323 expires. After expiry of timer T3323 the MS shall deactivate ISR by setting its TIN to "GUTI" and initiate the routing area updating procedure when the UE enters the state GMM-REGISTERED.NORMAL-SERVICE.

[TS 23.401, clause 4.3.5.2]

If the UE is camped on an E-UTRAN cell or is in ECM-CONNECTED state when the UE's periodic RAU or periodic LAU timer expires and ISR is activated the UE shall start the GERAN/UTRAN Deactivate ISR timer. After the GERAN/UTRAN Deactivate ISR timer expires the UE shall deactivate ISR by setting its TIN to "GUTI". The GMM/PMM-REGISTERED UE shall remember it has to perform a Routing Area Update to the SGSN or a Location Area Update to the MSC when it next returns to 2G/3G coverage.

The E-UTRAN Deactivate ISR timer is stopped when the UE performs a successful TAU; and the GERAN/UTRAN Deactivate ISR timer is stopped when the UE performs a successful RAU/LAU.

Expiry of the periodic TAU timer, or, the periodic RAU timer, or, the periodic LAU timer shall not cause the UE to change RAT.

...

E-UTRAN RRC state transitions shall have no impact on the periodic RAU timer or periodic LAU timer except that handover from 2G/3G to E-UTRAN shall cause the periodic RAU timer to be started from its initial value.

9.2.3.3.5.3 Test description

9.2.3.3.5.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1, home PLMN) is set to "Serving cell";
- if pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA, cell 5 (home PLMN, RAI-1, NMO 1) is set to "Non-suitable cell";
- if pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN, cell 24 (home PLMN, RAI-1, NMO 1) is set to "Non-suitable cell";
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

NOTE: Setting `px_RATComb_Testcd = EUTRA_Only` is not allowed.

UE:

- if `pc_UTRA AND px_RATComb_Testcd = EUTRA_UTRA`, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if `pc_GERAN AND px_RATComb_Testcd = EUTRA_GERAN`, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.2.3.3.5.3.2 Test procedure sequence

Table 9.2.3.3.5.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1 to 1b5 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
1a1	IF pc_UTRA THEN the SS sets the cell type of Cell 5 to "Serving cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
1a2	The UE transmits a ROUTING AREA UPDATE REQUEST message on Cell 5.	-->	ROUTING AREA UPDATE REQUEST	-	-
1a3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5.	<--	ROUTING AREA UPDATE ACCEPT	-	-
1a4	Void	-	-	-	-
1a5	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
1b1	ELSE IF pc_GERAN THEN the SS sets the cell type of Cell 24 to "Serving cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
1b2	The UE transmits a ROUTING AREA UPDATE REQUEST message on Cell 24.	-->	ROUTING AREA UPDATE REQUEST	-	-
1b2	The SS transmits an Authentication and Ciphering Request message on Cell 24	<--	Authentication and Ciphering Request	-	-
1b2	The UE transmits an Authentication and Ciphering Response message on Cell 24	-->	Authentication and Ciphering Response	-	-
1b3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 24	<--	ROUTING AREA UPDATE ACCEPT	-	-
1b4	Void	-	-	-	-
1b5	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 24 to "Non-suitable cell".	-	-	-	-
-	EXCEPTION: Steps 1Aa1 to 1Aa4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place according to UE mode of operation.	-	-	-	-
1A a1	IF CS/PS mode 1 or CS/PS mode 2 of operation is configured on the UE and px_AttachTypeTested is set to COMBINED_ATTACH THEN the UE transmits a TRACKING AREA UPDATE REQUEST message on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
1A a2	The SS transmits a TRACKING AREA UPDATE ACCEPT message on Cell A.	<--	TRACKING AREA UPDATE ACCEPT	-	-
1A a3	The UE transmits a TRACKING AREA UPDATE COMPLETE message on Cell A.	-->	TRACKING AREA UPDATE COMPLETE	-	-
1A a4	The SS releases the RRC connection.	-	-	-	-
2	The SS waits for 1 min.	-	-	-	-
3	The SS pages the UE on Cell A using S-TMSI with CN domain indicator set to "PS".	<--	-	-	-
4	The UE transmits a SERVICE REQUEST message on Cell A.	-->	SERVICE REQUEST	-	-
5	The SS transmits an ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message on Cell A activating a new EPS bearer context. This message is included in an <i>RRCConnectionReconfiguration</i> message to setup the new radio bearer associated with the	<--	ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST	-	-

	dedicated EPS bearer context activated by the NAS message.				
6	The UE transmits an ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT message on Cell A.	-->	ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT	-	-
7	The SS transmits a DEACTIVATE EPS BEARER CONTEXT REQUEST message on Cell A deactivating the dedicated EPS bearer context activated at Step 5. This message is included in an <i>RRCConnectionReconfiguration</i> message.	<--	DEACTIVATE EPS BEARER CONTEXT REQUEST	-	-
8	The UE transmits a DEACTIVATE EPS BEARER CONTEXT ACCEPT message on Cell A.	-->	DEACTIVATE EPS BEARER CONTEXT ACCEPT	-	-
8A	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Steps 9a1 to 9b5 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
9a1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA THEN the SS sets the cell type of Cell 5 to "Serving cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
9a2	Check: When T3312 started after Step 1a3 expires, does the UE transmit a ROUTING AREA UPDATE REQUEST on Cell 5?	-->	ROUTING AREA UPDATE REQUEST	1	P
9a3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5.	<--	ROUTING AREA UPDATE ACCEPT	-	-
9a4	Void	-	-	-	-
9a5	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 5 to "Non-suitable cell".	-	-	-	-
9b1	ELSE IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the SS sets the cell type of Cell 24 to "Serving cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
9b2	Check: When T3312 started after Step 1b3 expires, does the UE transmit a ROUTING AREA UPDATE REQUEST on Cell 24?	-->	ROUTING AREA UPDATE REQUEST	1	P
9b3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 24 .	<--	ROUTING AREA UPDATE ACCEPT	-	-
9b4	Void	-	-	-	-
9b5	The SS sets the cell type of Cell A to "Serving cell" and the cell type of Cell 24 to "Non-suitable cell".	-	-	-	-
-	EXCEPTION: Steps 9Aa1 to 9Aa4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place according to UE mode of operation.	-	-	-	-
9A a1	IF CS/PS mode 1 or CS/PS mode 2 of operation is configured on the UE and px_AttachTypeTested is set to COMBINED_ATTACH THEN the UE transmits a TRACKING AREA UPDATE REQUEST message on Cell A.	-->	TRACKING AREA UPDATE REQUEST	-	-
9A a2	The SS transmits a TRACKING AREA UPDATE ACCEPT message on Cell A.	<--	TRACKING AREA UPDATE ACCEPT	-	-
9A a3	The UE transmits a TRACKING AREA UPDATE COMPLETE message on Cell A.	-->	TRACKING AREA UPDATE COMPLETE	-	-
9A a4	The SS releases the RRC connection.	-	-	-	-
10	The SS waits for 1 min.	-	-	-	-
11	The SS pages the UE on Cell A using S-TMSI	<--	-	-	-

	with CN domain indicator set to "PS".				
12	The UE transmits a SERVICE REQUEST message on Cell A.	-->	SERVICE REQUEST	-	-
13	The SS transmits an ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message on Cell A activating a new EPS bearer context. This message is included in an <i>RRConnectionReconfiguration</i> message to setup the new radio bearer associated with the dedicated EPS bearer context activated by the NAS message.	<--	ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST	-	-
14	The UE transmits an ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT message on Cell A.	-->	ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT	-	-
15	The SS waits until T3312 timer started at Step 9a3/9b3 has expired.	-	-	-	-
16	Check: After T3312 started after Step 9a3/9b3 expires and before T3323 expires, does the test result of generic test procedure in TS 36.508 subclause 6.4.2.6 indicate that a dedicated EPS bearer context is active on cell A?	-	-	2	-
17	The SS transmits a DEACTIVATE EPS BEARER CONTEXT REQUEST message on Cell A deactivating the dedicated EPS bearer context activated at Step 13. This message is included in an <i>RRConnectionReconfiguration</i> message.	<--	DEACTIVATE EPS BEARER CONTEXT REQUEST	-	-
18	The UE transmits a DEACTIVATE EPS BEARER CONTEXT ACCEPT message on Cell A.	-->	DEACTIVATE EPS BEARER CONTEXT ACCEPT	-	-
19	The SS waits for 2 min.	-	-	-	-
19 A	The SS releases the RRC connection.	-	-	-	-
20	Check: After T3312 started after Step 9a3/9b3 expires and before T3323 expires, does the test result of generic test procedure in TS 36.508 subclause 6.4.2.2 indicate that the UE is in state Registered, Idle Mode on Cell A?	-	-	2	-
-	EXCEPTION: Steps 21a1 to 21b4 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that takes place if a capability is supported.	-	-	-	-
21a 1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA THEN the SS sets the cell type of Cell 5 to "Serving cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
21a 2	Check: After T3312 started after Step 9a3 expires and before T3323 expires, does the UE transmit a ROUTING AREA UPDATE REQUEST message on Cell 5?	-->	ROUTING AREA UPDATE REQUEST	3	P
21a 3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 5.	<--	ROUTING AREA UPDATE ACCEPT	-	-
21a 4	Void	-	-		
21b 1	ELSE IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the SS sets the cell type of Cell 24 to "Serving cell" and the cell type of Cell A to "Non-suitable cell".	-	-	-	-
21b 2	Check: After T3312 started after Step 9b3 expires and before T3323 expires, does the UE transmit a ROUTING AREA UPDATE	-->	ROUTING AREA UPDATE REQUEST	3	P

	REQUEST message on Cell 24?				
21b 3	The SS transmits a ROUTING AREA UPDATE ACCEPT message on Cell 24.	<--	ROUTING AREA UPDATE ACCEPT	-	-
21b 4	Void		-		

9.2.3.3.5.3.3 Specific message contents

Table 9.2.3.3.5.3.3-1: Message ROUTING AREA UPDATE REQUEST (steps 1a2/1b2, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update type	Any allowed value		
P-TMSI	P-TMSI mapped from GUTI assigned to UE during preamble		UTRA
MS network capability			
ISR support	1		

Table 9.2.3.3.5.3.3-2: Message ROUTING AREA UPDATE REQUEST (step 9a2/9b2, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update type	011	"Periodic updating"	
P-TMSI	P-TMSI assigned to UE during preamble		UTRA
MS network capability			
ISR support	1		
UE network capability	Not present		

Table 9.2.3.3.5.3.3-3: Message ROUTING AREA UPDATE ACCEPT (steps 1a3, and 21a3/21b3, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update result	100	"RA updated and ISR activated"	TA only
	001	"combined RA/LA updated"	combined_TA_LA
Periodic RA update timer	00100111	7 min	
Allocated P-TMSI	Not present		

Table 9.2.3.3.5.3.3-4: Message TRACKING AREA UPDATE REQUEST (step 9Aa1, table 9.2.3.3.5.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Old P-TMSI signature	Any allowed value		
GPRS ciphering key sequence number	Any allowed value		
Additional GUTI	Not present or any allowed value		
NonCE _{UE}	Any allowed value		

Table 9.2.3.3.5.3.3-5 Message TRACKING AREA UPDATE ACCEPT (steps 1Aa2 and 9Aa2 Table 9.2.3.3.5.3.2-1)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
EPS update result	101	"combined TA/LA updated and ISR activated"	

Table 9.2.3.3.5.3.3-6: Message TRACKING AREA UPDATE REQUEST (step 1Aa1, table 9.2.3.3.5.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	010	combined TA/LA updating with IMSI attach	
GPRS ciphering key sequence number	Any allowed value		
Old P-TMSI signature	Any allowed value		
Additional GUTI	Not present or any allowed value		
Nonce _{UE}	Any allowed value		

Table 9.2.3.3.5.3.3-7: Message ROUTING AREA UPDATE REQUEST (step 21a2/21b2, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update type	011	"Periodic updating"	TA only
	010	"combined RA/LA updating with IMSI attach"	combined_TA_LA
P-TMSI	P-TMSI assigned to UE during preamble		UTRA
MS network capability			
ISR support	1		
UE network capability	Not present		TA only
	Any allowed value		combined_TA_LA

Table 9.2.3.3.5.3.3-8: Message ROUTING AREA UPDATE ACCEPT (step 9a3, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update result	100	"RA updated and ISR activated"	TA only
	000	"RA updated"	combined_TA_LA
Periodic RA update timer	00100111	7 min	
Allocated P-TMSI	Not present		

Table 9.2.3.3.5.3.3-9: Message ROUTING AREA UPDATE ACCEPT (steps 1b3, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update result	100	"RA updated and ISR activated"	TA only
	001	"combined RA/LA updated"	combined_TA_LA
Periodic RA update timer	00100111	7 min	
READY Timer	00000	0 sec	
Allocated P-TMSI	Not present		

Table 9.2.3.3.5.3.3-10: Message ROUTING AREA UPDATE ACCEPT (step 9b3, Table 9.2.3.3.5.3.2-1)

Information Element	Value/remark	Comment	Condition
Update result	100	"RA updated and ISR activated"	TA only
	000	"RA updated"	combined_TA_LA
Periodic RA update timer	00100111	7 min	
READY Timer	00000	0 sec	
Allocated P-TMSI	Not present		

9.2.3.3.5a Periodic Location Update

9.2.3.3.5a.1 Test Purpose (TP)

(1)

```
with { UE in MM IDLE substate NORMAL SERVICE with periodic location update timer T3212 running}
ensure that {
  when { UE camps on a E-UTRAN cell and successfully performs a Tracking Area Update and T3212 expires}
  then { the UE does not perform a periodic location update whilst in E-UTRAN coverage and does not change RAT because T3212 has expired}
}
```

9.2.3.3.5a.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 23.401 clauses 4.3.5.2; and TS 24.008 clauses 4.7.1.4.1 and 4.7.5.1.1 and TS 24.301 clause 5.1.5.

[TS 23.401, clause 4.3.5.2 "Reachability Management for UE in ECM-IDLE state"]

...

If the UE is EPS attached only and either camps on an E UTRAN cell or is in ECM CONNECTED state when the UE's periodic LAU timer expires, the UE shall perform a Location Area Update procedure in NMO II/III or combined RA/LA update in NMO I when it next returns to GERAN/UTRAN coverage.

...

Expiry of the periodic TAU timer, or, the periodic RAU timer, or, the periodic LAU timer shall not cause the UE to change RAT.

...

E-UTRAN RRC state transitions shall have no impact on the periodic RAU timer or periodic LAU timer except that handover from GERAN/UTRAN to E-UTRAN shall cause the periodic RAU timer to be started from its initial value.

[TS 24.008, 4.2.2.1 "Service State, NORMAL SERVICE"]

When in state MM IDLE and service state NORMAL SERVICE, the mobile station shall:

- perform normal location updating when a new location area is entered;
- perform location updating procedure at expiry of timer T3211 or T3213;
- perform periodic updating at expiration of timer T3212;
- perform IMSI detach;
- support requests from the CM layer;
- respond to paging; and
- for an eCall only mobile station (as determined by information configured in USIM), perform the eCall inactivity procedure at expiry of timer T3242 or timer T3243.

[TS 24.008, 4.4.1 "Location updating procedure"]

...

Upon successful location updating the mobile station sets the update status to UPDATED in the SIM/USIM, and stores the Location Area Identification received in the LOCATION UPDATING ACCEPT message in the SIM/USIM. The attempt counter shall be reset.

[TS 24.008, 4.4.2 "Periodic updating"]

...

The procedure is controlled by the timer T3212 in the mobile station. If the timer is not already started, the timer is started each time the mobile station enters the MM IDLE substate NORMAL SERVICE or ATTEMPTING TO UPDATE. When the MS leaves the MM Idle State the timer T3212 shall continue running until explicitly stopped.

...

When the timer T3212 expires, the location updating procedure is started and the timer shall be set to its initial value for the next start. If the mobile station is in other state than MM Idle when the timer expires the location updating procedure is delayed until the MM Idle State is entered.

...

If the mobile station is in service state NO CELL AVAILABLE, LIMITED SERVICE, PLMN SEARCH or PLMN SEARCH-NORMAL SERVICE when the timer expires the location updating procedure is delayed until this service state is left.

[TS 24.301, clause 5.1.5]

UEs that operate in CS/PS mode 1 or CS/PS mode 2 of operation should not use any MM timers related to MM specific procedures (e.g. T3210, T3211, T3212, T3213) while camped on E-UTRAN, unless the re-activation of these timers is explicitly described. If the MM timers are already running, the UE should not react on the expiration of the timers.

9.2.3.3.5a.3 Test description

9.2.3.3.5a.3.1 Pre-test conditions

System Simulator:

- cell A is configured as Non-suitable cell;
- if pc_UTRA AND $px_RATComb_Tested = EUTRA_UTRA$, cell 5 (LAI-1, NMO II) is configured as Serving cell. The value of T3212 (in SIB1) is 0110 (6 minutes);
- if pc_GERAN AND $px_RATComb_Tested = EUTRA_GERAN$, Cell 24 (LAI-1, NMO II) is configured as Serving cell and does not support Dual Transfer Mode (DTM_SUPPORT is configured as default (see TS 51.010-1 clause 40.2.1.1 [23]). The value of T3212 (Octet 4 of the Control Channel Description IE) is 0110 (6 minutes);
- System information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- if pc_UTRA AND $px_RATComb_Tested = EUTRA_UTRA$, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND $px_RATComb_Tested = EUTRA_GERAN$, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].
- the UE is configured to initiate combined EPS/IMSI attach.

Preamble:

- The UE is in state Switched Off (state 1).

