

TS.11- Annex B

Detailed Test Procedures for a Single RAT / Multi RAT W-CDMA User Equipment

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# Annex B: Detailed Test Procedures for a Single RAT / Multi RAT W-CDMA User Equipment

This Annex contains the detailed procedures that are recommended to be used for Field and Lab Tests of a Single RAT / Multi RAT W-CDMA User Equipment.

To ensure that all features supported by the UE operate correctly on all supported frequency bands, an appropriate selection of frequency bands shall be used for the following tests.

# 15 Cell Selection/Reselection

## 15.1 WCDMA Cell Selection

### 15.1.1 WCDMA Cell Selection – Srxlev

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 15.1.2 WCDMA Cell Selection – Squal

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 15.2 System Info

### 15.2.1 Reception of System Info Type 5bis on non-supported UMTS Band

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

# 16 Void

Network selection/reselection test cases have been transitioned to Annex D, section 59

# 17 Network Registration – CS

## 17.1 IMSI Attach / Detach

### 17.1.1 IMSI Attach / Detach – Successful

Description

The DUT shall successfully perform the IMSI attach/detach procedures.

Related 3GPP core specifications

3GPP TS 24.008 4.4.3 (IMSI attach procedure), 4.3.4 (IMSI detach procedure)

Reason for test

To verify that the DUT can successfully perform the IMSI attach/detach procedures.

Initial configuration

DUT is powered off or in flight mode.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Power on DUT / disable flight mode and confirm successful attach procedure. | DUT performs a Location Updating procedure using Location Updating Type = 2 (IMSI attach).  The network shall respond to DUT with a LOCATION UPDATING ACCEPT that may contain a new TMSI.  If the LOCATION UPDATING ACCEPT contained a new TMSI, then verify that DUT acknowledges this message by sending a TMSI REALLOCATION COMPLETE. Otherwise, no TMSI REALLOCATION COMPLETE shall be sent.  DUT registers the new TMSI correctly |
| 2 | Receive MT call. | Voice Call is successful. |
| 3 | Power off DUT / enable Flight Mode | The DUT performs the IMSI Detach procedure using the correct TMSI by sending the “IMSI DETACH INDICATION” message. |

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| ATTACH | | | |
| 1 | 🡺 | LOCATION UPDATING REQUEST | MM  Updating Type = 2 (IMSI attach). |
| 2 | 🡸 | AUTHENTICATION REQUEST | MM |
| 3 | 🡺 | AUTHENTICATION RESPONSE | MM |
| 4 | 🡸 | LOCATION UPDATING ACCEPT | GMM |
| 5 | 🡺 | TMSI REALLOCATION COMPLETE (Depending on TMSI allocation) | MM |
| DETACH | | | |
| 6 | 🡺 | IMSI DETACH INDICATION |  |

Note: The IMSI attach procedure is used only if the update status is UPDATED and if the stored Location Area Identification is the same as the one which is actually broadcasted on the BCCH of the current serving cell. If the UE indicates Location Updating Type = 0 (Normal location updating), power the UE off and on to verify that it then uses Location Updating Type = 2 (IMSI attach).

### 17.1.2 IMSI Attach – Rejected (Reject Cause #15: No Suitable Cells In Location Area)

Description

The UE shall successfully perform the IMSI attach procedure on another LA of the same PLMN after it was rejected with Reject Cause #15 ‘No Suitable Cells In Location Area’.

Related 3GPP core specifications

3GPP TS 24.008 4.4.4.7 (Location updating not accepted by the network)

Reason for test

To verify that the UE successfully performs the IMSI attach procedure on another LA of the same PLMN after it was rejected with Reject Cause #15 ‘No Suitable Cells In Location Area’.

Initial configuration

ATT = 1

No Roaming with the UMTS PLMN ‘A’

2 different Location Areas in the UMTS PLMN ‘A’

Roaming allowed with the GSM PLMN ‘A’

UE is powered off

Test procedure

1. Power on the UE and verify that the UE sends a LOCATION UPDATING REQUEST to the UMTS network indicating: Location Updating Type = 2 (IMSI attach).

