80 Generic Access default conditions, message contents and macros

80.1 Default test conditions

The following default test conditions shall apply if not stated otherwise within an individual test description.

80.1.1 Unlicensed Radio Access

80.1.1.1 IEEE 802.11

First access point.

	Setting
Channel	7
SSID	GAN_1
SSID-Broadcast	On
Ciphering	Off
Mode	Infrastructure

Second access point.

	Setting
Channel	3
SSID	GAN_2
SSID-Broadcast	On
Ciphering	Off
Mode	Infrastructure

80.1.1.2 Bluetooth

	Setting
Profile	PAN

80.1.2 Protocol Settings

80.1.2.1 Dynamic Host Configuration Protocol - DHCP

	Setting
Server IP-Address	192.168.11.1
Port	67
Client (Transport) IP Range Pool	192.168.11.10 - 15
Address Mask	255.255.255.0
Default Gateway	192.168.11.1

80.1.2.2 Domain Name System – DNS

80.1.2.2.1 Public DNS Server

	Setting
Server IP-Address	192.168.11.16
Port	53

The following entries should be used:

	FQDN	IP
Provisioning SEGW	psgw.gan.mnc001.mcc001.3gppnetwork.org	192.168.11.32
Default SEGW	dsgw.default.gan	192.168.11.33
Serving SEGW	ssgw.serving.gan	192.168.11.34

80.1.2.2.2   DNS associated with GANC

	Setting
Server IP-Address	172.16.0.144
Port	53

The following entries should be used:

	FQDN	IP
Provisioning GANC	gan.mnc001.mcc001.3gppnetwork.org	172.16.0.192
Default GANC	gan.default.gan	172.16.0.193
Serving GANC	gan.serving.gan	172.16.0.194

80.1.2.3   Secure Gateway (SEGW)

	FQDN	IP
Provisioning SEGW	psgw.gan.mnc001.mcc001.3gppnetwork.org	192.168.11.32
Default SEGW	dsgw.default.gan	192.168.11.33
Serving SEGW	ssgw.serving.gan	192.168.11.34

80.1.2.4   Generic Access Network Controller (GANC)

	FQDN	IP
Provisioning GANC	gan.mnc001.mcc001.3gppnetwork.org	172.16.0.192
Default GANC	gan.default.gan	172.16.0.193
Serving GANC	gan.serving.gan	172.16.0.194

The TCP port used for Discovery and Registration is port number 14001 (see 44.318: 12.2.1)

80.1.2.5   Secure Internet Protocol - IPsec

All cryptographic suites must be supported on SS side.

The certificates specified in annex A 9 shall be used for authentication of the SS by the MS.

	Setting
Client (Local) IP Range Pool	172.16.0.202 -217

80.2   Default message contents

80.3   Macros

80.3.1   Overview

The present document presents macros for Generic Access test cases. It is intended to be a working document forming part of the Generic Access Test Specifications.

80.3.1.1   Definition

A macro is a name or sentence, possibly followed by an argument list, that is equated to a text to which it is to be expanded, possibly with the substitution of actual arguments.

Macros may be used to simplify the writing and reading of the test cases or to avoid the repetition of common sentences, message contents or message sequences. The macros defined in this subclause can be used throughout the test cases.

The definition of the macros is done in alphabetical order.

80.3.1.2 Syntax

80.3.1.2.1 Message contents

Any macro referencing message contents shall use the following table:

Macro reference (arguments)		
(P)SI	**Information Element**	**Value/Remarks**

The table must contain:

Macro reference: word or sentence that gives the name to the macro. It may include a list of arguments with actual values for some IE's.

(P)SI: the System Information and Packet System Information messages whose content is referenced. Several (P)SIs can be referenced in this column. The defined IE value(s) refers to the (P)SI(s) in the same row.

Information Element: IE which value is specified.

Value/Remarks: value and any other comment specific to the IE's. In particular, the mapping between an argument value and its coding shall be specified in this column (see note).

NOTE: If possible, only the meaning of the value will be shown and not the value itself; this avoids updating when the core specifications are modified.

80.3.1.2.2 Message sequence

Any macro referencing message contents shall use the following table:

Step	Direction	Message	Comments
		{ Macro reference }	Macro (arguments)

The table must contain:

Macro reference: word or sentence that assigns the name to the macro. It may include a list of arguments with actual values for some parameters used within the macro.

Step: Number of the message. Letters may be used for general values: the same rules as in 3GPP TS 11.10 apply.

Direction: it must be either:

- "MS → SS": for an uplink message or a macro containing only uplink message(s);

- "SS → MS": for a downlink message or a macro containing only downlink message(s);

- "SS ↔ MS": for a macro containing both uplink and downlink message(s);

- "MS": for an action performed on the mobile side; or

- "SS": for an action performed on the system simulator side.

Message: Message name or macro reference.

Comments: any other comment specific to the message. In particular, value of certain bits/fields of the corresponding message.

The symbol ':' can be used to indicate that the previous and following message or sequence of messages (both previous and following must appear) is repeated an unknown number of times, probably referenced with a letter on the 'step' column.

80.3.2   Default message contents

80.3.3   Macro message sequences

80.3.3.1   Location Update Procedure

80.3.3.1.1   GAN A/Gb Mode Location Update Procedure

Step	Direction	Message	Comments
		{ GAN A/Gb Mode Location Update Procedure }	
1	MS → SS	GA-CSR REQUEST	
2	SS → MS	GA-CSR REQUEST ACCEPT	
3	MS → SS	GA-CSR UPLINK DIRECT TRANSFER	Containing L3 (MM) Location Update Request
4	SS → MS	GA-CSR DOWNLINK DIRECT TRANSFER	Containing L3 (MM) Authentication Request
5	MS → SS	GA-CSR UPLINK DIRECT TRANSFER	Containing L3 (MM) Authentication Response
6	SS → MS	GA-CSR DOWNLINK DIRECT TRANSFER	Containing L3 (MM) Location Update Accept
A6 (Optional)	MS → SS	GA-CSR UPLINK DIRECT TRANSFER	Containing L3 (MM) TMSI Reallocation Complete This step is executed only when assigned mobile identity is of type TMSI
7	SS → MS	GA-CSR RELEASE	NOTE: Only in case the MS performed GPRS suspension procedure prior to the CS session, then the GPRS RESUMPTION IE shall be present with ACK field set to 1.
8	MS → SS	GA-CSR RELEASE COMPLETE	

80.3.3.1.2   GAN Iu Mode Location Update Procedure

Step	Direction	Message	Comments
		{ GAN Iu Mode Location Update Procedure }	
1	MS → SS	GA-RRC REQUEST	
2	SS → MS	GA-RRC REQUEST ACCEPT	
3	MS → SS	GA-RRC UPLINK DIRECT TRANSFER	Containing L3 (MM) Location Update Request
4	SS → MS	GA-RRC DOWNLINK DIRECT TRANSFER	Containing L3 (MM) Authentication Request
5	MS → SS	GA-RRC UPLINK DIRECT TRANSFER	Containing L3 (MM) Authentication Response

6	SS → MS	GA-RRC DOWNLINK DIRECT TRANSFER	Containing L3 (MM) Location Update Accept
A6 (Optional)	MS → SS	GA-RRC UPLINK DIRECT TRANSFER	Containing L3 (MM) TMSI Reallocation Complete This step is executed only when assigned mobile identity is of type TMSI
7	SS → MS	GA-RRC RELEASE	
8	MS → SS	GA-RRC RELEASE COMPLETE	

80.4 Test PDP contexts

PDP context 1: same as PDP context 1 in section 40.5.

81 GAN Discovery and Registration Procedures

81.1 Discovery Procedure

81.1.1 Discovery Procedure, Accepted

81.1.1.1 Discovery Procedure, MS holds the IP address of the provisioning SEGW and FQDN of provisioning GANC, provisioning GANC and default GANC belong to the same SEGW

81.1.1.1.1 Conformance requirement

The MS shall:

- If the MS holds an IP address of the Provisioning SEGW, the MS establishes the secure connection towards the Provisioning SEGW according to sub-clause 4.2

- Following successful establishment of secure connection to the Provisioning SEGW:

- If the MS holds a FQDN of the Provisioning GANC, the MS shall perform a DNS query "inside the secure connection" to retrieve the IP-address of the Provisioning GANC. The MS shall establish a TCP connection to the Provisioning GANC using this IP address and a TCP port defined for Discovery (see sub-clause 12.2.1). The MS shall not store the IP address retrieved from DNS for subsequent procedures (apart from DNS resolver caching).

When the MS receives GA-RC DISCOVERY ACCEPT message, it shall:

- stop the timer TU3901.

- set the timer value for TU3903 to the default value,

- store the information about Default GANC in persistent storage:

- The Default GANC information consists of the Default GANC, SEGW associated with the Default GANC and optionally a TCP port to be used with that Default GANC. If a specific TCP Port is not received in the message, the defined port for Registration is used (see sub-clause 12.2.1)

- release the TCP connection towards the Provisioning GANC

- the secure connection to the Provisioning SEGW can be reused as follows;

- If the MS is provisioned with an IP address of the Provisioning GANC-SEGW and it matches the received Default GANC-SEGW IP address IE, the MS shall reuse the existing secure connection.

- If the MS is provisioned with a FQDN of the Provisioning GANC-SEGW or derived a FQDN for the Provisioning GANC-SEGW and it matches the received Default GANC-SEGW FQDN IE, the MS shall reuse the existing secure connection.

- otherwise the MS shall release the existing secure connection towards the SEGW of the Provisioning GANC as defined in sub-clause 4.5

- initiate the registration procedure towards the Default GANC as defined in sub-clause 6.2.

Reference(s)

3GPP TS 44.318 sub-clause 5.3 and 5.5.1

81.1.1.1.2 Test purpose

To verify that the MS is able to initiate the Discovery Procedure with an IP address to the SEGW associated with the provisioning GANC and the FQDN to the GANC.

To verify that the MS keeps the secure connection when registering to the default GANC if the provisioning GANC and default GANC have the same SEGW.

81.1.1.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Provisioning GANC and default GANC belonging to the same SEGW

- Public DNS without knowledge of SEGW FQDN associated with Provisioning GANC

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS has the IP address for the SEGW associated with the provisioning GANC, but not the FQDN

- The MS has the FQDN for the provisioning GANC, but not the IP address

- The MS does not have any knowledge about the default GANC

- The MS does not have any knowledge about the serving GANC

Foreseen final state of the MS

The MS will stay in state GA-RC DEREGISTERED.

Test procedure

Make the MS join the AP so that the Discovery procedure is kicked off.

The SS is supposed to answer the Discovery Request message with a valid FQDN or IP address of Default GANC and IP address of the SEGW associated with Default GANC matching the IP address of SEGW associated with Provisioning GANC before timer TU3901 expires.

The MS shall attempt to register towards the Default GANC reusing the same security connection used during Discovery procedure.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			Set up Ipsec tunnel to SEGW
3	→			DNS Standard Query for GANC to the DNS server associated with the GANC
4	←			Standard Query Response with IP address to GANC
5	MS			Establish TCP connection to provisioning GANC
6	→		GA-RC DISCOVERY REQUEST	To provisioning GANC
7	←		GA-RC DISCOVERY ACCEPT	Default GANC and SEGW provided. Note: Default GANC belongs to the same SEGW as the Provisioning GANC The message is sent before expiry of TU3901.
8	MS			Establish TCP connection to default GANC using either IP address or FQDN
9	→		GA-RC REGISTER REQUEST	To default GANC

81.1.1.2 Discovery procedure, the MS holds the FQDN of the provisioning SEGW and IP address of the provisioning GANC, provisioning GANC and default GANC belong to different SEGWs

81.1.1.2.1 Conformance requirement

- If the MS holds a FQDN of the Provisioning SEGW, the MS performs a public DNS query to retrieve the IP-address of the Provisioning SEGW and establish the secure connection towards the Provisioning SEGW according to sub-clause 4.2. The MS shall not store the IP address retrieved from DNS for subsequent procedures (apart from DNS resolver caching).

- Following successful establishment of secure connection to the Provisioning SEGW

- If the MS holds an IP address of the Provisioning GANC, the MS shall establish a TCP connection to the Provisioning GANC using the well-known TCP port for Discovery as defined in sub-clause 12.2.1

When the MS receives GA-RC DISCOVERY ACCEPT message, it shall:

- stop the timer TU3901.

- set the timer value for TU3903 to the default value,

- store the information about Default GANC in persistent storage:

- The Default GANC information consists of the Default GANC, SEGW associated with the Default GANC and optionally a TCP port to be used with that Default GANC. If a specific TCP Port is not received in the message, the defined port for Registration is used (see sub-clause 12.2.1)

- release the TCP connection towards the Provisioning GANC

- the secure connection to the Provisioning SEGW can be reused as follows;

- If the MS is provisioned with an IP address of the Provisioning GANC-SEGW and it matches the received Default GANC-SEGW IP address IE, the MS shall reuse the existing secure connection.

- If the MS is provisioned with a FQDN of the Provisioning GANC-SEGW or derived a FQDN for the Provisioning GANC-SEGW and it matches the received Default GANC-SEGW FQDN IE, the MS shall reuse the existing secure connection.

- otherwise the MS shall release the existing secure connection towards the SEGW of the Provisioning GANC as defined in sub-clause 4.5

- initiate the registration procedure towards the Default GANC as defined in sub-clause 6.2.

Reference(s)

3GPP TS 44.318 sub-clause 5.3 and 5.5.1

81.1.1.2.2   Test purpose

To verify that the MS can initiate the Discovery Procedure with the FQDN to the SEGW associated with the provisioning GANC and IP address to the GANC.

To verify that the MS releases the secure connection when registering to the default GANC if the provisioning GANC and default GANC don't have the same SEGW.

81.1.1.2.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS that holds the IP address to the SEGW associated with the provisioning GANC, but without knowledge of the provisioning GANC's FQDN

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS has the FQDN for the SEGW associated with the provisioning GANC, but not the IP address

- The MS has the IP address to the provisioning GANC

- The MS does not have any knowledge about the default GANC

- The MS does not have any knowledge about the serving GANC

Foreseen final state of the MS

The MS will stay in state GA-RC DEREGISTRED.

Test procedure

Make the MS join the AP so that the Discovery procedure is kicked off.

The SS is supposed to answer the Discovery Request message before timer TU3901 expires.

The MS shall release the Security Association towards the SEGW associated with Provisioning GANC.

The MS shall establish a secure tunnel towards the SEGW provided in Discovery Accept messasge and establish TCP to the Default GANC.

The MS shall send Register Request message towards the Default GANC.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	→			DNS Standard Query for the SEGW to the public DNS server
3	←			Standard Query Response with IP address to the SEGW
4	MS			MS sets up a secure connection to the SEGW and establishes TCP connection to the provisioning GANC
5	MS			MS establish a TCP connection using the stored IP address
6	→		GA-RC DISCOVERY REQUEST	To provisioning GANC
7	←		GA-RC DISCOVERY ACCEPT	Default GANC and SEGW provided. The message is sent before expiry of TU3901.
8				MS releases the secure connection to the SEGW
9				MS sets up a secure connection to the new SEGW using either IP address or FQDN
10				MS establish a TCP connection to the default GANC using either IP address or FQDN
11	→		GA-RC REGISTER REQUEST	To default GANC

81.1.1.3 Discovery procedure, the MS is not provisioned with information about the provisioning GANC or its SEGW

81.1.1.3.1 Conformance requirement

- In case the MS is not provisioned with information about the Provisioning SEGW, derive a FQDN of the Provisioning SEGW from the IMSI (as described in [3]);

  The MS performs a public DNS Query to retrieve the IP-address of the Provisioning SEGW and establish the secure connection towards the Provisioning SEGW according to sub-clause 4.2. The MS shall not store the IP address retrieved from DNS for subsequent procedures (apart from DNS resolver caching);

- Following successful establishment of secure connection to the Provisioning SEGW:

- In cases where the MS is not provisioned with information about the Provisioning GANC, the MS derives a FQDN of the Provisioning GANC from the IMSI (as described in [3]).

  A DNS query is performed "inside the secure connection" to retrieve the IP-address of the Provisioning GANC. The MS shall not store the IP address retrieved from DNS for subsequent procedures (apart from DNS resolver caching). A TCP connection is then established inside the IPsec tunnel, to the Provisioning GANC using the TCP port defined for Discovery procedure (see sub-clause 12.2.1).

- In all cases the MS shall establish only a single TCP connection to the GANC over the IPsec tunnel.

Reference(s)

3GPP TS 44.318 sub-clause 5.3.

81.1.1.3.2 Test purpose

To verify that the MS can derive the FQDN from its IMSI and go to the correct DNS to ask for the IP address to the SEGW and provisioning GANC.

81.1.1.3.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the provisioning GANC's FQDN

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS does not have any knowledge about the provisioning GANC

- The MS does not have any knowledge about the default GANC

- The MS does not have any knowledge about the serving GANC

Foreseen final state of the MS

The MS will stay in state GA-RC DEREGISTRED.

Test procedure

Make the MS join the AP so that the Discovery procedure is kicked off.

The MS will derive SEGW associated with provisioning GANC and provisioning GANC from the IMSI.

The SS is supposed to answer the Discovery Request message before timer TU3901 expires.

Use a default GANC associated with the same SEGW as the provisioning GANC in order to simplify the test sequence.

The MS will attempt to register towards the default GANC reusing the same security association.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			Derive FQDN to SEGW from the IMSI
3	→			DNS Standard Query for the SEGW to the public DNS server
4	←			Standard Query Response with IP address to the SEGW
5	MS			MS sets up a secure connection to the SEGW
6	MS			Derive FQDN to GANC from the IMSI
7	→			DNS Standard Query for GANC to the DNS server associated with the GANC
8	←			Standard Query Response with address to GANC
9	MS			Establish TCP connection to provisioning GANC over the secure connection
10	→		GA-RC DISCOVERY REQUEST	To provisioning GANC

11	←	GA-RC DISCOVERY ACCEPT	Default GANC provided and SEGW matching the SEGW associated with provisioning GANC. The message is sent before expiry of TU3901.
12	MS		Establish TCP connection to default GANC using either IP address or FQDN
13	→	GA-RC REGISTER REQUEST	To default GANC

81.1.2 Discovery Procedure, Rejected

81.1.2.1 Discovery Procedure, Discovery Reject, Network Congestion

81.1.2.1.1 Conformance requirement

When the MS receives GA-RC DISCOVERY REJECT message it shall:

- stop the timer TU3901,

- set the timer value for TU3903 to the default value,

- If the value of the Reject Cause IE indicates 'Network Congestion', the MS shall

- Maintain the secure connection to the GANC-SEGW and the TCP connection to the GANC

- Create a random value between zero and the received value in TU3902 Timer IE and

- Add this value to the received value in TU3902 Timer IE, this becomes the new value for TU3902

- Start timer TU3902 according to the new calculated value

Reference(s)

3GPP TS 44.318 sub-clause 5.5.2

81.1.2.1.2 Test purpose

To verify that the MS wait the correct time after receiving Discovery Reject due to network congestion before it tries to go through the discovery procedure again.

81.1.2.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the provisioning GANC's FQDN

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS has the IP address or the FQDN for the provisioning GANC

- The MS does not have any knowledge about the default GANC

- The MS does not have any knowledge about the serving GANC

Foreseen final state of the MS

The MS will stay in state GA-RC DEREGISTRED.

Test procedure

Make the MS join the AP so that the Discovery procedure is kicked off.

The SS is supposed to answer the Discovery Request message with Discovery rejected with cause 'Network congestion' before timer TU3901 expires. The TU3902 timer is set to 60 (1 minutes).

The MS will set TU3902 between 1 and 2 minutes and send a Discovery Request message towards the provisioning GANC after expiration of the timer.

Specific Test Parameters

-

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
3	→		GA-RC DISCOVERY REQUEST	To provisioning GANC
4	←		GA-RC DISCOVERY REJECTED	With cause set to Network congestion TU3902 Timer IEs set to 60
5	MS			Wait for 1 – 2 minutes . The MS sets TU3902 randomly between 60 and 120, i.e. 1 to 2 minutes.
6	→		GA-RC DISCOVERY REQUEST	New attempt on the same secure connection to the provisioning GANC

81.1.2.2 Discovery Procedure, Discovery Reject, IMSI not allowed

81.1.2.2.1 Conformance requirement

When the MS receives GA-RC DISCOVERY REJECT message it shall:

- If the value of the Reject Cause IE indicates 'IMSI not allowed' or "Unspecified", then the MS shall:

- Release the TCP connection established to the Provisioning GANC, if still established.

- Release the secure connection towards the SEGW associated with the Provisioning GANC as defined in sub-clause 4.5.

- Not initiate a new Discovery procedure until the next power-on.

Reference(s)

3GPP TS 44.318 sub-clause 5.5.2.

81.1.2.2.2 Test purpose

To verify that the MS does not try to kick off the Discovery procedure again after receiving Discovery Reject due to IMSI not allowed.

81.1.2.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the provisioning GANC's FQDN

- DNS inside of the SEGW associated with the provisioning GANC with knowledge of the provisioning GANC's FQDN

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS has the IP address or the FQDN for the provisioning GANC

- The MS does not have any knowledge about the default GANC

- The MS does not have any knowledge about the serving GANC

Foreseen final state of the MS

The MS will start the discovery procedure and receive Discovery rejected with cause value 'IMSI not allowed'. The MS will not try to kick off the Discovery procedure until it is powered off and back on again. When the second attempt to register has started the signalling is interrupted and the MS will stay in state GA-RC DEREGISTRED.

Test procedure

Make the MS join the AP so that the Discovery procedure is kicked off.

The SS is supposed to answer the Discovery Request message with Discovery rejected with cause 'IMSI not allowed' before timer TU3901 expires. The TU3902 timer is set to 60 (1 minutes).

Specific Test Parameters

-

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
3	→		GA-RC DISCOVERY REQUEST	To provisioning GANC
4	←		GA-RC DISCOVERY REJECTED	Cause: IMSI not allowed
5				MS releases the TCP connection and the secure connection
6	MS			Wait for 2 minutes. Make sure that the MS does not try to access the GAN network.
7	MS			Switch off the MS and then back on again.
8	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
9	→		GA-RC DISCOVERY REQUEST	New attempt

81.1.2.3   Void

81.1.3   Discovery Procedure, Abnormal Cases

81.1.3.1   Discovery Procedure, TU3901/TU3903 Expires

81.1.3.1.1   Conformance requirement

If timer TU3901 has expired in the MS, the MS shall:

- release the TCP connection towards the Provisioning GANC,

- release the secure connection towards SEGW of the Provisioning GANC as defined in sub-clause 4.5,

- double the current value for timer TU3903 but not exceeding the maximum value defined for this timer as defined in sub-clause 12.1.1 and

- start timer TU3903

Reference(s)

3GPP TS 44.318 sub-clause 5.6.1.

81.1.3.1.2   Test purpose

To verify that the MS attempts to kick off the Discovery procedure again after the correct time has elapsed when the TU3901/TU3903 timer expires.

81.1.3.1.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the provisioning GANC's FQDN

- DNS inside of the SEGW associated with the provisioning GANC with knowledge of the provisioning GANC's FQDN

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS has the IP address or the FQDN for the provisioning GANC

- The MS does not have any knowledge about the default GANC

- The MS does not have any knowledge about the serving GANC

- Timer TU3901 set to the default value 30 seconds

- Timer TU3903 set to 1 minute

Foreseen final state of the MS

The MS will start the discovery procedure and when TU3901 expires it will set TU3903 to 2 minutes. When TU3903 expires it will kick off the Discovery procedure again. The same sequence is repeated and for each time TU3903 is doubled until it reaches its maximum value of 32 minutes.

Test procedure

Make the MS join the AP so that the Discovery procedure is kicked off.

The SS is not supposed to answer the Discovery Request message at any occasion.

Specific Test Parameters

-

Maximum duration of test

100 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
3	→		GA-RC DISCOVERY REQUEST	To provisioning GANC, MS starts TU3901
4	MS			Wait for 30 s so TU3901 expires. TU3903 is set to 2 min. when TU3901 expires.
5				MS releases the TCP connection and the secure connection
6	MS			Wait for 2 minutes so that TU3903 expires
7	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
8	→		GA-RC DISCOVERY REQUEST	New attempt, MS starts TU3901
9	MS			Wait for 30 s so TU3901 expires. TU3903 is set to 4 min. when TU3901 expires the 2nd time.
10				MS releases the TCP connection and the secure connection
11	MS			Wait for 4 minutes so that TU3903 expires.
12	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
13	→		GA-RC DISCOVERY REQUEST	New attempt, MS starts TU3901
14	MS			Wait for 30 s so TU3901 expires. TU3903 is set to 8 min. when TU3901 expires the 3rd time.
15				MS releases the TCP connection and the secure connection
16	MS			Wait for 8 minutes so that TU3903 expires.
17	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
18	→		GA-RC DISCOVERY REQUEST	New attempt, MS starts TU3901
19	MS			Wait for 30 s so TU3901 expires. TU3903 is set to 16 min. when TU3901 expires the 4th time.
20				MS releases the TCP connection and the secure connection
21	MS			Wait for 16 minutes so that TU3903 expires.
22	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
23	→		GA-RC DISCOVERY REQUEST	New attempt, MS starts TU3901
24	MS			Wait for 30 s so TU3901 expires. TU3903 is set to 32 min. when TU3901 expires the 5th time.
25				MS releases the TCP connection and the secure connection

26	MS		Wait for 32 minutes so that TU3903 expires.
27	MS		MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
28	→	GA-RC DISCOVERY REQUEST	New attempt, MS starts TU3901
29	MS		Wait for 30 s so TU3901 expires. TU3903 is set to 32 min. again when TU3901 expires the 6th time.
30			MS releases the TCP connection and the secure connection
31	MS		Wait for 32 minutes so that TU3903 expires.
32	MS		MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
33	→	GA-RC DISCOVERY REQUEST	New attempt

81.1.3.2 Void

81.1.3.3 Void

81.1.3.4 Void

81.1.3.5 Void

81.1.3.6 Void

81.1.3.7 SEGW certificate checking, the MS holds the "invalid" FQDN of the provisioning SEGW

81.1.3.7.1 Conformance requirement

As the MS and GANC-SEGW use EAP-SIM or EAP-AKA for mutual authentication, IKEv2 mandates that this is used in conjunction with a public key signature based authentication of the GANC-SEGW to the MS.

The MS requirements for certificate authentication and handling are listed in 3GPP TS 33.234 [10].

In addition to the requirements listed in 3GPP TS 33.234 [10], the MS shall take the following actions for received GANC-SEGW certificates:

- match the SubjectAltName in the end entity certificate with the IDr payload, and with GANC-SEGW identity obtained from derivation of the Provisioning GANC-SEGW FQDN, provisioning, discovery or register redirect.

- If the MS was provisioned with an IP address of the GANC-SEGW, (or received it in the GA-RC DISCOVERY ACCEPT or GA-RC REGISTER REDIRECT message), then the certificate shall contain an IPaddress SubjectAltName that matches that address.

- If the MS was provisioned with an FQDN of the GANC-SEGW, or received it in the GA-RC DISCOVERY ACCEPT or GA-RC REGISTER REDIRECT message, then the certificate shall contain a DNSname SubjectAltName that matches that FQDN.

- If the MS derived the FQDN of the Provisioning GANC-SEGW, then the certificate shall contain a DNSname SubjectAltName that matches that FQDN.

If the MS and GANC-SEGW are not able to set up the SA for any other reason than EAP-SIM or EAP-AKA authentication failure, and the current GANC-SEGW is the SEGW associated to the Provisioning GANC, the MS shall act as if a "Lower layer failure in the MS" has occurred and act as defined in sub-clause 5.6.2.

Reference(s)

3GPP TS 44.318 sub-clauses 4.2.5 and 4.2.6

81.1.3.7.2 Test purpose

To verify that the MS does correct SEGW certificate checking during secure tunnel establishment.

81.1.3.7.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS that holds the IP address to the SEGW associated with the provisioning GANC, but that DNS entry is not in provisioning SEGW certificate.

Mobile Station:

- MS in state GA-RC DEREGISTERED

- The MS has the "invalid" FQDN for the SEGW

The MS holds an "invalid" FQDN of the Provisioning SEGW. MS is made to perform a public DNS query to retrieve the IP-address of the Provisioning SEGW and to initialise establishment of the secure connection towards the Provisioning SEGW. Secure tunnel establishment will fail, because provisioning SEGW certificate does not contain DNS subjectAltName "invalid.provisioning.gan".The MS shall act as if "a Lower layer failure in the MS" has occurred and act as defined in sub-clause 5.6.2.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	→			DNS Standard Query for the SEGW to the public DNS server
3	←			Standard Query Response with IP address to the SEGW
4	→		IKE_SA_INIT	MS sends IKE_SA_INIT message to initialize secure connection setup to the SEGW
5	←		IKE_SA_INIT	SEGW replies with IKE_SA_INIT
6	→		IKE_AUTH	MS informs trusted CA certificates in CERT_REQ payload. Authentication phase is started
7	←		IKE_AUTH	SEGW replies with certificate that does not contain "invalid" FQDN in its SubjectAltName field
8 (optional)	→		IKE_AUTH	MS may optionally send one more IKE_AUTH message
9	MS			MS stops attempting to set up a security connection and starts TU3903
10	MS			Wait for 10 seconds
11	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC using either IP address or FQDN

81.2 Registration Procedure

81.2.1 Registration Procedure, Accepted

81.2.1.1 Registration Procedure, MS in GSM Coverage, Serving GANC for CGI Known

81.2.1.1.1 Conformance requirement

If the MS is in GERAN or UTRAN coverage, it shall check if it has stored Serving GANC information for the current GSM CGI in case of GERAN coverage, or UTRAN cell Identity, in case of UTRAN Coverage, or if the MS is not in GERAN/UTRAN coverage, it shall check if it has stored Serving GANC information for the current AP-ID

- if found, the MS shall initiate Registration procedure towards the stored Serving GANC

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- Start Keep alive mechanism as defined in sub-clause 6.5 using the received TU3906 Timer IE

Reference(s)

3GPP TS 44.318 sub-clause 6.2.1 and 6.2.3.1

81.2.1.1.2 Test purpose

To verify that the MS can store the address to a serving GANC associated with a certain GSM cell and access that GANC at the Registration procedure.

81.2.1.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC
4	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds GANC Control Channel Description IE shall indicate that GPRS services are not available and IMSI Attach/Detach procedure shall not apply.
5	MS			Wait for 1 minutes so that TU3906 expires
A5 (Optional)			{GAN A/Gb Mode Location Update Procedure}	This step is performed only if the MS initiates a Location Area Update while TU3906 is still running
6	→		GA-RC KEEP ALIVE	

81.2.1.2 Registration Procedure, MS in GSM Coverage, Serving GANC for CGI Not Known; MS not in GSM Coverage, Serving GANC for AP Known

81.2.1.2.1 Conformance requirement

If the MS is in GERAN or UTRAN coverage, it shall check if it has stored Serving GANC information for the current GSM CGI in case of GERAN coverage, or UTRAN cell Identity, in case of UTRAN Coverage, or if the MS is not in GERAN/UTRAN coverage, it shall check if it has stored Serving GANC information for the current AP-ID

- if found, the MS shall initiate the GAN Registration procedure towards the stored Serving GANC

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- Start Keep alive mechanism as defined in sub-clause 6.5 using the received TU3906 Timer IE

The GANC may at any time initiate the deregistration of a MS by sending the GA-RC DEREGISTER message to the MS. When the GA-RC layer in the network has submitted the GA-RC DEREGISTER message to the TCP layer, it may initiate release of its half of the bidirectional TCP connection

Reference(s)

3GPP TS 44.318 sub-clause 6.2.1, 6.2.3.1, and 6.4.3

81.2.1.2.2 Test purpose

To verify that the MS can register to the default GANC if it doesn't have any data stored about serving GANC in the current GSM cell.

To verify that the MS can store the address to a serving GANC associated with a certain AP and access that GANC at the Registration procedure.

81.2.1.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

- DNS inside of the default SEGW associated with the default GANC

Mobile Station:

- MS has stored a serving GANC associated with the AP-ID

- MS has not stored a serving GANC associated with the GSM cell (CGI)

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

The SS requests the MS to deregister. The GSM cell is then removed. The MS should now attempt to register using the stored AP-ID.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the default SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To default GANC, verify correct GSM CGI is used.
4	←		GA-RC REGISTER ACCEPT.	GANC Control Channel Description IE shall indicate that GPRS services are not available and IMSI Attach/Detach procedure shall not apply.
A4 (Optional)			{GAN A/Gb Mode Location Update Procedure}	This step is performed only if the MS initiates a Location Area Update
5	←		GA-RC DEREGISTER	Reject Cause = Unspecified
6	SS			Remove GSM Coverage
7	MS			Remove the TCP connection and the secure connection to SEGW
8	MS			MS is joining the AP
9	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
10	→		GA-RC REGISTER REQUEST	To serving GANC, verify correct AP-ID is used.

11	←	GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds
12	MS		Wait for 1 minutes so that TU3906 expires
13	→	GA-RC KEEP ALIVE	

81.2.1.3 Void

81.2.1.4 Registration Procedure, MS Holds The IP Address to The serving SEGW And The FQDN to The Serving GANC

81.2.1.4.1 Conformance requirement

To initiate the registration procedure the MS shall:

- If the MS has stored an IP address of the GANC-SEGW, and the MS does not already have an established secure connection to this GANC-SEGW, the MS establishes a secure connection towards the GANC-SEGW according to sub-clause 4.2,

Following successful establishment of secure tunnel:

- If the MS holds a FQDN of the GANC, the MS performs a DNS query "inside the secure tunnel" to retrieve the IP-address of the GANC. The MS establishes a TCP connection to the GANC at the stored TCP port to be used for Registration with this GANC. If no TCP port has been stored for this GANC, the default TCP port (see sub-clause 12.2.1) shall be used. The MS shall not store the retrieved IP address for subsequent procedures (apart from DNS resolver caching);

- The MS shall only establish a single TCP connection to the GANC over the IPsec tunnel.

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- Start Keep alive mechanism as defined in sub-clause 6.5 using the received TU3906 Timer IE

Reference(s)

3GPP TS 44.318 sub-clause 6.2.1 and 6.2.3.1

81.2.1.4.2 Test purpose

To verify that the MS can register to the GANC by using IP addresses to SEGW and GANC.

81.2.1.4.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored the IP address to the SEGW associated with the serving GANC associated with the AP-ID but not the FQDN

- MS has stored the FQDN to the serving GANC associated with the AP-ID but not the IP address

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			Set up Ipsec tunnel to serving SEGW
3	→			DNS Standard Query for GANC to the DNS server associated with the GANC
4	←			Standard Query Response with IP address to GANC
5	MS			Establish TCP connection to serving GANC
6	→		GA-RC REGISTER REQUEST	To serving GANC
7	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds. GANC Control Channel Description IE shall indicate that GPRS services are not available and IMSI Attach/Detach procedure shall not apply.
8	MS			Wait for 1 minutes so that TU3906 expires
A8 (Optional)			{GAN A/Gb Mode Location Update Procedure}	This step is performed only if the MS initiates a Location Area Update while TU3906 is still running
9	→		GA-RC KEEP ALIVE	

81.2.1.5 Registration Procedure, MS Holds The FQDN to The serving SEGW And The IP Address to The Serving GANC

81.2.1.5.1 Conformance requirement

To initiate the GAN registration procedure the MS shall:

- If the MS has stored a FQDN of the GANC-SEGW, the MS performs a public DNS query to retrieve the IP-address of the GANC-SEGW, if the MS does not already have an established secure connection to this GANC-SEGW, the MS establishes the secure connection towards the GANC-SEGW according to sub-clause 4.2. The MS shall not store the IP address retrieved from DNS for subsequent procedures (apart from DNS resolver caching).

Following successful establishment of secure tunnel:

- If the MS holds an IP address of the GANC, the MS establishes a TCP connection to the GANC at the stored TCP port to be used for Registration with this GANC. If no TCP port has been stored for this GANC, the default TCP port (see sub-clause 12.2.1) shall be used.

- The MS shall only establish a single TCP connection to the GANC over the IPsec tunnel.

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- Start Keep alive mechanism as defined in sub-clause 6.5 using the received TU3906 Timer IE

Reference(s)

3GPP TS 44.318 sub-clause 6.2.1 and 6.2.3.1

81.2.1.5.2 Test purpose

To verify that the MS can register to the GANC by using FQDN to SEGW.

81.2.1.5.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

Mobile Station:

- MS has stored the FQDN to the SEGW associated with the serving GANC associated with the AP-ID, but not the IP address

- MS has stored the IP address to the serving GANC associated with the AP-ID, but not the FQDN

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	→			DNS Standard Query for the SEGW to the public DNS server
3	←			Standard Query Response with IP address to the SEGW
4	MS			MS sets up a secure connection to the SEGW and establishes TCP connection to the serving GANC using the stored IP address
5	→		GA-RC REGISTER REQUEST	To serving GANC
6	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds GANC Control Channel Description IE shall indicate that GPRS services are not available and IMSI Attach/Detach procedure shall not apply.

7	MS			Wait for 1 minutes so that TU3906 expires
A7 (Optional)			{GAN A/Gb Mode Location Update Procedure}	This step is performed only if the MS initiates a Location Area Update while TU3906 is still running
8	→		GA-RC KEEP ALIVE	

81.2.1.6 Registration Procedure, MS is capable of GAN A/Gb mode and GAN Iu mode, directed to operate in GAN A/Gb mode

81.2.1.6.1 Conformance requirement

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- stop the timer TU3904,

- reset the Redirection Counter,

- retrieve the GAN Mode Indicator IE (if included) and:

- if no GAN Mode Indicator IE is included or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, and the MS supports GAN A/Gb mode, then the MS shall operate in GAN A/Gb mode while registered with the GANC.

- if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN Iu mode, and the MS supports GAN Iu mode, then the MS shall operate in GAN Iu mode while registered with the GANC.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.1

81.2.1.6.2 Test purpose

To verify that the MS that is capable of both GAN A/Gb mode and GAN Iu mode operation can be directed to operate in GAN A/Gb mode as a result of the Registration procedure.

81.2.1.6.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, with different LAI than GAN cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC GAN Mode Support Indicator in GAN Classmark IE indicates that MS supports GAN A/Gb mode and GAN Iu mode
4	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds GAN Mode Indicator IE indicates that MS shall use GAN A/Gb mode
5			{GAN A/GB Mode Location Update Procedure}	

81.2.1.7 Registration Procedure, MS is capable of GAN A/Gb mode and GAN Iu mode, directed to operate in GAN Iu mode

81.2.1.7.1 Conformance requirement

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- stop the timer TU3904,

- reset the Redirection Counter,

- retrieve the GAN Mode Indicator IE (if included) and:

- if no GAN Mode Indicator IE is included or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, and the MS supports GAN A/Gb mode, then the MS shall operate in GAN A/Gb mode while registered with the GANC.