9.2.3.3.5a.3.2 Test procedure sequence

Table 9.2.3.3.5a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on and camps on Cell 24 or Cell 5.	-	-	-	-
-	EXCEPTION: In parallel to the events described in steps 5 to 7 the step specified in Table 9.2.3.3.5a.3.2-3 should take place.	-	-	-	-
2	Void	-	-	-	-
-	EXCEPTION: The messages in the next two steps are sent only on Cell 24	-	-	-	-
2A a1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE		
-	EXCEPTION: The next step describes behaviour that depends on UE capability.	-	-	-	-
2A a2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.		
3-4	Void	-	-	-	-
5	The UE transmits an ATTACH REQUEST message on Cell 24 or Cell 5 indicating "GPRS attach".	-->	ATTACH REQUEST		
-	EXCEPTION: The messages in the next two steps are only on Cell 24				
5A a1	The SS transmits an Authentication and Ciphering Request message on Cell 24	<--	Authentication and Ciphering Request	-	-
5A a2	The UE transmits an Authentication and Ciphering Response message on Cell 24	-->	Authentication and Ciphering Response	-	-
6	The SS transmits an ATTACH ACCEPT message indicating "GPRS only attached". The UE sets the update status to UPDATED on the USIM. The SS allocates a P-TMSI.	<--	ATTACH ACCEPT	-	-
7	The UE transmits an ATTACH COMPLETE to acknowledge the P-TMSI allocation.	-->	ATTACH COMPLETE		
8	The UE requests the activation of a default PDP context	-->	ACTIVATE PDP CONTEXT REQUEST		
9	The SS accepts the request for default PDP context request and return an ACTIVATE PDP CONTEXT ACCEPT	<--	ACTIVATE PDP CONTEXT ACCEPT		
-	EXCEPTION: Step 9Aa1 describes behaviour that depends on the RAT combination; the "lower case letter" identifies a step sequence that takes place if a UTRA is applied.	-	-	-	-
9A a1	IF px_RATComb_Tested = EUTRA_UTRA THEN the SS releases the RRC connection.	-	-	-	-
10	The signal strength of Cell A is raised to that of the Serving Cell and Cell 24 or Cell 5 is lowered to that of a Suitable Neighbour Cell as defined in table 6.2.2.1-1 of TS 36.508 [18]. Note: Cell 24 or Cell 5 is still suitable but the UE shall select Cell A	-	-	-	-
11	The UE camps on E-UTRAN cell A and transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
12	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
13	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
14	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
15	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the	-->	SECURITY MODE COMPLETE	-	-

	initial security configuration.				
16	SS responds with TRACKING AREA UPDATE ACCEPT message including a valid TAI list containing the TAI of Cell A; with PLMN ID of Cell A included in the GUTI. The UE sets the TIN = GUTI. Note: This Accept message includes EPS update result = combined TA/LA updated.	<--	TRACKING AREA UPDATE ACCEPT	-	-
17	The UE transmits a TRACKING AREA UPDATE COMPLETE message	-->	TRACKING AREA UPDATE COMPLETE	-	-
18	The SS releases the RRC Connection	-	-	-	-
19-28	Void	-	-	-	-
29	Check: Does UE transmit a LOCATION UPDATING REQUEST (on Cell 24 or Cell 5) and changes RAT. Check this until 7 minutes after step 3 in Table 9.2.3.3.5a.3.2-3 (when in GERAN) or 7 (when in UTRAN)	-->	LOCATION UPDATING REQUEST	1	F
30-36	Void	-	-	-	-

Table 9.2.3.3.5a.3.2-2: Void

Table 9.2.3.3.5a.3.2-3: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE transmits a LOCATION UPDATING REQUEST with location updating type set to "IMSI attach" on Cell 24 or Cell 5.	-->	LOCATION UPDATING REQUEST	-	-
2	The SS transmits a LOCATION UPDATING ACCEPT, and the UE stores the received LAI and sets the update status to UPDATED on the USIM. The SS allocates a TMSI.	<--	LOCATION UPDATING ACCEPT	-	-
3	The UE transmits a TMSI REALLOCATION COMPLETE message to acknowledge the TMSI allocation.	-->	TMSI REALLOCATION COMPLETE	-	-

9.2.3.3.5a.3.3 Specific message contents

Table 9.2.3.3.5a.3.3-1: Void

Table 9.2.3.3.5a.3.3-2: Message TRACKING AREA UPDATE REQUEST (step 11, table 9.2.3.3.5a.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
EPS update type	001	combined TA/LA updating	
GPRS ciphering key sequence number	Any allowed value		
Old P-TMSI signature	Any allowed value		
Additional GUTI	Not present or any allowed value		
Nonce _{UE}	Any allowed value		

9.2.3.3.6 E-UTRAN RRC connection failure / Reselection of UTRAN cell / NAS signalling to release old S1 interface connection

9.2.3.3.6.1 Test Purpose (TP)

(1)

```
with { UE is E-UTRA RRC_CONNECTED state and ISR not activated }
ensure that {
  when { Radio link failure is detected and UE attempts to select a suitable E-UTRA cell to re-
  establish the RRC connection }
  then { UE can not find a suitable cell for T311 and leaves RRC_CONNECTED state with release
  cause 'RRC connection failure' }
```

(2)

```
with { UE searches for a suitable cell after an indication of E-UTRAN 'RRC connection failure' }
ensure that {
  when { UE detects an UTRA cell and returns to coverage }
  then { UE performs a routing area update }
}
```

9.2.3.3.6.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.008, clause 4.7.5, TS36.331 clauses 5.3.7.2, 5.3.11.1, 5.3.11.3 and 5.3.12 and TS36.304 clauses 5.2.7.

[TS24.008 clause 4.7.5]

This procedure is used for:

...

- in Iu mode and A/Gb mode after intersystem change from S1 mode, and the GMM receives an indication of "RRC connection failure" from lower layers due to lower layer failure while in S1 mode;

...

[TS 36.331 clause 5.3.7.2]

The UE shall only initiate the procedure when AS security has been activated. The UE initiates the procedure when one of the following conditions is met:

- 1> upon detecting radio link failure, in accordance with 5.3.11; or

...

Upon initiation of the procedure, the UE shall:

- 1> stop timer T310, if running;
- 1> start timer T311;
- 1> suspend all RBs except SRB0;
- 1> reset MAC;
- 1> apply the default physical channel configuration as specified in 9.2.4;
- 1> apply the default semi-persistent scheduling configuration as specified in 9.2.3;
- 1> apply the default MAC main configuration as specified in 9.2.2;
- 1> perform cell selection in accordance with the cell selection process as specified in TS 36.304 [4];

[TS 36.304 clause 5.3.11.1]

The UE shall:

- 1> upon receiving N310 consecutive "out-of-sync" indications from lower layers while neither T300, T301, T304 nor T311 is running;
- 2> start timer T310;

[TS 36.304 clause 5.3.11.3]

The UE shall:

- 1> upon T310 expiry; or
- 1> upon random access problem indication from MAC while neither T300, T301, T304 nor T311 is running; or
- 1> upon indication from RLC that the maximum number of retransmissions has been reached:
 - 2> consider radio link failure to be detected;
 - 2> if AS security has not been activated:
 - 3> perform the actions upon leaving RRC_CONNECTED as specified in 5.3.12, with release cause 'other';
 - 2> else:
 - 3> initiate the connection re-establishment procedure as specified in 5.3.7;

[TS36.331 clause 5.3.12]

Upon leaving RRC_CONNECTED, the UE shall:

- 1> reset MAC;
- 1> stop all timers that are running except T320;
- 1> release all radio resources, including release of the RLC entity, the MAC configuration and the associated PDCP entity for all established RBs;
- 1> indicate the release of the RRC connection to upper layers together with the release cause;
- 1> if leaving RRC_CONNECTED was not triggered by reception of the *MobilityFromEUTRACommand* message:
- 2> enter RRC_IDLE by performing cell selection in accordance with the cell selection process, defined for the case of leaving RRC_CONNECTED, as specified in TS 36.304 [4];

[TS 36.304 clause 5.2.7]

On transition from RRC_CONNECTED to RRC_IDLE, a UE shall attempt to camp on the last cell for which it was in RRC_CONNECTED or any cell on a frequency or frequency of RAT assigned by RRC in the state transition message. If no suitable cell is found, the UE shall perform a cell selection starting with Stored Information Cell Selection procedure in order to find a suitable cell to camp on.

When returning to idle mode after UE moved to RRC_CONNECTED state from camped on any cell state, UE shall attempt to camp on the last cell for which it was in RRC_CONNECTED state or any cell on a frequency or frequency of RAT assigned by RRC in the state transition message. If no acceptable cell is found, the UE shall continue to search for an acceptable cell of any PLMN in state *any cell selection*.

9.2.3.3.6.3 Test description

9.2.3.3.6.3.1 Pre-test conditions

System Simulator:

- cell A (belongs to TAI-1) is set to "Serving cell";
- cell 5 (belongs to RAI-1) is set to "Non-suitable cell";
- cell 5 belongs to a PLMN different from cell A's PLMN and not included in cell A's Equivalent PLMN list;
- system information indicates that NMO 1 is used.

- System information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.2.3.3.6.3.2 Test procedure sequence

Table 9.2.3.3.6.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS changes the power level of Cell A to non-suitable "Off" according to TS 36.508 subclause 6.2.2.1 in order that the radio link quality of Cell A be degraded and waits for 1s (i.e. T310 transmitted in SIB2.) + additional 0.5s to ensure the UE detects the radio link failure	-	-	-	-
1A	The SS sets Cell A to "Non-suitable cell" and waits for 10s (i.e. T311 transmitted in SIB2)	-	-	-	-
2	The SS raises Cell 5 level as "Serving cell"	-	-	-	-
-	EXCEPTION: In parallel with step 3 below, the test steps in the parallel behaviour in table 9.2.3.3.6.3.2-2 is taking place	-	-	-	-
3	Check: Does the UE transmit a <i>RRConnectionReestablishmentRequest</i> messages within the next 60s?	-->	<i>RRConnectionReestablishmentRequest</i>	1	F
-	At the end of this test procedure sequence, the UE is in end state UTRA connected (U2) according to TS 36.508 but attached for EPS services only.	-	-	-	-

Table 9.2.3.3.6.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Check: Does UE perform Routing area updating procedure on Cell 5? Note: No message contents other than message type needs checking.	-->	ROUTING AREA UPDATE REQUEST	2	P
2-5	The SS completes the routing area update procedure by performing Steps 5-8 of the procedure in TS 36.508 subclause 6.4.2.8.	-	-	-	-

9.2.3.3.6.3.3 Specific Message Contents

None

9.2.3.4 A/Gb mode to S1 mode inter-system change

9.2.3.4.1 TAU/RAU procedure for inter-system cell reselection between A/Gb and S1 modes

9.2.3.4.1.1 Test Purpose (TP)

(1)

with { UE attached to GERAN with a PDP context active, and, E-UTRAN NAS and Security parameters including a valid GUTI stored on the USIM }
ensure that {

```

when { UE performs a cell reselection to E-UTRAN and performs a Tracking Area Update }
then { the UE encodes the RRC parameters in the RRC Connection Establishment messages correctly
(i.e. in the RRCConnectionRequest message, the ue-Identity is set to "randomValue" and the
establishmentCause is set to MO-signalling; and, in the RRCConnectionSetupComplete message the
selectedPLMN-identity, mmegi and mmec indicate the value of the registered MME }
}

```

(2)

```

with { UE attached to GERAN with a PDP context active, and, E-UTRAN NAS and EPS Security parameters
including a valid GUTI stored on the USIM, and ISR not activated }
ensure that {
when { UE performs a cell reselection to E-UTRAN and performs a Tracking Area Update }
then { the UE encodes the parameters in the TRACKING AREA UPDATE REQUEST correctly i.e.:
- the NAS key set identifierASME IE is set to the value stored in the USIM/allocated in
the last TRACKING AREA UPDATE ACCEPT message;
- the Old GUTI IE is derived from the mapped P-TMSI and RAI;
- the Additional GUTI IE is set to the GUTI stored in the USIM/allocated in the last
TRACKING AREA UPDATE ACCEPT message;
- the GPRS ciphering key sequence number IE is set to the value allocated in the
AUTHENTICATION AND CIPHERING REQUEST message; and
- the NONCEue IE is included;
- the DRX parameter IE is not included. }
}

```

(3)

```

with { UE powered on in GERAN }
ensure that {
when { UE makes its first Tracking Area Update to E-UTRAN }
then { UE sends the UE radio capability information update needed IE }
}

```

(4)

```

with { UE registered in E-UTRAN, and, GERAN NAS and Security parameters including a valid P-TMSI
available in the UE and ISR not activated }
ensure that {
when { UE performs a cell reselection to GERAN and performs a Routeing Area Update }
then { the UE derives the TLLI parameter in the RLC/MAC header from the GUTI allocated in the
TRACKING AREA UPDATE ACCEPT message }
}

```

(5)

```

with { UE registered in E-UTRAN, and, GERAN NAS and GERAN Security parameters including a valid P-
TMSI available in the UE, and ISR not activated }
ensure that {
when { UE performs a cell reselection to GERAN and performs a Routeing Area Update }
then { the UE encodes the parameters in the ROUTING AREA UPDATE REQUEST correctly i.e.:
- [the GPRS ciphering key sequence number IE is set to the value mapped from
KSI-ASME;;] - the Old routing area identification IE, and the Old P-
TMSI signature IE are
mapped from the GUTI allocated in the TRACKING AREA UPDATE ACCEPT message;
- the Additional mobile identity IE contains the P-TMSI allocated in the last received
ATTACH ACCEPT/ROUTING AREA UPDATE ACCEPT message;
- the Additional old routing area identification IE contains the RAI allocated in the
last received ATTACH ACCEPT/ROUTING AREA UPDATE ACCEPT message; and
- [the DRX parameter IE is not included]. }
}

```

(6)

```

with { UE registered }
ensure that {
when { UE performs Tracking Area Update to E-UTRAN which is not for the "first TAU following
GERAN/UTRAN Attach" or for a "UE radio capability update" }
then { UE does not send the UE radio capability information update needed IE }
}

```

(7)

```

with { UE attached to GERAN with a PDP context active, and, E-UTRAN NAS and Security parameters
including a valid GUTI stored on the USIM }
ensure that {
  when { UE performs a cell reselection to E-UTRAN and performs a Tracking Area Update }
  then { the UE encodes the RRC parameters in the RRC Connection Establishment messages correctly
(i.e. in the RRCConnectionRequest message, the ue-Identity is set to S-TMSI or random value for pre-
Rel-12 UE, or set to random value from Rel-12 and onwards, and the establishmentcause is set to MO-
signalling; and, in the RRCConnectionSetupComplete message the registeredMME is not included when s-
TMSI is included, or include the registeredMME and the mapped GUMMEI otherwise }
}

```

9.2.3.4.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 23.003 clauses 2.8.2.1 and 2.8.2.2; TS 23.401 clauses 4.3.5.6, 5.3.3.1 and 5.3.3.3; TS 24.008 clauses 4.7.1.4.1 and 4.7.5.1.1; and TS 24.301 clauses 5.3.1.1 and 5.5.3.2.2.

[TS 23.003, clause 2.8.2.1 “Mapping from GUTI to RAI, P-TMSI and P-TMSI signature”]

The mapping of the GUTI shall be done to the combination of RAI of GERAN/UTRAN and the P-TMSI:

E-UTRAN <MCC> maps to GERAN/UTRAN <MCC>

E-UTRAN <MNC> maps to GERAN/UTRAN <MNC>

E-UTRAN <MME Group ID> maps to GERAN/UTRAN <LAC>

E-UTRAN <MME Code> maps to GERAN/UTRAN <RAC> and is also copied into the 8 most significant bits of the NRI field within the P-TMSI;

E-UTRAN <M-TMSI> maps as follows:

- 6 bits of the E-UTRAN <M-TMSI> starting at bit 29 and down to bit 24 are mapped into bit 29 and down to bit 24 of the GERAN/UTRAN <P-TMSI>;
- 16 bits of the E-UTRAN <M-TMSI> starting at bit 15 and down to bit 0 are mapped into bit 15 and down to bit 0 of the GERAN/UTRAN <P-TMSI>;
- and the remaining 8 bits of the E-UTRAN <M-TMSI> are mapped into the 8 MBS bits of the <P-TMSI signature> field.

For UTRAN, the 10-bit long NRI bits are masked out from the P-TMSI and also supplied to the RAN node as IDNNS (Intra Domain NAS Node Selector). However, the RAN configured NRI length should not exceed 8 bits.

[TS 23.003, clause 2.8.2.2 “Mapping from RAI and P-TMSI to GUTI”]

The mapping of P-TMSI (TLLI) and RAI in GERAN/UTRAN to GUTI in E-UTRAN shall be performed as follows:

GERAN/UTRAN <MCC> maps to E-UTRAN <MCC>

GERAN/UTRAN <MNC> maps to E-UTRAN <MNC>

GERAN/UTRAN <LAC> maps to E-UTRAN <MME Group ID>

GERAN/UTRAN <RAC> maps into bit 23 and down to bit 16 of the M-TMSI

The 8 most significant bits of GERAN/UTRAN <NRI> map to the MME code.

GERAN/UTRAN <P-TMSI> maps as follows:

- 6 bits of the GERAN/UTRAN <P-TMSI> starting at bit 29 and down to bit 24 are mapped into bit 29 and down to bit 24 of the E-UTRAN <M-TMSI>;
- 16 bits of the GERAN/UTRAN <P-TMSI> starting at bit 15 and down to bit 0 are mapped into bit 15 and down to bit 0 of the E-UTRAN <M-TMSI>.