NOTE: The IMSI attach procedure is used only if the update status is UPDATED and if the stored Location Area Identification is the same as the one which is actually broadcasted on the BCCH of the current serving cell. If the UE indicates Location Updating Type = 0 (Normal location updating), power the UE off and on to verify that it then uses Location Updating Type = 2 (IMSI attach).

1. The UMTS network shall respond to the UE with a LOCATION UPDATING REJECT with Reject Cause #15 ‘No Suitable Cells In Location Area’.
2. Check that the UE stores the LAI in the list of “forbidden location areas for roaming”.
3. Check that the UE performs a Location Update procedure on the second LA in UMTS technology of the same PLMN.
4. The UMTS network shall respond to the UE with a LOCATION UPDATING REJECT with Reject Cause #15 ‘No Suitable Cells In Location Area’.
5. Check that the UE stores the LAI of the second LA in UMTS technology in the list of “forbidden location areas for roaming”.
6. Check that the UE has still stored the LAI of the first LA in UMTS technology in the list of “forbidden location areas for roaming”.
7. Check that the UE performs a Location Update procedure on a LA in GSM technology of the same PLMN.
8. The network shall respond to the UE with a LOCATION UPDATING ACCEPT that may contain a new TMSI.
9. If the LOCATION UPDATING ACCEPT contained a new TMSI, then verify that the UE acknowledges this message by sending a TMSI REALLOCATION COMPLETE. Otherwise, no TMSI REALLOCATION COMPLETE shall be sent.
10. Check that the UE is able to receive a call.

Expected behaviour

1. The UE performs a Location Updating procedure using Location Updating Type = 2 (IMSI attach).
2. The UE stores the LAI in the list of “forbidden location areas for roaming”
3. The UE performs a Location Update procedure on a second LA in UMTS technology of the same PLMN.
4. The UE stores the LAI of the second UMTS LA in the list of “forbidden location areas for roaming”
5. The UE has stored both LAIs from the UMTS PLMN in the list of “forbidden location areas for roaming”. The UE is not reselecting the first LA in UMTS technology of the same PLMN.
6. The UE performs a Location Update procedure on a LA in GSM technology of the same PLMN.
7. The UE registers the new TMSI correctly

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡸 | SYSTEM INFORMATION (BCCH) | LAI = a, UMTS |
| 2 | 🡺 | RRC CONNECTION REQUEST (CCCH) | In UMTS PLMN ‘A’, LAI = a |
| 3 | 🡸 | RRC CONNECTION SETUP (CCCH) |  |
| 4 | 🡺 | RRC CONNECTION SETUP COMPLETE (DCCH) |  |
| 5 | 🡺 | LOCATION UPDATING REQUEST | Location Updating Type = 2 (IMSI attach) |
| 6 | 🡸 | LOCATION UPDATING REJECT | Reject Cause #15 ‘No Suitable Cells In Location Area’ |
| 7 | 🡸 | RRC CONNECTION RELEASE |  |
| 8 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |
| 9 | 🡸 | SYSTEM INFORMATION (BCCH) | LAI = b, UMTS |
| 10 | 🡺 | RRC CONNECTION REQUEST (CCCH) | In UMTS PLMN ‘A’, LAI = b |
| 11 | 🡸 | RRC CONNECTION SETUP (CCCH) |  |
| 12 | 🡺 | RRC CONNECTION SETUP COMPLETE (DCCH) |  |
| 13 | 🡺 | LOCATION UPDATING REQUEST | Location Updating Type = 0 (normal location update) |
| 14 | 🡸 | LOCATION UPDATING REJECT | Reject Cause #15 ‘No Suitable Cells In Location Area’ |
| 15 | 🡸 | RRC CONNECTION RELEASE |  |
| 16 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |
| 17 | 🡸 | SYSTEM INFORMATION (BCCH) |  |
| 18 | 🡺 | RRC CONNECTION REQUEST (CCCH) | In GSM PLMN ‘A’, LAI = c |
| 19 | 🡸 | RRC CONNECTION SETUP (CCCH) |  |
| 20 | 🡺 | LOCATION UPDATING REQUEST |  |
| 21 | 🡸 | AUTHENTICATION REQUEST |  |
| 20 | 🡺 | AUTHENTICATION RESPONSE |  |
| 23 | 🡸 | SECURITY MODE COMMAND |  |
| 24 | 🡺 | SECURITY MODE COMPLETE |  |
| 25 | 🡸 | LOCATION UPDATING ACCEPT |  |
| 26 | 🡺 | TMSI REALLOCATION COMPLETE |  |
| 27 | 🡸 | RRC CONNECTION RELEASE |  |
| 28 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |

