
45 Session Management Procedures

45.1 Definition

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45.2 PDP context activation

45.2.1 Initiated by the mobile station

45.2.1.1 Attach initiated by context activation/QoS Offered by Network is the QoS Requested

45.2.1.1.1 Conformance requirement

PDP context activation shall initiate GPRS Attach by the MS when the MS is GPRS Detached.

In order to request a PDP context activation, the MS sends an ACTIVATE PDP CONTEXT REQUEST message to the network. If the QoS offered by the network is the same as the QoS requested by the mobile, then upon receipt of the message ACTIVATE PDP CONTEXT ACCEPT the MS shall stop timer T3380 and shall initiate establishment of the logical link with the offered QoS.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclauses 6.1.1 and 6.1.3.1.1.

45.2.1.1.2 Test purpose

To check the MS initiates a GPRS ATTACH if one is not already active. To test the behaviour of the MS when the network responds to a PDP context activation request with the requested QoS.

45.2.1.1.3 Method of test

Specific PICS statements:

- GPRS Auto Attach (TSPC_AddInfo_on_auto_GPRS_AP)

PIXIT statements:

-Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-DEREGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

If the MS is attached, it should be triggered to initiate a GPRS detach procedure. A context activation is then requested by the user. On receipt of the ACTIVATE PDP CONTEXT REQUEST message a ACTIVATE PDP CONTEXT ACCEPT is returned by the SS with the same requested QoS. The contents of the ACTIVATE PDP CONTEXT REQUEST message shall then be checked. The SS then waits for T3380 +10% seconds to ensure T3380 has been stopped and no more ACTIVATE PDP CONTEXT REQUEST messages are sent by the MS. The SS then sends a MODIFY PDP CONTEXT REQUEST message to which the MS shall reply with a MODIFY PDP CONTEXT ACCEPT message to ensure the context has been set up.

Expected sequence

Step	Direction	Message	Comments
1	MS		If MS is not configured for GPRS auto attachment (see PICS), go to step 5. The MS initiates a GPRS detach (without power off) by MMI or by AT command.
2	MS		
3	MS -> SS	DETACH REQUEST	Detach type = 'normal detach, GPRS detach' Initiate a context activation Request attach Accept attach Negotiated Ready timer value IE should not be included Force to standby indicator set Request a pdp context activation
4	SS -> MS	DETACH ACCEPT	
5	MS		
6	MS -> SS	ATTACH REQUEST	
7	SS -> MS	ATTACH ACCEPT	
8	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	
9	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	
10	SS		Wait for T3380 +10% seconds to ensure no further activate request messages come from the MS Send a modify request for the activated context Accept the modification request to show context is activated
11	SS -> MS	MODIFY PDP CONTEXT REQUEST	
12	MS -> SS	MODIFY PDP CONTEXT ACCEPT	

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Modify PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	As above

Modify PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

45.2.1.2 QoS Offered by Network is a lower QoS

45.2.1.2.1 QoS Accepted by MS

45.2.1.2.1.1 Conformance requirement

In order to request a PDP context activation, the MS sends an ACTIVATE PDP CONTEXT REQUEST message to the network. If the QoS offered by the network is acceptable to mobile, then upon receipt of the message ACTIVATE PDP CONTEXT ACCEPT the MS shall initiate establishment of the logical link with the offered QoS.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.1.1.

45.2.1.2.1.2 Test purpose

To test the behaviour of the MS when the network responds to a PDP context activation request with a lower QoS than that requested.

45.2.1.2.1.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

The requested QoS and Minimum QoS are set. A context activation is requested by the user. On receipt of the ACTIVATE PDP CONTEXT REQUEST message a ACTIVATE PDP CONTEXT ACCEPT is returned by the SS with a QoS lower than the requested but higher than or equal to the minimum. The SS then sends a MODIFY PDP CONTEXT REQUEST message and the MS shall respond with a MODIFY PDP CONTEXT ACCEPT message to confirm the context is active.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept a pdp context activation
4	SS -> MS	MODIFY PDP CONTEXT REQUEST	Send a modify request for the activated context
5	MS -> SS	MODIFY PDP CONTEXT ACCEPT	Accept the modification request to show context is activated

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	At least one value lower than in above but higher than or equal to minimum
Radio priority level	Arbitrarily chosen
Spare half octet	0
PDP address	omitted

Modify PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	As above

Modify PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

45.2.1.2.2 QoS Rejected by MS

45.2.1.2.2.1 Conformance requirement

In order to request a PDP context activation, the MS sends an ACTIVATE PDP CONTEXT REQUEST message to the network.

Upon receipt of the message **ACTIVATE PDP CONTEXT ACCEPT** offering a QoS which is not acceptable to the mobile, the MS shall initiate the PDP context deactivation procedure.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.1.1.

45.2.1.2.2.2 Test purpose

To test the behaviour of the MS when the QoS offered by the network in response to a PDP context activation request is not acceptable to the MS.

45.2.1.2.2.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

The requested QoS and Minimum QoS are set. A context activation is requested by the user. On receipt of the **ACTIVATE PDP CONTEXT REQUEST** message an **ACTIVATE PDP CONTEXT ACCEPT** message is returned by the SS with a QoS lower than the minimum. The MS shall then send a **DEACTIVATE PDP CONTEXT REQUEST** message. A **DEACTIVATE PDP CONTEXT ACCEPT** message will be sent in return by the SS.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context activation
4	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Deactivate the pdp context
5	SS -> MS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	At least one value lower than in above and lower than minimum
Radio priority level	Arbitrarily chosen
Spare half octet	0

Deactivate PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM cause	QoS not acceptable

Deactivate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1

45.2.2 PDP context activation requested by the network, successful and unsuccessful

Applicability

This test needs to take into account the number of contexts supported by the MS to be able to test the response when all contexts are activated and the network tries to initiate a new context.

45.2.2.1 Conformance requirement

- 1) Upon receipt of a REQUEST PDP CONTEXT ACTIVATION message:
 - If the MS accepts the request the MS shall then initiate the PDP context activation procedure.
 - If the MS rejects the request, the MS shall send a REQUEST PDP CONTEXT ACTIVATION REJECT message with one of the following causes:
 - #26: insufficient resources;
 - #31: activation rejected, unspecified;
 - #40: feature not supported; or
 - #95 – 111: protocol errors.
- 2) The MS shall not ignore the request.

- 3) If the MS accepts the request, the ACTIVATE PDP CONTEXT REQUEST message sent by the MS shall contain the parameters requested by the network in the REQUEST PDP CONTEXT ACTIVATION message, except for the offered QoS which may be changed by the MS.
- 4) Whenever a REQUEST PDP CONTEXT ACTIVATION message is received by the MS specifying a transaction identifier relating to a PDP context not in state PDP-INACTIVE, the MS shall locally deactivate the old PDP context relating to the received transaction identifier. Furthermore, the MS shall continue with the activation procedure of a new PDP context as indicated in the received message.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclauses 6.1.3.1.2, 6.1.3.1.4 and 8.3.2 (f).

45.2.2.2 Test purpose

To test the behaviour of the MS upon receipt of a context activation request from the network.

45.2.2.3 Method of test

Specific PICS statements:

-

PIXIT statements:

- Number of network initiated PDP contexts supported

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Case 1

For an MS that supports PDP Context Activation requested by the network.

Test procedure

A REQUEST PDP CONTEXT ACTIVATION message is sent by the SS. On receipt of the ACTIVATE PDP CONTEXT REQUEST message an ACTIVATE PDP CONTEXT ACCEPT message is returned by the SS. This is repeated until the maximum number of contexts supported by the MS are activated. If the MS cannot support seven PDP contexts then one greater than the maximum supported by the MS should be requested. In response to this activation request the MS shall return a REQUEST PDP CONTEXT ACTIVATION REJECT message with cause set to 'insufficient resources', 'feature not supported', 'activation rejected, unspecified' or 'protocol errors' using cause values #26, #31, #40 or #95-#111. A REQUEST PDP CONTEXT ACTIVATION message is then sent using a currently activated context transaction identifier. The MS shall activate this context in place of the previous context.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request a pdp context activation request
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context activation
4	SS		Steps 1-3 are repeated for Min(number of Network Initiated contexts supported, 7) NOTE: If all 7 contexts are supported steps 5 and 6 should not be performed
5	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request a pdp context activation request
6	MS -> SS	REQUEST PDP CONTEXT ACTIVATION REJECT	The context activation request is rejected with cause 'insufficient resources', 'feature not supported', 'activation rejected, unspecified' or 'protocol errors' using cause values #26, #31, #40 or #95-111.
7	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request a pdp context activation request for an existing context
8	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation to replace the existing context
9	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context activation

Case 2

For an MS that does not support PDP Context Activation requested by the network.

Test procedure

A REQUEST PDP CONTEXT ACTIVATION message is sent by the SS. The MS shall then send an REQUEST PDP CONTEXT ACTIVATION REJECT message with cause set to 'insufficient resources' or 'feature not supported' or 'activation rejected, unspecified' or 'protocol errors'.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request a pdp context activation request
2	MS -> SS	REQUEST PDP CONTEXT ACTIVATION REJECT	Reject the pdp context activation request with cause 'insufficient resources', 'feature not supported', 'activation rejected, unspecified' or 'protocol errors' using cause values #26, #31, #40 or #95-111.

Specific message contents

As default except:

Request PDP Context Activation

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
Offered PDP address	Arbitrarily chosen

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	As above

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Request PDP Context Activation Reject

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
PDP address	As above
SM cause	'insufficient resources' or 'feature not supported' or 'activation rejected, unspecified' or 'protocol errors'

45.2.3 Void

45.2.4 Abnormal cases

45.2.4.1 T3380 Expiry

45.2.4.1.1 Conformance requirement

- 1) On the first expiry of the timer T3380, the MS shall resend the PDP CONTEXT ACTIVATION REQUEST.
- 2) On the second expiry of the timer T3380, the MS shall resend the PDP CONTEXT ACTIVATION REQUEST.
- 3) On the third expiry of the timer T3380, the MS shall resend the PDP CONTEXT ACTIVATION REQUEST.
- 4) On the fourth expiry of the timer T3380, the MS shall resend the PDP CONTEXT ACTIVATION REQUEST.
- 5) On the fifth expiry of the timer T3380, the MS shall release all resources possibly allocated for this invocation and shall abort the procedure; no automatic PDP context activation re-attempt shall be performed.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.1.5.

45.2.4.1.2 Test purpose

To test the behaviour of the MS when the network does not reply to PDP CONTEXT ACTIVATION REQUEST

45.2.4.1.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A context activation is requested by the user. The MS shall send the ACTIVATE PDP CONTEXT REQUEST message five times with $T3380 \pm 10\%$ seconds between each message. After this no further ACTIVATE PDP CONTEXT REQUEST messages shall be sent by the MS.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
3	SS		$T3380 \pm 10\%$ seconds
4	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
5	SS		$T3380 \pm 10\%$ seconds
6	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
7	SS		$T3380 \pm 10\%$ seconds
8	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
9	SS		$T3380 \pm 10\%$ seconds
10	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
11	SS		Wait for $T3380 + 10\%$ seconds to ensure no further ACTIVATE PDP CONTEXT REQUEST messages are sent by the MS

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

45.2.4.2 Collision of MS initiated and network requested PDP context activation

45.2.4.2.1 Conformance requirement

In the event of collision between MS initiated and network initiated PDP context activation requests, the MS shall discard the REQUEST PDP CONTEXT ACTIVATION message and shall wait for an ACTIVATE PDP CONTEXT ACCEPT message.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.1.5.

45.2.4.2.2 Test purpose

To test the behaviour of the MS when there is a collision between an MS initiated and network requested PDP context activation.

45.2.4.2.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Case 1

For an MS that supports PDP Context Activation requested by the network.

Test procedure

A context activation is requested by the user. After receipt of the ACTIVATE PDP CONTEXT REQUEST message the SS sends a REQUEST PDP CONTEXT ACTIVATION message followed by an ACTIVATE PDP CONTEXT ACCEPT message in a time less than T3380 (Use T3380/2). The MS shall send no messages within this time.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
3	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request a pdp context activation request
4	SS		Wait for T3380/2 seconds to ensure MS does not resend ACTIVATE PDP CONTEXT REQUEST
5	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context activation

Case 2

For an MS that does not support PDP Context Activation requested by the network.

Test procedure

A context activation is requested by the user. After receipt of the ACTIVATE PDP CONTEXT REQUEST message the SS sends a REQUEST PDP CONTEXT ACTIVATION message. The MS shall send a REQUEST PDP CONTEXT ACTIVATION REJECT message with cause set to 'insufficient resources' or 'feature not supported' or 'activation rejected, unspecified' or 'protocol errors'. The SS then sends an ACTIVATE PDP CONTEXT ACCEPT.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Request a pdp context activation
3	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request a pdp context activation request
4	MS -> SS	REQUEST PDP CONTEXT ACTIVATION REJECT	The context activation request is rejected with cause 'insufficient resources', 'feature not supported', 'activation rejected, unspecified' or 'protocol errors' using cause values #26, #31, #40 or #95-111.
5	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context activation

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen
APN	Arbitrarily chosen

Request PDP Context Activation

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
Offered PDP address	As requested by the MS
APN	As requested by the MS (Case 1) Different from requested by the MS (Case 2)

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Request PDP Context Activation Reject

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
SM cause	'insufficient resources' or 'feature not supported' or 'activation rejected, unspecified' or 'protocol errors'

45.2.4.3 Network initiated PDP context activation request for an already activated PDP context (on the MS side)

45.2.4.3.1 Definition

45.2.4.3.2 Conformance requirement

If the MS receives a REQUEST PDP CONTEXT ACTIVATION message with the same combination of APN, PDP type and PDP address as an already activated PDP context, the MS shall deactivate the existing PDP context and, if any, all the linked PDP contexts (matching the combination of APN, PDP type and PDP address) locally without notification to the network and proceed with the requested PDP context activation.

Reference

3GPP TS 24.008 clause 6.1.3.1.5 d).

45.2.4.3.3 Test purpose

To test the behaviour of the MS when it detects a network initiated PDP context activation for the PDP context already activated on the MS side.

45.2.4.3.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

- Network requested pdp context activation supported (TSPC_AddInfo_N_req_PDP_CA)

PIXIT statements:

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Test procedure

A PDP context activation is requested by the user. SS accepts PDP context activation. Secondary PDP context activation is requested by the user. SS accepts secondary PDP context activation. SS sends a REQUEST PDP CONTEXT ACTIVATION message with the same combination of APN, PDP type and PDP address as an already activated PDP context. 2 cases are expected:

Case A (MS supports "Network requested PDP context activation"):

The MS deactivates the existing PDP context and linked secondary PDP context (matching the combination of APN, PDP type and PDP address) locally without notification to the SS and proceeds with the requested PDP context activation.

Case B (MS does not support "Network requested PDP context activation"):

The MS sends REQUEST PDP CONTEXT ACTIVATION REJECT message with cause set to 'insufficient resources' or 'feature not supported' or 'activation rejected, unspecified' or 'protocol errors' and the existing PDP contexts stay still active.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	MS requests a PDP context activation
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	SS accepts the PDP context activation
4	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	MS requests a secondary PDP context activation
5	SS -> MS	ACTIVATE SECONDARY PDP CONTEXT ACCEPT	SS accepts the secondary PDP context activation
6	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	SS requests a PDP context activation with the same combination of APN, PDP type and PDP address as the activated PDP context If the MS supports "Network requested PDP context activation" branch A is performed, otherwise branch B is performed.
7A	MS		MS locally deactivates the activated PDP context and the secondary PDP context
8A	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	MS replies with a Request PDP context activation
9A	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	SS accepts the PDP context activation
10A	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of the secondary PDP context
11A	MS -> SS	SM STATUS	Cause set to #81. This verifies that the secondary PDP context was locally deactivated.
12A	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of the first PDP context
13A	MS -> SS	SM STATUS	Cause set to #81. This verifies that the first PDP context was locally deactivated.
7B	MS -> SS	REQUEST PDP CONTEXT ACTIVATION REJECT	The context activation request is rejected with cause 'insufficient resources', 'feature not supported', 'activation rejected, unspecified' or 'protocol errors' using cause values #26, #31, #40 or #95-111.
8B	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of the secondary PDP context
9B	MS -> SS	MODIFY PDP CONTEXT ACCEPT	MS Accepts PDP context modification.

Specific message contents

None.

45.2.5 Secondary PDP context activation procedures

45.2.5.1 Successful Secondary PDP Context Activation Procedure Initiated by the MS

45.2.5.1.1 QoS Offered by Network is the QoS Requested

45.2.5.1.1.1 Definition

45.2.5.1.1.2 Conformance requirement

In order to request a PDP context activation with the same PDP address and APN as an already active PDP context, the MS shall send an ACTIVATE SECONDARY PDP CONTEXT REQUEST message to the network, enter the state PDP-ACTIVE-PENDING and start timer T3380. The message shall contain the selected NSAPI. The MS shall ensure that the selected NSAPI is not currently being used by another Session Management entity in the MS. The message shall also include a QoS profile, a requested LLC SAPI and the Linked TI. The QoS profile is the requested QoS.

Reference

3GPP TS 24.008 clauses 6.1.3.2 and 6.1.3.2.1.

45.2.5.1.1.3 Test purpose

To test the behaviour of the MS when SS responds to a Secondary PDP context activation request with the requested QoS.

45.2.5.1.1.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

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PIXIT statements:

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Test procedure

A PDP context activation is requested by the MS and accepted by the SS. Secondary PDP context activation is requested by the MS. On receipt of the `ACTIVATE SECONDARY PDP CONTEXT REQUEST` message an `ACTIVATE SECONDARY PDP CONTEXT ACCEPT` is returned by the SS with the same requested QoS. The SS then waits for T3380 seconds to ensure T3380 has been stopped and no more `ACTIVATE SECONDARY PDP CONTEXT REQUEST` messages are sent by the MS. The SS then sends a `MODIFY PDP CONTEXT REQUEST` message to which the MS shall reply with a `MODIFY PDP CONTEXT ACCEPT` message to ensure the PDP context has been activated.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a secondary PDP context activation
5	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request a Secondary PDP context activation. Check that TFT filed is present in message and <i>TFT operation</i> is "Create a new TFT".
6	SS -> MS	ACTIVATE SECONDARY PDP CONTEXT ACCEPT	Accept the Secondary PDP context activation, the QoS is set to the requested QoS.
7	SS		Wait for T3380 seconds to ensure no further activate request messages come from the MS
8	SS -> MS	MODIFY PDP CONTEXT REQUEST	SS sends a modify request to MS for the activated context
9	MS -> SS	MODIFY PDP CONTEXT ACCEPT	The MS accepts the modification request from the network to show context is activated

Specific message contents

45.2.5.1.2 QoS Offered by Network is a lower QoS

45.2.5.1.2.1 QoS accepted by MS

45.2.5.1.2.1.1 Definition

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45.2.5.1.2.1.2 Conformance requirement

In order to request a PDP context activation with the same PDP address and APN as an already active PDP context, the MS shall send an **ACTIVATE SECONDARY PDP CONTEXT REQUEST** message to the network, enter the state **PDP-ACTIVE-PENDING** and start timer T3380. The message shall contain the selected NSAPI. The MS shall ensure that the selected NSAPI is not currently being used by another Session Management entity in the MS. The message shall also include a QoS profile, a requested LLC SAPI and the Linked TI. The QoS profile is the requested QoS.

Upon receipt of the message **ACTIVATE SECONDARY PDP CONTEXT ACCEPT**, the MS shall stop timer T3380 and enter the state **PDP-ACTIVE**. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

In GSM the MS shall initiate establishment of the logical link for the LLC SAPI indicated by the network with the offered QoS and selected radio priority level if no logical link has been already established for that SAPI. If the LLC SAPI indicated by the network can not be supported by the MS, the MS shall initiate the PDP context deactivation procedure.

Reference

3GPP TS 24.008 clauses 6.1.3.2 and 6.1.3.2.1.

45.2.5.1.2.1.3 Test purpose

To test the behaviour of the MS when the SS responds to a Secondary PDP context activation request with a lower QoS than that requested.

45.2.5.1.2.1.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

The requested QoS and Minimum QoS are set. A PDP context activation is requested by the MS and accepted by the SS. Secondary context activation is requested by the user. On receipt of the ACTIVATE SECONDARY PDP CONTEXT REQUEST message an ACTIVATE SECONDARY PDP CONTEXT ACCEPT is returned by the SS with a QoS lower than the requested but higher than or equal to the minimum. The SS then sends a MODIFY PDP CONTEXT REQUEST message and the MS shall respond with a MODIFY PDP CONTEXT ACCEPT message to confirm the context is active.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a secondary PDP context activation
5	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request a Secondary PDP context activation.. Check that TFT filed is present in message and <i>TFT operation</i> is "Create a new TFT".
6	SS -> MS	ACTIVATE SECONDARY PDP CONTEXT ACCEPT	Accept a Secondary PDP context activation, the QoS is lower than the requested QoS and higher than minimum QoS.
7	SS -> MS	MODIFY PDP CONTEXT REQUEST	Send a modify request to MS for the activated context
8	MS -> SS	MODIFY PDP CONTEXT ACCEPT	Accept the modification request from network to show context is activated

Specific message contents

None.

45.2.5.1.2.2 QoS rejected by MS

45.2.5.1.2.2.1 Definition

-

45.2.5.1.2.2.2 Conformance requirement

In order to request a PDP context activation with the same PDP address and APN as an already active PDP context, the MS shall send an ACTIVATE SECONDARY PDP CONTEXT REQUEST message to the network, enter the state PDP-ACTIVE-PENDING and start timer T3380. The message shall contain the selected NSAPI. The MS shall ensure that the selected NSAPI is not currently being used by another Session Management entity in the MS. The message shall also include a QoS profile, a requested LLC SAPI and the Linked TI. The QoS profile is the requested QoS.

Upon receipt of the message ACTIVATE SECONDARY PDP CONTEXT ACCEPT, the MS shall stop timer T3380 and enter the state PDP-ACTIVE. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

In GSM the MS shall initiate establishment of the logical link for the LLC SAPI indicated by the network with the offered QoS and selected radio priority level if no logical link has been already established for that SAPI. If the LLC SAPI indicated by the network can not be supported by the MS, the MS shall initiate the PDP context deactivation procedure.

Reference

3GPP TS 24.008 clauses 6.1.3.2 and 6.1.3.2.1.

45.2.5.1.2.2.3 Test purpose

To test the behaviour of the MS when the SS responds to a Secondary PDP context activation request with a lower QoS than that requested and not acceptable by the MS.

45.2.5.1.2.2.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

The requested QoS and Minimum QoS are set. PDP context activation is requested by the user and accepted by the SS. Secondary PDP context activation is requested by the user. On receipt of the ACTIVATE SECONDARY PDP CONTEXT REQUEST message an ACTIVATE SECONDARY PDP CONTEXT ACCEPT message is returned by the SS with the QoS lower than the minimum. The MS shall then send a DEACTIVATE PDP CONTEXT REQUEST message for the secondary PDP context. A DEACTIVATE PDP CONTEXT ACCEPT message will be sent in return by the SS.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a secondary PDP context activation
5	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request a Secondary PDP context activation Check that TFT filed is present in message and <i>TFT operation</i> is "Create a new TFT".
6	SS -> MS	ACTIVATE SECONDARY PDP CONTEXT ACCEPT	Accept the Secondary PDP context activation with QoS lower than Minimum QoS
7	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request deactivation of the secondary PDP context SM Cause = #37, 'QoS not accepted'
8	SS -> MS	DEACTIVATE PDP CONTEXT ACCEPT	Tear down indicator IE shall not be included Accept the PDP context deactivation

Specific message contents

None

45.2.5.2 Unsuccessful Secondary PDP Context Activation Procedure Initiated by the MS

45.2.5.2.1 Definition

45.2.5.2.2 Conformance requirement

Upon receipt of an `ACTIVATE SECONDARY PDP CONTEXT REQUEST` message, the network may reject the MS initiated PDP context activation by sending an `ACTIVATE SECONDARY PDP CONTEXT REJECT` message to the MS.

Upon receipt of an `ACTIVATE SECONDARY PDP CONTEXT REJECT` message, the MS shall stop timer T3380 and enter the state `PDP-INACTIVE`.

Reference

3GPP TS 24.008 clauses 6.1.3.2 and 6.1.3.2.2.

45.2.5.2.3 Test purpose

To test the behaviour of the MS when network rejects the MS initiated Secondary PDP context activation.

45.2.5.2.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

A PDP context activation is requested by the user and accepted by the SS. Secondary context activation is requested by the user. On receipt of the `ACTIVATE SECONDARY PDP CONTEXT REQUEST` message from the MS, an `ACTIVATE SECONDARY PDP CONTEXT REJECT` with cause #43 'unknown PDP context' is returned by the SS. SS shall wait for T3380 seconds to ensure that the MS sends no more `ACTIVATE SECONDARY PDP CONTEXT REQUEST` messages.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a secondary PDP context activation
5	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request a Secondary PDP context activation. Check that TFT filed is present in message and <i>TFT operation</i> is "Create a new TFT".
6	SS -> MS	ACTIVATE SECONDARY PDP CONTEXT REJECT	SS rejects the Secondary PDP context activation with cause '#43: unknown PDP context'
7	SS		Wait for T3380 seconds to ensure no further ACTIVATE SECONDARY PDP CONTEXT REQUEST messages come from the MS

Specific message contents

None.

45.2.5.3 Abnormal cases

45.2.5.3.1 T3380 Expiry

45.2.5.3.1.1 Definition

45.2.5.3.1.2 Conformance requirement

- 1) On the first expiry of the timer T3380, the MS shall re-send the ACTIVATE SECONDARY PDP CONTEXT REQUEST.
- 2) On the second expiry of the timer T3380, the MS shall re-send the ACTIVATE SECONDARY PDP CONTEXT REQUEST.
- 3) On the third expiry of the timer T3380, the MS shall re-send the ACTIVATE SECONDARY PDP CONTEXT REQUEST.
- 4) On the fourth expiry of the timer T3380, the MS shall re-send the ACTIVATE SECONDARY PDP CONTEXT REQUEST.
- 5) On the fifth expiry of the timer T3380, the MS shall release all resources possibly allocated for this invocation and shall abort the procedure; no automatic secondary PDP context activation re-attempt shall be performed.

Reference

3GPP TS 24.008 clause 6.1.3.2.3 a).

45.2.5.3.1.3 Test purpose

To test the behaviour of the MS when the SS does not reply to ACTIVATE SECONDARY PDP CONTEXT REQUEST message.

45.2.5.3.1.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

A PDP context is activated by the user and accepted by the SS. Secondary PDP context activation is requested by the user. The MS shall send ACTIVATE SECONDARY PDP CONTEXT REQUEST message five times with T3380 seconds between each message. After this, no further ACTIVATE SECONDARY PDP CONTEXT REQUEST messages shall be sent by the MS.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a secondary PDP context activation
5	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request a Secondary PDP context activation
6	SS		T3380 +10% seconds
7	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request the Secondary PDP context activation
8	SS		T3380 +10% seconds
9	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request the Secondary PDP context activation
10	SS		T3380 +10% seconds
11	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request the Secondary PDP context activation
12	SS		T3380 +10% seconds
13	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request the Secondary PDP context activation
14	SS		Wait for T3380 +10% seconds to ensure no further ACTIVATE SECONDARY PDP CONTEXT REQUEST messages are sent by the MS

Specific message contents

None.

45.3 PDP context modification procedure

45.3.1 Network initiated PDP context modification

45.3.1.1 Conformance requirement

- 1) Upon receipt of a MODIFY PDP CONTEXT REQUEST message.
 - If the MS can accept the modification requested, the MS shall reply with the MODIFY PDP CONTEXT ACCEPT message.
 - If the MS is unable to accept the modification requested, the MS shall initiate the PDP context deactivation procedure for the NSAPI that has been indicated in the message MODIFY PDP CONTEXT REQUEST - the

reject cause IE value of the DEACTIVATE PDP CONTEXT REQUEST message shall indicate "QoS not accepted".

- 2) The MS shall either accept the modification request or deactivate the PDP context, it shall not ignore the modification request.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.2.

45.3.1.2 Test purpose

To test the behaviour of the MS upon receipt of a MODIFY PDP CONTEXT REQUEST message.

45.3.1.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context is activated by the user and accepted by the SS. A MODIFY PDP CONTEXT REQUEST message is then sent to the MS with a QoS that is acceptable to the MS (higher than or equal to the minimum QoS set in the MS). The MS shall send a MODIFY PDP CONTEXT ACCEPT message in return. A MODIFY PDP CONTEXT REQUEST message is then sent to the MS with a QoS that is not acceptable to the MS (lower than the minimum QoS set in the MS). The MS shall send a DEACTIVATE PDP CONTEXT REQUEST message in return.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of a pdp context
5	MS -> SS	MODIFY PDP CONTEXT ACCEPT	Accept the pdp context modification
6	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of a pdp context
7	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Reject the pdp context modification by deactivating the pdp context. Cause set to 'QoS not acceptable'
8	SS -> MS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Modify PDP Context Request (used in step 4)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	Higher than or equal to the minimum QoS and lower than the requested QoS.

Modify PDP Context Request (used in step 6)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	Lower than the minimum QoS

Modify PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

Deactivate PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM cause	QoS not acceptable

Deactivate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1

45.3.2 MS initiated PDP context modification

45.3.2.1 MS initiated PDP Context Modification accepted by network

45.3.2.1.1 Definition

-

45.3.2.1.2 Conformance requirement

In order to initiate the procedure, the MS sends the MODIFY PDP CONTEXT REQUEST message to the network, enters the state PDP-MODIFY-PENDING and starts timer T3381. The message may contain the requested new QoS and/or the TFT and the requested LLC SAPI (used in GSM).

Upon receipt of the MODIFY PDP CONTEXT REQUEST message, the network may reply with the MODIFY PDP CONTEXT ACCEPT message in order to accept the context modification. The reply message may contain the negotiated QoS and the radio priority level based on the new QoS profile and the negotiated LLC SAPI, that shall be used in GSM by the logical link.

Upon receipt of the MODIFY PDP CONTEXT ACCEPT message, the MS shall stop the timer T3381. If the offered QoS parameters received from the network differs from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

Reference

3GPP TS 24.008 clauses 6.1.3.3 and 6.1.3.3.2.

45.3.2.1.3 Test purpose

To test the behaviour of the MS upon receipt of a MODIFY PDP CONTEXT ACCEPT message from the network with

- Requested QoS;

45.3.2.1.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

MS Higher Layer release (TSPC_MS_HIGHER_LAYER_RELEASE)

PIXIT statements:

-

Test procedure

For a R97 to R7 MS, MS initiated PDP Context Modification for first PDP context is supported.

For a R8 MS, MS initiated PDP Context Modification for first PDP context is not supported. Hence this TC is not applicable.

The requested QoS and Minimum QoS are set. A PDP context is activated by the user and accepted by the SS. The MS initiates a PDP context modification by sending a MODIFY PDP CONTEXT REQUEST message with new QoS. The SS accepts the context modification and replies with the MODIFY PDP CONTEXT ACCEPT message with the QoS requested. The SS waits 'T3390' seconds to confirm that UE will not initiate a PDP context deactivation.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request the modification of a PDP context, with new QoS
5	SS -> MS	MODIFY PDP CONTEXT ACCEPT	Accept the PDP context modification with QoS requested
6			SS waits 'T3390' seconds to confirm UE does not initiate PDP context deactivation.

Specific message contents

None.

45.3.2.2 MS initiated PDP Context Modification not accepted by the network

45.3.2.2.1 Definition

45.3.2.2.2 Conformance requirement

In order to initiate the procedure, the MS sends the MODIFY PDP CONTEXT REQUEST message to the network, enters the state PDP-MODIFY-PENDING and starts timer T3381. The message may contain the requested new QoS and/or the TFT and the requested LLC SAPI (used in GSM).