...

[TS 23.401, clause 4.3.5.6, "Idle mode signalling reduction function"]

The TIN can take one of the three values, "P-TMSI", "GUTI" or "RAT-related TMSI". The UE shall set the TIN when receiving an Attach Accept, a TAU Accept or RAU Accept message according to the rules in table 4.3.5.6-1.

Table 4.3.5.6-1: Setting of the TIN

Message received by UE	Current TIN value stored by UE	TIN value to be set by the UE when receiving message
Attach Accept via E-UTRAN (never indicates ISR activation)	Any value	GUTI
Attach Accept via GERAN/UTRAN (never indicates ISR activation)	Any value	P-TMSI
TAU Accept not indicating ISR	Any value	GUTI
TAU Accept indicating ISR	GUTI P-TMSI or RAT-related TMSI	GUTI RAT-related TMSI
RAU Accept not indicating ISR	Any value	P-TMSI
RAU Accept indicating ISR	P-TMSI GUTI or RAT-related TMSI	P-TMSI RAT-related TMSI

[TS 23.401, clause 5.3.3.1, step 2, "Tracking Area Update procedure with Serving GW change"]

....

If the UE's TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and related RAI then these two elements are indicated as the old GUTI.

...

[TS 23.401, clause 5.3.3.3, step 2, "Routeing Area Update with MME interaction and without S-GW change"]

...

If the UE's internal TIN indicates "GUTI" and the UE holds a valid GUTI then the UE indicates the GUTI as the old P-TMSI and old RAI

...

[TS 24.008, clause 4.7.1.4.1, "Radio resource sublayer address handling (A/Gb mode only)"]

For an MS supporting S1 mode, the following five cases can be distinguished:

- a) the TIN indicates "P-TMSI" or "RAT-related TMSI" and the MS holds a valid P-TMSI and a RAI;
- b) the TIN indicates "GUTI" and the MS holds a valid GUTI;
- c) the TIN is deleted and the UE holds a valid P-TMSI and RAI;
- d) the TIN is deleted and the UE holds a valid GUTI, but no valid P-TMSI and RAI; or
- e) none of the previous cases is fulfilled.

In case a) the MS shall derive a foreign TLLI from the P-TMSI and proceed as specified for case i) above.

In case b), the MS shall derive a P-TMSI from the GUTI and then a foreign TLLI from this P-TMSI and proceed as specified for case i) above.

...

[TS 24.008, clause 4.7.5.1.1, "Normal and periodic routing area updating procedure initiation"]

To initiate the normal routing area updating procedure, the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-AREA-UPDATING-INITIATED.

If the MS supports S1 mode, the MS shall handle the P-TMSI IE as follows:

- If the TIN indicates "GUTI" and the MS holds a valid GUTI, the MS shall map the GUTI into a P-TMSI, P-TMSI signature and RAI as specified in 3GPP TS 23.003 [4]. The MS shall include the mapped RAI in the Old routing area identification IE and the mapped P-TMSI signature in the P-TMSI signature IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the mapped P-TMSI in the P-TMSI IE. Additionally, in Iu mode and A/Gb mode, if the MS holds a valid P-TMSI and RAI, the MS shall indicate the P-TMSI in the Additional mobile identity IE and the RAI in the Additional old routing area identification IE.
- If the TIN indicates "P-TMSI" or "RAT-related TMSI" and the MS holds a valid P-TMSI and RAI, the MS shall indicate the RAI in the Old routing area identification IE. When the routing area updating procedure is initiated in Iu mode, the MS shall also include the P-TMSI in the P-TMSI IE.

If the routing area updating procedure is not initiated by the MS due to an S1 mode to Iu mode or S1 mode to A/Gb mode intersystem change, the message ROUTING AREA UPDATE REQUEST shall contain the P-TMSI signature when received within a previous ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message.

If the routing area updating procedure is initiated by the MS due to an S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in idle mode and the MS does not have a valid current UMTS security context, the message ROUTING AREA UPDATE REQUEST shall include a P-TMSI signature filled with a NAS token as specified in 3GPP TS 33.401 [119]. If the MS has a valid current UMTS security context, the MS shall indicate it in the GPRS ciphering key sequence number IE.

NOTE: If the TIN indicates "GUTI", 8 bits of the NAS token will be filled with bits from the M-TMSI (see 3GPP TS 23.003 [4]).

If the routing area updating procedure is initiated by the MS due to the S1 mode to Iu mode or S1 mode to A/Gb mode inter-system change in connected mode or in idle mode if the MS does not have a valid current security context, the MS shall derive CK' and IK' from the K_{ASME} and the NAS downlink COUNT value corresponding to the NAS token derived as specified in 3GPP TS 33.401 [119]. The MS shall indicate the eKSI value in the CKSN field of the GPRS ciphering key sequence number IE in the ROUTING AREA UPDATE REQUEST message. Then, the MS shall reset the START value and store the mapped UMTS security context replacing the current UMTS security context.

...

In order to indicate the new DRX parameter while in GERAN or UTRAN coverage, the MS shall send the ROUTING AREA UPDATE REQUEST message containing the DRX parameter in the DRX parameter IE to the network, with the exception of the case if the MS had indicated its UE specific DRX parameter (3GPP TS 24.301 [120]) to the network while in E-UTRAN coverage. In this case, when the MS enters GERAN or UTRAN coverage and initiates a routing area updating procedure, the MS shall not include the DRX parameter in the DRX parameter IE in the ROUTING AREA UPDATE REQUEST message.

[TS 24.008, clause 4.7.5.1.3, "Normal and periodic routing area updating procedure accepted by the network"]

If the MS has indicated in the ROUTING AREA UPDATE REQUEST message that it supports PS inter-RAT HO from GERAN to E-UTRAN, the network may include in the ROUTING AREA UPDATE ACCEPT message a request to provide the E-UTRAN inter RAT information container.

[TS 24.301, clause 5.3.1.1 "Establishment of the NAS signalling connection"]

For the routing of the initial NAS message to the appropriate MME, the UE NAS provides the lower layers with either the S-TMSI or the registered globally unique MME identifier (GUMMEI) that consists of the PLMN ID, the MME group ID, and the MME code (see 3GPP TS 23.003 [2]).

- When the UE is registered in the tracking area of the current cell during the NAS signalling connection establishment, the UE NAS shall provide the lower layers with the S-TMSI, but shall not provide the registered MME identifier to the lower layers. Exceptionally, when the UE in EMM-IDLE mode initiates a tracking area updating procedure for load balancing purposes, the UE NAS shall provide the lower layers with neither S-TMSI nor registered MME identifier.
- When the UE is not registered in the tracking area of the current cell during the NAS signalling connection establishment, the UE NAS does not provide the lower layers with the S-TMSI. If the UE has a valid registered MME identifier from a previous registration, the UE NAS shall provide the lower layers with the registered MME identifier.

[TS 24.301, clause 5.5.3.2.2 “Normal and periodic tracking area updating procedure initiation”]

...

In order to indicate its UE specific DRX parameter while in E-UTRAN coverage, the UE shall send the TRACKING AREA UPDATE REQUEST message containing the UE specific DRX parameter in the DRX parameter IE to the network, with the exception of the case if the UE had indicated its DRX parameter (3GPP TS 24.008 [13]) to the network while in GERAN or UTRAN coverage. In this case, when the UE enters E-UTRAN coverage and initiates a tracking area updating procedure, the UE shall not include the UE specific DRX parameter in the DRX parameter IE in the TRACKING AREA UPDATE REQUEST message.

...

When initiating a tracking area updating procedure as a result of an Iu mode to S1 mode or A/Gb mode to S1 mode inter-system change, the UE shall handle the GUTI as follows:

- if the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the old GUTI IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE: Mapping the P-TMSI and RAI to the GUTI is specified in Annex H of 3GPP TS 23.401 [10].

- if the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE.

...

When the tracking area updating procedure is initiated to perform an inter-system change from A/Gb mode or Iu mode to S1 mode, the UE shall include the KSI_{ASME} in the TRACKING AREA UPDATE REQUEST message if the UE has a cached EPS security context. Otherwise, the UE shall set the KSI_{ASME} to the value "no key is available".

When the tracking area updating procedure is initiated in EMM-IDLE mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode, the UE shall include the KSI_{SGSN} in the TRACKING AREA UPDATE REQUEST message. If the UE does not have a cached EPS security context, the UE shall include the $Nonce_{UE}$ IE in the TRACKING AREA UPDATE REQUEST message. The TRACKING AREA UPDATE REQUEST message shall be integrity protected with the cached EPS security context if the UE has one. If the UE does not have a cached EPS security context, the TRACKING AREA UPDATE REQUEST message shall not be integrity protected.

...

When the tracking area updating procedure is initiated in EMM-IDLE mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode, the UE shall include the KSI_{SGSN} in the TRACKING AREA UPDATE REQUEST message. If the UE does not have a cached EPS security context, the UE shall include the $Nonce_{UE}$ IE in the TRACKING AREA UPDATE REQUEST message. The TRACKING AREA UPDATE REQUEST message shall be integrity protected with the cached EPS security context if the UE has one. If the UE does not have a cached EPS security context, the TRACKING AREA UPDATE REQUEST message shall not be integrity protected.

...

If the UE initiates the first tracking area updating procedure following an attach in A/Gb mode or Iu mode, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

...

[TS 24.301, clause 4.4.2 “Handling of EPS security contexts”]

...

The key set identifier eKSI is assigned by the MME either during the authentication procedure or, for the mapped security context, during the handover procedure. The eKSI consists of a value and a type of security context parameter indicating whether an EPS security context is a native EPS security context or a mapped EPS security context. When the EPS security context is a native EPS security context, the eKSI has the value of KSI_{ASME} , and when the current EPS security context is a mapped EPS security context, the eKSI has the value of KSI_{SGSN} .

...

[TS 24.301, clause 5.3.1.1 “Establishment of the NAS signalling connection”]

b) if the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE NAS shall provide the lower layers with the MME identifier part of the mapped GUTI, which is generated from the P-TMSI and RAI.

9.2.3.4.1.3 Test description

9.2.3.4.1.3.1 Pre-test conditions

System Simulator:

NOTE: while this test describes the uses of 3 cells, it is intended that this test only requires 2 cells to be active at any one instant.

- cell A (E-UTRAN), cell B (E-UTRAN), cell 24 and cell 26 (GERAN)
- with the exception of the MCC and MNC, cell 24 and cell 26 take the default parameters of the GERAN cells as defined in clause 6.3.1 of TS 36.508 [18], cells 24 and 26 are configured with the same MCC and MNC as cell A. Cells 24 and 26 are in the same routing area;
- as defined in clause 40.1 of TS 51.010 [23], the GERAN cells are configured to use Network Mode of Operation I;
- the power level of Cell 24 is the Serving Cell level;
- the power level of Cell A is set to the Non-suitable level;
- the power level of Cell B is set to the Non-suitable " Off" level;
- the power level of Cell 26 is set to the Non-suitable Off.
- System information combination 5 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cells.

UE:

- the UE was previously registered on E-UTRAN cell B, and when on E-UTRAN, the UE was last authenticated and registered on a cell (no name assigned) frequency 2 belonging to a PLMN with (MCC, MNC) = (65, 987) and allocated a GUTI with (MMEGI, MMEC) = (0xfedc, 0xba) and an arbitrary M-TMSI value.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.2.3.4.1.3.2 Test procedure sequence

Table 9.2.3.4.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U – S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message on Cell 24	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message	<--	SECURITY MODE COMMAND	-	-
6	The UE transmits a NAS SECURITY MODE COMPLETE message ciphered with the new EPS security context identified by the KSI_{ASME} received in the SECURITY MODE COMMAND message in step 5	-->	SECURITY MODE COMPLETE	-	-
8	SS responds with ATTACH ACCEPT message including valid TMSI, P-TMSI (TIN set to P-TMSI) and RAI. Editor's Note: the default message contents in 51.010 clause 40.2.4.3 allocate a Negotiated READY timer value of 32 seconds.	<--	ATTACH ACCEPT	-	-
9	The UE transmits an ATTACH COMPLETE message.	-	ATTACH COMPLETE	-	-
9A	The activation of a PDP context is triggered by MMI or AT command.	-	-	-	-
9B	The UE transmits an ACTIVATE PDP CONTEXT REQUEST message	-->	ACTIVATE PDP CONTEXT REQUEST	-	-
9C	The SS responds with an ACTIVATE PDP CONTEXT ACCEPT message	<--	ACTIVATE PDP CONTEXT ACCEPT	-	-
10	Void	-	-	-	-
11	Void	-	-	-	-
12	Void	-	-	-	-
13	The signal strength of Cell A is raised to that of the Serving Cell and that of Cell 24 is lowered to that of a Suitable Neighbour Cell. Note: Cell 24 is still suitable but the UE is expected to select Cell A.	-	-	-	-
14	Void	-	-	-	-
15	Check: Does the UE send an RRCConnectionRequest with the <i>ue-Identity</i> set to "randomValue" and the <i>establishmentCause</i> set to MO-signalling on Cell A? Editor's Note: Cell reselection to E-UTRAN might not occur until the GPRS READY timer has expired. Hence this step might occur up to 40 seconds after step 13.	-->	RRCConnectionRequest	1	P
16	The SS responds with RRCConnectionSetup	<--	RRCConnectionSetup		
17	Check: Does the UE send an RRCConnectionSetupComplete with the <i>mmeGi</i> and <i>mmeC</i> set to the values derived from the mapped RAI and P-TMSI Check: Are the contents of the TRACKING AREA UPDATE REQUEST with the correct parameters?	-->	RRCConnectionSetupComplete(RRC parameters, TRACKING AREA UPDATE REQUEST)	1, 2, 3	P
18	The SS sends TRACKING AREA UPDATE ACCEPT	<--	TRACKING AREA UPDATE ACCEPT	-	-

	Note: the default message contents cause the allocation of a new GUTI and new TAI list				
19	The UE sends TRACKING AREA UPDATE COMPLETE	-->	TRACKING AREA UPDATE COMPLETE	-	-
20	The SS releases the RRC connection	-	-	-	-
21	Cell 24 is switched off	-	-	-	-
22	The signal strength of Cell 26 is raised to that of the Serving Cell and that of Cell A is lowered to that of a Non suitable Neighbour Cell. Note: Cell A is still suitable but the UE is expected to select Cell 26.	-	-	-	-
23	Check: Does the UE send on Cell 26 an RLC/MAC header with the TLLI derived from the P-TMSI that is derived from the GUTI allocated in step 18?	-	-	4	P
24	Check: Does the UE send on Cell 26 a ROUTING AREA UPDATE REQUEST with the correct parameters?	-->	ROUTING AREA UPDATE REQUEST	5	P
24 A	The SS transmits an AUTHENTICATION AND CIPHERING REQUEST message.	<--	AUTHENTICATION AND CIPHERING REQUEST	-	-
24 B	The UE transmits an AUTHENTICATION AND CIPHERING RESPONSE message.	-->	AUTHENTICATION AND CIPHERING RESPONSE	-	-
25	The SS sends ROUTING AREA UPDATE ACCEPT (without the allocated P-TMSI IE, but with the Requested MS Information IE indicating "E-UTRAN inter RAT information container IE requested in case UE supports PS inter-RAT HO from GERAN to E-UTRAN").	<--	ROUTING AREA UPDATE ACCEPT	-	-
-	EXCEPTION: Step 26 describes behaviour that depends on the UE capability.	-	-	-	-
26	IF <i>pc_GERAN_2_E_UTRAN_PSHO</i> , then the UE sends ROUTING AREA UPDATE COMPLETE message	-->	ROUTING AREA UPDATE COMPLETE	-	-
27	The signal strength of Cell A is raised to that of the Serving Cell and that of Cell 26 is lowered to that of a Suitable Neighbour Cell. Note: Cell 26 is still suitable but the UE is expected to select Cell A.	-	-	-	-
27 A	Check: Does the UE send an RRCConnectionRequest with the <i>ue-Identity</i> set for Rel-8 to Rel-11 UE to <i>s-TMSI</i> or <i>randomValue</i> , and, for Rel-12 and onwards UE set to <i>randomValue</i> ?	-->	RRCConnectionRequest	7	P
27 B	The SS responds with RRCConnectionSetup	<--	RRCConnectionSetup		
28	Check: Does the UE send on Cell A an RRCConnectionSetupComplete without the registeredMME when <i>s-TMSI</i> is included in step 27A, otherwise with the registeredMME and the mapped GUMMEI? Check: Does the UE send a TRACKING AREA UPDATE REQUEST with the correct parameters?	-->	RRCConnectionSetupComplete(RRC parameters, TRACKING AREA UPDATE REQUEST)	7 2, 6	P
29	The SS sends TRACKING AREA UPDATE ACCEPT Note: the default message contents cause the allocation of a new GUTI.	<--	TRACKING AREA UPDATE ACCEPT	-	-
30	The UE sends TRACKING AREA UPDATE COMPLETE	-->	TRACKING AREA UPDATE COMPLETE	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected	-	-	-	-

(E2_T3440) according to TS 36.508.			
------------------------------------	--	--	--

9.2.3.4.1.3.3 Specific message contents

Table 9.2.3.4.1.3.3-1: Message RRCConnectionRequest (step 15, Table 9.2.3.4.1.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
InitialUE-Identity CHOICE {			
random-Value	Any allowed value		
}			
establishmentCause	Mo-Signalling		

Table 9.2.3.4.1.3.3-2: Message RRCConnectionSetupComplete (step 17, Table 9.2.3.4.1.3.2-1)