- if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN Iu mode, and the MS supports GAN Iu mode, then the MS shall operate in GAN Iu mode while registered with the GANC.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.1

81.2.1.7.2 Test purpose

To verify that the MS that is capable of both GAN A/Gb mode and GAN Iu mode operation can be directed to operate in GAN Iu mode as a result of the Registration procedure.

81.2.1.7.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, with different LAI than GAN cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC GAN Mode Support Indicator in GAN Classmark IE indicates that MS supports GAN A/Gb mode and GAN Iu mode
4	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds GAN Mode Indicator IE indicates that MS shall use GAN Iu mode
5			{GAN Iu Mode Location Update Procedure}	

81.2.1.8 Registration Procedure, MS is capable of GAN A/Gb mode and GAN Iu mode, no GAN Mode Indicator IE in GA-RC REGISTER ACCEPT

81.2.1.8.1 Conformance requirement

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- stop the timer TU3904,

- reset the Redirection Counter,

- retrieve the GAN Mode Indicator IE (if included) and:

- if no GAN Mode Indicator IE is included or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, and the MS supports GAN A/Gb mode, then the MS shall operate in GAN A/Gb mode while registered with the GANC.

- if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN Iu mode, and the MS supports GAN Iu mode, then the MS shall operate in GAN Iu mode while registered with the GANC.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.1

81.2.1.8.2 Test purpose

To verify that the MS that is capable of both GAN A/Gb mode and GAN Iu mode operation will use GAN A/Gb mode if no GAN Mode Indicator IE is included in the GA-RC REGISTER ACCEPT message.

81.2.1.8.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, with different LAI than GAN cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN

3	→	GA-RC REGISTER REQUEST	To serving GANC GAN Mode Support Indicator in GAN Classmark IE indicates that MS supports GAN A/Gb mode and GAN Iu mode
4	←	GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds No GAN Mode Indicator IE included
5		{GAN A/GB Mode Location Update Procedure}	

81.2.1.9 Registration Procedure, MS is capable of GAN Iu mode only, no GAN Mode Indicator IE in GA-RC REGISTER ACCEPT

81.2.1.9.1 Conformance requirement

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- stop the timer TU3904,

- reset the Redirection Counter,

- retrieve the GAN Mode Indicator IE (if included) and:

- if no GAN Mode Indicator IE is included or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, and the MS supports GAN A/Gb mode, then the MS shall operate in GAN A/Gb mode while registered with the GANC.

- if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN Iu mode, and the MS supports GAN Iu mode, then the MS shall operate in GAN Iu mode while registered with the GANC.

If no GAN Mode Indicator IE is included in the GA-RC REGISTER ACCEPT message or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, but the MS does not support GAN A/Gb mode, then the MS shall immediately initiate GAN deregistration per sub-clause 6.4.1 and then proceed according to the registration reject procedures defined for the case of 'Invalid GANC' in sub-clause 6.2.3.3.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.1 and 6.2.4.6

81.2.1.9.2 Test purpose

To verify that the MS that is capable of GAN Iu mode operation (only) initiates GAN deregistration if the GA-RC REGISTER ACCEPT message does not include the GAN Mode Indicator.

81.2.1.9.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, with different LAI than GAN cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC GAN Mode Support Indicator in GAN Classmark IE indicates that MS supports GAN Iu mode (only)
4	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds No GAN Mode Indicator IE included
5	→		GA-RC DEREGISTER	Register Reject Cause = Unspecified

81.2.1.10 Registration Procedure, MS is capable of GAN Iu mode only, GAN Mode Indicator IE in GA-RC REGISTER ACCEPT indicates that MS shall use GAN A/Gb mode

81.2.1.10.1 Conformance requirement

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- stop the timer TU3904,

- reset the Redirection Counter,

- retrieve the GAN Mode Indicator IE (if included) and:

- if no GAN Mode Indicator IE is included or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, and the MS supports GAN A/Gb mode, then the MS shall operate in GAN A/Gb mode while registered with the GANC.

- if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN Iu mode, and the MS supports GAN Iu mode, then the MS shall operate in GAN Iu mode while registered with the GANC.

If no GAN Mode Indicator IE is included in the GA-RC REGISTER ACCEPT message or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, but the MS does not support GAN A/Gb mode, then the MS shall immediately initiate GAN deregistration per sub-clause 6.4.1 and then proceed according to the registration reject procedures defined for the case of 'Invalid GANC' in sub-clause 6.2.3.3.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.1 and 6.2.4.6

81.2.1.10.2 Test purpose

To verify that the MS that is capable of GAN Iu mode operation (only) initiates GAN deregistration if the GA-RC REGISTER ACCEPT message includes the GAN Mode Indicator with value 'The MS shall operate in GAN A/Gb mode'.

81.2.1.10.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, with different LAI than GAN cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC GAN Mode Support Indicator in GAN Classmark IE indicates that MS supports GAN Iu mode (only)
4	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds GAN Mode Indicator IE indicates that MS shall use GAN A/Gb mode
5	→		GA-RC DEREGISTER	Register Reject Cause = Unspecified

81.2.1.11 Registration Procedure, MS is capable of GAN Iu mode (only) is directed to operate in GAN Iu mode

81.2.1.11.1 Conformance requirement

When the MS receives GA-RC REGISTER ACCEPT message, it shall:

- stop the timer TU3904,

- reset the Redirection Counter,

- retrieve the GAN Mode Indicator IE (if included) and:

- if no GAN Mode Indicator IE is included or if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN A/Gb mode, and the MS supports GAN A/Gb mode, then the MS shall operate in GAN A/Gb mode while registered with the GANC.

- if the GAN Mode Indicator IE is included and indicates that the MS shall operate in GAN Iu mode, and the MS supports GAN Iu mode, then the MS shall operate in GAN Iu mode while registered with the GANC.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.1

81.2.1.11.2 Test purpose

To verify that the MS that is capable of GAN Iu mode operation (only) can be directed to operate in GAN Iu mode as a result of the Registration procedure.

81.2.1.11.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, with different LAI than GAN cell

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored a serving GANC associated with the GSM cell (CGI)

- MS has not stored a serving GANC associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Accept before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC GAN Mode Support Indicator in GAN Classmark IE indicates that MS supports GAN Iu mode (only)
4	←		GA-RC REGISTER ACCEPT	TU3906 set to 60 seconds GAN Mode Indicator IE indicates that MS shall use GAN Iu mode
5			{GAN Iu Mode Location Update Procedure}	

81.2.2 Registration Procedure, Redirected

81.2.2.1 Registration Procedure, Redirected, Not Possible to Reuse Secure Connection

81.2.2.1.1 Conformance requirement

When the MS receives GA-RC REGISTER REDIRECT message, it shall:

- stop the timer TU3904,

- Increment the Redirection counter,

- release the TCP connection towards the GANC,

- otherwise release the secure connection towards SEGW of the previous GANC as defined in sub-clause 4.5

- initiate the registration procedure towards the returned GANC as defined in sub-clause 6.2.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.2

81.2.2.1.2 Test purpose

To verify that the MS can register to another GANC when it receives Registration Redirect as a response on the Registration Request message.

81.2.2.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

- DNS inside of the default SEGW associated with the default GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- The serving GANC does not belong to the same SEGW as the default GANC

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Redirect before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
				MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
2	→		GA-RC REGISTER REQUEST	To serving GANC
3	←		GA-RC REGISTER REDIRECT	Redirect default GANC, with associated default SEGW IP or FQDN
4	MS			Remove the TCP connection and the secure connection to SEGW
5	MS			MS sets up secure connection to the new SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To default GANC

81.2.2.2 Registration Procedure, Redirected, Current And Received GANC Belongs to The Same SEGW, IP Address Matches

81.2.2.2.1 Conformance requirement

When the MS receives GA-RC REGISTER REDIRECT message, it shall:

- stop the timer TU3904,

- Increment the Redirection counter,

- release the TCP connection towards the GANC,

- if the returned SEGW is the same as the one used for the connection towards the previous GANC,

- if the MS held a Serving GANC-SEGW IP address for the current Serving GANC (either in the Serving GANC store or received in a previous GA-RC REGISTER REDIRECT) and the received GA-RC REGISTER REDIRECT contains the Serving GANC-SEGW IP address IE, and these two IP addresses match, the MS shall reuse the secure connection, or

- initiate the registration procedure towards the returned GANC as defined in sub-clause 6.2.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.2

81.2.2.2.2 Test purpose

To verify that the MS can register to another GANC when it receives Registration Redirect as a response on the Registration Request message.

To verify that the same Ipsec tunnel can be reused if the current GANC belongs to the same SEGW as the received GANC using FQDN as identifier.

81.2.2.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC and default GANC.

Mobile Station:

- MS has stored the IP address or FQDN to the serving GANC and its SEGW associated with the AP-ID

- The serving GANC belongs to the same SEGW as the default GANC

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Redirect before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
				MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
2	→		GA-RC REGISTER REQUEST	To serving GANC
3	←		GA-RC REGISTER REDIRECT	Redirect default GANC, IP address for the SEGW sent

4	MS		Remove the TCP connection
5	MS		Establish a TCP connection to the default GANC over the same secure connection
6	→	GA-RC REGISTER REQUEST	To default GANC

81.2.2.3 Registration Procedure, Redirected, Current And Received GANC Belongs to The Same SEGW, FQDN Matches

81.2.2.3.1 Conformance requirement

When the MS receives GA-RC REGISTER REDIRECT message, it shall:

- stop the timer TU3904,

- Increment the Redirection counter,

- release the TCP connection towards the GANC,

- if the returned SEGW is the same as the one used for the connection towards the previous GANC,

- if the MS held a Serving GANC-SEGW FQDN identifier (either in the Serving GANC store or received in a previous GA-RC REGISTER REDIRECT) and the received GA-RC REGISTER REDIRECT contains the Serving GANC-SEGW FQDN IE, and these identifiers match, the MS shall reuse the secure connection

- initiate the registration procedure towards the returned GANC as defined in sub-clause 6.2

.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.2

81.2.2.3.2 Test purpose

To verify that the MS can register to another GANC when it receives Registration. Redirect as a response on the Registration Request message.

To verify that the same Ipsec tunnel can be reused if the current GANC belongs to the same SEGW as the received GANC using FQDN as identifier.

81.2.2.3.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC and default GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and the IP address or FQDN of its SEGW associated with the AP-ID

- The serving GANC belongs to the same SEGW as the default GANC

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC REGISTERED.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Redirect before timer TU3904 expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the AP
				MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using FQDN
2	→		GA-RC REGISTER REQUEST	To serving GANC
3	←		GA-RC REGISTER REDIRECT	Redirect default GANC, FQDN for the SEGW sent
4	MS			Remove the TCP connection
5	MS			Establish a TCP connection to the default GANC over the same secure connection
6	→		GA-RC REGISTER REQUEST	To default GANC

81.2.3   Registration Procedure, Rejected

81.2.3.1   Registration Procedure, Registration rejected, Network congestion

81.2.3.1.1   Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

- stop the timer TU3904,

- if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Network Congestion'
- create a random value between zero and the received value in IE 'TU3907 Timer' and
- add this value to the received value in IE 'TU3907 Timer', and use this as the new value for TU3907
- start timer TU3907 according to the new calculated value and wait for it to expire.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.3

81.2.3.1.2 Test purpose

To verify that the MS retries to register again after the correct time, according to the received timer TU3907, after receiving Register reject.

81.2.3.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN or IP address of the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due to network congestion before timer TU3904 expires. TU3907 Timer IE is set to 60 (1 minutes).

Specific Test Parameters

-

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC
4	←		GA-RC REGISTER REJECT	Cause: network congested. TU3907 Timer IE is set to 60 seconds
5	MS			The MS sets TU3907 randomly between 60 and 120, i.e. 1 – 2 minutes. Wait until the TU3907 expires
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.2.3.2 Registration Procedure, Registration rejected, AP not allowed

81.2.3.2.1 Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

- stop the timer TU3904,

  - if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

  - else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'AP not allowed'
- release the TCP connection established to the GANC, if still established,
- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5
- store the AP-ID in the AP Black List and not initiate a new Register Request from this AP, until the AP-ID is removed from the AP Black List i.e. as a result of power-cycle.

The MS shall also:

  - Update the stored Serving GANC table as follows if the received Reject cause was not 'Network Congestion' or 'Geo Location not known':

- If the MS is not in GERAN/UTRAN coverage it shall remove information related to the AP-ID, if exists in the table.

Reference(s)

   3GPP TS 44.318 sub-clause 6.2.3.3

81.2.3.2.2   Test purpose

To verify that the MS does not try to register again, after receiving Register reject due to Location not allowed until the MS is joining another AP.

81.2.3.2.3   Method of test

Initial conditions

System Simulator:

  - 2 GAN cells, default parameter

  - Public DNS without knowledge of the serving GANC's FQDN

  - DNS inside of the serving SEGW associated with the serving GANC

  - DNS inside of the default SEGW associated with the default GANC

Mobile Station:

  - MS has stored the FQDN or IP address to the serving GANC and its SEGW associated with the AP-ID

  - MS has stored the FQDN or IP address to the default GANC and its SEGW

  - MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due to AP not allowed before timer TU3904 expires.

The MS are not allowed to try to register again from the same AP. Therefore wait for 2 minutes and let the MS join the second AP, where the mobile will try to register again.

Specific Test Parameters

-

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the first AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC
4	←		GA-RC REGISTER REJECT	Cause: AP not allowed
5	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
6	MS			Wait for 2 minutes. Make sure that the MS doesn't try to register again.
7	MS			MS is joining the second AP
8	MS			MS sets up secure connection to the default SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
9	→		GA-RC REGISTER REQUEST	To default GANC

81.2.3.3 Registration Procedure, Registration rejected, Location not allowed

81.2.3.3.1 Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

- stop the timer TU3904,

- if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Location not allowed'
- release the TCP connection established to the GANC, if still established,
- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5
- update the Location Black List according to the received information elements Location Black List indicator and Location Area Identification (i.e. the same as that included in the GA-RC REGISTER REQUEST message) and not initiate a new Register Request from the locations indicated by the updated Location Black List, until they are removed from the Location Black List i.e. as a result of power-cycle.

The MS shall also:

- Update the stored Serving GANC table as follows if the received Reject cause was not 'Network Congestion' or 'Geo Location not known':

- If the MS is in GERAN/UTRAN coverage it shall remove information related to the current GSM-CGI or UTRAN Cell Identity, if it exists in the table.

- If the MS is not in GERAN/UTRAN coverage it shall remove information related to the AP-ID, if exists in the table.

Reference(s)

   3GPP TS 44.318 sub-clause 6.2.3.3

81.2.3.3.2   Test purpose

To verify that the MS does not try to register again, after receiving Register reject due to Location not allowed until it is powercycled.

81.2.3.3.3   Method of test

Initial conditions

System Simulator:

   - 1 GAN cell, default parameter

   - 1 GSM cell, default parameters

   - Public DNS without knowledge of the serving GANC's FQDN

   - DNS inside of the serving SEGW associated with the serving GANC

   - DNS inside of the default SEGW associated with the default GANC

Mobile Station:

   - MS has stored the FQDN or IP address to the serving GANC and its SEGW associated with the GSM cell (CGI)

   - MS has stored the FQDN or IP address to the default GANC and its SEGW

   - MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due to Location not allowed before timer TU3904 expires.

The MS are not allowed to try to register again from the same Location Area. Therefore wait for 5 minutes and then powercycle the MS so that the LAI disappears from the Location black list and the MS can register again from that Location area.

Specific Test Parameters

-

Maximum duration of test

6 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP

2	MS		MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→	GA-RC REGISTER REQUEST	To serving GANC
4	←	GA-RC REGISTER REJECT	Cause: Location not allowed
5	MS		Release the TCP connection to the GANC and the secure connection to the SEGW
6	MS		Wait for 5 minutes. Make sure that the MS doesn't try to register again.
7	MS		Powercycle the MS
8	MS		MS sets up secure connection to the default SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
9	→	GA-RC REGISTER REQUEST	Todefault GANC

81.2.3.4 Registration Procedure, Registration rejected, IMSI not allowed

81.2.3.4.1 Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

- stop the timer TU3904,

- if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

    - else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'IMSI not allowed'
- release the TCP connection established to the GANC, if still established.
- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5
- not initiate a new GAN Registration procedure until the next power-on.

The MS shall also:

- Update the stored Serving GANC table as follows if the received Reject cause was not 'Network Congestion' or 'Geo Location not known':

- If the MS is not in GERAN/UTRAN coverage it shall remove information related to the AP-ID, if exists in the table.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.3

81.2.3.4.2 Test purpose

To verify that the MS does not try to register again after receiving Registration reject due to IMSI not allowed until the MS is power cycled.

81.2.3.4.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

- DNS inside of the default SEGW associated with the default GANC

Mobile Station:

- MS has stored the FQDN or the IP address to the serving GANC and its SEGW associated with the AP-ID

- MS has stored the FQDN or the IP address to the default GANC and its SEGW

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due to IMSI not allowed before timer TU3904 expires.

Wait for 2 minutes to confirm that the MS does not try to register again.

Switch off the MS and switch it back on again. The MS is supposed to try to register with the default GANC.

Specific Test Parameters

-

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the first AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC
4	←		GA-RC REGISTER REJECT	Cause: IMSI not allowed
5	MS			Release the TCP connection to the serving GANC and the secure connection to the serving SEGW
6	MS			Wait for 2 minutes. Make sure that the MS doesn't try to register again.
7	MS			Power cycle the MS
8	MS			MS sets up secure connection to the default SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
9	→		GA-RC REGISTER REQUEST	To default GANC

81.2.3.5 Void

81.2.3.6 Registration Procedure, Registration rejected, invalid GANC

81.2.3.6.1 Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

- stop the timer TU3904,

- if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

    - else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Invalid GANC' or 'Unspecified'
- release the TCP connection established to the GANC, if still established.
- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5
- act as defined in sub-clause 6.2.4.5

The MS shall also:

- Update the stored Serving GANC table as follows if the received Reject cause was not 'Network Congestion' or 'Geo Location not known':

- If the MS is not in GERAN/UTRAN coverage it shall remove information related to the AP-ID, if exists in the table.

The MS shall;

- If the GANC selection is ongoing:

- act on upper layer indications as follows;

- If no more PLMNs/GANCs are available for GANC selection or the GANC selection is finished unsuccessfully;

- stop all ongoing registration procedures;

- release the TCP connection towards the current GANC, if established,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5

    - initiate registration towards the Default GANC as defined in sub-clause 6.2.1;

- else if the GANC selection process indicates new PLMN/GANC selection:

- initiate registration procedure towards the GANC associated with the selected PLMN as defined in sub-clause 6.2.

    - else if the MS attempted the registration towards the Default GANC

- delete the stored information about the Default GANC,

- delete the contents of the stored Serving GANC table

- Increment Redirection Counter

- initiate Discovery Procedure as defined in sub-clause 5.3

    - else if the MS attempted the registration towards current GANC is a Serving GANC

- Update the stored Serving GANC table as defined in the end of sub-clause 6.2.3.3 (i.e. delete information about this Serving GANC in the table) and

- Increment Redirection Counter

- initiate Registration Procedure towards the Default GANC as defined in sub-clause 6.2.1

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.3 and 6.2.4.5

81.2.3.6.2 Test purpose

To verify for serving and default GANC that the MS does not try to register again to the same GANC after receiving Registration reject due to invalid GANC.

81.2.3.6.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of any GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

- DNS inside of the default SEGW associated with the default GANC

- DNS inside of the provisioning SEGW associated with the provisioning GANC

Mobile Station:

- MS has stored the FQDN or IP address to the serving GANC associated with the AP-ID

- MS has stored the FQDN or IP address to the default GANC

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due invalid GANC before timer TU3904 expires.

Check that the MS kicks off the Registration procedure towards the Default GANC. Check the Register Reject Cause IE and Redirection Counter IE in the Discovery Request message.

The SS is supposed to answer the Registration Request message with Registration Rejected due invalid GANC before timer TU3904 expires.

Check that the MS kicks off the Discovery procedure towards the Provisioning GANC. Check the Register Reject Cause IE and Redirection Counter IE in the Discovery Request message.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the first AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC
4	←		GA-RC REGISTER REJECT.	Cause: Invalid GANC
5				Release the TCP connection to the serving GANC and the secure connection to the serving SEGW
6				MS sets up secure connection to the default SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
7	→		GA-RC REGISTER REQUEST	To default GANC
8	←		GA-RC REGISTER REJECT.	Cause: Invalid GANC
9				Release the TCP connection to the default GANC and the secure connection to the default SEGW
10				MS sets up secure connection to the provisioning SEGW and establishes a TCP connection to the provisioning GANC using either IP address or FQDN
11	→		GA-RC DISCOVERY REQUEST	To provisioning GANC

81.2.3.7 Registration Procedure, Registration rejected, Geo location not known

81.2.3.7.1 Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

- stop the timer TU3904,

- if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Geo Location not known'
  - release the TCP connection established to the GANC, if still established.
  - release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5
  - not retry registration from this AP until the location is provided or until the next power-on.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.3

81.2.3.7.2 Test purpose

To verify that the MS does not try to register again after receiving Registration Reject due to 'Geo location not known' until the MS is power cycled.

81.2.3.7.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the serving SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN or the IP address to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due to Geo location not known before timer TU3904 expires.

Wait for 2 minutes to confirm that the MS does not try to register again.

Switch off the MS and switch it back on again. The MS is supposed to try to register again.

Specific Test Parameters

-

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the first AP
2	MS			MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	To serving GANC
4	←		GA-RC REGISTER REJECT	Cause: Geo location not known
5				Release the TCP connection to the GANC and the secure connection to the SEGW
6	MS			Wait for 2 minutes. Make sure that the MS doesn't try to register again.
7	MS			Power cycle the MS

| 8 | MS | | | MS sets up secure connection to the serving SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN |
| 9 | → | GA-RC REGISTER REQUEST | | To serving GANC |

81.2.4 Registration Procedure, Abnormal Cases

81.2.4.1 Registration Procedure, TU3904/TU3905 expiry, Serving GANC

81.2.4.1.1 Conformance requirement

If timer TU3904 expires in the MS, the MS shall:

- release the TCP connection towards the GANC,

- release the secure connection towards SEGW of the GANC as defined in sub-clause 4.5,

- If GAN registration is unsuccessful after a number of attempts defined by the MS parameter "Up Register Max Retries" (defined in sub-clause 12.2.3), the MS shall act as defined in sub-clause 6.2.4.5.

- Otherwise, if GAN Registration can be re-attempted according to the MS parameter "Up Register Max Retries", start timer TU3905 and wait for it to expire.

If timer TU3905 has expired in the MS, the MS shall restart the Registration procedure as defined in sub-clause 6.2.1.

Reference(s)

3GPP TS 44.318 sub-clause 6.2.4.1 and 6.2.4.3

81.2.4.1.2 Test purpose

To verify that the MS retries to register correct number of times before it tries to register at another GANC when it does not get any reply on the Registration Request message.

81.2.4.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is not supposed to answer the Registration Request message at all.

The MS will wait for TU3904 and TU3905 to expire and retry to register again the number of times that is set in the MS parameter 'Up Register Max Retries'. After that it will try to register at the default GANC

Specific Test Parameters

'Up Register Max Retries' (3 times)

Maximum duration of test

3 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is joining the first AP
2	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	1st time to serving GANC, MS starts TU3904
4	MS			Wait for 30 seconds so that TU3904 expires. TU3905 is set
5	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
6	MS			Wait for 10 seconds so that TU3905 expires
7	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
8	→		GA-RC REGISTER REQUEST	2nd time to serving GANC, MS starts TU3904. 1st reattempt
9	MS			Wait for 30 seconds so that TU3904 expires. TU3905 is set
10	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
11	MS			Wait for 10 seconds so that TU3905 expires
12	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
13	→		GA-RC REGISTER REQUEST	3rd time to serving GANC, MS starts TU3904. 2nd reattempt
14	MS			Wait for 30 seconds so that TU3904 expires.
15	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
16	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
17	→		GA-RC REGISTER REQUEST	To default GANC

81.2.4.2 Registration Procedure, Registration Rejected, Network Congestion, Persistent Fault

81.2.4.2.1 Conformance requirement

When the MS receives GA-RC REGISTER REJECT message it shall:

-   stop the timer TU3904,

-   if the MS is in the process of GANC selection;

- ignore the received Register Reject Cause Information Element; and;

- proceed as defined in sub-clause 6.2.4.5.

    - else extract the Register Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Network Congestion'
- create a random value between zero and the received value in IE 'TU3907 Timer' and
- add this value to the received value in IE 'TU3907 Timer', and use this as the new value for TU3907
- start timer TU3907 according to the new calculated value and wait for it to expire.

If timer TU3907 expires in the MS, the MS shall:

    - If GAN registration is unsuccessful after a number of attempts defined by the MS parameter "Up Register Max Retries" (defined in sub-clause 12.2.3), the MS shall act as if a "Lower layer failure in the MS" has occurred as defined in sub-clause 6.2.4.2

    - else, if the TCP connection to the GANC is still established,

- send a GA-RC REGISTER REQUEST that includes information elements as described in sub-clause 6.2.1 and

- start timer TU3904

    - else, restart the GAN Registration procedure towards the GANC as defined in sub-clause 6.2.1

Reference(s)

3GPP TS 44.318 sub-clause 6.2.3.3 and 6.2.4.4

81.2.4.2.2 Test purpose

To verify that the MS retries to register to the same GANC the correct number of times when it gets rejected due to network congestion several times.

81.2.4.2.3 Method of test

Initial conditions

System Simulator:

    - 1 GAN cell, default parameter

    - Public DNS without knowledge of the serving GANC's FQDN

    - DNS inside of the SEGW associated with the serving GANC

Mobile Station:

    - MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

    - MS in state GA-RC DEREGISTERED

Foreseen final state of the MS

The MS will stay in state to GA-RC DEREGISTERED as the registration fails.

Test procedure

Make the MS join the AP so that the Registration procedure is kicked off.

The SS is supposed to answer the Registration Request message with Registration Rejected due to network congestion before timer TU3904 expires. TU3907 Timer IE is set to 60 (1 minutes).

The MS will wait for TU3904 and TU3907 to expire and retry to register again the number of times that is set in the MS parameter 'Up Register Max Retries'.

At the first reject the SS releases the TCP connection and the Ipsec tunnel, so that the MS has to establish the connection again. The rest of the rejects can keep the connection as that is the most likely scenario.

Specific Test Parameters

Up Register Max Retries' is set to 3 times

Maximum duration of test

7 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is joining the AP
2	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
3	→		GA-RC REGISTER REQUEST	1st time to serving GANC, MS starts TU3904
4	←		GA-RC REGISTER REJECT	Cause: network congested. TU3907 Timer IE is set to 60 seconds
5	MS			The MS sets TU3907 randomly between 60 and 120, i.e. 1 – 2 minutes. Wait until TU3907 expires
6	→		GA-RC REGISTER REQUEST	2nd time to serving GANC, MS starts TU3904. 1st reattempt
7	←		GA-RC REGISTER REJECT	Cause: network congested. TU3907 Timer IE is set to 60 seconds
8	MS			The MS sets TU3907 randomly between 60 and 120, i.e. 1 – 2 minutes. Wait until TU3907 expires
9	→		GA-RC REGISTER REQUEST	3rd time to serving GANC, MS starts TU3904. 2nd reattempt
10	←		GA-RC REGISTER REJECT	Cause: network congested. TU3907 Timer IE is set to 60 seconds
11 (optional)	MS			The MS sets TU3907 randomly between 60 and 120, i.e. 1 – 2 minutes. Wait until TU3907 expires
12	MS			Release the TCP connection to the GANC and the secure connection to the SEGW

81.2.4.3 Void

81.2.4.4 Void

81.2.4.5 Void

81.2.4.6 Void

81.2.4.7 Void

81.2.5 Registration Procedure, Register Update

81.2.5.1 Registration Procedure, Register Update, Rejected

81.2.5.1.1 Conformance requirement

If the network rejects the Registration Update, it shall send the GA-RC DEREGISTER message to the MS. This message shall contain the Register Reject Cause information element.

When the MS receives the GA-RC DEREGISTER message, it shall behave as defined in sub-clause 6.4.4 "Reception of GA-RC DEREGISTER by MS".

When the MS receives the GA-RC DEREGISTER message, it shall:

- - 'AP not allowed'

- release the TCP connection established to the GANC, if still established,

- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5,

- store the AP-ID in the AP Black List of and not initiate a new Register Request from this AP, until the AP-ID is removed from the AP black list i.e. as a result of power-cycle.

Reference(s)

3GPP TS 44.318 sub-clause 6.3.2.2, 6.3.3.1 and 6.4.4

81.2.5.1.2 Test purpose

To verify that the MS acts according to the Register Update Reject Cause contained in the GA-RC DEREGISTER from the network.

81.2.5.1.3 Method of test

Initial conditions

System Simulator:

- 2 GAN cells, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED

Test procedure

Make the MS join a second AP so that the Registration Update procedure is kicked off.

The SS is supposed to reply with GA-RC DEREGISTER.

The MS will then check the Register Reject Cause IE contained in GA-RC DEREGISTER message and act as specified in GANC 44.318 section 6.4.4.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is changing APs
2	→		GA-RC REGISTER UPDATE UPLINK	To serving GANC

3	←	GA-RC DEREGISTER	To MS Cause: AP not allowed
4	MS		Release the TCP connection to the GANC and the secure connection to the SEGW
5	MS		Wait for 5 minutes. Make sure that the MS doesn't try to register again.

81.2.5.2 Registration Procedure, Register Update, Redirection

81.2.5.2.1 Conformance requirement

If the network decides to redirect the MS to another GANC, it shall send the GA-RC REGISTER REDIRECT message to the MS. This message shall contain valid information about another GANC, so that the MS is able to initiate the Registration procedure towards that GANC.

Reference(s)

3GPP TS 44.318 sub-clause 6.3.2.3

81.2.5.2.2 Test purpose

To verify that the MS can register to another GANC if it gets redirected as a result of the Registration Update procedure.

81.2.5.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- 1 GSM cell, initially switched off

Mobile Station:

- MS in state GA-RC REGISTERED under no GSM coverage

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED as the Registration procedure to the new GANC is interrupted.

Test procedure

GSM cell is activated, MS is changing location area by going into GSM coverage area and Registration Update procedure is kicked off.

The SS is supposed to reply with .GA-RC REGISTER REDIRECT

The MS will then send GA-RC REGISTER REQUEST to the suggested GANC.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	SS			The GSM cell is activated.

2	→	GA-RC REGISTER UPDATE UPLINK	To serving GANC
3	←	GA-RC REGISTER REDIRECT	Suggest a different GANC
4	→	GA-RC REGISTER REQUEST	To the suggested GANC.

81.2.6 Registration Procedure, Deregister

81.2.6.1 Registration Procedure, Deregister, Network Congestion, MS in State GA-CSR DEDICATED

81.2.6.1.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

  - else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Network Congestion'

- release all local GAN resources (e.g. MS is in active call over GAN)

- release the TCP connection towards the current GANC and

- release the secure connection towards the GANC-SEGW, as defined in sub-clause 4.5

- create a random value between zero and the received value in IE 'TU3907 Timer' and

- add this value to the received value in IE 'TU3907 Timer', and use this as the new value for TU3907

- start timer TU3907 according to the new calculated value

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.1.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and starts to try to register again after receiving GA-RC DEREGISTER with cause 'Network Congestion'.

81.2.6.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-CSR DEDICATED with an active call

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Network Congestion'.

The MS is supposed to start the Registration procedure when TU3907 has expired.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	←		GA-RC DEREGISTER	From serving GANC, cause: network congested. TU3907 is set to 10 sec.
2	MS			Release the active call
3	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
4	MS			The SS checks that the following step is initiated by the MS within min 10 and 20 sec
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.2.6.2 Registration Procedure, Deregister, AP Not Allowed, MS in State GA-RC REGISTERED

81.2.6.2.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'AP not allowed'

- release the TCP connection established to the GANC, if still established,

- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5,

- store the AP-ID in the AP Black List of and not initiate a new Register Request from this AP, until the AP-ID is removed from the AP black list i.e. as a result of power-cycle.

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.2.2   Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and does not start to try to register again after receiving GA-RC DEREGISTER with cause 'AP not allowed' until it is powercycled.

81.2.6.2.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'AP not allowed'.

The MS are not allowed to try to register again from the same AP. Therefore, wait for 5 minutes and then powercycle the MS so that the AP disappears from the AP black list and the MS can register again from that AP.

Specific Test Parameters

-

Maximum duration of test

6 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, cause: AP not allowed.
2	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
3	MS			Wait for 5 minutes
4	MS			Powercycle the MS
5				MS sets up secure connection to the SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To default GANC

81.2.6.3   Registration Procedure, Deregister, Location Not Allowed, MS in State GA-CSR IDLE

81.2.6.3.1   Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

  - else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Location not allowed'

- release the TCP connection established to the GANC, if still established,

- release the secure connection towards the SEGW associated with the GANC, as defined in sub-clause 4.5,

- update the Location Black List according to the received information elements Location Black List indicator and Location Area Identification and not initiate a new Register Request from that Location, until the Location is removed from the Location Black List i.e. as a result of power-cycle.

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.3.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and does not start to try to register again after receiving GA-RC DEREGISTER with cause 'Location not allowed' until it is powercycled.

81.2.6.3.3 Method of test

Initial conditions

System Simulator:

- 1 GSM cell, default parameters

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the GSM cell (CGI)

- MS in state GA-CSR IDLE

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Location not allowed'.

The MS are not allowed to try to register again from the same Location area. Therefore, wait for 5 minutes and then powercycle the MS so that the LAI disappears from the Location black list and the MS can register again from that Location area.

Specific Test Parameters

-

Maximum duration of test

6 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, cause: Location not allowed.
2	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
3	MS			Wait for 5 minutes
4	MS			Powercycle the MS
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To default GANC

81.2.6.4 Registration Procedure, Deregister, IMSI Not Allowed

81.2.6.4.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'IMSI not allowed'

- release the TCP connection established to the GANC, if still established.

- release the secure connection towards the SEGW associated with the GANC as defined in sub-clause 4.5,

- not initiate a new Registration procedure until the next power-on.

The MS shall also,

- Update the stored Serving GANC table as following if the received Reject cause was not 'Network Congestion' or 'Geo Location not known'

- If the MS is not in GERAN/UTRAN coverage

- Remove information related to the AP-ID, if exists in the table.

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.4.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and does not start to try to register again after receiving GA-RC DEREGISTER with cause 'IMSI not allowed' until it is powercycled.

81.2.6.4.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the default GANC's FQDN

- DNS inside of the SEGW associated with the default GANC

Mobile Station:

- MS has stored the FQDN to the default GANC and its SEGW associated with the AP-ID

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'IMSI not allowed'.

The MS are not allowed to try to register again. Therefore, wait for 5 minutes and then powercycle the MS so that the MS can register again.

Specific Test Parameters

-

Maximum duration of test

6 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, cause: IMSI not allowed.
2				Release the TCP connection to the GANC and the secure connection to the SEGW
3	MS			Wait for 5 minutes
4	MS			Powercycle the MS
5				MS sets up secure connection to the SEGW and establishes a TCP connection to the default GANC using FQDN
6	→		GA-RC REGISTER REQUEST	To default GANC

81.2.6.5 Registration Procedure, Deregister, Unspecified

81.2.6.5.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Unspecified'

- release the TCP connection established to the GANC, if still established.

- release the secure connection towards the SEGW associated with the GANC as defined in sub-clause 4.5,

- act as if a "Lower layer failure in the MS" has occurred as defined in sub-clause 6.2.4.2

The MS shall also,

- Update the stored Serving GANC table as following if the received Reject cause was not 'Network Congestion' or 'Geo Location not known'

- If the MS is not in GERAN/UTRAN coverage

- Remove information related to the AP-ID, if exists in the table.

Lower layer failure in the MS can be for example related to DNS, IPsec or TCP. If any lower layer failure happens in the MS, the MS shall:

- release the TCP connection towards the current GANC, if established,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5 and

-

-

    If registration is still unsuccessful after a number of attempts defined by the MS parameter "Up Connect Attempt Count" (defined in sub-clause 12.2.3), the MS shall act as defined in sub-clause 6.2.4.5.

- Otherwise, start timer TU3905 and wait for it to expire.

Reference(s)

    3GPP TS 44.318 sub-clause 6.4.4 and 6.2.4.2

81.2.6.5.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and act as if it has discovered a lower layer fault when it receives the GA-RC DEREGISTER message with message code 'Unspecified' and the number of failed attempts doesn't exceed the Up Connection Attempt Count.

81.2.6.5.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the default GANC's FQDN

- DNS inside of the SEGW associated with the default GANC

Mobile Station:

- MS has stored the FQDN to the default GANC and its SEGW associated with the AP-ID

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Unspecified'.

The MS will try to register again to the default GANC.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, with reject cause: Unspecified.
2	MS			Release the TCP connection to the GANC and the secure connection to the SEGW and TU3905 is started
3	MS			TU3905 expires
4	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the default GANC using FQDN
5	→		GA-RC REGISTER REQUEST	To default GANC

81.2.6.6 Registration Procedure, Deregister, Unspecified, Persistent Fault, Default GANC

81.2.6.6.1 Conformance requirement

3GPP TS 44.318, section 6.4.4:

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Unspecified'

- release the TCP connection established to the GANC, if still established.

- release the secure connection towards the SEGW associated with the GANC as defined in sub-clause 4.5,

- act as if a "Lower layer failure in the MS" has occurred as defined in sub-clause 6.2.4.2

The MS shall also,

- Update the stored Serving GANC table as following if the received Reject cause was not 'Network Congestion' or 'Geo Location not known'

- If the MS is not in GERAN/UTRAN coverage

- Remove information related to the AP-ID, if exists in the table.

3GPP TS 44.318, section 6.2.4.2:

Lower layer failure in the MS can be for example related to DNS, IPsec or TCP. If any lower layer failure happens in the MS, the MS shall:

- release the TCP connection towards the current GANC, if established,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5 and

- If registration is still unsuccessful after a number of attempts defined by the MS parameter "Up Connect Attempt Count" (defined in sub-clause 12.2.3), the MS shall act as defined in sub-clause 6.2.4.5.

- Otherwise, start timer TU3905 and wait for it to expire.

3GPP TS 44.318, section 6.2.4.5:

else if the MS attempted the registration towards the Default GANC

- delete the stored information about the Default GANC,

- delete the contents of the stored Serving GANC table

- Increment Redirection Counter

- initiate Discovery Procedure as defined in sub-clause 5.3

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4 and 6.2.4.2, 6.2.4.5

81.2.6.6.2   Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and will act as after a Registration Failure when it receives the GA-RC DEREGISTER message with message code 'Unspecified' and the number of failed attempts exceeds the Up Connection Attempt Count..