Upon receipt of a MODIFY PDP CONTEXT REQUEST message, the network may reject the MS initiated PDP context modification request by sending a MODIFY PDP CONTEXT REJECT message to the MS. The message shall contain a cause code that typically indicates one of the following:

- # 26: insufficient resources;
- # 32: Service option not supported;
- # 41: semantic error in the TFT operation;
- # 42: syntactical error in the TFT operation;
- # 44: semantic errors in packet filter(s);
- # 45: syntactical errors in packet filter(s);
- # 95 - 111: protocol errors.

Upon receipt of a MODIFY PDP CONTEXT REJECT message, the MS shall stop timer T3381 and enter the state PDP-ACTIVE.

Reference

3GPP TS 24.008 clauses 6.1.3.3, 6.1.3.3.2 and 6.1.3.3.3.

45.3.2.2.3 Test purpose

To test the behaviour of the MS upon receipt of a MODIFY PDP CONTEXT REJECT message from the network.

45.3.2.2.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

- MS Higher Layer release (TSPC_MS_HIGHER_LAYER_RELEASE)

PIXIT statements:

-

Test procedure

For a R97 to R7 MS, MS initiated PDP Context Modification for first PDP context is supported.

For a R8 MS, MS initiated PDP Context Modification for first PDP context is not supported. Hence this TC is not applicable. A PDP context is activated by the user and accepted by the SS. The MS initiates a PDP context modification by sending a MODIFY PDP CONTEXT REQUEST message. The SS rejects the context modification and replies with the MODIFY PDP CONTEXT REJECT with cause set to # 26: insufficient resources.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request the modification of a PDP context
5	SS -> MS	MODIFY PDP CONTEXT REJECT	SS rejects PDP context modification SM cause set to # 26: 'insufficient resources'
6	SS		Wait for T3381 seconds to ensure no further MODIFY PDP CONTEXT REQUEST messages are sent by the MS

Specific message contents

None.

45.3.3 Abnormal cases

45.3.3.1 T3381 Expiry

45.3.3.1.1 Definition

45.3.3.1.2 Conformance requirement

On the first expiry of timer T3381, the MS shall resend the MODIFY PDP CONTEXT REQUEST message reset and restart timer T3381. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3381, the MS may continue to use the previously negotiated QoS or it may initiate the PDP context deactivation procedure.

Reference

3GPP TS 24.008 clause 6.1.3.3.4 a) case: In the MS.

45.3.3.1.3 Test purpose

To test the behaviour of the MS when SS does not reply to MODIFY PDP CONTEXT REQUEST message.

45.3.3.1.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

- MS Higher Layer release (TSPC_MS_HIGHER_LAYER_RELEASE)

PIXIT statements:

-

Test procedure

For a R97 to R7 MS, MS initiated PDP Context Modification for first PDP context is supported.

For a R8 MS, MS initiated PDP Context Modification for first PDP context is not supported. Hence this TC is not applicable.

A PDP context activation is requested by the user and accepted by the SS. The MS shall send MODIFY PDP CONTEXT REQUEST message five times with T3381 seconds between each message. After this no further MODIFY PDP CONTEXT REQUEST messages shall be sent by the MS.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context activation
4	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context, with new QoS
5	SS		T3381 ±10% seconds
6	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context, with new QoS
7	SS		T3381 ±10% seconds
8	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context, with new QoS
9	SS		T3381 ±10% seconds
10	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context, with new QoS
11	SS		T3381 ±10% seconds
12	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context, with new QoS
13	SS		Wait for T3381 +10% seconds to ensure no further MODIFY PDP CONTEXT REQUEST messages are sent by the MS. The MS may initiate PDP context deactivation procedure.

Specific message contents

None.

45.3.3.2 Collision of MS and network initiated PDP context modification procedures

45.3.3.2.1 Definition

45.3.3.2.2 Conformance requirement

A collision of a MS and network initiated PDP context modification procedures is identified by the MS if a MODIFY PDP CONTEXT REQUEST message is received from the network after the MS has sent a MODIFY PDP CONTEXT REQUEST message itself, and both messages contain the same TI and the MS has not yet received a MODIFY PDP CONTEXT ACCEPT message from the network.

In the case of such a collision, the network initiated PDP context modification shall take precedence over the MS initiated PDP context modification. The MS shall terminate internally the MS initiated PDP context modification procedure, enter the state PDP-Active and proceed with the network initiated PDP context modification procedure by sending a MODIFY PDP CONTEXT ACCEPT message. The network shall ignore the MODIFY PDP CONTEXT REQUEST message received in the state PDP-MODIFY-PENDING. The network shall proceed with the network initiated PDP context modification procedure as if no MODIFY PDP CONTEXT REQUEST message was received from the MS.

Reference

3GPP TS 24.008 clause 6.1.3.3.4 b).

45.3.3.2.3 Test purpose

To test behaviour of the MS when it identifies collision of the MS and SS initiated PDP context modification with the same TI.

45.3.3.2.4 Method of test

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Specific PICS statements:

MS Higher Layer release (TSPC_MS_HIGHER_LAYER_RELEASE)

PIXIT statements:

-

Test procedure

For a R97 to R7 MS, MS initiated PDP Context Modification for first PDP context is supported.

For a R8 MS, MS initiated PDP Context Modification for first PDP context is not supported. Hence this TC is not applicable.

A PDP context is activated by the user and accepted by the SS. The MS initiates a PDP context modification by sending a MODIFY PDP CONTEXT REQUEST message. Then the SS initiates the PDP context modification by sending MODIFY PDP CONTEXT REQUEST message with the same TI. The MS shall reply to the SS initiated PDP context modification procedure by sending MODIFY PDP CONTEXT ACCEPT message with the same TI.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a PDP context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context activation
4	MS -> SS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context, with new QoS
5	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request modification of the PDP context with the same TI
6	MS		MS identifies collision, terminates internally the MS initiated PDP context modification procedure
7	MS -> SS	MODIFY PDP CONTEXT ACCEPT	Accept SS initiated PDP context modification. The TI flag set to 0.
8	SS		Wait for T3381 +10% seconds from Step 4 to ensure no further MODIFY PDP CONTEXT REQUEST messages are sent by the MS

Specific message contents

Activate PDP Context Request (used in step 2)

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Modify PDP Context Request (MS to Network direction) (used in step 4)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

Modify PDP Context Request (Network to MS direction) (used in step 5)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1

Modify PDP Context Accept (used in step 7)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

45.4 PDP context deactivation procedure

45.4.1 PDP context deactivation initiated by the MS

45.4.1.1 Conformance requirement

The message contains the transaction identifier in use for the PDP context to be deactivated and a cause code that typically indicates one of the following causes:

- #26: insufficient resources;
- #36: regular PDP context deactivation; or
- #37: QoS not accepted.

Upon receipt of the DEACTIVATE PDP CONTEXT ACCEPT message, the MS shall stop timer T3390.

- Whenever any session management message except REQUEST PDP CONTEXT ACTIVATION or SM-STATUS is received by the MS specifying a transaction identifier which is not recognised as relating to an active context or to a context that is in the process of activation or deactivation the MS shall send a SM-STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value and remain in the PDP-INACTIVE state.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclauses 6.1.3.3.1 and 8.3.2 (b).

45.4.1.2 Test purpose

To test the behaviour of the MS upon receipt of a DEACTIVATE PDP CONTEXT ACCEPT message from the network.

45.4.1.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context is activated by the user and accepted by the SS. The context deactivation is then requested by the user. The MS shall send a DEACTIVATE PDP CONTEXT REQUEST message to the SS. The SS shall then reply with a DEACTIVATE PDP CONTEXT ACCEPT message. The SS shall then wait for T3390 +10% seconds to ensure T3390 has been stopped and that no further messages are sent from the MS. If the MS did not initiate detach procedure, the SS shall then send a MODIFY PDP CONTEXT REQUEST for the deactivated context and the MS shall reply with an SM STATUS message with cause #81 'transaction identifier not known'.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a pdp context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context
4	MS		Initiate a context deactivation
5	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
6	SS -> MS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation
7	SS		Wait for T3390 +10% seconds to ensure no further deactivate request messages are sent Note: The MS may initiate Detach procedure during this time.
8A	MS -> SS	DETACH REQUEST	
9A	SS -> MS	DETACH ACCEPT	
8B	SS -> MS	MODIFY PDP CONTEXT REQUEST	Send a modify request for the deactivated context.
9B	MS -> SS	SM STATUS	Cause set to #81

Note: Branch 'A' is applicable if the MS initiates Detach procedure after the PDP context is deactivated. Otherwise branch 'B' is applicable.

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Deactivate PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM cause	Regular Deactivation

Deactivate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1

Modify PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	As above

SM Status

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM Cause	#81

45.4.2 PDP context deactivation initiated by the network

45.4.2.1 Conformance requirement

The MS shall, upon receipt of the DEACTIVATE PDP CONTEXT REQUEST message, reply with a DEACTIVATE PDP CONTEXT ACCEPT message.

- Whenever any session management message except REQUEST PDP CONTEXT ACTIVATION or SM-STATUS is received by the MS specifying a transaction identifier which is not recognised as relating to an active context or to a context that is in the process of activation or deactivation the MS shall send a SM-STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value and remain in the PDP-INACTIVE state.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclauses 6.1.3.3.2 and 8.3.2 (b).

45.4.2.2 Test purpose

To test the behaviour of the MS upon receipt of a DEACTIVATE PDP CONTEXT REQUEST message from the network.

45.4.2.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context is activated by the user and accepted by the SS. A DEACTIVATE PDP CONTEXT REQUEST message is then sent by the SS. The MS shall reply with a DEACTIVATE PDP CONTEXT ACCEPT message. If the MS did not initiate detach procedure, the SS shall then send a MODIFY PDP CONTEXT REQUEST for the deactivated context and the MS shall reply with an SM STATUS message with cause #81 'transaction identifier not known'.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	SS -> MS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
5	MS -> SS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation.
			Wait for 10 seconds. The MS may initiate Detach procedure.
6A	MS -> SS	DETACH REQUEST	
6B	SS -> MS	MODIFY PDP CONTEXT REQUEST	Send a modify request for the deactivated context.
7B	MS -> SS	SM STATUS	Cause set to #81

Note: Branch 'A' is applicable if the MS initiates Detach procedure after the PDP context is deactivated. Otherwise branch 'B' is applicable.

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Deactivate PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
SM cause	Regular Deactivation

Deactivate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

Modify PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	As above

SM Status

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SMCause	#81

45.4.3 Abnormal cases

45.4.3.1 T3390 Expiry

45.4.3.1.1 Conformance requirement

- 1) On the first expiry of timer T3390, the MS shall resend the message DEACTIVATE PDP CONTEXT REQUEST.
- 2) On the second expiry of timer T3390, the MS shall resend the message DEACTIVATE PDP CONTEXT REQUEST.
- 3) On the third expiry of timer T3390, the MS shall resend the message DEACTIVATE PDP CONTEXT REQUEST.
- 4) On the fourth expiry of timer T3390, the MS shall resend the message DEACTIVATE PDP CONTEXT REQUEST.
- 5) On the fifth expiry of timer T3390, the MS shall release all resources allocated and shall erase the PDP context related data.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.3.3.

45.4.3.1.2 Test purpose

To test the behaviour of the MS when the network does not reply to a DEACTIVATE PDP CONTEXT REQUEST message from the MS.

45.4.3.1.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context is activated by the user and accepted by the SS. A context deactivation is then requested by the user. The MS shall send a DEACTIVATE PDP CONTEXT REQUEST message five times with $T3390 \pm 10\%$ seconds between each message. $T3390 + 10\%$ seconds after the fifth message the SS shall send a MODIFY PDP CONTEXT REQUEST message for the deactivated context and the MS shall reply with SM STATUS with cause set to #81 'Transaction identifier not known'.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a context deactivation
5	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
6	SS		$T3390 \pm 10\%$ seconds
7	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
8	SS		$T3390 \pm 10\%$ seconds
9	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
10	SS		$T3390 \pm 10\%$ seconds
11	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
12	SS		$T3390 \pm 10\%$ seconds
13	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
14	SS		Wait $T3390 + 10\%$ seconds
15	SS -> MS	MODIFY PDP CONTEXT REQUEST	Try to modify the deactivated context.
16	MS -> SS	SM STATUS	Cause set to #81

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Deactivate PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM cause	Regular Deactivation

Modify PDP Context Request

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	As above

SM Status

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM Cause	#81

45.4.3.2 Collision of MS and network initiated PDP context deactivation requests

45.4.3.2.1 Conformance requirement

If the MS and the network initiated PDP context deactivation requests collide, the MS and the network shall each reply with the message DEACTIVATE PDP CONTEXT ACCEPT and shall stop timer T3390 and T3395, respectively.

Reference

3GPP TS 04.08 / 3GPP TS 24.008 subclause 6.1.3.3.3.

45.4.3.2.2 Test purpose

To test the behaviour of the MS when there is a collision between an MS initiated and a network initiated context deactivation.

45.4.3.2.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context is activated by the user and accepted by the SS. A context deactivation is then requested by the user. Upon receipt of the DEACTIVATE PDP CONTEXT REQUEST message the SS sends a DEACTIVATE PDP CONTEXT REQUEST message. The MS shall reply with only one DEACTIVATE PDP CONTEXT ACCEPT message. Upon receipt of this message the SS sends a DEACTIVATE PDP CONTEXT ACCEPT message.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a context deactivation
5	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
6	SS -> MS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context
7	MS -> SS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation
8	SS -> MS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation

Specific message contents

As default except:

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0

Deactivate PDP Context Request (used in step 5)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0
SM cause	Regular Deactivation

Deactivate PDP Context Request (used in step 6)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
SM cause	Regular Deactivation

Deactivate PDP Context Accept (used in step 7)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	0

Deactivate PDP Context Accept (used in step 8)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1

45.4.4 PDP context deactivation initiated by the network / Tear down indicator

45.4.4.1 Conformance requirement

The PDP context deactivation may be initiated by the MS or by the network. The *tear down indicator* information element may be included in the DEACTIVATE PDP CONTEXT REQUEST message in order to indicate whether only the PDP context associated with this specific TI or all active PDP contexts sharing the same PDP address as the PDP context associated with this specific TI shall be deactivated. If the *tear down indicator* information element is not included in the DEACTIVATE PDP CONTEXT REQUEST message, only the PDP context associated with this specific TI shall be deactivated.

The Tear down indicator IE is included in the message in order to indicate whether only the PDP context associated with this specific TI or all active PDP contexts sharing the same PDP address as the PDP context associated with this specific TI shall be deactivated.

Reference

3GPP TS 24.008 subclauses 6.1.3.4, 8.3.2 (b) and 9.5.14.1.

45.4.4.2 Test purpose

To test the behaviour of the MS upon receipt of a DEACTIVATE PDP CONTEXT REQUEST message from the network including Tear down indicator IE.

45.4.4.3 Method of test

Specific PICS statements:

-

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context is activated by the user and accepted by the SS. A Secondary PDP context is activated by the user and accepted by the SS. A DEACTIVATE PDP CONTEXT REQUEST message is then sent by the SS indicating the TI of second PDP context and including Tear down indicator IE. The MS shall reply with a DEACTIVATE PDP CONTEXT ACCEPT message. The SS shall then send a MODIFY PDP CONTEXT REQUEST including the TI of second PDP context and the MS shall reply with an SM STATUS message with cause #81 'transaction identifier not known'. The SS shall then send a MODIFY PDP CONTEXT REQUEST including the TI of the first PDP context and the MS shall reply with an SM STATUS message with cause #81 'transaction identifier not known'.

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	MS		Initiate a context activation
2	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context
3	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
4	MS		Initiate a secondary PDP context activation
5	MS -> SS	ACTIVATE SECONDARY PDP CONTEXT REQUEST	Request a Secondary PDP context activation
6	SS -> MS	ACTIVATE SECONDARY PDP CONTEXT ACCEPT	Accept the Secondary PDP context activation
7	SS -> MS	DEACTIVATE PDP CONTEXT REQUEST	Request a deactivation of a pdp context. Include TI of second PDP context and Tear down indicator flag set to 1.
8	MS -> SS	DEACTIVATE PDP CONTEXT ACCEPT	Accept the pdp context deactivation. TI is the same as step 7.
9	SS -> MS	MODIFY PDP CONTEXT REQUEST	Send a modify request including the TI of second PDP context.
10	MS -> SS	SM STATUS	Cause set to #81
11	SS -> MS	MODIFY PDP CONTEXT REQUEST	Send a modify request including the TI of first PDP context.
12	MS -> SS	SM STATUS	Cause set to #81

Specific message contents

None.

45.5 Unknown or Unforeseen Transaction Identifier/Non-semantic Mandatory Information Element Errors

45.5.1 Error cases

45.5.1.1 Conformance requirement

45.5.1.1.1 Conformance requirement for release 98 and earlier MS

The mobile station shall reject a session management message other than SM-STATUS received with TI value "111" by immediately sending an SM-STATUS message with TI value "111". For a session management message received with TI different from "111", the following procedures shall apply:

- Whenever any session management message except REQUEST PDP CONTEXT ACTIVATION or SM-STATUS is received by the MS specifying a transaction identifier which is not recognised as relating to an active context or to a context that is in the process of activation or deactivation or has been [recently] deactivated, the MS shall send a SM-STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value and remain in the PDP-INACTIVE state.
- When a REQUEST PDP CONTEXT ACTIVATION message is received with a transaction identifier flag set to "1", this message shall be ignored.

When on receipt of a message:

- an "imperative message part" error; or
- a "missing mandatory IE" error;

is diagnosed or when a message containing:

- a syntactically incorrect mandatory IE; or
- an IE unknown in the message, but encoded as "comprehension required"; or
- an out of sequence IE encoded as "comprehension required";

is received, the mobile station shall proceed as follows:

- If the message was an SM message the SM-STATUS message with cause #96 "invalid mandatory information" shall be returned.
- If a mobile station receives a GMM message or SM message with message type not defined for the PD or not implemented by the receiver, it shall return a status message (GMM STATUS or SM STATUS depending on the protocol discriminator) with cause #97 'message type non-existent or not implemented'.
- If the mobile station receives a message not compatible with the protocol state, the mobile station shall ignore the message except for the fact that, if an RR connection exists, it returns a status message (STATUS, MM STATUS depending on the protocol discriminator) with cause #98 "Message type not compatible with protocol state". When the message was a GMM message the GMM-STATUS message with cause #98 "Message type not compatible with protocol state" shall be returned. When the message was a SM message the SM-STATUS message with cause #98 'Message type not compatible with protocol state' shall be returned.
- Other syntactic errors.

This subclause applies to the analysis of the value part of an information element. It defines the following terminology:

- An IE is defined to be syntactically incorrect in a message if it contains at least one value defined as 'reserved', or if its value part violates syntactic rules given in the specification of the value part. However it is not a syntactical error that a type 4 standard IE specifies in its length indicator a greater length than possible according to the value part specification: extra bits are ignored.

Reference

3GPP TS 04.08 subclauses 8.3.2 and 8.5.

3GPP TS 04.07 subclause 11.4.2.

45.5.1.1.2 Conformance requirement for release 99 and later MS

The mobile station and network shall ignore a session management message with TI EXT bit = 0. Otherwise, the following procedures shall apply:

- Whenever any session management message except REQUEST PDP CONTEXT ACTIVATION or SM-STATUS is received by the MS specifying a transaction identifier which is not recognized as relating to an active context or to a context that is in the process of activation or deactivation, the MS shall send a SM-STATUS message with cause #81 "invalid transaction identifier value" using the received transaction identifier value including the extension octet and remain in the PDP-INACTIVE state.
- When REQUEST PDP CONTEXT ACTIVATION message is received with a transaction identifier flag set to "1", this message shall be ignored.

When on receipt of a message,

- an "imperative message part" error; or
- a "missing mandatory IE" error;

is diagnosed or when a message containing:

- a syntactically incorrect mandatory IE; or
- an IE unknown in the message, but encoded as "comprehension required" (see 3GPP TS 24.007); or
- an out of sequence IE encoded as "comprehension required" (see 3GPP TS 24.007) is received,

the mobile station shall proceed as follows:

If the message is not one of the messages listed in subclauses 8.5.1, 8.5.2, 8.5.3, 8.5.4 and 8.5.5 a) or b), the mobile station shall ignore the message except for the fact that, if an RR connection exists, it shall return a status message (STATUS, MM STATUS depending on the protocol discriminator) with cause # 96 "Invalid mandatory information". If the message was a GMM message the GMM-STATUS message with cause #96 "Invalid mandatory information" shall be returned. If the message was an SM message the SM-STATUS message with cause # 96 "invalid mandatory information" shall be returned.

- the network shall proceed as follows:

When the message is not one of the messages listed in subclause 8.5.3 b), c), d) or e) and 8.5.5 a) or c), the network shall either:

- try to treat the message (the exact further actions are implementation dependent), or
- ignore the message except that it should return a status message (STATUS, or MM STATUS (depending on the protocol discriminator), GMM STATUS, or SM STATUS) with cause # 96 "Invalid mandatory information".

This subclause applies to the analysis of the value part of an information element. It defines the following terminology:

- An IE is defined to be syntactically incorrect in a message if it contains at least one value defined as 'reserved', or if its value part violates syntactic rules given in the specification of the value part. However it is not a syntactical error that a type 4 standard IE specifies in its length indicator a greater length than possible according to the value part specification: extra bits are ignored.

Reference

3GPP TS 24.008 subclauses 6.1, 8.3.2, 8.5 and 9.5.2.1.

3GPP TS 24.007 subclause 11.4.2.

45.5.1.2 Test Purpose

To test the behaviour of the MS when messages with unknown or unforeseen transaction identifiers or non-semantic mandatory information element errors occur.

45.5.1.3 Method of test

Specific PICS statements:

- MS Higher Layer Release (TSPC_MS_HIGHER_LAYER_RELEASE)

PIXIT statements:

-

Initial conditions

System Simulator:

1 cell, default parameters.

Mobile Station:

The MS is in GMM-state "GMM-REGISTERED, normal service" with valid P-TMSI and CKSN.

Test procedure

A PDP context activation is requested by the SS with the transaction identifier set to '1'. The MS shall not respond to this request.

A PDP context is then activated from the MS. An invalid accept message is then sent by the SS. The MS shall then send an SM STATUS message. After the MS has sent an ACTIVATE PDP CONTEXT REQUEST message the SS sends a MODIFY PDP CONTEXT REQUEST message with the same transaction identifier. The MS shall reply with an SM STATUS message with the cause set to #98 'Message type not compatible with protocol state'.

After T3380 has expired $\pm 10\%$ seconds the MS shall send another ACTIVATE PDP CONTEXT REQUEST message. The SS sends back a Session Management message with an unknown message type. The MS shall reply with an SM STATUS message with the cause set to #97 'Message type non-existent or not implemented'.

After a further T3380 has expired the MS shall send another ACTIVATE PDP CONTEXT REQUEST message $\pm 10\%$ seconds. Another invalid accept message is sent by the SS.

After a further T3380 has expired $\pm 10\%$ seconds a valid accept message with QoS length greater than 3 is sent by the SS. This shall be accepted by the MS.

A deactivate message is then sent from the SS coded with the extension mechanism for TI. Therefore the TIO value is set to 111 and the transaction identifier extension TIE is set to an unused value greater than 6 (no reserved value). A MS implemented release 98 or earlier should reply with an SM STATUS message with transaction identifier set to '111'. A Rel.99 MS shall reply with an SM STATUS message with cause #81 'invalid transaction identifier value'.

A deactivate message is then sent from the SS with a different transaction identifier to the one used in the activate request message sent by the MS. The MS shall reply with an SM STATUS message with cause #81 'invalid transaction identifier value'.

Two invalid modification messages are then sent to the MS in turn. The MS shall respond each time with an SM-STATUS message with cause #96 "invalid mandatory information".

Maximum duration of test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1	SS -> MS	REQUEST PDP CONTEXT ACTIVATION	Request the activation of a PDP context with the transaction identifier flag set to "1"
2	SS		Wait 30 seconds to ensure MS does not request context activation
3	MS		Initiate a context request
4	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context from the MS
5	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Unknown IE encoded as 'comprehension required'
6	MS -> SS	SM STATUS	Cause set to #96
7	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context from the MS (auto-generated) This message shall be sent within T3380 seconds $\pm 10\%$ from the last ACTIVATE PDP CONTEXT REQUEST message
8	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of the PDP context
9	MS -> SS	SM STATUS	Cause set to #98 'Message type not compatible with protocol state'.
10	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context from the MS (auto-generated) This message shall be sent within T3380 seconds $\pm 10\%$ from the last ACTIVATE PDP CONTEXT REQUEST message
11	SS -> MS	UNKNOWN MESSAGE	Message with unknown message type
12	MS -> SS	SM STATUS	Cause set to #97 'message type non-existent or not implemented'.
13	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context from the MS (auto-generated) This message shall be sent within T3380 seconds $\pm 10\%$ from the last ACTIVATE PDP CONTEXT REQUEST message
14	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Out of sequence IE encoded as 'comprehension required'
15	MS -> SS	SM STATUS	Cause set to #96
16	MS -> SS	ACTIVATE PDP CONTEXT REQUEST	Activate a PDP context from the MS (auto-generated) This message shall be sent within T3380 seconds $\pm 10\%$ from the last ACTIVATE PDP CONTEXT REQUEST message
17	SS -> MS	ACTIVATE PDP CONTEXT ACCEPT	Accept the PDP context
			Step 18A, 19A is performed for release 98 and earlier MS and step 18B, 19B for release 99 and later MS implementation
18A	SS -> MS	DEACTIVATE PDP CONTEXT REQUEST	TI set to "111"
18B	SS -> MS	DEACTIVATE PDP CONTEXT REQUEST	TIO=111 and TIE=not used value greater than 6
19A	MS -> SS	SM STATUS	TI set to "111", cause value not checked
19B	MS->SS	SM STATUS	with cause #81 "invalid transaction identifier value"
20	SS -> MS	DEACTIVATE PDP CONTEXT REQUEST	Try to deactivate the context with a different transaction identifier to that used to activate the context
21	MS -> SS	SM STATUS	Cause set to # 81
22	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of the PDP context
23	MS -> SS	SM STATUS	Cause set to # 96
24	SS -> MS	MODIFY PDP CONTEXT REQUEST	Request the modification of the PDP context
25	MS -> SS	SM STATUS	Cause set to # 96

Specific message contents

As default except:

Request PDP Context Activation

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	1
Offered PDP address	Arbitrarily chosen

Activate PDP Context Request

Information Element	Value/remark
Transaction identifier	In the range 0-6
Transaction identifier flag	0
NSAPI	In the range 5-15
Requested LLC SAPI	3, 5, 9 or 11
Requested QoS	Arbitrarily chosen
Requested PDP address	Arbitrarily chosen

Activate PDP Context Accept (used in step 5)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0
PDP address	Arbitrarily chosen
'Comprehension required IE'	0Fh NOTE: first four bits encoded as 'comprehension required'

Activate PDP Context Accept (used in step 14)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above
Radio priority level	Arbitrarily chosen
Spare half octet	0
PDP address	omitted
'Comprehension required IE'	07h NOTE: first four bits encoded as 'comprehension required'
Protocol configuration options	Minimum length with Configuration protocol of 'PPP'

Activate PDP Context Accept (used in step 17)

Information Element	Value/remark
Transaction identifier	As above
Transaction identifier flag	1
Negotiated LLC SAPI	As above
Negotiated QoS	As above but For R97 and R98 : Length set to 5 and 2 extra octets set to 0 after the normal QoS octets For R99 and Rel-4 : Length set to 13 and 2 extra octets set to 0 after the normal QoS octets For Rel-5 and later: Length set to 16 and 2 extra octets set to 0 after the normal QoS octets For Rel-7 and later: Length set to 18 and 2 extra octets set to 0 after the normal QoS octets
Radio priority level	Arbitrarily chosen
Spare half octet	0
PDP address	Arbitrarily chosen

Deactivate PDP Context Request (used in step 18)

Information Element	Value/remark
Transaction identifier	111
Transaction identifier flag	1
SM cause	24h, regular deactivation

Deactivate PDP Context Request (used in step 20)

Information Element	Value/remark
Transaction identifier	In the range 0-6, but different from the TI in the Activate PDP Context Request message
Transaction identifier flag	1
SM cause	24h, regular deactivation

Modify PDP Context Request (used in step 22)

Information Element	Value/remark
Transaction identifier	As in step 17
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	As above
New QoS	This IE will NOT be present

Modify PDP Context Request (used in step 24)

Information Element	Value/remark
Transaction identifier	As in step 17
Transaction identifier flag	1
Radio priority level	As above
Spare half octet	0
Requested LLC SAPI	Fh, NOTE: this is a reserved value
New QoS	Arbitrary value

46 LLC and SMDCP Tests

46.1 LLC Tests

This subclause contains the test case requirements for Logical Link Control (LLC) procedures in the General Packet Radio Service (GPRS).

46.1.1 Default Conditions

The default values of LLC layer parameters are as per "Table 9: LLC layer parameter default values" in clause 8.9.8 of 3GPP TS 04.64. It is possible that the MS negotiates values different from what is given in the table. In the case where the negotiated value affects the test operation, this is noted in the test.

- The MS default initial condition is that it is GPRS attached and ciphering disabled.

Unless stated otherwise, the default conditions shall apply. N_{MS} denotes the frames sent from the MS and N_{SS} denotes the frames sent from the SS.

Unless stated otherwise the timer T3192 should be set to 80ms.

For all timers, a measurement tolerance of $\pm 10\%$ shall be applied.

The MS may send an XID command any time. The SS shall send an XID response accepting the values proposed by the MS, unless stated otherwise in the test case.

46.1.2 Test cases

46.1.2.1 Unacknowledged data transfer

46.1.2.1.1 Data transmission in protected mode

46.1.2.1.1.1 Conformance requirement

LLC has two modes of operation - acknowledged and unacknowledged. In the unacknowledged mode of operation, layer3 information is transmitted in numbered Unconfirmed Information (UI) frames. The UI frames are not acknowledged at the LLC layer. Neither error recovery nor reordering mechanisms is defined, but transmission and format errors are detected. Duplicate UI frames are discarded.

In the protected mode of unacknowledged operation, the FCS field protects the frame header and the information field.

Unacknowledged mode of operation is defined for all SAPIs that are not reserved.

Reference

3GPP TS 04.64, subclause 4.3.

46.1.2.1.1.2 Test purpose

To verify that the MS performs unacknowledged data transfer for SAPIs 3, 5 and 11 in the protected mode to the network

46.1.2.1.1.3 Method of test

Initial conditions

For execution counter $K = 4$ (GEA 4) Test USIM has to be plugged into the MS

The MS shall be GPRS attached with ciphering enabled. Encryption GEA1, GEA 2, GEA 3 or GEA 4 is used depending on the execution counter K.

Specific PICS statements:

- Supported encryption Algorithm : GEA 1 (TSPC_Feat_GEA 1)
- Supported encryption Algorithm : GEA 2 (TSPC_Feat_GEA 2)
- Supported encryption Algorithm : GEA 3 (TSPC_Feat_GEA 3)
- Supported encryption Algorithm : GEA 4 (TSPC_Feat_GEA 4)

PIXIT statements:

-

Test procedure

During GPRS attach ciphering GEA1, GEA2, GEA3 or GEA4 is activated depending on the execution counter K.

During GPRS attach and PDP context activation, the GMM messages are sent and received by the LLC layer at the MS using UI frames in the unacknowledged mode, on SAPI 1. This implicitly verifies bi-directional unacknowledged data transmission on SAPI 1.

After the PDP context is activated, the MS is made to initiate unacknowledged data transfer on SAPI 3. MS shall transmit UI frames with the E and PM bits set to 1, indicating that encryption and protection are on. Transmit 5 000 octets from the MS.