Derivation path: 36.508 table 4.6.1-18			
Information Element	Value/remark	Comment	Condition
RRCConnectionSetupComplete ::= SEQUENCE {			
rrc-TransactionIdentifier	RRC-TransactionIdentifier-UL		
criticalExtensions CHOICE {			
c1 CHOICE {			
rrcConnectionSetupComplete-r8 SEQUENCE {			
selectedPLMN-Identity	Indicates the PLMN of cell A.		
registeredMME SEQUENCE {			
plmn-Identity	Not Checked		
Mmegi	LAC sent to the UE in step 8		
Mmec	Bit 23 to bit 16 of P-TMSI sent to the UE in step 8		
}			
nas-DedicatedInformation	Not checked at RRC layer		
nonCriticalExtension SEQUENCE {}	Not checked		
}			
}			
}			

Table 9.2.3.4.1.3.3-3: Message TRACKING AREA UPDATE REQUEST (step 17, Table 9.2.3.4.1.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Sent in SECURITY PROTECTED NAS MESSAGE with valid integrity check			
NAS key set identifier _{ASME}			
NAS key set identifier	The valid NAS key set identifier KSI _{ASME} of the UE	As stored on the USIM in EF _{EPSNSC}	
TSC	'0'B	native security context	
Old GUTI	Mapped from the P-TMSI and RAI allocated in step 8		
Additional GUTI	GUTI1	Set to the value stored in the USIM in EF _{EPSLOCI}	
DRX parameter	Not present		
UE radio capability information update needed	'1'B	UE radio capability information update needed	
GPRS ciphering key sequence number	Value mapped from the AUTHENTICATION AND CIPHERING REQUEST message		
Old P _{tmsi} Signature	Any Value		
Nonce	Any Value		

Table 9.2.3.4.1.3.3-4: Message ROUTING AREA UPDATE REQUEST (step 24, Table 9.2.3.4.1.3.2-1)

Derivation path: 24.008 table 9.4.14			
Information Element	Value/Remark	Comment	Condition
Protocol discriminator	GMM		
Skip indicator	'0000'		
Routing area update request message identity	'0000 1000' B		
Update type	Any allowed value		
GPRS ciphering key sequence number	set to the value to KSI-ASME	With ISR inactive and TIN indicates GUTI, then eKSI value is set to KSI-ASME	
Old routing area identification	Mapped from the GUTI received in step 18.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Mapped from the GUTI received in step 18.		
Requested READY timer value	If present, any allowed value.		
DRX parameter	Not present	Shall be absent	
TMSI status	If present, any allowed value.		
P-TMSI	Not present		
MS network capability	Any allowed value.		
PDP context status	If present, any allowed value.		
PS LCS Capability	If present, any allowed value.		
MBMS context status	If present, any allowed value.		
UE network capability	Any allowed value.		
Additional mobile identity	Set to the P-TMSI allocated in step 8		
Additional old routing area identification	Set to the RAI allocated		

	in step 8		
Mobile station classmark 2	If present, any allowed value.		
Mobile station classmark 3	If present, any allowed value.		
Supported Codecs	If present, any allowed value.		

Table 9.2.3.4.1.3.3-5: Message ROUTING AREA UPDATE ACCEPT (step 25, Table 9.2.3.4.1.3.2-1)

Derivation path: 24.008 table 9.4.15			
Information Element	Value/Remark	Comment	Condition
allocated P-TMSI	Absent		
Requested MS Information	'0100' B	E-UTRAN inter RAT information container IE requested	pc_GERAN_2_E_UTRAN_PSHO

Table 9.2.3.4.1.3.3-6: Message ROUTING AREA UPDATE COMPLETE (step 26, Table 9.2.3.4.1.3.2-1)

Derivation path: 24.008 table 9.4.16			
Information Element	Value/Remark	Comment	Condition
E-UTRAN inter RAT handover information	Any allowed value		

Table 9.2.3.4.1.3.3-6A: Message RRCConnectionRequest (step 27A, Table 9.2.3.4.1.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
ue-IdentityCHOICE {			
s-TMSI	Received from NAS layer	Rel-8 to Rel-11 inclusive	
randomValue	Any allowed value	Rel-8 and onwards	
}			
establishmentCause	Mo-Signalling		

Table 9.2.3.4.1.3.3-7: Message RRCConnectionSetupComplete (step 28, Table 9.2.3.4.1.3.2-1)

Derivation path: 36.508 table 4.6.1-18			
Information Element	Value/remark	Comment	Condition
RRCConnectionSetupComplete ::= SEQUENCE {			
Rrc-TransactionIdentifier	RRC-TransactionIdentifier-UL		
criticalExtensions CHOICE {			
C1 CHOICE {			
rrcConnectionSetupComplete-r8 SEQUENCE {			
selectedPLMN-Identity	Indicates the PLMN of cell 24.		
registeredMME	Not present	Shall be absent if the upper layers provided S-TMSI in <i>RRCConnectionRequest</i> message in step 27A for pre-Rel-12 UE	
registeredMME	generated from the P-TMSI and RAI	Present only when the InitialUE-Identity in step 27A is set to random Value	
nas-DedicatedInformation	Not checked at RRC layer		
nonCriticalExtension SEQUENCE {			
nonCriticalExtension SEQUENCE {			
gummei-Type-r10	mapped	Present when the registeredMME is included,	
}			
}			
}			
}			
}			

Table 9.2.3.4.1.3.3-8: Message TRACKING AREA UPDATE REQUEST (step 28, Table 9.2.3.4.1.3.2-1)

Derivation path: 36.508 table 4.7.2-27			
Information Element	Value/Remark	Comment	Condition
Sent in SECURITY PROTECTED NAS MESSAGE with valid integrity check			
EPS update type	000	TA updating	TA_only
	010	combined T/TA updating with IMSI attach	combined_TA_LA
NAS key set identifier _{ASME}			
NAS key set identifier	The valid NAS key set identifier KSI _{ASME} of the UE	As stored on the USIM in EF _{EPSNSC} in the pre-test conditions	
TSC	'0'B	native security context	
Old GUTI	Mapped from the P-TMSI allocated in Step 8 and RAI allocated in		
Additional GUTI	GUTI1	Set to the value allocated in step 18	
DRX parameter	Not present		
UE radio capability information update needed	Not present		
Old Ptmsi Signature	Any Value		
Nonce	Any Value		

9.3 EMM connection management procedures (S1 mode only)

9.3.1 Service request procedure

9.3.1.1 Service request initiated by UE for user data

9.3.1.1.1 Test Purpose (TP)

(1)

```

with { UE in EMM-REGISTERED state and EMM-IDLE mode }
ensure that {
  when { UE has user data pending }
  then { UE establishes the RRC connection with the RRC establishmentCause set to 'mo-Data' and
sends a SERVICE REQUEST message }
}

```

9.3.1.1.2 Conformance requirements

The conformance requirements covered in the current TC are specified in: TS 24.301 clauses 5.3.1.1, 5.1.3.2.2.4, 5.3.1.1, 5.6.1.1, 5.6.1.2, 5.6.1.4 and Annex D and TS 36.331 clause 5.3.3.3.

[TS 24.301 clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a NAS signalling connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

[TS 24.301 clause 5.1.3.2.2.4]

In the state EMM-REGISTERED an EMM context has been established and a default EPS bearer context has been activated in the UE.

...

The UE may initiate sending and receiving user data and signalling information and reply to paging. Additionally, tracking area updating procedure is performed (see subclause 5.5.3).

[TS 24.301 clause 5.3.1.1]

In S1 mode, when the RRC connection has been established successfully, the UE shall enter EMM -CONNECTED mode and consider the NAS signalling connection established.

[TS 24.301 clause 5.6.1.1]

The purpose of the service request procedure is to transfer the EMM mode from EMM-IDLE to EMM-CONNECTED mode and establish the radio and S1 bearers when uplink user data or signalling is to be sent.

...

The UE shall invoke the service request procedure when:

....

- b) the UE, in EMM-IDLE mode, has pending user data to be sent;

[TS 24.301 clause 5.6.1.2]

If the UE has pending uplink data or uplink signalling in EMM-IDLE mode to be transmitted or it responds to paging with CN domain indicator set to "PS", the UE initiates the service request procedure by sending a SERVICE REQUEST message to the MME, starts the timer T3417, and enters the state EMM-SERVICE-REQUEST-INITIATED.

[TS 24.301 clause 5.6.1.4]

For cases a, b and c in subclause 5.6.1.1, the UE shall treat the indication from the lower layers that the user plane radio bearer is set up as successful completion of the procedure.

....

Upon successful completion of the procedure, the UE shall stop the timer T3417 and enter the state EMM-REGISTERED.

[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
...		
Service Request	If a SERVICE REQUEST is to request user plane radio resources, the RRC establishment cause shall be set to MO data. (See Note 1)	"originating calls"
	If a SERVICE REQUEST is to request resources for UL signalling, the RRC establishment cause shall be set to MO data. (See Note 1)	"originating calls"
Note 1: For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".		

[TS 36.331, clause 5.3.3.3]

...

The UE shall set the contents of *RRCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;

2> else

3> draw a random value and set the *ue-Identity* to this value;

NOTE 1 Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

1> Set the *establishmentCause* in accordance with the information received from upper layers;

9.3.1.1.3 Test description

9.3.1.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Loopback Activated (State 4) according to TS 36.508 [18] using the specific message content for ACTIVATE TEST MODE and CLOSE UE TEST LOOP messages in table 9.3.1.1.3.3-1 and table 9.3.1.1.3.3-2.

9.3.1.1.3.2 Test procedure sequence

Table 9.3.1.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits one IP Packet to the UE.	<--	IP packet	-	-
2	The SS waits 1 second after the IP packet has been transmitted in step 1 and then transmits an <i>RRCCConnectionRelease</i> message. (Note 2)	-	-	-	-
3	Check: Does the UE transmit an <i>RRCCConnectionRequest</i> message with <i>establishmentCause</i> set to 'mo-Data' followed by a SERVICE REQUEST message? (Note 1)	-->	SERVICE REQUEST	1	P
4-7	Steps 6 to 9 of the generic radio bearer establishment procedure (TS 36.508 4.5.3.3-1) are executed to successfully complete the service request procedure.	-	-	-	-
Note 1: Triggered when timer T_delay_modeB (IP PDU delay time) expires and pending uplink data exist in buffered PDCP SDUs according to [25] clause 5.4.4.3. Note 2: The 1 second delay is used to secure that the UE have received and forwarded the IP Packet transmitted by the SS in step 1 to the UE test loop function before the <i>RRCCConnectionRelease</i> message is sent by the SS in step 2.					

9.3.1.1.3.3 Specific message contents

Table 9.3.1.1.3.3-1: ACTIVATE TEST MODE (preamble)

Derivation Path: 36.508, Table 4.7A-1, condition UE TEST LOOP MODE B

Table 9.3.1.1.3.3-2: CLOSE UE TEST LOOP (preamble)

Derivation Path: 36.508, Table 4.7A-3, condition UE TEST LOOP MODE B			
Information Element	Value/remark	Comment	Condition
UE test loop mode B LB setup			
IP PDU delay	0 0 0 0 0 1 0 1	5 seconds	

Table 9.3.1.1.3.3-3: Message *RRConnectionRequest* (step 3, Table 9.3.1.1.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
RRConnectionRequest ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcConnectionRequest-r8 SEQUENCE {			
establishmentCause	mo-Data		
}			
}			
}			

9.3.1.2 Void

9.3.1.3 Service request / Mobile originating CS fallback

9.3.1.3.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-CONNECTED mode}
ensure that {
  when { UE initiates mobile originating CS fallback }
  then { UE sends EXTENDED SERVICE REQUEST message }
}
```

(2)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE initiates mobile originating CS fallback }
  then { UE establishes the RRC connection with the RRC establishmentCause set to 'mo-Data' and
  sends EXTENDED SERVICE REQUEST message }
}
```

9.3.1.3.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.3.1.1, 5.6.1.1, 5.6.1.2 and Annex D and TS 36.331 clause 5.3.3.3.[TS 24.301 clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a NAS signalling connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

[TS24.301 clause5.6.1.1]

The purpose of the service request procedure is to transfer the EMM mode from EMM-IDLE to EMM-CONNECTED mode and establish the radio and S1 bearers when uplink user data or signalling is to be sent. Another purpose of this procedure is to invoke MO/MT CS fallback procedures.

This procedure is used when:

...

- the UE in EMM-IDLE or EMM-CONNECTED mode has requested to perform mobile originating/terminating CS fallback; or

...

The service request procedure is initiated by the UE, however, for the downlink transfer of signalling or user data in EMM-IDLE mode, the trigger is given by the network by means of the paging procedure (see subclause 5.6.2).

The UE shall invoke the service request procedure when:

...

- d) the UE, in EMM-IDLE or EMM-CONNECTED mode, has a mobile originating CS fallback request;

...

[TS24.301 clause 5.6.1.2]

If the UE has pending uplink data or uplink signalling in EMM-IDLE mode to be transmitted or it responds to paging with CN domain indicator set to "PS", the UE initiates the service request procedure by sending a SERVICE REQUEST message to the MME, starts the timer T3417, and enters the state EMM-SERVICE-REQUEST-INITIATED.

The UE shall send an EXTENDED SERVICE REQUEST message,

- regardless of the EMM mode, if the UE has a mobile originating CS fallback request; and

...

[TS24.301 clause 5.6.1.5]

#39 (CS domain temporarily not available);

The UE shall start timer T3442 and shall set the EPS update status to EU2 NOT UPDATED (and shall store it according to subclause 5.1.3.3). The UE shall enter the state EMM-REGISTERED.NORMAL-SERVICE.

The UE shall not try to send an EXTENDED SERVICE REQUEST message for mobile originating services to the network until timer T3442 expires or the UE sends a TRACKING AREA UPDATE REQUEST message.

...

[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
...		
Service Request	If a EXTENDED SERVICE REQUEST has service type set to "mobile originating CS fallback", the RRC establishment cause shall be set to MO data. (See Note1).	"originating calls"
...		
Note 1: For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".		

[TS 36.331, clause 5.3.3.3]

...

The UE shall set the contents of *RRCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;
 - 2> else
 - 3> draw a random value and set the *ue-Identity* to this value;

NOTE 1: Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 1> Set the *establishmentCause* in accordance with the information received from upper layers;

9.3.1.3.3 Test description

9.3.1.3.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Generic RB established (state 3) on cell A according to TS 36.508 [18].

9.3.1.3.3.2 Test procedure sequence

Table 9.3.1.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	Force the UE to initiate CS Voice call. (Note 1)	-		-	-
2	Check: Does the UE transmit EXTENDED SERVICE REQUEST message?	-->	EXTENDED SERVICE REQUEST	1	P
3	The SS sends SERVICE REJECT message with T3442 = 60 seconds in order that the UE enters EMM-REGISTERED.NORMAL-SERVICE.	<--	SERVICE REJECT	-	-
4	The SS releases the RRC connection	--		-	-
-	EXCEPTION: The behaviour in table 9.3.1.3.3.2-2 may occur in parallel with step 4A.	-	-	-	-
4A	SS waits for 60 seconds (T3442)	-	-	-	-
5	Force the UE to initiate CS Voice call. (Note1)	-		-	-
6	Check: Does the UE transmit an <i>RRCConnectionRequest</i> message with <i>establishmentCause</i> set to 'mo-Data' followed by EXTENDED SERVICE REQUEST message?	-->	EXTENDED SERVICE REQUEST	2	P
7	The SS sends SERVICE REJECT message with T3442 = 60 seconds in order that the UE enters EMM-REGISTERED.NORMAL-SERVICE.	<--	SERVICE REJECT	-	-
8	The SS releases the RRC connection	--		-	-
-	EXCEPTION: The behaviour in table 9.3.1.3.3.2-2 may occur in parallel with step 8A.	-	-	-	-
8A	SS waits for 60 seconds (T3442)	-	-	-	-
Note 1: This could be done by e.g. MMI or by AT command.					

Table 9.3.1.3.3.2-2: Parallel Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
2	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
3	The SS releases the RRC connection.	-	-	-	-

9.3.1.3.3.3 Specific message contents

Table 9.3.1.3.3.3-1: Message EXTENDED SERVICE REQUEST (step 2/6, Table 9.3.1.3.3.2-1)

Derivation Path: 36.508 clause 4.7.2-14A			
Information Element	Value/remark	Comment	Condition
Service type	'0000'B	"mobile originating CS fallback"	
M-TMSI	M-TMSI1		
CSFB response	Not present		

Table 9.3.1.3.3.3-2: Message SERVICE REJECT (step 3 and7, Table 9.3.1.3.3.2-1)

Derivation Path: 36.508 clause 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0010 0111'	"CS domain temporarily not available"	
T3442 value	'0010 0001'B	1 minute	

Table 9.3.1.3.3.3-3: Message RRCConnectionRequest (step 6, Table 9.3.1.3.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
<pre> RRCConnectionRequest ::= SEQUENCE { criticalExtensions CHOICE { rrcConnectionRequest-r8 SEQUENCE { establishmentCause } } } </pre>	mo-Data		

Table 9.3.1.3.3.3-4 Message TRACKING AREA UPDATE ACCEPT (step 2, Table 9.3.1.3.3.2-2)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	Not present		
MS identity	Not present		

Table 9.3.1.3.3.3-5: ATTACH ACCEPT (Preamble)

Derivation Path: 36.508 Table 4.7.2-1			
Information Element	Value/remark	Comment	Condition
EPS network feature support	Not present		

9.3.1.4 Service request / Rejected / IMSI invalid

9.3.1.4.1 Test Purpose (TP)

(1)

```

with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'Illegal UE' }
  then { UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, deletes any GUTI, last visited
registered TAI, TAI list and KSI, considers the USIM as invalid for EPS services until switching off
or the UICC containing the USIM is removed, enters the state EMM-DEREGISTERED }
}

```

(2)

```

with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'Illegal UE' }

```

```

    then { UE handles the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature,
    RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI and
    ciphering key sequence number }
}

```

9.3.1.4.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5 and TS 24.008, clause 4.7.13.4.