1. The UE receives an incoming call.

### 17.1.3 IMSI Attach – Rejected (Reject Cause #13: Roaming not allowed in this Location Area)

Description

The UE shall perform a new PLMN selection after being rejected with Reject Cause #13 ‘Roaming not allowed in this location area’.

Related 3GPP core specifications

3GPP TS 24.008 4.4.4.7 (Location updating not accepted by the network)

Reason for test

To verify that the UE successfully performs the IMSI attach procedure on another RAT of the same PLMN after being rejected with Reject Cause #13 ‘Roaming not allowed in this location area’.

Initial configuration

ATT = 1

USIM with “User Controlled PLMN Selector with Access Technology” (EFPLMNwAcT) indicating, in the first position, PLMN ‘A’ and Access Technology Identifier ‘UTRAN’

USIM with “User Controlled PLMN Selector with Access Technology” (EFPLMNwAcT) indicating, in the second position, PLMN ‘B’ and Access Technology Identifier ‘GSM’ (PLMN ‘B’ may be the same as PLMN ‘A’)

No Roaming with the UMTS PLMN ‘A’

2 different Location Areas in the UMTS PLMN ‘A’

Roaming allowed with the GSM PLMN ‘B’ (PLMN ‘B’ may be the same as PLMN ‘A’)

UE is powered off

Test procedure

1. Power on the UE and verify that the UE sends a LOCATION UPDATING REQUEST to the UMTS network.
2. The UMTS network shall respond to the UE with a LOCATION UPDATING REJECT with Reject Cause #13 ‘Roaming not allowed in this location area’.
3. Check that the UE stores the LAI in the list of “forbidden location areas for roaming”.
4. Check that the UE performs a PLMN selection instead of selecting immediately the second LA in UMTS technology of the same PLMN.
5. Check that, after the PLMN selection, the UE performs a Location Update procedure on the second LA in UMTS technology of the same PLMN.
6. The UMTS network shall again respond to the UE with a LOCATION UPDATING REJECT with Reject Cause #13 ‘Roaming not allowed in this location area’.
7. Check that the UE stores the LAI of the second LA in UMTS technology in the list of “forbidden location areas for roaming”.
8. Check that the UE has still stored the LAI of the first LA in UMTS technology in the list of “forbidden location areas for roaming”.
9. Check that, after a new PLMN selection, the UE performs a Location Update procedure on a LA in GSM technology of PLMN ‘B’.
10. The network shall respond to the UE with a LOCATION UPDATING ACCEPT.
11. Check that the UE is able to receive a call.

Expected behaviour

1. The UE performs a Location Updating procedure.
2. The UE stores the LAI in the list of “forbidden location areas for roaming”.
3. The UE performs a new PLMN selection.
4. The UE performs a Location Update procedure on a second LA in UMTS technology of the same PLMN.
5. –
6. The UE stores the LAI of the second UMTS LA in the list of “forbidden location areas for roaming”.
7. The UE has stored both LAIs from the UMTS PLMN in the list of “forbidden location areas for roaming”.
8. The UE performs a new PLMN selection. The UMTS Las can’t be selected. The UE performs a Location Update procedure on a LA in GSM technology of PLMN ‘B’.
9. The UE registers correctly.
10. The UE receives an incoming call.