Repeat the test case for SAPIs 5 and 11.

The test is performed for all GEA x encryption algorithm supported by the MS.

Maximum duration of the test

10 minutes.

Expected sequence

The sequence is performed for execution counter K=1 when the MS supports GEA1, for K=2 when the MS supports GEA2, for K=3 when the MS supports GEA3 and for K=4 when the MS supports GEA4.

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. PDP context activation from the MS. The PDP context used here is PDP context 5.
2			Initiate data transfer of 5000 octets from the MS.
3	MS -> SS	UI frame	Verify that the number of octets in the UI frame does not exceed N201-U. Verify that E=1 and PM=1, PD=0, C/R = 0 and the FCS is correct. Check whether the SAPI is 3, 5 or 11 when data is sent from the MS on these SAPIs. Verify that the sequence numbers are correct and that there are no duplicate or missing frames
4			Repeat step 3 until 5000 octets are sent.
5			Repeat the test case for SAPIs 5 and 11. The PDP context used for SAPI 5 is PDP Context 8 and the one for SAPI 11 is PDP Context 9.

46.1.2.1.2 Data transmission in unprotected mode

46.1.2.1.2.1 Conformance requirement

LLC has two modes of operation - acknowledged and unacknowledged. In the unacknowledged mode of operation, layer3 information is transmitted in numbered Unconfirmed Information (UI) frames. The UI frames are not acknowledged at the LLC layer. Neither error recovery nor reordering mechanisms is defined, but transmission and format errors are detected. Duplicate UI frames are discarded.

In the unprotected mode of unacknowledged operation, the FCS field protects the frame header and the first N202 octets of the information field

Unacknowledged mode of operation is defined for all SAPIs that are not reserved.

Reference

3GPP TS 04.64, subclause 4.3.

46.1.2.1.2.2 Test purpose

To verify that the MS performs unacknowledged data transfer without protection in the correct manner, on SAPIs 5 and 9.

46.1.2.1.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After the PDP context is activated, the MS initiates unacknowledged data transfer on SAPI 5. The MS shall transmit UI frames with the E and PM bits set to 0, indicating that encryption and protection are off.

Repeat the test case for SAPI 9.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro.Initiate PDP context activation from the MS. Use PDP context 10.
2			Initiate unacknowledged data transfer for 5000 octets, from the MS.
3	MS -> SS	UI frame	Verify that the number of octets received at the MS in the UI frame does not exceed N201-U. Verify that E=0 and PM=0, PD=0, C/R = 0 and the FCS is correct. Verify that SAPI = 5 for the first run of the test case and SAPI=9 for the second run of the test case. Verify that the sequence numbers are correct and that there are no duplicate frames.
4	MS -> SS		Repeat step 3 until data transfer is complete.
5		.	Repeat the test case with PDP Context 6. This will use SAPI 9.

46.1.2.1.3 Reception of I frame in ADM

46.1.2.1.3.1 Conformance requirement

The DM unnumbered response shall be used by an LLE to report to its peer entity that the LLE is in a state such that ABM operation cannot be performed. An LLE shall transmit a DM response to any valid command received that it cannot action.

No information field is permitted within the DM response.

Reference

3GPP TS 04.64, clause 6.4.1.4.

46.1.2.1.3.2 Test purpose

To verify that the MS sends a DM response if an I frame is received while in unacknowledged mode.

46.1.2.1.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After sending data to the MS in unacknowledged mode, send an I frame from the SS. The MS shall send a DM response to indicate that it cannot perform an ABM operation.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 1.
2			Initiate unacknowledged data transfer for 2000 octets, from the SS.
3	SS -> MS	UI frame	
4			Repeat step 3 until 1500 octets are transmitted.
5	SS -> MS	I frame	Send an I Command frame (C/R bit set to 1) from the SS
6	MS -> SS	DM response	Verify that the MS sends a DM response with F = 0.
7			Repeat step 3 until all 2000 octets are transmitted. The MS must not send anymore DM frames.

46.1.2.2 Acknowledged data transfer

46.1.2.2.1 Link establishment

46.1.2.2.1.1 Link establishment from MS to SS

46.1.2.2.1.1.1 Conformance requirement

In the acknowledged operation, layer 3 information is transmitted in numbered Information (I) frames. The I frames are acknowledged at the LLC layer. Error recovery and reordering procedures based on retransmission of unacknowledged I frames are specified.

Acknowledged operation requires that ABM operation has been initiated by an establishment procedure using the Set Asynchronous Balanced Mode (SABM) command.

Acknowledged operation is allowed for all SAPs that are not reserved except SAPs 1 and 7 for Release 97-98 and 1, 2, 7 and 8 for Release 99.

Reference

3GPP TS 04.64, subclauses 4.4 and 8.5.2.

46.1.2.2.1.1.2 Test purpose

To test the establishment of acknowledged mode data transfer from the MS to the SS.

46.1.2.2.1.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate acknowledged data transfer from the MS on SAPI 3. Verify that the MS establishes a link before initiating data transfer.

Initiate data transfer from the MS and ensure that the data sent from the MS is received at the SS.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context11.
2	MS -> SS	SABM	Verify that P/F =1.
3	SS -> MS	UA	Send UA from the SS before T200 can expire at the MS. Verify that the MS does not resend SABM.
4			Initiate data transfer of 5000 octets from the MS.
5	MS -> SS	I + S	
6	SS -> MS	RR	Acknowledge whenever requested by the MS. Ensure that the MS does not retransmit the data.
7			Repeat steps 5 and 6 until data transfer is completed

46.1.2.2.1.2 Link establishment from SS to MS

46.1.2.2.1.2.1 Conformance requirement

In the acknowledged operation, layer 3 information is transmitted in numbered Information (I) frames. The I frames are acknowledged at the LLC layer. Error recovery and reordering procedures based on retransmission of unacknowledged I frames are specified.

Acknowledged operation requires that ABM operation has been initiated by an establishment procedure using the Set Asynchronous Balanced Mode (SABM) command.

Acknowledged operation is allowed for all SAPIs that are not reserved except SAPIs 1 and 7.

An LLE shall initiate a request for release of the ABM operation by transmitting a DISC command with the P bit set to 1.

An LLE receiving a DISC command while in ABM state shall transmit a UA response with the F bit set to the same binary value as the P bit in the received DISC command.

Reference

3GPP TS 04.64, subclauses 4.4 and 8.5.2.

46.1.2.2.1.2.2 Test purpose

To test the establishment and release of acknowledged mode data transfer from the SS to the MS.

46.1.2.2.1.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate PDP context activation from the MS . Do a PDP context modification from the SS, which will make the SS initiate a link establishment.

Initiate acknowledged data transfer from the SS on SAPI 9. Verify that the MS responds with a UA.

Initiate data transfer from the SS and ensure that the data sent from the SS is received at the MS.

Terminate data transfer from the SS.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 10.
2		{PDP Context Modification}	Macro. Initiate PDP context modification from the SS using PDP Context 12.
3	SS -> MS	SABM	Send SABM with P/F = 1.
4	MS -> SS	UA	Verify that UA is received before the T200 timer at the SS expires.
5			Initiate data transfer of 2000 octets from the SS.
6	SS -> MS	I + S	Set the A bit to 1 in each I+S frame.
A7 (optional step)	MS -> SS	RNR	The MS can send an RNR. Stop data transmission until the MS sends an RR.
7	MS -> SS	RR	Verify that the MS sends an RR for each frame.
8			Repeat steps 6 and 7 until 2000 octets are sent.
9	SS -> MS	DISC	Send DISC from the SS.
10	MS -> SS	UA	

46.1.2.2.1.3 Loss of UA frame

46.1.2.2.1.3.1 Conformance requirement

If timer T200 expires before the UA or DM response with the F bit set to 1 is received, the LLE shall:

- retransmit the SABM command;
- set timer T200;
- increment the retransmission counter.

Reference

3GPP TS 04.64, subclause 8.5.1.3.

46.1.2.2.1.3.2 Test purpose

To test the MS response to the loss of a UA frame during link establishment.

46.1.2.2.1.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate link establishment for acknowledged data transfer from the MS, for SAPI 9. When the SS receives the SABM frame, do not send a response.

After the MS sends another SABM, respond with a UA from the SS and send some frames from the SS to ensure that the link is established.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP context 12.
2	MS -> SS	SABM	Verify that P/F = 1.
3	MS -> SS	SABM	Do not send UA from the SS. Verify that MS sends another SABM with P/F = 1 after T200 seconds, with the same SAPI that it sent in the first SABM .
4	SS -> MS	UA	Send UA from the SS before T200 for that SAPI expires at the MS.
5			Initiate sending 5 I+S frames from the SS.
6	SS -> MS	I+S	Set the A bit to 1 in all the I+S frames.
A7 (optional step)	MS -> SS	RNR	The MS may send an RNR. If it does, stop transmitting from the SS until the MS sends an RR.
7	MS -> SS	RR	Verify that the MS receives and acknowledges all the frames by sending an RR for each I+S frame received.
8			Repeat steps 6 and 7 until 5 I+S frames are sent from the SS.

46.1.2.2.1.4 Total loss of UA frame

46.1.2.2.1.4.1 Conformance requirement

If timer T200 expires before the UA or DM response with the F bit set to 1 is received, the LLE shall:

- retransmit the SABM command;
- set timer T200;
- increment the retransmission counter.

Reference

3GPP TS 04.64, subclause 8.5.1.3.

46.1.2.2.1.4.2 Test purpose

To verify that:

- the MS attempts to establish a link N200 times after sending the first SABM.

46.1.2.2.1.4.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate link establishment from the MS by sending a SABM frame, for SAPI 11. At the SS, ignore the SABM from the MS.

The MS shall wait for time-out of timer T200 and then send a new SABM frame.

At the SS, ignore the SABM frame sent by the MS. Wait until the MS sends N200 + 1 SABM frames in all.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS, using PDP Context 13.
2	MS -> SS	SABM	Verify that P/F = 1, SAPI = 11.
3	MS -> SS	SABM	Do not send UA from the SS. Verify that MS sends another SABM with P/F = 1 after T200 seconds, with the same SAPI that it sent in the first SABM.
4			Perform step 3 N200 times. Ensure that the MS sends N200 + 1 SABM frames in step 2 and steps 3 only.

46.1.2.2.1.5 DM response

46.1.2.2.1.5.1 Conformance requirement

The DM unnumbered response shall be used by an LLE to report to its peer that the LLE is in such a state that ABM operation cannot be performed.

Upon reception of the DM response with the F bit set to 1, the originator of the SABM command shall enter the ADM state.

If the originator of the establishment procedure receives an LL-RELEASE indication with Cause "DM received", it shall inform the SM sub-layer using the SNSM-STATUS.request primitive with Cause "DM received". SM shall then deactivate all PDP contexts for that SAPI requiring acknowledged peer-to-peer LLC operation.

Reference

3GPP TS 04.64, subclauses 6.4.1.4 and 8.5.1.2.

3GPP TS 04.65, subclause 6.2.1.4.

46.1.2.2.1.5.2 Test purpose

To verify that a link is not established with the MS when a DM response is sent in response to a SABM command.

46.1.2.2.1.5.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate pdp context activation from the MS on SAPI 3. From the SS, send a DM with the F bit set to 1.

Verify that the MS deactivated the PDP Context.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation using PDP Context 11.
2	MS -> SS	SABM	Verify that P/F =1 in the SABM sent from the MS.
3	SS -> MS	DM	Send DM with F=1 from the SS before T200 can expire at the MS. Wait for 2 * T200 seconds after the transmission of DM and verify that the MS does not resend SABM in this period.
4		{PDP Context De-Activation}	Verify that the MS initiates PDP Context Deactivation. MS may initiate this deactivation during 2*T200 sec wait given in step 3.

46.1.2.2.2 MS sends I+S frames

46.1.2.2.2.1 Checking N(S)

46.1.2.2.2.1.1 Conformance requirement

Having either transmitted the UA response to a received SABM command or received the UA response to a transmitted SABM command, I frames and supervisory frames may be transmitted and received. I frames shall be transmitted in ascending N(S) order.

When there is an opportunity to transmit a frame, then the LLE shall do one of the following in the order of priority:

- If there are any I frames marked for retransmission and if the LLE is not in the peer receive busy condition, then the LLE shall increment by 1 the retransmission count variable for the I frame with lowest send sequence number N(S). If the retransmission count variable does not exceed the value of N200, then the LLE shall retransmit the frame.
- If the LLE has a new frame to retransmit, if $V(S) < V(A) + k$ and if the LLE is not in the peer receiver busy condition, then the new I frame shall be transmitted.
- If the LLE has an acknowledgement to transmit, then the LLE shall transmit an S frame.

Reference

3GPP TS 04.64, subclauses 8.6 and 8.6.1.

46.1.2.2.2.1.2 Test purpose

To verify that the MS handles the send sequence number N(S) correctly.

46.1.2.2.2.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate data transfer from the MS on SAPI 3. Send 515 I+S frames continuously. The value of N(S) shall begin from 0 and increment by 1 mod (512) for each frame.

Acknowledge each I frame by sending an RR frame to the MS, in sequence.

Maximum duration of the test

30 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate a PDP context activation using PDP Context 11, from the MS.
2			Initiate data transfer, from the MS.
3	MS -> SS	I+S frame	N(S) = 0 for the first frame.
4	SS -> MS	S frame with RR	Respond whenever acknowledgement is requested.
5			Repeat steps 3 and 4 until all 515 I+S frames have been transmitted from the MS. Verify that : the MS does not retransmit any frame. N(S) begins with 0 and is incremented by 1 mod (512).

NOTE: The application will resend data until all data have been sent.

46.1.2.2.2.2 Busy condition at the peer, with RR sent for resumption of transmission

46.1.2.2.2.2.1 Conformance requirement

The receive not ready (RNR) command shall be used by an LLE to indicate a busy condition. The value of N(R) in the RNR frame acknowledges I frames numbered up to and including N(R) - 1. Subsequent frames, if any, shall not be considered confirmed.

After receiving a valid RNR frame, the LLE shall:

- set a peer receiver busy condition;
- not transmit or retransmit any frames to the peer LLE;
- treat the N(R) contained in the received RNR as an acknowledgement for all the I frames that have been (re-)transmitted, up to and including N(R)- 1 and set its V(A) to the value of N(R) contained in the RNR frame;
- set T201 to initiate the inquiry process; and
- reset the retransmission count variable.

If timer T201 expires, the LLE shall:

- if the value of the retransmission count variable is less than N200:
 - transmit an appropriate supervisory frame with an A bit set to 1;
 - set timer T201; and
 - add one to its retransmission count variable.

The LLE receiving the supervisory frame with the A bit set to 1 shall respond, at the earliest opportunity, with an appropriate supervisory frame (see subclause 8.6.4.1) to indicate whether or not its own receiver busy condition still exists.

Upon receipt of the supervisory frame, the LLE shall reset timer T201, and:

- if the frame is an RR, ACK or SACK frame:
 - the peer receiver busy condition shall be cleared;
- if timer T201 was active before the peer receiver busy condition was set, and if the associated I frame is still not acknowledged, then timer T201 shall be set and associated with the same I frame; and
- the LLE may transmit new I frames or retransmit I frames as defined in subclauses 8.6.1 or 8.6.3, respectively.

The busy peer shall respond at the earliest opportunity, with an appropriate supervisory frame.

- If the highest numbered I frame was received with $N(S)=V(R)$, the appropriate supervisory frame is the RR frame.

Reference

3GPP TS 04.64, subclauses 6.4.3.4 and 8.6.4.

46.1.2.2.2.2 Test purpose

To verify that the MS:

- Handles busy condition when an RNR is sent from the SS;
- Resumes transmission upon reception of an RR.

46.1.2.2.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

The MS is made to send 1 I+S frame on SAPI 9.

The SS does not acknowledge the received I+S frame, when sending as response a supervisory RNR frame.

Immediately after the first RNR frame, the MS shall stop sending I+S frames and start the retransmission timer T201.

After T201 seconds, the MS shall send an RR frame with the A bit set to 1.

The SS responds with a RNR frame.

Within T201 after the second RNR frame, the SS transmit an RR frame to resume transmission.

Immediately after the RR frame, the MS shall start the retransmission of the I+S frame from the point at which it ceased to receive acknowledgement.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 12. Negotiate a value of at least 1 minute for T201.
2			Initiate data transfer of 1 octet of data in acknowledged mode from the MS.
3	MS -> SS	I+S frame	Send 1 octet of data. N(S) = 0 for the first frame
4	SS -> MS	RNR frame	After sending an RNR frame with N(R) = 0 verify that the MS does not send any I + S frames during the next T201 seconds .
5	MS -> SS	RR frame	MS sends an RR frame at T201 after step 4. Verify that the A bit is set to 1.
6	SS -> MS	RNR frame	
7	SS -> MS	RR	Send within T201 after step 6 an RR from the SS with N(R) = 0
8	MS -> SS	I + S	Verify that the MS starts retransmission of the I+S frame from the point at which it had stopped sending, that is, from N(S) = 0
9	SS -> MS	RR	Acknowledge the I + S frame transmitted by the MS.

46.1.2.2.2.3 Busy condition at the peer, with ACK sent for resumption of transmission

46.1.2.2.2.3.1 Conformance requirement

The receive not ready (RNR) command shall be used by an LLE to indicate a busy condition. The value of N(R) in the RNR frame acknowledges I frames numbered up to and including N(R) - 1 . Subsequent frames, if any, shall not be considered confirmed.

After receiving a valid RNR frame, the LLE shall:

- set a peer receiver busy condition;
- not transmit or retransmit any frames to the peer LLE;
- treat the N(R) contained in the received RNR as an acknowledgement for all the I frames that have been (re-)transmitted, up to and including N(R)- 1 and set its V(A) to the value of N(R) contained in the RNR frame;
- set T201 to initiate the inquiry process; and
- reset the retransmission count variable.

If timer T201 expires, the LLE shall:

- if the value of the retransmission count variable is less than N200:
 - transmit an appropriate supervisory frame with an A bit set to 1;
 - set timer T201; and
 - add one to its retransmission count variable.

The LLE receiving the supervisory frame with the A bit set to 1 shall respond, at the earliest opportunity, with an appropriate supervisory frame (see subclause 8.6.4.1) to indicate whether or not its own receiver busy condition still exists.

Upon receipt of the supervisory frame, the LLE shall reset timer T201, and:

- if the frame is an RR, ACK or SACK frame:
 - the peer receiver busy condition shall be cleared;
 - if timer T201 was active before the peer receiver busy condition was set, and if the associated I frame is still not acknowledged, then timer T201 shall be set and associated with the same I frame; and
 - the LLE may transmit new I frames or retransmit I frames as defined in subclauses 8.6.1 or 8.6.3, respectively.

The busy peer shall respond at the earliest opportunity, with an appropriate supervisory frame.

- If the highest numbered frame was received with $N(S) = V(R) + 1$, the appropriate frame is the ACK frame.

Reference

3GPP TS 04.64, subclauses 6.4.3.4 and 8.6.4.

46.1.2.2.3.2 Test purpose

To verify that the MS:

- Handles busy condition when an RNR is sent from the SS;
- Resumes transmission upon reception of an ACK.

46.1.2.2.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

The MS is made to send I+S frames continuously on SAPI 9. The SS acknowledges the received I+S frames with supervisory RR frames.

After receiving the last transmitted frame, the SS responds with a supervisory RNR frame. The RNR frame will indicate that all frames except the one before and the last one have been received.

Immediately after the first RNR frame, the MS shall stop sending I+S frames and start the retransmission timer T201.

After T201 seconds, send an ACK frame from the SS, which acknowledges the last received I+S frame.

Immediately after the ACK frame, the MS shall retransmit the unacknowledged frame $N(S)=N_{MS}-2$.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. PDP context activation from the MS with PDP Context 12. If the mobile negotiates a window size kU less than 3, this test shall end at this step.
2			Initiate acknowledged mode data transmission from the MS.
3	MS -> SS	I+S frame	$N(S)=0$ for the first frame
4	SS -> MS	RR frame	Acknowledge when requested.
5			Repeat steps 3 and 4. The $N(S)$ of the frames shall range from $N(S) = 0$ until $N(S) = N_{MS} - 3 \bmod 512$.
6	MS -> SS	I+S frames	The MS sends the I+S frames with $N(S) = N_{MS} - 2$ and $N(S) = N_{MS} - 1$
7	SS -> MS	RNR frame	After sending RNR frame with $N(R) = N_{MS} - 2 \bmod 512$, wait for T201 seconds at the SS.
7a (Optional)	MS -> SS	I+S frames	MS may send few I+S frames before the RNR frame is received completely at the mobile. SS does not acknowledge them.
8	MS -> SS	RR frame	MS sends an RR frame after T201 times out.
9	SS -> MS	RNR frame	
10	SS -> MS	ACK	Send an ACK from the SS with $N(R) = N_{MS} - 2 \bmod 512$ within T201 after step 9.
11	MS -> SS	I + S frame	Verify that the MS sends an I+S frame with $N(S) = N_{MS} - 2 \bmod 512$.
12	SS -> MS	RR	Acknowledge all the frames transmitted by the MS so far with $N(R) = N_{MS}$.

46.1.2.2.2.4 SACK frame

46.1.2.2.2.4.1 Conformance requirement

On receipt of a valid SACK frame, the LLE shall consider all I frames with the corresponding bit set to 1 in the SACK bitmap as acknowledged.

Reference

3GPP TS 04.64, subclause 8.6.3.2.

46.1.2.2.2.4.2 Test purpose

To verify that the MS considers only the frames as indicated by the SACK bit map have been received correctly and that it retransmits the frames that have not been acknowledged.

46.1.2.2.2.4.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

$N_{MS} \geq 1$.

Initiate data transfer from the MS and send frames from $N(S) = 0$ to $N(S) = N_{MS}$, where $N_{MS} = kU - 1$.

If N_{MS} is even, do not acknowledge an arbitrarily chosen sequence of $N_{MS}/2$ frames and acknowledge the other frames by using SACK.

If N_{MS} is odd, do not acknowledge an arbitrarily chosen sequence of $(N_{MS} - 1)/2$ frames and acknowledge the other frames by using SACK.

Verify that the MS retransmits the not-acknowledged frames.

Acknowledge the retransmitted frames.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. PDP context activation from the MS with PDP Context 11. If the mobile negotiates a window size kU less than 2, this test shall end at this step.
2			Initiate acknowledged mode data transfer from the MS.
3	MS -> SS	I+S frames	$N(S) = 0$ for the first frame
4			Repeat step 3, with $N(S)$ incremented by 1 for each step. These must be repeated until an I+S frame with the A bit set to 1 is received at the SS and at least $N_{MS} + 1$ I+S frames were transmitted.
5	SS -> MS	SACK	If N_{MS} is even, do not acknowledge an arbitrarily chosen sequence of $N_{MS}/2$ frames and acknowledge the other frames by using SACK. If N_{MS} is odd, do not acknowledge an arbitrarily chosen sequence of $(N_{MS} - 1)/2$ frames and acknowledge the other frames by using SACK.
6	MS -> SS	I+S frames	Verify that the MS retransmits the not acknowledged frames.
7	SS -> MS	RR	Acknowledge all the frames. $N(R) = N_{MS} + 1$

46.1.2.2.3 Reception of I + S frames at the MS

46.1.2.2.3.1 Checking $N(R)$

46.1.2.2.3.1.1 Conformance requirement

Whenever an LLE receives a frame with the A bit set to 1, it shall transmit an I+S or S frame.

In ABM mode, all I frames and Supervisory frames contain $N(R)$, the expected send sequence number of the next in-sequence received I frame. At the time that a frame of the above type is designated for transmission, the value of $N(R)$ is equal to the value of the receive state variable $V(R)$. $N(R)$ indicates that the LLE transmitting the $N(R)$ has correctly received all I frames numbered up to and including $N(R) - 1$.

Reference

3GPP TS 04.64, subclauses 6.3.5.4.5 and 8.6.3.1.

46.1.2.2.3.1.2 Test purpose

To verify that the MS transmits acknowledgements with the correct $N(R)$.

46.1.2.2.3.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Send I+S frames continuously from the SS. Send more than 512 frames. The delay between two I+S frames should be less than T201.

Do not send any data from the MS.

When the MS sends RR frames, check the value of N(R) to verify that it indicates that all frames sent from the SS has been acknowledged.

Maximum duration of the test

30 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 11.
2			Initiate acknowledged mode data transfer from the SS.
3	SS -> MS	I+S frame	
4	SS -> MS	I+S frame	The last I+S frame shall have its $N(S) = N_{SS} + i \text{ mod } 512$. Set the A bit to 1 in the last frame of each window and the last frame sent from the SS.
A5 (optional step)	MS -> SS	RR	Verify whether the RR frames received from the MS have the correct N(R) values. Verify whether all the I+S frames sent from the SS have been acknowledged.
B5 (optional step)	MS -> SS	RNR	The SS shall wait for an RR frame before it sends the next I+S frame.
			The MS may not send an RR if the A bit is not set in step 4.
6			Repeat from step 4 515 times.
7			At the end of the test, all the frames sent shall have been acknowledged.

46.1.2.2.3.2 MS handling busy condition during bi-directional data transfer

46.1.2.2.3.2.1 Conformance requirement

The receive not ready (RNR) command shall be used by an LLE to indicate a busy condition. The value of N(R) in the RNR frame acknowledges I frames numbered up to and including N(R) - 1. Subsequent frames, if any, shall not be considered confirmed.

After receiving a valid RNR frame, the LLE shall:

- set a peer receiver busy condition;
- not transmit or retransmit any frames to the peer LLE;
- treat the N(R) contained in the received RNR as an acknowledgement for all the I frames that have been (re-)transmitted, up to and including N(R)- 1 and set its V(A) to the value of N(R) contained in the RNR frame;
- set T201 to initiate the inquiry process; and
- reset the retransmission count variable.

The busy peer shall respond at the earliest opportunity, with an appropriate supervisory frame.

- If the highest numbered frame was received with $N(S) = V(R) + 1$, the appropriate frame is the ACK frame.

Reference

3GPP TS 04.64, subclauses 6.4.3.4 and 8.6.4.

46.1.2.2.3.2.2 Test purpose

To verify that the MS handles peer receiver busy condition when it is transmitting to the SS and receiving data from the SS.

46.1.2.2.3.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Send 1 octet of data from the MS.

Send 1 I+S frame from the SS, containing 1 octet of data.

Send an RNR from the SS to indicate receiver busy condition, after 1 frame (N(S) = 0) has been received at the SS. The N(R) value that is sent in the RNR frame is 0.

Verify that the MS stops transmission of I+S frames.

T201 seconds after sending the RNR frame, send an RR frame from the SS with N(R) = 0 to request the MS to resume transmission.

Verify that the MS resumes transmission. The frame sent from the MS should have its N(S) = 0.

Verify that the MS sends acknowledgements for all the I+S frames transmitted from the SS.

Maximum duration of the test

10 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro.Initiate PDP context activation from the MS using PDP Context 12.
2			Initiate acknowledged mode data transfer of 1 octet from the MS and the SS.
3	MS -> SS	I+S frame	N(S) = 0 for the first frame
4	SS -> MS	I+S frame	A bit set to 1.
5	SS -> MS	RNR frame	Do not acknowledge the first I+S frame received at the SS. N(R) = 0.
A6 (optional step)	MS -> SS	RNR frame	The MS may repeat this step. In this case, the MS shall send an RR frame for resumption of transmission.
6	MS -> SS	RR	Acknowledgement to the I+S frame sent in step 4. This could have been sent by the MS already directly after step 4.
7	MS -> SS	RR	Verify that the MS sends this after T201 seconds after step 5. The MS shall not resend the I+S frame sent in step 3.
8	SS -> MS	RR	N(R) = 0. Send this to resume transmission from the MS.
9	MS -> SS	I+S	Verify that the MS - resends the I+S frame sent in step 3.
10	SS -> MS	RR	Acknowledge the frame transmitted by the MS.

46.1.2.2.3.3 SACK frame

46.1.2.2.3.3.1 Conformance requirement

The SACK supervisory frame shall be used by an LLE to acknowledge single or multiple frames. Frames up to and including $N(R) - 1$, and frames indicated by the SACK bitmap, have been received correctly.

If the LLE is in the own receiver busy condition, the appropriate supervisory frame is the RNR frame. Otherwise, if the highest numbered frame was received with $N(S) = V(R)$, the appropriate supervisory frame is the RR frame. Otherwise, if the highest numbered I frame was received with $N(S) = V(R) + 1$, the appropriate supervisory frame is the ACK frame. Otherwise, the appropriate supervisory frame is the SACK frame.

Reference

3GPP TS 04.64, subclauses 6.4.3.3 and 8.6.4.1.

46.1.2.2.3.3.2 Test purpose

To verify whether the MS sends a SACK frame when it is required and that the SACK frame has the correct bits set.

46.1.2.2.3.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

$N_{MS} = 20$, for this test case.

Initiate data transfer from the SS and send frames from $N(S) = 0$ to $N(S) = N_{MS} - 3$. The A bit shall be set to 1 for all frames sent. Wait till all the frames are acknowledged. Send the frame with $N(S) = N_{MS}$ with the A bit set to 1. Verify that the MS acknowledges all the frames until $N_{MS} - 3$ using RR and negatively acknowledges the other frames ($N_{MS} - 2$ and $N_{MS} - 1$) by using SACK. Retransmit the frames $N_{MS} - 2$ and $N_{MS} - 1$ with A bit set to 1. Verify that the MS acknowledges the retransmitted frames.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation with PDP Context 12. If the negotiated window size is less than 3, the test shall end at this step.
2			Initiate acknowledged mode data transfer from the SS.
3	SS -> MS	I+S frame	$N(S) = 0$ for the first frame, A bit = 1.
-	-	-	
A4 (Optional step)	MS -> SS	RNR frame	The MS can optionally send an RNR frame. If it does, do not send data until the MS sends an RR.
4	MS -> SS	RR frame	$N(R) = 1$ for the first frame
5			Repeat steps 3 and 4 with the $N(S)$ and $N(R)$ values incremented by 1 for each step and with A=1 for the I+S frame . The last RR frame shall have its $N(R) = N_{MS} - 2$.
6	SS -> MS	I+S frame	Send with $N(S) = N_{MS}$, A bit = 1.
A7 (Optional step)	MS -> SS	RNR	$N(R) = N_{MS} - 2$. In this case the SS shall not transmit anything until the MS sends a SACK.
7	MS -> SS	SACK	Verify that the MS does not acknowledge the frames $N_{MS} - 2$ and $N_{MS} - 1$ and acknowledges the other frames (N_{MS}) using SACK.
8	SS -> MS	I+S frame	Retransmit the frame $N_{MS} - 2$ with A bit = 1.
A9 (Optional step)	MS -> SS	RNR	In this case, the SS shall not transmit anything until the MS sends an ACK.
9	MS -> SS	ACK	
10	SS -> MS	I+S	$N(S) = N_{MS} - 1$, A bit = 1.
A11	MS -> SS	RR	$N(R) = N_{MS} + 1$
B11	MS -> SS	RNR	The RNR shall indicate that the MS has received all the frames sent from the SS. $N(R) = N_{MS} + 1$

46.1.2.2.3.4 ACK frame

46.1.2.2.3.4.1 Conformance requirement

Whenever an LLE receives a frame with the A bit set to 1, it shall transmit an I+S or S frame.

The ACK supervisory frame shall be used by an LLE to acknowledge a single or multiple I frames. Frames up to and including $N(R) - 1$, and frame $N(R) + 1$, have been received correctly.

Reference

3GPP TS 04.64, subclauses 6.4.3.2 and 8.6.3.1.

46.1.2.2.3.4.2 Test purpose

To verify that the MS transmits an ACK frame when frames up to and including $N(R) - 1$ and frame $N(R) + 1$ have been received correctly.