[TS 24.301, clause 5.6.1.5]

If the service request cannot be accepted, the network shall return a SERVICE REJECT message to the UE including an appropriate EMM cause value. When the EMM cause value is #39 "CS domain temporarily not available", the MME shall include a value for timer T3442 in the SERVICE REJECT message.

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

#3 (Illegal UE); or

...

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI and ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off or the UICC containing the USIM is removed.

NOTE 1: The possibility to configure a UE so that the radio transceiver for a specific radio access technology is not active, although it is implemented in the UE, is out of scope of the present specification.

[TS 24.008, clause 4.7.13.4]

If the Service request cannot be accepted, the network returns a SERVICE REJECT message to the mobile station. An MS that receives a SERVICE REJECT message stops timer T3317. The MS shall then take different actions depending on the received reject cause value:

3 (Illegal MS); or

...

- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM/USIM as invalid for GPRS services until switching off or the SIM/USIM is removed.
- A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall abort the RR connection, unless an emergency call is ongoing. The SIM/USIM shall be considered as invalid also for non-GPRS services until switching off or the SIM/USIM is removed.

If S1 mode is supported in the MS, the MS shall handle the EMM parameters EMM state, EPS update status, GUTI, last visited registered TAI, TAI list and KSI as specified in 3GPP TS 24.301 [120] for the case when the service request procedure is rejected with the EMM cause with the same value.

9.3.1.4.3 Test description

9.3.1.4.3.1 Pre-test conditions

System Simulator:

- cell A and cell B;
- If (p_x_RATComb_Tested = EUTRA_UTRA OR p_x_RATComb_Tested = EUTRA_GERAN);- if p_c_UTRA AND p_x_RATComb_Tested = EUTRA_UTRA, cell 5 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- if p_c_GERAN AND p_x_RATComb_Tested = EUTRA_GERAN, cell 24 (belongs to LAI-1 and RAI-1, home PLMN) is configured;
- system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
 - cell A is "Serving cell" and cell B, cell 5 and cell 24 are "non-Suitable cell".
- If (p_x_RATComb_Tested = EUTRA_Only):
 - neither cell 5 nor cell 24 is configured;
 - system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells.

UE:

- if p_c_UTRA AND p_x_RATComb_Tested = EUTRA_UTRA, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if p_c_GERAN AND p_x_RATComb_Tested = EUTRA_GERAN, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.3.1.4.3.2 Test procedure sequence

Table 9.3.1.4.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS transmits a SERVICE REJECT message with the EMM cause set to 'Illegal UE'.	<--	SERVICE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Set the cell type of Cell A to the "non-Suitable cell". Set the cell type of Cell B to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell B unless explicitly stated otherwise.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
-	EXCEPTION: Steps 6Aa1 to 6Ba1 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
6Aa1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA OR pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN the SS sets the cell type of Cell B to the "non-Suitable cell" and sets the cell type of Cell 5 or Cell 24 to the "Serving cell".	-	-	-	-
-	The following messages are to be observed on Cell 5 or Cell 24 unless explicitly stated otherwise.	-	-	-	-
6Aa2	Void	-	-	-	-
6Aa3	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	2	F
6Aa4	If possible (see ICS) switch off is performed or the USIM is removed, otherwise the power is removed.	-	-	-	-
6Aa5	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
-	EXCEPTION: Steps 21a6a1, 21a6a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if pc_AutomaticAttachSwitchON is NOT supported	-	-	-	-
6Aa5 Aa1	IF NOT pc_AutomaticAttachSwitchON	-	Registration on CS	-	-
6Aa5 Aa2	IF NOT pc_AutomaticAttachSwitchON the user initiates an attach by MMI or by AT command.	-	-	-	-
6Aa6	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
6Ba1	If not (pc_UTRA or pc_GERAN) then (if possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed (Note 2)).	-	-	-	-
7-11	Void	-	-	-	-
11A	Set the cell type of the Cell B to the "non-Suitable cell". Set the cell type of Cell A to the "Serving cell". If px_RATComb_Tested = EUTRA_UTRA set the cell type of Cell 5 to the "Cell Off" or if	-	-	-	-

	px_RATComb_Tested = EUTRA_GERAN set Cell 24 to the "Cell Off".				
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
	EXCEPTION: Steps 12a1 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
12	Void	-	-	-	-
12a1	If not (pc_UTRA or pc_GERAN), the UE is brought back to operation or the USIM is inserted.	-	-	-	-
13	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
14-30	Void	-	-	-	-
31a1 - 31a9	Void	-	-	-	-
32-43	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-
Note 1: Void.					
Note 2: Switching off, USIM removal, or power removal shall be done before T3310 and T3311 expire (30 seconds) so that the UE does not retransmit ATTACH REQUEST message.					

9.3.1.4.3.3 Specific message contents

Table 9.3.1.4.3.3-1: SERVICE REJECT (step 3, Table 9.3.1.4.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 0011'B	Illegal UE	

Table 9.3.1.4.3.3-2: ATTACH REQUEST (step 13, Table 9.3.1.4.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	'111'B	no key is available	
TSC	Any allowed value	TSC does not apply for NAS key set identifier value "111".	
Old GUTI or IMSI	IMSI of the UE		
Last visited registered TAI	Not present		
Old location area identification	Not present		
TMSI status	Not present		
	'0'B	no valid TMSI available	pc_combined_attach AND (px_AttachTypeTested = COMBINED_ATTACH) AND (pc_UTRA OR pc_GERAN)

Table 9.3.1.4.3.3-3: ATTACH REQUEST (step 6Aa6, Table 9.3.1.4.3.2-1)

Derivation Path: TS 24.008 , Table 9.4.1			
Information Element	Value/remark	Comment	Condition
MS network capability	Any allowed value		
Attach type	Any allowed value		
GPRS ciphering key sequence number	'111'B	No key is available (MS to network)	
DRX parameter	Any allowed value		
P-TMSI or IMSI	IMSI of the UE		
Old routing area identification	All bits of octets 5 and 6 are set to 1, except bit 1 of octet 6 which is set to 0. Other bits are not checked.		
MS Radio Access capability	Any allowed value		
Old P-TMSI signature	Not present		
Requested READY timer value	Not present or any allowed value		
TMSI status	Not present		
	'0'B	no valid TMSI available	pc_SupportOpMode AND (px_AttachTypeTested = COMBINED_ATTACH)
PS LCS Capability	Not present or any allowed value		
Mobile station classmark 2	Not present or any allowed value		
Mobile station classmark 3	Not present or any allowed value		
Supported Codecs	Not present or any allowed value		
UE network capability	Not present or any allowed value		
Additional mobile identity	Not present		
Additional old routing area identification	Not present		

9.3.1.5 Service request / Rejected / Illegal ME

9.3.1.5.1 Test Purpose (TP)

(1)

```

with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'Illegal ME' }
  then { UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, deletes any GUTI, last visited
registered TAI, TAI list and KSI, considers the USIM as invalid for EPS services until switching off
or the UICC containing the USIM is removed, enters the state EMM-DEREGISTERED }
}

```

(2)

```

with { UE supporting A/Gb mode or Iu mode and having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'Illegal ME' }
  then { UE sets the GPRS update status to GU3 ROAMING NOT ALLOWED, deletes any P-TMSI, P-TMSI
signature, TMSI, LAI, RAI and GPRS ciphering key sequence number and considers the SIM/USIM as
invalid for GPRS services until switching off or the SIM/USIM is removed }
}

```

9.3.1.5.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5 and TS 24.008, clause 4.7.13.4.

[TS 24.301, clause 5.6.1.5]

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

...

#6 (Illegal ME);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall enter the state EMM-DEREGISTERED.

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI and ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off or the UICC containing the USIM is removed.

NOTE 1: The possibility to configure a UE so that the radio transceiver for a specific radio access technology is not active, although it is implemented in the UE, is out of scope of the present specification.

[TS 24.008, clause 4.7.13.4]

If the Service request cannot be accepted, the network returns a SERVICE REJECT message to the mobile station. An MS that receives a SERVICE REJECT message stops timer T3317. The MS shall then take different actions depending on the received reject cause value:

...

6 (Illegal ME);

- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM/USIM as invalid for GPRS services until switching off or the SIM/USIM is removed.
- A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall abort the RR connection, unless an emergency call is ongoing. The SIM/USIM shall be considered as invalid also for non-GPRS services until switching off or the SIM/USIM is removed.

9.3.1.5.3 Test description

The test description is identical to the one of subclause 9.3.1.4 except that the reject cause #3 "Illegal UE" is replaced with reject cause #6 "Illegal ME".

9.3.1.6 Service request / Rejected / EPS services not allowed

9.3.1.6.1 Test Purpose (TP)

(1)

```
with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'EPS services not allowed' }
  then { UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, deletes any GUTI, last visited
registered TAI, TAI list and KSI, considers the USIM as invalid for EPS services until switching off
or the UICC containing the USIM is removed and enters the state EMM-DEREGISTERED }
}
```

(2)

```
with { UE supporting A/Gb mode or Iu mode and having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'EPS services not allowed' }
  then { UE sets the GPRS update status to GU3 ROAMING NOT ALLOWED, deletes any P-TMSI, P-TMSI
signature, RAI and GPRS ciphering key sequence number and considers the SIM/USIM as invalid for GPRS
services until switching off or the SIM/USIM is removed }
}
```

9.3.1.6.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5 and TS 24.008, clause 4.7.13.4.

[TS 24.301, clause 5.6.1.5]

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

...

#7 (EPS services not allowed);

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed. The UE shall enter the state EMM-DEREGISTERED.

A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation is still IMSI attached for non-EPS services. The UE shall set the update status to U2 NOT UPDATED, shall select GERAN or UTRAN radio access technology and proceed with appropriate MM specific procedure according to the MM service state. The UE shall not reselect E-UTRAN radio access technology until switching off or the UICC containing the USIM is removed

...

If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

[TS 24.008, clause 4.7.13.4]

If the Service request cannot be accepted, the network returns a SERVICE REJECT message to the mobile station. An MS that receives a SERVICE REJECT message stops timer T3317. The MS shall then take different actions depending on the received reject cause value:

...

7 (GPRS services not allowed);

- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence

number. The SIM/USIM shall be considered as invalid for GPRS services until switching off or the SIM/USIM is removed. The new state is GMM-DEREGISTERED.

9.3.1.6.3 Test description

9.3.1.6.3.1 Pre-test conditions

System Simulator:

- cell A is configured as the "Serving cell";
- If ($p_x_RATComb_Tested = EUTRA_UTRA$ OR $p_x_RATComb_Tested = EUTRA_GERAN$);
- if pc_UTRA AND $p_x_RATComb_Tested = EUTRA_UTRA$, cell 5 (belongs to LAI-1 and RAI-1, home PLMN) is configured and set to as a 'Non-suitable cell';
- if pc_GERAN AND $p_x_RATComb_Tested = EUTRA_GERAN$, cell 24 (belongs to LAI-1 and RAI-1, home PLMN) is configured and set to as a 'Non-suitable cell';
- system information combination 10 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;
- If ($p_x_RATComb_Tested = EUTRA_Only$):
 - neither cell 5 nor cell 24 is configured;
 - system information combination 1 as defined in TS 36.508[18] clause 4.4.3.1 is applied in E-UTRA cells;

UE:

- if pc_UTRA AND $p_x_RATComb_Tested = EUTRA_UTRA$, the UE is previously registered on UTRAN cell 5 using default message contents according to TS 36.508 [18].
- if pc_GERAN AND $p_x_RATComb_Tested = EUTRA_GERAN$, the UE is previously registered on GERAN cell 24 using default message contents according to TS 36.508 [18].

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.3.1.6.3.2 Test procedure sequence

Table 9.3.1.6.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
1A	Void	-	-	-	-
-	The following messages are to be observed on Cell A unless explicitly stated otherwise.	-	-	-	-
2	UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS transmits an SERVICE REJECT message with EMM cause = "EPS services not allowed".	<--	SERVICE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	Check: Does the UE transmit a SERVICE REQUEST message in the next 30 seconds?	-->	SERVICE REQUEST	1	F
6	Check: Does the test result of generic procedure in TS 36.508 subclause 6.4.2.5 indicate that the UE does not respond to paging when paged with S-TMSI included in GUTI-1 and with CN domain indicator set to "PS"?	-	-	1	-
-	EXCEPTION: Steps 7a1 to 7b8 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
7a1	IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA THEN SS configures: - Cell A as 'Non-suitable cell' - Cell 5 as 'Serving cell'	-	-	-	-
-	The following messages are to be observed on Cell 5 unless explicitly stated otherwise.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.3.1.6.3.2-2 occurs in parallel with step 7a2.	-	-	-	-
7a2	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
7a3	The user initiates an attach by MMI or by AT command.	-	-	-	-
7a4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
7a5	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
-	EXCEPTION: Steps 7a6a1 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
7a6a1	IF pc_CS THEN the UE optionally transmits an IMSI DETACH INDICATION message	-->	IMSI DETACH INDICATION	-	-
7a7	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
7a8	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
-	EXCEPTION: Steps 21a6a1, 21a6a2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if pc_AutomaticAttachSwitchON is NOT supported	-	-	-	-
7a8Aa1	IF NOT pc_AutomaticAttachSwitchON	-	Registration on CS	-	-
7a8Aa2	IF NOT pc_AutomaticAttachSwitchON the user initiates an attach by MMI or by AT command.	-	-	-	-

7b1	IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN SS configures: - Cell A as 'Non-suitable cell' - Cell 24 as 'Serving cell'	-	-	-	-
-	The following messages are to be observed on Cell 24 unless explicitly stated otherwise.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.3.1.6.3.2-2 occurs in parallel with step 7b2.	-	-	-	-
7b2	Check: Does the UE transmit an ATTACH REQUEST message in the next 90 seconds?	-->	ATTACH REQUEST	2	F
7b3	The user initiates an attach by MMI or by AT command.	-	-	-	-
7b4	Check: Does the UE transmit an ATTACH REQUEST message in the next 30 seconds?	-->	ATTACH REQUEST	1	F
7b5	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed.	-	-	-	-
7b6	IF Location Updating procedure has been performed in step 1a1 of behaviour described in table 9.3.1.6.3.2-2 parallel to step 7b2 THEN the UE transmits an IMSI DETACH INDICATION message	-->	IMSI DETACH INDICATION	-	-
7b6A	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE	-	-
-	EXCEPTION: Step 7b6B describes behaviour that depends on UE capability.	-	-	-	-
7b6B	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE	-	-
7b7	The UE is brought back to operation or the USIM is inserted.	-	-	-	-
7b8	Check: Does the UE transmit an ATTACH REQUEST message?	-->	ATTACH REQUEST	2	P
	EXCEPTION: Steps 8a1 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
8 a1	IF not (pc_UTRA or pc_GERAN) then (if possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed).	-	-	-	-
9	The SS configures: - Cell A as the 'Serving cell'. - IF pc_UTRA AND px_RATComb_Tested = EUTRA_UTRA THEN Cell 5 'Non-suitable cell off'. - IF pc_GERAN AND px_RATComb_Tested = EUTRA_GERAN THEN Cell 24 'Non-suitable cell off'.	-	-	-	-
	EXCEPTION: Steps 10a1 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported				
10 a1	If not (pc_UTRA or pc_GERAN), the UE is brought back to operation or the USIM is inserted..	-	-	-	-
11	The UE transmits an ATTACH REQUEST message on cell A including a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	1	P
12	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
13	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
14	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
15	The UE transmits a NAS SECURITY MODE	-->	SECURITY MODE COMPLETE	-	-

	COMPLETE message and establishes the initial security configuration.				
-	EXCEPTION: Steps 16a1 to 16a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
16a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
16a2	The UE transmits the ESM INFORMATION REQUEST message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
17	SS responds with ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
Note 1: Void					

Table 9.3.1.6.3.2-2: Parallel behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
-	EXCEPTION: Steps 1a1 and 1a4 describe a behaviour which depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported.	-	-	-	-
1a1	IF pc_CS THEN the UE optionally transmits a LOCATION UPDATING REQUEST message.	-->	LOCATION UPDATING REQUEST	-	-
-	EXCEPTION: The messages in the next two steps are sent only on Cell 24	-	-	-	-
1a1A a1	The UE transmits a <i>Classmark Change</i> message	-->	CLASSMARK CHANGE		
-	EXCEPTION: The next step describes behaviour that depends on UE capability.	-	-	-	-
1a1A a2	IF pc_UTRA THEN the UE transmits a <i>Utran Classmark Change</i> message.	-->	UTRAN CLASSMARK CHANGE.		
1a2	The SS transmits an AUTHENTICATION REQUEST message to initiate the authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
1a3	The UE transmits an AUTHENTICATION RESPONSE message.	-->	AUTHENTICATION RESPONSE	-	-
1a4	The SS transmits a LOCATION UPDATING ACCEPT message including IMSI-1	<--	LOCATION UPDATING ACCEPT	-	-

9.3.1.6.3.3 Specific message contents

Table 9.3.1.6.3.3-1: SERVICE REJECT (step 3, Table 9.3.1.6.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 0111'B	EPS services not allowed	

Table 9.3.1.6.3.3-2: Message ATTACH REQUEST (step 11, Table 9.3.1.6.3.2-1)

Derivation path: TS 36.508 table 4.7.2-4			
Information Element	Value/Remark	Comment	Condition
NAS key set identifier	'111'B	no key is available	
Old GUTI or IMSI	IMSI1		
Last visited registered TAI	Not present		

Table 9.3.1.6.3.3-3: Message ATTACH REQUEST (step 7a8 and 7b8, Table 9.3.1.6.3.2-1)

Derivation path: TS 24.008 table 9.4.1			
Information Element	Value/Remark	Comment	Condition
GPRS ciphering key sequence number	'111'B	no key is available	
P-TMSI or IMSI	IMSI1		
Old routing area identification	all bits of the location area code shall be set to one with the exception of the least significant bit which shall be set to zero	RAI is deleted	
Old P-TMSI signature	Not present		
TMSI status	Not present or 0		

Table 9.3.1.6.3.3-4: Void**Table 9.3.1.6.3.3-5: Void****Table 9.3.1.6.3.3-6: LOCATION UPDATING ACCEPT (step 1a2, Table 9.3.1.6.3.2-2)**

Derivation Path: TS 36.508 Table 4.7B.2-5			
Information Element	Value/remark	Comment	Condition
Mobile identity			
IMSI	IMSI-1		

9.3.1.7 Service request / Rejected / UE identity cannot be derived by the network

9.3.1.7.1 Test Purpose (TP)

(1)

```

with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause value = 9 (UE identity cannot be
derived by the network) }
  then { UE sets the EPS update status to EU2 NOT UPDATED and deletes any GUTI, last visited
registered TAI, TAI list and KSI and automatically initiate the attach procedure }
}

```

9.3.1.7.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5.