81.2.6.6.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS has stored the FQDN to the default GANC and its SEGW

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Unspecified'. The MS treat this as a lower layer fault and starts to try to set up the connection to the GANC again. The SS simulates a persistent lower layer fault and after three attempts the number of failed attempts has reached the 'Up Connect Attempt Count' parameter and the fault will be treated as a registration fault. The MS will perform a Discovery procedure towards the Provisioning GANC.

Specific Test Parameters

-

Maximum duration of test

2 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, with reject cause : Unspecified.
2	MS			Release the TCP connection to the serving GANC and the secure connection to the SEGW and TU3905 is started
3	MS			TU 3905 expires after 10 seconds
4	MS			MS tries to set up a secure connection to the default SEGW but fails. MS removes the secure connection. Number of Up Connect Attempts is increased to 1 and TU3905 is started
5	MS			TU 3905 expires after 10 seconds
6	MS			MS sets up a secure connection to the default SEGW and tries to set up a TCP connection to the default GANC but fails with the TCP connection. MS removes the TCP connection and the secure connection. Number of Up Connect Attempts is increased to 2 and TU3905 is started
7	MS			TU 3905 expires after 10 seconds
8	MS			MS sets up a secure connection to the default SEGW and tries to set up a TCP connection to the default GANC but fails with the TCP connection. MS removes the TCP connection and the secure connection. Number of Up Connect Attempts is increased to 3.
9	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the provisioning GANC
10	→		GA-RC DISCOVERY REQUEST	To provisioning GANC

81.2.6.7 Registration Procedure, Deregister, Invalid GANC, Serving GANC

81.2.6.7.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Invalid GANC'

- release the TCP connection established to the GANC, if still established.

- release the secure connection towards the SEGW associated with the GANC as defined in sub-clause 4.5,

- act as defined in sub-clause 6.2.4.5 "Registration Failure"

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.7.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and does not start to try to register again to the same GANC after receiving GA-RC DEREGISTER with cause 'Invalid GANC'.

81.2.6.7.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Invalid GANC'.

The MS will try to register to default GANC.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, invalid GANC.
2	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
3	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the default GANC using either IP address or FQDN
4	→		GA-RC REGISTER REQUEST	To default GANC

81.2.6.8 Registration Procedure, Deregister, Geo Location Not Known

81.2.6.8.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

    - else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

    - 'Geo Location not known'

- release the TCP connection established to the GANC, if still established.

- release the secure connection towards the SEGW associated with the GANC as defined in sub-clause 4.5,

- not retry registration from this AP until the location is provided or until the next power-on.

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.8.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and does not start to try to register again after receiving GA-RC DEREGISTER with cause 'Geo location not known' until it is powercycled.

81.2.6.8.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Geo location not known'.

The MS are not allowed to try to register again. Therefore, wait for 5 minutes and then powercycle the MS so that the MS can register again.

Specific Test Parameters

-

Maximum duration of test

6 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		

1	←	GA-RC DEREGISTER	From serving GANC, cause: Geo location not known'.
2			Release the TCP connection to the GANC and the secure connection to the SEGW
3	MS		Wait for 5 minutes
4	MS		Powercycle the MS
5			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→	GA-RC REGISTER REQUEST	To serving GANC

81.2.6.9 Registration Procedure, Deregister, MS Initiated

81.2.6.9.1 Conformance requirement

When the MS is leaving or about to leave the GAN coverage and the MS has successfully registered with a GANC, it should:

- send the GA-RC DEREGISTER -message using the currently established TCP-connection,

- release the TCP connection towards the GANC,

- release the secure connection towards the SEGW, as defined in sub-clause 4.5 and

- release all resources related to GAN

Reference(s)

3GPP TS 44.318 sub-clause 6.4.1

81.2.6.9.2 Test purpose

To verify that the MS sends GA-RC DEREGISTER when it is about to leave the AP e.g. when it is powered off.

81.2.6.9.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RC REGISTERED

Foreseen final state of the MS

The MS will be switched off.

Test procedure

The MS sends the GA-RC DEREGISTER message as it is switched off.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			Switch off the MS
2	→		GA-RC DEREGISTER	To serving GANC
3	MS			Release the TCP connection to the GANC and the secure connection to the SEGW

81.2.6.10 Registration Procedure, Deregister, Network Congestion, MS in State GA-RRC CONNECTED

81.2.6.10.1 Conformance requirement

When the MS receives the GA-RC DEREGISTER message, it shall:

- if the MS is in the process of PLMN selection;

- ignore the received Register Reject Cause Information Element, and

- proceed as defined in sub-clause 6.2.4.5.

- else extract the Reject Cause information element and act as following depending on the value of the Reject Cause IE:

- 'Network Congestion'

- release all local GAN resources (e.g. MS is in active call over GAN)

- release the TCP connection towards the current GANC and

- release the secure connection towards the GANC-SEGW, as defined in sub-clause 4.5

- create a random value between zero and the received value in IE 'TU3907 Timer' and

- add this value to the received value in IE 'TU3907 Timer', and use this as the new value for TU3907

- start timer TU3907 according to the new calculated value

Reference(s)

3GPP TS 44.318 sub-clause 6.4.4

81.2.6.10.2 Test purpose

To verify that the MS changes state to GA-RC DEREGISTERED and starts to try to register again after receiving GA-RC DEREGISTER with cause 'Network Congestion'.

81.2.6.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

- Public DNS without knowledge of the serving GANC's FQDN

- DNS inside of the SEGW associated with the serving GANC

Mobile Station:

- MS has stored the FQDN to the serving GANC and its SEGW associated with the AP-ID

- MS in state GA-RRC CONNECTED (CS sublayer entity or CS sublayer entity or both CS and PS CS sublayer entities)

Foreseen final state of the MS

The MS will change state to GA-RC DEREGISTERED.

Test procedure

The SS initiates the deregistration by sending GA-RC DEREGISTER with cause 'Network Congestion'.

The MS is supposed to start the Registration procedure when TU3907 has expired.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RC DEREGISTER	From serving GANC, cause: network congested. TU3907 is set to 10 sec.
2	MS			Release the active call
3	MS			Release the TCP connection to the GANC and the secure connection to the SEGW
4	MS			The SS checks that the following step is initiated by the MS within min 10 and 20 sec
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.3 Lower Layer Faults

81.3.1 TCP Reset

81.3.1.1 TCP Reset, Successful Re-establishment, MS in State GA-CSR DEDICATED

81.3.1.1.1 Conformance requirement

When MS receives TCP RST after TCP connection failure, it shall attempt to re-establish TCP connection once. After successfully re-establishing TCP connection, the MS shall send GA-RC SYNCHRONIZATION INFORMATION to the GANC to synchronize the state information. If unsuccessful, the MS shall release the related local GA-CSR or GA-PSR resources, and continue as per section 9.5.

Reference(s)

3GPP TS 44.318 sub-clause 6.6.1.

81.3.1.1.2   Test purpose

To verify that the MS ca re-establish the TCP connection after receiving a TCP Reset.

81.3.1.1.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR DEDICATED

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will stay in GA-CSR DEDICATED.

Test procedure

The MS starts in GA-CSR DEDICATED.

The SS sends a TCP RST and the MS re-establish the TCP connection and send the GA-RC SYNCHRONISATION INFORMATION message.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-CSR DEDICATED
2		SS		The SS sends TCP RST
3	MS			The MS re-establish the TCP connection
4	→		GA-RC SYNCHRONIZATION INFORMATION	To serving GANC

81.3.1.2   TCP Reset, Unsuccessful Re-establishment, MS in State GA-CSR IDLE

81.3.1.2.1   Conformance requirement

When MS receives TCP RST after TCP connection failure, it shall attempt to re-establish TCP connection once. After successfully re-establishing TCP connection, the MS shall send GA-RC SYNCHRONIZATION INFORMATION to the GANC to synchronize the state information. If unsuccessful, the MS shall release the related local GA-RC or GA-PSR resources, and continue as per section 9.5.

Reference(s)

3GPP TS 44.318 sub-clause 6.6.1.

81.3.1.2.2   Test purpose

To verify that the MS can re-establish the TCP connection after receiving a TCP Reset.

81.3.1.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR IDLE

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-CSR IDLE.

The SS sends a TCP RST and the MS tries to re-establish the TCP connection. When that fails it start timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS starts in GA-CSR IDLE
2	SS			The SS sends TCP RST
3	MS			The MS tries to re-establish the TCP connection, the SS doesn't reply. MS starts timer TU3905
4	MS			Wait for 10 seconds
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.3.1.3 TCP Reset, Successful Re-establishment, MS in State GA-RRC-CONNECTED (CS domain)

81.3.1.3.1 Conformance requirement

When MS receives TCP RST after TCP connection failure, it shall attempt to re-establish TCP connection once. After successfully re-establishing TCP connection, the MS shall send GA-RC SYNCHRONIZATION INFORMATION to the GANC to synchronize the state information. If unsuccessful, the MS shall release the related local GA-RRC resources, and continue as per section 9.5.

Reference(s)

3GPP TS 44.318 sub-clause 6.6.1.

81.3.1.3.2   Test purpose

To verify that the MS can re-establish the TCP connection after receiving a TCP Reset.

81.3.1.3.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-CONNECTED (CS domain)

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will stay in GA-RRC-CONNECTED (CS domain).

Test procedure

The MS starts in GA-RRC-CONNECTED (CS domain).

The SS sends a TCP RST and the MS re-establish the TCP connection and send the GA-RC SYNCHRONISATION INFORMATION message.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-RRC-CONNECTED (CS domain)
2	SS			The SS sends TCP RST
3	MS			The MS re-establish the TCP connection
4	→		GA-RC SYNCHRONIZATION INFORMATION	To serving GANC

81.3.1.4   TCP Reset, Successful Re-establishment, MS in State GA-RRC-CONNECTED (PS domain)

81.3.1.4.1   Conformance requirement

When MS receives TCP RST after TCP connection failure, it shall attempt to re-establish TCP connection once. After successfully re-establishing TCP connection, the MS shall send GA-RC SYNCHRONIZATION INFORMATION to the GANC to synchronize the state information. If unsuccessful, the MS shall release the related local GA-RRC resources, and continue as per section 9.5.

Reference(s)

3GPP TS 44.318 sub-clause 6.6.1.

81.3.1.4.2 Test purpose

To verify that the MS can re-establish the TCP connection after receiving a TCP Reset.

81.3.1.4.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-CONNECTED (PS domain)

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will stay in GA-RRC-CONNECTED (PS domain).

Test procedure

The MS starts in GA-RRC-CONNECTED (PS domain).

The SS sends a TCP RST and the MS re-establish the TCP connection and send the GA-RC SYNCHRONISATION INFORMATION message.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-RRC-CONNECTED (PS domain)
2	SS			The SS sends TCP RST
3	MS			The MS re-establish the TCP connection
4	→		GA-RC SYNCHRONIZATION INFORMATION	To serving GANC

81.3.1.5 TCP Reset, Unsuccessful Re-establishment, MS in State GA-RRC-IDLE (CS and PS domains)

81.3.1.5.1 Conformance requirement

When MS receives TCP RST after TCP connection failure, it shall attempt to re-establish TCP connection once. After successfully re-establishing TCP connection, the MS shall send GA-RC SYNCHRONIZATION INFORMATION to the GANC to synchronize the state information. If unsuccessful, the MS shall release the related local GA-RC or GA-RRC resources, and continue as per section 9.5.

Reference(s)

3GPP TS 44.318 sub-clause 6.6.1.

81.3.1.5.2   Test purpose

To verify that the MS can re-establish the TCP connection after receiving a TCP Reset.

81.3.1.5.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-IDLE (CS and PS domains)

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-RRC-IDLE (CS and PS domains).

The SS sends a TCP RST and the MS tries to re-establish the TCP connection. When that fails it start timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-RRC-IDLE (CS and PS domains)
2	SS			The SS sends TCP RST
3	MS			The MS tries to re-establish the TCP connection, the SS doesn't reply. MS starts timer TU3905
4	MS			Wait for 10 seconds
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.3.2   Lower Layer Faults, MS is Registered

81.3.2.1   IPSec Tunnel Failure, MS in State GA-CSR IDLE

81.3.2.1.1   Conformance requirement

The handling of lower layer failures in the MS while in the GA-RC-DEREGISTERED state is described in sub-clauses 5.6.2 and 6.2.4.2.

The handling of lower layer failures in the MS while not in the GA-RC-DEREGISTERED state is described below:

For all lower layer failures in the MS (for example related to DNS, IPsec or TCP failures other than RST) except the TCP connection failure specified in section 6.6, the MS shall:

- release the TCP connection towards the current GANC, if established,

- stop timer TU3906,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5,

- start timer TU3905, and

- enter GA-RC-DEREGISTERED state.

Reference(s)

3GPP TS 44.318 sub-clause 9.5.

81.3.2.1.2 Test purpose

To verify that the MS tries to register again after a lower layer fault when in state GA-CSR IDLE.

81.3.2.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR IDLE

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-CSR IDLE.

The SS removes the Ipsec tunnel. When that happens the MS starts timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-CSR IDLE
2	SS			The SS removes the Ipsec tunnel
3	MS			MS starts timer TU3905
4	MS			Wait for 10 seconds

| 5 | MS | | | MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN |
| 6 | → | GA-RC REGISTER REQUEST | | To serving GANC |

81.3.2.2 TCP Failure, MS in State GA-CSR DEDICATED

81.3.2.2.1 Conformance requirement

The handling of lower layer failures in the MS while in the GA-RC-DEREGISTERED state is described in sub-clauses 5.6.2 and 6.2.4.2.

The handling of lower layer failures in the MS while not in the GA-RC-DEREGISTERED state is described below:

For all lower layer failures in the MS (for example related to DNS, IPsec or TCP failures other than RST) except the TCP connection failure specified in section 6.6, the MS shall:

- release the TCP connection towards the current GANC, if established,

- stop timer TU3906,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5,

- start timer TU3905, and

- enter GA-RC-DEREGISTERED state.

Reference(s)

3GPP TS 44.318 sub-clause 9.5

81.3.2.2.2 Test purpose

To verify that the MS tries to register again after a lower layer fault when in state GA-CSR DEDICATED.

81.3.2.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR DEDICATED

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-CSR DEDICATED.

The SS removes the Ipsec tunnel. When that happens the MS starts timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-CSR DEDICATED
2	SS			The SS removes the Ipsec tunnel
3	MS			MS starts timer TU3905
4	MS			Wait for 10 seconds
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.3.2.3   IPSec Tunnel Failure, MS in State GA-RRC-IDLE (CS and PS domains)

81.3.2.3.1   Conformance requirement

The handling of lower layer failures in the MS while in the GA-RC-DEREGISTERED state is described in sub-clauses 5.6.2 and 6.2.4.2.

The handling of lower layer failures in the MS while not in the GA-RC-DEREGISTERED state is described below:

For all lower layer failures in the MS (for example related to DNS, IPsec or TCP failures other than RST) except the TCP connection failure specified in section 6.6, the MS shall:

- release the TCP connection towards the current GANC, if established,

- stop timer TU3906,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5,

- start timer TU3905, and

- enter GA-RC-DEREGISTERED state.

Reference(s)

    3GPP TS 44.318 sub-clause 9.5.

81.3.2.3.2   Test purpose

To verify that the MS tries to register again after a lower layer fault when in state GA-RRC-IDLE.

81.3.2.3.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-IDLE (CS and PS domains)

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-RRC-IDLE (CS and PS domains).

The SS removes the IPSec tunnel. When that happens the MS starts timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-RRC-IDLE (CS and PS domains)
2	SS			The SS removes the IPSec tunnel
3	MS			MS starts timer TU3905
4	MS			Wait for 10 seconds
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.3.2.4 TCP Failure, MS in State GA-RRC-CONNECTED (CS domain)

81.3.2.4.1 Conformance requirement

The handling of lower layer failures in the MS while in the GA-RC-DEREGISTERED state is described in sub-clauses 5.6.2 and 6.2.4.2.

The handling of lower layer failures in the MS while not in the GA-RC-DEREGISTERED state is described below:

For all lower layer failures in the MS (for example related to DNS, IPsec or TCP failures other than RST) except the TCP connection failure specified in section 6.6, the MS shall:

- release the TCP connection towards the current GANC, if established,

- stop timer TU3906,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5,

- start timer TU3905, and

- enter GA-RC-DEREGISTERED state.

Reference(s)

3GPP TS 44.318 sub-clause 9.5

81.3.2.4.2 Test purpose

To verify that the MS tries to register again after a lower layer fault when in state GA-RRC-CONNECTED (CS domain).

81.3.2.4.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-CONNECTED (CS domain)

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-RRC-CONNECTED (CS domain).

The SS removes the Ipsec tunnel. When that happens the MS starts timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-RRC-CONNECTED (CS domain)
2	SS			The SS removes the IPSec tunnel
3	MS			MS starts timer TU3905
4	MS			Wait for 10 seconds
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

81.3.2.5 TCP Failure, MS in State GA-RRC-CONNECTED (PS domain)

81.3.2.5.1 Conformance requirement

The handling of lower layer failures in the MS while in the GA-RC-DEREGISTERED state is described in sub-clauses 5.6.2 and 6.2.4.2.

The handling of lower layer failures in the MS while not in the GA-RC-DEREGISTERED state is described below:

For all lower layer failures in the MS (for example related to DNS, IPsec or TCP failures other than RST) except the TCP connection failure specified in section 6.6, the MS shall:

- release the TCP connection towards the current GANC, if established,

- stop timer TU3906,

- release the secure connection towards SEGW of the current GANC, if established, as defined in sub-clause 4.5,

- start timer TU3905, and

- enter GA-RC-DEREGISTERED state.

Reference(s)

3GPP TS 44.318 sub-clause 9.5

81.3.2.5.2   Test purpose

To verify that the MS tries to register again after a lower layer fault when in state GA-RRC-CONNECTED (PS domain).

81.3.2.5.3   Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-CONNECTED (PS domain)

- The MS has the IP address or the FQDN for the serving GANC

Foreseen final state of the MS

The MS will change to GA-RC DEREGISTERED.

Test procedure

The MS starts in GA-RRC-CONNECTED (PS domain).

The SS removes the Ipsec tunnel. When that happens the MS starts timer TU3905 and tries to register again when the timer expires.

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS starts in GA-RRC-CONNECTED (PS domain)
2		SS		The SS removes the IPSec tunnel
3	MS			MS starts timer TU3905
4	MS			Wait for 10 seconds
5	MS			MS sets up secure connection to the SEGW and establishes a TCP connection to the serving GANC using either IP address or FQDN
6	→		GA-RC REGISTER REQUEST	To serving GANC

82 GAN CS Domain Procedures

82.1 GA-CSR connection establishment

82.1.1 GA-CSR connection establishment / successful case

82.1.1.1 GA-CSR connection establishment, Upper Layer Message Transmission and GA-CRS connection release by GANC

82.1.1.1.1 Conformance requirement

The GA-CSR connection is a logical connection between the MS and the GANC. It is established when the upper layers in the MS request GA-CSR to enter dedicated mode. The MS initiates GA-CSR connection establishment by sending the GA-CSR REQUEST message to the network. When a successful response is received from the network, GA-CSR replies to the upper layer that it has entered dedicated mode. The upper layers have then the possibility to request transmission of messages to the network. These messages are sent to the network using GA-CSR UPLINK DIRECT TRANSFER messages as defined in sub-clause 7.2.1.

The GA-CSR UPLINK DIRECT TRANSFER message is used for the transfer of upper layer messages from the MS to the GANC while the GA-CSR DOWNLINK DIRECT TRANSFER message is used for the transfer of upper layer messages from the GANC to the MS. The first GA-CSR UPLINK DIRECT TRANSFER message received by the GANC triggers the establishment of the signalling connection to the CN for that MS.

The GANC initiates this procedure to command the MS to release the GA-CSR and any traffic channel resources and instruct the MS to leave GA-CSR-DEDICATED state.

The GA-CSR RELEASE message will include an RR cause indication as follows:

#0: normal release, e.g. at the end of a call.

- #1: unspecified abnormal release.

- #65: if e.g. a handover procedure is stopped because the call has been cleared.

When the MS receives the GA-CSR RELEASE message, it shall:

- transmit a GA-CSR RELEASE COMPLETE message to the GANC and release all GA-CSR and any traffic channel resources,

- Enter GA-CSR-IDLE state.

Reference(s)

3GPP TS 44.318 subclause 7.1 / 7.2 / 7.5.3 / 7.5.4

82.1.1.1.2 Test purpose

To verify that MS is able to initiate GA-CSR connection establishment between the MS and GANC and to verify that MS is able to communicate with the CN by encapsulating upper layer messages (CC/MM/SS/SMS messages) to GA-CSR UPLINK DIRECT TRANSFER container message and able to receive upper layer messages within GA-CSR DOWNLINK DIRECT TRANSFER container message.

To verify that MS is able to release the GA-CSR connection, able to move into GA-CSR-IDLE state and release all GA-CSR and any traffic channel resources, when the MS receives the GA-CSR RELEASE message from SS.

82.1.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-IDLE state in service of GAN cell

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.

Test Procedure

The MS is made to initiate a GA-CSR connection establishment. The MS moves into GA-CSR-DEDICATED state when the MS receives the GA-CSR REQUEST ACCEPT message from the SS within timer TU3908 (5 sec.) from sending GA-CSR REQUEST message. SS verifies that MS sends GA-CSR UPLINK DIRECT TRANSFER message within 10s from GA-CSR REQUEST ACCEPT message. The SS answers by sending upper layer message within GA-CSR DOWNLINK DIRECT TRANSFER container message.

The SS sends GA-CSR RELEASE message. The MS enters GA-CSR-IDLE state and transmits a GA-CSR RELEASE COMPLETE to the SS and releases all GA-CSR and any traffic channel resources.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is made to initiate GA-CSR connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-CSR REQUEST	
4	←		GA-CSR REQUEST ACCEPT	
5	MS			MS in GA-CSR-DEDICATED state
6	→		GA-CSR UPLINK DIRECT TRANSFER	Within 10s from GA-CSR REQUEST ACCEPT message Containing (UL) CC/MM/SS/SMS message
7	←		GA-CSR DOWNLINK DIRECT TRANSFER	Containing (DL) CC/MM/SS/SMS message
8	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
9	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.1.2 GA-CSR connection establishment / negative cases

82.1.2.1 GA-CSR REQUEST rejected

82.1.2.1.1 Conformance requirement

3GPP TS 44.318 subclause 7.1.2.2:

If the GANC rejects the GA-CSR connection establishment request, it shall send the GA-CSR REQUEST REJECT message to the MS.

3GPP TS 44.318 subclause 7.1.3.2:

When the MS receives the GA-CSR REQUEST REJECT message, it shall:

- if timer TU3908 is active:

- stop timer TU3908,

- remain in GA-CSR-IDLE state and

- indicate to upper layers that GA-CSR was not able to enter dedicated state

3GPP TS 44.318 subclause 7.3.2:

If the mobile identity in the GA-CSR PAGING REQUEST message matches any of the valid identities of the MS and the MS is in GA-CSR-IDLE state, the MS shall:

- if timer TU3908 is not active and access to the network is allowed;

- send a GA-CSR PAGING RESPONSE message to the GANC and

- enter GA-CSR-DEDICATED state.

Reference(s)

3GPP TS 44.318 subclauses 7.1.2.2 / 7.1.3.2 / 7.3.2

82.1.2.1.2 Test purpose

To verify that MS will remain in GA-CSR-IDLE state when MS receives the GA-CSR REQUEST REJECT message.

82.1.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-IDLE state in service of GAN cell

Foreseen Final State of the MS

MS in GA-CSR- IDLE state.

Test Procedure

The MS is made to initiate a GA-CSR connection establishment. SS sends the GA-CSR REQUEST REJECT message to the MS. MS is not able to enter GA-CSR-DEDICATED state. The SS sends GA-CSR PAGING REQUEST to verify that MS in GA-CSR-IDLE state. MS answers by sending GA-CSR PAGING RESPONSE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-CSR connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-CSR REQUEST	TU3908 is started
4	←		GA-CSR REQUEST REJECT	The SS sends GA-CSR REQUEST REJECT before the expiry of TU3908.

5	MS		MS in GA-CSR-IDLE state
6	←	GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
7	→	GA-CSR PAGING RESPONSE	MS enters GA-CSR-DEDICATED state
8	←	GA-CSR RELEASE	IE 'RR cause' indicates #0
9	→	GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.1.2.2   MS receives GA-CSR REQUEST ACCEPT message after TU3908 expiry

82.1.2.2.1   Conformance requirement

If the GANC accepts the GA-CSR connection establishment request, it shall send the GA-CSR REQUEST ACCEPT message to the MS.

When the MS receives the GA-CSR REQUEST ACCEPT message, it shall:

- if timer TU3908 is active:

- stop timer TU3908,

- move into GA-CSR-DEDICATED state,

- indicate to upper layers that GA-CSR has entered dedicated state and

- send the initial GA-CSR UPLINK DIRECT TRANSFER message to the network

    - if timer TU3908 is not active:

- ignore the GA-CSR REQUEST ACCEPT message and

- continue with any ongoing procedure as if the GA-CSR REQUEST ACCEPT message was not received

    - If timer TU3908 expires in the MS, the MS shall remain in GA-CSR-IDLE state and indicate to upper layers that GA-CSR was not able to enter dedicated state

If the mobile identity in the GA-CSR PAGING REQUEST message matches any of the valid identities of the MS and the MS is in GA-CSR-IDLE state, the MS shall:

    - if timer TU3908 is not active and access to the network is allowed;

- send a GA-CSR PAGING RESPONSE message to the GANC and

- enter GA-CSR-DEDICATED state.

    - if timer TU3908 is active;

    - discard the received GA-CSR PAGING REQUEST message.

Reference(s)

3GPP TS 44.318 subclauses 7.1.2.1 / 7.1.3.1 / 7.1.4.1 / 7.3.2

82.1.2.2.2   Test purpose

To verify that MS will remain in GA-CSR IDLE state if TU3908 expires before MS receives the GA-CSR REQUEST ACCEPT message.

82.1.2.2.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-IDLE state in service of GAN cell

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.

Test Procedure

The MS is made to initiate a GA-CSR connection establishment. MS receives the GA-CSR REQUEST ACCEPT message from the SS after timer TU3908 (5 sec.) expires. MS remains in GA-CSR IDLE state. The MS may send GA-CSR-REQUEST message due to upper layer requesting to restart the higher layer procedure which verifies that MS has been in GA-CSR-IDLE state. If GA-CSR-REQUEST message is not received, the SS sends GA-CSR PAGING REQUEST to verify that MS in GA-CSR-IDLE state. MS answers by sending GA-CSR PAGING RESPONSE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-CSR connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-CSR REQUEST	
4	SS			SS waits 5 seconds after SS has received the GA-CSR REQUEST message
5	MS			TU3908 expires
6	←		GA-CSR REQUEST ACCEPT	
7	MS			MS ignores the GA-CSR REQUEST ACCEPT message and remains in GA-CSR-IDLE state
7a (optional)	→		GA-CSR REQUEST	MS may send GA-CSR-REQUEST message due to upper layer restarting the higher layer procedure. This verifies that the MS has been in GA-CSR-IDLE state.
8 (conditional)	←		GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
9 (conditional)	→		GA-CSR PAGING RESPONSE	MS enters GA-CSR DEDICATED state
10 (conditional)	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
11 (conditional)	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

NOTE: Steps 8-11 are not applicable If GA-CSR-REQUEST message is received in step 7a

82.2 Upper layer message transmission

82.2.1 Upper layer message transmission / successful cases

82.2.1.1 Void

82.2.2 Upper layer message transmission / negative cases

82.2.2.1 MS receives GA-CSR DOWNLINK DIRECT TRANSFER message when not in GA-CSR-DEDICATED state

82.2.2.1.1 Conformance requirement

If the MS receives a GA-CSR DOWNLINK DIRECT TRANSFER message and MS is not in GA-CSR-DEDICATED state, the MS shall:

- ignore the contents of the GA-CSR DOWNLINK DIRECT TRANSFER message;

- transmit a GA-CSR STATUS message as follows:

- set the IE "RR Cause" to " Message type not compatible with protocol state"

- include the received message contents in the IE "PDU in error"

- continue with any ongoing procedure and act as if the GA-CSR DOWNLINK DIRECT TRANSFER message was not received.

Reference(s)

3GPP TS 44.318 subclause 7.2.4.1

82.2.2.1.2 Test purpose

To verify that MS ignores the contents of the GA-CSR DOWNLINK DIRECT TRANSFER message if MS is not in GA-CSR-DEDICATED state and to be able to send GA-CSR STATUS message to the SS.

82.2.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-IDLE state in service of GAN cell

Foreseen Final State of the MS

MS in GA-CSR-IDLE state in service of GAN cell

Test Procedure

MS is in GA-CSR-IDLE state in service of GAN cell. SS sends GA-CSR DOWNLINK DIRECT TRANSFER message containing upper layer message. MS ignores the contents of the message and sends GA-CSR STATUS message to the SS with IE 'RR Cause': 'Message type not compatible with protocol state'. MS includes the received message contents in the IE 'PDU in error'.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in GA-CSR-IDLE state
2	←		GA-CSR DOWNLINK DIRECT TRANSFER	Containing (DL) CC/MM/SS/SMS message
3	→		GA-CSR STATUS	RR Cause: 'Message type not compatible with protocol state' PDU in Error: '<received (DL) message>'

82.3 Paging for CS domain

82.3.1 Paging for CS domain / successful case

82.3.1.1 Paging for CS domain

82.3.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 7.3.1:

The GANC initiates this procedure when it receives a PAGING REQUEST message over the A-interface or a Paging CS over the Gb-interface. The MS to be paged is identified by the identity received in the request from the CN. If the request includes the TMSI then the GANC should include the TMSI as the mobile identity else it should include the IMSI received in the request.

3GPP TS 44.318 subclause 7.3.2:

If the mobile identity in the GA-CSR PAGING REQUEST message matches any of the valid identities of the MS and the MS is in GA-CSR-IDLE state, the MS shall:

- if timer TU3908 is not active and access to the network is allowed;

- send a GA-CSR PAGING RESPONSE to the GANC and

- enter GA-CSR-DEDICATED state.

3GPP TS 44.318 subclause 7.3.4:

If the MS receives a GA-CSR PAGING REQUEST and the mobile identity included in the message does not match any of the valid identities assigned to the MS, the MS shall:

- ignore the GA-CSR PAGING REQUEST message

- continue with any ongoing procedure as if the GA-CSR PAGING REQUEST message was not received.

Reference(s)

3GPP TS 44.318 subclauses 7.3.1 / 7.3.2 / 7.3.4

82.3.1.1.2 Test purpose

To verify that MS ignores the GA-CSR PAGING REQUEST and continues with any ongoing procedure, if received GA-CSR PAGING REQUEST doesn't contain valid identity.

To verify that MS is able send a GA-CSR PAGING RESPONSE to the SS and enter GA-CSR-DEDICATED state when MS receives GA-CSR PAGING REQUEST with valid identities of the MS.

82.3.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-IDLE state in service of GAN cell

Foreseen Final State of the MS

MS in GA-CSR-IDLE state in service of GAN cell Test Procedure

The SS initiates paging procedure by sending GA-CSR PAGING REQUEST message with not matching identity to the MS. MS ignores the GA-CSR PAGING REQUEST and continues with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received. After 10s the SS sends GA-CSR PAGING REQUEST to verify that MS in GA-CSR-IDLE state. MS answers by sending GA-CSR PAGING RESPONSE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-CSR PAGING REQUEST	With not matching identity
2	MS			MS ignores GA-CSR PAGING REQUEST message
3	SS			SS waits 10s for response
4	←		GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
5	→		GA-CSR PAGING RESPONSE	MS enters GA-CSR-DEDICATED state
6	←		GA-CSR RELEASE	IE 'RR cause' = #0
7	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.3.2 Paging for CS domain / negative cases

82.3.2.1 Void

82.3.2.2 MS receives GA-CSR PAGING REQUEST when TU3908 is active

82.3.2.2.1 Conformance requirement

If the mobile identity in the GA-CSR PAGING REQUEST message matches any of the valid identities of the MS and the MS is in GA-CSR-IDLE state, the MS shall:

- if timer TU3908 is not active and access to the network is allowed;

- send a GA-CSR PAGING RESPONSE message to the GANC and

- enter GA-CSR-DEDICATED state.

- if timer TU3908 is active;

- discard the received GA-CSR PAGING REQUEST message

Reference(s)

3GPP TS 44.318 subclause 7.3.2

82.3.2.2.2 Test purpose

To verify that MS discards the received GA-CSR PAGING REQUEST message if timer TU3908 is active.

82.3.2.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-IDLE state in service of GAN cell

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.

Test Procedure

MS is made to initiate GA-CSR connection. MS sends GA-CSR REQUEST message and activates timer TU3908. The SS initiates paging procedure by sending GA-CSR PAGING REQUEST message to the MS when TU3908 is active in MS. MS discards the received GA-CSR PAGING REQUEST message. After TU3908 expiry the SS sends GA-CSR PAGING REQUEST to verify that MS in GA-CSR-IDLE state. MS may answer by sending GA-CSR PAGING RESPONSE or re-establish the GA-CSR connection by re-sending GA-CSR REQUEST message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is made to initiate GA-CSR connection
2	→		GA-CSR REQUEST	MS activates TU3908
3	←		GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI'), sent before TU3908 expiry
4	MS			MS discards GA-CSR PAGING REQUEST message
5	SS			SS waits for TU3908 to expire. The MS may resend GA-CSR REQUEST after the expiry of TU3908. The following steps are executed only if no GA-CSR REQUEST is received from the MS.
6	←		GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
7	→		GA-CSR PAGING RESPONSE	MS enters GA-CSR-DEDICATED state
8	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
9	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.3.2.3 MS receives GA-CSR PAGING REQUEST when in GA-CSR DEDICATED state

82.3.2.3.1 Conformance requirement

If the MS receives a GA-CSR PAGING REQUEST message and MS is in GA-CSR-DEDICATED state or GA-RC-REGISTERED state, the MS shall:

- ignore the GA-CSR PAGING REQUEST message

- continue with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 7.3.4

82.3.2.3.2 Test purpose

To verify that MS ignores the GA-CSR PAGING REQUEST and continues with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received, if MS receives GA-CSR PAGING REQUEST when MS is in GA-CSR-DEDICATED state.

82.3.2.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell.

Foreseen Final State of the MS

MS in GA-CSR-IDLE state in service of GAN cell.

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell. The SS initiates paging procedure by sending GA-CSR PAGING REQUEST message to the MS. The MS ignores the GA-CSR PAGING REQUEST and continues with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received. After 10s the SS sends GA-CSR RELEASE to verify that MS in GA-CSR-DEDICATED state. MS answers by sending GA-CSR RELEASE COMPLETE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in GA-CSR-DEDICATED state with ongoing procedure
2	←		GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
3	MS			MS ignores the GA-CSR PAGING REQUEST and continues with ongoing procedure
4	SS			SS waits 10s for response
5	←		GA-CSR RELEASE	IE 'RR cause'

| 6 | → | GA-CSR RELEASE COMPLETE | MS enters GA-CSR-IDLE state |

82.3.2.4 MS receives GA-CSR PAGING REQUEST when in GA-RC REGISTERED state

82.3.2.4.1 Conformance requirement

If the MS receives a GA-CSR PAGING REQUEST message and MS is in GA-CSR-DEDICATED state or GA-RC-REGISTERED state, the MS shall:

- ignore the GA-CSR PAGING REQUEST message

- continue with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 7.3.4

82.3.2.4.2 Test purpose

To verify that MS ignores the GA-CSR PAGING REQUEST and continues with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received, if MS receives GA-CSR PAGING REQUEST when MS is in GA-RC-REGISTERED state.

82.3.2.4.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GERAN mode camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.

Test Procedure

MS is camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state. The SS initiates paging procedure by sending GA-CSR PAGING REQUEST message to the MS. The MS ignores the GA-CSR PAGING REQUEST and continues with any ongoing procedure as if the GA-CSR PAGING REQUEST was not received. After 10s, the voice call is deactivated to switch the serving RR entity to GA-CSR. The SS waits 30 seconds to ensure that the MS enters the GA-CSR-IDLE state and sends GA-CSR PAGING REQUEST to verify that MS in GA-CSR-IDLE state. MS answers by sending GA-CSR PAGING RESPONSE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS is camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state

2	←	GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
3	MS		MS ignores the GA-CSR PAGING REQUEST and continues with ongoing procedure
4	SS		SS waits 10s for response
5	MS		The voice call is deactivated to switch the serving RR entity to GA-CSR-IDLE state.
6	SS		Wait 30 seconds to ensure that the MS enters GA-CSR-IDLE state.
67	←	GA-CSR PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI')
78	→	GA-CSR PAGING RESPONSE	MS enters GA-CSR-DEDICATED state
89	←	GA-CSR RELEASE	IE 'RR cause' indicates #0
910	→	GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.4 Traffic Channel assignment

82.4.1 Traffic Channel assignment / successful cases

82.4.1.1 Traffic Channel assignment

82.4.1.1 Traffic Channel assignment and Release

82.4.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 7.4.2:

The MS shall act on the received GA-CSR ACTIVATE CHANNEL message when in GA-CSR-DEDICATED state as follows:

- Code and decode the CS payload samples according to the IE "Channel Mode";

- Use the value indicated by the IE "Sample Size" as the minimum sampling size for the coding and decoding of the CS payload samples, if the MS is not able to use the indicated value. If AMR is used with FEC by sending redundant frames, the sample size is defined as the size of the new speech sample in each RTP packet, not including any redundant speech sample.

- Configure the uplink CS payload stream to be transmitted to the UDP port identified by the IE "UDP Port";

- Configure the uplink CS payload stream to be transmitted to the IP address identified by the IE "IP address";

- If received, use the configuration included in the IE 'Multi-rate Configuration' for the CS payload stream;

- If received, use the configuration included in the IE "RTP Redundancy Configuration" for the CS payload stream. The redundancy policy is defined for each of the AMR modes to use. The level of redundancy can span from no redundancy to double redundancy. In the same active codec set, a lower codec mode shall not be associated with a lower redundancy level then a higher codec mode. For example, the highest mode in the set is used with no redundancy, the next lower with single redundancy and rest of the modes with double redundancy;

- If received, use the Payload Type included in the IE 'Payload Type' for the PT field in the RTP header for the CS downlink and uplink payload streams;

- On successful activation of the channel, the MS shall:

- Transmit a GA-CSR ACTIVATE CHANNEL ACK message and include the UDP port number in the IE 'UDP Port" for the downlink CS payload stream to be used by the GANC.

- Include the selected RTP sample size, to be used uplink and downlink, in the IE Sample Size.

- if the IE 'RTCP UDP Port' was received in the GA-CSR ACTIVATE CHANNEL message and the MS is capable of supporting RTCP, activate the uplink RTCP stream and include the IE 'RTCP UDP Port' for the downlink RTCP stream to be used by the GANC.