46.1.2.2.3.4.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

For this test case, $N_{SS} = 20$.

Send I+S frames with $N(S) = 0$ to $N(S) = N_{SS} - 2$ from the SS. The delay between two I+S frames should be less than T201. Set the A bit to 1 in frames 0 to $N_{SS} - 2$. Verify that the MS sends an RR frame as acknowledgement for these frames. Send the frame with A=1. Do not send frame $N_{SS} - 1$. Verify that the MS sends an ACK frame, indicating that N_{SS} and $N_{SS} - 2$ have been received and that $N_{SS} - 1$ has not been received. Now send a frame from the SS with $N(S) = N_{SS} - 1$, with A=1. Verify that the MS acknowledges all the frames received so far, including this frame, with an RR.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation with PDP Context 13.
2			Initiate acknowledged mode data transmission from the SS.
3	SS -> MS	I+S frame	A = 1
A4 (Optional step)	MS -> SS	RNR	If the MS sends an RNR, do not transmit data until it has sent an RR.
4	MS -> SS	RR	
5			Repeat steps 3 to 5 until frames 0 to $N_{SS} - 2$ have been sent. Verify that RR frames are sent to acknowledge frames from $N(S) = 0$ until $N(S) = N_{SS} - 2$.
6	SS -> MS	I+S frame	Send the frame N_{SS} with A=1. Do not send the frame with $N(S) = N_{SS} - 1$.
A7 (Optional step)	MS -> SS	RNR	$N(R) = N_{SS} - 2$. If the MS sends an RNR, do not transmit data until it sends an ACK.
7	MS -> SS	ACK	Verify that an ACK frame is sent to acknowledge the frames $N_{SS} - 2$ and N_{SS} , with $N(R) = N_{SS} - 1$
8	SS -> MS	I+S frame	$N(S) = N_{SS} - 1$, with A=1.
A9 (Optional step)	MS -> SS	RNR	Verify that $N(R) = N_{SS} + 1$
9	MS -> SS	RR	Verify that an RR frame is received to acknowledge frame $N_{SS} - 1$ with $N(R) = N_{SS} + 1$

46.1.2.2.4 Link Reestablishment

46.1.2.2.4.1 Reestablishment due to reception of SABM

46.1.2.2.4.1.1 Conformance requirement

The criteria for re-establishing the ABM mode of operation are defined in this clause by the following conditions:

- the receipt, while in the ABM state, of a SABM;
- the receipt of an LL-ESTABLISH-REQ primitive from layer 3;
- the occurrence of N200 retransmission failures;
- the occurrence of a frame rejection condition; and
- the receipt of an unsolicited DM response with F bit set to 0 while in ABM state.

In Asynchronous Balanced Mode, only I frames contain $N(S)$, the send sequence number of transmitted I frames. At the time that an in-sequence I frame is designated for transmission, the value of $N(S)$ is set equal to the value of the send state variable $V(S)$.

An LLE receiving a SABM command, if it is able to enter the ABM state, shall:

- inform layer 3 using the LL-ESTABLISH-IND primitive;

- if the received SABM command contains a Layer-3 Parameters XID parameter, wait for the receipt of an LL-ESTABLISH-RES primitive from layer 3;
- respond with a UA response with the F bit set to the same binary value as the P bit in the received SABM command (i.e., F=1);
- reset timer T200 if active;
- set V(S), V(R), V(A), and B to 0;
- enter the ABM state;
- clear all existing exception conditions; and
- clear any existing peer receiver busy condition.

Reference

3GPP TS 04.64, subclauses 8.7.1, 6.3.5.4.3 and 8.5.1.2.

46.1.2.2.4.1.2 Test purpose

To verify whether the MS initiates reestablishment of the link if it receives a SABM while in ABM state.

46.1.2.2.4.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After establishing a link, initiate data transfer from the MS . After receiving 1 frame from the MS, send a SABM from the SS and verify whether the MS responds with a UA. After the link is re-established, verify that the MS resumes data transmission.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context establishment from the MS, using PDP Context 12. Negotiate kU = 1.
2			Initiate acknowledged mode data transfer of 2000 octets from the MS.
3	MS -> SS	I + S	
4	SS -> MS	RR	Acknowledge one frame.
5	MS -> SS	I + S	N(S) = 1.
6	SS -> MS	SABM	After receiving 2 frame from the MS, send a SABM from the SS to re-establish the link.
7	MS -> SS	UA	Verify that the MS responds with a UA.
8	MS -> SS	I+S	Verify that that N(S) begins from 0.
9	SS -> MS	RR	Acknowledge the frame sent from the MS.
10			Repeat steps 8 and 9 until all the frames from the MS are transmitted.

46.1.2.2.4.2 Reestablishment due to N200 failures

46.1.2.2.4.2.1 Conformance requirement

The criteria for re-establishing the ABM mode of operation are defined in this clause by the following conditions:

- the receipt, while in the ABM state, of a SABM;
- the receipt of an LL-ESTABLISH-REQ primitive from layer 3;
- the occurrence of N200 retransmission failures;
- the occurrence of a frame rejection condition; and
- the receipt of an unsolicited DM response with F bit set to 0 while in ABM state.

In case of a re-establishment, all NSAPIs mapped to the affected SAPI shall enter the recovery state and all buffered N-PDUs (i.e. the ones whose complete reception has not been acknowledged and the ones that have not been transmitted yet) shall be transmitted starting with the oldest N-PDU when the link is re-established

Reference

3GPP TS 04.64, clause 8.7.1.

3GPP TS 04.65, subclauses 5.1.2.3, 5.1.2.5 and 6.2.1.2.

46.1.2.2.4.2.2 Test purpose

To verify whether the MS initiates reestablishment of the link when there is an N200 retransmission failure.

46.1.2.2.4.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After establishing a link, initiate data transfer from the MS, to send 1 octet of data. Do not acknowledge the data frame sent from the SS. The MS shall retransmit the frame N200 times. Wait for $(N200 * T201)$ seconds and see if the MS initiates link reestablishment by sending a SABM. After the link is re-established verify that the MS resumes data transmission.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro.Initiate PDP context activation from the MS using PDP context 11.
2			Initiate acknowledged mode data transfer from the MS.
3	MS -> SS	I + S	Send 1 octet of data. Do not acknowledge this frame from the SS
4	MS -> SS	I + S	Verify that the MS retransmits the I+S frame N200 times and that it does not send any SABM frames during retransmission. SS does not acknowledge any of these frames.
5	MS -> SS	SABM	Verify that the MS sends a SABM and that it stops sending anymore data to the SS. Verify that this occurs after T201 seconds after the last I+S frame in step 4.
6	SS -> MS	UA	
7	MS -> SS	I+S	Verify that the MS resumes transmission of data from step 2.
8	SS -> MS	RR	Acknowledge the frame transmitted from the MS.

46.1.2.2.4.3 Reestablishment due to reception of DM

46.1.2.2.4.3.1 Conformance requirement

The criteria for re-establishing the ABM mode of operation are defined in this clause by the following conditions:

- the receipt, while in the ABM state, of a SABM;
- the receipt of an LL-ESTABLISH-REQ primitive from layer 3;
- the occurrence of N200 retransmission failures;
- the occurrence of a frame rejection condition; and
- the receipt of an unsolicited DM response with F bit set to 0 while in ABM state.

In case of a re-establishment, all NSAPIs mapped to the affected SAPI shall enter the recovery state and all buffered N-PDUs (i.e. the ones whose complete reception has not been acknowledged and the ones that have not been transmitted yet) shall be transmitted starting with the oldest N-PDU when the link is re-established.

Reference

3GPP TS 04.64, subclause 8.7.1.

3GPP TS 04.65, subclauses 5.1.2.3, 5.1.2.5 and 6.2.1.2.

46.1.2.2.4.3.2 Test purpose

To verify whether the MS initiates reestablishment of the link if it receives a DM while in ABM state.

46.1.2.2.4.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After establishing a link, initiate data transfer from the MS. After receiving 3 frames from the MS, send a DM with F=0 from the SS and verify whether the MS responds with a SABM. After the link is re-established, verify that the MS resumes data transmission.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS, using PDP context 12.
2			Initiate acknowledged mode data transfer of 8000 octets from the MS.
3	MS -> SS	I+S	
4	SS -> MS	RR	Send RR frames as acknowledgements from the SS.
5			Repeat steps 3 and 4 once.
6	MS -> SS	I+S	
7	SS -> MS	DM	Send a DM with the F bit set to 0 from the SS.
			Discard all the I+S frames received at the SS.
8	MS -> SS	SABM	Verify that the MS re-establishes the link with a SABM
9	SS -> MS	UA	Respond with a UA
10	MS -> SS	I+S	Verify that the MS resumes data transmission , with N(S) set to 0, only for the first frame sent after resumption of transmission.
11	SS -> MS	RR	Acknowledge all frames sent from the MS.
12			Repeat steps 10 and 11 until all the frames from the MS are transmitted.

46.1.2.3 Collision of commands and responses

46.1.2.3.1 Collision of SABM

46.1.2.3.1.1 Conformance requirement

If the transmitted and received unnumbered commands are SABM commands and a Layer-3 Parameters XID parameter is present in both or in neither, then the SABM command transmitted by the SGSN shall be ignored and treated as not transmitted. The LLE in the SGSN shall send the UA response at the earliest possible opportunity if it is able to enter ABM.

Reference

3GPP TS 04.64 subclause 8.5.5.1

46.1.2.3.1.2 Test purpose

To verify that the MS ignores a SABM command received from the SS when it (the MS) is waiting for a UA response, when a Layer-3 Parameters XID parameter is present in both.

46.1.2.3.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate link establishment from the MS by sending a SABM with Layer-3 Parameters XID parameter present. Upon reception of the SABM at the SS, send a SABM with Layer-3 Parameters XID parameter present. Verify that the MS ignores the SABM sent by the SS. Wait for T200 seconds at the SS after receiving the SABM from the MS see if the

MS resends the SABM. After reception of the SABM, respond with a UA. Initiate data transmission from the MS. Acknowledge all the frames sent from the MS.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS with PDP Context 11.
2	MS -> SS	SABM	Verify that P/F = 1. A layer-3 XID parameter shall be present in the SABM received from the MS.
3	SS -> MS	SABM	Send a SABM with P/F =1 to simulate collision. Send the SABM from the SS with a layer 3 XID parameter.
4	MS -> SS	SABM	Ensure that the MS resends the SABM.
5	SS -> MS	UA	Send UA from the SS before T200 can expire at the MS.
6	MS -> SS	I + S	Initiate data transfer from the MS.
7	SS -> MS	RR	Send a supervisory frame as acknowledgement. Wait for T201 seconds to ensure that the MS does not retransmit the data.

46.1.2.3.2 Collision of SABM and DISC

46.1.2.3.2.1 Conformance requirement

If the transmitted and received unnumbered commands are a SABM and DISC command, the LLEs shall issue a DM response at the earliest possible opportunity. Upon receipt of a DM response with the F bit set to 1, the LLE shall enter the ADM state and notify layer3 by means of the appropriate primitive.

Reference

3GPP TS 04.64, subclauses 8.5.5.2 and 8.5.4.

46.1.2.3.2.2 Test purpose

To verify that when the MS receives a DISC after sending a SABM, it shall send a DM response to the SS. Upon reception of a DM response, it shall enter the ADM state.

46.1.2.3.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate link establishment from the MS by sending a SABM command. Send a DISC command in response to this from the SS. Verify that the MS sends a DM and upon reception of a DM from the SS, it enters the ADM state. The MS might try to re-establish ABM directly, or after sending numbered frames from the SS verify that the MS does not acknowledge them and answers with a DM.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 12.
2	MS -> SS	SABM	Verify that P/F = 1
3	SS -> MS	DISC	Send DISC from the SS before T200 can expire at the MS.
4	MS -> SS	DM	
5	SS -> MS	DM	Send DM with F=1
			Branch A, B or C is executed
A6 (Optional)	MS -> SS	DEACTIVATE PDP CONTEXT REQUEST	MS may deactivate the pdp context
A7 (Conditional)	SS -> MS	DEACTIVATE PDP CONTEXT ACCEPT	
B6 (Optional)	MS -> SS	SABM	The MS may try to re-establish ABM.
C6 (Optional)	SS -> MS	I+S	Send an I+S Command (C/R bit set to 1) frame from the SS.
C7 (Conditional)	MS -> SS	DM	The MS shall send a DM as response to the I+S frame with the F bit set to 0.

46.1.2.3.3 Collision of SABM and XID commands

46.1.2.3.3.1 Conformance requirement

If the transmitted unnumbered command is a SABM command and the received unnumbered command is an XID command, then the LLE shall ignore the received XID command.

Reference

3GPP TS 04.64 subclause 8.5.5.2.

46.1.2.3.3.2 Test purpose

To verify that the MS ignores the XID command if it collides with a SABM command.

46.1.2.3.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

When the MS initiates link establishment using a SABM, send an XID command. Verify that the XID command is ignored.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 12.
2	MS -> SS	SABM	Verify that P/F = 1.
3	SS -> MS	XID	Send an XID command without layer3 parameters.
4	MS -> SS	SABM	Ensure that the MS does not send an XID response and resends the SABM.
5	SS -> MS	UA	Send UA from the SS before T200 can expire at the MS. Wait for T200 seconds after the transmission of UA to ensure that the MS does not send an XID response.

46.1.2.4 Unsolicited response frames

46.1.2.4.1 Unsolicited DM

46.1.2.4.1.1 Conformance requirement

When a DM response with the F bit set to 0 is received by an LLE, a collision between a transmitted SABM or DISC command and the unsolicited DM response may have occurred.

A DM response with the F bit set to 0 colliding with a SABM or DISC shall be ignored.

An LLE shall ignore a DM response received with F=0 when it is in the Local Establishment state.

Reference

3GPP TS 04.64 subclauses 8.5.6 and 8.8.4.

46.1.2.4.1.2 Test purpose

To verify that the MS ignores a DM response sent with F=0 when LLC is in the Local Establishment state.

46.1.2.4.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Send SABM with P/F =1 from the MS to establish a link. Send a DM response with F=0 from the SS, in response to this. Verify that the MS ignores this DM response and sends SABM after expiry of T200. Respond with UA from the SS after receiving SABM. Send 1 I+S frame from the SS and verify that the MS acknowledges it.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS with PDP Context 11.
2	MS -> SS	SABM	Initiate data transfer from the MS. Verify that P/F = 1.
3	SS -> MS	DM	Send a DM response with F=0
4	MS -> SS	SABM	Ensure that the second SABM is sent.
5	SS -> MS	UA	Send UA from the SS before T200 expires at the MS.
6	SS -> MS	I+S frame	Send one I+S frame from the SS.
A7 (Optional step)	MS -> SS	RNR	Verify that the RNR acknowledges the frame transmitted in step 6.
7	MS -> SS	RR frame	Verify that the MS acknowledges the I+S frame transmitted from the SS.

46.1.2.5 FRMR frames

46.1.2.5.1 Sending FRMR due to undefined command control field

46.1.2.5.1.1 Conformance requirement

The FRMR unnumbered response may be received by an LLE as a report of a frame rejection condition not recoverable by retransmission of the identical frame:

- receipt of a command or response control field that is undefined or not implemented;
- receipt of a supervisory or unnumbered frame with incorrect length; or
- receipt of an I frame with an information field that exceeds the maximum established length.

Upon occurrence of a frame rejection condition, the LLMEs shall issue an LLGMM-STATUS-IND primitive; and the LLE shall:

- discard the frame causing the frame rejection condition;
- transmit a FRMR response frame; and
- if the LLE is in ABM operation, initiate re-establishment.

Reference

3GPP TS 04.64, subclauses 6.4.1.5 and 8.8.2.

46.1.2.5.1.2 Test purpose

To verify that if the MS receives a frame with a command control field that is not implemented, it sends an FRMR frame and re-establishes the link.

46.1.2.5.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After establishing a link, initiate data transfer from the MS. After receiving the first frame, send a supervisory frame from the SS to acknowledge the last I+S frame received. In this set the first byte of the S frame control field to 1110 0000. Verify whether the MS sends an FRMR. After the link is re-established, verify that the MS resumes data transmission.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS with PDP context 11.
2			Initiate acknowledged mode data transfer of 1 octet from the MS.
3	MS -> SS	I + S	
4	SS -> MS		After receiving the first I + S frame, send a frame, with the contents of the control field as 1110 0000.
5	MS -> SS	FRMR	Verify that the control field of the frame sent in step 4 is sent back in the FRMR response. Verify that the value of V(S) received is 1. W3 shall be set to 1. W1 and W2 shall be set to 0. W4 shall be set to 1.
6	MS -> SS	SABM	Verify that the MS re-establishes the link with a SABM and that it stops sending anymore data to the SS.
7	SS -> MS	UA	Respond with a UA
8	MS -> SS	I+S	Verify that the MS resumes data transmission, with N(S)=0, for the first frame transmitted
9	SS -> MS	RR	Acknowledge all frames sent from the MS.

46.1.2.5.2 Sending FRMR due to reception of an S frame with incorrect length

46.1.2.5.2.1 Conformance requirement

The FRMR unnumbered response may be received by an LLE as a report of a frame rejection condition not recoverable by retransmission of the identical frame:

- receipt of a command or response control field that is undefined or not implemented;
- receipt of a supervisory or unnumbered frame with incorrect length; or
- receipt of an I frame with an information field that exceeds the maximum established length.

Upon occurrence of a frame rejection condition whilst in ABM operation, the LLME shall issue an LLGMM-STATUS-IND primitive; and the LLE shall initiate re-establishment.

Reference

3GPP TS 04.64, subclauses 6.4.1.5 and 8.8.2.

46.1.2.5.2.2 Test purpose

To verify that if the MS receives an S frame with incorrect length, it sends an FRMR frame and re-establishes the link.

46.1.2.5.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After establishing a link, initiate data transfer from the MS. Send an RR with incorrect length, from the SS, when an I+S frame from the MS with the A bit set is received. Verify whether the MS sends an FRMR. After the link is re-established, verify that the MS resumes data transmission.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS with PDP context 12.
2			Initiate acknowledged mode data transfer from the MS with a sufficient amount of data so that an I+S frame with the A bit set to 1 is sent by the MS.
3	MS -> SS	I + S	
4			Repeat step 3 until a frame with the A bit set to 1 is received.
5	SS -> MS	RR	There shall be an extra octet in this RR frame, before the FCS. The RR frame shall appear as follows: Address field (1 octet) Control field (2 octets) Extra field (1 octet) FCS (3 octets)
			SS shall discard I+S frames received from the MS.
6	MS -> SS	FRMR	Verify that the control field of the RR message is sent back in the FRMR response. W1, W3 and W4 shall be set to 1. The content of W2 shall not be checked.
7	MS -> SS	SABM	Verify that the MS re-establishes the link with a SABM and that it stops sending anymore data to the SS.
8	SS -> MS	UA	Respond with a UA
9	MS -> SS	I+S	Verify that the MS resumes transmission of data.
10	SS -> MS	RR	Acknowledge all frames sent from the MS.
11			Repeat 9 and 10 until all the frames from the MS are transmitted and acknowledged.

46.1.2.5.3 Sending FRMR due to reception of an I frame information field exceeding the maximum length

46.1.2.5.3.1 Conformance requirement

The FRMR unnumbered response may be received by an LLE as a report of a frame rejection condition not recoverable by retransmission of the identical frame:

- receipt of a command or response control field that is undefined or not implemented;
- receipt of a supervisory or unnumbered frame with incorrect length; or
- receipt of an I frame with an information field that exceeds the maximum established length.

Upon occurrence of a frame rejection condition whilst in ABM operation, the LLME shall issue an LLGMM-STATUS-IND primitive; and the LLE shall initiate re-establishment.

Reference

3GPP TS 04.64, subclauses 6.4.15 and 8.8.2.

46.1.2.5.3.2 Test purpose

To verify that if the MS receives an I frame with an information field that exceeds the maximum established length, it sends an FRMR frame and re-establishes the link.

46.1.2.5.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

After establishing a link, initiate data transfer from the SS. After sending 5 frames from the SS, send an I+S frame with length greater than N201-I, from the SS. Verify whether the MS sends an FRMR. After the link is re-established, send frames from the SS with N(S) = 0 until N(S) = 5. Verify that the MS acknowledges all the data sent.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP context 11,
2			Initiate acknowledged mode data transfer from the SS.
3	SS -> MS	I + S	A = 1
A4 (Optional step)	MS -> SS	RNR	If the MS sends an RNR, do not transmit data until it sends an RR.
4	MS -> SS	RR	Send RR frames as acknowledgements from the MS.
5			Repeat steps 3 and 4 until 5 frames are sent from the SS.
6	SS -> MS	I + S	Send an I+S frame with the information field length greater than N201-I, from the SS .
7	MS -> SS	FRMR	Verify that the control field of the I+S message is sent back in the FRMR response. Also verify that the value of V(R) indicates all the frames sent so far except the erroneous I+S frame have been received. W2 and W4 shall be set to 1. W1, W3 shall be set to 0.
8	MS -> SS	SABM	Verify that the MS re-establishes the link with a SABM .
9	SS -> MS	UA	Respond with a UA
10	SS -> MS	I+S	Send data from the SS.
A11 (Optional step)	MS -> SS	RNR	If the MS sends an RNR , do not transmit data until it has sent an RR.
B11 (Optional step)	MS -> SS	RR	Verify that all the frames sent from the SS are acknowledged.
12			Repeat 10 and 11 until all the frames from the SS are transmitted and acknowledged.

46.1.2.5.4 Frame reject condition during establishment of ABM

46.1.2.5.4.1 Conformance requirement

The FRMR unnumbered response may be received by an LLE as a report of a frame rejection condition not recoverable by retransmission of the identical frame:

- receipt of a command or response control field that is undefined or not implemented;
- receipt of a supervisory or unnumbered frame with incorrect length; or
- receipt of an I frame with an information field that exceeds the maximum established length.

Upon occurrence of a frame rejection condition whilst in ABM operation, the LLME shall issue an LLGMM-STATUS-IND primitive; and the LLE shall initiate re-establishment.

Upon occurrence of a frame rejection condition during establishment of or release from ABM operation, or whilst in ADM state, the LLE shall discard the frame.

Reference

3GPP TS 04.64, subclauses 6.4.15 and 8.8.2.

46.1.2.5.4.2 Test purpose

To verify that if the MS receives a U frame with its frame type not implemented during ABM establishment, it shall ignore the message.

46.1.2.5.4.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate link establishment from the MS by sending a SABM. Send an invalid U frame as response. Check if the MS resends the SABM. Respond with a UA. Initiate data transfer from the MS and acknowledge all the frames sent from the MS.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 13.
2	MS -> SS	SABM	Verify that P/F = 1.
3	SS -> MS	Invalid U frame	Send a U frame with its control field M4 M3 M2 M1 = 0010
4	MS -> SS	FRMR	
5	MS -> SS	SABM	Ensure that the MS resends SABM
6	SS -> MS	UA	
7	MS -> SS	I + S	Initiate data transfer from the MS.
8	SS -> MS	RR	Acknowledge all frames sent from the MS.

46.1.2.6 Multiple Connections

46.1.2.6.1 Simultaneous acknowledged and unacknowledged data transfer on the same SAPI

46.1.2.6.1.1 Conformance requirement

The purpose of LLC is to convey information between layer-3 entities in the MS and SGSN. Specifically, LLC shall support:

- multiple MSs, at the Um interface;
- multiple layer-3 entities within the MS.

Reference

3GPP TS 04.64, subclause 4.2.

46.1.2.6.1.2 Test purpose

To verify that LLC supports simultaneous acknowledged and unacknowledged data transfer in the same direction on the same SAPI.

46.1.2.6.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate acknowledged data transfer from the MS on SAPI 3. Send 300 frames continuously. The value of N(S) shall begin from 0 and increment by 1 mod (512) for each frame. Initiate unacknowledged data transfer from the MS on the same SAPI within 1 minute from initiation of the acknowledged data transfer.

Acknowledge all the I frames sent from the SS by sending RR frames to the MS.

Maximum duration of the test

30 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation on PDP context 11 and 5 from the MS. - For PDP context 11, SS negotiates a value of 140 for N201-I. - For PDP context 5, SS triggers an XID negotiation to set N201-U to 140.
2			Initiate acknowledged mode data transfer from the MS.
3	MS -> SS	I+S frame	N(S) = 0 for the first frame
4	SS -> MS	S frame with RR	Send RR only when A bit = 1.
5			Initiate unacknowledged mode data transfer of 200 UI frames (using PDP context 5) from the MS within 1 minute from step2.
6	MS -> SS	I+S frame	
7	SS -> MS	RR	Send RR only when A bit = 1.
8	MS -> SS	UI	
9			Repeat from step 6 until 300 I+S frames of acknowledged data and 200 UI frames of unacknowledged data are transmitted. I Verify that : The MS does not retransmit any frame. N(S) begins with 0 and is incremented by 1 mod (512) for each transmission N(U) begins with 0 and is incremented by 1 mod (512) for each transmission

46.1.2.6.2 Simultaneous acknowledged and unacknowledged data transfer on different SAPIs

46.1.2.6.2.1 Conformance requirement

The purpose of LLC is to convey information between layer-3 entities in the MS and SGSN. Specifically, LLC shall support:

- multiple MSs, at the Um interface;
- multiple layer-3 entities within the MS.

Reference

3GPP TS 04.64, subclause 4.2.

46.1.2.6.2.2 Test purpose

To verify that LLC supports simultaneous acknowledged and unacknowledged data transfer on different SAPIs in different directions.

46.1.2.6.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate unacknowledged data transfer from the MS on SAPI 5. Initiate acknowledged data transfer from the SS on SAPI 3 after the first *i* frames have been received from the MS. Send 300 I+S frames continuously from the SS. The value of N(S) shall begin from 0 and increment by 1 mod (512) for each frame.

Verify that the MS acknowledges all the I frames sent from the SS. Verify that the UI frames are received at the SS in sequence.

Maximum duration of the test

15 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation on PDP Contexts 8 and 11 from the MS. For PDP context 8, SS triggers an XID negotiation to set N201-U to 140.
2			Initiate unacknowledged mode data transfer of 200 UI frames octets from the MS.
3	MS -> SS	UI frame	
4			Initiate acknowledged mode data transfer of 300 I+S frames octets from the SS.
5	SS -> MS	I+S frame	Start sending I+S frames after i UI frames have been received. Set the A bit to 1 when the window is full and for the last I+S frame.
A6	MS -> SS	UI frame	
B6	MS -> SS	RNR	If the MS sends an RNR, the SS shall resume transmission only after it transmits a SACK, RR or an ACK.
C6	MS -> SS	SACK	The SS shall retransmit the unacknowledged frames.
D6	MS -> SS	ACK	The SS shall retransmit the unacknowledged frames.
E6	MS -> SS	S frame with RR	Verify that the MS acknowledges all the frames sent from the SS.
			The MS may not send any frame if the A bit was not set in step 5.
7			Repeat steps 5 and 6 until all 300 I+S frames have been transmitted for the acknowledged mode from the SS and 200 UI frames for the unacknowledged mode to the SS. Verify that : The MS acknowledges all I+S frames sent. -The MS sends all UI frames in the correct sequence.

46.1.2.7 XID Negotiation

46.1.2.7.1 Negotiation initiated by the SS during ABM, for T200 and N200

46.1.2.7.1.1 Conformance requirement

The negotiation procedure is one-step, i.e., one side shall start the process by sending an XID command, offering a certain set of parameters from the applicable parameter repertoire the sending entity wants to negotiate, proposing values within the allowed range. In return, the other side shall send an XID response, either confirming these requested values, or offering higher or lower ones in their place.

XID frames shall always be used with the P/F bit set to 1.

T200, N200 and N201-U can be negotiated in ADM and ABM.

Reference

3GPP TS 04.64, subclause 6.4.1.6.

46.1.2.7.1.2 Test purpose

To verify that when the SS initiates XID negotiations with a certain value of T200 and N200, the MS complies with the final negotiated values

46.1.2.7.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate XID negotiation from the SS, with N200 = 4 and T200 = 10 s. The MS will send an XID response. Initiate data transfer from the MS. Verify that the MS complies with the values of T200 and N200 that were agreed upon.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS for PDP Context 11
2	SS -> MS	XID	XID command with N200 = 4, T200 = 10 s. Check if the P/F bit is set to 1.
3	MS -> SS	XID	XID response. Check if the P/F bit is set to 1. The values, if received in this message shall be the negotiated values, else the values are deemed to be confirmed.
4			Initiate acknowledged mode data transfer of 1 octet from the MS.
5	MS -> SS	I + S	
6			Do not respond with an RR.
7	MS -> SS	I+S	Verify that the MS resends the I+S frame every T200 seconds N200 times.
8	MS -> SS	SABM	Verify that the MS sends a SABM to re-establish the link
9	SS -> MS	UA	Respond with a UA within T200 seconds.

46.1.2.7.2 Negotiation initiated by the SS during ADM, for N201-I

46.1.2.7.2.1 Conformance requirement

The negotiation procedure is one-step, i.e., one side shall start the process by sending an XID command, offering a certain set of parameters from the applicable parameter repertoire the sending entity wants to negotiate, proposing values within the allowed range. In return, the other side shall send an XID response, either confirming these requested values, or offering higher or lower ones in their place.

XID frames shall always be used with the P/F bit set to 1.

N201-I, mD, mU, kD and kU can be negotiated to any value in Range in ADM. In ABM, N201-I, mD, mU, kD and kU can only be negotiated to the same or higher value as previously used.

Reference

3GPP TS 04.64, subclause 6.4.1.6.

46.1.2.7.2.2 Test purpose

To verify that when the SS initiates XID negotiations with a certain value of N201-I during ADM, the MS complies with the final negotiated values.

46.1.2.7.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate PDP context activation from the MS and in the UA response from the SS send a value of 140 for N201-I. If the MS responds with an XID command, in the XID response, give N201-I = 140.

Initiate data transfer from the SS. Send an I+S frame of length N201-I with the A bit set to 1. Verify that the MS acknowledges this I+S frame.

The next I+S frame sent from the SS shall be of length N201-I+1. Verify that the MS sends FRMR and re-establishes the link.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 11.
2	MS -> SS	SABM	
3	SS -> MS	UA	Set N201-I = 140 in the UA sent. If the MS sends an XID command with a different value of N201-I, send back a response with N201-I = 140.
4	SS -> MS	I+S	Send an I+S frame from the SS with length N201-I with the A bit set to 1.
A5 (optional step)	MS -> SS	RNR	If the MS sends an RNR, verify that the RNR acknowledges the frame sent in step 4. Do not transmit the next I+S frame to the SS until the MS sends an RR.
5	MS -> SS	RR	Verify that the MS responds with an RR.
6	SS -> MS	I+S	The length of this I+S frame shall be N201-I + 1. Set the A bit to 1.
7	MS -> SS	FRMR	Verify that the control field of the I+S message is sent back in the FRMR response. Also verify that the value of V(R) indicates all the frames sent so far except the erroneous I+S frame have been received. W2 and W4 shall be set to 1. W1 and W3 shall be set to 0.
8	MS -> SS	SABM	Verify that the MS re-establishes the link with a SABM.
9	SS -> MS	UA	Respond with a UA within T200 seconds.

46.1.2.7.3 Negotiation initiated by the SS (using XID, for IOV-UI)

46.1.2.7.3.1 Conformance requirement

The negotiation procedure is one-step, i.e., one side shall start the process by sending an XID command, offering a certain set of parameters from the applicable parameter repertoire the sending entity wants to negotiate, proposing values within the allowed range. In return, the other side shall send an XID response, either confirming these requested values, or offering higher or lower ones in their place.

XID frames shall always be used with the P/F bit set to 1.