[TS 24.301, clause 5.6.1.5]

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

...

#9 (UE identity cannot be derived by the network);

The UE shall set the EPS update status to EU2 NOT UPDATED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall enter the state EMM-DEREGISTERED.

Subsequently, the UE shall automatically initiate the attach procedure.

NOTE 3: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

9.3.1.7.3 Test description

9.3.1.7.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.3.1.7.3.2 Test procedure sequence

Table 9.3.1.7.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS transmits a SERVICE REJECT message with the EMM cause set to #9 (UE identity cannot be derived by the network).	<--	SERVICE REJECT	-	-
-	EXCEPTION: Steps 3a1-3a2 describes the behaviour that depends on UE behaviour (Note 1).	-	-	-	-
3a1	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 3a2 describes a behaviour which depends on the UE capability	-	-	-	-
3a2	IF NOT pc_Automatic_EPS_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message including IMSI and without integrity protection?	-->	ATTACH REQUEST	1	P
5-16	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-
Note 1: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second, existing RRC Connection is released.					

9.3.1.7.3.3 Specific message contents

Table 9.3.1.7.3.3-1: SERVICE REJECT (step 3, Table 9.3.1.7.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1001'B	UE identity cannot be derived by the network	

Table 9.3.1.7.3.3-2: ATTACH REQUEST (step 4, Table 9.3.1.7.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier	'111'B	no key is available	
Old GUTI or IMSI	IMSI		
Last visited registered TAI	Not present		

9.3.1.7a Service request / Rejected / UE implicitly detached

9.3.1.7a.1 Test Purpose (TP)

(1)

```

with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause set to 'Implicitly detached' }
  then { UE enters the state EMM-DEREGISTERED.NORMAL-SERVICE, delete the EPS mapped EPS security context if any and performs a new attach procedure }
}

```

9.3.1.7a.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5.

[TS 24.301, clause 5.6.1.5]

If the service request cannot be accepted, the network shall return a SERVICE REJECT message to the UE including an appropriate EMM cause value.

...

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

...

#10 (Implicitly detached);

The UE shall enter the state EMM-DEREGISTERED.NORMAL-SERVICE. The UE shall delete any mapped EPS security context or partial native EPS security context. The UE shall perform a new attach procedure.

NOTE 4: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

9.3.1.7a.3 Test description

9.3.1.7a.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (state 2) on cell A according to TS 36.508 [18].

9.3.1.7a.3.2 Test procedure sequence

Table 9.3.1.7a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS transmits a SERVICE REJECT message with the EMM cause set to 'Implicitly detached'.	<--	SERVICE REJECT	-	-
-	EXCEPTION: Steps 3a1 & 3a2 describes the behaviour that depends on UE behaviour (Note 1).	-	-	-	-
3a1	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 3a2 describes a behaviour which depends on the UE capability	-	-	-	-
3a2	IF NOT pc_Automatic_EPS_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
4	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message and integrity protected using the native security context resulting from authentication during the test preamble?	-->	ATTACH REQUEST	1	P
5-16	The attach procedure is completed by executing steps 5 to 16 of the UE registration procedure in TS 36.508 sub clause 4.5.2.3.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA connected (E2) according to TS 36.508.	-	-	-	-
Note 1: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second, existing RRC Connection is released.					

9.3.1.7a.3.3 Specific message contents

Table 9.3.1.7a.3.3-1: SERVICE REJECT (step 3, Table 9.3.1.7a.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0000 1010'B	Implicitly detached	

Table 9.3.1.7a.3.3-2: ATTACH REQUEST (step 4, Table 9.3.1.7a.3.2-1)

Derivation Path: 36.508, Table 4.7.2-4			
Information Element	Value/remark	Comment	Condition
NAS key set identifier			
NAS key set identifier	NAS key set identifier allocated to UE during authentication in test preamble		
TSC	'0'B	Native security context	
Old GUTI or IMSI	GUTI allocated to UE during previous attach on Cell A.		
Last visited registered TAI	TAI-1		

9.3.1.8 to 9.3.1.12 Void

9.3.1.12a Extended service request / Rejected / CS domain temporarily not available

9.3.1.12a.1 Test Purpose (TP)

(1)

```

with { UE has received a SERVICE REJECT message with the EMM cause set to 'CS domain temporarily not
available' and T3442 expired }
ensure that {
  when { UE is requested to initiate a CS call }
    then { UE transmit EXTENDED SERVICE REQUEST message }
}

```

9.3.1.12a.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5.

[TS 24.301, clause 5.6.1.5]

If the service request cannot be accepted, the network shall return a SERVICE REJECT message to the UE including an appropriate EMM cause value. When the EMM cause value is #39 "CS domain temporarily not available", the MME shall include a value for timer T3442 in the SERVICE REJECT message.

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

...

#39 (CS domain temporarily not available);

The UE shall start timer T3442 and enter the state EMM-REGISTERED.NORMAL-SERVICE.

The UE shall not try to send an EXTENDED SERVICE REQUEST message for mobile originating services to the network, except for mobile originating CS fallback for emergency calls, until timer T3442 expires or the UE sends a TRACKING AREA UPDATE REQUEST message.

9.3.1.12a.3 Test description

9.3.1.12a.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) according to TS 36.508 [18].

9.3.1.12a.3.2 Test procedure sequence

Table 9.3.1.12a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "CS".	-	-	-	-
2	The UE transmits an EXTENDED SERVICE REQUEST message.	-->	EXTENDED SERVICE REQUEST	-	-
3	The SS transmits a SERVICE REJECT message with the EMM cause set to 'CS domain temporarily not available' and T3442 = 60 seconds.	<--	SERVICE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.3.1.12a.3.2-2 may occur in parallel with step 4A.	-	-	-	-
4A	SS waits for 60 seconds (T3442)	-	-	-	-
5	Cause the UE to originate CS call. (Note 1)	-	-	-	-
6	Check: Does the UE transmit an EXTENDED SERVICE REQUEST message?	-->	EXTENDED SERVICE REQUEST	1	P
6A	The SS sends SERVICE REJECT message with the EMM cause set to 'CS domain temporarily not available' and T3442 = 60 seconds.	<--	SERVICE REJECT	-	-
6B	The SS releases the RRC Connection,	-	-	-	-
-	EXCEPTION: The behaviour in table 9.3.1.12a.3.2-2 may occur in parallel with step 6C.	-	-	-	-
6C	The SS waits for 60 seconds (T3442)	-	-	-	-
7	If possible (see ICS) switch off is performed or the USIM is removed. Otherwise the power is removed. (Note 2)	-	-	-	-
<p>Note 1: The trigger in step 5 is the same as in the generic procedure in 36.508 clause 6.4.3.5.</p> <p>Note 2: The UE is powered off, switched off, or the USIM is removed because the UE may retry a transmission of an EXTENDED SERVICE REQUEST message depending on the UE implementation after timer T3442 expires. Additionally, it is not clear which postamble procedure is performed, since the UE may search the UTRAN/GERAN cell after step 3.</p>					

Table 9.3.1.12a.3.2-2: Parallel Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
2	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
3	The SS releases the RRC connection.	-	-	-	-

9.3.1.12a.3.3 Specific message contents

Table 9.3.1.12a.3.3-1: Message SERVICE REJECT (step 3 and 6A, Table 9.3.1.12a.3.2-1)

Derivation Path: TS 36.508, Table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0010 0111'B	CS domain temporarily not available	
T3442 value			
Timer value	'0 0001'B	1 minute	
Unit	'001'B	value is incremented in multiples of 1 minute	

Table 9.3.1.12a.3.3-2: Message TRACKING AREA UPDATE ACCEPT (step 2, Table 9.3.1.12a.3.2-2)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	Not present		
MS Identity	Not Present		

9.3.1.13 Void

9.3.1.14 Void

9.3.1.15 Void

9.3.1.16 Service request / Abnormal case / Switch off

9.3.1.16.1 Test Purpose (TP)

(1)

```

with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE is switched off }
  then { UE performs the detach procedure }
}

```

9.3.1.16.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.6.

[TS 24.301, clause 5.6.1.6]

The following abnormal cases can be identified:

...

g) Switch off

If the UE is in state EMM-SERVICE-REQUEST-INITIATED at switch off, the detach procedure shall be performed.

...

9.3.1.16.3 Test description

9.3.1.16.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (state 2) according to TS 36.508 [18].

9.3.1.16.3.2 Test procedure sequence

Table 9.3.1.16.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS does not respond to the SERVICE REQUEST message. NOTE: The SS does not transmit both <i>SecurityModeCommand</i> message and <i>RRCConnectionReconfiguration</i> message.	-	-	-	-
4	The UE is switched off.	-	-	-	-
5	Check: Does the UE transmit a DETACH REQUEST message?	-->	DETACH REQUEST	1	P
6	Check: Does the test result of generic test procedure in TS 36.508 subclause 6.4.2.5 indicates that the UE does not respond to paging when paged with S-TMSI included in GUTI-1 and with CN domain indicator set to "PS"?	-	-	1	-

9.3.1.16.3.3 Specific message contents

None.

9.3.1.17 Service request / Abnormal case / Procedure collision

9.3.1.17.1 Test Purpose (TP)

(1)

```
with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a DETACH REQUEST message with the Type of detach set to 're-attach required' }
  then { UE sends a DETACH ACCEPT message and performs the attach procedure }
}
```

(2)

```
with { UE having sent a SERVICE REQUEST message or an EXTENDED SERVICE REQUEST message }
ensure that {
  when { UE receives a DETACH REQUEST message with the Type of detach set to the value other than 're-attach required' }
  then { UE sends a DETACH ACCEPT message }
}
```

9.3.1.17.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.6.

[TS 24.301, clause 5.6.1.6]

The following abnormal cases can be identified:

...

h) Procedure collision

If the UE receives a DETACH REQUEST message with detach type "re-attach required" or "re-attach not required" with EMM cause other than #2 "IMSI unknown in HSS" from the network in state EMM-SERVICE-REQUEST-INITIATED, the detach procedure shall be progressed and the service request procedure shall be aborted.

Additionally, if the service request was initiated for CS fallback or 1xCS fallback, the EMM sublayer shall indicate to the MM sublayer or the cdma2000[®] upper layers that the CS fallback or 1xCS fallback procedure has failed.

If the Detach type IE in the DETACH REQUEST message indicated "re-attach required", the attach procedure shall be performed.

9.3.1.17.3 Test description

9.3.1.17.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle mode (state 2) according to TS 36.508 [18].

9.3.1.17.3.2 Test procedure sequence

Table 9.3.1.17.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS transmits a DETACH REQUEST message with the Type of detach set to 're-attach required'.	<--	DETACH REQUEST	-	-
4	Check: Does the UE transmit a DETACH ACCEPT message?	-->	DETACH ACCEPT	1	P
5	Void	-	-	-	-
-	EXCEPTION: Steps 5a-5b describes a behaviour that depends on UE behaviour (Note 1).	-	-	-	-
5a	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Step 5b describes a behaviour which depends on the UE capability	-	-	-	-
5b	IF NOT pc_Automatic_Re_Attach, the user initiates an attach by MMI or by AT command.	-	-	-	-
6	Check: Does the UE transmit an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message?	-->	ATTACH REQUEST	1	P
7	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
8	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
9	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
10	The UE transmits a NAS SECURITY MODE COMPLETE message and establishes the initial security configuration.	-->	SECURITY MODE COMPLETE	-	-
-	EXCEPTION: Steps 11a1 to 11a2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred after NAS SECURITY MODE COMPLETE message.	-	-	-	-
11a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
11a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
12	The SS responds with an ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message.	<--	ATTACH ACCEPT	-	-
-	EXCEPTION: In parallel to the event described in step 13 below the generic procedure for IP address allocation in the U-plane specified in TS 36.508 subclause 4.5A.1 takes place performing IP address allocation in the U-plane if requested by the UE.	-	-	-	-
13	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message.	-->	ATTACH COMPLETE	-	-

14	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: Steps 15a1 to 15b2 describe behaviour that depends on the UE capability; the "lower case letter" identifies a step sequence that take place if a capability is supported	-	-	-	-
15a1	IF (px_AttachTypeTested == COMBINED_ATTACH) and (pc_CS_Fallback is true) THEN the SS pages the UE using S-TMSI with CN domain indicator set to "CS".	-	-	-	-
15a2	The UE transmits an EXTENDED SERVICE REQUEST message.	-->	EXTENDED SERVICE REQUEST	-	-
15b1	ELSE the SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
15b2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
16	The SS transmits a DETACH REQUEST message with the Type of detach set to the value other than 're-attach required'.	<--	DETACH REQUEST	-	-
17	Check: Does the UE transmit a DETACH ACCEPT message?	-->	DETACH ACCEPT	2	P
18	The SS releases the RRC connection.	-	-	-	-
-	At the end of this test procedure sequence, the UE is in end state E-UTRA deregistered (E4) according to TS 36.508.	-	-	-	-

Note 1: SS waits for 1 second to receive the Attach Request on the existing RRC Connection. In case Attach Request is not received within 1 second, existing RRC Connection is released.

9.3.1.17.3.3 Specific message contents

Table 9.3.1.17.3.3-1: Message DETACH REQUEST (step 3, Table 9.3.1.17.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-12			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	'001'B	re-attach required	
EMM cause	Not present	If the detach type IE indicates "IMSI detach" or "re-attach required", then the UE shall ignore the EMM cause IE if received.	

Table 9.3.1.17.3.3-2: Message DETACH REQUEST (step 16, Table 9.3.1.17.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-12			
Information Element	Value/remark	Comment	Condition
Detach type			
Type of detach	'010'B	re-attach not required	
EMM cause	'0000 0011'B	Illegal UE	

9.3.1.18 Service Request / Rejected / Not authorized for this CSG

9.3.1.18.1 Test Purpose (TP)

(1)

```
with { UE having sent a SERVICE REQUEST message }
ensure that {
  when { UE receives a SERVICE REJECT message with the EMM cause value = 25 (Not authorized for this CSG) and this SERVICE REJECT message is not without integrity protection }
```

```

    then { UE sets the EPS update status to EU3 ROAMING NOT ALLOWED, removes the CSG ID of the cell
    that sent SERVICE REJECT message from the Allowed CSG list, searches for a suitable cell in the same
    PLMN }
}

```

(2)

```

with { UE in state EMM-REGISTERED and EMM-IDLE mode and the CSG ID is removed from the Allowed CSG
list }
ensure that {
    when { UE detects entering new tracking areas not included in the TAI list }
        then { UE attempts to enter a normal cell and does not select a cell which is not included in
the allowed CSG list }
}

```

9.3.1.18.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: TS 24.301, clause 5.6.1.5.

[TS 24.301, clause 5.6.1.5]

On receipt of the SERVICE REJECT message, the UE shall stop timer T3417 and take the following actions depending on the received EMM cause value.

...

#25 (Not authorized for this CSG);

Cause #25 is only applicable when received from a CSG cell. Cause #25 received from a non-CSG cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.6.

If the SERVICE REJECT message with cause #25 was received without integrity protection, then the UE shall discard the message.

The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3). The UE shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

The UE shall remove the CSG ID of the cell where the UE has initiated the service request procedure from the Allowed CSG list.

The UE shall search for a suitable cell in the same PLMN according to 3GPP TS 36.304 [21].

9.3.1.18.3 Test description

9.3.1.18.3.1 Pre-test conditions

System Simulator:

- cell A(TAC1, frequency 1, is a CSG cell);
- cell B(TAC2, frequency 1, not a CSG cell);
- cell A is "Serving cell" and cell B " Non-suitable cell".
- System information combination 3 as defined in TS 36.508[18] clause 4.4.3.1 is used in E-UTRA cell B.
- System information combination 7 as defined in TS 36.508[18] clause 4.4.3.1 is used in cell A;

UE:

- the UE is previously registered on cell A using manual CSG selection (so the allowed CSG list includes CSG ID of cell A).