3GPP TS 44.318 subclause 7.4.4:

The RTP channel is available for use by upper layers. To enable uplink quality measurements in the GANC, the MS shall send at least one RTP frame each 480 ms. The AMR payload Table of Contents shall indicate NO_DATA if there is no speech or SID frames to send.

3GPP TS 44.318 subclause 7.5.1:

If the MS needs to release the GA-CSR connection and signalling connection to the core network, it shall send the GA-CSR CLEAR REQUEST message to the GANC. The MS shall include the 'RR Cause' IE.

Reference(s)

3GPP TS 44.318 subclauses 7.4.2 / 7.4.4 / 7.5.1

82.4.1.1.2 Test purpose

To verify that MS is able to establish a GAN traffic channel.

The MS initiates the release the GA-CSR connection by sending GA-CSR CLEAR REQUEST to the SS. The MS enters GA-CSR-IDLE state and releases all GA-CSR and any traffic channel resources.

82.4.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell and a voice call is ongoing.

Foreseen Final State of the MS

MS in GA-CSR-IDLE state in service of GAN cell.

Test Procedure

A voice call is ongoing. The SS configures a traffic channel by transmitting GA-CSR ACTIVATE CHANNEL to the MS. MS responses by transmitting a GA-CSR ACTIVATE CHANNEL ACK with the IE 'UDP Port'. Then the SS configures itself for transmission of RTP packets to the MS to the indicated UDP port and transmits a GA-CSR ACTIVATE CHANNEL COMPLETE message to the MS. MS and SS sends at least one RTP frame each 480 ms. The SS releases the call by sending GA-CSR DL DIRECT TRANSFER message (Release) and receiving GA-CSR UL DIRECT TRANSFER (Release Complete) message. Therefore, the MS will send GA-CSR CLEAR REQUEST to release CSR connection.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-CSR-DEDICATED state, voice call is ongoing.

2	←	GA-CSR ACTIVATE CHANNEL	IE 'Channel Mode', IE 'Sample Size', IE 'UDP Port', IE 'IP address', optional IE 'Multi-rate Configuration', optional IE 'RTP Redundancy Configuration ', optional IE 'Payload Type'.
3	→	GA-CSR ACTIVATE CHANNEL ACK	IE 'UDP Port', optional IE 'RTCP UDP Port'
4	←	GA-CSR ACTIVATE CHANNEL COMPLETE	
5	→		Verify that the MS sends at least one RTP frame
6	←	GA-CSR DL DIRECT TRANSFER (Release)	
7	→	GA-CSR UL DIRECT TRANSFER (Release Complete)	Eventual CC L3 messages are ignored.
8	→	GA-CSR CLEAR REQUEST	

82.4.2 Traffic Channel assignment / negative cases

82.4.2.1 MS fails to establish the traffic channel

82.4.2.1.1 Conformance requirement

If the MS fails to establish the channel indicated in the GA-CSR ACTIVATE CHANNEL the MS shall:

- transmit a GA-CSR ACTIVATE CHANNEL FAILURE message

- act as if the GA-CSR ACTIVATE CHANNEL message was not received.

Reference(s)

3GPP TS 44.318 subclause 7.4.5

82.4.2.1.2 Test purpose

To verify that if MS fails to establish the traffic channel, it transmits a GA-CSR ACTIVATE CHANNEL FAILURE and act as if the GA-CSR ACTIVATE CHANNEL was not received.

82.4.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell and a voice call is ongoing.

Foreseen Final State of the MS

MS in GA-CSR- IDLE state in service of GAN cell.

Test Procedure

A voice call is ongoing. The SS configures a traffic channel by transmitting corrupted GA-CSR ACTIVATE CHANNEL to the MS. In the corrupted GA-CSR ACTIVATE CHANNEL message "Sample Size" octet 3 is set to "1" (1ms), which is a undefined value.

MS fails to establish the traffic channel and transmits a GA-CSR ACTIVATE CHANNEL FAILURE and acts as if the GA-CSR ACTIVATE CHANNEL was not received.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-CSR-DEDICATED state, voice call is ongoing
2	←		GA-CSR ACTIVATE CHANNEL	This message has non-supportive configuration, with a "Sample Size" octet 3 set to "1"
3	MS			MS fails to establish the traffic channel
4	→		GA-CSR ACTIVATE CHANNEL FAILURE	IE 'FAILURE message identity'
5	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
6	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.5 Release of GA-CSR

82.5.1 Release of GA-CSR

82.5.1.1 Void

82.5.1.2 Void

82.6 Classmark Indication

82.6.1 Classmark Indication Procedure

82.6.1.1 Classmark Indication, Initiation of Classmark Interrogation by MS

82.6.1.1.1 Conformance requirement

On receipt of the GA-CSR CLASSMARK ENQUIRY message or in case of "early classmark sending" procedure based on the system information indication received in GA-RC REGISTER ACCEPT message, the mobile station sends a GA-CSR CLASSMARK CHANGE message to the GANC.

The MS shall include the IE "Mobile Classmark 2" in the GA-CSR CLASSMARK CHANGE. It may also contain a IE "Mobile Classmark 3" depending on the MS capabilities.

In addition a MS supporting UTRAN sends a GA-CSR UTRAN CLASSMARK CHANGE message.

The Classmark Enquiry Mask information element in the GA-CSR CLASSMARK ENQUIRY message indicates the type of request. If the Classmark Enquiry Mask information element is not included in the GA-CSR CLASSMARK ENQUIRY message, this indicates a request for GA-CSR CLASSMARK CHANGE message.

Reference(s)

   3GPP TS 44.318 sub-clause 7.6.2

82.6.1.1.2 Test purpose

To verify that the MS replies the GA-CSR CLASSMARK ENQUIRY correctly.

82.6.1.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR-DEDICATED

Foreseen final state of the MS

MS in GA-CSR-IDLE state.

Test procedure

The SS sends the GA-CSR CLASSMARK ENQUIRY message. The MS replies with the GA-CSR CLASMARK CHANGE message.

Specific Test Parameters

-

Maximum duration of test

1 min.

Reference(s)Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	←		GA-CSR CLASSMARK ENQUIRY	The Classmark Enquiry Mask information element is not included
2	→		GA-CSR CLASSMARK CHANGE	
3	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
4	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.7 Handover to GAN

82.7.1 Handover to GAN / successful cases

82.7.1.1 Handover from GERAN to GAN

82.7.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 7.7.1:

The procedure is initiated when the source radio access technology (e.g. GERAN) orders the MS to make handover to GAN.

The procedure is applicable in GA-RC REGISTERED state provided the conditions described in Annex C: "(Source-RAT) Measurement Report for Handover and Cell Change Order to GAN" are met.

The handover order in the source radio access technology mode is sent via the (RR) HANDOVER COMMAND message. If the ARFCN and BSIC parameters included in the Cell Description IE in the (RR) HANDOVER COMMAND message (specified in [12]) match those of the GAN cell, the MS shall:

- send a GA-CSR HANDOVER ACCESS message to the network including the complete (RR) HANDOVER COMMAND message in the Handover To GAN Command IE and enter GA-CSR-DEDICATED state;

NOTE: sending the complete (RR) HANDOVER COMMAND message in the Handover To GAN Command IE instead of the Handover Reference IE allows for more than 256 concurrent handover requests

- if non-signalling mode is indicated in Channel Mode IE, the MS shall:

- start timer TU3920;

3GPP TS 44.318 subclause 7.7.3:

- If the traffic channel assignment was successfully completed within timer TU3920, the MS shall:

- stop timer TU3920;

- send a GA-CSR HANDOVER COMPLETE message to the network;

- switch to GAN mode i.e. attach the GA-RR entity to the RR-SAP;

In addition the MS shall send upper layer messages for which LAPDm has not yet received acknowledgement from the network to the network using the GA-RR entity.

Reference(s)

3GPP TS 44.318 subclause 7.7.1 / 7.7.3

82.7.1.1.2 Test purpose

To verify that MS completes the handover procedure from GERAN to GAN successfully.

82.7.1.1.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GERAN mode in service of GERAN cell, voice call activated and in GA-RC-REGISTERED state

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.Test Procedure

The MS is in GERAN mode in service of GERAN cell, voice call activated. MS sends MEASUREMENT REPORT with GAN-ARFCN within cell info list to GERAN cell and MS has not detected GSM neighbour cell matching the {GAN-ARFCN, GAN-BSIC} couple. SS sends (RR) HANDOVER COMMAND with ARFCN and BSIC in 'Cell Description' IE matched of the GAN cell. MS sends a GA-CSR HANDOVER ACCESS message to the GAN network with the complete (RR) HANDOVER COMMAND message in the 'Handover To GAN Command' IE and enters GA-CSR-DEDICATED state. MS establishes GAN traffic channel with SS and MS sends GA-CSR HANDOVER COMPLETE message to the SS.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1				MS in service voice call activated on GERAN cell
2	→		MEASUREMENT REPORT	Sent to GERAN cell with GAN-ARCFN within cell info list
3	←		RR HANDOVER COMMAND	Sent on GERAN cell with GAN cell ARFCN and BSIC and Channel Mode indicating speech.

4	→	GA-CSR HANDOVER ACCESS	Sent to GAN cell, with IE 'Handover To GAN Command', MS enters GA-CSR-DEDICATED state
5			GAN Traffic Channel assignment procedure (steps 5-10)
6	←	GA-CSR ACTIVATE CHANNEL	IE 'Channel Mode', IE 'Sample Size', IE 'UDP Port', IE 'IP address', optional IE 'Multi-rate Configuration', optional IE 'Payload Type'.
7	→	GA-CSR ACTIVATE CHANNEL ACK	IE 'UDP Port'
8	←	GA-CSR ACTIVATE CHANNEL COMPLETE	Optional IE 'RTCP UDP Port'
9	↔	RTP frame each 480 ms	To enable quality measurements
10			GAN Traffic Channel assignment procedure ready
11	→	GA-CSR HANDOVER COMPLETE	Sent to GAN cell, voice call ongoing on GAN cell
12	←	GA-CSR RELEASE	IE 'RR cause' indicates #0
13	→	GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.7.1.2 Handover from GERAN to GAN signalling case

82.7.1.2.1 Conformance requirement

The procedure is initiated when the source radio access technology (e.g. GERAN) orders the MS to make handover to GAN.

The procedure is applicable in GA-RC REGISTERED state provided the conditions described in Annex C: "(Source-RAT) Measurement Report for Handover and Cell Change Order to GAN" are met.

The handover order in the source radio access technology mode is sent via the (RR) HANDOVER COMMAND message. If the ARFCN and BSIC parameters included in the Cell Description IE in the (RR) HANDOVER COMMAND message (specified in [12]) match those of the GAN cell, the MS shall:

- send a GA-CSR HANDOVER ACCESS message to the network including the complete (RR) HANDOVER COMMAND message in the Handover To GAN Command IE and enter GA-CSR-DEDICATED state;

NOTE: sending the complete (RR) HANDOVER COMMAND message in the Handover To GAN Command IE instead of the Handover Reference IE allows for more than 256 concurrent handover requests

- if non-signalling mode is indicated in Channel Mode IE, the MS shall:

- start timer TU3920;

- otherwise, the MS shall:

- immediately send a GA-CSR HANDOVER COMPLETE message to the network;

- switch to GAN mode i.e. attach the GA-RR entity to the RR-SAP;.

Reference(s)

3GPP TS 44.318 subclauses 7.7.1

82.7.1.2.2 Test purpose

To verify that MS completes the handover signalling procedure from GERAN to GAN successfully.

82.7.1.2.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GERAN mode in service of GERAN cell, in GA-CSR-REGISTERED state

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.Test Procedure

The MS is in GERAN mode in service of GERAN cell. MS sends MEASUREMENT REPORT with GAN-ARFCN within cell info list to GERAN cell and MS has not detected GSM neighbour cell matching the {GAN-ARFCN, GAN-BSIC} couple. SS sends (RR) HANDOVER COMMAND with ARFCN and BSIC in 'Cell Description' IE matched of the GAN cell. MS sends a GA-CSR HANDOVER ACCESS message to the GAN network with the complete (RR) HANDOVER COMMAND message in the 'Handover To GAN Command' IE and enters GA-CSR DEDICATED state. MS immediately sends GA-CSR HANDOVER COMPLETE message to the SS and switches to GAN mode i.e. attaches the GAN-RR entity to the RR-SAP.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1				MS in service on GERAN cell
2	→		MEASUREMENT REPORT	Sent to GERAN cell with GAN-ARCFN within cell info list
3	←		RR HANDOVER COMMAND	Sent on GERAN cell with GAN cell ARFCN and BSIC and Channel Mode indicating signalling only.
4	→		GA-CSR HANDOVER ACCESS	Sent to GAN cell, with IE 'Handover To GAN Command', MS enters GA-CSR DEDICATED state
5	→		GA-CSR HANDOVER COMPLETE	Immediately sent to GAN cell, MS switches to GAN mode
6	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
7	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.7.1.3 Handover from UTRAN to GAN

82.7.1.3.1 Conformance requirement

The procedure is initiated when the source radio access technology (e.g. GERAN) orders the MS to make handover to GAN.

The procedure is applicable in GA-RC-REGISTERED state provided the conditions described in Annex C: "(Source-RAT) Measurement Report for Handover and Cell Change Order to GAN" are met.

The handover order in the source radio access technology mode is sent via the (RR) HANDOVER COMMAND message. If the ARFCN and BSIC parameters included in the Cell Description IE in the (RR) HANDOVER COMMAND message (specified in [12]) match those of the GAN cell, the MS shall:

- send a GA-CSR HANDOVER ACCESS message to the network including the complete (RR) HANDOVER COMMAND message in the *Handover To GAN Command* IE and enter GA-CSR-DEDICATED state;

NOTE: sending the complete (RR) HANDOVER COMMAND message in the *Handover To GAN Command* IE instead of the *Handover Reference* IE allows for more than 256 concurrent handover requests

- if non-signalling mode is indicated in *Channel Mode* IE, the MS shall:

- start timer TU3920;

- otherwise, the MS shall:

- immediately send a GA-CSR HANDOVER COMPLETE message to the network;

- switch to GAN mode i.e. attach the GA-RR entity to the RR-SAP;

If the traffic channel assignment was successfully completed within timer TU3920, the MS shall:

- stop timer TU3920;

- send a GA-CSR HANDOVER COMPLETE message to the network;

- switch to GAN mode i.e. attach the GA-RR entity to the RR-SAP;

In addition the MS shall send upper layer messages for which LAPDm has not yet received acknowledgement from the network to the network using the GA-RR entity.

Reference(s)

3GPP TS 44.318 subclause 7.7.1 / 7.7.3

82.7.1.3.2   Test purpose

To verify that MS completes the handover procedure from UTRAN to GAN successfully.

82.7.1.3.3   Method of test

Initial Conditions

System Simulator:

- 2 cells - Cell 1 is UTRAN (3GPP TS 34.108, subclause 6.1 shall be referenced for default parameters), Cell 2 is GAN (GAN default parameters)

Mobile Station:

- MS in UTRAN mode in service of UTRAN cell, voice call activated and in GA-RC-REGISTERED state

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.

Test Procedure

The MS is in UTRAN mode in service of UTRAN cell, voice call activated. After measurement reporting procedure in UTRAN cell with successful reporting of the GAN cell, SS sends (RR) HANDOVER COMMAND with ARFCN and BSIC in 'Cell Description' IE of the GAN cell. MS sends a GA-CSR HANDOVER ACCESS message to the GAN network with the complete (RR) HANDOVER COMMAND message in the 'Handover To GAN Command' IE and enters GA-CSR-DEDICATED state. MS establishes GAN traffic channel with SS and MS sends GA-CSR HANDOVER COMPLETE message to the SS.

Specific test parameters

-

Maximum Duration of Test

2 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1				MS in service voice call activated on UTRAN cell
2	←		MEASUREMENT CONTROL	SS configures event 3a in the UE.
3	→		MEASUREMENT REPORT	UE sends a MEASUREMENT REPORT to SS triggered by event 3a. Measurement results for GAN cell are included with best possible receiving level (GSM carrier RSSI = 63).
4	←		HANDOVER FROM UTRAN COMMAND-GSM	Sent on cell 1 (UTRAN cell) GAN-ARFCN is assigned in (RR) HANDOVER COMMAND part of the message
5	→		GA-CSR HANDOVER ACCESS	Sent to GAN cell, with IE 'Handover To GAN Command', MS enters GA-CSR-DEDICATED state
6				GAN Traffic Channel assignment procedure (steps 5-10)
7	←		GA-CSR ACTIVATE CHANNEL	IE 'Channel Mode', IE 'Sample Size', IE 'UDP Port', IE 'IP address', optional IE 'Multi-rate Configuration', optional IE 'Payload Type'.
8	→		GA-CSR ACTIVATE CHANNEL ACK	IE 'UDP Port'
9	←		GA-CSR ACTIVATE CHANNEL COMPLETE	Optional IE 'RTCP UDP Port'
10	↔		RTP frame each 480 ms	To enable quality measurements
11				GAN Traffic Channel assignment procedure ready
12	→		GA-CSR HANDOVER COMPLETE	Sent to GAN cell, voice call ongoing on GAN cell
13	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
14	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

Specific Message Contents:

Default settings for measurement control from 3GPP TS 34.108 are used.

Following specific settings are applied:

MEASUREMENT CONTROL (Step 2)

Information Element	Value/remark
Measurement Identity	3
Measurement Command	Default
Measurement Reporting Mode	
- Measurement Reporting Transfer Mode	Default
- Periodic Reporting / Event Trigger Reporting Mode	Event triggered
Additional measurements list	Default
CHOICE measurement type	
- inter-RAT measurement	
- inter-RAT measurement object list	
CHOICE Inter-RAT Cell Removal	Remove all inter-RAT cells
-Remove all inter-RAT cells	(No Data)
New inter-RAT cells (1 to <MaxCellMeas>)	
- inter-RAT cell id	0
CHOICE Radio Access Technology	GSM
- Cell individual offset	0
- Cell selection and re-selection info	Not present
- BSIC	BSIC of GAN (cell 2)
- Band indicator	Default
- BCCH ARFCN	ARFCN not corresponding to a channel from any frequency band defined in 45.005
- Cell for measurement	Not present
- inter-RAT measurement quantity	
- Measurement quantity for UTRAN quality estimate	
- Intra-frequency measurement quantity	
- Filter coefficient	0
- CHOICE mode	FDD
- Measurement quantity	CPICH RSCP
CHOICE system	GSM
- Measurement quantity	GSM carrier RSSI
- Filter coefficient	0
- BSIC verification required	required
- inter-RAT reporting quantity	
CHOICE system	GSM
- Observed time difference to to GSM cell reporting indicator	FALSE
- GSM carrier RSSI reporting indicator	TRUE
CHOICE report criteria	
- Inter-RAT measurements reporting criteria	
- Parameters required for each event (1 to<maxMeasEvent>)	
- Inter-RAT event identity	3a
- Threshold own system	Default
- W	Default
- Threshold other system	Default
- Hysteresis	Default
- Time to Trigger	640 ms
- Reporting cell status	Report cells within active set or within virtual active set or of the other RAT
- Maximum number of reported cells	1 cells

82.7.2 Handover to GAN / negative cases

82.7.2.1 Void

82.7.2.2 TU3920 expires during handover procedure

82.7.2.2.1 Conformance requirement

If the traffic channel assignment procedure fails or the timer TU3920 expires before traffic channel assignment is completed, the MS shall:

- terminate the procedure including release of the associated GA-CSR resources;

- resume the connection in the source radio access technology used before the handover;

- indicate the failure to the source radio access technology.

Reference(s)

3GPP TS 44.318 subclause 7.7.5

82.7.2.2.2 Test purpose

To verify that MS is able to terminate the handover procedure and resume the connection in the source radio access technology used before the handover, if timer TU3920 expires during handover procedure.

82.7.2.2.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GERAN mode in service of GERAN cell, voice call activated and in GA-RC-REGISTERED state

Foreseen Final State of the MS

MS in GERAN mode in service of GERAN cell, voice call activated

Test Procedure

The MS is in GERAN mode in service of GERAN cell, voice call activated. MS sends MEASUREMENT REPORT with GAN-ARFCN within cell info list to GERAN cell and MS has not detected GSM neighbour cell matching the {GAN-ARFCN, GAN-BSIC} couple. SS sends RR HANDOVER COMMAND with ARFCN and BSIC in 'Cell Description' IE matched of the GAN cell. MS sends a GA-CSR HANDOVER ACCESS message to the GAN network with the complete (RR) HANDOVER COMMAND message in the 'Handover To GAN Command' IE and enters GA-CSR-DEDICATED state. TU3920 expires during handover procedure. MS terminates the handover procedure and resumes the connection in the source radio access technology used before the handover. MS returns HANDOVER FAILURE message to GERAN cell.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1				MS in service voice call activated on GERAN cell
2	→		MEASUREMENT REPORT	Sent to GERAN cell with GAN-ARCFN within cell info list
3	←		RR HANDOVER COMMAND	Sent on GERAN cell with GAN cell ARFCN and BSIC and Channel Mode indicating speech.
4	→		GA-CSR HANDOVER ACCESS	Sent to GAN cell, with IE 'Handover To GAN Command', MS enters GA-CSR-DEDICATED state

5	←	GA-CSR ACTIVATE CHANNEL	IE 'Channel Mode', IE 'Sample Size', IE 'UDP Port', IE 'IP address', optional IE 'Multi-rate Configuration', optional IE 'Payload Type'.
6	→	GA-CSR ACTIVATE CHANNEL ACK	IE 'UDP Port'
7			SS doesn't send GA-CSR ACTIVATE CHANNEL COMPLETE, TU3920 expires during GAN Traffic Channel assignment procedure
8	MS		MS terminates handover procedure and resumes connection on GERAN cell
9	→	HANDOVER FAILURE	Sent on GERAN cell

82.8 Handover from GAN

82.8.1 Handover from GAN / successful cases

82.8.1.1 Handover from GAN to GERAN

82.8.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 7.8.1:

The purpose of this procedure is to transfer, upon request from the MS (and under the control of the GAN), a connection between MS and GAN to another radio access technology (e.g. GERAN).

The procedure is applicable in GA-CSR-DEDICATED state.

The procedure may be initiated by the MS based on:

- local measurements of GAN coverage signal quality;

- reception of a GA-CSR UPLINK QUALITY INDICATION message indicating poor uplink quality in the *UL Quality Indication* IE; If the UL Quality Indication IE indicates "Network problem" a handover out to GERAN or UTRAN should be attempted. In case the UL Quality Indication information element shows "Radio problem" or "Undetermined problem" a search for a new access point should be done before the handover out is initiated;

- reception of RTCP packets indicating poor uplink quality;

- excessive loss or delay in the received RTP packets.

When the MS decides to trigger the handover from GAN, it shall:

- send a GA-CSR HANDOVER INFORMATION message to the network including a list of candidate/ target cell identifiers ranked in order of preference which is the most recent list available from the other radio access technology (e.g. GSM RR) and including the received signal strength for each identified GERAN or UTRAN cell. The MS may include GERAN cells, UTRAN cells or both.

3GPP TS 44.318 subclause 7.8.3:

The MS shall:

- suspend all NAS layer signalling transmissions;

- start the connection establishment to the target radio access technology (e.g. GERAN) by using the contents of the Handover From GAN Command IE. This message carries information about the candidate/ target cell identifier and radio parameters relevant for the target radio access technology;

A MS that is simultaneously operating in GPRS and CS modes over GAN shall follow the procedure as outlined in 3GPP TS 43.055 when it switches to target cell.

NOTE: The requirements concerning the establishment of the radio connection towards the target radio access technology (e.g. GERAN) and the signalling procedure are outside of the scope of this specification.

3GPP TS 44.318 subclause 7.8.4:

Upon successfully completing the handover, the GANC should:

- release all radio resources associated with the GAN connection.

Upon successfully completing the handover, the MS shall:

- switch to target radio access technology (e.g. GERAN) mode i.e. detach the GA-RR entity from the RR-SAP;

- enter GA-RC-REGISTERED state.

NOTE: The release of the GAN radio resources is initiated from the target RAT. The MS may deregister from the GANC (as defined in sub-clause 6.4) after successfully completing the handover. If the MS chooses to deregister from the GANC, it may do so either immediately after successfully completing the handover or after sending the GA-CSR RELEASE COMPLETE message to the GANC in response to the GA-CSR RELEASE message from the GANC.

Reference(s)

3GPP TS 44.318 subclause 7.8.1 / 7.8.3 / 7.8.4

82.8.1.1.2 Test purpose

To verify that MS is able to complete the handover procedure from GAN to GERAN successfully.

82.8.1.1.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GERAN mode in service of GERAN cell, voice call activated

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell, voice call activated. SS sends GA-CSR UPLINK QUALITY INDICATION to the MS indicating poor uplink quality. MS sends a GA-CSR HANDOVER INFORMATION with candidate lists. SS sends GA-CSR HANDOVER COMMAND message to the MS. MS starts the connection establishment to the GERAN cell, switches to GERAN mode, detaches the GAN-RR entity, releases all radio resources associated with the GAN connection and enters GA-RC-REGISTERED state. The MS may (optionally) immediately send the GA-RC DEREGISTER message to the GANC and enter the GA-RC-DEREGISTERED state.

Specific test parameters

-

Maximum Duration of Test

2 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1				MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

2	←	GA-CSR UPLINK QUALITY INDICATION	IE 'UL Quality Indication'
3	→	GA-CSR HANDOVER INFORMATION	IE 'Cell Identifier List'
4	←	GA-CSR HANDOVER COMMAND	IE 'Handover From GAN Command'. Indicates non-synchronized handover.
5	MS		MS establishes new connection to GERAN
6	→	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH until reception of PHYSICAL INFORMATION.
7	←	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS message.
8	→	HANDOVER COMPLETE	Sent on GERAN cell
9 (optional)	→	GA-RC DEREGISTER	IE 'Deregister cause' Sent if MS chooses to immediately deregister after successful handover from GAN
10 (conditional)	←	GA-CSR RELEASE	IE 'RR cause' Sent if GANC does not receive GA-RC DEREGISTER from MS (step 9)
11 (conditional)	→	GA-CSR RELEASE COMPLETE	MS in GERAN mode in service of GERAN cell, voice call activated, MS in GA-CSR-REGISTERED state Sent if MS does not send GA-RC DEREGISTER to GANC (step 9)

82.8.1.2   Handover from GAN to UTRAN

82.8.1.2.1   Conformance requirement

3GPP TS 44.318 subclause 7.8.1:

The purpose of this procedure is to transfer, upon request from the MS (and under the control of the GAN), a connection between MS and GAN to another radio access technology (e.g. GERAN).

The procedure is applicable in GA-CSR-DEDICATED state.

The procedure may be initiated by the MS based on:

- local measurements of GAN coverage signal quality;

- reception of a GA-CSR UPLINK QUALITY INDICATION message indicating poor uplink quality in the *UL Quality Indication* IE; If the UL Quality Indication IE indicates "Network problem" a handover out to GERAN or UTRAN should be attempted. In case the UL Quality Indication information element shows "Radio problem" or "Undetermined problem" a search for a new access point should be done before the handover out is initiated;

- reception of RTCP packets indicating poor uplink quality;

- excessive loss or delay in the received RTP packets.

When the MS decides to trigger the handover from GAN, it shall:

- send a GA-CSR HANDOVER INFORMATION message to the network including a list of candidate/ target cell identifiers ranked in order of preference which is the most recent list available from the other radio access technology (e.g. GSM RR) and including the received signal strength for each identified GERAN or UTRAN cell. The MS may include GERAN cells, UTRAN cells or both.

3GPP TS 44.318 subclause 7.8.3:

The MS shall:

- suspend all NAS layer signalling transmissions;

- start the connection establishment to the target radio access technology (e.g. GERAN) by using the contents of the *Handover From GAN Command* IE. This message carries information about the candidate/ target cell identifier and radio parameters relevant for the target radio access technology;

A MS that is simultaneously operating in GPRS and CS modes over GAN shall follow the procedure as outlined in 3GPP TS 43.055 when it switches to target cell.

NOTE: The requirements concerning the establishment of the radio connection towards the target radio access technology (e.g. GERAN) and the signalling procedure are outside of the scope of this specification.

3GPP TS 44.318 subclause 7.8.4:

Upon successfully completing the handover, the GANC should:

- release all radio resources associated with the GAN connection.

Upon successfully completing the handover, the MS shall:

- switch to target radio access technology (e.g. GERAN) mode i.e. detach the GA-RR entity from the RR-SAP;

- enter GA- RC -REGISTERED state.

NOTE: The release of the GAN radio resources is initiated from the target RAT. The MS may deregister from the GANC (as defined in sub-clause 6.4) after successfully completing the handover. If the MS chooses to deregister from the GANC, it may do so either immediately after successfully completing the handover or after sending the GA-CSR RELEASE COMPLETE message to the GANC in response to the GA-CSR RELEASE message from the GANC.

Reference(s)

3GPP TS 44.318 subclause 7.8.1 / 7.8.3 / 7.8.4

82.8.1.2.2 Test purpose

To verify that MS is able to complete the handover procedure from GAN to UTRAN successfully.

82.8.1.2.3 Method of test

Initial Conditions

System Simulator:

- 2 cells - Cell 1 is GAN (GAN default parameters), Cell 2 is UTRAN (3GPP TS 34.108, subclause 6.1 shall be referenced for default parameters)

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in UTRAN mode in service of UTRAN cell, voice call activated

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell, voice call activated. SS sends GA-RC UPLINK QUALITY INDICATION to the MS indicating poor uplink quality. MS sends a GA-CSR HANDOVER INFORMATION with candidate lists including cell 2 (UTRAN). SS sends GA-CSR HANDOVER COMMAND message to the MS. MS starts the connection establishment to the UTRAN cell, switches to UTRAN mode, detaches the GAN-RR entity, releases all radio resources associated with the GAN connection and enters GA-CSR-REGISTERED state. The MS may (optionally) immediately send the GA-RC DEREGISTER message to the GANC and enter the GA-RC-DEREGISTERED state.

Specific test parameters

-

Maximum Duration of Test

2 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1				MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated
2	SS			The SS configures the dedicated channel with the configuration: conversational/speech/UL:12.2 DL:12.2 kbps/CS RAB + UL:3.4 DL3.4 kbps SRBs in UTRAN cell.
3	←		GA-CSR UPLINK QUALITY INDICATION	IE 'UL Quality Indication'
4	→		GA-CSR HANDOVER INFORMATION	IE 'UTRAN Cell Identifier List' and 'UTRAN Received Signal Level List' shall be present. UTRAN cell 2 shall be indicated.
5	←		GA-CSR HANDOVER COMMAND	Value part of IE 'Handover From GAN Command' includes INTERSYSTEM TO UTRAN HANDOVER COMMAND.
6	MS			The MS accepts the handover command and configures its lower layers using the parameters from INTERSYSTEM TO UTRAN HANDOVER COMMAND.
7	SS			The SS waits for uplink physical channel in synchronization.
8	→		HANDOVER TO UTRAN COMPLETE	The SS receives this message on DCCH of cell 2 (UTRAN cell). It implies that the down link physical channel has synchronised with UTRAN.
9 (optional)	→		GA-RC DEREGISTER	IE 'Deregister cause' Sent if MS chooses to immediately deregister after successful handover from GAN
10 (conditional)	←		GA-CSR RELEASE	IE 'RR cause' Sent if GANC does not receive GA-RC DEREGISTER from MS (step 9)
11 (conditional)	→		GA-CSR RELEASE COMPLETE	MS in UTRAN mode in service of UTRAN cell, voice call activated, MS in GA-CSR-REGISTERED state Sent if MS does not send GA-RC DEREGISTER to GANC (step 9)

82.8.2 Handover from GAN / negative cases

82.8.2.1 Connection establishment fails on GERAN cell

82.8.2.1.1 Conformance requirement

If the MS does not succeed in establishing a connection to the target radio access technology, the MS shall:

- revert back to the GAN configuration;

- return a GA-CSR HANDOVER FAILURE message and resume normal operation as if the GA-CSR HANDOVER COMMAND message has not been received. The cause shall be set as specified in 3GPP TS 44.018.

Reference(s)

3GPP TS 44.318 subclause 7.8.5

82.8.2.1.2 Test purpose

To verify that if MS fails to complete requested handover to GERAN, MS reverts back to the GAN configuration.

82.8.2.1.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GA-CSR-IDLE state

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell, voice call activated. SS sends GA-CSR UPLINK QUALITY INDICATION to the MS indicating poor uplink quality. MS sends a GA-CSR HANDOVER INFORMATION with candidate lists. SS sends GA-CSR HANDOVER COMMAND message to the MS. MS starts the connection establishment to the GERAN cell. MS does not succeed in establishing a connection to the target GERAN cell. MS reverts back to the GAN configuration, sends a GA-CSR HANDOVER FAILURE message and resumes normal operation.

Specific test parameters

-

Maximum Duration of Test

2 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1				MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated
2	←		GA-CSR UPLINK QUALITY INDICATION	IE 'UL Quality Indication'
3	→		GA-CSR HANDOVER INFORMATION	IE 'Cell Identifier List'
4	←		GA-CSR HANDOVER COMMAND	IE 'Handover From GAN Command'. Indicates non-synchronized handover.
5	→		HANDOVER ACCESS	Repeated until T3124 (TS 3GPP 44.018) expires.
6	→		GA-CSR HANDOVER FAILURE	IE 'RR Cause' as in test case 26.6.5.8.
7	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
8	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.8.2.2 Handover command with non-supported configuration

82.8.2.2.1 Conformance requirement

If the GA-CSR HANDOVER COMMAND message instructs the MS:

- to perform a non-supported scenario, or

- to use a non-supported configuration,

the MS shall return a GA-CSR HANDOVER FAILURE message with cause as defined in 3GPP TS 44.018 and resume normal operation as if the GA-CSR HANDOVER COMMAND message has not been received.

Reference(s)

3GPP TS 44.318 subclause 7.8.7

82.8.2.2.2 Test purpose

To verify that if the GA-CSR HANDOVER COMMAND message instructs the MS to use a non-supported configuration, MS resumes normal operation as if the GA-CSR HANDOVER COMMAND message has not been received.

82.8.2.2.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GA-CSR-IDLE state.

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell, voice call activated. SS sends GA-CSR UPLINK QUALITY INDICATION to the MS indicating poor uplink quality. MS sends a GA-CSR HANDOVER INFORMATION with candidate lists. SS sends GA-CSR HANDOVER COMMAND message to the MS. The GA-CSR HANDOVER COMMAND message instructs the MS to use a not supported frequency. MS sends a GA-CSR HANDOVER FAILURE message and resumes normal operation as if the GA-CSR HANDOVER COMMAND message has not been received.

Specific test parameters

-

Maximum Duration of Test

2 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1				MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated
2	←		GA-CSR UPLINK QUALITY INDICATION	IE 'UL Quality Indication'

3	→	GA-CSR HANDOVER INFORMATION	IE 'Cell Identifier List'
4	←	GA-CSR HANDOVER COMMAND	Handover to frequency not supported by the MS.
5	→	GA-CSR HANDOVER FAILURE	With IE 'RR Cause' "*frequency not implemented*", MS resumes normal operation on GAN cell
6	←	GA-CSR RELEASE	IE 'RR cause' indicates #0
7	→	GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.9 Ciphering Configuration Procedure

82.9.1 Ciphering Configuration Procedure, Normal cases

82.9.1.1 Ciphering Configuration Procedure

82.9.1.1.1 Conformance requirement

The network initiates the ciphering mode setting procedure by sending a GA-CSR CIPHERING MODE COMMAND message to the mobile station, indicating whether ciphering shall be used or not, and if yes which algorithm to use.

Additionally, the network may, by the use of the cipher response information element, request the mobile station to include its IMEISV in the GA-CSR CIPHERING MODE COMPLETE message.

Whenever the mobile station receives a valid GA-CSR CIPHERING MODE COMMAND message, it shall, if a SIM is present and considered valid and the ciphering key sequence number stored on the SIM indicates that a ciphering key is available, save information about the ciphering key to use if the MS is later performing Handover from GAN. A valid GA-CSR CIPHERING MODE COMMAND message is defined to be one of the following:

- one that indicates "start ciphering" and is received by the mobile station in the "not ciphered" mode;

- one that indicates "no ciphering" and is received by the MS in the "not ciphered" mode; or

- one that indicates "no ciphering" and is received by the mobile station in the "ciphered" mode.

Other GA-CSR CIPHERING MODE COMMAND messages shall be regarded as erroneous, and a GA-CSR STATUS message with cause "Protocol error unspecified" shall be returned, and no further action taken.

The MS shall also calculate a MAC (Message Authentication Code). The MAC shall be calculated over the following data:

RAND | IMSI

using "HMAC-SHA1-96" algorithm, as specified in [24] with Kc as authentication key.

In the formulas above, the "|" character denotes concatenation. RAND is the 16-octet random number received from the GANC in the GA-CSR CIPHERING MODE COMMAND message. IMSI is the MS IMSI, in the same format as defined for the Mobile Identity IE as defined in [8 / 3GPP TS 44.318 v.6.0.0] i.e. as a variable-length sequence of digits in BCD format (e.g. the IMSI "123456789098765" is encoded as the following octets (in hexadecimal): "21 43 65 87 09 89 67 F5"). Network byte order is used.

The Kc key is the Kc that has been derived during the last authentication. The length of the MAC is 12 octets.

When the appropriate action on the GA-CSR CIPHERING MODE COMMAND message has been taken, the mobile station sends back a GA-CSR CIPHERING MODE COMPLETE message. If the "cipher response" field of the cipher response information element in the GA-CSR CIPHERING MODE COMMAND message specified "IMEISV must be included" the mobile station shall include its IMEISV in the GA-CSR CIPHERING MODE COMPLETE message.

Reference(s)

3GPP TS 44.318 sub-clause 7.9.1 and 7.9.2

82.9.1.1.2 Test purpose

To verify that the MS can reply a GA-CSR CIPHERING MODE COMMAND message and return the correct Message Authentication Code (MAC).

82.9.1.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR-DEDICATED

- MS in not ciphered mode

Foreseen final state of the MS

MS in GA-CSR IDLE state. Test procedure

The SS sends the GA-CSR CIPHERING MODE message. The Cipher Response IE should indicate that IMEISV should not be included. The MS replies with the GA-CSR CIPHERING MODE COMPLETE message. SS checks that the IMEISV is not included and that the MAC is correct. The SS sends another GA-CSR CIPHERING MODE COMMAND message with SC in Cipher Mode Setting IE set to "No ciphering". The MS replies with the GA-CSR CIPHERING MODE COMPLETE message. The SS sends new GA-CSR CIPHERING MODE message. The Cipher Response IE should indicate that IMEISV should be included. The MS replies with the GA-CSR CIPHERING MODE COMPLETE message. SS checks that the IMEISV is included and that the MAC is correct.

Specific Test Parameters

-

Maximum duration of test

1 min.