LLC layer and layer-3 parameters may be negotiated with the exchange of XID frames or with the exchange of SABM and UA frames. After successful negotiations of SABM and UA frames, the LLE shall be in ABM mode of operation.

IOV-UI shall only be negotiated in ADM. IOV-UI and IOV-I shall only be transmitted in the downlink direction.

Reference

3GPP TS 04.64, subclauses 6.4.1.6 and 8.5.3.

46.1.2.7.3.2 Test purpose

To verify that when the SS sends IOV-UI to the MS in a XID, the MS shall cipher its output using this value of IOV-UI.

46.1.2.7.3.3 Method of test

Initial conditions

The MS shall be GPRS attached with ciphering enabled. Encryption GEA1, GEA2, GEA3 or GEA4 is used depending on the execution counter K.

Specific PICS statements:

- Supported encryption Algorithm: GEA1 (TSPC_Feat_GEA1)
- Supported encryption Algorithm: GEA2 (TSPC_Feat_GEA2)
- Supported encryption Algorithm: GEA3 (TSPC_Feat_GEA3)
- Supported encryption Algorithm: GEA4 (TSPC_Feat_GEA4)

PIXIT statements:

-

Test procedure

During GPRS attach ciphering GEA1, GEA2, GEA3 or GEA4 is activated depending on the execution counter K.

Initiate link establishment from the SS. In the XID command, send a new value of IOV-UI, different from the default used. Send 1000 octets from the MS and verify that the frames have been ciphered as per the new value of IOV-UI.

The test is performed for all GEA x encryption algorithm supported by the MS.

Maximum duration of the test

5 minutes.

Expected sequence

The sequence is performed for execution counter K=1 when the MS supports GEA1, for K=2 when the MS supports GEA2, for K=3 when the MS supports GEA3 and for K=4 when the MS supports GEA4.

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 5.
2		{PDP Context Modification}	Macro. Initiate PDP context modification to PDP Context 3 from the SS.
3	SS -> MS	XID	With IOV-UI = $2^{27} * 10$.
4	MS -> SS	XID	
5			Initiate data transfer from the MS. Send 1000 octets.
6	MS -> SS	UI	Verify that ciphering is as per the new value of IOV-UI. The SS shall check this by analyzing the FCS.
7			Repeat the steps 6 till the data transfer is complete.

46.1.2.7.4 Negotiation initiated by the SS (during ADM, for N201-U)

46.1.2.7.4.1 Conformance requirement

The negotiation procedure is one-step, i.e., one side shall start the process by sending an XID command, offering a certain set of parameters from the applicable parameter repertoire the sending entity wants to negotiate, proposing

values within the allowed range. In return, the other side shall send an XID response, either confirming these requested values, or offering higher or lower ones in their place.

XID frames shall always be used with the P/F bit set to 1.

T200, N200 and N201-U can be negotiated in ADM and ABM.

N201-U is used for U and UI frames.

Reference

3GPP TS 04.64, subclauses 6.4.1.6 and 8.9.5.

46.1.2.7.4.2 Test purpose

To verify that when the SS initiates XID negotiations with a certain value of N201-U during ADM, the MS complies with the final negotiated values.

46.1.2.7.4.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Initiate XID negotiation from the SS, with N201-U = 140. The MS shall send an XID response. The value of N201-U shall either be not present in the XID response or set to 140.

Initiate data transfer from the MS. Verify that the length of the UI frames sent from the MS never exceeds the negotiated value of N201-U.

Maximum duration of the test

5 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 9.
2	SS -> MS	XID	XID command with N201-U = 140
3	MS -> SS	XID	XID response. Check if the P/F bit is set to 1. The N201-U value, if received in this message shall be set to 140, else the value is deemed to be confirmed.
4			Initiate unacknowledged data transfer of 1000 octets from the MS.
5	MS -> SS	UI	Verify that the frame length does not exceed the negotiated value of N201-U.
6			Repeat step 5 until 1000 octets have been sent from the MS.

46.1.2.7.5 Negotiation initiated by the SS (during ADM, for IOV-UI)

46.1.2.7.5.1 Conformance requirement

The negotiation procedure is one-step, i.e., one side shall start the process by sending an XID command, offering a certain set of parameters from the applicable parameter repertoire the sending entity wants to negotiate, proposing

values within the allowed range. In return, the other side shall send an XID response, either confirming these requested values, or offering higher or lower ones in their place.

XID frames shall always be used with the P/F bit set to 1.

IOV-UI shall only be negotiated in ADM. IOV-UI and IOV-I shall only be transmitted in the downlink direction.

IOV-UI is associated with a TLLI.

Reference

3GPP TS 04.64, subclauses 6.4.1.6, 8.5.3 and 8.9.

3GPP TS 04.08 subclause 4.7.12.

46.1.2.7.5.2 Test purpose

To verify that when the SS sends IOV-UI to the MS in an XID command:

- The MS shall cipher its output using this value of IOV-UI.
- This value of IOV-UI shall be applicable for all SAPIs using this TLLI.
- Identity Response sent from the MS shall not be ciphered.

46.1.2.7.5.3 Method of test

Initial conditions

- For execution counter K = 4 (GEA 4) Test USIM has to be plugged into the MS.

Specific PICS statements:

- Supported encryption Algorithm : GEA 1 (TSPC_Feat_GEA 1)
- Supported encryption Algorithm : GEA 2 (TSPC_Feat_GEA 2)
- Supported encryption Algorithm : GEA 3 (TSPC_Feat_GEA 3)
- Supported encryption Algorithm : GEA 4 (TSPC_Feat_GEA 4)

PIXIT statements:

-

Test procedure

Send a value of IOV-UI from the SS, different from the default used. Send 1 000 octets from the MS and verify that the frames have been ciphered as per the new value of IOV-UI.

Send 1 000 octets from the MS on SAPI 11. Verify that the frames have been ciphered as per the new value of IOV-UI.

The test is performed for all GEA x encryption algorithm supported by the MS.

Maximum duration of the test

3 minutes.

Expected sequence

The sequence is performed for execution counter K=1 when the MS supports GEA1, for K=2 when the MS supports GEA2, for K=3 when the MS supports GEA3 and for K=4 when the MS supports GEA4.

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate a PDP context activation from the MS using PDP Context 10.
2	SS -> MS	UI [Authentication and Ciphering Request]	Send the Authentication and Ciphering Request from the SS to start ciphering using the following encryption algorithmn: GEA1 for K=1, GEA2 for K=2, GEA3 for K=3, GEA4 for K=4.
3	MS -> SS	UI [Authentication and Ciphering Response]	
4	SS -> MS	XID	XID command with IOV-UI = 5000.
5	MS -> SS	XID	Verify that the MS accepts this value of IOV-UI by sending an XID response. Verify the XID response received. If the MS has requested for a new set of XID parameters, verify that the values requested are within range.
6			Initiate unacknowledged data transfer of 1000 octets from the MS.
7	MS -> SS	UI	Verify that these frames have been ciphered as per the new value of IOV-UI.
8	SS -> MS	UI [Identity Request]	This UI frame must not be sent ciphered.
9	MS -> SS	UI [Identity Response]	This UI frame shall not be ciphered. The E bit shall not be set to 1.
10		{PDP Context Deactivation}	Macro. Deactivate PDP Context 10.
A11 (Optional step)			If the MS performs a GMM detach the SS completes the Detach procedure.
11		{PDP Context Activation}	Macro. Activate PDP Context 9. If the MS is detached in step A11, GPRS-re-attachment shall be performed.
A12 (Conditional step)			If the MS is re-attached in step 11, then step 2, 3, 4 and 5 shall be repeated to set IOV-UI parameter and restart ciphering.
12			Initiate a data transfer of 1000 octets from the MS on SAPI 11 for the same value of TLLI as before.
13	MS -> SS	UI	Verify that ciphering is as per the new value of IOV-UI.

Specific message contents

AUTHENTICATION AND CIPHERING REQUEST in step 2:

Same as default content except :

Information element	Value/remark
IE AUTN	Not present for K = 1 Not present for K = 2 Not present for K = 3 Present for K = 4
Ciphering Algorithm Type of Algorithm	GEA/1 for K = 1 GEA/2 for K = 2 GEA/3 for K = 3 GEA/4 for K = 4

46.1.2.7.6 Negotiation initiated by the SS (during ABM, for Reset)

Send Reset during unacknowledged mode data transfer and check if N(S) begins from 0.

46.1.2.7.6.1 Conformance requirement

The negotiation procedure is one-step, i.e., one side shall start the process by sending an XID command, offering a certain set of parameters from the applicable parameter repertoire the sending entity wants to negotiate, proposing values within the allowed range. In return, the other side shall send an XID response, either confirming these requested values, or offering higher or lower ones in their place.

XID frames shall always be used with the P/F bit set to 1.

Reset shall only be negotiated with an XID frame, and only transmitted in the downlink direction. If Reset is present in an XID frame, it shall be the first parameter in the XID information field.

The Reset parameter shall be used, in the SGSN originating Reset and the MS receiving Reset, to:

- set all LLC layer parameters to the default values given in table 9;
- change any LLEs in A BM state to ADM state;
- set the unconfirmed state variable V(U) to value 0;
- set the unconfirmed receive state variable V(UR) to 0;
- set the OCs for unacknowledged information transfer to 0.

The Reset parameter shall be treated before any additional XID parameters present in the same XID frame.

Reference

3GPP TS 04.64, subclauses 6.4.1.6 and 8.5.3.1.

46.1.2.7.6.2 Test purpose

To verify that when the SS sends the Reset parameter to the MS in an XID:

- it sets all LLC layer parameters to the default values;
- change any LLEs in A BM state to ADM state;
- set the unconfirmed state variable V(U) to value 0;
- set the unconfirmed receive state variable V(UR) to 0;
- set the OCs for unacknowledged information transfer to 0.

46.1.2.7.6.3 Method of test

Initial conditions

System simulator

The System Simulator shall support two cells, each in a different SGSN Routing Area.

Mobile station:

The MS shall be GPRS attached with ciphering enabled.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

For this test case, $N_{MS} = N_{SS} = 10$.

Initiate unacknowledged data transfer from the MS. Send N_{MS} UI frames.

Initiate unacknowledged data transfer from the SS. Send N_{SS} UI frames.

During PDP context activation for Context 11, initiate XID negotiation from the SS, with $N200 = 4$ and $T200 = 10$, if it is not done by the MS or if the MS tries to negotiate with $N200 < 4$ and $T200 < 10$, otherwise accept the values proposed by the MS. Initiate data transfer from the MS. Do not acknowledge the first frame sent from the MS and verify that the MS complies with the values of $T200$ and $N200$ that were agreed upon.

Initiate inter-SGSN Routing Area Update from the MS, which will make the SS send an XID command with the Reset parameter. Send I+S frames from the MS, with the A bit set to 1. Do not acknowledge the first I+S frame. Verify that the MS sends the I+S frame $N200$ times, every $T201$ seconds. Verify that the values of $N200$ and $T201$ are the default values.

Initiate unacknowledged data transfer from the MS for the same SAPI and for the same TLLI used before sending Reset from the SS. Verify that the frames are numbered from 0 and not from N_{MS} . Verify that the frames can be decrypted using $OC = 0$.

Maximum duration of the test

10 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS using PDP Context 9.
2	MS -> SS	UI frame	
3			Repeat step 2 until N _{MS} frames are sent.
4	SS -> MS	UI frame	
5			Repeat step 4 until N _{SS} frames are sent.
6		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS for PDP Context 11.
7	MS -> SS	SABM	If the MS negotiates N200 and T200, then accept the proposed values if N200 >= 4 and T200 >=10.
8	SS -> MS	UA	Send N200 = 4, T200 = 10 s in the UA response, if the MS does not negotiate N200 and T200, or if the values of N200 and T200 proposed by the MS are not accepted by the SS in step 7.
9			Initiate acknowledged mode data transfer of 1 octet from the MS.
10	MS -> SS	I + S	
11			Do not respond with an RR. Verify that the MS retransmits the I+S frame every T200 seconds N200 times.
12	MS -> SS	SABM	Verify that the MS sends a SABM to re-establish the link
13	SS -> MS	UA	Respond with a UA within T200 seconds.
14		{Inter-SGSN Routing Area Update}	Macro. Initiate Inter-SGSN Routing Area Update from the MS. (This procedure sends XID reset). The MS shall reselect the new cell and do a Routing Area Update with the new SGSN.
15	SS->MS	SABM	Send N200 and T200 with values higher than the ones negotiated in step 7 and 8.
16	MS->SS	UA	
17	MS -> SS	I + S	Resume data transfer from the MS.
18			Do not respond with an RR from the SS. Check that the MS retransmits the frame after T201 seconds, N200 times. T201 and N200 shall be as per the values negotiated, if any, after link re-establishment and not as per the values of N200 and T200 negotiated before sending a Reset, in step 8.
19	MS -> SS	SABM	Verify that the MS sends a SABM to re-establish the link
20	SS -> MS	UA	Respond with a UA within T200 seconds.
21	MS -> SS	UI	Initiate unacknowledged data transfer from the MS and send 50 octets for the same SAPI and for the same TLLI used before sending Reset from the SS. Verify that these frames have been ciphered with OC = 0 and are numbered from 0 and not from N _{MS} .

46.1.2.7.7 XID command with unrecognised type field

46.1.2.7.7.1 Conformance requirement

If a SABM or XID command with an invalid XID information field is received, then the SABM or XID command, respectively, shall be ignored.

If a SABM or XID command with unrecognised type field is received, then this parameter shall be ignored.

Reference

3GPP TS 04.64, subclause 8.5.3.3.

46.1.2.7.7.2 Test purpose

To test the MS response to an XID command with an unrecognised type field.

46.1.2.7.7.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Send an XID frame from the SS with N201-U = 800 and another parameter with type = 15. Verify that the MS responds with an XID response. Verify that the MS sends UI frames with N201-U taking negotiated value.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate a PDP context from the MS using PDP Context 10.
2	SS -> MS	XID	Send an XID command with N201-U = 800 and an XID parameter with its type = 15, length =4 and value = 1500.
3	MS -> SS	XID	Verify the XID response received. If the MS has requested for a new XID value, verify that the new values are within range the sense of negotiation is correct The values received in the XID response shall be regarded as the final negotiated values.
4			Initiate unacknowledged mode data transfer of 2000 octets from the MS.
5	MS -> SS	UI frame	Verify that the frame length does not exceed the negotiated value for N201-U

46.1.2.7.8 XID Response with out of range values

46.1.2.7.8.1 Conformance requirement

If UA or XID response with an invalid XID information field is received, then the UA or XID response shall be ignored, the SABM or XID command shall be retransmitted, and the retransmission counter shall be incremented.

Reference

3GPP TS 04.64, subclause 8.5.3.3.

46.1.2.7.8.2 Test purpose

To test the MS response to an XID response with the N201-I value out of range.

46.1.2.7.8.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Send an XID frame within SABM, from the MS with layer3 parameters. Respond from the SS with an XID, with N201-I = 1600. Verify that the MS ignores this response and resends the SABM with the XID command. Now accept the XID values received at the SS. Send an I+S frame with length less than N201-I and the A bit set to 1 and verify that the MS responds with an RR. Send an I+S frame from the SS with its length larger than the maximum negotiated value of N201-I and verify that the MS sends an FRMR and re-establishes the link.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS, using PDP context 11.
2	MS -> SS	SABM[XID]	XID command with layer3 parameters, sent with SABM.
3	SS -> MS	UA[XID]	Send an XID response in UA, with N201-I = 1600
4	MS -> SS	SABM[XID]	Verify that the MS resends the SABM command.
5	SS -> MS	UA[XID]	Send UA accepting all the XID values.
6	SS -> MS	I+S	Send an I+S frame with the maximum negotiated value of N201-I, with the A bit set to 1.
A7 (optional step)	MS -> SS	RNR	If the MS sends an RNR, verify that the RNR acknowledges the frame sent in step 6. Do not transmit the next I+S frame to the SS until the MS sends an RR.
7	MS -> SS	RR	Verify that the MS responds with an RR
8	SS -> MS	I+S	Send an I+S frame with length = N201 - I + 1, with the A bit set to 1.
9	MS -> SS	FRMR	Verify that the MS responds with an FRMR
10	MS -> SS	SABM	Verify that the MS initiates link re-establishment
11	SS -> MS	UA	Respond with a UA.

46.2 SNDCP Tests

This clause contains the test case requirements for Subnetwork Dependent Convergence Protocol(SNDCP) procedures in the General Packet Radio Service (GPRS).

46.2.1 Default Conditions

- The MS default initial condition is that it is GPRS attached.
- Data and header compression are off.

The N-PDU size shall be more than the negotiated values of N201-U and N201-I so that segmentation at SNDCP is ensured. Unless stated otherwise, the default conditions shall apply.

If the MS sends an XID command with XID parameters any time before a data transfer, the SS shall send an XID response, accepting the values proposed by the MS.

46.2.2 Test cases

46.2.2.1 Data transfer

46.2.2.1.1 Mobile originated normal data transfer with LLC in acknowledged mode

46.2.2.1.1.1 Conformance requirement

The SNDCP entity shall initiate acknowledged data transmission only if the PDP context for the NSAPI identified in the SN-DATA.request has been activated and if acknowledged LLC operation has been established.

The N-PDU number in acknowledged mode is a number assigned to each N-PDU received by SNDCP through an SN-DATA.request. N-PDU numbers for different NSAPIs shall be assigned independently. The N-PDU number shall be included in the SNDCP header of the first segment of an N-PDU.

Upon reception of an SN-DATA.request, the SNDCP entity shall assign to the N-PDU received the current value of the Send N-PDU number as the N-PDU number, increment the Send N-PDU number by 1, perform the compression and segmentation functions, then forward the SN-PDU(s) in LL-DATA.request to the LLC layer. The N-PDU shall be stored into a buffer in the SNDCP entity. The buffered N-PDU shall be deleted when the SN-DATA PDU carrying the last segment of the N-PDU is confirmed by an LL-DATA.confirm primitive.

A (possibly compressed) N-PDU shall be segmented into one or more SN-PDUs. The length of each SN-PDU shall not be greater than N201-I (for acknowledged mode) or N201-U (for unacknowledged mode).

Reference

3GPP TS 04.65, subclauses 6.9.1 and 6.7.1.1.

46.2.2.1.1.2 Test purpose

To verify that:

- The MS sends the N-PDU number in the first segment of every N-PDU.
- The MS increments the N-PDU number properly.
- The size of a segment must not be greater than N201-I.

46.2.2.1.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Activation of PDP context 13 is initiated from MS.

Verify that the first segment of the first N-PDU received has N-PDU number 0. Acknowledge all the segments received from the MS. For the subsequent N-PDUs received, verify that the N-PDU number is incremented properly.

Repeat the test case for PDP contexts 11 and 12.

Maximum duration of the test

10 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. The PDP context used here is PDP context 13.
2			Initiate data transfer of 5000 octets from the MS .
3	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-I. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0.
4			Verify that the last segment of every N-PDU received has M=0, T=0, and F=0. Note: Final SN-DATA-PDU could have M=0, T=0 and F=1, if the last N-PDU is too short to be segmented
5			Verify that for the subsequent N-PDUs, the N-PDU number is incremented properly
6			Repeat step 3 to 5 until data transfer is completed.
7			Repeat the test case for SAPIs 3 and 9. The PDP context used for SAPI 3 is PDP Context 11 and the one for SAPI 9 is PDP Context 12.

46.2.2.1.2 Mobile originated normal data transfer with LLC in unacknowledged mode

46.2.2.1.2.1 Conformance requirement

The SNDSCP entity shall initiate unacknowledged data transmission only if the PDP context for the NSAPI identified in the SN-DATA.request has been activated. The SNDSCP entity may initiate unacknowledged data transmission even if the acknowledged peer-to-peer operation is not established for that NSAPI. The N-PDU number in unacknowledged mode is a number assigned to each N-PDU received by SNDSCP through an SN-UNITDATA.request. N-PDU numbers for different NSAPIs shall be assigned independently. The N-PDU number shall be included in the SNDSCP header of every SN-UNITDATA PDU.

A variable, the Send N-PDU number (unacknowledged), shall be maintained for each NSAPI using unacknowledged peer-to-peer LLC operation. When an NSAPI using unacknowledged peer-to-peer LLC operation is activated, the Send N-PDU number (unacknowledged) shall be set to 0. The Send N-PDU number (unacknowledged) shall also be set as described in subclauses 5.1.2.1 and 5.1.2.22. Modulo 4096 operation shall be applied to the Send N-PDU number (unacknowledged).

Upon reception of an SN-UNITDATA request, the SNDSCP entity shall assign the current value of the Send N-PDU number (unacknowledged) as the N-PDU number of the N-PDU received, increment Send N-PDU number (unacknowledged) by 1, compress and segment the information, then forward the SN-PDU(s) in LL-UNITDATA.request to the LLC layer. The N-PDU shall be deleted immediately after the data has been delivered to the LLC layer.

A (possibly compressed) N-PDU shall be segmented into one or more SN-PDUs. The length of each SN-PDU shall not be greater than N201-I (for acknowledged mode) or N201-U (for unacknowledged mode).

The segment number is a sequence number assigned to each SN-UNITDATA PDU. The sequence number shall set to 0 in the first SN-UNITDATA PDU of an N-PDU, and incremented by 1 for each subsequent SN-UNITDATA PDU. Modulo 16 operation is applied. N-PDU number is included in every SN-UNITDATA PDU.

The SNDSCP entity shall perform the mapping function of SN_UNITDATA primitives onto LL_UNITDATA primitives

Reference

3GPP TS 04.65, subclauses 6.9.2, 6.7.1.1, 6.7.3 and 5.2.

46.2.2.1.2.2 Test purpose

To verify that:

- The MS sends the N-PDU number in every segment of every N-PDU.
- The MS increments the N-PDU number and segment number properly and modulo 16 operation is applied.
- The size of a segment shall not be greater than N201-U.
- The MS maps the SN_UNITDATA PDUs onto SAPIs allocated by Network.

46.2.2.1.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP context 10 is initiated from MS.

Initiate unacknowledged data transfer from MS.

Verify that the first segment of the first N-PDU received has N-PDU number 0. For the subsequent N-PDUs received, verify that the N-PDU number is incremented properly.

Verify that the SN-UNITDATA PDUs are numbered correctly.

Verify the SAPI number on which the data PDU is received.

Verify that Modulo 16 operation is applied.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. The PDP context used here is PDP context 10.
2	SS -> MS	XID	XID command with N201-U = 140.
3	MS -> SS	XID	XID response.
4			Initiate data transfer of 5000 octets (with each N-PDU being more than 140 octets) from the MS.
5	MS -> SS	SN-UNITDATA PDU	Verify that the number of octets in the SN-UNITDATA PDU does not exceed N201-U. Verify that the first SN-UNITDATA PDU received has M=1, T=1, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0, segment = 0.
6	SS		Verify that the segment number is incremented properly for every SN-PDU. Verify that the last segment of every N-PDU received has M=0, T=1, and F=0. The last N-PDU may not be segmented; the F bit shall not be checked.
7	SS		Verify that for the subsequent N-PDUs, the N-PDU number is incremented properly and N-PDU number is present in every SN-UNITDATA PDU
8	SS		Verify the SAPI number in the received LLC frame header
9			Repeat steps 5 to 8 until data transfer is completed. Verify modulo 16 operation is applied for the 17th segment of SN-UNITDATA PDU, Note: This check of 'Modulo 16 operation' is to be done only if; the NPDUs are having 17 or more segments.

46.2.2.1.3 Usage of acknowledged mode for data transmission before and after PDP Context modification, on different SAPIs

46.2.2.1.3.1 Conformance Requirement

Upon reception of the SNSM-MODIFY.indication from the SM sublayer:

- the SNDCP entity shall, if necessary, establish the acknowledged peer-to-peer LLC operation for the indicated SAPI (the establishment criteria and procedure are described in subclause 6.2.1);
- the SNDCP entity shall also, if necessary, release the acknowledged peer-to-peer LLC operation for the originally-assigned SAPI (the release criteria and procedure are described in subclause 6.2.2); In addition, if the newly-assigned SAPI is different from the original SAPI:
 - LL-DATA.indication, LL-DATA.confirm and LL-UNITDATA.indication received on the old SAPI shall be ignored;
 - LL-DATA.request and LL-UNITDATA.request shall be sent on the new SAPI; and
 - if acknowledged peer-to-peer LLC operation is used both before and after the receipt of the SNSM-MODIFY. indication, then all buffered N-PDUs (i.e., the ones whose complete reception has not been acknowledged and the ones that have not been transmitted yet) shall be transmitted starting from the oldest N-PDU.

Reference

3GPP TS 04.65, subclause 5.1.2.23.

46.2.2.1.3.2 Test purpose

To verify that after the PDP context modification:

- the MS resumes acknowledged data transfer correctly with the oldest N-PDU which is buffered after a PDP context modification.

46.2.2.1.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 11 is initiated from MS.

After the first N-PDU is correctly received in acknowledged mode, the last segment of the second N-PDU (N-PDU number=1) is not acked and a PDP context modification is initiated from SS to PDP context 12, ie: using SAPI 9 in acknowledged mode.

After the modification procedure is complete, the first SN-DATA PDU received shall have the N-PDU number 1. The N-PDU received shall be the same as the last one before the modification procedure was triggered.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 11.
2			Initiate acknowledged data transfer for 5000 octets, from the MS.
3	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-I. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X=0, DCOMP = PCOMP = 0, N-PDU number = 0.
4			Verify that the last segment of the first N-PDU received has M=0, T=0, and F=0. The last segment of last N-PDU may be not segmented; the F bit shall not be checked.
5			Receive the next N-PDU, N-PDU = 1 by following steps 3 and 4. Do not acknowledge the last segment of the N-PDU.
6		{PDP Context Modification}	Macro. Initiate PDP context modification procedure from the SS. Use PDP context 12 (ie: using SAPI 9 in acknowledged mode)
7	SS->MS	DISC	Initiate the release of LLC link by sending DISC on SAPI 3 and receive UA or DM from MS.
8	MS->SS	UA or DM	
9	SS->MS	SABM	Initiate the establishment of LLC link by sending SABM on SAPI 9 and receive UA from MS.
10	MS->SS	UA	
11	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-I. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X=0, DCOMP = PCOMP = 0. Verify that the N-PDU received has N-PDU number = 1.
12			Verify that the last segment of every N-PDU received has M=0, T=0, and F=0. The last segment of last N-PDU may be not segmented; the F bit shall not be checked.
13			Verify that for the subsequent N-PDUs, the N-PDU number is incremented properly
14			Repeat steps 11 to 13 until data transfer is completed.

46.2.2.1.4 Reset indication during unacknowledged mode

46.2.2.1.4.1 Conformance Requirement

Upon receipt of the LL-RESET indication, the SNDCCP layer shall:

- reset all SNDCCP XID parameters to their default values;
- in the MS, for every NSAPI using unacknowledged peer-to-peer LLC operation, set the Send N-PDU number (unacknowledged) to 0.

Reference

3GPP TS 04.65, subclause 5.1.2.1.

46.2.2.1.4.2 Test purpose

To verify that the MS resets the Send N-PDU number to 0 on link reset during an unacknowledged mode data transfer.

46.2.2.1.4.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 8 is initiated from MS.

An XID command is sent with reset from SS during unacknowledged data transfer, after receiving N-PDU number 2 from MS. The next N-PDU number from MS shall be 0.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 8.
2			Initiate unacknowledged data transfer using sufficient amount of data (for example 150000 octets) to be sure that at step 8 the MS still has available N-PDUs for transmission subsequent to XID procedure at step 6 and step 7.
3	MS -> SS	SN-UNITDATA PDU	Verify that the number of octets in the SN-UNITDATA PDU does not exceed N201-U. Verify that the first SN-UNITDATA PDU received has M=1, T=1, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0, sequence number = 0.
4			Verify that the last segment of the first N-PDU received has M=0, T=1, and F=0.
5			Receive the N-PDUs from the MS until N-PDU number becomes 2
6	SS->MS	XID	Initiate the XID command from SS with reset
			Discard all UI frames received.
7	MS->SS	XID	XID response
8	MS -> SS	SN-UNITDATA PDU	Verify that the number of octets in the SN-UNITDATA PDU does not exceed N201-U. Verify that the first SN-UNITDATA PDU received after link reset has M=1, T=1, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0, segment number = 0.

46.2.2.1.5 Reset indication during acknowledged mode

46.2.2.1.5.1 Conformance Requirement

Upon receipt of the LL-RESET indication, the SMDCP layer shall:

- reset all SMDCP XID parameters to their default values;
- for every NSAPI using acknowledged peer-to-peer LLC operation, enter the recovery state and suspend the transmission of SN-PDUs until an SNSM-SEQUENCE indication primitive is received for the NSAPI.

Reference

3GPP TS 04.65, subclause 5.1.2.1.

46.2.2.1.5.2 Test purpose

To verify that the MS suspends the data transfer in acknowledged mode on link reset and resume when indicated by the SS.

46.2.2.1.5.3 Method of test

Initial conditions

Two cells , cell A and B need to be supported.B is in a routing area (in a new SGSN) and location area different from that of A. The power level of cell A shall be higher than that of cell B so that the MS selects cell A.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 13 is initiated from MS.

Acknowledge the first 2 N-PDUs received from MS during the data transfer.

Initiate an inter SGSN Routing Area Update procedure from MS. An XID command is sent with reset from SS, after receiving N-PDU number N from MS. Specify the Receive N-PDU number to be 3 in the Routing Area Update Accept message. Verify that the data transfer is resumed and the MS sends the complete N-PDU with N-PDU number 3.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 13.
2			Initiate acknowledged data transfer for 7000 octets, from the MS.
3	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-l. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X=0, DCOMP = PCOMP = 0, N-PDU number = 0.
4			Verify that the last segment of the first N-PDU received has M=0, T=0, and F=0.
5			Receive the N-PDUs from the MS until N-PDU number becomes 1 and acknowledge all the segments completely.
6			Receive the N-PDUs 2 and 3 from the MS and do not acknowledge the last SN-PDU of N-PDU 3..
7		{Inter-SGSN Routing Area Update}	Macro. Initiate a cell change requesting the MS to move to cell B. Initiate an inter SGSN Routing Area Update procedure from SS. Send the Receive N-PDU number as 3 in the Routing Area Update Accept message. Note: After changing the signal strength and before receiving the RAU REQUEST, MS may send some more SN-DATA PDUs. These PDUs are not acknowledged in cell A.
8	SS->MS	SABM	
9	MS->SS	UA	
10	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-l. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X=0, DCOMP = PCOMP = 0, N-PDU number = 3. Last N-PDU may be not segmented; in which case the M bit shall not be checked.
11			Repeat step 10 until data transfer is completed.

46.2.2.1.6 Inter SGSN (with NAS container / new Routing Area / SGSN indicated Reset) PS Handover / Synchronized cell case / successful

46.2.2.1.6.1 Conformance Requirement

If during PS handover the MS is requested to perform a Reset of LLC layer parameters and layer-3 parameters (see 3GPP TS 24.008 [8a]), the MS shall perform the actions described above and shall send the XID response on one of the active SAPs once the PS handover procedure has been successfully completed.

If Reset of LLC layer parameters and layer-3 parameters without old XID indicator has been performed, following the sending of the XID response each active LLE in the MS shall:

- set timer T100; and
- not initiate any XID negotiation procedure while T100 is running.

3GPP TS 44.064, subclause 8.5.3.1.

46.2.2.1.6.2 Test purpose

To verify that the MS triggered by a Packet Switch Handover to move to a different SGSN will handle the different types of LLC reset contained in the NAS container.

46.2.2.1.6.3 Method of test

Initial conditions

Cells A and B need to be supported. Cell B is in a routing area (in a new SGSN) and location area different from that of Cell A. The power level of Cell A shall be higher than that of Cell B so that the MS selects Cell A.