Preamble:

- The UE is in state Registered, Idle mode (state 2) on cell A according to [18].

9.3.1.18.3.2 Test procedure sequence

Table 9.3.1.18.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS pages the UE using S-TMSI with CN domain indicator set to "PS".	-	-	-	-
-	The following messages are sent and shall be received on Cell A.	-	-	-	-
2	The UE transmits a SERVICE REQUEST message.	-->	SERVICE REQUEST	-	-
3	The SS transmits a SERVICE REJECT message with the EMM cause = " Not authorized for this CSG " as specified.	<--	SERVICE REJECT	-	-
4	The SS releases the RRC connection.	-	-	-	-
5	The SS configures: - Cell A as a "Serving cell". - Cell B as a "Suitable Neighbour intra-frequency cell".	-	-	-	-
6	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on cell B?	-->	TRACKING AREA UPDATE REQUEST	1	P
7	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
8	The UE transmits a TRACKING AREA UPDATE COMPLETE message.	-->	TRACKING AREA UPDATE COMPLETE	-	-
8A	The SS releases the RRC connection.	-	-	-	-
9	The SS configures: - Cell A as a " Serving cell". - Cell B as a " Not Suitable cell".	-	-	-	-
10	Check: Does the UE transmit a TRACKING AREA UPDATE REQUEST message on cell A in the next 30 seconds?	-->	TRACKING AREA UPDATE REQUEST	2	F

9.3.1.18.3.3 Specific message contents

Table 9.3.1.18.3.3-1: SERVICE REJECT (step 3, Table 9.3.1.18.3.2-1)

Derivation Path: TS 36.508 Table 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'00011001'B	#25 "Not authorized for this CSG"	

Table 9.3.1.18.3.3-2: SystemInformationBlockType1 for Cell A, B(Pre-test conditions and all steps in Table 9.3.1.18.3.2-1)

Derivation Path: 36.508 clause 4.4.3.2			
Information Element	Value/remark	Comment	Condition
SystemInformationBlockType1 ::= SEQUENCE {			
cellAccessRelatedInfo SEQUENCE {			
csg-Indication	TRUE		Cell A
	FALSE		Cell B
csg-Identity	Not present		Cell B
	'000 0000 0000 0000 0000 0000 0010'B		Cell A

9.3.2 Paging procedure

9.3.2.1 Paging procedure

9.3.2.1.1 Test Purpose (TP)

(1)

```
with { UE in ECM-IDLE }
ensure that {
  when { the network initiates a paging procedure for EPS services using S-TMSI }
  then { the UE responds to the paging with a SERVICE REQUEST message providing correct S-TMSI in
the RRConnectionRequest }
}
```

9.3.2.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301, clauses 5.6.1.1, 5.6.2.2.1, TS 33.401 clause 7.2.6.2, TS 36.331 clause 5.3.3.3.

[TS 24.301, clause 5.6.2.2.1]

To initiate the procedure the EMM entity in the network requests the lower layer to start paging (see 3GPP TS 36.300 [20], 3GPP TS 36.413 [23]) and starts the timer T3413 for this paging procedure. Upon reception of a paging indication, the UE shall respond to the paging with a SERVICE REQUEST message (see 3GPP TS 23.401 [10] and 3GPP TS 36.413 [23]). If the paging for EPS services was received during an ongoing UE initiated EMM specific procedure or service request procedure, then the UE shall ignore the paging and the UE and the network shall proceed with the EMM specific procedure or the service request procedure.

[TS 24.301, clause 5.6.1.1]

The UE shall invoke the service request procedure when:

- a) the UE in EMM-IDLE mode receives a paging request with CN domain indicator set to "PS" from the network;

[TS 33.401 clause 7.2.6.2]

The procedure the UE uses to transit from ECM-IDLE to ECM-CONNECTED when in EMM-REGISTERED state is initiated by a NAS Service Request message from the UE to the MME. As the UE is in EMM-REGISTERED state, a EPS security context exists in the UE and the MME, and this EPS security context further contains uplink and downlink NAS COUNTS. The NAS Service Request message sent in EMM-REGISTERED shall be integrity protected and contain the uplink NAS sequence number.

[TS 36.331, clause 5.3.3.3]

The UE shall set the contents of *RRConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
 - 2> if upper layers provide an S-TMSI:
 - 3> set the *ue-Identity* to the value received from upper layers;

9.3.2.1.3 Test description

9.3.2.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

- none.

Preamble:

- the UE is in Registered, Idle Mode (state 2) according to TS 36.508 [18].

9.3.2.1.3.2 Test procedure sequence

Table 9.3.2.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	SS pages the UE using S-TMSI with CN domain indicator set to "PS"	-	-	-	-
2	Check: Does the UE transmit <i>RRCConnectionRequest</i> message providing correct S-TMSI?	-	-	1	P
3	Check: Does the UE respond with a SERVICE REQUEST message?	-->	SERVICE REQUEST	1	P
4-7	Steps 6 to 9 of the generic radio bearer establishment procedure (TS 36.508 4.5.3.3-1) are executed to successfully complete the service request procedure.	-	-	-	-

9.3.2.1.3.3 Specific message contents

Table 9.3.2.1.3.3-1: *RRCConnectionRequest* (step 2, Table 9.3.2.1.3.2-1)

Derivation Path: Table 4.6.1-16			
Information Element	Value/remark	Comment	Condition
<i>RRCConnectionRequest</i> ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcConnectionRequest-r8 SEQUENCE {			
ue-Identity[1] CHOICE {			
s-TMSI	Set to the value of the S-TMSI of the UE		
}			
}			
}			
}			

9.3.2.2 Paging for CS fallback / Idle mode

9.3.2.2.1 Test Purpose (TP)

(1)

```
with { UE in state EMM-REGISTERED and EMM-IDLE mode}
ensure that {
  when { UE received Paging for mobile termination CS fallback from NW }
  then { UE establishes the RRC connection with the RRC establishmentCause set to 'mt-Access' and sends EXTENDED SERVICE REQUEST message }
}
```

9.3.2.2.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.3.1.1, 5.6.1.1, 5.6.2.3 and Annex D and TS 36.331 clause 5.3.3.3.

[TS 24.301 clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a NAS signalling connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

[TS24.301 clause5.6.1.1]

The purpose of the service request procedure is to transfer the EMM mode from EMM-IDLE to EMM-CONNECTED mode and establish the radio and S1 bearers when uplink user data or signalling is to be sent. Another purpose of this procedure is to invoke MO/MT CS fallback procedures.

This procedure is used when:

...

- the UE in EMM-IDLE or EMM-CONNECTED mode has requested to perform mobile originating/terminating CS fallback; or

...

The service request procedure is initiated by the UE, however, for the downlink transfer of signalling or user data in EMM-IDLE mode, the trigger is given by the network by means of the paging procedure (see subclause 5.6.2).

The UE shall invoke the service request procedure when:

...

- e) the UE, in EMM-IDLE or EMM-CONNECTED mode, has a CS fallback response to be sent to the network; or

...

[TS24.301 clause5.6.2.3]

The network may initiate the paging procedure for non-EPS services when the UE is IMSI attached for non-EPS services.

To initiate the procedure when no NAS signalling connection exists, the EMM entity in the network requests the lower layer to start paging (see 3GPP TS 36.300 [2012], 3GPP TS 36.413 [2315]) and starts the timer T3413 for this paging procedure. The paging message includes a CN domain indicator set to "CS" in order to indicate that this is paging for CS fallback. Upon reception of a paging indication, the UE may respond to the paging immediately or may request upper layers input i.e. to accept or reject CS fallback. The response is indicated in the CSFB response information element in the EXTENDED SERVICE REQUEST message in both EMM-IDLE and EMM-CONNECTED modes.

The network shall stop the timer T3413 for the paging procedure when a response is received from the UE.

To notify the UE about an incoming mobile terminating CS service when a NAS signalling connection exists, the EMM entity in the network shall send a CS SERVICE NOTIFICATION message.

[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
...		
Service Request	If a EXTENDED SERVICE REQUEST has service type set to "mobile terminating CS fallback", the RRC establishment cause shall be set to MT access. (See Note1).	"terminating calls"
...		
Note 1:	For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".	

[TS 36.331, clause 5.3.3.3]

...

The UE shall set the contents of *RRCConnectionRequest* message as follows:

- 1> set the *ue-Identity* as follows:
- 2> if upper layers provide an S-TMSI:
- 3> set the *ue-Identity* to the value received from upper layers;
- 2> else
- 3> draw a random value and set the *ue-Identity* to this value;

NOTE 1: Upper layers provide the S-TMSI if the UE is registered in the TA of the current cell.

- 1> Set the *establishmentCause* in accordance with the information received from upper layers;

9.3.2.2.3 Test description

9.3.2.2.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Registered, Idle Mode (state 2) on cell A according to TS 36.508 [18].

9.3.2.2.3.2 Test procedure sequence

Table 9.3.2.2.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS sends a paging message which CN domain indicates "CS" domain to the UE.	-	-	-	-
2	The UE accepts CS fallback	-	-	-	-
3	Check: Does the UE transmit an <i>RRConnectionRequest</i> message with <i>establishmentCause</i> set to 'mt-Access' followed by EXTENDED SERVICE REQUEST message?	-->	EXTENDED SERVICE REQUEST	1	P
4	The SS sends SERVICE REJECT message with T3442 = 60 seconds in order that the UE enters EMM-REGISTERED.NORMAL-SERVICE.	<--	SERVICE REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.3.2.2.3.2-2 may occur in parallel with step 6.	-	-	-	-
6	SS waits for 60 seconds (T3442)	-	-	-	-

Table 9.3.2.2.3.2-2: Parallel Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
2	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
3	The SS releases the RRC connection.	-	-	-	-

9.3.2.2.3.3 Specific message contents

Table 9.3.2.2.3.3-0: Message *RRConnectionRequest* (step 3, Table 9.3.2.2.3.2-1)

Derivation path: 36.508 table 4.6.1-16			
Information Element	Value/Remark	Comment	Condition
RRConnectionRequest ::= SEQUENCE {			
criticalExtensions CHOICE {			
rrcConnectionRequest-r8 SEQUENCE {			
establishmentCause	mt-Access		
}			
}			
}			

Table 9.3.2.2.3.3-1: Message EXTENDED SERVICE REQUEST (step 3, Table 9.3.2.2.3.2-1)

Derivation Path: 36.508 clause 4.7.2-14A			
Information Element	Value/remark	Comment	Condition
M-TMSI	M-TMSI1		

Table 9.3.2.2.3.3-2: Message SERVICE REJECT (step 4, Table 9.3.2.2.3.2-1)

Derivation Path: 36.508 clause 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'0010 0111'B	CS domain temporarily not available	
T3442 value	'0010 0001'B	1 minute	

Table 9.3.2.2.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 2, Table 9.3.2.2.3.2-2)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	Not present		
MS identity	Not present		

9.3.2.2a Paging for CS fallback / Connected mode

9.3.2.2a.1 Test Purpose (TP)

(1)

```

with { UE in state EMM-REGISTERED and EMM-CONNECTED mode}
ensure that {
  when { UE receives a CS SERVICE NOTIFICATION message for mobile termination CS fallback from NW }
  then { UE sends EXTENDED SERVICE REQUEST message }
}

```

9.3.2.2a.2 Conformance requirements

References: The conformance requirements covered in the present TC are specified in: 3GPP TS 24.301 clauses 5.3.1.1, 5.6.1.1, 5.6.2.3 and Annex D and TS 36.331 clause 5.3.3.3.

[TS 24.301 clause 5.3.1.1]

When the UE is in EMM-IDLE mode and needs to transmit an initial NAS message, the UE shall request the lower layer to establish a NAS signalling connection. In this request to the lower layer the NAS shall provide to the lower layer the RRC establishment cause and the call type as specified in annex D of this specification.

[TS24.301 clause5.6.1.1]

The purpose of the service request procedure is to transfer the EMM mode from EMM-IDLE to EMM-CONNECTED mode and establish the radio and S1 bearers when uplink user data or signalling is to be sent. Another purpose of this procedure is to invoke MO/MT CS fallback procedures.

This procedure is used when:

...

- the UE in EMM-IDLE or EMM-CONNECTED mode has requested to perform mobile originating/terminating CS fallback; or

...

The service request procedure is initiated by the UE, however, for the downlink transfer of signalling or user data in EMM-IDLE mode, the trigger is given by the network by means of the paging procedure (see subclause 5.6.2).

The UE shall invoke the service request procedure when:

...

- e) the UE, in EMM-IDLE or EMM-CONNECTED mode, has a CS fallback response to be sent to the network; or

...

[TS24.301 clause5.6.2.3]

The network may initiate the paging procedure for non-EPS services when the UE is IMSI attached for non-EPS services.

To initiate the procedure when no NAS signalling connection exists, the EMM entity in the network requests the lower layer to start paging (see 3GPP TS 36.300 [2012], 3GPP TS 36.413 [2315]) and starts the timer T3413 for this paging procedure. The paging message includes a CN domain indicator set to "CS" in order to indicate that this is paging for CS fallback. Upon reception of a paging indication, the UE may respond to the paging immediately or may request upper layers input i.e. to accept or reject CS fallback. The response is indicated in the CSFB response information element in the EXTENDED SERVICE REQUEST message in both EMM-IDLE and EMM-CONNECTED modes.

The network shall stop the timer T3413 for the paging procedure when a response is received from the UE.

To notify the UE about an incoming mobile terminating CS service when a NAS signalling connection exists, the EMM entity in the network shall send a CS SERVICE NOTIFICATION message.

[TS 24.301, Annex D]

...

Table D.1.1: Mapping of NAS procedure to establishment cause and call type

NAS procedure	RRC establishment cause (according 3GPP TS 36.331 [22])	Call type
...		
Service Request	If a EXTENDED SERVICE REQUEST has service type set to "mobile terminating CS fallback", the RRC establishment cause shall be set to MT access. (See Note1).	"terminating calls"
...		
Note 1:	For these NAS procedures initiated by UEs of access class 12, 13 or 14 in their home country, the RRC establishment cause will be set to "High priority access AC 11 – 15". For this purpose the home country is defined as the country of the MCC part of the IMSI, see 3GPP TS 22.011 [1A]. For these NAS procedures initiated by UE of access class 11 or 15 in their HPLMN or EHPLMN, the RRC establishment cause will be set to "High priority access AC 11 – 15".	

9.3.2.2a.3 Test description

9.3.2.2a.3.1 Pre-test conditions

System Simulator:

- Cell A(TAI-1) is set to "Serving cell"

UE:

None.

Preamble:

- The UE is in state Generic RB established (state 3) on cell A according to [18].

9.3.2.2a.3.2 Test procedure sequence

Table 9.3.2.2a.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS sends a CS SERVICE NOTIFICATION message to the UE.	<--	CS SERVICE NOTIFICATION	-	-
2	The UE accepts CS fallback	-		-	-
3	Check: Does the UE transmit an EXTENDED SERVICE REQUEST message to SS?	-->	EXTENDED SERVICE REQUEST	1	P
4	The SS sends a SERVICE REJECT message with T3442 = 60 seconds in order that the UE enters EMM-REGISTERED.NORMAL-SERVICE.	<--	SERVICE REJECT	-	-
5	The SS releases the RRC connection.	-	-	-	-
-	EXCEPTION: The behaviour in table 9.3.2.2a.3.2-2 may occur in parallel with step 6.	-	-	-	-
6	SS waits for 60 seconds (T3442)	-	-	-	-

Table 9.3.2.2a.3.2-2: Parallel Behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message/PDU/SDU		
1	The UE transmits a TRACKING AREA UPDATE REQUEST message.	-->	TRACKING AREA UPDATE REQUEST	-	-
2	The SS transmits a TRACKING AREA UPDATE ACCEPT message.	<--	TRACKING AREA UPDATE ACCEPT	-	-
3	The SS releases the RRC connection.	-	-	-	-

9.3.2.2a.3.3 Specific message contents

Table 9.3.2.2a.3.3-1: Message EXTENDED SERVICE REQUEST (step 3, Table 9.3.2.2a.3.2-1)

Derivation Path: 36.508 clause 4.7.2-14A			
Information Element	Value/remark	Comment	Condition
M-TMSI	M-TMSI1		

Table 9.3.2.2a.3.3-2: Message SERVICE REJECT (step 4, Table 9.3.2.2a.3.2-1)

Derivation Path: 36.508 clause 4.7.2-22			
Information Element	Value/remark	Comment	Condition
EMM cause	'00100111'B	CS domain temporarily not available	
T3442 value	'0010 0001'B'	1 minute	

Table 9.3.2.2a.3.3-3: Message TRACKING AREA UPDATE ACCEPT (step 2, Table 9.3.2.2a.3.2-2)

Derivation path: 36.508 table 4.7.2-24			
Information Element	Value/Remark	Comment	Condition
GUTI	Not present		
MS identity	Not present		

9.4 NAS Security

9.4.1 Integrity protection / Correct functionality of EPS NAS integrity algorithm / SNOW3G

9.4.1.1 Test Purpose (TP)

(1)

```
with { successful completion of EPS authentication and key agreement (AKA) procedure }
ensure that {
  when { UE receives a an integrity protected SECURITY MODE COMMAND message instructing to start
integrity protection using algorithm SNOW3G }
  then { UE transmits an integrity protected SECURITY MODE COMPLETE using SNOW3G and starts
applying the NAS Integrity protection in both UL and DL }
```

(2)

```
with { Integrity protection successful started by executing Security Mode Procedure}
ensure that {
  when { UE receives an IDENTITY REQUEST message without integrity protected }
  then { UE does not transmit an IDENTITY RESPONSE message }
}
```

9.4.1.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301 clause 4.4.4.1, 4.4.4.2, 5.4.3.1, 5.4.3.2 and 5.4.3.3.