Reference(s) Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-CSR CIPHERING MODE COMMAND	Indicate that IMEISV should not be included
2	→		GA-CSR CIPHERING MODE COMPLETE	SS checks that the IMEISV is not included and that the MAC is correct
3	←		GA-CSR CIPHERING MODE COMMAND	SC indicating "No Ciphering"
4	→		GA-CSR CIPHERING MODE COMPLETE	
5	←		GA-CSR CIPHERING MODE COMMAND	Indicate that IMEISV should be included
6	→		GA-CSR CIPHERING MODE COMPLETE	SS checks that the IMEISV is included and that the MAC is correct
7	←		GA-CSR RELEASE	IE 'RR cause' #0
8	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.9.1.2 Void

82.9.2 Ciphering Configuration Procedure, Abnormal cases

82.9.2.1 Ciphering Configuration Procedure, Invalid Ciphering Mode Command

82.9.2.1.1 Conformance requirement

Whenever the mobile station receives a valid GA-CSR CIPHERING MODE COMMAND message, it shall, if a SIM is present and considered valid and the ciphering key sequence number stored on the SIM indicates that a ciphering key is available, save information about the ciphering key to use if the MS is later performing Handover from GAN. A valid GA-CSR CIPHERING MODE COMMAND message is defined to be one of the following:

- one that indicates "start ciphering" and is received by the mobile station in the "not ciphered" mode;

- one that indicates "no ciphering" and is received by the MS in the "not ciphered" mode; or

- one that indicates "no ciphering" and is received by the mobile station in the "ciphered" mode.

Other GA-CSR CIPHERING MODE COMMAND messages shall be regarded as erroneous, and a GA-CSR STATUS message with cause "Protocol error unspecified" shall be returned, and no further action taken.

Reference(s)

3GPP TS 44.318 sub-clause 7.9.2

82.9.2.1.2 Test purpose

To verify that the MS can reject a GA-CSR CIPHERING MODE COMMAND in the wrong ciphering mode by returning the GA-CSR STATUS message with cause "Protocol error unspecified".

82.9.2.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-CSR-DEDICATED

- MS in not ciphered mode

Foreseen final state of the MS

MS in GA-CSR IDLE state. Test procedure

The SS sends the GA-CSR CIPHERING MODE message. The MS replies with the GA-CSR CIPHERING MODE COMPLETE message and changes to ciphered mode. The SS sends another GA-CSR CIPHERING MODE message. The MS responds with an GA-CSR STATUS message with cause "Protocol error unspecified".

Specific Test Parameters

-

Maximum duration of test

1 min.

Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-CSR CIPHERING MODE COMMAND	Indicating "start ciphering"

2	→	GA-CSR CIPHERING MODE COMPLETE	
3	←	GA-CSR CIPHERING MODE COMMAND	Indicating "start ciphering"
4	→	GA-CSR STATUS	Cause: Protocol error unspecified.
5	←	GA-CSR RELEASE	IE 'RR cause' #0
6	→	GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.10 Channel mode modify procedure

82.10.1 Channel mode modify procedure / successful cases

82.10.1.1 Channel mode modify / successful case

82.10.1.1.1 Conformance requirement

In dedicated mode, the GANC can request a modification of the channel mode, multi-rate configuration, RTP redundancy configuration, sample size, GANC IP address, GANC RTP UDP port and GANC RTCP UDP port used for an active traffic channel.

The channel mode modify procedure allows the network to request the mobile station to modify configuration used for an active channel. The channel mode covers the coding, decoding and transcoding mode as well as the redundancy policy used on the active channel.

This procedure is always initiated by the network.

The network initiates the procedure by sending a GA-CSR CHANNEL MODE MODIFY message to the mobile station.

When the MS has received the GA-CSR CHANNEL MODE MODIFY message, the mobile station modifies the configuration, sets the mode and/or the RTP redundancy configuration for the active channel and then replies by a GA-CSR CHANNEL MODE MODIFY ACKNOWLEDGE message indicating the ordered channel mode.

Reference(s)

3GPP TS 44.318 subclauses 7.10 / 7.10.1.1 / 7.10.1.2

82.10.1.1.2 Test purpose

To verify that MS is able to change active channel mode if requested when it is different from the one used by the

mobile station or whether it is already in use.

82.10.1.1.3 Method of test

Initial Conditions

System Simulator:

-   1 GAN cell, default parameters

Mobile Station:

-   MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GA-CSR-IDLE state

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell, voice call activated. SS sends GA-CSR CHANNEL MODE MODIFY message to change active channel mode. The mode is different from the one used by the mobile station.

MS sets the mode for the active channel and then replies by a GA-CSR CHANNEL MODE MODIFY ACKNOWLEDGE message indicating the ordered channel mode.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in service voice call activated on GAN cell
2	←		GA-CSR CHANNEL MODE MODIFY	IE 'Channel Mode'
3	MS			MS sets the different mode
4	→		GA-CSR CHANNEL MODE MODIFY ACKNOWLEDGE	
5	MS			MS in service voice call activated on GAN cell with different channel mode
6	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
7	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

82.10.2   Channel mode modify procedure / negative cases

82.10.2.1   Channel mode modify indicates non-supported mode

82.10.2.1.1   Conformance requirement

If the GA-CSR CHANNEL MODE MODIFY message includes IE "RTP Redundancy Configuration" and MS has indicated that it does not support RTP Redundancy through the GAN Classmark, it shall ignore the IE "RTP Redundancy Configuration".

If the mobile station does not support the indicated channel mode or sample size modifications, it shall retain the old mode and return the used configuration in the GA-CSR CHANNEL MODE MODIFY ACKNOWLEDGE message.

Reference(s)

 3GPP TS 44.318 subclause 7.10.1.3

82.10.2.1.2   Test purpose

To verify that MS is able to retain the old channel mode, if GA-CSR CHANNEL MODE MODIFY is requested with non-supported mode.

82.10.2.1.3   Method of test

Initial Conditions

System Simulator:

 - 1 GAN cell, default parameters

Mobile Station:

 - MS in GA-CSR-DEDICATED state in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GA-CSR-IDLE state

Test Procedure

The MS is in GA-CSR-DEDICATED state in service of GAN cell, voice call activated. SS sends GA-CSR CHANNEL MODE MODIFY message to change active channel mode. The requested mode is not supported by the mobile station. MS retains the old mode for the active channel and then replies by a GA-CSR CHANNEL MODE MODIFY ACKNOWLEDGE message with associated channel mode.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service voice call activated on GAN cell
2	←		GA-CSR CHANNEL MODE MODIFY	IE Channel Mode, requested mode is not supported by the MS
3	MS			MS retains the old mode
4	→		GA-CSR CHANNEL MODE MODIFY ACKNOWLEDGE	Associated with old channel mode
5	MS			MS in service voice call activated on GAN cell with old channel mode
6	←		GA-CSR RELEASE	IE 'RR cause' indicates #0
7	→		GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state

83   GAN PS Domain Procedures

83.1   GA-PSR Transport Channel Activation & Deactivation Procedures

83.1.1   GA-PSR Transport Channel Activation & Deactivation Procedures, Normal Cases

83.1.1.1   MS Initiated GA-PSR TC Activation

83.1.1.1.1   Conformance requirements

Upon receiving the uplink user data transfer request from the LLC for LLC SAPI 3, 5, 9 or 11 and while the MS GA-PSR is in the GA-PSR-STANDBY state, the MS shall,

- send a GA-PSR-ACTIVATE-UTC-REQ message,

- start timer TU4002,

- set the uplink packet sequence number to 0,

- set the expected downlink packet sequence number to 0 and

Upon receiving the GA-PSR-ACTIVATE-UTC-ACK message while the MS initiated GA-PSR TC activation is in progress, the MS shall stop timer TU4002, create and store the corresponding GA-PSR TC information and the MS GA-PSR shall transition into GA-PSR-ACTIVE state. The MS GA-PSR shall start TU4001 timer and forward any outstanding uplink user data packets. The TU4001 timer is restarted whenever any user data packet is sent to or received from the GANC.

References

3GPP TS 44.318, subclauses 8.2.1 & 8.2.3

83.1.1.1.2 Test purpose

To verify that on receiving uplink data request from LLC in GA-PSR-STANDBY state, MS shall initiate GA-PSR TC Activation procedure.

To verify that on receipt of acknowledgment from GANC for the activation request MS shall move into GA-PSR-ACTIVE state.

83.1.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell.

Test Procedure

MS is made to initiate the GA-PSR TC and send to SS the GA-PSR-ACTIVATE-UTC-REQ.

The SS responds to MS with GA-PSR-ACTIVATE-UTC-ACK and the MS transmits GA-PSR-UNITDATA with the data to SS.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	MS			MS initiated GA-PSR TC activation
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←		GA-PSR-ACTIVATE-UTC-ACK	
4	→		GA-PSR-UNITDATA	SS confirms that the MS is in GA-PSR-ACTIVE state.
5	←		GA-PSR-DEACTIVATE-UTC-REQ	
6	→		GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

-

83.1.2 GA-PSR Transport Channel Activation & Deactivation Procedures, Abnormal Cases.

83.1.2.1 GA-PSR TC Activation Collision

83.1.2.1.1 Conformance requirements

If the GANC receives a GA-PSR-ACTIVATE-UTC-REQ message from the MS while the network initiated GA-PSR TC activation procedure is in progress, the GANC aborts the network initiated activation procedure and responds to the MS with the GA-PSR-ACTIVATE-UTC-ACK message including the cause indicating successful activation. The message includes GANC IP address and GANC UDP port to be used for the uplink GPRS user data transport.

If the MS receives a GA-PSR-ACTIVATE-UTC-REQ message from the GANC while the MS initiated GA-PSR TC activation procedure is in progress, the MS shall silently discard the request and wait for the acknowledgment related to the MS initiated activation already in progress.

Upon receiving the uplink user data transfer request from the LLC for LLC SAPI 3, 5, 9 or 11 and while the MS GA-PSR is in the GA-PSR-STANDBY state, the MS shall,

- send a GA-PSR-ACTIVATE-UTC-REQ message,

- start timer TU4002,

- set the uplink packet sequence number to 0,

- set the expected downlink packet sequence number to 0 and

Upon receiving the GA-PSR-ACTIVATE-UTC-ACK message while the MS initiated GA-PSR TC activation is in progress, the MS shall stop timer TU4002, create and store the corresponding GA-PSR TC information and the MS GA-PSR shall transition into GA-PSR-ACTIVE state. The MS GA-PSR shall start TU4001 timer and forward any outstanding uplink user data packets. The TU4001 timer is restarted whenever any user data packet is sent to or received from the GANC.

References

3GPP TS 44.318, subclauses 8.2.1; 8.2.3 & 8.2.4.1

83.1.2.1.2 Test purpose

To verify that on receiving a GA-PSR-ACTIVATE-UTC-REQ message from the GANC while the MS initiated GA-PSR TC activation procedure is in progress, the MS shall silently discard the request and wait for the acknowledgment related to the MS initiated activation already in progress.

83.1.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

MS is made to initiate MS GA-PSR TC activation procedure and hence the MS receives a GA-PSR-ACTIVATE-UTC-REQ message from the GANC.

MS waits for the GA-PSR-ACTIVATE-UTC-ACK, while ignoring the GA-PSR-ACTIVATE-UTC-REQ from the GANC. Upon receiving the GA-PSR-ACTIVATE-UTC-ACK from the GANC, the MS enters the GA-PSR-ACTIVE

state, transmitting the GA-PSR-UNITDATA to the SS. SS confirms that MS in the GA-PSR-ACTIVE state by receiving the GA-PSR-UNITDATA message.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	**SS**		
1	MS			MS is made to initiate GA-PSR TC
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←		GA-PSR-ACTIVATE-UTC-REQ	SS initiated GA-PSR-ACTIVE state
4	←		GA-PSR-ACTIVATE-UTC-ACK	MS is waiting for this message
5	→		GA-PSR-UNITDATA	MS is transmitting the uplink user data packets
6		←	GA-PSR-DEACTIVATE-UTC-REQ	SS initiates the deactivation
7		→	GA-PSR-DEACTIVATE-UTC-ACK	MS response on deactivation

Specific Message Contents

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83.1.2.2 GANC Rejects GA-PSR TC Activation

83.1.2.2.1 Conformance requirements

Upon receiving the uplink user data transfer request from the LLC for LLC SAPI 3, 5, 9 or 11 and while the MS GA-PSR is in the GA-PSR-STANDBY state, the MS shall,

- send a GA-PSR-ACTIVATE-UTC-REQ message,

- start timer TU4002,

- set the uplink packet sequence number to 0,

- set the expected downlink packet sequence number to 0 and

If the GANC decides to reject GA-PSR TC activation, it shall send a GA-PSR-ACTIVATE-UTC-ACK message to the MS with the failure cause code and shall not include GANC IP address and UDP port number. The following rejection cause values are supported:

- "No available resources" indicates that the GANC failed to allocate required resources.

- "GANC failure" indicates internal GANC failure

- "Not authorized for data service" indicates that the MS is not authorized to use data services via GAN

Upon receiving the GA-PSR-ACTIVATE-UTC-ACK message indicating failure, the MS shall declare the procedure as failed to the upper layers.

References

3GPP TS 44.318, subclauses 8.2.1; 8.2.4.1; 8.2.4.4

83.1.2.2.2 Test purpose

To verify that by receiving the GA-PSR-ACTIVATE-UTC-ACK message with the failure cause code, described below, the MS would declare the procedure as failed to the upper layers.

83.1.2.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The MS initiates the GA-PSR-ACTIVE state transmitting GA-PSR-ACTIVATE-UTC-REQ to the SS. The SS responds with GA-PSR-ACTIVATE-UTC-ACK with failure code "No available resources". The MS remains in the GA-PSR-STANDBY state. To confirm that the MS is in the GA-PSR-STANDBY state, the SS sends GA-PSR-ACTIVATE-UTC-REQ and waits for the GA-PSR-ACTIVATE-UTC-ACK from the MS. Upon receiving the GA-PSR-ACTIVATE-UTC-ACK, the SS concludes that the MS was in GA-PSR-STANDBY state in step 4.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1				MS is made to initiate GA-PSR TC
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←		GA-PSR-ACTIVATE-UTC-ACK	Failure code is "No available resources" without valid IP address and port
4	MS			MS is declaring the procedure as failed to the upper layers and remains to be in the GA-PSR-STANDBY state.
5	←		GA-PSR-ACTIVATE-UTC-REQ	
6	→		GA-PSR-ACTIVATE-UTC-ACK	SS confirms that the MS was in the GA-PSR-STANDBY state.
7	←		GA-PSR-DEACTIVATE-UTC-REQ	
8	→		GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.1.3 Network Initiated GA-PSR Transport Channel Activation, Normal Case

83.1.3.1 Processing of the GA-PSR TC Activation Request by the MS

83.1.3.1.1 Conformance requirements

Upon receiving the downlink user data transfer request associated with LLC SAPI 3, 5, 9 or 11 and if there is no GA-PSR TC associated with the specific MS, the GANC allocates the IP address and the UDP port number to be used by the MS for GPRS user data transport and sends a GA-PSR-ACTIVATE-UTC-REQ message to the MS. The GANC also:

- sets downlink packet sequence number to 0 and

- sets the expected uplink packet sequence number to 0

Upon receiving the GA-PSR-ACTIVATE-UTC-REQ message from the GANC, the MS shall verify the following:

- the GA-PSR is in GA-PSR-STANDBY state

- the GA-PSR TC does not exist

- the GPRS service is not suspended

Assuming successful verification, the MS shall allocate UDP port number for the MS GPRS user data transport and store the associated information. In parallel, the MS GA-PSR shall transition to GA-PSR-ACTIVE state and start TU4001 timer. Subsequently, the MS shall send the GA-PSR-ACTIVATE-UTC-ACK message to the GANC with the cause indicating successful activation. The message includes the MS UDP port to be used for the downlink GPRS user data transport.

After the MS has sent the GA-PSR-ACTIVATE-UTC-ACK message, it shall:

- set the uplink packet sequence number to 0 and

- set the expected downlink packet sequence number to 0

When the TU4001 timer expires and if there are no outstanding uplink GPRS user data messages to be transferred, the MS GA-PSR shall send the GA-PSR-DEACTIVATE-UTC-REQ message to the GANC to request the deactivation of the transport channel. In parallel, the MS shall start TU4002 timer to wait for the confirmation.

References

3GPP TS 44.318, subclauses 8.3.1; 8.3.2 & 8.4.1

83.1.3.1.2 Test purpose

To verify that on receiving the GA-PSR-ACTIVATE-UTC-REQ message from the GANC, MS will:

1) Allocate UDP port number for the MS GPRS user data transport and store the associated information.

2) Transition to GA-PSR-ACTIVE state and start TU4001 timer.

3) Send the GA-PSR-ACTIVATE-UTC-ACK message to the GANC with the cause indicating successful activation.

4) Includes the MS UDP port to be used for the downlink GPRS user data transport in the GA-PSR-ACTIVATE-UTC-ACK message.

5) Set uplink packet sequence number to 0 and

6) Set the expected downlink packet sequence number to 0

83.1.3.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The SS initiates the GA-PSR-ACTIVE state transmitting GA-PSR-ACTIVATE-UTC-REQGA-PSR-ACTIVATE-UTC REQ to the MS. MS responds with GA-PSR-ACTIVATE-UTC-ACK and starts TU4001. SS does not transmit any data for the time exceeding TU4001. The MS transmits GA-PSR-DEACTIVATE-UTC-REQ, confirming that the MS was in GA-PSR-ACTIVE state and TU4001 has been started in step 2.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	←		GA-PSR-ACTIVATE-UTC-REQ	
2	→		GA-PSR-ACTIVATE-UTC-ACK	SS verifying the IE UDP Port for GPRS user data transport (port number for DL)
3	SS			Waiting for time exceeding TU4001
4	→		GA-PSR-DEACTIVATE-UTC-REQ	SS confirms that the MS was in GA-PSR-ACTIVE state in step 3.
5		←	GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.1.4 Network Initiated GA-PSR Transport Channel Activation, Abnormal Cases

83.1.4.1 Void

83.1.4.2 MS Rejects GA-PSR TC Activation when the GPRS Service is suspended

83.1.4.2.1 Conformance requirements

If the MS determines that the GPRS service is suspended when the GA-PSR-ACTIVATE-UTC-REQ is received, it shall send a GA-PSR-ACTIVATE-UTC-ACK message to the GANC with the failure cause code set to "GPRS Suspended".

Upon receiving the GA-PSR-ACTIVATE-UTC-ACK message indicating that the GPRS service is suspended, the GANC aborts the activation procedure.

References

   3GPP TS 44.318, subclause 8.3.4.2

83.1.4.2.2 Test purpose

To verify that on receiving a GA-PSR-ACTIVATE-UTC-REQ by the MS when the GPRS service for the MS is suspended, the MS sends a GA-PSR-ACTIVATE-UTC-ACK message to the GANC with the failure cause code set to "GPRS Suspended".

83.1.4.2.3 Method of test

Initial Conditions

System Simulator:

   - 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The SS initiates the GA-PSR-ACTIVE state transmitting GA-PSR-ACTIVATE-UTC-REQ to the MS. The SS responds with GA-PSR-ACTIVATE-UTC-ACK and MS enters the GA-PSR-ACTIVE state. The MS starts to transmit data using GA-PSR-UNITDATA. The MS is made to initiate a voice call, which will make MS initiate the GPRS suspend procedure. The SS intitiates the GA-PSR-ACTIVE procedure, sending the GA-PSR-ACTIVATE-UTC-REQ.

The MS responds with GA-PSR-ACTIVATE-UTC-ACK, with failure cause code set to "GPRS Suspended"

The SS checks that GA-PSR-ACTIVATE-UTC-ACK, contains failure cause code "GPRS Suspended"

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1				Trigger MS to initiate data transfer
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←		GA-PSR-ACTIVATE-UTC-ACK	MS is waiting for this message
4	→		GA-PSR-UNITDATA	MS is transmitting the uplink user data packets
5				MS is made to initiate a voice call
6		→	GA-CSR GPRS SUSPENSION REQUEST Or

GA-CSR REQUEST | Repeat step 6 until both messages GA-CSR GPRS SUSPENSION REQUEST and GA-CSR REQUEST are received |
7		←	GA-CSR REQUEST ACCEPT	MS in GA-CSR-DEDICATED state
8		→	GA-CSR UPLINK DIRECT TRANSFER	
9	←		GA-PSR-ACTIVATE-UTC-REQ	
10	→		GA-PSR-ACTIVATE-UTC-ACK	Failure cause code set to "GPRS Suspended"
11		←	GA-CSR RELEASE	IE 'RR cause', including GPRS resumption indication as per standard GSM/GPRS to indicate that resume of GPRS service is not necessary.
12		→	GA-CSR RELEASE COMPLETE	MS enters GA-CSR-IDLE state and GA-PSR-STANDBY

Specific Message Contents

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83.1.4.3   MS Receives GA-PSR TC Activation Request while GA-PSR TC active

83.1.4.3.1   Conformance requirements

If the MS receives a GA-PSR TC activation message from the GANC while the GA-PSR TC is active, it shall send the GA-PSR-ACTIVATE-UTC-ACK message to the GANC. The message shall include MS UDP port allocated to the existing GA-PSR TC. In parallel, if the GANC provided new IP Address and UDP port number, the MS shall update the GA-PSR TC attributes accordingly.

After sending the GA-PSR-ACTIVATE-UTC-ACK message, the MS shall:

- set uplink packet sequence number to 0 and

- set the expected downlink packet sequence number to 0

References

3GPP TS 44.318, subclauses 8.2.1; 8.2.3 & 8.3.4.3

83.1.4.3.2 Test purpose

To verify that if the MS receives a GA-PSR TC activation message from the GANC while the GA-PSR TC is active, the MS sends the GA-PSR-ACTIVATE-UTC-ACK message to the GANC.

83.1.4.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

MS is made to initiate GA-PSR-ACTIVE state establishment and SS responds with GA-PSR-ACTIVATE-UTC-ACK. MS enters the GA-PSR-ACTIVE state and sends GA-PSR-UNITDATA. While the MS is transmitting data the SS sends GA-PSR-ACTIVATE-UTC-REQ with a different IP address and port number.

The MS responds with GA-PSR-ACTIVATE-UTC-ACK, containing the MS UDP port allocated to the existing GA-PSR TC. MS is triggered to initiate another data transfer. The MS transmits GA-PSR-UNITDATA, using new IP address and port number.

SS checks that the MS transmits the GA-PSR-UNITDATA, using new IP address and port number, and that the MS sets uplink packet sequence number to 0.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1				Trigger MS to initiate data transfer
2	→		GA-PSR-ACTIVATE-UTC-REQ	
3	←		GA-PSR-ACTIVATE-UTC-ACK	
4	→		GA-PSR-UNITDATA	MS is transmitting the uplink user data packets
5	←		GA-PSR-ACTIVATE-UTC-REQ	SS provides different IP address and port number
6	→		GA-PSR-ACTIVATE-UTC-ACK	Message includes the MS UDP port allocated to the existing GA-PSR TC
7				Trigger MS to initiate an other data transfer
8	→		GA-PSR-UNITDATA	MS using new IP address and port number, SS verifies that sequence number =0.
9	←		GA-PSR-DEACTIVATE-UTC-REQ	

10	→	GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.1.5 MS Initiated Deactivation of GA-PSR Transport Channel, Normal Case

83.1.5.1 GA-PSR TC Deactivation Initiation by the MS

83.1.5.1.1 Conformance requirements

When the TU4001 timer expires and if there are no outstanding uplink GPRS user data messages to be transferred, the MS GA-PSR shall send GA-PSR-DEACTIVATE-UTC-REQ message to the GANC to request the deactivation of the transport channel. In parallel, the MS shall start TU4002 timer to wait for the confirmation.

Upon receipt of a GA-PSR-DEACTIVATE-UTC-REQ message from the MS, the GANC releases the GA-PSR TC and sends the GA-PSR-DEACTIVATE-UTC-ACK message to the MS indicating successful deactivation; i.e. the cause IE is set to "success".

Upon receipt of a GA-PSR-DEACTIVATE-UTC-ACK message from the GANC, the MS GA-PSR shall stop TU4002 timer, and release the GA-PSR TC. In parallel, the MS GA-PSR shall transition to GA-PSR-STANDBY state.

Packets received out-of-sequence should be dropped.

References

3GPP TS 44.318, subclauses 8.4.1; 8.4.2; 8.4.3 and 8.7.5.3

83.1.5.1.2 Test purpose

To verify that, when the TU4001 timer expires and if there are no outstanding uplink GPRS user data messages to be transferred, the MS GA-PSR sends GA-PSR-DEACTIVATE-UTC-REQ message to the GANC to request the deactivation of the transport channel and in parallel, the MS starts TU4002 timer to wait for the confirmation.

To verify that upon receiving a GA-PSR-DEACTIVATE-UTC-ACK message from the GANC, the MS GA-PSR stops TU4002 timer, and releases the GA-PSR TC and that the MS GA-PSR transitions to GA-PSR-STANDBY state.

83.1.5.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

MS is made to initiate GA-PSR-ACTIVE state and SS responds with GA-PSR-ACTIVATE-UTC-ACK. MS enters the GA-PSR-ACTIVE state and sends GA-PSR-UNITDATA. Once all expected data has been transmitted and the sequential TU has expired, the MS sends GA-PSR-DEACTIVATE-UTC-REQ, and starts TU4002, requesting SS to deactivate GA-PSR state. In response, the SS sends GA-PSR-DEACTIVATE-UTC-ACK. Upon receiving the GA-PSR-DEACTIVATE-UTC-ACK the MS stops the TU4002 and enters the GA-PSR-STANDBY state.

To verify that the MS deactivated timer TU4002, SS sends a GA-PSR-ACTIVATE-UTC-REQ again. If the MS deactivated TU4002, the MS will respond with a GA-PSR-ACTIVATE-UTC-ACK.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	**SS**		
1				Trigger MS to initiate data transfer
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←		GA-PSR-ACTIVATE-UTC-ACK	MS is waiting for this message
4	→		GA-PSR-UNITDATA	MS is transmitting the uplink user data packets
5	MS			TU4001 timer expires, no DATA on UPLINK
6	→		GA-PSR-DEACTIVATE-UTC-REQ	MS starts TU4002
7	←		GA-PSR-DEACTIVATE-UTC-ACK	MS stops TU4002 timer, releases the GA-PSR TC and the MS GA-PSR transitions to GA-PSR-STANDBY state.
8	←		GA-PSR-ACTIVATE-UTC-REQ	Wait for 5 sec before sending
9	→		GA-PSR-ACTIVATE-UTC-ACK	The MS will not acknowledge the activation request in case TU4002 was not stopped
10	←		GA-PSR-DEACTIVATE-UTC-REQ	to bring the MS back to STANDBY state deactivate GA-PSR state
11	→		GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.1.6 MS Initiated Deactivation of GA-PSR Transport Channel, Abnormal Cases

83.1.6.1 Uplink User Data Transfer is initiated while GA-PSR TC Deactivation is in Progress

83.1.6.1.1 Conformance requirements

If the MS LLC initiates the uplink user data transfer after the MS GA-PSR has sent the deactivation request to the GANC, the MS GA-PSR shall complete the deactivation procedure first and than initiate a new GA-PSR TC activation procedure to enable data transfer.

References

3GPP TS 44.318, subclause 8.4.4.3

83.1.6.1.2 Test purpose

To verify that if the MS LLC initiates the uplink user data transfer after the MS GA-PSR has sent the deactivation request to the GANC, the MS GA-PSR completes the deactivation procedure first and than initiate a new GA-PSR TC activation procedure to enable data transfer.

83.1.6.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

MS is made to initiate GA-PSR-ACTIVE state establishment by triggering a user data transfer of 1 octet. The SS responds with GA-PSR-ACTIVATE-UTC-ACK. After the MS completes the user data transfer it initiates deactivation by sending the GA-PSR-DEACTIVATE-UTC-REQ. Then MS is triggered to initiate the uplink user data transfer. The MS shall not start data transmission but instead initiates second activation by sending GA-PSR-ACTIVATE-UTC-REQ after the deactivation procedure is completed. The SS responds with GA-PSR-ACTIVATE-UTC-ACK and MS begins to transmit the data, sending GA-PSR-UNITDATA.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state by triggering user data transfer of 1 octet.
2	←		GA-PSR-ACTIVATE-UTC-ACK	
3	→		GA-PSR-UNITDATA	MS starts TU4001
4	→		GA-PSR-DEACTIVATE-UTC-REQ	Sent after TU4001 expires
5	MS			MS is triggered to initiate uplink user data transfer within 5 seconds.
6	SS			SS checks that no GA-PSR-ACTIVATE-UTC-REQ is sent by the MS before deactivation procedure is complete.
7	←		GA-PSR-DEACTIVATE-UTC-ACK	Sent within 5 seconds of step 4 (before expiration of TU4002)
8	→		GA-PSR-ACTIVATE-UTC-REQ	
9	←		GA-PSR-ACTIVATE-UTC-ACK	
10	→		GA-PSR-UNITDATA	MS transmits data, which was initiated in step 5
11	←		GA-PSR-DEACTIVATE-UTC-REQ	
12	→		GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.1.6.2   Downlink User Data Transfer is received while the GA-PSR TC Deactivation is in Progress

83.1.6.2.1   Conformance requirements

If the MS receives any downlink user data packets while waiting for the GA-PSR-DEACTIVATE-UTC-ACK message response, it shall abort the deactivation procedure (i.e. stop timer TU4002) and restart TU4001 timer.

References

3GPP TS 44.318, subclause 8.4.4.4

83.1.6.2.2   Test purpose

To verify that if the MS receives any downlink user data packets while waiting for the GA-PSR-DEACTIVATE-UTC-ACK response, it aborts the deactivation procedure (i.e. stop timer TU4002) and restarts TU4001 timer.

83.1.6.2.3   Method of test

Initial Conditions

System Simulator:

-   1 GAN cell, default parameters

Mobile Station:

-   MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The MS is made to initiate GA-PSR-ACTIVE state establishment by triggering a user data transfer of 1 octet. The SS responds with GA-PSR-ACTIVATE-UTC-ACK. After the MS completes the user data transfer it initiates deactivation by sending GA-PSR-DEACTIVATE-UTC-REQ. The SS sends GA-PSR-UNITDATA, preventing deactivation of the GA-PSR TC by the MS. To check that the MS is in GA-PSR-ACTIVE state, a data transmission is triggered in the MS. SS initiates deactivation procedure and sends GA-PSR-DEACTIVATE-UTC-REQ. The MS responds with GA-PSR-DEACTIVATE-UTC-ACK.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state by triggering user data transfer of 1 octet.
2	←		GA-PSR-ACTIVATE-UTC-ACK	
3	→		GA-PSR-UNITDATA	MS starts TU4001
4	→		GA-PSR-DEACTIVATE-UTC-REQ	Sent after TU4001 expires
5	MS			MS starts TU4002 and waiting for GA-PSR-DEACTIVATE-UTC-ACK
6	←		GA-PSR-UNITDATA	MS stops TU4002 and starts TU4001
7	→		GA-PSR-UNITDATA	MS is triggered to initiate uplink user data transfer before TU4001 expires, SS check data.
8	←		GA-PSR-DEACTIVATE-UTC-REQ	

| 9 | → | | GA-PSR-DEACTIVATE-UTC-ACK | |

Specific Message Contents

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83.1.6.3 Unexpected GA-PSR-DEACTIVATE-UTC-ACK response

83.1.6.3.1 Conformance requirements

If the MS receives an unexpected GA-PSR-DEACTIVATE-UTC-ACK message response while the GA-PSR is in GA-PSR-ACTIVE state, the MS GA-PSR shall stop TU4001 timer, and release the GA-PSR TC. In parallel, the MS GA-PSR shall transition to GA-PSR-STANDBY state.

If the MS receives an unexpected GA-PSR-DEACTIVATE-UTC-ACK message response while the GA-PSR is in GA-PSR-STANDBY state, the message is silently discarded.

References

   3GPP TS 44.318, subclauses 8.4.4.5

83.1.6.3.2 Test purpose

To verify that if the MS receives an unexpected GA-PSR-DEACTIVATE-UTC-ACK response while the GA-PSR is in GA-PSR-ACTIVE state, the MS GA-PSR stops TU4001 timer, releases the GA-PSR TC and, the MS GA-PSR transitions to GA-PSR-STANDBY state.

83.1.6.3.3 Method of test

Initial Conditions

System Simulator:

   - 1 GAN cell, default parameters

Mobile Station:

   - MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

   MS in GA-PSR-STANDBY state in service of GAN cell.

Test Procedure

MS is made to initiate GA-PSR-ACTIVE state establishment and SS responds with GA-PSR-ACTIVATE-UTC-ACK. While the MS transmits data, the SS sends GA-PSR-DEACTIVATE-UTC-ACK. The MS enters the GA-PSR-STANDBY state. To confirm that the MS is in the GA-PSR-STANDBY state, the SS sends the GA-PSR-UNITDATA message and expects to receive the GA-PSR-ACTIVATE-UTC-REQ.

Check for 10 sec that MS does not send any more messages.

To verify that the MS is in GA-PSR-STANDBY state a new connection is initiated with GA-PSR-ACTIVATE-UTC-REQ. If the MS responses with GA-PSR-ACTIVATE-UTC-ACK, the MS was in GA-PSR-STANDBY state.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1				Trigger MS to initiate data transfer

2	→	GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←	GA-PSR-ACTIVATE-UTC-ACK	
4	→	GA-PSR-UNITDATA	MS LLC initiates the uplink user data transfer, SS check data
5	←	GA-PSR-DEACTIVATE-UTC-ACK	
6			SS checks for 10 sec that MS does not send any more messages.
7	←	GA-PSR-ACTIVATE-UTC-REQ	
8	→	GA-PSR-ACTIVATE-UTC-ACK	To verify that the MS was in GA-PSR-STANDBY state
9	←	GA-PSR-DEACTIVATE-UTC-REQ	
10	→	GA-PSR-DEACTIVATE-UTC-ACK	MS in GA-PSR-STANDBY state

Specific Message Contents

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83.1.6.4 Unexpected GA-PSR-ACTIVATE-UTC-REQ

83.1.6.4.1 Conformance requirements

If the MS receives any downlink user data packets while waiting for the GA-PSR-DEACTIVATE-UTC-ACK message response, it shall abort the deactivation procedure (i.e. stop timer TU4002) and restart TU4001 timer.

If the MS receives an unexpected GA-PSR-ACTIVATE-UTC-REQ message while waiting for GA-PSR-DEACTIVATE-UTC-ACK message response, the MS ignores the request and continues waiting for deactivation response.

References

   3GPP TS 44.318, subclauses 8.4.4.4 and 8.4.4.6

83.1.6.4.2 Test purpose

To verify that if the MS receives an unexpected GA-PSR-ACTIVATE-UTC-REQ while waiting for GA-PSR-DEACTIVATE-UTC-ACK response, the MS ignores the request and continues waiting for deactivation response.

83.1.6.4.3 Method of test

Initial Conditions

System Simulator:

-   1 GAN cell, default parameters

Mobile Station:

-   MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

   MS in GA-PSR-STANDBY state in service of GAN cell.

Test Procedure

MS is made to initiate GA-PSR-ACTIVE state establishment and SS responds with GA-PSR-ACTIVATE-UTC-ACK. MS transmits data and sequentially initiates the deactivation procedure sending GA-PSR-DEACTIVATE-UTC-REQ. The MS receives an unexpected GA-PSR-ACTIVATE-UTC-REQ while waiting for GA-PSR-DEACTIVATE-UTC-

ACK response. MS ignores this message and continues to wait for the GA-PSR-DEACTIVATE-UTC-ACK response. SS waits for one second to make sure MS receives GA-PSR-ACTIVATE-UTC-REQ before GA-PSR-UNIT-DATA. SS sends the GA-PSR-UNITDATA, and MS responds by aborting the deactivation procedure. To finish the test SS sends GA-PSR-DEACTIVATE-UTC-REQ and MS responds with GA-PSR-DEACTIVATE-UTC-ACK.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	**SS**		
1				Trigger MS to initiate data transfer
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiated GA-PSR-ACTIVE state
3	←		GA-PSR-ACTIVATE-UTC-ACK	
4	→		GA-PSR-UNITDATA	MS LLC initiates the uplink user data transfer,
5	MS			After transmitting all data, wait till TU4001 expires and the MS initiates the deactivation procedure.
6	→		GA-PSR-DEACTIVATE-UTC-REQ	
7	←		GA-PSR-ACTIVATE-UTC-REQ	
8	MS			Waiting for GA-PSR-DEACTIVATE-UTC-ACK
9	SS			Waiting for 1s
10	←		GA-PSR-UNITDATA	MS aborts the deactivation procedure (i.e. stop timer TU4002) and restart TU4001 timer
11	←		GA-PSR-DEACTIVATE-UTC-REQ	
12	→		GA-PSR-DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.1.7 GANC Initiated Deactivation of GA-PSR Transport Channel, Normal Case

83.1.7.1 GA-PSR TC Deactivation Initiation by the GANC

83.1.5.7.1 Conformance requirements

When the GANC decides to deactivate GA-PSR TC channel, it shall send GA-PSR-DEACTIVATE-UTC-REQ message to the MS to request the deactivation.

If the MS receives an unexpected GA-PSR-DEACTIVATE-UTC-ACK message response while the GA-PSR is in GA-PSR-ACTIVE state, the MS GA-PSR shall stop TU4001 timer, and release the GA-PSR TC. In parallel, the MS GA-PSR shall transition to GA-PSR-STANDBY state.

References

3GPP TS 44.318, subclauses 8.5.1 & 8.4.4.5

83.1.7.1.2 Test purpose

To verify that upon receiving a GA-PSR-DEACTIVATE-UTC-REQ message from the GANC, the MS releases the GA-PSR TC, sends the GA-PSR-DEACTIVATE-UTC-ACK message to the GANC indicating successful deactivation and MS GA-PSR enters the GA-PSR-STANDBY state.