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 13 is initiated from MS.

Acknowledge the first 2 N-PDUs received from MS during the data transfer.

Initiate an inter SGSN Routing Area Update procedure from MS triggered by a PSHO including the NAS container (same GEA used) after receiving N-PDU number N from MS. Specify the Receive N-PDU number to be 3 in the Routing Area Update Accept message. Verify that the data transfer is resumed and the MS sends the complete N-PDU with N-PDU number 3.

The procedure is run twice, the only difference being k, the old XID field in the {Inter-SGSN Routing Area Update – with PSHO} macro:

Sequence k=0, the MS shall perform a Reset of LLC and SNDCP without old XID indicator

Sequence k=1, the MS shall perform a Reset of LLC and SNDCP with old XID indicator

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 13.
2			Initiate acknowledged data transfer for 7000 octets, from the MS.
3	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-l. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X=0, DCOMP = PCOMP = 0, N-PDU number = 0.
4			Verify that the last segment of the first N-PDU received has M=0, T=0, and F=0.
5			Receive the N-PDUs from the MS until N-PDU number becomes 1 and acknowledge all the segments completely.
6			Receive the N-PDUs 2 and 3 from the MS and do not acknowledge the last SN-PDU of N-PDU 3.
7		{Inter-SGSN Routing Area Update – with PSHO}	Macro parameter: Old XID : K parameter according to tested sequence. Send the Receive N-PDU number as 3 in the Routing Area Update Accept message.
8	SS->MS	SABM	
9	MS->SS	UA	
10	MS -> SS	SN-DATA PDU	Verify that the number of octets in the SN-DATA PDU does not exceed N201-l. Verify that the first SN-DATA PDU received has M=1, T=0, F=1, X=0, DCOMP = PCOMP = 0, N-PDU number = 3. Last N-PDU may be not segmented; in which case the M bit shall not be checked.
11			Repeat step 10 until data transfer is completed.

46.2.2.2 Segmentation

46.2.2.2.1 LLC link re-establishment on reception of SN-DATA PDU with F=0 in ack mode in the Receive First Segment state

46.2.2.2.1.1 Conformance Requirement

Receive First Segment state:

- If an SN-DATA PDU is received with the F bit set to 0, the SN-DATA PDU shall be discarded, and the acknowledged LLC operation shall be re-established for the SAPI used.

Reference

3GPP TS 04.65, subclause 6.7.4.1.

46.2.2.2.1.2 Test purpose

To verify that the MS re-establishes the LLC SAPI on reception of an SN-DATA PDU with F=0 as the first segment in the acknowledged mode data transfer.

46.2.2.2.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 13 is initiated from MS.

An acknowledged mode data transfer is started from SS with the first SN_DATA PDU with F=0.

Verify that the MS shall re-establish the LLC SAPI 11.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 13.
2			Initiate acknowledged data transfer for 5000 octets, from the SS.
3	SS -> MS	SN-DATA PDU	Send the first SN-DATA PDU with M=1, T=0, F=0, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0 .
4	MS->SS	SABM	MS re-establishes the LLC SAPI 11
5	SS->MS	UA	
6	SS -> MS	SN-DATA PDU	Send the first SN-DATA PDU with M=1, T=0, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0
7			Repeat step 6 until data transfer is completed. Verify that all SN-DATA PDUs are acknowledged.

46.2.2.2.2 LLC link re-establishment on receiving second segment with F=1 and with different PCOMP and DCOMP values in the acknowledged mode data transfer

46.2.2.2.2.1 Conformance Requirement

Receive Subsequent Segment state:

- If an SN-DATA PDU is received with the F bit set to 1, and if DCOMP, PCOMP or N-PDU number is different from those in the first segment, then the SN-DATA PDU and all previous segments belonging to the same N-PDU shall be discarded, and the acknowledged LLC operation shall be re-established for the SAPI used.

Reference

3GPP TS 04.65, subclause 6.7.4.2.

46.2.2.2.2.2 Test purpose

To verify that the MS re-establishes the LLC SAPI on reception of the second SN-DATA PDU with F=1 and with PCOMP and DCOMP values different from those of the previous segment, in the second segment in acknowledged mode data transfer.

46.2.2.2.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 13 is initiated from MS.

AN acknowledged mode data transfer is started from SS with the first SN_DATA PDU with F=1. Send the second SN-DATA PDU from SS with F=1 and with PCOMP and DCOMP values different from those in the first segment.

Verify that the MS shall re-establish the LLC SAPI 11.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 13.
2			Initiate acknowledged data transfer for 5000 octets, from the SS.
3	SS -> MS	SN-DATA PDU	Send the first SN-DATA PDU with M=1, T=0, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0.
4	SS->MS	SN-DATA PDU	Send the second SN-DATA PDU with M=1, T=0, F=1, X = 0, DCOMP = PCOMP = 1, N-PDU number = 0.
5	MS->SS	SABM	Re-establishment of LLC link on SAPI 11.
6	SS->MS	UA	
7	SS -> MS	SN-DATA PDU	Send the first SN-DATA PDU with M=1, T=0, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0
8			Repeat step 7 until data transfer is completed. Verify that all SN-DATA PDUs are acknowledged.

46.2.2.2.3 Single segment N-PDU from MS

46.2.2.2.3.1 Conformance Requirement

- The F bit in the SNDCP header shall be set to 1 for the first segment, and 0 for all subsequent segments. For unacknowledged peer-to-peer LLC operation, DCOMP and PCOMP shall be included in the header when the F bit is set to 1, and shall not be included when the F bit is set to 0. For acknowledged peer-to-peer LLC operation, DCOMP, PCOMP and N-PDU number shall be included in the header when the F bit is set to 1, and shall not be included when the F bit is set to 0.
- The M bit in the SNDCP header shall be set to 0 for the last segment, and 1 for all previous segments. If only one SN-PDU is generated for an N-PDU, the F bit shall be set to 1 and the M bit set to 0.

Reference

3GPP TS 04.65, subclause 6.7.1.1.

46.2.2.2.3.2 Test purpose

To verify that for a single segment N-PDU, the MS shall send the SN_UNITDATA PDU with F=1 and M=0 during unacknowledged data transfer.

46.2.2.2.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 10 is initiated from MS.

An unacknowledged mode data transfer is started from MS for a data size less than N201-U. Verify that the MS sends the SN-UNITDATA PDU with M=0 and F=1.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 10.
2			Initiate unacknowledged data transfer for 1 octet, from the MS.
3	MS -> SS	SN-UNITDATA PDU	Verify that the single SN-UNITDATA PDU is received with M=0 and F=1.

46.2.2.3 Link Release

46.2.2.3.1 LLC link release on receiving DM from the SS during link establishment

46.2.2.3.1.1 Conformance Requirement

If the originator of the establishment procedure receives an LL-RELEASE.indication with Cause "DM received", it shall inform the SM sub-layer using the SNSM-STATUS.request primitive with Cause "DM received". SM shall then deactivate all PDP contexts for that SAPI requiring acknowledged peer-to-peer LLC operation.

Reference

3GPP TS 04.65, subclause 6.2.1.4.

46.2.2.3.1.2 Test purpose

To verify that in MS, the LLC SAPI is released and the PDP context is deactivated on reception of DM response from SS during link establishment.

46.2.2.3.1.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 13 is initiated from MS.

A DM response is sent from SS, after receiving a SABM from the MS for link establishment. The MS shall release the LLC SAPI 11 and the PDP context for the NSAPI shall be deactivated.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 13.
2	MS -> SS	SABM	SABM sent for link establishment during PDP context activation
3	SS->MS	DM	Initiate a DM response with F=1 from the SS.
4			Verify that the MS initiates PDP Context Deactivation.

46.2.2.4 XID negotiation

46.2.2.4.1 Response from MS on receiving XID request from the SS

46.2.2.4.1.1 Conformance Requirement

The XID negotiation is a one-step procedure; i.e., the initiating end proposes parameter values, and the responding end either accepts these or offers different values in their place according to the XID negotiation rules described in the present document; the rules limit the range of parameter values as well as the sense of negotiation. The initiating end accepts (or rejects) the values in the response; this concludes the negotiation.

A bit set to 0 means that the compression entity is not applicable to the corresponding NSAPI. A bit set to 1 means that the compression entity is applicable to the corresponding NSAPI.

Reference

3GPP TS 04.65, subclause 6.8.1.

46.2.2.4.1.2 Test purpose

To verify that:

- the MS which does not support compression, responds with applicable NSAPI field with 0 for an XID request from the SS with some compression entity;
- the MS which supports compression responds with the applicable NSAPI field set to 1 for an XID request from the SS with some compression entity.

46.2.2.4.1.3 Method of test

Initial conditions

-

Specific PICS statements:

- MS supporting compression has compression turned on (TSPC_AddInfo_GPRS_Data_Compr and/or TSPC_AddInfo_GPRS_Header_Compr).
- Support of GPRS header compression algorithm type RFC 1144 (TSPC_AddInfo_GPRS_Header_Compr_Type_RFC1144)
- Support of GPRS header compression algorithm type RFC 2507 (TSPC_AddInfo_GPRS_Header_Compr_Type_RFC2507)
- Support of ROHC algorithm type RFC 3241 (TSPC_AddInfo_ROHC_Type_RFC3241)
- Support of ROHC algorithm type RFC 3242 (TSPC_AddInfo_ROHC_Type_RFC3242)
- Support of ROHC algorithm type RFC 3408 (TSPC_AddInfo_ROHC_Type_RFC3408)
- Support of ROHC algorithm type RFC 3095 (TSPC_AddInfo_ROHC_Type_RFC3095)

PIXIT statements:

-

Test procedure

PDP Context 10 is initiated from MS. The MS supporting compression will also trigger an XID negotiation. Modify the PDP Context to PDP Context 9 from the SS.

After PDP context modification, trigger compression by sending an XID Request from SS including a L3-parameter with some compression entity for the NSAPI assigned for the PDP context.

The MS which does not support compression or has a lack of resources shall respond with XID response setting the applicable NSAPI field set to 0, indicating that compression is not supported/wanted.

The MS which support compression and has compression turned on shall respond with XID response setting the applicable NSAPI field set to 1, indicating that compression is supported. The MS may choose to not include an SNDCCP XID parameter in its response (implicit response), which is equivalent to responding with the value proposed by the SS.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 10. The MS supporting compression will also trigger an XID negotiation.
2		{PDP Context Modification}	Macro. Initiate PDP Context Modification from the SS. The new context is PDP Context 9. If the MS supports compression, SS triggers an XID negotiation in order to remove the PDP Context from the Applicable NSAPIs of the compression entities negotiated in step 1.
3	SS -> MS	XID Request	In the layer3 XID parameters, send a PCOMP entity with parameter type = 2, entity number = 1 and algorithm type, which the MS supports or 0 if the MS does not have support of header compression, a DCOMP entity with parameter type = 1, entity number = 1 and algorithm type = 0. In the applicable NSAPI field, set the bit for the NSAPI assigned for the PDP context.
A4	MS -> SS	XID Response	Verify that the MS which does not support compression, has compression turned off or has a lack of resources responds with the assigned NSAPI field set to 0.
B4	MS -> SS	XID Response	Verify that the MS which supports compression and has compression turned on responds either with the assigned NSAPI field set to 1 or without including the relevant L3 XID parameter (implicit response).
5			Initiate unacknowledged data transfer for 5000 octets, from the MS.
6	MS -> SS	SN-UNITDATA PDU	Verify that the number of octets in the SN-UNITDATA PDUs does not exceed N201-U.
A7			For mobiles which do not support compression, verify that the first SN-UNITDATA PDU received has M=1, T=1, F=1, X = 0, DCOMP = PCOMP = 0, N-PDU number = 0.
B7			For mobiles which support compression such that the SN-UNITDATA-PDU needs to be segmented, verify that the first SN-UNITDATA PDU received has M=1, T=1, F=1, X = 0, DCOMP = the negotiated value (assuming that data is compressible), PCOMP = the negotiated value (assuming that data contains a valid TCP/IP header) or 0 (data did not contain a valid TCP/IP header), N-PDU number = 0.
C7			For mobiles which support compression such that the SN-UNITDATA-PDU does not need to be segmented, verify that the first SN-UNITDATA PDU received has M=0, T=1, F=1, X = 0, DCOMP = the negotiated value (assuming that data is compressible), PCOMP = the negotiated value (assuming that data contains a valid TCP/IP header) or 0 (data did not contain a valid TCP/IP header), N-PDU number = 0. Go to step 9.
A8, B8			Verify that the last segment of the first N-PDU received has M=0, T=1, and F=0. The last segment of last N-PDU may be not segmented; the F bit shall not be checked.
9			Verify that for the subsequent N-PDUs, the N-PDU number is incremented properly
10			Repeat step 6 to 9 until data transfer is complete.

46.2.2.4.2 Response from MS on receiving an XID request from the SS with an unassigned entity number

46.2.2.4.2.1 Conformance Requirement

In the originating SNDCP XID block, if an unassigned entity number is included with the P bit set to 0, then the Applicable NSAPIs field in the response shall be set to 0.

Reference

3GPP TS 04.65, subclause 6.8.3.

46.2.2.4.2.2 Test purpose

To verify that in the originating SNDCP XID block, if an unassigned entity number is included with the P bit set to 0, the Applicable NSAPIs field in the response shall be set to 0.

46.2.2.4.2.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 10 is initiated from MS.

Send an XID command from the SS with P bit set to 0, with an unassigned entity number.

The MS shall respond with XID response setting the applicable NSAPI field set to 0, indicating that compression is not supported.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 10.
2	SS -> MS	XID	In the layer3 XID parameters, send a PCOMP entity with parameter type = 2. Set the P bit to 0 and the entity number to a number not assigned.
3	MS -> SS	XID	Verify that the MS responds with the assigned NSAPI field set to 0.

46.2.2.4.3 Response from MS on receiving an XID response from the SS with unrecognised type field

46.2.2.4.3.1 Conformance Requirement

If the responding SNDCP XID block includes a parameter with unrecognised Type field, unsupported length, an out-of-range value or a value violating the sense of negotiation, a parameter type 1 or 2 which violates the rules in subclause 6.8.1, a parameter with duplicated instances, contains prohibited changes (see subclauses 6.5.1.2 and 6.6.1.2) to the parameters of compression entities used with acknowledged peer-to-peer LLC operation when the SNDCP XID block is sent on LL-XID primitives, or a compression field with the P bit set to 1, then the originator shall ignore the block and reinitiate the negotiation.

Reference

3GPP TS 04.65, subclause 6.8.3.

46.2.2.4.3.2 Test purpose

To verify that in the XID response, if an unrecognised type field is specified, the originator shall ignore the block and reinitiate XID negotiation.

46.2.2.4.3.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

PDP Context 11 is initiated from MS.

In the response to SABM, in the UA, send SNDCP parameter type = 30.

The MS shall resend the SABM command or send an XID command.

Maximum duration of the test

2 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 11.
2	MS -> SS	SABM	
3	SS -> MS	UA	Include an SNDCP XID parameter with parameter type = 30.
4	MS -> SS	XID Command Or SABM command	Verify that the MS sends an XID Command or resends the SABM command

46.2.2.5 LLC link release on receiving "Invalid XID response" from the network during link establishment procedure

46.2.2.5.1 Conformance Requirement

If the originator of the establishment procedure receives an LL-RELEASE.indication with Cause "Invalid XID response", it shall inform the SM sub-layer using the SNSM-STATUS.request primitive with Cause "Invalid XID response". SM shall then deactivate all PDP contexts for that SAPI.

Reference

3GPP TS 04.65, subclause 6.2.1.4.

3GPP TS 04.64, subclause 8.5.3.3.

46.2.2.5.2 Test purpose

To verify that in the MS, the PDP context is deactivated on reception of "Invalid XID response" from network during link establishment.

46.2.2.5.3 Method of test

Initial conditions

-

Specific PICS statements:

-

PIXIT statements:

-

Test procedure

Activation of PDP Context 13 is initiated from MS.

The MS sends a SABM from the MS for link establishment.

The SS responds to the SABM with a UA with Invalid XID information field.

The MS shall ignore this response and re-transmit the SABM N200 times.

The SS shall respond with the UA with Invalid XID information, N200 times.

Verify that the MS releases the LLC SAPI and the PDP context for the SAPI is deactivated.

Maximum duration of the test

3 minutes.

Expected sequence

Step	Direction	Message	Comments
1		{PDP Context Activation}	Macro. Initiate PDP context activation from the MS. Use PDP context 13.
2	MS -> SS	SABM	SABM sent for link establishment during PDP context activation
3	SS->MS	UA	In response to the SABM , SS sends UA with an Invalid XID information field . MS shall ignore this response and Re-transmit the SABM N200 times.
4			Repeat steps 2 and 3 N200 times . (Send UA with Invalid XID parameters in response to SABM received N200 times.)
5		{PDP Context De-Activation}	Verify that the MS initiates PDP Context Deactivation.

47 Dual Transfer Mode

The default cell configuration for section 47 for the system simulator is the “PBCCH not present” case unless stated explicitly in the test case initial conditions.

To bring the MS into active state U10, macro 40.4.3.22 shall be used.

47.1 Reallocation of CS resources

47.1.1 Reallocation of CS resources / Assignment Command

47.1.1.1 Conformance requirements

While in dual transfer mode an inter-frequency change of channel can be performed through the dedicated channel assignment procedure.

Upon receipt of the ASSIGNMENT COMMAND message, the MS shall abandon the packet resource immediately, enter dedicated mode and then initiate a local end release of link layer connections and disconnects the physical channels. The MS then commands the switching to the assigned channels and initiates the establishment of lower layer connections.

After the main signalling link is successfully established, the MS returns an ASSIGNMENT COMPLETE message, specifying cause "normal event", to the network on the main DCCH.

The sending of this message on the MS side and its receipt on the network side allow the resumption of the transmission of signalling layer messages other than those belonging to RR management which include the Packet Assignment signalling to re-establish DTM.

References

3GPP TS 04.18 / 44.018, sub-clause 3.4.3

47.1.1.2 Test purpose

To verify that the channel assignment procedure can completely modify the physical channel configuration of the MS within the current frequency band and that the MS can re-establish successfully the PS resources.

47.1.1.3 Method of test

Initial Conditions

System Simulator:

1 cell, Cell A, with both TCH of cell activated and DTM supported.

Mobile Station:

The MS is in the active state (U10) of a call, on cell A, with a TMSI and P-TMSI allocated and the PDP context 2 activated but no allocated TBFs.

Specific PICS statements

-

PIXIT statements

-

Test Procedure

Once the MS is in DTM, the SS attempts to modify the resources of the MS. The MS is allocated a timeslot, in the same frequency band, on the current cell. The re-allocation of the MS resources is realised by the MS receiving an ASSIGNMENT COMMAND message from the SS. The ASSIGNMENT COMMAND message instructs the switching of the MS to the newly assigned channel and initiates the establishment of lower layer connections. The establishment of the lower layer connections includes the activation of the channels, the connection to the channels and the establishment of the main signalling link. Once the CS connection is established, the MS should return an ASSIGNMENT COMPLETE message on the new main signalling link. The SS then sends the PACKET ASSIGNMENT message to the MS over the main signalling link to establish the packet resources and the MS enters DTM.

MS supporting DTM shall complete test for k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1, 2.

Step	Direction	Message	Comments
1	SS		MS in state U10, on Timeslot N (chosen arbitrarily), utilising default TCH of cell and either: k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
2	SS->MS	PACKET ASSIGNMENT	See specific message contents
3	SS<->MS	{ Acknowledged downlink data }	Macro – Transmitting 10,000 octets of Data
4	SS->MS	ASSIGNMENT COMMAND	This message to be sent before the termination of the macro. Allocating resources on Timeslot N' (chosen arbitrarily) utilising the first alternative TCH of Cell A and either: k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
5	MS->SS	ASSIGNMENT COMPLETE	Sent on the correct channel after establishment of the main signalling link.
6	SS->MS	PACKET ASSIGNMENT	See specific message contents
7	SS<->MS	{ Downlink Data Transfer }	Macro – Completion of the 10,000 octets of Data.

Specific Message Contents

PACKET ASSIGNMENT (Step 2):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included (N ± 1) MOD 8

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included N

PACKET ASSIGNMENT (Step 6):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included (N' ± 1) MOD 8

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included N'

47.1.2 Reallocation of CS resources / Handover Command

47.1.2.1 Conformance requirements

While in dual transfer mode an intra-cell change of channel can be performed, when requested by the network, through the handover procedure.

Upon receipt of the HANOVER COMMAND message, the MS shall immediately abandon the packet resources entering dedicated mode. Once the packet resources have been released the MS initiates the release of link layer connections and disconnects the physical channels. The MS then commands the switching to the assigned channels and initiates the establishment of lower layer connections.

After the main signalling link is successfully established, the MS returns a HANOVER COMPLETE message to the network on the main DCCH, then the TBFs can be re-established using the Packet Assignment procedure.

References

3GPP TS 04.18/44.018, sub-clauses 3.4.4.1, 3.4.4.3 & 3.4.23

47.1.2.2 Test purpose

To verify that when the MS changes the CS resources to a different timeslot in the same frequency band using the Handover procedure, the MS successfully re-establishes the CS and PS resources.

47.1.2.3 Method of test

Initial Conditions

System Simulator:

1 cell, DTM supported.

Mobile Station:

The MS is in the active state (U10) of a call, on cell A, with a TMSI and P-TMSI allocated and the PDP context 1 activated but no allocated TBFs.

Specific PICS statements

-

PIXIT statements

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Test Procedure

Once the MS is in DTM, the SS attempts to modify the resources of the MS by allocating a different timeslot, in the same frequency band, on the current cell. The re-allocation of the MS resources is realised by the MS receiving a HANOVER COMMAND message from the SS. The HANOVER COMMAND message instructs the switching of the MS to the newly assigned channel and the establishment of lower layer connections. Once the CS connection is established, the MS should return a HANOVER COMPLETE message on the new main signalling link. Once the MS has successfully completed the handover procedure to the cell, the SS sends the DTM INFORMATION message, informing the MS of the cell parameters. The PACKET ASSIGNMENT message is then sent to the MS over the main signalling link to establish the packet resources and the MS re-enters DTM.

MS supporting DTM shall complete test for k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1,2.

Step	Direction	Message	Comments
1	SS		MS in state U10, on Timeslot N (chosen arbitrarily), utilising either: k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
2	SS->MS	PACKET ASSIGNMENT	See specific message contents
3	SS<->MS	{ Acknowledged downlink data }	Macro – Transmitting 10kB of Data
4	SS->MS	HANDOVER COMMAND	This message to be sent before the termination of the macro. Timeslot $(N + 4) \text{ MOD } 8$ and either: k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
5	MS->SS	HANDOVER COMPLETE	Sent on the new channel after establishment of the main signalling link
6	SS->MS	DTM INFORMATION	Contains the cell parameters
7	SS->MS	PACKET ASSIGNMENT	See specific message contents
8	SS<->MS	{ Downlink Data Transfer }	Macro – Completion of the 10kB of Data.

Specific Message Contents

PACKET ASSIGNMENT (Step 2):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included ($N \pm 1$) MOD 8

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included N

PACKET ASSIGNMENT (Step 7):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included $((N + 4) \pm 1) \text{ MOD } 8$

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included ($N + 4$) MOD 8

47.1.3 Intra frequency reallocation of CS resources / DTM Assignment Command

47.1.3.1 Conformance requirements

In dual transfer mode an intracell change of channel can be requested by upper layers for changing the channel type, or decided by the RR sublayer, e.g. for an internal handover or for the reallocation of all the resources of the mobile station. The purpose is to modify completely the physical channel configuration of the mobile station without frequency redefinition or change in synchronization while staying in the same cell.

Upon receipt of the DTM ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections, disconnects the physical channels, commands the switching to the assigned channel and initiates the establishment of lower layer connection (this includes the activation of the channel, their connection and the establishment of the main signalling link).

NOTE: This conformance requirement was taken from Rel-5 specifications, but it is also a requirement on R99 and Rel-4 MS.

References

3GPP TS 44.018, sub-clause 3.4.23.2

47.1.3.2 Test purpose

To verify that the MS can reallocate both the CS connection and PS resources to different timeslot(s) within the same frequency band, having received the DTM ASSIGNMENT COMMAND message.

47.1.3.3 Method of test

Initial Conditions

System Simulator:

1 cell, DTM supported.

Mobile Station:

The MS is in the active state (U10) of a call.

The MS is in GMM Ready state with a P-TMSI allocated and the PDP context 1 activated.

Specific PICS statements

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PIXIT statements

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Test Procedure

Once the MS is in DTM, the SS attempts to modify the resources of the MS. The SS allocates the MS a different timeslot configuration, in the same frequency band, on the current cell. The re-allocation of the MS resources is realised by the MS receiving a DTM ASSIGNMENT COMMAND from the SS. On receipt of the DTM ASSIGNMENT COMMAND message, the MS initiates a local end release of link layer connections, disconnects the physical channels. After the MS has switched to the assigned channel, the MS initiates the establishment of lower layer connection, the activation of the channel and the establishment of the main signalling link. The MS returns an ASSIGNMENT COMPLETE message on the new signalling link.

MS supporting DTM shall complete testing for k=1, and indicating support of single slot DTM shall complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for $k = 1, 2$.

Step	Direction	Message	Comments
1	SS		MS in state U10, on Timeslot N (chosen arbitrarily), utilising a default TCH of cell and either: k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
2	SS->MS	PACKET ASSIGNMENT	Assigning downlink resources on Timeslot N+1.
3	SS<->MS	{ Downlink data transfer }	Macro – Transmitting 2.000 octets of Data
4	SS->MS	DTM ASSIGNMENT COMMAND	This message is sent after approximately 1.000 octets have been successfully transmitted. See specific message contents.
5	MS->SS	ASSIGNMENT COMPLETE	
6	SS<->MS	{ Downlink data transfer }	Macro – Completion of the 2.000 octet transmission.
7	SS		Verify that the CS connection is still through connected on the new Timeslot.

Specific Message Contents

DTM ASSIGNMENT COMMAND (Step 4):

k=1:

As default message contents except: Description of the CS Channel - Timeslot number - Channel Type RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	(N + 4) MOD 8 TCH/F Not included $((N + 4) \pm 1) \text{MOD } 8$
--	---

k=2:

As default message contents except: Description of the CS Channel - Timeslot number - Channel Type RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	(N + 4) mod 8 TCH/H Not included (N + 4) MOD 8
--	---

47.1.4 Inter frequency reallocation of CS resources / DTM Assignment Command

47.1.4.1 Conformance requirements

In dual transfer mode an intracell change of channel can be requested by upper layers for changing the channel type, or decided by the RR sublayer, e.g. for an internal handover or for the reallocation of all the resources of the mobile station. The purpose is to modify completely the physical channel configuration of the mobile station without frequency redefinition or change in synchronization while staying in the same cell.

Upon receipt of the DTM ASSIGNMENT COMMAND message, the mobile station initiates a local end release of link layer connections, disconnects the physical channels, commands the switching to the assigned channel and initiates the establishment of lower layer connection (this includes the activation of the channel, their connection and the establishment of the main signalling link).

NOTE: This conformance requirement was taken from Rel-5 specifications, but it is also a requirement on R'99 and Rel-4 MS.

References

3GPP TS 44.018, sub-clause 3.4.23.2

47.1.4.2 Test purpose

To verify that the MS, can reallocate both the CS connection and PS resources to a different frequency band, having received the DTM ASSIGNMENT COMMAND message while in DTM.

47.1.4.3 Method of test

Initial Conditions

System Simulator:

1 cell, Cell A, with both TCH of cell activated and DTM supported. TCH2 allocated in a different frequency band and added to the Cell Channel Description in S11.

Mobile Station:

The MS is in the active state (U10) of a call, on cell A, with a TMSI and P-TMSI allocated and the PDP context 1 activated but no allocated TBFs.

Specific PICS statements

-

PIXIT statements

-

Test Procedure

Once the MS is in DTM, the SS attempts to modify the resources of the MS. The MS is allocated a new timeslot, in a different frequency band. The re-allocation of the MS resources is realised by the MS receiving a DTM ASSIGNMENT COMMAND from the SS. On receipt of the DTM ASSIGNMENT COMMAND message, the MS initiates a local end release of link layer connections and disconnects the physical channels. After the MS has switched to the assigned channel, the MS initiates the establishment of lower layer connection, the activation of the channel and the establishment of the main signalling link. The MS returns an ASSIGNMENT COMPLETE message on the new signalling link and continues transmitting on the uplink TBF.

MS supporting DTM shall complete testing for k=1 MSs indicating support of single slot DTM shall complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for $k = 1, 2$.

Step	Direction	Message	Comments
1	SS		MS in state U10, on Timeslot N (chosen arbitrarily), utilising either: k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 2 000 octets.
3	MS->SS	DTMREQUEST	
4	SS->MS	PACKET ASSIGNMENT	See specific message contents.
5	SS<->MS	{ Uplink data }	Macro – Transmitting 2 000 octets of data.
6	SS->MS	DTM ASSIGNMENT COMMAND	This message to be sent before the termination of the macro. The SS instructs the MS to utilise the first alternative TCH of Cell A in a different Band supported by the MS and see specific message contents for other changes to default message.
7	MS->SS	ASSIGNMENT COMPLETE	
8	SS<->MS	{ Uplink data transfer }	Macro – completion of 2 000 octets of data upload.
9	SS		Verify that the CS connection is still through connected on the new Timeslot.

Specific Message Contents

PACKET ASSIGNMENT (Step 4):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	($N \pm 1$) MOD 8 Not included

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N Not included

DTM ASSIGNMENT COMMAND (Step 6):

As default message contents except: Description of the CS Channel - Timeslot number - Channel Type RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N TCH/F ($N \pm 1$) MOD 8 Not included
--	---

For GSM 850 and PCS 1900 only :

SYSTEM INFORMATION TYPE 1:

As default message contents except: SI 1 Rest Octets - Band Indicator	H (ARFCN indicates 1900 band)
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SYSTEM INFORMATION TYPE 6:

As default message contents except: SI 6 Rest Octets - Band Indicator	H (ARFCN indicates 1900 band)
---	-------------------------------

47.2 Release of CS resources

47.2.1 Mobile originating CS release

41.2.1.1 Conformance requirements

If the MS is operating in DTM when the RR connection release is requested by the MS, the radio resources allocated on a PDCH are released, the MS returns to the PCCCH or CCCH configuration, packet idle mode. The MS aborts the RR connection by initiating a normal release of the main signalling link, performing local end releases on all other signalling links, disconnecting all traffic channels and aborts all the packet resources.

References

3GPP TS 04.18/44.018, sub-clauses 3.4.13.1 and 3.4.13.3

47.2.1.2 Test purpose

To verify that after the MS releases the CS connection, the PS resources are correctly re-established.

47.2.1.3 Method of test

Initial Conditions

System Simulator:

1 cell, DTM supported.

Mobile Station:

The MS is in the active state (U10) of a call.

The MS is GPRS attached with a P-TMSI allocated and the PDP context 1 activated.

Specific PICS statements

-

PIXIT statements

-

Test Procedure

The MS is in dedicated mode when it is triggered to initiate uplink data transfer. The MS sends a DTM REQUEST message to the SS requesting uplink resources. The SS assigns the required resources and waits until approximately half the uplink data has been passed to the SS before triggering the MS to release the CS resources. The MS initiates the signalling required to release the channel by sending a DISCONNECT message. Once the resources have been cleared the MS requests the establishment of an uplink TBF and completes the data transmission.

MS supporting DTM shall complete testing for k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1,2.