[TS 24.301, clause 4.4.4.1]

For the UE, integrity protected signalling is mandatory for the NAS messages once a valid EPS security context exists and has been taken into use. For the network, integrity protected signalling is mandatory for the NAS messages once a secure exchange of NAS messages has been established for the NAS signalling connection. Integrity protection of all NAS signalling messages is the responsibility of the NAS. It is the network which activates integrity protection.

[TS 24.301, clause 4.4.4.2]

Once the secure exchange of NAS messages has been established, the receiving EMM or ESM entity in the UE shall not process any NAS signalling messages unless they have been successfully integrity checked by the NAS. If NAS signalling messages, having not successfully passed the integrity check, are received, then the NAS in the UE shall discard that message. If any NAS signalling message is received as not integrity protected even though the secure exchange of NAS messages has been established by the network, then the NAS shall discard this message.

[TS 24.301, clause 5.4.3.1]

The purpose of the NAS security mode control procedure is to take an EPS security context into use, and initialise and start NAS signalling security between the UE and the MME with the corresponding NAS keys and security algorithms.

[TS 24.301, clause 5.4.3.2]

The MME initiates the NAS security mode control procedure by sending a SECURITY MODE COMMAND message to the UE and starting timer T3460 (see example in figure 5.4.3.2.1).

If the security mode control procedure is initiated further to a successful execution of the authentication procedure, the MME shall use the reset downlink NAS COUNT to integrity protect the SECURITY MODE COMMAND message.

The MME shall send the SECURITY MODE COMMAND message unciphered, but shall integrity protect the message with the NAS integrity key based on K_{ASME} or mapped K'_{ASME} indicated by the eKSI included in the message. The MME shall set the security header type of the message to "integrity protected with new EPS security context".

...

The MME shall include the replayed security capabilities of the UE (including the security capabilities with regard to NAS, RRC and UP (user plane) ciphering as well as NAS, RRC integrity, and other possible target network security capabilities, i.e. UTRAN/GERAN if UE included them in the message to network), the replayed nonce_{UE} if the UE included it in the message to the network, the selected NAS ciphering and integrity algorithms and the Key Set Identifier (eKSI).

Additionally, the MME may request the UE to include its IMEISV in the SECURITY MODE COMPLETE message.

NOTE: The AS and NAS security capabilities will be the same, i.e. if the UE supports one algorithm for NAS it is also be supported for AS.

[TS 24.301, clause 5.4.3.3]

Upon receipt of the SECURITY MODE COMMAND message, the UE shall check whether the security mode command can be accepted or not. This is done by performing the integrity check of the message and by checking that the received UE security capabilities and the received nonce_{UE} have not been altered compared to what the UE provided in the initial layer 3 message that triggered this procedure.

If the type of security context flag is set to "native security context" and if the KSI matches a valid native EPS security context held in the UE while the UE has a mapped EPS security context as the current security context, the UE shall take the native EPS security context into use.

If the security mode command can be accepted, the UE shall reset the uplink NAS COUNT and the UE shall take the new EPS security context into use when:

- a) the SECURITY MODE COMMAND message is received further to a successful execution of the authentication procedure; or
- b) the type of security context flag is set to "mapped security context" in the NAS KSI IE included in the SECURITY MODE COMMAND message

If the security mode command can be accepted, the UE shall send a SECURITY MODE COMPLETE message integrity protected with the selected NAS integrity algorithm and the NAS integrity key based on the K_{ASME} or mapped K'_{ASME} if the type of security context flag is set to "mapped security context" indicated by the eKSI. If the SECURITY MODE COMMAND message includes the type of security context flag set to "mapped security context" in the NAS KSI IE, nonce_{MME} and nonce_{UE}, the UE shall generate K'_{ASME} from both nonces as indicated in 3GPP TS 33.401 [19] and reset the downlink NAS COUNT to check whether the SECURITY MODE COMMAND can be accepted or not. The UE shall cipher the SECURITY MODE COMPLETE message with the selected NAS ciphering algorithm and the NAS ciphering key based on the K_{ASME} or mapped K'_{ASME} indicated by the eKSI. The UE shall set the security header type of the message to "integrity protected and ciphered with new EPS security context".

From this time onward the UE shall cipher and integrity protect all NAS signalling messages with the selected NAS ciphering and NAS integrity algorithms.

If the MME indicated in the SECURITY MODE COMMAND message that the IMEISV is requested, the UE shall include its IMEISV in the SECURITY MODE COMPLETE message.

9.4.1.3 Test description

9.4.1.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.4.1.3.2 Test procedure sequence

Table 9.4.1.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a NAS SECURITY MODE COMMAND message to activate NAS security. It is integrity protected.	<--	SECURITY MODE COMMAND	-	-
6	Check: Does the UE transmit a NAS SECURITY MODE COMPLETE message and starts applying the NAS Integrity protection in both UL and DL?	-->	SECURITY MODE COMPLETE	1	P
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits with an ATTACH ACCEPT message. The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
8	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
9	The SS transmits an IDENTITY REQUEST message with Integrity protected and with default ciphering	<-	IDENTITY REQUEST	-	-
10	Check: Does the UE transmit an IDENTITY RESPONSE message with Integrity Protected and with default ciphering?	->	IDENTITY RESPONSE	1	P
11	The SS transmits an IDENTITY REQUEST message (not Integrity protected)	<-	IDENTITY REQUEST	-	-
12	Check: Does the UE transmit an IDENTITY RESPONSE message within the next 5 seconds?	->	IDENTITY RESPONSE	2	F

9.4.1.3.3 Specific message contents

Table 9.4.1.3.3-1: SECURITY MODE COMMAND (Step 5)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms			
- Type of integrity protection algorithm	001	EPS integrity algorithm 128-EIA1[SNOW3G]	

9.4.2 Integrity protection / Correct functionality of EPS NAS integrity algorithm / AES

9.4.2.1 Test Purpose (TP)

(1)

```
with { successful completion of EPS authentication and key agreement (AKA) procedure }
ensure that {
  when { UE receives an integrity protected SECURITY MODE COMMAND message, to start integrity
  protection using algorithm AES }
  then { UE sends SECURITY MODE COMPLETE, integrity protected with AES and starts applying the NAS
  Integrity protection in both UL and DL}
```

(2)

```
with { Integrity protection successful started by executing Security Mode Procedure}
ensure that {
  when { UE receives a IDENTITY REQUEST message (requested identification parameter is not IMSI),
  without integrity protected }
  then { UE Does not transmit IDENTITY Response}
}
```

9.4.2.2 Conformance requirements

Same Conformance requirements as in clause 9.4.1.2

9.4.2.3 Test description

9.4.2.3.1 Pre-test conditions

Same Pre-test conditions as in clause 9.4.1.3.1

9.4.2.3.2 Test procedure sequence

Same Test procedure sequence as in table 9.4.1.3.2.1, except the integrity protection algorithm is AES.

9.4.2.3.3 Specific message contents

Table 9.4.2.3.3-1: SECURITY MODE COMMAND (Step 6)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms			
- Type of integrity protection algorithm	010	EPS integrity algorithm 128-EIA2 (AES)	

9.4.3 Ciphering and deciphering / Correct functionality of EPS NAS encryption algorithm / SNOW3G

9.4.3.1 Test Purpose (TP)

(1)

```
with { successful completion of EPS authentication and key agreement (AKA) procedure }
```

```

ensure that {
  when { UE receives a SECURITY MODE COMMAND instructing to start ciphering using algorithm SNOW3G }
  then { UE sends a SECURITY MODE COMPLETE message ciphered with SNOW3G and starts applying the
NAS ciphering in both UL and DL}
}

```

9.4.3.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 24.301 clause 5.4.3.1, 5.4.3.2 and 5.4.3.3.

[TS 24.301, clause 5.4.3.1]

The purpose of the NAS security mode control procedure is to take an EPS security context into use, and initialise and start NAS signalling security between the UE and the MME with the corresponding NAS keys and security algorithms.

[TS 24.301, clause 5.4.3.2]

The MME initiates the NAS security mode control procedure by sending a SECURITY MODE COMMAND message to the UE and starting timer T3460 (see example in figure 5.4.3.2.1).

If the security mode control procedure is initiated further to a successful execution of the authentication procedure, the MME shall use the reset downlink NAS COUNT to integrity protect the SECURITY MODE COMMAND message.

The MME shall send the SECURITY MODE COMMAND message unciphered, but shall integrity protect the message with the NAS integrity key based on K_{ASME} or mapped K'_{ASME} indicated by the eKSI included in the message. The MME shall set the security header type of the message to "integrity protected with new EPS security context".

...

The MME shall include the replayed security capabilities of the UE (including the security capabilities with regard to NAS, RRC and UP (user plane) ciphering as well as NAS, RRC integrity, and other possible target network security capabilities, i.e. UTRAN/GERAN if UE included them in the message to network), the replayed $nonce_{UE}$ if the UE included it in the message to the network, the selected NAS ciphering and integrity algorithms and the Key Set Identifier (eKSI).

Additionally, the MME may request the UE to include its IMEISV in the SECURITY MODE COMPLETE message.

NOTE: The AS and NAS security capabilities will be the same, i.e. if the UE supports one algorithm for NAS it is also be supported for AS.

[TS 24.301, clause 5.4.3.3]

Upon receipt of the SECURITY MODE COMMAND message, the UE shall check whether the security mode command can be accepted or not. This is done by performing the integrity check of the message and by checking that the received UE security capabilities and the received $nonce_{UE}$ have not been altered compared to what the UE provided in the initial layer 3 message that triggered this procedure.

If the type of security context flag is set to "native security context" and if the KSI matches a valid native EPS security context held in the UE while the UE has a mapped EPS security context as the current security context, the UE shall take the native EPS security context into use.

If the security mode command can be accepted, the UE shall reset the uplink NAS COUNT and the UE shall take the new EPS security context into use when:

- a) the SECURITY MODE COMMAND message is received further to a successful execution of the authentication procedure; or
- b) the type of security context flag is set to "mapped security context" in the NAS KSI IE included in the SECURITY MODE COMMAND message

If the security mode command can be accepted, the UE shall send a SECURITY MODE COMPLETE message integrity protected with the selected NAS integrity algorithm and the NAS integrity key based on the K_{ASME} or mapped K'_{ASME} if the type of security context flag is set to "mapped security context" indicated by the eKSI. If the SECURITY MODE COMMAND message includes the type of security context flag set to "mapped security context" in the NAS KSI IE, $nonce_{MME}$ and $nonce_{UE}$, the UE shall generate K'_{ASME} from both nonces as indicated in 3GPP TS 33.401 [19] and reset the downlink NAS COUNT to check whether the SECURITY MODE COMMAND can be accepted or not. The UE

shall cipher the SECURITY MODE COMPLETE message with the selected NAS ciphering algorithm and the NAS ciphering key based on the K_{ASME} or mapped K'_{ASME} indicated by the eKSI. The UE shall set the security header type of the message to "integrity protected and ciphered with new EPS security context".

From this time onward the UE shall cipher and integrity protect all NAS signalling messages with the selected NAS ciphering and NAS integrity algorithms.

If the MME indicated in the SECURITY MODE COMMAND message that the IMEISV is requested, the UE shall include its IMEISV in the SECURITY MODE COMPLETE message.

9.4.3.3 Test description

9.4.3.3.1 Pre-test conditions

System Simulator:

- cell A.

UE:

none.

Preamble:

- the UE is in state Switched OFF (state 1) according to TS 36.508 [18].

9.4.3.3.2 Test procedure sequence

Table 9.4.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The UE is switched on.	-	-	-	-
2	The UE transmits an ATTACH REQUEST message including a PDN CONNECTIVITY REQUEST message	-->	ATTACH REQUEST	-	-
3	The SS transmits an AUTHENTICATION REQUEST message to initiate the EPS authentication and AKA procedure.	<--	AUTHENTICATION REQUEST	-	-
4	The UE transmits an AUTHENTICATION RESPONSE message and establishes mutual authentication.	-->	AUTHENTICATION RESPONSE	-	-
5	The SS transmits a SECURITY MODE COMMAND message to activate NAS security.	<--	SECURITY MODE COMMAND	-	-
6	Check: Does the UE transmit a SECURITY MODE COMPLETE message ciphered and starts applying the NAS ciphering in both UL and DL?	-->	SECURITY MODE COMPLETE	1	P
-	EXCEPTION: Steps 6Aa1 to 6Aa2 describe behaviour that depends on UE configuration; the "lower case letter" identifies a step sequence that take place if the UE has ESM information which needs to be transferred.	-	-	-	-
6A a1	IF the UE sets the ESM information transfer flag in the last PDN CONNECTIVITY REQUEST message THEN the SS transmits an ESM INFORMATION REQUEST message to initiate exchange of protocol configuration options and/or APN.	<--	ESM INFORMATION REQUEST	-	-
6A a2	The UE transmits an ESM INFORMATION RESPONSE message to transfer protocol configuration options and/or APN.	-->	ESM INFORMATION RESPONSE	-	-
7	The SS transmits with an ATTACH ACCEPT message The ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message is piggybacked in ATTACH ACCEPT message	<--	ATTACH ACCEPT	-	-
8	The UE transmits an ATTACH COMPLETE message including an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message	-->	ATTACH COMPLETE	-	-
9	The SS transmits an IDENTITY REQUEST message Ciphered	<-	IDENTITY REQUEST	-	-
10	Check: Does the UE transmit an IDENTITY RESPONSE message Ciphered?	->	IDENTITY RESPONSE	1	P

9.4.3.3.3 Specific message contents

Table 9.4.3.3.3-1: SECURITY MODE COMMAND (Step 5)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms			
- Type of ciphering algorithm	001	EPS encryption algorithm 128-EEA1 [SNOW3G]	

9.4.4 Cipherng and deciphering / Correct functionality of EPS NAS encryption algorithm / AES

9.4.4.1 Test Purpose (TP)

(1)

```
with { successful completion of EPS authentication and key agreement (AKA) procedure }
ensure that {
  when { UE receives a SECURITY MODE COMMAND, to start encryption using algorithm AES }
  then { UE sends SECURITY MODE COMPLETE, encrypted with AES and starts applying the NAS
encryption in both UL and DL }
}
```

9.4.4.2 Conformance requirements

Same Conformance requirements as in clause 9.4.3.2

9.4.4.3 Test description

9.4.4.3.1 Pre-test conditions

Same Pre-test conditions as in clause 9.4.3.3.1

9.4.4.3.2 Test procedure sequence

Same Test procedure sequence as in Table 9.4.3.3.2-1, except the integrity cipherng algorithm is AES.

9.4.4.3.3 Specific message contents

Table 9.4.4.3.3-1: SECURITY MODE COMMAND (Step 5)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms - Type of cipherng algorithm	010	EPS encryption algorithm 128-EEA2 (AES)	

9.4.5 Integrity protection / Correct functionality of EPS NAS integrity algorithm / ZUC

9.4.5.1 Test Purpose (TP)

(1)

```
with { successful completion of EPS authentication and key agreement (AKA) procedure }
ensure that {
  when { UE receives an integrity protected SECURITY MODE COMMAND message, to start integrity
protection using algorithm ZUC }
  then { UE sends SECURITY MODE COMPLETE, integrity protected with ZUC and starts applying the NAS
Integrity protection in both UL and DL }
}
```

(2)

```
with { Integrity protection successful started by executing Security Mode Procedure}
ensure that {
  when { UE receives a IDENTITY REQUEST message (requested identification parameter is not IMSI),
without integrity protected }
  then { UE Does not transmit IDENTITY Response}
}
```

9.4.5.2 Conformance requirements

Same Conformance requirements as in clause 9.4.1.2

9.4.5.3 Test description

9.4.5.3.1 Pre-test conditions

Same Pre-test conditions as in clause 9.4.1.3.1

9.4.5.3.2 Test procedure sequence

Same Test procedure sequence as in table 9.4.1.3.2.1, except the integrity protection algorithm is ZUC.

9.4.5.3.3 Specific message contents

Table 9.4.5.3.3-1: SECURITY MODE COMMAND (Step 6)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms - Type of integrity protection algorithm	011	EPS integrity algorithm 128-EIA3 (ZUC)	

9.4.6 Ciphering and deciphering / Correct functionality of EPS NAS encryption algorithm / ZUC

9.4.6.1 Test Purpose (TP)

(1)

```
with { successful completion of EPS authentication and key agreement (AKA) procedure }
ensure that {
  when { UE receives a SECURITY MODE COMMAND, to start encryption using algorithm ZUC }
  then { UE sends SECURITY MODE COMPLETE, encrypted with ZUC and starts applying the NAS encryption
in both UL and DL }
}
```

9.4.6.2 Conformance requirements

Same Conformance requirements as in clause 9.4.3.2

9.4.6.3 Test description

9.4.6.3.1 Pre-test conditions

Same Pre-test conditions as in clause 9.4.3.3.1

9.4.6.3.2 Test procedure sequence

Same Test procedure sequence as in Table 9.4.3.3.2-1, except the integrity ciphering algorithm is ZUC.

9.4.6.3.3 Specific message contents

Table 9.4.6.3.3-1: SECURITY MODE COMMAND (Step 5)

Derivation path: 36.508 table 4.7.2-19			
Information Element	Value/Remark	Comment	Condition
Selected NAS security algorithms - Type of ciphering algorithm	011	EPS encryption algorithm 128-EEA3 (ZUC)	