83.1.7.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The SS initiates active state. The MS responds with GA-PSR-ACTIVATE-UTC-ACK. The SS initiates deactivation of the TC and sends GA-PSR-DEACTIVATE-UTC-ACK. The MS responds with GA-PSR-DEACTIVATE-UTC-ACK and enters the GA-PSR-STANDBY state. To confirm that the MS is in the GA-PSR-STANDBY state, the MS is triggered to send user data. Therefore, GA-PSR-ACTIVATE-UTC-REQ is expected to be sent from the MS. The SS sends GA-PSR-ACTIVATE-UTC-ACK message and waits for GA-PSR-UNITDATA.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	←		GA-PSR-ACTIVATE-UTC-REQ	SS initiated GA-PSR-ACTIVE state
2	→		GA-PSR-ACTIVATE-UTC-ACK	
3	←		GA-PSR-UNITDATA	
4	←		GA-PSR-DEACTIVATE-UTC-REQ	SS initiates the deactivation
5	→		GA-PSR-DEACTIVATE-UTC-ACK	MS response on deactivation
6				Trigger MS to send user data
7	→		GA-PSR-ACTIVATE-UTC-REQ	SS verifies that MS was in GA-PSR-STANDBY state in step 5.
8	←		GA-PSR-ACTIVATE-UTC-ACK	
8a	→		GA-PSR-UNITDATA	
9	←		GA-PSR-DEACTIVATE-UTC-REQ	SS initiates the deactivation
10	→		GA-PSR-DEACTIVATE-UTC-ACK	MS response on deactivation

Specific Message Contents

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83.1.8 Void

83.2 GA-PSR GPRS User Data Transport

83.2.1 GA-PSR GPRS User Data Transport , Normal Cases

83.2.1.1 MS Initiates Uplink GPRS User Data Transfer

83.2.1.1.1 Conformance requirements

The GPRS user data packets are tunnelled using UDP transport as specified for GA-PSR Transport Channel. Each packet is assigned a sequence number in the range of 0 to 65535 sequentially. The sequence number is set to 0 after reaching the maximum – 65535.

Assuming that the GA-PSR TC has been already activated as specified in sub-clauses 8.2 or 8.3, the MS GA-PSR is able to immediately forward any uplink GPRS user data packets to the GANC. Upon the request from the LLC to transfer an uplink LLC PDU with GPRS user data identified with LLC SAPI 3, 5, 9 or 11, the MS GA-PSR shall restart TU4001 timer and encapsulate the complete LLC PDU within a GA-PSR UNITDATA message.

Subsequently, the MS shall send the GA-PSR UNITDATA message to the GANC using the existing GA-PSR TC; i.e. using the corresponding GANC IP address and UDP port number.

The MS shall increment the uplink packet sequence number for each GA-PSR-UNITDATA message sent to the GANC.

References

 3GPP TS 44.318, subclauses 8.7 & 8.7.1.

83.2.1.1.2 Test purpose

To verify that MS:

 1) Uses corresponding GANC IP address and UDP port number,

 2) Transmits at least 65537 packets, and that each packet is assigned a sequence number in the range of 0 to 65535 sequentially.

 3) Assigns sequence number to 0 after reaching the maximum – 65535

83.2.1.1.3 Method of test

Initial Conditions

System Simulator:

 - 1 GAN cell, default parameters

Mobile Station:

 - MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated

Foreseen Final State of the MS

 MS in GA-PSR-STANDBY state in service of GAN cell.

Test Procedure

The MS activates the GA-PSR TC with the corresponding GANC IP address and UDP port number and immediately forwards uplink GPRS user data, which consist of 65537 of packets, being requested from the MS LLC, to the GANC. The MS tunnels the GPRS data packets using UDP transport, assigning number to the packets in range from 0 to 65535 sequentially. The MS increments the uplink packet sequence number for each GA-PSR-UNITDATA message, being sent to the GANC, and assigns the number 0 after reaching the 65535.

SS verifies that MS:

 1) Uses corresponding GANC IP address and UDP port number,

2) Transmits at least 65537 packets, and that each packet is assigned a sequence number in the range of 0 to 65535 sequentially.

3) Assigns sequence number to 0 after reaching the maximum – 65535

Maximum Duration of Test

30 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	**SS**		
1	→		GA-PSR-ACTIVATE-UTC-REQ	SS initiated GA-PSR-ACTIVE state
2	←		GA-PSR-ACTIVATE-UTC-ACK	SS sends IP address and UDP port number
3	→		GA-PSR-UNITDATA	MS sends at least 65537 packets, SS verified that the sequence number is set to 0 after reaching the maximum – 65535
4	→		GA-PSR-DEACTIVATE-UTC-REQ	Sent after TU4001 expires
5	←		GS-PSR DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.2.2 GA-PSR GPRS User Data Transport , Abnormal Cases

83.2.2.1 Void

83.2.2.2 Void

83.2.2.3 MS Receives a Downlink Message to Initiate Uplink GPRS User Data Transfer while the GA-PSR TC activation Procedure is in progress

83.2.2.3.1 Conformance requirements

Upon receiving a downlink message while the GA-PSR TC activation procedure is in progress (TU4002 timer is still running), the MS GA-PSR shall process the request as if the transport channel was active. The MS shall not initiate uplink GPRS user data transfer until the GA-PSR TC activation procedure is successfully completed (as specified in the subclause 8.2). The MS shall use the IP address and UDP port number received in the GA-PSR ACTIVATE UTC ACK message for sending uplink GPRS user data packets to the GANC on that transport channel.

References

3GPP TS 44.318, subclause 8.7.5.4

83.2.2.3.2 Test purpose

To verify that MS GA-PSR shall only use IP address and UDP port number received in the GA-PSR ACTIVATE UTC ACK message to send uplink GPRS user data packets to the SS

83.2.2.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated

Foreseen Final State of the MS

MS in GA-PSR-ACTIVE state in service of GAN cell.

Test Procedure

The MS receives a downlink message GA-PSR UNITDATA while Transport Channel activation is in progress. The MS activates the GA-PSR TC with the GANC IP address and UDP port number given in the GA-PSR ACTIVATE UTC ACK message and sends uplink GPRS user data.

SS verifies that MS:

1) GA-PSR shall only use IP address and UDP port number received in the GA-PSR ACTIVATE UTC ACK message to send uplink GPRS user data packets to the SS

Maximum Duration of Test

5 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	MS			MS in GA-PSR-STANDBY state
2	→		GA-PSR-ACTIVATE-UTC-REQ	MS initiates GA-PSR TC activation
3	←		GA-PSR-UNITDATA	SS initiates a GPRS user data transfer by sending GA_PSR UNIT DATA message with IP address and UDP port address
4	SS			Waiting for 2 sec to check MS does not send any data
5	←		GA-PSR-ACTIVATE-UTC-ACK	SS sends a different IP address and UDP port number than source IP address and UDP port number in step 3
6	MS			MS in GA-PSR-ACTIVE state
7	→		GA-PSR-UNITDATA	MS completes data transfer using new IP address and UDP port given in GA-PSR-ACTIVATE-UTC-ACK

Specific Message Contents

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83.3 Packet paging for packet service

83.3.1 PS Paging Request Processed by the MS, Normal Case

83.3.1.1 PS Paging Request Processed by the MS

83.3.1.1.1 Conformance requirements

Upon receiving a GA-PSR-PS-PAGE message from the GANC, the MS GA-PSR shall forward the indication to the GMM layer using the GMM RR SAP as per standard GPRS. Subsequently, the MS shall send an uplink LLC PDU as a page response per standard GPRS. The MS may either send GA-PSR-DATA or GA-PSR-UNITDATA message as described in sub-clauses 8.7 and 8.8.

References

3GPP TS 44.318, subclauses 8.9.2

83.3.1.1.2 Test purpose

To verify that the MS responds with GA-PSR-DATA message upon receiving a GA-PSR-PS-PAGE message from the GANC.

83.3.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Forseen Final State of the MS

MS in Idle state

Test Procedure

The SS sends the GA-PSR-PS-PAGE, paging the MS. The MS responds with GA-PSR-DATA. The SS checks the received data is the paging response.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction	Message	Comments
1	x		MS is in GA-PSR-STANDBY state
2	←	GA-PSR-PS-PAGE	MS is made to initiate GA-PSR TC
3	→	GA-PSR-DATA	SS verifies that the MS sends the GA-PSR-DATA Check that the received data is the paging reponse (Empty LLC PDU)

Specific Message Contents

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83.4 GPRS Suspend Procedure

83.4.1 GPRS Suspension Initiation by the MS, normal Case

83.4.1.1 GPRS Suspension Initiation by the MS

83.4.1.1.1 Conformance requirements

While transitioning to dedicated mode and if unable to support simultaneous CS and PS services, the MS shall request the suspension of the downlink GPRS data transfer by sending a GA-CSR GPRS SUSPENSION REQUEST message to the GANC

Upon receiving a GA-CSR GPRS SUSPENSION REQUEST message from the MS, the GANC completes the GPRS suspend procedure via the Gb interface as defined in [3GPP 48.018].

References

3GPP TS 44.318, subclauses 8.10.1 & 8.10.2

83.4.1.1.2 Test purpose

To verify that the MS requests the suspension of the downlink GPRS data transfer by sending a GA-CSR GPRS SUSPENSION REQUEST message to the GANC, while the MS is transitioning to dedicated mode and if the MS unable to support simultaneous CS and PS services.

83.4.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The SS initiates GA-PSR TC, sending the GA-PSR-ACTIVATE-UTC-REQ. The MS responds with GA-PSR-ACTIVATE-UTC-ACK. The SS sends data, sending GA-PSR-UNITDATA. The SS sends GA-CSR PAGING REQUEST, requesting transitioning of the MS to dedicated mode. MS sends GA-CSR GPRS SUSPENSION REQUEST. The SS verifies that the MS requests GPRS suspension.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	SS		
1	MS			MS is in GA-PSR-STANDBY state
2	←		GA-PSR-ACTIVATE-UTC-REQ	SS initiates GA-PSR TC
3	→		GA-PSR-ACTIVATE-UTC-ACK	
4	←		GA-PSR-UNITDATA	
5	←		GA-CSR PAGING REQUEST	
6	→		GA-CSR GPRS SUSPENSION REQUEST	SS verifies that the MS sends the GA-PSR-DATA message
7	←		GA-PSR-DEACTIVATE-UTC-REQ	SS deactivates
8	→		GS-PSR DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.5 Downlink Flow Control

83.5.1 Initiation of the Downlink Flow Control and Processing of the TU4003 Timer Expiry by the MS, Normal Case

83.5.1.1 Initiation of the Downlink Flow Control and Processing of the TU4003 Timer Expiry by the MS

83.5.1.1.1 Conformance requirements

Upon detecting the downlink flow control condition, the MS shall initiate a downlink flow control procedure by sending a GA-PSR-DFC-REQ message to the GANC via the existing GA-PSR TC. The message includes new estimated data rate that can be supported. At the same time the MS shall start timer TU4003 to continue monitoring the flow control condition. The timer TU4003 is specified in sub-clause 12.

When the TU4003 timer expires, the MS shall re-evaluate the flow control condition and perform the following based on the outcome of the evaluation:

- If the flow control condition still exists (e.g. downlink buffer utilization is still above the low watermark level), the MS shall calculate a new data rate that can be supported and forward the corresponding GA-PSR-DFC-REQ to the GANC via the existing GA-PSR TC. Simultaneously, the MS shall start timer TU4003 to continue monitoring the downlink data transfer.

- If the flow condition has been resolved (e.g. buffer utilization is below the low mark level), the MS shall not restart the TU4003 timer and shall stop sending flow control requests to the GANC.

References

3GPP TS 44.318, subclauses 8.11.1 & 8.11.3

83.5.1.1.2 Test purpose

To verify that:

1) If the flow control condition exists the MS calculates a new data rate that can be supported and forwards the corresponding GA-PSR-DFC-REQ to the GANC via the existing GA-PSR TC.

2) If the timer expires, the MS checks the downlink flow control condition, and if it continues to exist, the MS restarts the timer TU4003, and optionally sends another GA-PSR-DFC-REQ message to the GANC.

3) If the flow condition has been resolved (e.g. buffer utilization is below the low mark level), the MS not restarts the TU4003 timer and stops sending flow control requests to the GANC.

83.5.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Forseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

SS initiates the activation procedure and starts to transmit data. The MS detects flow control condition, sends the GA-PSR-DFC-REQ message and starts the TU4003 timer. SS reduces the data rate and continues to send the data. The SS verifies that the MS does not send GA-PSR-DFC-REQ message.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is in GA-PSR-STANDBY state
2	←		GA-PSR-ACTIVATE-UTC-REQ	SS initiates GA-PSR TC
3	→		GA-PSR-ACTIVATE-UTC-ACK	
4	←		GA-PSR-UNITDATA	SS sends data, with very high data rate to overflow the MS
5	→		GA-PSR-DFC-REQ	MS request DL Flow Control and starts TU4003
6	←		GA-PSR-UNITDATA	SS sends data, with normal data rate
7	SS			SS verifies that MS does not sends GA-PSR-DFC-REQ for the time exceeding TU4003
8		←	GA-PSR-DEACTIVATE-UTC-REQ	SS deactivates
9		→	GS-PSR DEACTIVATE-UTC-ACK	

Specific Message Contents

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83.6 Uplink Flow Control

83.6.1 Processing of the Uplink Flow Control Request by the MS, Normal Case

83.6.1.1 Processing of the Uplink Flow Control Request by the MS

83.6.1.1.1 Conformance requirements

Upon detecting the uplink flow control condition, the GANC initiates an uplink flow control procedure by sending a GA-PSR-UFC-REQUEST message to the MS via the existing GA-PSR TC. The request is PFC based if the packet flow management procedures are supported.

Upon receiving the GA-PSR-UFC-REQUEST message from the GANC, the MS adjusts the uplink data rate accordingly.

References

   3GPP TS 44.318, subclauses 8.12.1 & 8.12.2

83.6.1.1.2 Test purpose

To verify that the MS adjusts the uplink data rate accordingly with GA-PSR-UFC-REQUEST message received from the GANC.

83.6.1.1.3 Method of test

Initial Conditions

System Simulator:

   - 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Forseen Final State of the MS

MS in Idle state

Test Procedure

The MS activates GA-PSR TC and starts to send lowest data rate to the SS. SS requests UL Flow Control sending the GA-PSR-UFC-REQ. The MS sends the data with rate adjusted according to GA-PSR-UFC-REQ.

The SS verifies whether the MS sends the data with adjusted data rate.

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is in GA-PSR-STANDBY state
2	→		GA-PSR-ACTIVATE-UTC-REQ	SS is made to activate GA-PSR TC
3	←		GA-PSR-ACTIVATE-UTC-ACK	
4	→		GA-PSR-UNITDATA	MS sends data
5	←		GA-PSR-UFC-REQ	SS request UL Flow Control of 100 bits/s.
6	→		GA-PSR-UNITDATA	MS sends data with the adjusted data rate (100 bits/s), according with GA-PSR-UFC-REQ
7	SS			SS verifies whether the MS have adjusted data rate
8		←	GA-PSR-DEACTIVATE-UTC-REQ	SS initiates the deactivation
9		→	GA-PSR-DEACTIVATE-UTC-ACK	MS response on deactivation

Specific Message Contents

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83.6.2 Processing of the Uplink Flow Control Request by the MS, Abnormal Cases

83.6.2.1 GA-PSR TC in not Active

83.6.2.1.1 Conformance requirements

If the MS receives a GA-PSR-UFC-REQUEST message while the GA-PSR TC deactivation is in progress, the MS shall ignore the flow control request.

References

3GPP TS 44.318, subclauses 8.12.4.1.

83.6.2.1.2 Test purpose

To verify whether the MS ignores a flow control request received while the GA-PSR TC deactivation is in progress.

83.6.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS GA-PSR is in the GA-PSR-STANDBY state. PDP context 1 is activated.

Foreseen Final State of the MS

MS in GA-PSR-STANDBY state in service of GAN cell

Test Procedure

The MS is in GA-PSR STANDBY state. MS is made to activate GA-PSR TC .SS sends the GA-PSR-UFC-REQ after the MS has initiated deactivation procedure. The MS ignores the flow control request and does not abort deactivation procedure. This is checked by verifying that when asked to send data after expiration of TU4002, the MS sends GA-PSR-ACTIVATE-UTC-REQ..

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comments
	MS	**SS**		
1	MS			MS is in GA-PSR STANDBY state
2	□□-->		GA-PSR-ACTIVATE-UTC-REQ	MS is made to activate GA-PSR TC, by triggering UL data
3	<--		GA-PSR-ACTIVATE-UTC-ACK	
4	□□-->		GA PSR UNITDATA	MS sends data
5	-->		GA-PSR-DEACTIVATE-UTC-REQ	Sent after TU4001 expires
6	<--		GA-PSR-UFC-REQ	SS request UL Flow Control. Sent before TU4002 expires
7	SS			Wait 5s to allow TU4002 to expire
8				Trigger MS to initiate a data transfer
9	-->		GA-PSR-ACTIVATE-UTC-REQ	MS sends activation request
10	SS			SS verifies that MS sends activation request

Specific Message Contents

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84 GAN Iu Mode Procedures

84.1 Macros for GAN Iu mode

84.2 GA-RRC connection establishment

84.2.1 GA-RRC connection establishment / successful case

84.2.1.1 GA-RRC connection establishment, Upper Layer Message Transmission and GA-RRC connection release by GANC (CS domain)

84.2.1.1.1 Conformance requirement

The GAN Iu mode GA-RRC CS and PS connections are logical connections between the MS and the GANC. As described in 3GPP TS 43.318, the GA-RRC sub-layer in the MS contains two entities, the CS domain GA-RRC sublayer entity and the PS domain GA-RRC sublayer entity. These entities operate independently and in parallel; e.g., two GA-RRC connections are established in the case of simultaneous CS and PS services, one GA-RRC connection for each domain. Each GA-RRC sub-layer entity in the MS can be in one of two states, GA-RRC-IDLE or GA-RRC-CONNECTED.

A GA-RRC connection is established when the upper layers in the MS request the establishment of a signalling connection for either CS or PS domain and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for that domain; i.e., no GA-RRC connection exists. When a successful response is received from the network, GA-RRC replies to the upper layer that the GA-RRC sub-layer entity in the MS has entered the RRC connected mode (i.e., the GA-RRC-CONNECTED state). The upper layers then have the possibility to request transmission of NAS messages to the network.

The GA-RRC INITIAL DIRECT TRANSFER message is used to transfer the "initial" upper layer message for the domain (i.e., the first NAS message after GA-RRC connection establishment for the domain) from the MS to the GANC. Receipt of the GA-RRC INITIAL DIRECT TRANSFER message by the GANC triggers the establishment of the signalling connection to the indicated CN domain for the MS. The GA-RRC UPLINK DIRECT TRANSFER message is used to transfer all subsequent upper layer messages for the signalling connection from the MS to the GANC.

The GA-RRC DOWNLINK DIRECT TRANSFER message is used to transfer upper layer messages from the GANC to the MS.

The GANC initiates the GA-RRC connection release procedure to command the MS to release the GA-RRC connection and any user plane resources for a particular domain and instruct the GA-RRC sub-layer entity of the MS to leave the GA-RRC-CONNECTED state and return to the GA-RRC-IDLE state for the domain. The GANC normally initiates this procedure when it receives the Iu Release Command from the CN; however, the GANC may also initiate this procedure under certain failure conditions.

The GA-RRC RELEASE message includes the IE "GA-RRC Cause". The GA-RRC Cause value should be one of the following:

   #83: normal release; e.g., at the end of a call

   #115: unspecified failure

Other values, if received, should be treated as "unspecified failure".

When the GA-RRC sublayer entity in the MS receives the GA-RRC RELEASE message, it shall:

   - send a GA-RRC RELEASE COMPLETE message to the GANC,

   - release the GA-RRC connection and any user plane resources for the indicated domain,

   - stop timer TU5002 for the domain (if running),

   - stop timer TU5909 for the domain (if running), and

   - enter the GA-RRC-IDLE state for the domain.

Reference(s)

    3GPP TS 44.318 subclause 8a.1 / 8a.2 / 8a.5.3 / 8a.5.4

84.2.1.1.2 Test purpose

To verify all of the following for the CS domain.

To verify that MS is able to initiate GA-RRC connection establishment between the MS and GANC and to verify that MS is able to communicate with the CN by encapsulating NAS messages in the GA-RRC INITIAL DIRECT TRANSFER message (first NAS message after GA-RRC connection establishment) and GA-RRC UPLINK DIRECT TRANSFER message and able to receive upper layer messages within GA-RRC DOWNLINK DIRECT TRANSFER message.

To verify that MS is able to release the GA-RRC connection, able to move into GA-RRC-IDLE state and release all GA-RRC and any traffic channel resources, when the MS receives the GA-RRC RELEASE message from SS.

84.2.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

    - MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for CS domain.

Test Procedure

The MS is made to initiate a GA-RRC connection establishment for CS domain. The MS moves into GA-RRC-CONNECTED state when the MS receives the GA-RRC REQUEST ACCEPT message from the SS within timer TU5908 (5 sec.) from sending GA-RRC REQUEST message. SS verifies that MS sends GA-RRC INITIAL DIRECT TRANSFER message within 10s from GA-RRC REQUEST ACCEPT message. The SS answers by sending upper layer message within GA-RRC DOWNLINK DIRECT TRANSFER container message.

The SS sends GA-RRC RELEASE message. The MS enters GA-RRC-IDLE state and transmits a GA-RRC RELEASE COMPLETE to the SS and releases all GA-RRC and any traffic channel resources.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates CS domain
4	←		GA-RRC REQUEST ACCEPT	IE 'CN Domain Identity' indicates CS domain
5	MS			MS in GA-RRC-CONNECTED state for CS domain

6	→	GA-RRC INITIAL DIRECT TRANSFER	Within 10s from GA-RRC REQUEST ACCEPT message Containing NAS message IE 'CN Domain Identity' indicates CS domain
7	←	GA-RRC DOWNLINK DIRECT TRANSFER	Containing NAS message IE 'CN Domain Identity' indicates CS domain
8	←	GA-RRC RELEASE	IE 'GA-RRC Cause' indicates #83 IE 'CN Domain Identity' indicates CS domain
9	→	GA-RRC RELEASE COMPLETE	MS enters GA-RRC-IDLE state IE 'CN Domain Identity' indicates CS domain

84.2.1.2 GA-RRC connection establishment, Upper Layer Message Transmission and GA-RRC connection release by GANC (PS domain)

84.2.1.2.1 Conformance requirement

The GAN Iu mode GA-RRC CS and PS connections are logical connections between the MS and the GANC. As described in 3GPP TS 43.318, the GA-RRC sub-layer in the MS contains two entities, the CS domain GA-RRC sublayer entity and the PS domain GA-RRC sublayer entity. These entities operate independently and in parallel; e.g., two GA-RRC connections are established in the case of simultaneous CS and PS services, one GA-RRC connection for each domain. Each GA-RRC sub-layer entity in the MS can be in one of two states, GA-RRC-IDLE or GA-RRC-CONNECTED.

A GA-RRC connection is established when the upper layers in the MS request the establishment of a signalling connection for either CS or PS domain and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for that domain; i.e., no GA-RRC connection exists. When a successful response is received from the network, GA-RRC replies to the upper layer that the GA-RRC sub-layer entity in the MS has entered the RRC connected mode (i.e., the GA-RRC-CONNECTED state). The upper layers then have the possibility to request transmission of NAS messages to the network.

The GA-RRC INITIAL DIRECT TRANSFER message is used to transfer the "initial" upper layer message for the domain (i.e., the first NAS message after GA-RRC connection establishment for the domain) from the MS to the GANC. Receipt of the GA-RRC INITIAL DIRECT TRANSFER message by the GANC triggers the establishment of the signalling connection to the indicated CN domain for the MS. The GA-RRC UPLINK DIRECT TRANSFER message is used to transfer all subsequent upper layer messages for the signalling connection from the MS to the GANC.

The GA-RRC DOWNLINK DIRECT TRANSFER message is used to transfer upper layer messages from the GANC to the MS.

The GANC initiates the GA-RRC connection release procedure to command the MS to release the GA-RRC connection and any user plane resources for a particular domain and instruct the GA-RRC sub-layer entity of the MS to leave the GA-RRC-CONNECTED state and return to the GA-RRC-IDLE state for the domain. The GANC normally initiates this procedure when it receives the Iu Release Command from the CN; however, the GANC may also initiate this procedure under certain failure conditions.

The GA-RRC RELEASE message includes the IE "GA-RRC Cause". The GA-RRC Cause value should be one of the following:

   #83: normal release; e.g., at the end of a call

   #115: unspecified failure

Other values, if received, should be treated as "unspecified failure".

When the GA-RRC sublayer entity in the MS receives the GA-RRC RELEASE message, it shall:

   - send a GA-RRC RELEASE COMPLETE message to the GANC,

   - release the GA-RRC connection and any user plane resources for the indicated domain,

- stop timer TU5002 for the domain (if running),

- stop timer TU5909 for the domain (if running), and

- enter the GA-RRC-IDLE state for the domain.

Reference(s)

3GPP TS 44.318 subclause 8a.1 / 8a.2 / 8a.5.3 / 8a.5.4

84.2.1.2.2 Test purpose

To verify all of the following for the PS domain.

To verify that MS is able to initiate GA-RRC connection establishment between the MS and GANC and to verify that MS is able to communicate with the CN by encapsulating NAS messages in the GA-RRC INITIAL DIRECT TRANSFER message (first NAS message after GA-RRC connection establishment) and GA-RRC UPLINK DIRECT TRANSFER message and able to receive upper layer messages within GA-RRC DOWNLINK DIRECT TRANSFER message.

To verify that MS is able to release the GA-RRC connection, able to move into GA-RRC-IDLE state and release all GA-RRC and any traffic channel resources, when the MS receives the GA-RRC RELEASE message from SS.

84.2.1.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for PS domain.

Test Procedure

The MS is made to initiate a GA-RRC connection establishment for PS domain. The MS moves into GA-RRC-CONNECTED state when the MS receives the GA-RRC REQUEST ACCEPT message from the SS within timer TU5908 (5 sec.) from sending GA-RRC REQUEST message. SS verifies that MS sends GA-RRC INITIAL DIRECT TRANSFER message within 10s from GA-RRC REQUEST ACCEPT message. The SS answers by sending upper layer message within GA-RRC DOWNLINK DIRECT TRANSFER container message.

The SS sends GA-RRC RELEASE message. The MS enters GA-RRC-IDLE state and transmits a GA-RRC RELEASE COMPLETE to the SS and releases all GA-RRC and any traffic channel resources.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates PS domain

4	←	GA-RRC REQUEST ACCEPT	IE 'CN Domain Identity' indicates PS domain
5	MS		MS in GA-RRC-CONNECTED state for PS domain
6	→	GA-RRC INITIAL DIRECT TRANSFER	Within 10s from GA-RRC REQUEST ACCEPT message Containing NAS message IE 'CN Domain Identity' indicates PS domain
7	←	GA-RRC DOWNLINK DIRECT TRANSFER	Containing NAS message IE 'CN Domain Identity' indicates PS domain
8	←	GA-RRC RELEASE	IE 'GA-RRC Cause' indicates #83 IE 'CN Domain Identity' indicates PS domain
9	→	GA-RRC RELEASE COMPLETE	MS enters GA-RRC-IDLE state IE 'CN Domain Identity' indicates PS domain

84.2.2 GA-RRC connection establishment / negative cases

84.2.2.1 GA-RRC REQUEST rejected (CS domain)

84.2.2.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.1.2.2:

If the GANC rejects the GA-RRC connection establishment request, it shall send the GA-RRC REQUEST REJECT message to the MS including the IE "CN Domain Identity".

3GPP TS 44.318 subclause 8a.1.3.2:

When the MS receives the GA-RRC REQUEST REJECT message, it shall:

- if timer TU5908 is active for the domain indicated by the IE "CN Domain Identity":

- stop timer TU5908 for that domain,

- remain in the GA-RRC-IDLE state for that domain, and

- indicate to upper layers that GA-RRC was not able to enter the connected state for that domain;

- if timer TU5908 is not active for the domain indicated by the IE "CN Domain Identity":

- ignore the GA-RRC REQUEST REJECT message, and

- continue with the procedure as if the GA-RRC REQUEST REJECT message was not received.

3GPP TS 44.318 subclause 8a.3.2:

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

- if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

- if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

   3GPP TS 44.318 subclauses 8a.1.2.2 / 8a.1.3.2 / 8a.3.2

84.2.2.1.2   Test purpose

To verify that MS will remain in GA-RRC-IDLE state (CS domain) when MS receives the GA-RRC REQUEST REJECT message (CS domain).

84.2.2.1.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

   - MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC- IDLE state for CS domain.

Test Procedure

The MS is made to initiate a GA-RRC connection establishment for CS domain. SS sends the GA-RRC REQUEST REJECT message to the MS. MS is not able to enter GA-RRC-CONNECTED state. The SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER message containing paging response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates CS domain TU5908 is started
4	←		GA-RRC REQUEST REJECT	The SS sends GA-RRC REQUEST REJECT before the expiry of TU5908. IE 'CN Domain Identity' indicates CS domain
5	MS			MS in GA-RRC-IDLE state for CS domain
6	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain

7	→	GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-CONNECTED state for CS domain
8	←	GA-RRC RELEASE	IE 'RR cause' indicates #83 IE 'CN Domain Identity' indicates CS domain
9	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.2.2.2   MS receives GA-RRC REQUEST ACCEPT message after TU5908 expiry (CS domain)

84.2.2.2.1   Conformance requirement

If the GANC accepts the GA-RRC connection establishment request, it shall send the GA-RRC REQUEST ACCEPT message to the MS including the IE "CN Domain Identity".

When the MS receives the GA-RRC REQUEST ACCEPT message, it shall:

-   if timer TU5908 is active for the domain indicated by the IE "CN Domain Identity":

-   stop timer TU5908 for that domain,

-   move into the GA-RRC-CONNECTED state for that domain,

-   indicate to upper layers that GA-RRC has entered the connected state for that domain, and

-   send the GA-RRC INITIAL DIRECT TRANSFER message to the network;

-   if timer TU5908 is not active for the domain indicated by the IE "CN Domain Identity":

-   ignore the GA-RRC REQUEST ACCEPT message, and

-   continue with the procedure as if the GA-RRC REQUEST ACCEPT message was not received.

If timer TU5908 expires in the MS, the GA-RRC sub-layer entity in the MS shall remain in the GA-RRC-IDLE state and indicate to upper layers that GA-RRC was not able to enter the connected state for the domain.

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

-   if timer TU5908 is not active for the domain and access to the network is allowed:

-   indicate reception of paging to upper layers, and

-   forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

-   Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

-   if timer TU5908 is active for the domain:

-   ignore the GA-RRC PAGING REQUEST message, and

-   continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclauses 8a.1.2.1 / 8a.1.3.1 / 8a.1.4.1 / 8a.3.2

84.2.2.2.2 Test purpose

To verify that MS will remain in GA-RRC IDLE state (CS domain) if TU5908 expires before MS receives the GA-RRC REQUEST ACCEPT message (CS domain).

84.2.2.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC- IDLE state for CS domain.

Test Procedure

The MS is made to initiate a GA-RRC connection establishment for CS domain. MS receives the GA-RRC REQUEST ACCEPT message from the SS after timer TU5908 (5 sec.) expires. MS remains in GA-RRC IDLE state. The MS may send GA-RRC-REQUEST message due to upper layer requesting to restart the higher layer procedure which verifies that MS has been in GA-RRC-IDLE state. If GA-RRC-REQUEST message is not received, the SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER message containing paging response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates CS domain
4	SS			SS waits 5 seconds after SS has received the GA-RRC REQUEST message
5	MS			TU5908 expires
6	←		GA-RRC REQUEST ACCEPT	IE 'CN Domain Identity' indicates CS domain
7	MS			MS ignores the GA-RRC REQUEST ACCEPT message and remains in GA-RRC-IDLE state for CS domain

7a (optional)	→	GA-RRC REQUEST	MS may send GA-RRC-REQUEST message due to upper layer restarting the higher layer procedure. This verifies that the MS has been in GA-RRC-IDLE state. IE 'CN Domain Identity' indicates CS domain
8 (conditional)	←	GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain
9 (conditional)	→	GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-CONNECTED state for CS domain
10 (conditional)	←	GA-RRC RELEASE	IE 'GA-RRC Cause' indicates #83 IE 'CN Domain Identity' indicates CS domain
11 (conditional)	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain
NOTE:	Steps 8-11 are not applicable If GA-RRC-REQUEST message is received in step 7a		

84.2.2.3 GA-RRC REQUEST rejected (PS domain)

84.2.2.3.1 Conformance requirement

3GPP TS 44.318 subclause 8a.1.2.2:

If the GANC rejects the GA-RRC connection establishment request, it shall send the GA-RRC REQUEST REJECT message to the MS including the IE "CN Domain Identity".

3GPP TS 44.318 subclause 8a.1.3.2:

When the MS receives the GA-RRC REQUEST REJECT message, it shall:

- if timer TU5908 is active for the domain indicated by the IE "CN Domain Identity":

- stop timer TU5908 for that domain,

- remain in the GA-RRC-IDLE state for that domain, and

- indicate to upper layers that GA-RRC was not able to enter the connected state for that domain;

- if timer TU5908 is not active for the domain indicated by the IE "CN Domain Identity":

- ignore the GA-RRC REQUEST REJECT message, and

- continue with the procedure as if the GA-RRC REQUEST REJECT message was not received.

3GPP TS 44.318 subclause 8a.3.2:

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

- if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

- if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclauses 8a.1.2.2 / 8a.1.3.2 / 8a.3.2

84.2.2.3.2 Test purpose

To verify that MS will remain in GA-RRC-IDLE state (PS domain) when MS receives the GA-RRC REQUEST REJECT message (PS domain).

84.2.2.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC- IDLE state for PS domain.

Test Procedure

The MS is made to initiate a GA-RRC connection establishment for PS domain. SS sends the GA-RRC REQUEST REJECT message to the MS. MS is not able to enter GA-RRC-CONNECTED state. The SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER message containing paging response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates PS domain TU5908 is started
4	←		GA-RRC REQUEST REJECT	The SS sends GA-RRC REQUEST REJECT before the expiry of TU5908. IE 'CN Domain Identity' indicates PS domain
5	MS			MS in GA-RRC-IDLE state for PS domain

6	←	GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
7	→	GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-CONNECTED state for PS domain
8	←	GA-RRC RELEASE	IE 'RR cause' indicates #83 IE 'CN Domain Identity' indicates PS domain
9	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.2.2.4 MS receives GA-RRC REQUEST ACCEPT message after TU5908 expiry (PS domain)

84.2.2.4.1 Conformance requirement

If the GANC accepts the GA-RRC connection establishment request, it shall send the GA-RRC REQUEST ACCEPT message to the MS including the IE "CN Domain Identity".

When the MS receives the GA-RRC REQUEST ACCEPT message, it shall:

- if timer TU5908 is active for the domain indicated by the IE "CN Domain Identity":

- stop timer TU5908 for that domain,

- move into the GA-RRC-CONNECTED state for that domain,

- indicate to upper layers that GA-RRC has entered the connected state for that domain, and

- send the GA-RRC INITIAL DIRECT TRANSFER message to the network;

- if timer TU5908 is not active for the domain indicated by the IE "CN Domain Identity":

- ignore the GA-RRC REQUEST ACCEPT message, and

- continue with the procedure as if the GA-RRC REQUEST ACCEPT message was not received.

If timer TU5908 expires in the MS, the GA-RRC sub-layer entity in the MS shall remain in the GA-RRC-IDLE state and indicate to upper layers that GA-RRC was not able to enter the connected state for the domain.

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

- if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

- if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

> 3GPP TS 44.318 subclauses 8a.1.2.1 / 8a.1.3.1 / 8a.1.4.1 / 8a.3.2

84.2.2.4.2 Test purpose

To verify that MS will remain in GA-RRC IDLE state (PS domain) if TU5908 expires before MS receives the GA-RRC REQUEST ACCEPT message (PS domain).

84.2.2.4.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for PS domain.

Test Procedure

The MS is made to initiate a GA-RRC connection establishment for PS domain. MS receives the GA-RRC REQUEST ACCEPT message from the SS after timer TU5908 (5 sec.) expires. MS remains in GA-RRC IDLE state. The MS may send GA-RRC-REQUEST message due to upper layer requesting to restart the higher layer procedure which verifies that MS has been in GA-RRC-IDLE state. If GA-RRC-REQUEST message is not received, the SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER message containing paging response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection
2	MS			MS checks for access permission based on Access Control Class bits
3	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates PS domain
4	SS			SS waits 5 seconds after SS has received the GA-RRC REQUEST message
5	MS			TU5908 expires
6	←		GA-RRC REQUEST ACCEPT	IE 'CN Domain Identity' indicates PS domain
7	MS			MS ignores the GA-RRC REQUEST ACCEPT message and remains in GA-RRC-IDLE state for PS domain

7a (optional)	→	GA-RRC REQUEST	MS may send GA-RRC-REQUEST message due to upper layer restarting the higher layer procedure. This verifies that the MS has been in GA-RRC-IDLE state. IE 'CN Domain Identity' indicates PS domain
8 (conditional)	←	GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
9 (conditional)	→	GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-CONNECTED state for PS domain
10 (conditional)	←	GA-RRC RELEASE	IE 'GA-RRC Cause' indicates #83 IE 'CN Domain Identity' indicates PS domain
11 (conditional)	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain
NOTE:	Steps 8-11 are not applicable If GA-RRC-REQUEST message is received in step 7a		

84.3 Upper layer message transmission

84.3.1 Upper layer message transmission / successful cases

84.3.1.1 Void

84.3.2 Upper layer message transmission / negative cases

84.3.2.1 MS receives GA-RRC DOWNLINK DIRECT TRANSFER message when not in GA-RRC-CONNECTED state (CS domain)

84.3.2.1.1 Conformance requirement

If the MS receives a GA-RRC DOWNLINK DIRECT TRANSFER message and GA-RRC sub-layer entity in the MS is not in GA-RRC-CONNECTED state for the indicated domain, the MS shall:

- ignore the contents of the GA-RRC DOWNLINK DIRECT TRANSFER message;

- transmit a GA-RRC STATUS message to the GANC as follows:

- set the IE "GA-RRC Cause" to "Message type not compatible with protocol state"

- include the received message contents in the IE "PDU in Error"

- continue with any ongoing procedure and act as if the GA-RRC DOWNLINK DIRECT TRANSFER message was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.2.6.1

84.3.2.1.2 Test purpose

To verify that MS ignores the contents of the GA-RRC DOWNLINK DIRECT TRANSFER message (CS domain) if MS is not in GA-RRC-CONNECTED state (CS domain) and to be able to send GA-RRC STATUS message to the SS.

84.3.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Test Procedure

MS is in GA-RRC-IDLE state for CS domain in service of GAN cell. SS sends GA-RRC DOWNLINK DIRECT TRANSFER message containing upper layer message. MS ignores the contents of the message and sends GA-RRC STATUS message to the SS with IE 'GA-RRC Cause': 'Message type not compatible with protocol state'. MS includes the received message contents in the IE 'PDU in error'.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in GA-RRC-IDLE state for CS domain
2	←		GA-RRC DOWNLINK DIRECT TRANSFER	Containing (DL) CC/MM/SS/SMS message IE 'CN Domain Identity' indicates CS domain
3	→		GA-RRC STATUS	IE 'CN Domain Identity' indicates CS domain IE 'GA-RRC Cause' indicates #99 IE PDU in Error: '<received (DL) message>'

84.3.2.2 MS receives GA-RRC DOWNLINK DIRECT TRANSFER message when not in GA-RRC-CONNECTED state (PS domain)

84.3.2.2.1 Conformance requirement

If the MS receives a GA-RRC DOWNLINK DIRECT TRANSFER message and GA-RRC sub-layer entity in the MS is not in GA-RRC-CONNECTED state for the indicated domain, the MS shall:

- ignore the contents of the GA-RRC DOWNLINK DIRECT TRANSFER message;

- transmit a GA-RRC STATUS message to the GANC as follows:

- set the IE "GA-RRC Cause" to "Message type not compatible with protocol state"

- include the received message contents in the IE "PDU in Error"

- continue with any ongoing procedure and act as if the GA-RRC DOWNLINK DIRECT TRANSFER message was not received.