1	SS		MS in the active state (U10) of a call on Timeslot N. When: k=1, Channel Type=TCH/F; k=2, Channel Type=TCH/H.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 10k octets.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	See specific message contents.
5	MS<->SS	{ Uplink data }	Macro
6	MS		The MS is triggered to initiate the release of the CS connection when approximately 5k octets have been received.
7	MS->SS	DISCONNECT	
8	SS->MS	RELEASE	
9	MS->SS	RELEASE COMPLETE	
10	SS->MS	CHANNEL RELEASE	
11	MS<->SS	{ Uplink dynamic allocation two phase access }	Macro
12	MS<->SS	{ Completion of uplink RLC data block transfer }	Macro – Completion of the 10k octet transmission.

Specific Message Contents

PACKET ASSIGNMENT (Step 4):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	(N ± 1) MOD 8 Not included

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N Not included

47.3 Handover

47.3.1 Handover to same routing area

47.3.1.1 Handover to same routing area whilst in dedicated mode & MM Ready / Completed on the main DCCH

47.3.1.1.1 Conformance requirements

3GPP TS 04.18, sub-clause 3.4.26:

While in dedicated mode, upper layers in the mobile station or in the network may request the transport of GPRS information transparently over the radio interface. This procedure is only applicable when:

- the information from upper layers is signalling information; and
- the GTP length of the message is below the maximum indicated by the network.

In any other case, the RR procedures related to packet resource establishment while in dedicated mode apply.

The information from upper layers shall be carried inside the GTTP Information message. The GTTP Information message contains:

- the TLLI of the MS; and
- the LLC PDU.

The GTTP messages are sent using "normal" priority at the data link layer.

3GPP TS 23.060, sub-clause 6.9.1.1

A cell update takes place when the MS enters a new cell inside the current RA and the MS is in READY state. If the RA has changed, a routing area update is executed instead of a cell update.

References

3GPP TS 04.18, sub-clause 3.4.26

3GPP TS 23.060, sub-clause 6.9.1.1

3GPP TS 04.64 / 44.064, sub-clause 6.4.1.7.

47.3.1.1.2 Test purpose

To verify that when the network completes the CS handover of the MS to a different cell, the MS sends a cell update on the main DCCH in the new cell.

47.3.1.1.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B both in the same Location Area and Routing Area. Both cells shall be activated. Cell A shall be the strongest.

Mobile Station:

The MS is in GMM Ready state with a P-TMSI allocated. The value of the Ready Timer is chosen such that the MS is in the Ready State when handed to the new cell.

Specific PICS statements

-

PIXIT statements

-

Test Procedure

The MS is camped on cell A in packet idle mode

The MS is brought to dedicated mode. A HANOVER COMMAND message instructs the switching of the MS to the newly assigned channel and the establishment of lower layer connections. Once the CS connection is established, the MS should return a HANOVER COMPLETE message on the new main signalling link. The MS shall then send the GPRS INFORMATION message on the main DCCH including an empty LLC frame to indicate Cell Update.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	SS		MS in the active state (U10) of a call on Timeslot N. When: Channel Type=TCH/F;
3	SS->MS	HANDOVER COMMAND	Instructs the MS to do handover to Cell B
4	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
5	SS-MS	PHYSICAL INFORMATION	
6	MS->SS	HANDOVER COMPLETE	
7	SS->MS	DTM INFORMATION	
8	MS->SS	GPRS INFORMATION	The MS sends an empty LLC frame to indicate Cell Update.

Specific Message Contents

HANDOVER COMMAND (Step 3):

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Cell Description Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N (chosen arbitrarily) TCH/F Default values from Cell B Shall not be included. "Non synchronized". Ignore out of range timing advance.

47.3.1.2 Handover to same routing area whilst in DTM with downlink TBF Established

47.3.1.2.1 Conformance requirements

The handover procedure includes the:

- abortion of the downlink packet resources;
- disconnection and the deactivation of previously assigned channels and their release (layer 1);
- activation of the new channels, and their connection if applicable;
- triggering of the establishment of data link connection for SAPI = 0 on the new channels.

References

3GPP TS 04.18 / 44.018, sub-clause 3.4.4.

47.3.1.2.2 Test purpose

To verify that the downlink packet resources can be successfully aborted, then re-established in the new cell after the handover of CS resources.

47.3.1.2.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B with same LAI, default parameters and both support DTM.

Mobile Station:

The MS is in the active state (U10) of a call on Timeslot N (chosen arbitrarily) of cell A.

The MS is in GMM Ready state with a P-TMSI allocated and the PDP context 2 activated. The value of the Ready Timer is chosen such that the MS is in the Ready State when handed to the new cell.

Specific PICS statements

-

PIXIT statements

-

Test Procedure

After the MS is in DTM with an active downlink TBF, the SS initiates the Handover procedure. Once the MS has successfully completed the handover procedure to the new cell, the SS sends the DTM INFORMATION message, informing the MS of new cell parameters. The MS performs the Cell Update procedure using an empty LLC PDU on the main DCCH. The MS shall then accept the establishment of a downlink TBF, initiated by the SS with a PACKET ASSIGNMENT message.

MS supporting DTM shall complete test for k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1,2.

Step	Direction	Message	Comments
1	SS		MS in active state (U10) of a call and when: k=1, Channel Type = TCH/F; k=2, Channel Type = TCH/H.
2	SS->MS	PACKET ASSIGNMENT	See specific message contents.
3	SS<->MS	{ Acknowledged downlink data }	Macro – Transmitting 10kB of Data
4	SS->MS	HANDOVER COMMAND	This message to be sent before the termination of the macro. See specific message contents.
5	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
6	SS->MS	PHYSICAL INFORMATION	
7	MS->SS	HANDOVER COMPLETE	
8	SS->MS	DTM INFORMATION	
9	MS->SS	GPRS INFORMATION	The MS sends an empty LLC frame to indicate Cell Update.
10	SS->MS	PACKET ASSIGNMENT	See specific message contents.
11	SS<->MS	{ Acknowledged downlink data }	Macro - Completion of the 10kB of Data.

Specific Message Contents

PACKET ASSIGNMENT (Step 2):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included (N ± 1) MOD 8

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included N

HANDOVER COMMAND (Step 4):

k=1:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Cell Description Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N (chosen arbitrarily) TCH/F Default values from Cell B Shall not be included. "Non synchronized". Ignore out of range timing advance.

k=2:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Cell Description Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N' (chosen arbitrarily) TCH/H Default values from Cell B Shall not be included. "Non synchronized". Ignore out of range timing advance.

PACKET ASSIGNMENT (Step 10):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included (N' ± 1) MOD 8

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	Not included N'

47.3.1.3 Handover to same routing area whilst in DTM with both DL & UL TBFs

47.3.1.3.1 Handover to same routing area whilst in DTM with both DL & UL TBFs /
Successful case

47.3.1.3.1.1 Conformance requirements

The handover procedure includes:

- the abortion of the downlink and uplink packet resources;
- the disconnection and the deactivation of previously assigned channels and their release (layer 1);
- the activation of the new channels, and their connection if applicable;
- the triggering of the establishment of data link connection for SAPI = 0 on the new channels.

Then if DTM is supported in the new cell, the downlink and uplink TBF should be re-established if still required.

References

3GPP TS 04.18/44.018, sub-clause 3.4.4

47.3.1.3.1.2 Test purpose

To verify that when no errors occur in the CS handover to a different cell in the same routing area, the MS shall successfully re-establish the CS connection and the downlink and uplink PS resources.

47.3.1.3.1.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B with same LAI, DTM supported, default parameters.

Mobile Station:

The MS is in the active state (U10) of a call on Timeslot N (chosen arbitrarily) of cell A and has the PDP context 1 activated.

Specific PICS statements

-

PIXIT statements

-

Test Procedure

After the MS is in DTM with both uplink and downlink TBFs active, the SS initiates the Handover procedure. Once the MS has successfully completed the handover procedure to the new cell, the SS sends the DTM INFORMATION message, informing the MS of new cell parameters. The MS may perform the Cell Update procedure by sending a GPRS INFORMATION message containing an empty LLC PDU on the main DCCH. The MS shall then request the establishment of an uplink TBF with the DTM Request message and the SS assigns an uplink TBF.

The MS supporting DTM shall complete testing k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for $k = 1, 2$.

Step	Direction	Message	Comments
1	SS		MS in active state (U10) of a call and when: k=1, Channel Type = TCH/F; k=2, Channel Type = TCH/H.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 2kB of data.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	When: k=1, Timeslot = $(N \pm 1) \text{ MOD } 8$; k=2, Timeslot = N
5	SS<->MS	{ Uplink data transfer }	Macro
6	SS->MS	PACKET DOWNLINK ASSIGNMENT	This message to be sent before the termination of the macro. When: k=1, Timeslot = $(N \pm 1) \text{ MOD } 8$; k=2, Timeslot = N.
7	SS->MS	RLC DOWNLINK DATA	S/P Bit =1
8	MS->SS	PACKET DOWNLINK ACK/NACK	
9	SS->MS	HANDOVER COMMAND	See specific message contents.
10	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
11	SS->MS	PHYSICAL INFORMATION	
12	MS->SS	HANDOVER COMPLETE	
13	SS->MS	DTM INFORMATION	
14	MS->SS	GPRS INFORMATION	Sent on main DCCH. Contains an empty LLC PDU for Cell Update.
15	MS->SS	DTM REQUEST	Sent on main DCCH.
16	SS->MS	PACKET ASSIGNMENT	See specific message contents.
			Step 17 may be performed only if Step 14 has not been performed.
17	MS->SS	LLC PDU	Sent on PDCH. Empty LLC PDU for Cell Update NOTE: The empty LLC PDU may be followed by one or more lower priority LLC PDUs in the same RLC Data Block.
18	MS->SS	PACKET RESOURCE REQUEST	Sent on PDCH. (Step is performed if Empty LLC PDU received in step 17)
19	SS->MS	PACKET ASSIGNMENT	See specific message contents. (Step is performed if in step 18 PACKET RESOURCE REQUEST was received)
20	SS<->MS	{ Uplink data transfer }	Macro - Completion of the 2kB of Data.

Specific Message Contents

HANDOVER COMMAND (Step 8):

k=1:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number Cell Description Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N (chosen arbitrarily) Default values from Cell B Shall not be included. "Non synchronized". Ignore out of range timing advance.

k=2:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Cell Description Synchronization Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N (chosen arbitrarily) TCH/H Default values from Cell B Shall not be included. "Non synchronized". Ignore out of range timing advance.

PACKET ASSIGNMENT (Step 16):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	(N ± 1) MOD 8 Not included

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N Not included

47.3.1.3.2 Handover to same routing area whilst in DTM with both DL & UL TBFs / Abnormal case / Handover Failure

47.3.1.3.2.1 Conformance requirements

If a lower layer failure happens on the new channel before the HANOVER COMPLETE message has been sent, the MS deactivates the new channels, reactivates the old channels, reconnects the TCHs if any and triggers the establishment of the main signalling link. It then sends a HANOVER FAILURE message on the main signalling link and resumes normal operation as if no handover attempt had occurred.

References

3GPP TS 04.18/44.018, sub-clause 3.4.4.4

47.3.1.3.2.2 Test purpose

To verify that if an error occurs when attempting handover to a different cell, the MS shall abort all CS operations in the new cell and successfully attempt to re-establish CS and uplink PS resources in the old cell.

47.3.1.3.2.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B, DTM supported, default parameters.

Mobile Station:

The MS is in the active state (U10) of a call on Timeslot N (chosen arbitrarily) of cell A and has the PDP context 1 activated.

Specific PICS statements

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PIXIT statements

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Test Procedure

After the MS is in DTM with both uplink and downlink TBFs active, the SS initiates the Handover procedure. If the SS does not accept the MS on the new channel, the MS shall revert back to the original channel in the old cell. The MS shall then send a HANOVER FAILURE message on the main DCCH in the old cell. The MS then shall request the establishment of an uplink TBF with the Packet Request procedure and the SS assigns an uplink TBF followed by a downlink TBF.

The MS supporting DTM shall complete testing $k=1$ and MSs indicating support of single slot DTM shall additionally complete testing for $k=2$.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1,2.

Step	Direction	Message	Comments
1	SS		MS in active state (U10) of a call and when: k=1, Channel Type = TCH/F; k=2, Channel Type = TCH/H.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 2kB of data.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	When: k=1, Timeslot = T = (N ± 1) MOD 8; k=2, Timeslot = N.
5	SS<->MS	{ Uplink data }	Macro – Transmitting 2kB of data.
6	SS->MS	PACKET DOWNLINK ASSIGNMENT	This message to be sent before the termination of the macro. When: k=1, Timeslot = T; k=2, Timeslot = N.
7	SS->MS	RLC DOWNLINK DATA	S/P bit = 1
8	MS->SS	PACKET DOWNLINK ACK/NACK	
9	SS->MS	HANDOVER COMMAND	See specific message contents.
10	MS->SS	HANDOVER ACCESS	Handover Reference as included in the HANDOVER COMMAND. Message repeated multiple times. Sent on Cell B.
11	MS->SS	HANDOVER FAILURE	Sent on Cell A.
12	MS->SS	GPRS INFORMATION	The MS sends an empty LLC PDU to indicate Cell Update.
Optional step			
13	MS->SS	DTM REQUEST	
14	SS->MS	PACKET ASSIGNMENT	See specific message contents.
15	SS<->MS	{ Uplink data transfer }	Macro - Completion of the 2kB of Data.

Specific Message Contents

HANDOVER COMMAND (Step 9):

k=1:

Information Element	Value/remark
As default message contents, except:	
Channel Description	
- Timeslot Number	(N + 4) MOD 8 (chosen arbitrarily)
Cell Description	Default values from Cell B
Synchronization Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronization Indication	"Non synchronized".
- Normal Cell Indication	Ignore out of range timing advance.

k=2:

Information Element	Value/remark
As default message contents, except:	
Channel Description	
- Timeslot Number	(N + 4) MOD 8 (chosen arbitrarily)
- Channel Type	TCH/H
Cell Description	Default values from Cell B
Synchronization Indication	
- Report Observed Time Difference	Shall not be included.
- Synchronization Indication	"Non synchronized".
- Normal Cell Indication	Ignore out of range timing advance.

PACKET ASSIGNMENT (Step 14):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	T Not included

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N Not included

47.3.2 Handover to different routing area whilst in DM

47.3.2.1 Handover to different routing area whilst in DM / Performed on main DCCH / RAU complete before CS release

47.3.2.1.1 Conformance requirements

During a CS connection, an MS in class-B mode of operation (GSM only) cannot perform GPRS attach nor routing area updates, only MSs in class-A mode of operation can perform these procedures.

A GPRS MS in MS operation mode A shall perform the normal routing area update procedure during an ongoing circuit-switched transaction.

References

3GPP TS 23.060 sub-clause 6.3.1

3GPP TS 24.008 sub-clause 4.7.5.2.1

47.3.2.1.2 Test purpose

To verify that when the MS completes the CS handover, to a cell in a different routing area, the MS performs a RA update on the main DCCH.

47.3.2.1.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B with different RAIs and both support DTM.

Mobile Station:

The MS is in the active state (U10) of a call on cell A.

Specific PICS statements

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PIXIT statements

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Test Procedure

Once the MS is in an active call on cell A, the MS is instructed to change to a new cell in a different Routing Area, where the main signalling link is established. After the voice call has been correctly re-established, the MS completes the Routing Area Updating procedure on the main DCCH. The SS reallocates the P-TMSI of the MS in the ROUTING AREA UPDATE ACCEPT message, prompting the MS to acknowledge this change with the ROUTING AREA UPDATE COMPLETE message.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	SS		MS in state U10, on an arbitrarily chosen timeslot of cell A.
2	SS->MS	HANDOVER COMMAND	Instructs the MS to move to an arbitrarily chosen timeslot on cell B.
3	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of the PHYSICAL INFORMATION message. Handover reference as included in the HANDOVER COMMAND.
4	SS->MS	PHYSICAL INFORMATION	
5	MS->SS	HANDOVER COMPLETE	Sent on the new channel after the establishment of the main signalling link.
6	SS->MS	DTM INFORMATION	
7	MS->SS	GPRS INFORMATION	Contains the ROUTING AREA UPDATE REQUEST message.
8	SS->MS	GPRS INFORMATION	Contains the ROUTING AREA UPDATE ACCEPT message. Allocates a new P-TMSI, (C2345678Hex).
9	MS->SS	GPRS INFORMATION	Contains the ROUTING AREA UPDATE COMPLETE message. See specific message contents.

Specific message contents

ROUTING AREA UPDATE ACCEPT (Step 8):

Information Element	Value/remark
As default message contents except: - Allocated P-TMSI - Type of Identity - P-TMSI value	P-TMSI C2345678Hex

47.3.2.2 Handover to different routing area whilst in DM / Performed on main DCCH / CS release before RAU complete

47.3.2.2.1 Conformance requirements

During a CS connection, an MS in class-B mode of operation (GSM only) cannot perform GPRS attach nor routing area updates, only MSs in class-A mode of operation can perform these procedures.

A GPRS MS in MS operation mode A shall perform the normal routing area update procedure during an ongoing circuit-switched transaction.

References

3GPP TS 23.060 sub-clause 6.3.1

3GPP TS 24.008 sub-clause 4.7.5.2.1

47.3.2.2.2 Test purpose

To verify that when the MS completes the CS handover, to a cell in a different routing area, the MS attempts to complete the RA update on the main DCCH, but the CS resources are released and the RA update procedure is completed on new TBFs.

47.3.2.2.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B operating in NW Mode II with same LAI but different RAI and both support DTM. SI13 is broadcasted in such a way that it is received by the MS at least every 4 sec.

Mobile Station:

The MS is in the active state (U10) of a call on cell A.

The MS is in GMM Ready state with a P-TMSI allocated.

Specific PICS statements

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PIXIT statements

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Test Procedure

Once the MS is in an active call on cell A, the MS is then instructed to change to a new cell in a different Routing Area, where the main signalling link is established. After the voice call has been correctly re-established the MS initiates the Routing Area Updating procedure on the main DCCH. When the SS has successfully received the ROUTING AREA UPDATE REQUEST message, the SS releases the DCCH with a CHANNEL RELEASE command. The SS then establishes a downlink TBF to allow the ROUTING AREA UPDATE ACCEPT message to be sent to the MS. The MS responds to the ROUTING AREA UPDATE ACCEPT message, acknowledging the new P-TMSI allocated, by sending a ROUTING AREA UPDATE COMPLETE message.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	SS		MS in state U10, on an arbitrarily chosen timeslot of cell A. The RF level of cell A is lowered until cell B is preferred by the SS.
2	SS->MS	HANDOVER COMMAND	Instructs the MS to move to an arbitrarily chosen timeslot on cell B.
3	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of the PHYSICAL INFORMATION message. Handover reference as included in the HANDOVER COMMAND.
4	SS->MS	PHYSICAL INFORMATION	
5	MS->SS	HANDOVER COMPLETE	Sent on the new channel after the establishment of the main signalling link.
6	SS->MS	DTM INFORMATION	Sent on main DCCH.
7	MS->SS	GPRS INFORMATION	Contains the ROUTING AREA UPDATE REQUEST message
			All RAU REQUEST LAPDm frames shall be acknowledged by the SS.
8	SS->MS	CHANNEL RELEASE	
9			The SS waits at least two SI13 repeat periods.
10	SS		A downlink TBF is then established to allow the RAU ACCEPT message to be returned to the MS.
11	SS->MS	ROUTING AREA UPDATE ACCEPT	Allocating the MS a new P-TMSI (C2345678Hex).
12	MS->SS	ROUTING AREA UPDATE COMPLETE	See specific message contents.

Specific message contents

ROUTING AREA UPDATE ACCEPT (Step 11):

Information Element	Value/remark
As default message contents except: - Allocated P-TMSI - Type of Identity - P-TMSI value	P-TMSI C2345678Hex

47.3.3 Handover to different routing area whilst in DTM

47.3.3.1 Handover to different routing area whilst in DTM / Performed on TBFs

47.3.3.1.1 Handover to different routing area whilst in DTM / Performed on TBFs / RAU complete before CS release

47.3.3.1.1.1 Conformance requirements

In dedicated mode or dual transfer mode, an intercell or an intracell change of channel can be requested by the network RR sublayer. This change may be performed through the handover procedure.

Upon receipt of the HANDOVER COMMAND message, the mobile station initiates, the release of link layer connections, disconnects the physical channels (including the packet resources, if in class A mode of operation), commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links).

In, GSM, user data transmission in the MS shall be suspended during the routing area updating procedure; user data reception shall be possible.

References

3GPP TS 04.18/44.018 sub-clause 3.4.4

3GPP TS 24.008 sub-clause 4.7.5

47.3.3.1.1.2 Test purpose

To verify that a MS in DTM can complete Handover to a cell in a different routing area, where the RA update procedure is performed on TBFs, before the CS resources are released.

47.3.3.1.1.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B with same LAI but different RAI, both supporting DTM and with default parameters.

Mobile Station:

The MS is in the active state (U10) of a call, on Timeslot N (chosen arbitrarily) of cell A, with a TMSI and P-TMSI allocated and the PDP context 1 activated but no allocated TBFs.

Specific PICS statements

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PIXIT statements

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Test Procedure

A MS in dedicated mode with an active CS call is triggered to establish an uplink TBF. The MS sends a DTM REQUEST message appealing for uplink resources. Upon receiving the DTM request message the SS allocates uplink resources. Once the MS has entered DTM and has had at least ten RLC data blocks acknowledged, the SS sends a HANDOVER COMMAND message to the MS and completes the Handover procedure to a cell in the new RA. The Handover procedure is complete by the MS sending a HANDOVER COMPLETE message to the SS. Once the Handover procedure is complete the SS sends the MS a DTM INFORMATION message, providing the MS with the minimum information required to establish packet resources with the cell. The MS having received the DTM INFORMATION message indicating DTM support in the current cell, initiates the RA Update procedure. The RAU procedure is initiated by sending the ROUTING AREA UPDATE REQUEST message, encapsulated in GTTP, on the main DCCH. The SS completes the RA Update procedure by returning a ROUTING AREA UPDATE ACCEPT message on the main DCCH without re-allocating the P-TMSI. The MS can then again initiate the establishment of an uplink TBF.

MS supporting DTM shall complete test for k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1,2.

Step	Direction	Message	Comments
1	SS		MS in active state (U10) of a call and when: k=1, Channel Type = TCH/F; k=2, Channel Type = TCH/H.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 2kB of data.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	See specific message contents.
5	SS<->MS	{Uplink Data}	Macro – Transmitting approximately 1kB of Data.
6	SS->MS	HANDOVER COMMAND	See specific message contents.
7	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
8	SS->MS	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS messages. See specific message contents.
9	MS->SS	HANDOVER COMPLETE	
10	SS->MS	DTM INFORMATION	
11	MS->SS	GPRS INFORMATION	It shall contain a ROUTING AREA UPDATE REQUEST message
12	SS->MS	GPRS INFORMATION	It contains a ROUTING AREA UPDATE ACCEPT message. Does not allocate MS a new P-TMSI.
13	MS->SS	DTM REQUEST	
14	SS->MS	PACKET ASSIGNMENT	See specific message contents.
15	SS<->MS	{ Uplink data transfer }	Macro - Completion of the 2kB of Data.

Specific Message Contents

PACKET ASSIGNMENT (Step 4):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	(N ± 1) MOD 8 Not included

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N Not included

HANDOVER COMMAND (Step 6):

k=1:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Synchronisation Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N' (chosen arbitrarily) TCH/F Shall not be included. "Non synchronized". Ignore out of range timing advance.

k=2:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Synchronisation Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N' (chosen arbitrarily) TCH/H Shall not be included. "Non synchronized". Ignore out of range timing advance.

PACKET ASSIGNMENT (Step 14):

k=1:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	(N' ± 1) MOD 8 Not included

k=2:

Information Element	Value/remark
As default message contents except: RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	N' Not included

47.3.3.1.2 Handover to different routing area whilst in DTM / Performed on TBFs / CS release before RAU complete

47.3.3.1.2.1 Conformance requirements

In dedicated mode or dual transfer mode, an intercell or an intracell change of channel can be requested by the network RR sublayer. This change may be performed through the handover procedure.

Upon receipt of the HANDBOVER COMMAND message, the mobile station initiates, the release of link layer connections, disconnects the physical channels (including the packet resources, if in class A mode of operation), commands the switching to the assigned channels and initiates the establishment of lower layer connections (this includes the activation of the channels, their connection and the establishment of the data links).

In, GSM, user data transmission in the MS shall be suspended during the routing area updating procedure; user data reception shall be possible.

References

3GPP TS 04.18/44.018 sub-clause 3.4.4

3GPP TS 24.008 sub-clause 4.7.5

47.3.3.1.2.2 Test purpose

To verify that a MS in DTM can complete the Handover procedure to a cell in a different routing area, where the RA update is performed on TBFs, but the CS resources are released before the completion of the update. The MS then has to complete the update on new TBFs.

47.3.3.1.2.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B operating in NW Mode II with same LAI but different RAI, both supporting DTM, with default parameters. SI13 is broadcasted in such a way that it is received by the MS at least every 4 sec.

Mobile Station:

The MS is in the active state (U10) of a call, on Timeslot N of cell A, with a TMSI and P-TMSI allocated and the PDP context 1 activated but no allocated TBFs.

Specific PICS statements

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PIXIT statements

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Test Procedure

A MS in dedicated mode with an active CS call is triggered to establish an uplink TBF. The MS sends a DTM REQUEST message appealing for uplink resources. Upon receiving the DTM request message the SS allocates uplink resources. Once the MS has entered DTM and has had at least ten RLC data blocks acknowledged, the SS sends a HANDOVER COMMAND message to the MS and completes the Handover procedure to a cell in a new RA. The Handover procedure is completed by the MS sending a HANDOVER COMPLETE message to the SS. Once the Handover procedure is complete the SS sends the MS a DTM INFORMATION message, providing the MS with the minimum information required to establish packet resources with the cell. The MS having received the DTM INFORMATION message indicating DTM support in the current cell, initiates the RA Update procedure. The RA Update procedure is initiated by the MS sending the ROUTING AREA UPDATE REQUEST message, encapsulated in GTTP, on the main DCCH. The SS then releases the CS connection to the MS and allocates downlink PS resources to the MS with an PACKET DOWNLINK ASSIGNMENT message. The SS then completes the RAU procedure by sending the RAU ACCEPT message to the MS, allowing the MS to request uplink PS resources.

MS supporting DTM shall complete test for k=1 and MSs indicating support of single slot DTM shall additionally complete testing for k=2.

Maximum Duration of Test

5 minutes

Expected Sequence

The test sequence is repeated for k = 1,2.

Step	Direction	Message	Comments
1	SS		MS in active state (U10) of a call and when: k=1, Channel Type = TCH/F; k=2, Channel Type = TCH/H.
2	MS		Trigger the MS to initiate an uplink packet transfer containing 2kB of data.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	See specific message contents.
5	SS<->MS	{ Uplink data transfer }	Macro – Transmitting 2kB of Data
6	SS->MS	HANDOVER COMMAND	This message to be sent before the termination of the macro. See specific message contents.
7	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
8	SS->MS	PHYSICAL INFORMATION	Sent after reception of n HANDOVER ACCESS messages. See specific message contents.
9	MS->SS	HANDOVER COMPLETE	
10	SS->MS	DTM INFORMATION	
11	MS->SS	GPRS INFORMATION	It shall contain a ROUTING AREA UPDATE REQUEST message. All RAU REQUEST LAPDm frames shall be acknowledged by the SS.
12	SS->MS	CHANNEL RELEASE	The TCH is released.
13			The SS waits at least two SI13 repeat periods.
14			A downlink TBF is then established to allow the RAU ACCEPT message to be returned the MS.
15	SS->MS	ROUTING AREA UPDATE ACCEPT	Does not allocate MS a new P-TMSI.
16		{ Uplink dynamic allocation two phase access }	Macro
17	SS<->MS	{ Uplink data transfer }	Macro - Completion of the 2kB of Data.

Specific Message Contents

PACKET ASSIGNMENT (Step 4):

k=1:

Information Element	Value/remark
As default message contents except: GPRS Broadcast Information IE - GPRS Cell Options IE - NMO RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	01 (Network Mode of Operation II) (N ± 1) MOD 8 Not included

k=2:

Information Element	Value/remark
As default message contents except: GPRS Broadcast Information IE - GPRS Cell Options IE - NMO RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	01 (Network Mode of Operation II) N Not included

HANDOVER COMMAND (Step 6):

k=1:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Synchronisation Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N' (chosen arbitrarily) TCH/F Shall not be included. "Non synchronized". Ignore out of range timing advance.

k=2:

Information Element	Value/remark
As default message contents, except: Channel Description - Timeslot Number - Channel Type Synchronisation Indication - Report Observed Time Difference - Synchronization Indication - Normal Cell Indication	N' (chosen arbitrarily) TCH/H Shall not be included. "Non synchronized". Ignore out of range timing advance.

47.3.4 Handover to UTRAN while in DTM

47.3.4.1 Handover to UTRAN while in DTM / Downlink TBF

47.3.4.1.1 Conformance requirements

Once the mobile station enters the dual transfer mode, the existent procedures apply (see 3GPP TS 44.060). Some exceptions to the existent procedures while in dedicated mode are:

- When the mobile station receives a HANDOVER COMMAND, HANDOVER TO UTRAN COMMAND, HANDOVER TO CDMA2000 COMMAND, HANDOVER TO IU MODE COMMAND or ASSIGNMENT COMMAND message, it shall abandon the packet resource immediately, enter dedicated mode and perform the handover or assignment procedure, respectively.

After the successful completion of the handover from an GSM cell to an UMTS cell, an MS which has performed the GPRS suspension procedure in Gb mode (see 3GPP TS 04.18) (i.e. an MS in MS operation mode B or an DTM MS in a GSM cell that does not support DTM) shall perform a normal RA update procedure in the UMTS cell in order to resume the GPRS services in the network, before sending any other signalling messages or user data.

References

3GPP TS 04.18/44.018 sub-clause 3.4.23.1

3GPP TS 24.008 sub-clause 4.7.1.7

47.3.4.1.2 Test purpose

Verifying that the MS aborts Packet resources while in DTM and proceeds with the handover to UTRAN, upon reception of an INTER SYSTEM TO UTRAN HANDOVER COMMAND message.

47.3.4.1.3 Method of test

Initial Conditions

System Simulator:

2 cells - Cell 1 is GSM with DTM supported, Cell 2 is UTRAN. The present document sub-clause 26.6.5.1 shall be referenced for the default parameters of cell 1. 3GPP TS 34.108, sub-clause 6.1 shall be referenced for default parameters of Cell 2.

Mobile Station:

The MS is in the active state (U10) of a call.

The MS is GPRS idle with a P-TMSI allocated and the PDP context 1 activated

Specific PICS statements

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PIXIT statements

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Test Procedure

The SS starts the GSM cell and UTRAN cell and brings the MS into the call active state of Cell 1(CC state U10). The SS sends a PACKET ASSIGNMENT message to the MS on the main DCCH, instructing the MS to switch to the designated timeslot. The SS waits a specified time and then starts to transmit to the newly allocated resources. The SS configures the UTRAN dedicated channel corresponding to the default-configuration 3. After approximately 5k octets of data has been sent, the SS sends a MEASUREMENT INFORMATION to trigger the MS to perform measurements on the UTRAN cell. The SS verifies that the MS include the UTRAN cell in the MEASUREMENT REPORT and then sends INTERSYSTEM TO UTRAN HANDOVER COMMAND message indicating the dedicated channel of the target cell to the MS through the GSM serving cell. After the MS receives the command it shall configure itself accordingly and switch to the dedicated channel of UTRAN cell. The SS checks whether the handover has been performed, by verifying that the MS transmits the HANDOVER TO UTRAN COMPLETE message to the SS through DCCH of the UTRAN cell. The MS then performs the Routing Area Updating procedure, initiated with the transmission of a ROUTING AREA UPDATE REQUEST message. The SS completes the procedure by sending a ROUTING AREA UPDATE COMPLETE message to the MS. The SS establishes a radio bearer to the MS with the RADIO BEARER SETUP and RADIO BEARER SETUP COMPLETE messages. To check that PDP context is active, SS sends MODIFY PDP CONTEXT REQUEST in UMTS cell. The MS may or may not accept the QoS and replies to the SS accordingly.

Maximum Duration of Test

5 minutes

Expected Sequence

Note: Default message contents for UMTS signalling can be found in 3GPP TS 34.108 sub-clause 9.1.

Step	Direction	Message	Comments
1	SS		MS in state U10, utilising Timeslot N and TCH/F channel type for the CS connection on Cell 1 (Timeslot chosen arbitrarily)
2	SS->MS	PACKET ASSIGNMENT	Assigning downlink packet resources on Timeslot N+1 to the MS.
3	MS<->SS	{ Downlink data transfer }	Macro
4	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.
5	SS		Waits until approximately 5k octets is sent to the MS
6	←	MEASUREMENT INFORMATION	
7	→	MEASUREMENT REPORT	Including Measurement Results on the UTRAN cell in Step 6. Received within 5 sec + 10% from Step 6.
8	SS->MS	INTER SYSTEM TO UTRAN HANDOVER COMMAND	See specific message contents.
9	MS		The MS accepts the handover command and configures its lower layers using the parameters contained in the INTERSYSTEM TO UTRAN HANDOVER COMMAND
10	SS		The SS waits for uplink physical channel in synchronisation
11	MS->SS	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.
12	SS		The SS starts integrity protection for CS domain
13	SS->MS	UTRAN MOBILITY INFORMATION	The SS conveys CN system information for the PS domain to the UE in connected mode. See specific message contents.
14	MS->SS	UTRAN MOBILITY_INFORMATION CONFIRM	
15	MS->SS	ROUTING AREA UPDATE REQUEST	
16	SS->MS	AUTHENTICATION AND CIPHERING REQUEST	
17	MS->SS	AUTHENTICATION AND CIPHERING RESPONSE	
18	SS		The SS starts integrity protection for PS domain
19	SS->MS	ROUTING AREA UPDATE ACCEPT	
20	SS->MS	RADIO BEARER SETUP	PS RAB establishment
21	MS->SS	RADIO BEARER SETUP COMPLETE	
22			SS Releases the CS call.
23	SS->MS	MODIFY PDP CONTEXT REQUEST	SS requests the modification of a PDP context.
A24	MS->SS	MODIFY PDP CONTEXT ACCEPT	MS behaviour type A: Accept the PDP context modification
B24	MS->SS	DEACTIVATE PDP CONTEXT REQUEST	MS behaviour type B: Initiate the PDP context deactivation. Cause set to 'QoS not accepted'
B24a	SS->MS	DEACTIVATE PDP CONTEXT ACCEPT	MS behaviour type B: Accept the PDP context deactivation.
B24b	MS->SS	DETACH REQUEST	MS behaviour type B: A non-auto attach MS may (optionally) send a Detach Request. The SS shall wait up to 'T3390' seconds for the Detach Request.
B24c	SS->MS	DETACH ACCEPT	If the MS transmitted a Detach Request message in step B24b then the SS responds with a Detach Accept message.

Specific message contents

MEASUREMENT INFORMATION

Information Element	Value/remark
< RR short PD : bit >	0
< Message type : bit (5) >	'00101'B
< Short layer 2 header : bit (2) >	'00'B
< BA_IND : bit >	0
< 3G_BA_IND : bit >	0
< MP_CHANGE_MARK : bit >	0
< MI_INDEX : bit (4) >	'0000'B
< MI_COUNT : bit (4) >	'0000'B
< PWRC : bit >	0
< REPORT_TYPE : bit >	1 (Measurement Reporting shall be used)
< REPORTING_RATE : bit >	0 (SACCH rate reporting)
< INVALID_BSIC_REPORTING : bit >	0 (Report on cells with invalid BSIC not allowed)
0 1 < Real Time Difference Description >	0
0 1 < BSIC Description >	0
0 1 < REPORT PRIORITY Description >	0
0 1 < MEASUREMENT Parameters Description >	0
0 1 < extension length >	0
0 1 < 3G Neighbour Cell Description >	1
0 1 < 3G_Wait : bit (3) >	0
0 1 < Index_Start_3G : bit (7) >	0
0 1 < Absolute_Index_Start_EMR : bit (7) >	0
0 1 < UTRAN FDD Description >	1
0 1 < Bandwidth_FDD : bit (3) >	0
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	1
0 < FDD-ARFCN : bit (14) >	0 See TS 34.108, clause 6.1.5, table 6.1.1
< FDD_Indic0 : bit >	0
< NR_OF_FDD_CELLS : bit (5) >	'00001'B
< FDD_CELL_INFORMATION Field >	10 bits Scrambling code according to TS 34.108, clause 6.1.4, Default settings for cell No.1
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	0
0 1 < UTRAN TDD Description >	0
0 1 < CDMA2000 Description >	0
0 1 < 3G MEASUREMENT Parameters Description >	
< Qsearch_C : bit (4) >	'0111'B (Always)
< 3G_SEARCH_PRIO : bit (1) >	1
< FDD_REP_QUANT : bit (1) >	1 (Ec/No)
0 1 < FDD_MULTIRAT_REPORTING : bit (2) >	'1 01'B (Report on 1 UTRAN cell)
0 1 < FDD_REPORTING_OFFSET : bit (3) >	0
0 1 < TDD_MULTIRAT_REPORTING : bit (2) >	0
0 1 < TDD_REPORTING_OFFSET : bit (3) >	0
0 1 < CDMA2000_MULTIRAT_REPORTING : bit (2) >	0
0 1 < CDMA2000_REPORTING_OFFSET : bit (3) >	0

INTERSYSTEM TO UTRAN HANDOVER COMMAND

Information Element	Value/remark
RR management Protocol Discriminator	'0110'B
Skip Indicator	'0000'B
Inter System to UTRAN Handover Command Message Type	'01100011'B
Length of Handover to UTRAN Command contents	Octet length of the "Handover to UTRAN Command value part"
Handover to UTRAN Command value part	PER encoded ASN.1 value of type "HandoverToUTRANCommand-r3-IEs", the content is presented in the next table.

Content of "HandoverToUTRANCommand-r3-IEs" (in tabular format)

Information Element	Value/remark
New U-RNTI - SRNC Identity - S-RNTI-2	'000000000001'B Set to arbitrary value corresponding to DPCH Offset value currently stored in SS
Ciphering algorithm	The presence of this IE is dependent on IXIT statements in TS 34.123-2. If ciphering is indicated to be active, use UEA1. Else, this IE is omitted
CHOICE specification mode CHOICE preconfiguration mode - Default configuration mode - Default configuration identity - RAB Info - RAB identity (GSM-MAP) - CN domain identity - NAS Synchronisation Indicator - Uplink DPCH info - Uplink DPCH power control info - CHOICE mode - DPCCH power offset - PC Preamble - SRB delay	Preconfiguration Default configuration FDD 3 (12.2 kbps speech + 3.4 kbps signalling) '00000001'B CS domain Not Present FDD -78dB (i.e. ASN.1 IE value of $-20 (2 + (IE\ Value * 4))$) 1 frame 7 frames

<ul style="list-style-type: none"> - CHOICE mode - Scrambling code type - Reduced scrambling code number - Spreading factor 	<ul style="list-style-type: none"> FDD Long 0 64
links	
<ul style="list-style-type: none"> - Downlink information common for all radio links - Downlink DPCH info common for all RL - Downlink DPCH power control information <ul style="list-style-type: none"> - CHOICE Mode - DPC mode - Downlink information per radio link list - Downlink information for each radio link <ul style="list-style-type: none"> - CHOICE mode - Primary CPICH info - Primary scrambling code - Downlink DPCH info for each radio link <ul style="list-style-type: none"> - CHOICE mode - CHOICE mode <ul style="list-style-type: none"> - Primary CPICH usage for channel estimation - Secondary scrambling code - CHOICE Spreading factor - Code number - Scrambling code change - TPC combination index - Frequency info - UARFCN uplink(Nu) 	<ul style="list-style-type: none"> FDD Single TPC 1 FDD See TS 34.108, clause titled "Default settings for cell No.1 (FDD)" in clause 6.1 FDD FDD Primary CPICH may be used 1 128 0 No code change 0 Not Present Absence of this IE is equivalent to apply the default duplex distance defined for the operating frequency according to TS 25.101 See TS 34.108, clause 6.1.5, table 6.1.1
<ul style="list-style-type: none"> - UARFCN downlink(Nd) 	See TS 34.108, clause 6.1.5, table 6.1.1
Maximum allowed UL TX power	See TS 34.108, clause 6.1.5, table 6.1.1

Contents of UTRAN MOBILITY INFORMATION message:

The contents of the UTRAN MOBILITY INFORMATION message in this test case is identical to the default message in TS 34.108, with the following exceptions.

Information Element	Value/remark
Message Type	
Integrity check info	As default
RRC transaction identifier	As default
Integrity protection mode info	As default
Ciphering mode info	As default
New U-RNTI	As default
New C-RNTI	As default
UE Timers and constants in connected mode	As default
CN information info	
- PLMN identity	Not present
- CN common GSM-MAP NAS system information	Not present
- CN domain related information	
- CN domain identity	CS domain
- CN domain specific GSM-MAP NAS system info	
- T3212	30 (periodic updating every 3 hours)
- ATT	1 (MS shall apply IMSI attach and detach procedures)
- CN domain specific DRX cycle length coefficient	7
- CN domain related information	
- CN domain identity	PS domain
- CN domain specific GSM-MAP NAS system info	
- RAC	6 (GERAN and UTRAN cells use different RAC)
- NMO	0 (Network Mode of Operation I)
- CN domain specific DRX cycle length coefficient	7
URA identity	Not present
Downlink counter synchronization info	Not Present

47.3.4.2 Handover to UTRAN while in DTM / Uplink TBF

47.3.4.2.1 Conformance requirements

Once the mobile station enters the dual transfer mode, the existent procedures apply (see 3GPP TS 44.060). Some exceptions to the existent procedures while in dedicated mode are:

- When the mobile station receives a HANDOVER COMMAND, HANDOVER TO UTRAN COMMAND, HANDOVER TO CDMA2000 COMMAND, HANDOVER TO IU MODE COMMAND or ASSIGNMENT COMMAND message, it shall abandon the packet resource immediately, enter dedicated mode and perform the handover or assignment procedure, respectively.

After the successful completion of the handover from an GSM cell to an UMTS cell, an MS which has performed the GPRS suspension procedure in Gb mode (see 3GPP TS 04.18) (i.e. an MS in MS operation mode B or an DTM MS in a GSM cell that does not support DTM) shall perform a normal RA update procedure in the UMTS cell in order to resume the GPRS services in the network, before sending any other signalling messages or user data.

References

3GPP TS 04.18/44.018 sub-clause 3.4.23.1

3GPP TS 24.008 sub-clause 4.7.1.7

47.3.4.2.2 Test purpose

Verifying that the MS aborts Packet resources while in DTM and proceeds with the handover to UTRAN, upon reception of an INTER SYSTEM TO UTRAN HANDOVER COMMAND message.

47.3.4.2.3 Method of test

Initial Conditions

System Simulator:

2 cells - Cell 1 is GSM with DTM supported, Cell 2 is UTRAN. The present document sub-clause 26.6.5.1 shall be referenced for the default parameters of cell 1. 3GPP TS 34.108, sub-clause 6.1 shall be referenced for default parameters of Cell 2.

Mobile Station:

The MS is in the active state (U10) of a call.
The MS is GPRS idle with a P-TMSI allocated and the PDP context 1 activated

Specific PICS statements

-

PIXIT statements

-

Test Procedure

The SS starts the GSM cell and UTRAN and brings the MS into the call active state (CC state U10). The MS is then triggered to initiate packet uplink data transfer in RLC acknowledged mode and sends a DTM REQUEST message. On receipt of the DTM REQUEST message, requesting uplink resources, the SS sends a PACKET ASSIGNMENT message to the MS on the main DCCH, instructing the MS to switch to the designated timeslot. The SS waits a specified time and then starts to transmit to the newly allocated resources. The SS configures the UTRAN dedicated channel corresponding to the default-configuration 3. After approximately 5k octets of data has been sent, the SS sends a MEASUREMENT INFORMATION to trigger the MS to perform measurements on the UTRAN cell. The SS verifies that the MS include the UTRAN cell in the MEASUREMENT REPORT and then sends an INTER SYSTEM TO UTRAN HANDOVER COMMAND message, indicating the dedicated channel of the target cell to the MS, through the GSM serving cell. After the MS receives the command it shall configure itself accordingly and switch to the dedicated channel of UTRAN cell. The SS checks whether the handover has been performed, by verifying that the MS transmits a HANDOVER TO UTRAN COMPLETE message to the SS through the DCCH of the UTRAN cell. The MS then optionally attempt to resume the packet resources with the transmission of a SERVICE REQUEST message. The

radio bearer is then established and the SS sends a SERVICE ACCEPT message to the MS instructing the MS to use the bearer for packet transmission. To check that PDP context is active, SS sends MODIFY PDP CONTEXT REQUEST in UMTS cell. The MS may or may not accept the QoS and replies to the SS accordingly.

Maximum Duration of Test

5 minutes

Expected Sequence

Note: Default message contents for UMTS signalling can be found in 3GPP TS 34.108 sub-clause 9.1.

Step	Direction	Message	Comments
1	SS		MS in state U10, utilising Timeslot N and TCH/F channel type for the CS connection on Cell 1 (Timeslot chosen arbitrarily)
2			Trigger the MS to initiate an uplink packet transfer containing 10k octets.
3	MS->SS	DTM REQUEST	
4	SS->MS	PACKET ASSIGNMENT	Assigning uplink packet resources on Timeslot N+1 to the MS.
5	MS<->SS	{ Uplink data transfer }	Macro
6	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.
7	SS		Waits until approximately 5k octets have been successfully transmitted.
8	←	MEASUREMENT INFORMATION	
9	→	MEASUREMENT REPORT	Including Measurement Results on the UTRAN cell in Step 8
10	SS->MS	INTER SYSTEM TO UTRAN HANDOVER COMMAND	Received within 5 sec + 10% from Step 8. See specific message contents.
11	MS		The MS accepts the handover command and configures its lower layers using the parameters contained in the INTERSYSTEM TO UTRAN HANDOVER COMMAND
12	SS		The SS waits for uplink physical channel in synchronisation
13	MS->SS	HANDOVER TO UTRAN COMPLETE	The SS receives this message on DCCH of cell 2 (UTRAN cell). It implies that the downlink physical channel has synchronised with UTRAN.
14	SS		The SS starts integrity protection for CS domain
15	SS->MS	UTRAN MOBILITY INFORMATION	The SS conveys CN system information for the PS domain to the UE in connected mode. See specific message contents.
16	MS->SS	UTRAN MOBILITY_INFORMATION CONFIRM	
17	MS->SS	ROUTING AREA UPDATE REQUEST	
18	SS->MS	AUTHENTICATION AND CIPHERING REQUEST	
19	MS->SS	AUTHENTICATION AND CIPHERING RESPONSE	
20	SS		The SS starts integrity protection for PS domain
21	SS->MS	ROUTING AREA UPDATE ACCEPT	
22	MS->SS	SERVICE REQUEST	MS may optionally perform step 22 to 25.
23	SS->MS	RADIO BEARER SETUP	PS RAB establishment
24	MS->SS	RADIO BEARER SETUP COMPLETE	
25	SS->MS	SERVICE ACCEPT	The SS accepts the SERVICE REQUEST message, indicating the newly established RAB is to be used for the uplink packet session.
26			SS Releases the CS call.
27	SS->MS	MODIFY PDP CONTEXT REQUEST	SS requests the modification of a PDP context.
A28	MS->SS	MODIFY PDP CONTEXT ACCEPT	MS behaviour type A: Accept the PDP context modification
B28	MS->SS	DEACTIVATE PDP CONTEXT REQUEST	MS behaviour type B: Initiate the PDP context deactivation. Cause set to 'QoS not accepted'
B28a	SS->MS	DEACTIVATE PDP CONTEXT ACCEPT	MS behaviour type B: Accept the PDP context deactivation.
B28b	MS->SS	DETACH REQUEST	MS behaviour type B: A non-auto attach MS may (optionally) send a Detach Request. The SS shall wait up to 'T3390' seconds for the Detach Request.
B28c	SS->MS	DETACH ACCEPT	If the MS transmitted a Detach Request message in step B28b then the SS responds with a Detach Accept message.

Specific message contents

MEASUREMENT INFORMATION

Information Element	Value/remark
< RR short PD : bit >	0
< Message type : bit (5) >	'00101'B
< Short layer 2 header : bit (2) >	'00'B
< BA_IND : bit >	0
< 3G_BA_IND : bit >	0
< MP_CHANGE_MARK : bit >	0
< MI_INDEX : bit (4) >	'0000'B
< MI_COUNT : bit (4) >	'0000'B
< PWRC : bit >	0
< REPORT_TYPE : bit >	1 (Measurement Reporting shall be used)
< REPORTING_RATE : bit >	0 (SACCH rate reporting)
< INVALID_BSIC_REPORTING : bit >	0 (Report on cells with invalid BSIC not allowed)
0 1 < Real Time Difference Description >	0
0 1 < BSIC Description >	0
0 1 < REPORT PRIORITY Description >	0
0 1 < MEASUREMENT Parameters Description >	0
0 1 < extension length >	0
0 1 < 3G Neighbour Cell Description >	1
0 1 < 3G_Wait : bit (3) >	0
0 1 < Index_Start_3G : bit (7) >	0
0 1 < Absolute_Index_Start_EMR : bit (7) >	0
0 1 < UTRAN FDD Description >	1
0 1 < Bandwidth_FDD : bit (3) >	0
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	1
0 < FDD-ARFCN : bit (14) >	0 See TS 34.108, clause 6.1.5, table 6.1.1
< FDD_Indic0 : bit >	0
< NR_OF_FDD_CELLS : bit (5) >	'00001'B
< FDD_CELL_INFORMATION Field >	10 bits Scrambling code according to TS 34.108, clause 6.1.4, Default settings for cell No.1
1 < Repeated UTRAN FDD Neighbour Cells > ** 0	0
0 1 < UTRAN TDD Description >	0
0 1 < CDMA2000 Description >	0
0 1 < 3G MEASUREMENT Parameters Description >	
< Qsearch_C : bit (4) >	'0111'B (Always)
< 3G_SEARCH_PRIO : bit (1) >	1
< FDD_REP_QUANT : bit (1) >	1 (Ec/No)
0 1 < FDD_MULTIRAT_REPORTING : bit (2) >	'1 01'B (Report on 1 UTRAN cell)
0 1 < FDD_REPORTING_OFFSET : bit (3) >	0
0 1 < TDD_MULTIRAT_REPORTING : bit (2) >	0
0 1 < TDD_REPORTING_OFFSET : bit (3) >	0
0 1 < CDMA2000_MULTIRAT_REPORTING : bit (2) >	0
0 1 < CDMA2000_REPORTING_OFFSET : bit (3) >	0

INTERSYSTEM TO UTRAN HANDOVER COMMAND

Information Element	Value/remark
RR management Protocol Discriminator	'0110'B
Skip Indicator	'0000'B
Inter System to UTRAN Handover Command Message Type	'01100011'B
Length of Handover to UTRAN Command contents	Octet length of the "Handover to UTRAN Command value part"
Handover to UTRAN Command value part	PER encoded ASN.1 value of type "HandoverToUTRANCommand-r3-IEs", the content is presented in the next table.

Content of "HandoverToUTRANCommand-r3-IEs" (in tabular format)

Information Element	Value/remark
New U-RNTI - SRNC Identity - S-RNTI-2	'00000000001'B Set to arbitrary value corresponding to DPCH Offset value currently stored in SS
Ciphering algorithm	The presence of this IE is dependent on IXIT statements in TS 34.123-2. If ciphering is indicated to be active, use UEA1. Else, this IE is omitted
CHOICE specification mode CHOICE preconfiguration mode - Default configuration mode - Default configuration identity - RAB Info - RAB identity (GSM-MAP) - CN domain identity - NAS Synchronisation Indicator - Uplink DPCH info - Uplink DPCH power control info - CHOICE mode - DPCCH power offset - PC Preamble - SRB delay	Preconfiguration Default configuration FDD 3 (12.2 kbps speech + 3.4 kbps signalling) '0000001'B CS domain Not Present FDD -78dB (i.e. ASN.1 IE value of $-20 (2 + (IE\ Value * 4))$) 1 frame 7 frames

<ul style="list-style-type: none"> - CHOICE mode - Scrambling code type - Reduced scrambling code number - Spreading factor 	<ul style="list-style-type: none"> FDD Long 0 64
links	
<ul style="list-style-type: none"> - Downlink information common for all radio links - Downlink DPCH info common for all RL - Downlink DPCH power control information <ul style="list-style-type: none"> - CHOICE Mode - DPC mode - Downlink information per radio link list - Downlink information for each radio link <ul style="list-style-type: none"> - CHOICE mode - Primary CPICH info - Primary scrambling code - Downlink DPCH info for each radio link <ul style="list-style-type: none"> - CHOICE mode - CHOICE mode <ul style="list-style-type: none"> - Primary CPICH usage for channel estimation - Secondary scrambling code - CHOICE Spreading factor - Code number - Scrambling code change - TPC combination index - Frequency info - UARFCN uplink(Nu) 	<ul style="list-style-type: none"> FDD Single TPC 1 FDD See TS 34.108, clause titled "Default settings for cell No.1 (FDD)" in clause 6.1 FDD FDD Primary CPICH may be used 1 128 0 No code change 0 Not Present Absence of this IE is equivalent to apply the default duplex distance defined for the operating frequency according to TS 25.101 See TS 34.108, clause 6.1.5, table 6.1.1
<ul style="list-style-type: none"> - UARFCN downlink(Nd) 	See TS 34.108, clause 6.1.5, table 6.1.1
Maximum allowed UL TX power	See TS 34.108, clause 6.1.5, table 6.1.1

Contents of UTRAN MOBILITY INFORMATION message:

The contents of the UTRAN MOBILITY INFORMATION message in this test case is identical to the default message in TS 34.108, with the following exceptions.

Information Element	Value/remark
Message Type	As default
Integrity check info	As default
RRC transaction identifier	As default
Integrity protection mode info	As default
Ciphering mode info	As default
New U-RNTI	As default
New C-RNTI	As default
UE Timers and constants in connected mode	As default
CN information info	
- PLMN identity	Not present
- CN common GSM-MAP NAS system information	Not present
- CN domain related information	
- CN domain identity	CS domain
- CN domain specific GSM-MAP NAS system info	
- T3212	30 (periodic updating every 3 hours)
- ATT	1 (MS shall apply IMSI attach and detach procedures)
- CN domain specific DRX cycle length coefficient	7
- CN domain related information	
- CN domain identity	PS domain
- CN domain specific GSM-MAP NAS system info	
- RAC	6 (GERAN and UTRAN cells use different RAC)
- NMO	0 (Network Mode of Operation I)
- CN domain specific DRX cycle length coefficient	7
URA identity	Not present
Downlink counter synchronization info	Not Present

47.4 Session Management

47.4.1 PDP Context Activation / Performed on main DCCH and TBFs

47.4.1.1 Conformance requirements

MAX_LAPDm (3 bit field)

This field indicates the maximum number of LAPDm frames on which a layer 3 can be segmented into and be sent on the main DCCH. It is coded as described in the SI 6 Rest Octets IE.

The parameter N201 is the maximum number of octets which are partially or entirely available for the information field of a frame.

The maximum number of octets partially or entirely available for the information field (N201) is:

- for frames of format A and B:
 - for the SACCH: N201 = 18;
 - for the FACCH and SDCCH: N201 = 20.
- for frames of format Bbis:
 - for BCCH, AGCH, NCH and PCH: N201 = 23;
- for frames of format Bter:
 - for the SACCH: N201 = 21;
 - for the FACCH and SDCCH: N201 = 23;
- for frames of format B4:
 - for the SACCH: N201 = 19.

The network should not use the main DCCH to send messages that exceed the maximum length specified for the uplink. The mobile station, however, shall not reject messages that exceed the maximum length.

References

3GPP TS 04.18/44.018, sub-clause 10.5.2.11a

3GPP TS 04.06/44.006, sub-clauses 2.1, 5.8.3

3GPP TS 03.55 sub-clause 4.1.1

47.4.1.2 Test purpose

To verify that:

- a) the MS uses the main DCCH when the message size is less than the product of MAX_LAPDm and N201;
- b) the MS uses an uplink TBFs when the message size is greater than the product of MAX_LAPDm and N201;
- c) the MS does not discard a frame when the network uses the main DCCH when the MS is in DTM;
- d) when the network exceeds the maximum LAPDm frame size in transmitting to the MS, the MS does not discard the message and continues to act upon the message.

47.4.1.3 Method of test

Initial Conditions

System Simulator:

2 cells, A and B with same LAI but different RAI, both supporting DTM and with default parameters.

MAX_LAPDm = 000 (Allowing any PS message segmented in up to 5 LAPDm frames)

Network Mode of Operation II

Mobile Station:

The MS is in the active state (U10) of a call, on Timeslot N (chosen arbitrarily) of cell A, with a TMSI and P-TMSI allocated but no allocated TBFs or activated PDP context.

The MS is set to use the following as an APN:

APN Network Identifier = "THIS-APN-HAS-TO-BE-63-OCTETS-IN-LENGTH-AND-IS-ENCODED-IN-ASCII-"

APN Operator Identifier = "OPERATOR-NAME.OPERATOR-GROUP.GPRS"

Note: The APN has been chosen to ensure that the ACTIVATE PDP CONTEXT REQUEST message is over the threshold for main DCCH use, forcing the MS not to use the main DCCH for this signalling message.

Specific PICS statements

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PIXIT statements

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Test Procedure

An MS in dedicated mode on cell A is ordered to complete the Handover procedure to cell B. Once the MS has successfully completed the handover procedure to the cell, the SS sends the DTM INFORMATION message, informing the MS of the cell parameters and then the MS completes the Routing Area Updating procedure on the main DCCH. The MS is then triggered to activate a PDP context. The MS has to establish an uplink TBF to be able to send the ACTIVATE PDP CONTEXT REQUEST because the message size is greater than is allowed on the main DCCH. The SS responds with the ACTIVATE PDP CONTEXT ACCEPT message on the main DCCH. After the MS has received the ACTIVATE PDP CONTEXT ACCEPT message optional can perform an XID negotiation procedure, the SS sends, on the main DCCH, a GMM INFORMATION message to the MS, with an incorrect message type included in the header. The MS responds to this unknown message type with a GMM STATUS message.

Maximum Duration of Test

5 minutes

Expected Sequence

Step	Direction	Message	Comments
1	SS		MS in state U10, on an arbitrarily chosen Timeslot N of cell A, k=1, Channel Type = TCH/F; or k=2, Channel Type = TCH/H.
2	SS		SS waits 10 seconds, maintaining the CS call.
3	SS->MS	HANDOVER COMMAND	Instructs MS to Handover to Timeslot N of the cell B, utilising a TCH/F.
4	MS->SS	HANDOVER ACCESS	Repeated on every burst of the uplink main DCCH (and optionally on the SACCH) until reception of PHYSICAL INFORMATION. Handover Reference as included in the HANDOVER COMMAND.
5	SS->MS	PHYSICAL INFORMATION	
6	MS->SS	HANDOVER COMPLETE	
7	SS->MS	DTM INFORMATION	Contains the cell parameters
8	MS->SS	GPRS INFORMATION	Containing a ROUTING AREA UPDATE REQUEST message.
9	SS->MS	GPRS INFORMATION	Containing a ROUTING AREA UPDATE ACCEPT message. Does not allocate MS a new P-TMSI. Negotiated Ready timer value IE should not be included. Force to standby indicator set
10	SS		MS triggered to request PDP context activation.
11	MS->SS	DTM REQUEST	The MS requests the transition into DTM, to send the ACTIVATE PDP CONTEXT REQUEST message which requires more LAPDm frames than allowed for use of the main DCCH for PS signalling.
12	SS->MS	PACKET ASSIGNMENT	The SS allocates uplink resources to the MS, k=1: on Timeslot $(N \pm 1) \text{ MOD } 8$. k=2: on Timeslot $N \text{ MOD } 8$.
13	MS->SS	ACTIVATE PDP CONTEXT REQUEST	Requests PDP context activation. This message is sent on the allocated uplink PDCH.
14	SS->MS	GPRS INFORMATION	Contains the ACTIVATE PDP CONTEXT ACCEPT message. Although the SS should establish a downlink TBF to send this message, as the MS is in DTM, the MS shall be able to receive this message on the main DCCH. Steps 15 to 19 are performed only if MS requests XID negotiation procedure after PDP context activation. SS waits 5 s for the request of the optional XID procedure. Steps 15 and 16 are only performed if MS is not in DTM mode any more. If the MS does not include any PDP address, dynamic PDP address shall be assigned by the SS. The MS with Rel-8 behaviour shall not include the PDP address and the PDP address allocation is dynamic.
15 (optional)	MS->SS	DTM REQUEST	The MS requests the transition into DTM, to send the XID REQUEST message
16 (optional)	SS->MS	PACKET ASSIGNMENT	The SS allocates uplink resources to the MS, k=1: on Timeslot $(N \pm 1) \text{ MOD } 8$. k=2: on Timeslot $N \text{ MOD } 8$.
17 (optional)	MS->SS	XID REQUEST	
18 (optional)	SS->MS	PACKET ASSIGNMENT	The SS allocates downlink resources to the MS, k=1: on Timeslot $(N + 1) \text{ MOD } 8$. k=2: on Timeslot $N \text{ MOD } 8$.
19 (optional)	SS->MS	XID RESPONSE	
20	SS->MS	GPRS INFORMATION	Wait 5 seconds before sending GPRS INFORMATION Contains the GMM INFORMATION message. This message is over the size that is allowed for transmission on the main DCCH, but it is a requirement that the MS shall be able to receive an 'oversized' message on the main DCCH.

21	MS->SS	GPRS INFORMATION	Contains the GMM STATUS message: Message cause #97 shall be returned by the MS to indicate the message received is of unknown message type.
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Specific Message Contents

k=1

PACKET ASSIGNMENT (Step 12 and Step 16):

As default message contents except: GPRS broadcast information - GPRS Cell Options - NMO RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	01 Network Mode 2 (N±1) MOD 8 Not included
--	--

PACKET ASSIGNMENT (Step 18):

As default message contents except: GPRS broadcast information - GPRS Cell Options - NMO RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	01 Network Mode 2 Not included (N±1) MOD 8
--	--

k=2:

PACKET ASSIGNMENT (Step 12 and Step 16):

As default message contents except: GPRS broadcast information - GPRS Cell Options - NMO RR Packet Uplink Assignment IE - TIMESLOT_ALLOCATION RR Packet Downlink Assignment IE	01 Network Mode 2 N MOD 8 Not included
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PACKET ASSIGNMENT (Step 18):

As default message contents except: GPRS broadcast information - GPRS Cell Options - NMO RR Packet Uplink Assignment IE RR Packet Downlink Assignment IE - TIMESLOT_ALLOCATION	01 Network Mode 2 Not included N MOD 8
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GMM INFORMATION (Step 20):

As default message contents except:	
GMM Information message identity	00111111
Full name for network IE	
- Network Name IEI	43
- Length of Network Name contents	161
- Coding Scheme	000
- Add CI	0
- Number of spare bits in last octet	0
- Text String	0123456789abcdef0123456789abcdef0123456789abcd ef0123456789abcdef0123456789abcdef0123456789abc def0123456789abcdef0123456789abcdef0123456789ab cdef0123456789abcdef

48 to 49 Void

Void.