Reference(s)

> 3GPP TS 44.318 subclause 8a.2.6.1

84.3.2.2.2 Test purpose

To verify that MS ignores the contents of the GA-RRC DOWNLINK DIRECT TRANSFER message (PS domain) if MS is not in GA-RRC-CONNECTED state (PS domain) and to be able to send GA-RRC STATUS message to the SS.

84.3.2.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Test Procedure

MS is in GA-RRC-IDLE state for PS domain in service of GAN cell. SS sends GA-RRC DOWNLINK DIRECT TRANSFER message containing upper layer message. MS ignores the contents of the message and sends GA-RRC STATUS message to the SS with IE 'GA-RRC Cause': 'Message type not compatible with protocol state'. MS includes the received message contents in the IE 'PDU in error'.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-RRC-IDLE state for PS domain
2	←		GA-RRC DOWNLINK DIRECT TRANSFER	Containing (DL) CC/MM/SS/SMS message IE 'CN Domain Identity' indicates PS domain
3	→		GA-RRC STATUS	IE 'CN Domain Identity' indicates PS domain IE 'GA-RRC Cause' indicates #99 IE PDU in Error: '<received (DL) message>'

84.4 Paging

84.4.1 Paging for CS domain / successful cases

84.4.1.1 Paging for CS domain

84.4.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.3.1:

The GANC sends the GA-RRC PAGING REQUEST message to the MS when the GANC receives a PAGING message over the Iu interface from a CN domain. The IMSI of the MS to be paged is identified by the IE "Permanent NAS UE Identity" received in the request from the CN. If the request also includes the (P-)TMSI then the GANC shall include the (P-)TMSI in the IE "Mobile Identity"; else the GANC shall include the IMSI in the IE "Mobile Identity". The GANC also includes the IE "CN Domain Identity" and the IE "GA-RRC Paging Cause", if a cause is received from the CN.

3GPP TS 44.318 subclause 8a.3.2:

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

-    if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

-    if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

3GPP TS 44.318 subclause 8a.3.3:

If the MS receives a GA-RRC PAGING REQUEST and the mobile identity included in the message does not match any of the valid identities assigned to the MS, the MS shall:

-    ignore the GA-RRC PAGING REQUEST message, and

-    continue with any ongoing procedure as if the GA-RRC PAGING REQUEST message was not received.

Reference(s)

   3GPP TS 44.318 subclauses 8a.3.1 / 8a.3.2 / 8a.3.3

84.4.1.1.2   Test purpose

To verify all of the following for the CS domain.

To verify that MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure, if received GA-RRC PAGING REQUEST doesn't contain valid identity.

To verify that MS is able send a GA-RRC INITIAL DIRECT TRANSFER containing a page response to the SS and enter GA-RRC-CONNECTED state when MS receives GA-RRC PAGING REQUEST with valid identities of the MS.

84.4.1.1.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

-    MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Test Procedure

The SS initiates paging procedure by sending GA-RRC PAGING REQUEST message with not matching identity to the MS. MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received. After 10s the SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER message containg page response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RRC PAGING REQUEST	With not matching identity IE 'CN Domain Identity' indicates CS domain
2	MS			MS ignores GA-RRC PAGING REQUEST message
3	SS			SS waits 10s for response
4	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain
5	→		GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-CONNECTED state for CS domain
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.4.2 Paging for CS domain / negative cases

84.4.2.1 Void

84.4.2.2 Paging for CS domain / negative cases / MS receives GA-RRC PAGING REQUEST when TU5908 is active

84.4.2.2.1 Conformance requirement

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

- if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

   - if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.3.2

84.4.2.2.2 Test purpose

To verify that MS discards the received GA-RRC PAGING REQUEST message (indicating CS domain page) if timer TU5908 is active for the CS domain.

84.4.2.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

   - MS in GA-RRC-IDLE state for CS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for CS domain.

Test Procedure

MS is made to initiate GA-RRC connection for CS domain. MS sends GA-RRC REQUEST message and activates timer TU5908. The SS initiates paging procedure by sending GA-RRC PAGING REQUEST message to the MS when TU5908 is active in MS. MS discards the received GA-RRC PAGING REQUEST message. After TU5908 expiry the SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS may answer by sending GA-RRC INITIAL DIRECT TRANSFER or re-establish the GA-RRC connection by re-sending GA-RRC REQUEST message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection for CS domain
2	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates CS domain MS activates TU5908 for CS domain
3	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI'), sent before TU5908 expiry IE 'CN Domain Identity' indicates CS domain
4	MS			MS discards GA-RRC PAGING REQUEST message

5	SS		SS waits for TU5908 to expire. The MS may resend GA-RRC REQUEST after the expiry of TU5908. The following steps are executed only if no GA-RRC REQUEST is received from the MS.
6	←	GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain
7	→	GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-CONNECTED state for CS domain
8	←	GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
9	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.4.2.3 Paging for CS domain / negative cases / MS receives GA-RRC PAGING REQUEST when in GA-RRC-CONNECTED state

84.4.2.3.1 Conformance requirement

If the MS receives a GA-RRC PAGING REQUEST message and the GA-RRC sublayer entity in the MS is in GA-RRC-CONNECTED state for the indicated domain or the MS is in the GA-RC-REGISTERED state but in GERAN/UTRAN mode, the MS shall:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.3.3

84.4.2.3.2 Test purpose

To verify that MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received, if MS receives GA-RRC PAGING REQUEST indicating CS domain when MS is in GA-RRC-CONNECTED state for the CS domain.

84.4.2.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state for CS domain in service of GAN cell.

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for CS domain in service of GAN cell.

Test Procedure

The MS is in GA-RRC-CONNECTED state for CS domain in service of GAN cell. The SS initiates paging procedure by sending GA-RRC PAGING REQUEST message to the MS. The MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received. After 10s the SS sends

GA-RRC RELEASE to verify that MS in GA-RRC-CONNECTED state. MS answers by sending GA-RRC RELEASE COMPLETE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-RRC-CONNECTED state for CS domain with ongoing procedure
2	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain
3	MS			MS ignores the GA-RRC PAGING REQUEST and continues with ongoing procedure
4	SS			SS waits 10s for response
5	←		GA-RRC RELEASE	IE 'GA-RRC Cause' IE 'CN Domain Identity' indicates CS domain
6	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.4.2.4 Paging for CS domain / negative cases / MS receives GA-RRC PAGING REQUEST when in GA-RC REGISTERED state

84.4.2.4.1 Conformance requirement

If the MS receives a GA-RRC PAGING REQUEST message and the GA-RRC sublayer entity in the MS is in GA-RRC-CONNECTED state for the indicated domain or the MS is in the GA-RC-REGISTERED state but in GERAN/UTRAN mode, the MS shall:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.3.3

84.4.2.4.2 Test purpose

To verify that MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received, if MS receives GA-RRC PAGING REQUEST when MS is in GA-RC-REGISTERED state but in GERAN/UTRAN mode.

84.4.2.4.3 Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GERAN mode camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for the CS domain.

Test Procedure

MS is camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state. The SS initiates CS domain paging procedure by sending GA-RRC PAGING REQUEST message to the MS. The MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received. After 10s, the voice call is deactivated to switch the serving RR entity to GA-RRC. The SS waits 30 seconds to ensure that the MS enters the GA-RRC-IDLE state (CS domain) and sends GA-RRC PAGING REQUEST (CS domain) to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER (CS domain) message containing the page response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state
2	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain
3	MS			MS ignores the GA-RRC PAGING REQUEST and continues with ongoing procedure
4	SS			SS waits 10s for response
5	MS			The voice call is deactivated to switch the serving RR entity to GA-RRC-IDLE state.
6	SS			Wait 30 seconds to ensure that the MS enters GA-RRC-IDLE state.
7	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates CS domain
8	→		GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-CONNECTED state for CS domain
9	←		GA-RRC RELEASE	IE 'CN Domain Identity' indicates CS domain IE 'GA-RRC Cause' indicates #83
10	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.4.3   Paging for PS domain / successful cases

84.4.3.1   Paging for PS domain

84.4.3.1.1   Conformance requirement

3GPP TS 44.318 subclause 8a.3.1:

The GANC sends the GA-RRC PAGING REQUEST message to the MS when the GANC receives a PAGING message over the Iu interface from a CN domain. The IMSI of the MS to be paged is identified by the IE "Permanent NAS UE Identity" received in the request from the CN. If the request also includes the (P-)TMSI then the GANC shall include the (P-)TMSI in the IE "Mobile Identity"; else the GANC shall include the IMSI in the IE "Mobile Identity". The GANC also includes the IE "CN Domain Identity" and the IE "GA-RRC Paging Cause", if a cause is received from the CN.

3GPP TS 44.318 subclause 8a.3.2:

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

- if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

- if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

3GPP TS 44.318 subclause 8a.3.3:

If the MS receives a GA-RRC PAGING REQUEST and the mobile identity included in the message does not match any of the valid identities assigned to the MS, the MS shall:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with any ongoing procedure as if the GA-RRC PAGING REQUEST message was not received.

Reference(s)

3GPP TS 44.318 subclauses 8a.3.1 / 8a.3.2 / 8a.3.3

84.4.3.1.2   Test purpose

To verify all of the following for the PS domain.

To verify that MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure, if received GA-RRC PAGING REQUEST doesn't contain valid identity.

To verify that MS is able send a GA-RRC INITIAL DIRECT TRANSFER containing a page response to the SS and enter GA-RRC-CONNECTED state when MS receives GA-RRC PAGING REQUEST with valid identities of the MS.

84.4.3.1.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Test Procedure

The SS initiates paging procedure by sending GA-RRC PAGING REQUEST message with not matching identity to the MS. MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received. After 10s the SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER message containg page response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	←		GA-RRC PAGING REQUEST	With not matching identity IE 'CN Domain Identity' indicates PS domain
2	MS			MS ignores GA-RRC PAGING REQUEST message
3	SS			SS waits 10s for response
4	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
5	→		GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-CONNECTED state for PS domain
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.4.4 Paging for PS domain / negative cases

84.4.4.1 Void

84.4.4.2 Paging for PS domain / negative cases / MS receives GA-RRC PAGING REQUEST when TU5908 is active

84.4.4.2.1 Conformance requirement

If the mobile identity in the GA-RRC PAGING REQUEST message matches any of the valid identities of the MS and the GA-RRC sub-layer entity in the MS is in the GA-RRC-IDLE state for the indicated domain, the MS shall:

- if timer TU5908 is not active for the domain and access to the network is allowed:

- indicate reception of paging to upper layers, and

- forward the IE "CN Domain Identity", the IE "Mobile Identity" and the IE "Paging Cause" (if received) to the upper layers;

- Note: The upper layers will request the establishment of a signalling connection and the transmission of the paging response in the initial NAS message. This results in the implicit establishment of the GA-RRC connection (i.e., the GA-RRC sub-layer entity in the MS enters the GA-RRC CONNECTED state) and the transmission of the paging response from the MS to the GANC in the GA-RRC INITIAL DIRECT TRANSFER message, as shown in Figure 8a.3.1.

  - if timer TU5908 is active for the domain:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with the ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.3.2

84.4.4.2.2 Test purpose

To verify that MS discards the received GA-RRC PAGING REQUEST message (indicating PS domain page) if timer TU5908 is active for the PS domain.

84.4.4.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

  - MS in GA-RRC-IDLE state for PS domain in service of GAN cell

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for PS domain.

Test Procedure

MS is made to initiate GA-RRC connection for PS domain. MS sends GA-RRC REQUEST message and activates timer TU5908. The SS initiates paging procedure by sending GA-RRC PAGING REQUEST message to the MS when TU5908 is active in MS. MS discards the received GA-RRC PAGING REQUEST message. After TU5908 expiry the SS sends GA-RRC PAGING REQUEST to verify that MS in GA-RRC-IDLE state. MS may answer by sending GA-RRC INITIAL DIRECT TRANSFER or re-establish the GA-RRC connection by re-sending GA-RRC REQUEST message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is made to initiate GA-RRC connection for PS domain
2	→		GA-RRC REQUEST	IE 'CN Domain Identity' indicates PS domain MS activates TU5908 for PS domain

3	←	GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI'), sent before TU5908 expiry IE 'CN Domain Identity' indicates PS domain
4	MS		MS discards GA-RRC PAGING REQUEST message
5	SS		SS waits for TU5908 to expire. The MS may resend GA-RRC REQUEST after the expiry of TU5908. The following steps are executed only if no GA-RRC REQUEST is received from the MS.
6	←	GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
7	→	GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-CONNECTED state for PS domain
8	←	GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
9	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.4.4.3 Paging for PS domain / negative cases / MS receives GA-RRC PAGING REQUEST when in GA-RRC-CONNECTED state

84.4.4.3.1 Conformance requirement

If the MS receives a GA-RRC PAGING REQUEST message and the GA-RRC sublayer entity in the MS is in GA-RRC-CONNECTED state for the indicated domain or the MS is in the GA-RC-REGISTERED state but in GERAN/UTRAN mode, the MS shall:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.3.3

84.4.4.3.2 Test purpose

To verify that MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received, if MS receives GA-RRC PAGING REQUEST indicating PS domain when MS is in GA-RRC-CONNECTED state for the PS domain.

84.4.4.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state for PS domain in service of GAN cell.

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for PS domain in service of GAN cell.

Test Procedure

The MS is in GA-RRC-CONNECTED state for PS domain in service of GAN cell. The SS initiates paging procedure by sending GA-RRC PAGING REQUEST message to the MS. The MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received. After 10s the SS sends GA-RRC RELEASE to verify that MS in GA-RRC-CONNECTED state. MS answers by sending GA-RRC RELEASE COMPLETE.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-RRC-CONNECTED state for PS domain with ongoing procedure
2	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
3	MS			MS ignores the GA-RRC PAGING REQUEST and continues with ongoing procedure
4	SS			SS waits 10s for response
5	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
6	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.4.4.4   Paging for PS domain / negative cases / MS receives GA-RRC PAGING REQUEST when in GA-RC REGISTERED state

84.4.4.4.1   Conformance requirement

If the MS receives a GA-RRC PAGING REQUEST message and the GA-RRC sublayer entity in the MS is in GA-RRC-CONNECTED state for the indicated domain or the MS is in the GA-RC-REGISTERED state but in GERAN/UTRAN mode, the MS shall:

- ignore the GA-RRC PAGING REQUEST message, and

- continue with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received.

Reference(s)

3GPP TS 44.318 subclause 8a.3.3

84.4.4.4.2   Test purpose

To verify that MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received, if MS receives GA-RRC PAGING REQUEST when MS is in GA-RC-REGISTERED state but in GERAN/UTRAN mode.

84.4.4.4.3   Method of test

Initial Conditions

System Simulator:

- 2 cells: GERAN cell & GAN cell

- 1 GERAN cell, default parameters

- 1 GAN cell, default parameters

Mobile Station:

- MS in GERAN mode camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state

Foreseen Final State of the MS

MS in GA-RRC-IDLE state for the PS domain.

Test Procedure

MS is camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state. The SS initiates PS domain paging procedure by sending GA-RRC PAGING REQUEST message to the MS. The MS ignores the GA-RRC PAGING REQUEST and continues with any ongoing procedure as if the GA-RRC PAGING REQUEST was not received. After 10s, the voice call is deactivated to switch the serving RR entity to GA-RRC. The SS waits 30 seconds to ensure that the MS enters the GA-RRC-IDLE state (PS domain) and sends GA-RRC PAGING REQUEST (PS domain) to verify that MS in GA-RRC-IDLE state. MS answers by sending GA-RRC INITIAL DIRECT TRANSFER (PS domain) message containing the page response.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS is camped on a GERAN cell, voice call activated and in GA-RC-REGISTERED state
2	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
3	MS			MS ignores the GA-RRC PAGING REQUEST and continues with ongoing procedure
4	SS			SS waits 10s for response
5	MS			The voice call is deactivated to switch the serving RR entity to GA-RRC-IDLE state.
6	SS			Wait 30 seconds to ensure that the MS enters GA-RRC-IDLE state.
7	←		GA-RRC PAGING REQUEST	Valid identity of the MS ('TMSI'/'IMSI') IE 'CN Domain Identity' indicates PS domain
8	→		GA-RRC INITIAL DIRECT TRANSFER	IE 'L3 Message' contains Paging Response IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-CONNECTED state for PS domain
9	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
10	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.5 Traffic Channel assignment

84.5.1 CS Traffic Channel assignment / successful cases

84.5.1.1 CS Traffic Channel assignment and Release

84.5.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.4.1.2:

The MS shall act on the received GA-RRC ACTIVATE CHANNEL message indicating the CS domain as follows:

- for each CTC specified in the IE "CTC Activation List":

    - store the RAB ID;

    - if the IE "RAB Configuration" indicates that the CTC is for AMR or AMR-WB speech, use the format specified in Annex A.1 and Annex D to code and decode the RTP packets;

    - if the IE "RAB Configuration" indicates that the CTC is for circuit switched data, use the format specified in Annex A.2 to code and decode the RTP packets;

    - use the value indicated by the IE "Sample Size" as the minimum sample size for the coding and decoding of the RTP packets, if the MS is not able to use the indicated value. If the circuit transport channel is for AMR or AMR-WB speech with RTP redundancy, the sample size is defined as the size of the new speech sample in each RTP packet, not including any redundant speech samples;

    - configure the uplink RTP packets to be transmitted to the UDP port and IP address identified by the IE "RTP UDP Port" and the IE "GANC IP address", respectively;

    - use the Payload Type included in the IE "Payload Type" for the PT field in the RTP header for the RTP packets;

    - if received, use the configuration included in the IE "Multi-rate Configuration 2" for the circuit transport channel that is for AMR or AMR-WB speech;

    - if received, use the configuration included in the IE "RTP Redundancy Configuration" for the circuit transport channel that is for AMR or AMR-WB speech. The redundancy policy is defined for each of the AMR modes specified in the IE "Multi-rate Configuration 2". The level of redundancy can span from no redundancy to double redundancy. In the same active codec set, a lower codec mode shall not be associated with a lower redundancy level then a higher codec mode. For example, the highest mode in the set is used with no redundancy, the next lower with single redundancy and rest of the modes with double redundancy.

    - if received, pass the contents of the NAS Synchronisation Indicator to upper layers.

On completing the above procedure, the MS shall:

- start timer TU5911 for the CS domain;

- transmit a GA-RRC ACTIVATE CHANNEL ACK message including the IE "CN Domain Identity" and the IE "CTC Activation Ack List". For each CTC specified in the IE "CTC Activation Ack List":

    - include the IE "RAB ID" for the CTC with the same value as received in the GA-RRC ACTIVATE CHANNEL message in the IE "RAB ID";

    - include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

    - for each CTC that is successfully configured (i.e., GA-RRC Cause value is '0'):

        - include the allocated UDP port number in the IE "RTP UDP Port" for the downlink RTP packets to be sent from the GANC to the MS;

        - include the selected RTP sample size, to be used for uplink and downlink RTP packets, in the IE "Sample Size";

        - include the Payload Type in the IE "Payload Type";

- if the IE "RTCP UDP Port" was received in the GA-RRC ACTIVATE CHANNEL message and the MS is capable of supporting RTCP, activate the uplink RTCP stream and include the IE "RTCP UDP Port" for the downlink RTCP packets to be sent from the GANC to the MS.

3GPP TS 44.318 subclause 8a.4.1.4:

On reception of the GA-RRC ACTIVATE CHANNEL COMPLETE message indicating the CS domain, the MS shall stop timer TU5911 for the CS domain and consider the successfully activated CTC(s) to be available for use by upper layers. To enable uplink quality measurements in the GANC, the MS shall send at least one RTP frame each 480 ms for each active CTC. During periods of discontinuous transmission (DTX), each RTP frame transmitted by the MS shall bear a format in the AMR/AMR-WB payload Table of Contents that either (a) omits all NO_DATA indications and contains only the next AMR speech or SID frame that is available, or (b) includes a single NO_DATA frame should no AMR speech or SID frame become available for 480 ms. The RTP timestamp shall indicate the time of that speech or SID or NO_DATA frame. See Section A.1.2 of Annex A for examples.

3GPP TS 44.318 subclause 8a.5.1:

If the MS needs to release the GA-RRC connection and signalling connection to a particular CN domain, it shall send the GA-RRC RELEASE REQUEST message to the GANC and start timer TU5909 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

    #40:   UE generated signalling connection release

    #115:   unspecified failure

Reference(s)

    3GPP TS 44.318 subclauses 8a.4.1.2 / 8a.4.1.4/ 8a.5.1

84.5.1.1.2 Test purpose

To verify that MS is able to establish a CS domain traffic channel.

The MS initiates the release the GA-RRC connection (CS domain) by sending GA-RRC CLEAR REQUEST to the SS. The MS enters GA-RRC-IDLE state and releases all GA-RRC and any traffic channel resources (CS domain).

84.5.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

    - MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell and a voice call is ongoing.

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain) in service of GAN cell.

Test Procedure

A voice call is ongoing. The SS configures a CS traffic channel by transmitting GA-RRC ACTIVATE CHANNEL (CS domain) to the MS. MS responses by transmitting a GA-RRC ACTIVATE CHANNEL ACK including the IE 'UDP Port'. Then the SS configures itself for transmission of RTP packets to the MS to the indicated UDP port and transmits a GA-RRC ACTIVATE CHANNEL COMPLETE message to the MS. MS and SS sends at least one RTP frame each 480 ms. The SS releases the call by sending GA-RRC DL DIRECT TRANSFER message (Release) and receiving GA-RRC UL DIRECT TRANSFER (Release Complete) message. Therefore, the MS will send GA-RRC RELEASE REQUEST to release the CS domain connection.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-RRC-CONNECTED state (CS domain), voice call is ongoing.
2	←		GA-RRC ACTIVATE CHANNEL	For the (single) CTC specified in the IE 'CTC Activation List': IE 'RAB ID', IE 'RAB Configuration', IE 'Sample Size', IE 'UDP Port', IE 'IP address', IE 'Payload Type', IE 'Multi-rate Configuration 2', optional IE 'RTP Redundancy Configuration ',optional IE 'RTCP UDP Port'
3	→		GA-RRC ACTIVATE CHANNEL ACK	For the (single) CTC specified in the IE 'CTC Activation Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating value #0), IE 'UDP Port', IE 'Sample Size', IE 'Payload Type', optional IE 'RTCP UDP Port'
4	←		GA-RRC ACTIVATE CHANNEL COMPLETE	
5	→			Verify that the MS sends at least one RTP frame
6	←		GA-RRC DL DIRECT TRANSFER (Release)	
7	→		GA-RRC UL DIRECT TRANSFER (Release Complete)	Eventual CC L3 messages are ignored.
8	→		GA-RRC RELEASE REQUEST	IE 'CN Domain Identity' indicates CS domain IE 'GA-RRC Cause' indicates #40

84.5.2 CS Traffic Channel assignment / negative cases

84.5.2.1 MS fails to establish the CS traffic channel

84.5.2.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.4.1.2:

The MS shall act on the received GA-RRC ACTIVATE CHANNEL message indicating the CS domain as follows:

- for each CTC specified in the IE "CTC Activation List":

  - store the RAB ID;

  - if the IE "RAB Configuration" indicates that the CTC is for AMR or AMR-WB speech, use the format specified in Annex A.1 and Annex D to code and decode the RTP packets;

  - if the IE "RAB Configuration" indicates that the CTC is for circuit switched data, use the format specified in Annex A.2 to code and decode the RTP packets;

  - use the value indicated by the IE "Sample Size" as the minimum sample size for the coding and decoding of the RTP packets, if the MS is not able to use the indicated value. If the circuit transport channel is for AMR or AMR-WB speech with RTP redundancy, the sample size is defined as the size of the new speech sample in each RTP packet, not including any redundant speech samples;

  - configure the uplink RTP packets to be transmitted to the UDP port and IP address identified by the IE "RTP UDP Port" and the IE "GANC IP address", respectively;

  - use the Payload Type included in the IE "Payload Type" for the PT field in the RTP header for the RTP packets;

- if received, use the configuration included in the IE "Multi-rate Configuration 2" for the circuit transport channel that is for AMR or AMR-WB speech;

- if received, use the configuration included in the IE "RTP Redundancy Configuration" for the circuit transport channel that is for AMR or AMR-WB speech. The redundancy policy is defined for each of the AMR modes specified in the IE "Multi-rate Configuration 2". The level of redundancy can span from no redundancy to double redundancy. In the same active codec set, a lower codec mode shall not be associated with a lower redundancy level then a higher codec mode. For example, the highest mode in the set is used with no redundancy, the next lower with single redundancy and rest of the modes with double redundancy.

- if received, pass the contents of the NAS Synchronisation Indicator to upper layers.

On completing the above procedure, the MS shall:

- start timer TU5911 for the CS domain;

- transmit a GA-RRC ACTIVATE CHANNEL ACK message including the IE "CN Domain Identity" and the IE "CTC Activation Ack List". For each CTC specified in the IE "CTC Activation Ack List":

  - include the IE "RAB ID" for the CTC with the same value as received in the GA-RRC ACTIVATE CHANNEL message in the IE "RAB ID";

  - include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

  - for each CTC that is successfully configured (i.e., GA-RRC Cause value is '0'):

    - include the allocated UDP port number in the IE "RTP UDP Port" for the downlink RTP packets to be sent from the GANC to the MS;

    - include the selected RTP sample size, to be used for uplink and downlink RTP packets, in the IE "Sample Size";

    - include the Payload Type in the IE "Payload Type";

    - if the IE "RTCP UDP Port" was received in the GA-RRC ACTIVATE CHANNEL message and the MS is capable of supporting RTCP, activate the uplink RTCP stream and include the IE "RTCP UDP Port" for the downlink RTCP packets to be sent from the GANC to the MS.

Reference(s)

3GPP TS 44.318 subclauses 8a.4.1.2

84.5.2.1.2 Test purpose

To verify that if MS fails to establish the traffic channel, it transmits a GA-RRC ACTIVATE CHANNEL ACK message including the reason for the failure.

84.5.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell and a voice call is ongoing.

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain) in service of GAN cell.

Test Procedure

A CS domain voice call is ongoing. The SS configures a traffic channel by transmitting corrupted GA-RRC ACTIVATE CHANNEL to the MS. In the corrupted GA-RRC ACTIVATE CHANNEL message "Sample Size" octet 3 is set to "1" (1ms), which is an undefined value.

MS fails to establish the traffic channel and transmits a GA-RRC ACTIVATE CHANNEL ACK message including the reason for the failure.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in GA-RRC-CONNECTED state (CS domain), voice call is ongoing
2	←		GA-RRC ACTIVATE CHANNEL	This message has non-supportive configuration, with a "Sample Size" octet 3 set to "1"
3	MS			MS fails to establish the traffic channel
4	→		GA-RRC ACTIVATE CHANNEL ACK	For the (single) CTC specified in the IE 'CTC Activation Ack List': IE 'RAB ID', IE 'GA-RRC Cause' indicates a value other than #0 (e.g., 'Invalid RAB Parameters Value' #19).
5	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
6	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.5.3 PS Traffic Channel assignment / successful cases

84.5.3.1 PS Traffic Channel assignment and Release

84.5.3.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.4.2.2:

The MS shall act on the received GA-RRC ACTIVATE CHANNEL message indicating the PS domain as follows:

- for each PTC specified in the IE "PTC Activation List":

  - store the RAB ID;

  - allocate local PTC resources based on the values in the IE "RAB Configuration";

  - use the TEID value included in the IE "GANC TEID" for the TEID field in the GA-RRC PDU messages to be sent to the GANC;

  - use the TEID value included in the IE "MS TEID" to verify the TEID field in the GA-RRC PDU messages to be received from the GANC;

  - configure the uplink GA-RRC PDU messages to be transmitted to the UDP port and IP address identified by the IE "GANC UDP Port" and the IE "GANC IP address", respectively.

On completing the above procedure, the MS shall:

- start timer TU5911 for the PS domain;

- transmit a GA-RRC ACTIVATE CHANNEL ACK message including the IE "CN Domain Identity" and the IE "PTC Activation Ack List". For each PTC specified in the IE "PTC Activation Ack List":

- include the IE "RAB ID" for the PTC with the same value as received in the GA-RRC ACTIVATE CHANNEL message in the IE "RAB ID";

- include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

- for each PTC that is successfully configured (i.e., GA-RRC Cause value is '0'):

  - include the allocated UDP port number in the IE "MS UDP Port" for the downlink GA-RRC PDU messages to be sent from the GANC to the MS.

3GPP TS 44.318 subclause 8a.4.2.4:

On reception of the GA-RRC ACTIVATE CHANNEL COMPLETE message indicating the PS domain, the MS shall stop timer TU5911 for the PS domain, and start timer TU4001 for each of the successfully activated PTC(s) which are now available for use by upper layers.

3GPP TS 44.318 subclause 8a.5.1:

If the MS needs to release the GA-RRC connection and signalling connection to a particular CN domain, it shall send the GA-RRC RELEASE REQUEST message to the GANC and start timer TU5909 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

    #40:   UE generated signalling connection release

    #115:   unspecified failure

Reference(s)

    3GPP TS 44.318 subclauses 8a.4.2.2 / 8a.4.2.4/ 8a.5.1

84.5.3.1.2 Test purpose

To verify that MS is able to establish a PS domain traffic channel.

The MS initiates the release the GA-RRC connection (PS domain) by sending GA-RRC RELEASE REQUEST to the SS. The MS enters GA-RRC-IDLE state and releases all GA-RRC and any traffic channel resources (PS domain).

84.5.3.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

    - MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell.

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain) in service of GAN cell.

Test Procedure

A PS session is ongoing. The SS configures a PS traffic channel by transmitting GA-RRC ACTIVATE CHANNEL (PS domain) to the MS. MS responses by transmitting a GA-RRC ACTIVATE CHANNEL ACK and configures the uplink GA-RRC PDU messages to be transmitted to the UDP port and IP address identified by the IE "GANC UDP Port" and the IE "GANC IP address", respectively. Then the SS configures itself for transmission of downlink GA-RRC PDU messages to be transmitted to the UDP port identified by the IE "MS UDP Port" and the IE "GANC IP address", and transmits a GA-RRC ACTIVATE CHANNEL COMPLETE message to the MS. The SS releases the PS session by sending GA-RRC DL DIRECT TRANSFER message (Deactivate PDP Context Request) and receiving GA-RRC UL DIRECT TRANSFER (Deactivate PDP Context Accept) message. Therefore, the MS will send GA-RRC RELEASE REQUEST to release the PS domain connection.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in GA-RRC-CONNECTED state (PS domain).
2	←		GA-RRC ACTIVATE CHANNEL	For the (single) PTC specified in the IE 'PTC Activation List': IE 'RAB ID', IE 'RAB Configuration', IE 'GANC TEID', IE 'MS TEID', IE 'GANC UDP Port', IE 'GANC IP address'.
3	→		GA-RRC ACTIVATE CHANNEL ACK	For the (single) PTC specified in the IE 'PTC Activation Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating value #0), IE 'MS UDP Port'.
4	←		GA-RRC ACTIVATE CHANNEL COMPLETE	
5	→			Verify that the MS sends at least one GA-RRC PDU message
6	←		GA-RRC DL DIRECT TRANSFER (Deactivate PDP Context Request)	
7	→		GA-RRC UL DIRECT TRANSFER (Deactivate PDP Context Accept)	
8	→		GA-RRC RELEASE REQUEST	IE 'CN Domain Identity' indicates PS domain IE 'GA-RRC Cause' indicates #40

84.5.4 PS Traffic Channel assignment / negative cases

84.5.4.1 MS fails to establish the PS traffic channel

84.5.4.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.4.2.2:

The MS shall act on the received GA-RRC ACTIVATE CHANNEL message indicating the PS domain as follows:

- for each PTC specified in the IE "PTC Activation List":

  - store the RAB ID;

  - allocate local PTC resources based on the values in the IE "RAB Configuration";

  - use the TEID value included in the IE "GANC TEID" for the TEID field in the GA-RRC PDU messages to be sent to the GANC;

  - use the TEID value included in the IE "MS TEID" to verify the TEID field in the GA-RRC PDU messages to be received from the GANC;

  - configure the uplink GA-RRC PDU messages to be transmitted to the UDP port and IP address identified by the IE "GANC UDP Port" and the IE "GANC IP address", respectively.

On completing the above procedure, the MS shall:

- start timer TU5911 for the PS domain;

- transmit a GA-RRC ACTIVATE CHANNEL ACK message including the IE "CN Domain Identity" and the IE "PTC Activation Ack List". For each PTC specified in the IE "PTC Activation Ack List":

  - include the IE "RAB ID" for the PTC with the same value as received in the GA-RRC ACTIVATE CHANNEL message in the IE "RAB ID";

  - include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

- for each PTC that is successfully configured (i.e., GA-RRC Cause value is '0'):

    - include the allocated UDP port number in the IE "MS UDP Port" for the downlink GA-RRC PDU messages to be sent from the GANC to the MS.

3GPP TS 44.318 subclause 8a.4.2.4:

On reception of the GA-RRC ACTIVATE CHANNEL COMPLETE message indicating the PS domain, the MS shall stop timer TU5911 for the PS domain, and start timer TU4001 for each of the successfully activated PTC(s) which are now available for use by upper layers.

3GPP TS 44.318 subclause 8a.5.1:

If the MS needs to release the GA-RRC connection and signalling connection to a particular CN domain, it shall send the GA-RRC RELEASE REQUEST message to the GANC and start timer TU5909 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

#40:   UE generated signalling connection release

#115:   unspecified failure

Reference(s)

3GPP TS 44.318 subclauses 8a.4.2.2 / 8a.4.2.4 / 8a.5.1

84.5.4.1.2   Test purpose

To verify that if MS fails to establish the PTC, it transmits a GA-RRC ACTIVATE CHANNEL ACK message including the reason for the failure.

84.5.4.1.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell.

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain) in service of GAN cell.

Test Procedure

A PS domain voice call is ongoing. The SS configures a PTC by transmitting corrupted GA-RRC ACTIVATE CHANNEL to the MS. In the corrupted GA-RRC ACTIVATE CHANNEL message the "RAB Configuration" IE indicates Interactive traffic class and the Guaranteed DL Bit Rate and Guaranteed UL Bit Rate fields are populated (which is not a valid combination according to TS 44.318, sub-clause 11.2.103).

MS fails to establish the traffic channel and transmits a GA-RRC ACTIVATE CHANNEL ACK message including the reason for the failure.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in GA-RRC-CONNECTED state (PS domain).
2	←		GA-RRC ACTIVATE CHANNEL	For the (single) PTC specified in the IE 'PTC Activation List': IE 'RAB ID', IE 'RAB Configuration', IE 'GANC TEID', IE 'MS TEID', IE 'GANC UDP Port', IE 'GANC IP address'. IE 'RAB Configuration' is misconfigured.
3	→		GA-RRC ACTIVATE CHANNEL ACK	For the (single) PTC specified in the IE 'PTC Activation Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating value other than #0; e.g., 'Invalid RAB Parameters Value' #19).
4	←		GA-RRC DL DIRECT TRANSFER (Deactivate PDP Context Request)	
5	→		GA-RRC UL DIRECT TRANSFER (Deactivate PDP Context Accept)	
6	→		GA-RRC RELEASE REQUEST	IE 'CN Domain Identity' indicates PS domain IE 'GA-RRC Cause' indicates #40

84.6 Release of GA-RRC

FFS

84.7 Void

84.8 Void

84.9 Security Mode Control Procedure

84.9.1 Security Mode Control Procedure / successful cases

84.9.1.1 Security Mode Control Procedure (CS domain)

84.9.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.6.1:

The GANC initiates the security mode control procedure by sending a GA-RRC SECURITY MODE COMMAND message to the MS. This message includes the IE "Selected Integrity Protection Algorithm", the IE "Selected Encryption Algorithm" (optional), and the IE "Random Number". The GANC selects the algorithms based on the permitted algorithms received from the CN and the MS security capabilities indicated in the IE "3G Security Capability" received from the MS in the GA-RC REGISTER REQUEST message.

3GPP TS 44.318 subclause 8a.6.2:

Whenever the MS receives a valid GA-RRC SECURITY MODE COMMAND message, it shall, if a (U)SIM is present and considered valid and the key set identifier (KSI) stored on the (U)SIM indicates that an integrity key and cipher key are available for the domain indicated in the IE "CN Domain Identity", store the selected integrity protection algorithm and (if received) the selected encryption algorithm for possible future use after a handover from GAN Iu mode to UTRAN during the same upper layer transaction. If handover from GAN Iu mode to UTRAN occurs, encryption is enabled if the IE "Selected Encryption Algorithm" is present in the message and disabled otherwise.

The MS shall also calculate a MAC (Message Authentication Code). The MAC shall be calculated over the following data:

RAND | IMSI

using "HMAC-SHA1-96" algorithm, as specified in [24] with the integrity key (IK) for the domain indicated in the IE "CN Domain Identity" used as the authentication key.

In the formulas above, the "|" character denotes concatenation. RAND is the 16-octet random number received from the GANC in the GA-RRC SECURITY MODE COMMAND message. IMSI is the MS IMSI, in the same format as defined for the Mobile Identity IE as defined in [8]; i.e. as a variable-length sequence of digits in BCD format (e.g. the IMSI "123456789098765" is encoded as the following octets (in hexadecimal): "21 43 65 87 09 89 67 F5"). Network byte order is used.

The IK key is the IK that has been derived during the last authentication for the domain indicated in the IE "CN Domain Identity". The length of the MAC is 12 octets.

When the appropriate action on the GA-RRC SECURITY MODE COMMAND message has been taken, the MS sends a GA-RRC SECURITY MODE COMPLETE message to the GANC. The MS includes the calculated MAC value in the IE "Ciphering Command MAC".

Reference(s)

> 3GPP TS 44.318 sub-clause 8a.6.1 and 8a.6.2.

84.9.1.1.2 Test purpose

To verify that the MS can reply to a GA-RRC SECURITY MODE COMMAND message and return the correct Message Authentication Code (MAC).

84.9.1.1.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-CONNECTED (CS domain)

Foreseen final state of the MS

- MS in GA-RRC IDLE state.

Test procedure

The SS sends the GA-RRC SECURITY MODE COMMAND message indicating the CS domain. The MS replies with the GA-RRC SECURITY MODE COMPLETE message indicating the CS domain. SS checks that the MAC is correct.

Specific Test Parameters

-

Maximum duration of test

1 min.

Reference(s)Expected sequence

Step	Direction		Message	Comment
	MS	SS		
1	←		GA-RRC SECURITY MODE COMMAND	IE 'CN Domain Identity' indicates CS domain
2	→		GA-RRC SECURITY MODE COMPLETE	IE 'CN Domain Identity' indicates CS domain SS checks that the MAC is correct
3	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain

4	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.9.1.2 Security Mode Control Procedure (PS domain)

84.9.1.2.1 Conformance requirement

3GPP TS 44.318 subclause 8a.6.1:

The GANC initiates the security mode control procedure by sending a GA-RRC SECURITY MODE COMMAND message to the MS. This message includes the IE "Selected Integrity Protection Algorithm", the IE "Selected Encryption Algorithm" (optional), and the IE "Random Number". The GANC selects the algorithms based on the permitted algorithms received from the CN and the MS security capabilities indicated in the IE "3G Security Capability" received from the MS in the GA-RC REGISTER REQUEST message.

3GPP TS 44.318 subclause 8a.6.2:

Whenever the MS receives a valid GA-RRC SECURITY MODE COMMAND message, it shall, if a (U)SIM is present and considered valid and the key set identifier (KSI) stored on the (U)SIM indicates that an integrity key and cipher key are available for the domain indicated in the IE "CN Domain Identity", store the selected integrity protection algorithm and (if received) the selected encryption algorithm for possible future use after a handover from GAN Iu mode to UTRAN during the same upper layer transaction. If handover from GAN Iu mode to UTRAN occurs, encryption is enabled if the IE "Selected Encryption Algorithm" is present in the message and disabled otherwise.

The MS shall also calculate a MAC (Message Authentication Code). The MAC shall be calculated over the following data:

RAND | IMSI

using "HMAC-SHA1-96" algorithm, as specified in [24] with the integrity key (IK) for the domain indicated in the IE "CN Domain Identity" used as the authentication key.

In the formulas above, the "|" character denotes concatenation. RAND is the 16-octet random number received from the GANC in the GA-RRC SECURITY MODE COMMAND message. IMSI is the MS IMSI, in the same format as defined for the Mobile Identity IE as defined in [8]; i.e. as a variable-length sequence of digits in BCD format (e.g. the IMSI "123456789098765" is encoded as the following octets (in hexadecimal): "21 43 65 87 09 89 67 F5"). Network byte order is used.

The IK key is the IK that has been derived during the last authentication for the domain indicated in the IE "CN Domain Identity". The length of the MAC is 12 octets.

When the appropriate action on the GA-RRC SECURITY MODE COMMAND message has been taken, the MS sends a GA-RRC SECURITY MODE COMPLETE message to the GANC. The MS includes the calculated MAC value in the IE "Ciphering Command MAC".

Reference(s)

3GPP TS 44.318 sub-clause 8a.6.1 and 8a.6.2.

84.9.1.2.2 Test purpose

To verify that the MS can reply to a GA-RRC SECURITY MODE COMMAND message and return the correct Message Authentication Code (MAC).

84.9.1.2.3 Method of test

Initial conditions

System Simulator:

- 1 GAN cell, default parameter

Mobile Station:

- MS in state GA-RRC-CONNECTED (PS domain)

Foreseen final state of the MS

- MS in GA-RRC IDLE state (PS domain)

Test procedure

The SS sends the GA-RRC SECURITY MODE COMMAND message indicating the PS domain. The MS replies with the GA-RRC SECURITY MODE COMPLETE message indicating the PS domain. SS checks that the MAC is correct.

Specific Test Parameters

-

Maximum duration of test

1 min.

Reference(s)Expected sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	←		GA-RRC SECURITY MODE COMMAND	IE 'CN Domain Identity' indicates PS domain
2	→		GA-RRC SECURITY MODE COMPLETE	IE 'CN Domain Identity' indicates PS domain SS checks that the MAC is correct
3	←		GA-RRC RELEASE	IE 'CN Domain Identity' indicates PS domain IE 'RR cause' #0
4	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state (PS domain)

84.10   Channel modify procedure

84.10.1 CS channel modify procedure / successful cases

84.10.1.1   CS channel modify / successful case

84.10.1.1.1   Conformance requirement

3GPP TS 44.318 subclause 8a.7.1.1:

The GANC initiates the circuit transport channel (CTC) modification procedure when it determines that one or more active CTCs require modification; e.g., based on information received from the MSC in the RAB Assignment Request message or based on local GANC logic.

The following CTC parameters may be modified:

- RAB Configuration

- Sample Size

- GANC RTP UDP Port

- GANC IP Address

- Multi-rate Configuration 2

- RTP Redundancy Configuration

- GANC RTCP UDP Port

- NAS Synchronisation Indicator

The GANC only includes the IEs which specify modifications to the existing CTC parameters.

One or more CTCs may be modified using a single instance of the channel modification procedure; however, it is not possible to modify both circuit and packet transport channels using a single instance of the channel modification procedure.

The GANC begins the modification of the CTC(s) by transmitting the GA-RRC MODIFY CHANNEL message to the MS. The message contains the IE "CN Domain Identity" (indicating CS domain) and IE "CTC Modification List" which includes the parameters necessary to describe the modifications to each circuit transport channel.

3GPP TS 44.318 subclause 8a.7.1.2:

On receipt of the GA-RRC MODIFY CHANNEL message indicating the CS domain, the MS shall process the specified CTC modifications.

On completion of the modification of the CTC(s), the MS shall:

- transmit a GA-RRC MODIFY CHANNEL ACK message including the IE "CN Domain Identity" and the IE "CTC Modification Ack List". For each CTC specified in the IE "CTC Modification Ack List":

  - include the IE "RAB ID" for the CTC with the same value as received in the GA-RRC MODIFY CHANNEL message in the IE "RAB ID";

  - include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

  - for each CTC that is successfully modified (i.e., GA-RRC Cause value is '0'):

    - include the modified parameter values currently used by the MS.

When the MS has sent the GA-RRC MODIFY CHANNEL ACK message, it shall start transmitting RTP packets based on the successful parameter modifications. The MS shall be able to receive RTP packets with the old parameters until the MS determines that the first RTP packet using the new parameters has been received.

Reference(s)

3GPP TS 44.318 subclauses 8a.7.1.1, 8a.7.1.2

84.10.1.1.2 Test purpose

To verify that MS is able to change active CTC parameters if requested.

84.10.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, voice call activated. SS sends GA-RRC MODIFY CHANNEL message to change the active sample size for the CTC. The MS sets the sample size for the active CTC and then replies by a GA-RRC MODIFY CHANNEL ACK message indicating the modified parameter.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in service voice call activated on GAN cell
2	←		GA-RRC MODIFY CHANNEL	IE 'CN Domain Identity' indicates CS domain. For the (single) CTC specified in the IE 'CTC Modification List': IE 'RAB ID', IE 'Sample Size' with new sample size value
3	MS			MS sets the different sample size
4	→		GA-RRC MODIFY CHANNEL ACK	IE 'CN Domain Identity' indicates CS domain. For the (single) CTC specified in the IE 'CTC Modification Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating value #0), IE 'Sample Size' with new sample size value
5	MS			MS in service voice call activated on GAN cell with different sample size
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.10.2 CS channel modify procedure / negative cases

84.10.2.1 CS channel modify requests illegal change to parameter

84.10.2.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.7.1.1:

The GANC initiates the circuit transport channel (CTC) modification procedure when it determines that one or more active CTCs require modification; e.g., based on information received from the MSC in the RAB Assignment Request message or based on local GANC logic.

The following CTC parameters may be modified:

- RAB Configuration

- Sample Size

- GANC RTP UDP Port

- GANC IP Address

- Multi-rate Configuration 2

- RTP Redundancy Configuration

- GANC RTCP UDP Port

- NAS Synchronisation Indicator

The GANC only includes the IEs which specify modifications to the existing CTC parameters.

One or more CTCs may be modified using a single instance of the channel modification procedure; however, it is not possible to modify both circuit and packet transport channels using a single instance of the channel modification procedure.

The GANC begins the modification of the CTC(s) by transmitting the GA-RRC MODIFY CHANNEL message to the MS. The message contains the IE "CN Domain Identity" (indicating CS domain) and IE "CTC Modification List" which includes the parameters necessary to describe the modifications to each circuit transport channel.

3GPP TS 44.318 subclause 8a.7.1.2:

On receipt of the GA-RRC MODIFY CHANNEL message indicating the CS domain, the MS shall process the specified CTC modifications.

On completion of the modification of the CTC(s), the MS shall:

- transmit a GA-RRC MODIFY CHANNEL ACK message including the IE "CN Domain Identity" and the IE "CTC Modification Ack List". For each CTC specified in the IE "CTC Modification Ack List":

    - include the IE "RAB ID" for the CTC with the same value as received in the GA-RRC MODIFY CHANNEL message in the IE "RAB ID";

    - include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

    - for each CTC that is successfully modified (i.e., GA-RRC Cause value is '0'):

        - include the modified parameter values currently used by the MS.

When the MS has sent the GA-RRC MODIFY CHANNEL ACK message, it shall start transmitting RTP packets based on the successful parameter modifications. The MS shall be able to receive RTP packets with the old parameters until the MS determines that the first RTP packet using the new parameters has been received.

Reference(s)

3GPP TS 44.318 subclauses 8a.7.1.1, 8a.7.1.2

84.10.2.1.2 Test purpose

To verify that the MS does not change the CTC parameters if requested to make an illegal change to a parameter (i.e., to change the Payload Type value).

84.10.2.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, voice call activated

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, voice call activated. SS sends GA-RRC MODIFY CHANNEL message to change the Payload Type value. The requested change is not allowed. MS retains the old Payload Type value for the active CTC and then replies by a GA-RRC MODIFY CHANNEL ACK message with a failure indication.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service voice call activated on GAN cell
2	←		GA-RRC MODIFY CHANNEL	IE 'CN Domain Identity' indicates CS domain. For the (single) CTC specified in the IE 'CTC Modification List': IE 'RAB ID', IE 'Payload Type' with new value
3	MS			MS retains the old Payload Type value
4	→		GA-RRC MODIFY CHANNEL ACK	IE 'CN Domain Identity' indicates CS domain. For the (single) CTC specified in the IE 'CTC Modification Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating other than value #0; e.g., value #19 indicating invalid RAB parameters value)
5	MS			MS in service voice call activated on GAN cell with old Payload Type value
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.10.3 PS channel modify procedure / successful cases

84.10.3.1   PS channel modify / successful case

84.10.3.1.1   Conformance requirement

3GPP TS 44.318 subclause 8a.7.2.1:

The GANC initiates the packet transport channel (PTC) modification procedure when it determines that one or more active PTCs require modification; e.g., based on information received from the SGSN in the RAB Assignment Request message or based on local GANC logic.

The following PTC parameters may be modified:

- RAB Configuration

- GANC UDP Port

- GANC IP Address

The GANC only includes the IEs which specify modifications to the existing PTC parameters.

One or more PTCs may be modified using a single instance of the channel modification procedure; however, it is not possible to modify both circuit and packet transport channels using a single instance of the channel modification procedure.

The GANC begins the modification of the PTC(s) by transmitting the GA-RRC MODIFY CHANNEL message to the MS. The message contains the IE "CN Domain Identity" (indicating PS domain) and IE "PTC Modification List" which includes the parameters necessary to describe the modifications to each packet transport channel.

3GPP TS 44.318 subclause 8a.7.2.2:

On receipt of the GA-RRC MODIFY CHANNEL message indicating the PS domain, the MS shall process the specified PTC modifications.

On completion of the modification of the PTC(s), the MS shall:

- transmit a GA-RRC MODIFY CHANNEL ACK message including the IE "CN Domain Identity" and the IE "PTC Modification Ack List". For each PTC specified in the IE "PTC Modification Ack List":

    - include the IE "RAB ID" for the PTC with the same value as received in the GA-RRC MODIFY CHANNEL message in the IE "RAB ID";

    - include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

    - for each PTC that is successfully modified (i.e., GA-RRC Cause value is '0'):

        - include the modified parameter values currently used by the MS.

When the MS has sent the GA-RRC MODIFY CHANNEL ACK message, it shall start transmitting GA-RRC PDU messages based on the successful parameter modifications. The MS shall be able to receive GA-RRC PDU messages with the old parameters until the MS determines that the first GA-RRC PDU message using the new parameters has been received.

Reference(s)

    3GPP TS 44.318 subclauses 8a.7.2.1, 8a.7.2.2

84.10.3.1.2   Test purpose

To verify that MS is able to change active PTC parameters if requested.

84.10.3.1.3   Method of test

Initial Conditions

System Simulator:

    - 1 GAN cell, default parameters

Mobile Station:

    - MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with active PTC

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with an active PTC. SS sends GA-RRC MODIFY CHANNEL message to change the RAB Configuration. The MS modifies the RAB Configuration for the active PTC and then replies by a GA-RRC MODIFY CHANNEL ACK message indicating the modified parameter.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service with PTC activated on GAN cell

2	←	GA-RRC MODIFY CHANNEL	IE 'CN Domain Identity' indicates PS domain. For the (single) PTC specified in the IE 'PTC Modification List': IE 'RAB ID', IE 'RAB Configuration' with new value
3	MS		MS sets the new RAB Configuration value
4	→	GA-RRC MODIFY CHANNEL ACK	IE 'CN Domain Identity' indicates PS domain. For the (single) PTC specified in the IE 'PTC Modification Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating value #0), IE 'RAB Configuration' with new value
5	MS		MS in service with active PTC on GAN cell with new RAB Configuration value
6	←	GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
7	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.10.4 PS channel modify procedure / negative cases

84.10.4.1 PS channel modify requests illegal change to parameter

84.10.4.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.7.2.1:

The GANC initiates the packet transport channel (PTC) modification procedure when it determines that one or more active PTCs require modification; e.g., based on information received from the SGSN in the RAB Assignment Request message or based on local GANC logic.

The following PTC parameters may be modified:

- RAB Configuration

- GANC UDP Port

- GANC IP Address

The GANC only includes the IEs which specify modifications to the existing PTC parameters.

One or more PTCs may be modified using a single instance of the channel modification procedure; however, it is not possible to modify both circuit and packet transport channels using a single instance of the channel modification procedure.

The GANC begins the modification of the PTC(s) by transmitting the GA-RRC MODIFY CHANNEL message to the MS. The message contains the IE "CN Domain Identity" (indicating PS domain) and IE "PTC Modification List" which includes the parameters necessary to describe the modifications to each packet transport channel.

3GPP TS 44.318 subclause 8a.7.2.2:

On receipt of the GA-RRC MODIFY CHANNEL message indicating the PS domain, the MS shall process the specified PTC modifications.

On completion of the modification of the PTC(s), the MS shall:

- transmit a GA-RRC MODIFY CHANNEL ACK message including the IE "CN Domain Identity" and the IE "PTC Modification Ack List". For each PTC specified in the IE "PTC Modification Ack List":

- include the IE "RAB ID" for the PTC with the same value as received in the GA-RRC MODIFY CHANNEL message in the IE "RAB ID";

-   include the IE "GA-RRC Cause" indicating either success (i.e., value '0') or a failure cause value;

-   for each PTC that is successfully modified (i.e., GA-RRC Cause value is '0'):

    -   include the modified parameter values currently used by the MS.

When the MS has sent the GA-RRC MODIFY CHANNEL ACK message, it shall start transmitting GA-RRC PDU messages based on the successful parameter modifications. The MS shall be able to receive GA-RRC PDU messages with the old parameters until the MS determines that the first GA-RRC PDU message using the new parameters has been received.

Reference(s)

   3GPP TS 44.318 subclauses 8a.7.2.1, 8a.7.2.2

84.10.4.1.2 Test purpose

To verify that the MS does not change the PTC parameters if requested to make an illegal change to a parameter (i.e., to change the MS TEID value).

84.10.4.1.3 Method of test

Initial Conditions

System Simulator:

-   1 GAN cell, default parameters

Mobile Station:

-   MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with active PTC

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with an active PTC. SS sends GA-RRC MODIFY CHANNEL message to change the MS TEID value. The requested change is not allowed. MS retains the old MS TEID value for the active PTC and then replies by a GA-RRC MODIFY CHANNEL ACK message with a failure indication.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in service with PTC activated on GAN cell
2	←		GA-RRC MODIFY CHANNEL	IE 'CN Domain Identity' indicates PS domain. For the (single) PTC specified in the IE 'PTC Modification List': IE 'RAB ID', IE 'MS TEID' with new value
3	MS			MS retains the old MS TEID value

4	→	GA-RRC MODIFY CHANNEL ACK	IE 'CN Domain Identity' indicates PS domain. For the (single) PTC specified in the IE 'PTC Modification Ack List': IE 'RAB ID', IE 'GA-RRC Cause' (indicating other than value #0; e.g., value #19 indicating invalid RAB parameters value)
5	MS		MS in service with active PTC on GAN cell with old MS TEID value
6	←	GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
7	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.11 Deactivate channel procedure

84.11.1 CS deactivate channel procedure / successful cases

84.11.1.1 CS deactivate channel request from GANC

84.11.1.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.8.3:

The GANC normally initiates this procedure when it receives the RAB Assignment message from the CN indicating RAB release; however, the GANC may also initiate this procedure under certain failure conditions.

One or more circuit or packet transport channels may be deactivated using a single instance of the channel deactivation procedure; however, it is not possible to deactivate both circuit and packet transport channels using a single instance of the channel deactivation procedure.

The GA-RRC DEACTIVATE CHANNEL message includes the IE "GA-RRC Cause" with value as follows:

#0: normal event, e.g. deactivate due to RAB release request from CN

#115: unspecified failure

#10: relocation cancelled (e.g., the handover procedure is stopped because the call has been cleared)

3GPP TS 44.318 subclause 8a.8.4:

When the MS receives the GA-RRC DEACTIVATE CHANNEL message, it shall:

- deactivate the CTC(s) or PTC(s) identified in the IE "RAB ID List";

- send a GA-RRC DEACTIVATE CHANNEL COMPLETE message to the GANC.

3GPP TS 44.318 subclause 8a.8.5:

If timer TU5002 expires in the MS, the MS shall release the associated transport channel(s).

Reference(s)

3GPP TS 44.318 subclauses 8a.8.3, 8a.8.4, 8a.8.5

84.11.1.1.2 Test purpose

To verify that MS is able to deactivate a CTC if requested.

84.11.1.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, one CTC active

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, with one CTC active. SS sends GA-RRC DEACTIVATE CHANNEL message to deactivate the CTC. The MS deactivates the CTC and then replies by a GA-RRC DEACTIVATE CHANNEL COMPLETE message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service with one CTC active on GAN cell
2	←		GA-RRC DEACTIVATE CHANNEL	IE 'CN Domain Identity' indicates CS domain. For the (single) CTC specified in the IE 'RAB ID List': IE 'RAB ID'
3	MS			MS deactivates the CTC
4	→		GA-RRC DEACTIVATE CHANNEL COMPLETE	IE 'CN Domain Identity' indicates CS domain.
5	MS			MS with GA-RRC connection (CS domain) but no active CTC
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.11.1.2 CS deactivate channel request from MS

84.11.1.2.1 Conformance requirement

3GPP TS 44.318 subclause 8a.8.1:

If the MS needs to deactivate one or more transport channels for a particular domain, it shall send the GA-RRC DEACTIVATE CHANNEL REQUEST message to the GANC and start timer TU5002 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

#0: normal release (e.g., due to inactivity timer timeout)

#115: unspecified failure

3GPP TS 44.318 subclause 8a.8.2:

When the GANC receives the GA-RRC DEACTIVATE CHANNEL REQUEST message, it shall request the selected CN domain to release the identified RABs associated with the MS. The GANC selects the CN domain based on the value of the received IE "CN Domain Identity". Note that the GANC may also request the selected CN domain to release the Iu connection for the MS in this case, based on local policy settings.

3GPP TS 44.318 subclause 8a.8.3:

The GANC normally initiates this procedure when it receives the RAB Assignment message from the CN indicating RAB release; however, the GANC may also initiate this procedure under certain failure conditions.

One or more circuit or packet transport channels may be deactivated using a single instance of the channel deactivation procedure; however, it is not possible to deactivate both circuit and packet transport channels using a single instance of the channel deactivation procedure.

The GA-RRC DEACTIVATE CHANNEL message includes the IE "GA-RRC Cause" with value as follows:

#0: normal event, e.g. deactivate due to RAB release request from CN

#115: unspecified failure

#10: relocation cancelled (e.g., the handover procedure is stopped because the call has been cleared)

3GPP TS 44.318 subclause 8a.8.4:

When the MS receives the GA-RRC DEACTIVATE CHANNEL message, it shall:

- deactivate the CTC(s) or PTC(s) identified in the IE "RAB ID List";

- send a GA-RRC DEACTIVATE CHANNEL COMPLETE message to the GANC.

3GPP TS 44.318 subclause 8a.8.5:

If timer TU5002 expires in the MS, the MS shall release the associated transport channel(s).

Reference(s)

   3GPP TS 44.318 subclauses 8a.8.1, 8a.8.2, 8a.8.3, 8a.8.4, 8a.8.5

84.11.1.2.2   Test purpose

To verify that MS is able to request deactivation of a CTC.

84.11.1.2.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, one CTC active

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, with one CTC active. MS sends GA-RRC DEACTIVATE CHANNEL REQUEST message to request deactivation of the CTC. SS sends GA-RRC DEACTIVATE CHANNEL message to deactivate the CTC. The MS deactivates the CTC and then replies by a GA-RRC DEACTIVATE CHANNEL COMPLETE message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in service with one CTC active on GAN cell
2	→		GA-RRC DEACTIVATE CHANNEL REQUEST	IE 'CN Domain Identity' indicates CS domain, IE 'GA-RRC Cause' = #115. For the (single) CTC specified in the IE 'RAB ID List': IE 'RAB ID'.
3	←		GA-RRC DEACTIVATE CHANNEL	IE 'CN Domain Identity' indicates CS domain, For the (single) CTC specified in the IE 'RAB ID List': IE 'RAB ID'
4	MS			MS deactivates the CTC
5	→		GA-RRC DEACTIVATE CHANNEL COMPLETE	IE 'CN Domain Identity' indicates CS domain.
6	MS			MS with GA-RRC connection (CS domain) but no active CTC
7	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
8	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.11.2 CS deactivate channel procedure / negative cases

84.11.2.1   TU5002 timer expires

84.11.2.1.1   Conformance requirement

3GPP TS 44.318 subclause 8a.8.1:

If the MS needs to deactivate one or more transport channels for a particular domain, it shall send the GA-RRC DEACTIVATE CHANNEL REQUEST message to the GANC and start timer TU5002 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

   #0:   normal release (e.g., due to inactivity timer timeout)

   #115:   unspecified failure

3GPP TS 44.318 subclause 8a.8.2:

When the GANC receives the GA-RRC DEACTIVATE CHANNEL REQUEST message, it shall request the selected CN domain to release the identified RABs associated with the MS. The GANC selects the CN domain based on the value of the received IE "CN Domain Identity". Note that the GANC may also request the selected CN domain to release the Iu connection for the MS in this case, based on local policy settings.

3GPP TS 44.318 subclause 8a.8.3:

The GANC normally initiates this procedure when it receives the RAB Assignment message from the CN indicating RAB release; however, the GANC may also initiate this procedure under certain failure conditions.

One or more circuit or packet transport channels may be deactivated using a single instance of the channel deactivation procedure; however, it is not possible to deactivate both circuit and packet transport channels using a single instance of the channel deactivation procedure.

The GA-RRC DEACTIVATE CHANNEL message includes the IE "GA-RRC Cause" with value as follows:

#0: normal event, e.g. deactivate due to RAB release request from CN

#115: unspecified failure

#10: relocation cancelled (e.g., the handover procedure is stopped because the call has been cleared)

3GPP TS 44.318 subclause 8a.8.4:

When the MS receives the GA-RRC DEACTIVATE CHANNEL message, it shall:

- deactivate the CTC(s) or PTC(s) identified in the IE "RAB ID List";

- send a GA-RRC DEACTIVATE CHANNEL COMPLETE message to the GANC.

3GPP TS 44.318 subclause 8a.8.5:

If timer TU5002 expires in the MS, the MS shall release the associated transport channel(s).

Reference(s)

   3GPP TS 44.318 subclauses 8a.8.1, 8a.8.2, 8a.8.3, 8a.8.4, 8a.8.5

84.11.2.1.2   Test purpose

To verify that the MS releases the CTC when the TU5002 timer (CS domain) expires.

84.11.2.1.3   Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, one CTC active

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (CS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (CS domain) in service of GAN cell, with one CTC active. MS sends GA-RRC DEACTIVATE CHANNEL REQUEST message to request deactivation of the CTC and starts timer TU5002 (CS domain). SS does not respond and timer TU5002 (CS domain) expires. MS deactivates the CTC.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service with one CTC active on GAN cell

2	→	GA-RRC DEACTIVATE CHANNEL REQUEST	IE 'CN Domain Identity' indicates CS domain, IE 'GA-RRC Cause' = #115. For the (single) CTC specified in the IE 'RAB ID List': IE 'RAB ID'. MS starts TU5002 (CS domain)
3	SS		SS waits for period longer than TU5002
4	MS		TU5002 (CS domain) expires. MS releases the CTC resources
5	MS		MS with GA-RRC connection (CS domain) but no active CTC
6	←	GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates CS domain
7	→	GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates CS domain MS enters GA-RRC-IDLE state for CS domain

84.11.3 PS deactivate channel procedure / successful cases

84.11.3.1 PS deactivate channel request from GANC

84.11.1.3.1 Conformance requirement

3GPP TS 44.318 subclause 8a.8.3:

The GANC normally initiates this procedure when it receives the RAB Assignment message from the CN indicating RAB release; however, the GANC may also initiate this procedure under certain failure conditions.

One or more circuit or packet transport channels may be deactivated using a single instance of the channel deactivation procedure; however, it is not possible to deactivate both circuit and packet transport channels using a single instance of the channel deactivation procedure.

The GA-RRC DEACTIVATE CHANNEL message includes the IE "GA-RRC Cause" with value as follows:

#0: normal event, e.g. deactivate due to RAB release request from CN

#115: unspecified failure

#10: relocation cancelled (e.g., the handover procedure is stopped because the call has been cleared)

3GPP TS 44.318 subclause 8a.8.4:

When the MS receives the GA-RRC DEACTIVATE CHANNEL message, it shall:

- deactivate the CTC(s) or PTC(s) identified in the IE "RAB ID List";

- send a GA-RRC DEACTIVATE CHANNEL COMPLETE message to the GANC.

3GPP TS 44.318 subclause 8a.8.5:

If timer TU5002 expires in the MS, the MS shall release the associated transport channel(s).

Reference(s)

3GPP TS 44.318 subclauses 8a.8.3, 8a.8.4, 8a.8.5

84.11.1.3.2 Test purpose

To verify that MS is able to deactivate a PTC if requested.

84.11.1.3.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, one PTC active

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with one PTC active. SS sends GA-RRC DEACTIVATE CHANNEL message to deactivate the PTC. The MS deactivates the PTC and then replies by a GA-RRC DEACTIVATE CHANNEL COMPLETE message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	**SS**		
1	MS			MS in service with PTC active on GAN cell
2	←		GA-RRC DEACTIVATE CHANNEL	IE 'CN Domain Identity' indicates PS domain. For the (single) PTC specified in the IE 'RAB ID List': IE 'RAB ID'
3	MS			MS deactivates the PTC
4	→		GA-RRC DEACTIVATE CHANNEL COMPLETE	IE 'CN Domain Identity' indicates PS domain.
5	MS			MS with GA-RRC connection (PS domain) but no active PTC
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.11.3.2 PS deactivate channel request from MS

84.11.3.2.1 Conformance requirement

3GPP TS 44.318 subclause 8a.8.1:

If the MS needs to deactivate one or more transport channels for a particular domain, it shall send the GA-RRC DEACTIVATE CHANNEL REQUEST message to the GANC and start timer TU5002 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

#0: normal release (e.g., due to inactivity timer timeout)

#115: unspecified failure

3GPP TS 44.318 subclause 8a.8.2:

When the GANC receives the GA-RRC DEACTIVATE CHANNEL REQUEST message, it shall request the selected CN domain to release the identified RABs associated with the MS. The GANC selects the CN domain based on the

value of the received IE "CN Domain Identity". Note that the GANC may also request the selected CN domain to release the Iu connection for the MS in this case, based on local policy settings.

3GPP TS 44.318 subclause 8a.8.3:

The GANC normally initiates this procedure when it receives the RAB Assignment message from the CN indicating RAB release; however, the GANC may also initiate this procedure under certain failure conditions.

One or more circuit or packet transport channels may be deactivated using a single instance of the channel deactivation procedure; however, it is not possible to deactivate both circuit and packet transport channels using a single instance of the channel deactivation procedure.

The GA-RRC DEACTIVATE CHANNEL message includes the IE "GA-RRC Cause" with value as follows:

#0: normal event, e.g. deactivate due to RAB release request from CN

#115: unspecified failure

#10: relocation cancelled (e.g., the handover procedure is stopped because the call has been cleared)

3GPP TS 44.318 subclause 8a.8.4:

When the MS receives the GA-RRC DEACTIVATE CHANNEL message, it shall:

- deactivate the CTC(s) or PTC(s) identified in the IE "RAB ID List";

- send a GA-RRC DEACTIVATE CHANNEL COMPLETE message to the GANC.

3GPP TS 44.318 subclause 8a.8.5:

If timer TU5002 expires in the MS, the MS shall release the associated transport channel(s).

Reference(s)

   3GPP TS 44.318 subclauses 8a.8.1, 8a.8.2, 8a.8.3, 8a.8.4, 8a.8.5

84.11.3.2.2 Test purpose

To verify that MS is able to request deactivation of a PTC.

84.11.3.2.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, one PTC active

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with one PTC active. MS sends GA-RRC DEACTIVATE CHANNEL REQUEST message to request deactivation of the PTC. SS sends GA-RRC DEACTIVATE CHANNEL message to deactivate the PTC. The MS deactivates the PTC and then replies by a GA-RRC DEACTIVATE CHANNEL COMPLETE message.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service with one PTC active on GAN cell
2	→		GA-RRC DEACTIVATE CHANNEL REQUEST	IE 'CN Domain Identity' indicates PS domain, IE 'GA-RRC Cause' = #0. For the (single) PTC specified in the IE 'RAB ID List': IE 'RAB ID'.
3	←		GA-RRC DEACTIVATE CHANNEL	IE 'CN Domain Identity' indicates PS domain, For the (single) PTC specified in the IE 'RAB ID List': IE 'RAB ID'
4	MS			MS deactivates the PTC
5	→		GA-RRC DEACTIVATE CHANNEL COMPLETE	IE 'CN Domain Identity' indicates PS domain.
6	MS			MS with GA-RRC connection (PS domain) but no active PTC
7	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
8	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

84.11.4 PS deactivate channel procedure / negative cases

84.11.4.1 TU5002 timer expires

84.11.4.1.1 Conformance requirement

3GPP TS 44.318 subclause 8a.8.1:

If the MS needs to deactivate one or more transport channels for a particular domain, it shall send the GA-RRC DEACTIVATE CHANNEL REQUEST message to the GANC and start timer TU5002 for the domain. The MS shall include the IE "CN Domain Identity" and the IE "GA-RRC Cause". The GA-RRC Cause value shall be one of the following:

  #0: normal release (e.g., due to inactivity timer timeout)

  #115: unspecified failure

3GPP TS 44.318 subclause 8a.8.2:

When the GANC receives the GA-RRC DEACTIVATE CHANNEL REQUEST message, it shall request the selected CN domain to release the identified RABs associated with the MS. The GANC selects the CN domain based on the value of the received IE "CN Domain Identity". Note that the GANC may also request the selected CN domain to release the Iu connection for the MS in this case, based on local policy settings.

3GPP TS 44.318 subclause 8a.8.3:

The GANC normally initiates this procedure when it receives the RAB Assignment message from the CN indicating RAB release; however, the GANC may also initiate this procedure under certain failure conditions.

One or more circuit or packet transport channels may be deactivated using a single instance of the channel deactivation procedure; however, it is not possible to deactivate both circuit and packet transport channels using a single instance of the channel deactivation procedure.

The GA-RRC DEACTIVATE CHANNEL message includes the IE "GA-RRC Cause" with value as follows:

#0: normal event, e.g. deactivate due to RAB release request from CN

#115: unspecified failure

#10: relocation cancelled (e.g., the handover procedure is stopped because the call has been cleared)

3GPP TS 44.318 subclause 8a.8.4:

When the MS receives the GA-RRC DEACTIVATE CHANNEL message, it shall:

- deactivate the PTC(s) or PTC(s) identified in the IE "RAB ID List";

- send a GA-RRC DEACTIVATE CHANNEL COMPLETE message to the GANC.

3GPP TS 44.318 subclause 8a.8.5:

If timer TU5002 expires in the MS, the MS shall release the associated transport channel(s).

Reference(s)

3GPP TS 44.318 subclauses 8a.8.1, 8a.8.2, 8a.8.3, 8a.8.4, 8a.8.5

84.11.4.1.2 Test purpose

To verify that the MS releases the PTC when the TU5002 timer (PS domain) expires.

84.11.4.1.3 Method of test

Initial Conditions

System Simulator:

- 1 GAN cell, default parameters

Mobile Station:

- MS in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, one PTC active

Foreseen Final State of the MS

MS in GA-RRC-IDLE state (PS domain)

Test Procedure

The MS is in GA-RRC-CONNECTED state (PS domain) in service of GAN cell, with one PTC active. MS sends GA-RRC DEACTIVATE CHANNEL REQUEST message to request deactivation of the PTC and starts timer TU5002 (PS domain). SS does not respond and timer TU5002 (PS domain) expires. MS deactivates the PTC.

Specific test parameters

-

Maximum Duration of Test

1 min.

Expected Sequence

Step	Direction		Message	Comment
	MS	SS		
1	MS			MS in service with one PTC active on GAN cell
2	→		GA-RRC DEACTIVATE CHANNEL REQUEST	IE 'CN Domain Identity' indicates PS domain, IE 'GA-RRC Cause' = #0. For the (single) PTC specified in the IE 'RAB ID List': IE 'RAB ID'. MS starts TU5002 (PS domain)
3		SS		SS waits for period longer than TU5002

4	MS			TU5002 (PS domain) expires. MS releases the PTC resources
5	MS			MS with GA-RRC connection (PS domain) but no active PTC
6	←		GA-RRC RELEASE	IE 'GA-RRC Cause' = #83 IE 'CN Domain Identity' indicates PS domain
7	→		GA-RRC RELEASE COMPLETE	IE 'CN Domain Identity' indicates PS domain MS enters GA-RRC-IDLE state for PS domain

90 Text Telephony (TTY) Services

This subclause contains test cases for Text Telephony (TTY) services.

90.1 Transmission of CTM Bearer Code

90.1.1 Mobile Originated TTY Call

90.1.1.1 Conformance requirement

1) When establishing a mobile originated call with TTY mode enabled in the MS, bit 6 of Octet 3a in the Bearer Capability Information Element shall be '1'.

2) When establishing a mobile originated call with TTY mode disabled in the TTY-compatible MS, bit 6 of Octet 3a in the Bearer Capability Information Element shall be '0'.

Reference(s):

For conformance requirement 1 and 2:

  3GPP TS 04.08 / TS 24.008, subclause 10.5.4.5

90.1.1.2 Test purpose

1) To verify that a TTY compatible MS, with TTY mode enabled, correctly sets bit 6 of Octet 3a in the Bearer Capability Information Element to 1 when made to originate a call.

2) To verify that a TTY compatible MS, with TTY mode disabled, correctly sets bit 6 of Octet 3a in the Bearer Capability Information Element to 0 when made to originate a call.

90.1.1.3 Method of test

90.1.1.3.1 void

90.1.1.3.2 Initial conditions

System Simulator:

- 1 cell, default parameters.

Mobile Station:

- The MS is in MM-state "idle, updated" with valid TMSI and CKSN.

90.1.1.3.3 Final foreseen state of the MS

U0, null.

90.1.1.3.4 Test Procedure

a) The MS is set to TTY mode using the normal MMI. A mobile originated call is established following the generic call set-up procedure for mobile originating speech calls.

b) After receipt of the SETUP message from the MS, the SS shall disconnect the call.

c) TTY mode is disabled in the MS using the normal MMI. A mobile originated call is established following the generic call set-up procedure for mobile originating speech calls.

d) After receipt of the SETUP message from the MS, the SS shall disconnect the call.

90.1.1.4 Test requirement

1) In step a), the MS shall send a SETUP message where bit 6 of Octet 3a of the Bearer Capability Information Element is set to 1.

2) In step c), the MS shall send a SETUP message where bit 6 of Octet 3a of the Bearer Capability Information Element is set to 0.

90.1.2 Mobile Terminated TTY Call

90.1.2.1 Conformance requirement

1) When establishing a mobile terminated call with TTY mode enabled in the MS, bit 6 of Octet 3a in the Bearer Capability Information Element shall be '1'.

2) When establishing a mobile terminated call with TTY mode disabled in the TTY-compatible MS, bit 6 of Octet 3a in the Bearer Capability Information Element shall be '0'.

Reference(s):

For conformance requirement 1 and 2:

3GPP TS 04.08 / TS 24.008, subclause 10.5.4.5

90.1.2.2 Test purpose

3) verify that a TTY compatible MS, with TTY mode enabled, correctly sets bit 6 of Octet 3a in the Bearer Capability Information Element to 1 when receiving a mobile terminated call.

4) To verify that a TTY compatible MS, with TTY mode disabled, correctly sets bit 6 of Octet 3a in the Bearer Capability Information Element to 0 when receiving a mobile terminated call.

90.1.2.3 Method of test

90.1.2.3.1 void

90.1.2.3.2 Initial conditions

System Simulator:

- 1 cell, default parameters.

Mobile Station:

- The MS is in MM-state "idle, updated" with valid TMSI and CKSN.

90.1.2.3.3 Final foreseen state of the MS

U0, null.

90.1.2.3.4 Test Procedure

a) The MS is set to TTY mode using the normal MMI. A mobile terminated call is established following the generic call set-up procedure for mobile terminating speech calls.

b) After receipt of the CALL CONFIRMED message from the MS, the SS shall disconnect the call.

c) TTY mode is disabled in the MS using the normal MMI. A mobile terminated call is established following the generic call set-up procedure for mobile terminating speech calls.

d) After receipt of the CALL CONFIRMED message from the MS, the SS shall disconnect the call.

90.1.2.4 Test requirement

1) In step a), the MS shall send a CALL CONFIRMED message where bit 6 of Octet 3a of the Bearer Capability Information Element is set to 1.

2) In step c), the MS shall send a CALL CONFIRMED message where bit 6 of Octet 3a of the Bearer Capability Information Element is set to 0.