### 17.1.4 Void

## 17.2 Normal Location Area Update

### 17.2.1 Normal Location Update – Successful

Description

The UE can successfully perform a normal location update after camping onto a serving cell with a different LAI.

Related 3GPP core specifications

3GPP TS 24.008 4.4.1 (Location updating procedure)

Reason for test

To verify that the UE can successfully perform a normal location update after camping onto a serving cell with a different LAI.

Initial configuration

The UE is attached in Circuit mode.

Test procedure

1. Move the UE from the initial cell into a cell with a different LAI till the UE performs a cell reselection.
2. The UE shall send a LOCATION UPDATE REQUEST message to the network. Check whether the “location updating type” parameter holds the “normal” value.
3. The network shall then send a LOCATION UPDATE ACCEPT message to the UE. This message contains a new TMSI for the UE and the LAI for the new cell.
4. Check that the UE responds to paging in the new cell by calling the UE.

Expected behaviour

The UE performs a ‘Normal Location Update’ procedure and receives an incoming call.

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | RRC CONNECTION REQUEST | “Establishment cause”: Registration. |
| 2 | 🡸 | RRC CONNECTION SETUP |  |
| 3 | 🡺 | RRC CONNECTION SETUP COMPLETE |  |
| 4 | 🡺 | LOCATION UPDATING REQUEST | “location updating type” = normal, “CKSN” = CKSN1, “location area identification” = a, “mobile station classmark 1” and “mobile identity” = TMSI1. |
| 5 | 🡸 | AUTHENTICATION REQUEST | MM |
| 6 | 🡺 | AUTHENTICATION RESPONSE | MM |
| 7 | 🡸 | SECURITY MODE COMMAND |  |
| 8 | 🡺 | SECURITY MODE COMPLETE |  |
| 9 | 🡸 | LOCATION UPDATING ACCEPT | « Mobile identity » = new TMSI (=TMSI2), LAI = b. |
| 10 | 🡺 | TMSI REALLOCATION COMPLETE |  |
| 11 | 🡸 | RRC CONNECTION RELEASE |  |
| 12 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |

### 17.2.2 Normal Location Area Update – TMSI unknown in VLR

Description

The DUT successfully performs a normal location update procedure after camping onto a serving cell with a different LAI and a TMSI which us unknown to the VLR.

Related 3GPP core specifications

3GPP TS 24.008 4.4.1 (Location updating procedure)

Reason for test

To verify that the DUT can successfully perform a normal location update after camping onto a serving cell with a different LAI and a TMSI which is unknown to the VLR.

Initial configuration

DUT in 3G only mode.

DUT is powered off.

UICC preparation: Change the TMSI and LAI on the EFLOCI field of the (U)SIM to a different but valid figure.

Test procedure

1. Power on DUT and check the protocol details using a suitable trace tool.
2. Receive an MT Voice call.

Expected behaviour

1. Check DUT sends a LOCATION UPDATING REQUEST message to the network containing the unknown TMSI/LAI. Check the “location update type” parameter holds the “normal” value.

Check NW sends the IDENTITY REQUEST message requesting the DUT’s IMSI.

Check DUT replies with an IDENTITY RESPONSE message containing the IMSI.

Check DUT gets assigned a new TMSI from the network either as part of the LOCATION UPDATING ACCEPT message or via the dedicated TMSI REALLOCATON COMMAND message.

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | LOCATION UPDATING REQUEST | - “location updating type” = normal  - “location area code” = A  - “mobile identity” = TMSI1 |
| 2 | 🡸 | IDENTITY REQUEST | - “identity type” = 1 (IMSI) |
| 3 | 🡺 | IDENTITY RESPONSE | UE responds with its IMSI |
| 8 | 🡺 | LOCATION UPDATING ACCEPT | - “location area code” = B  - “mobile identity” = TMSI2 |
| 9 | 🡸 | TMSI REALLOCATION COMPLETE |  |

OR

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | LOCATION UPDATING REQUEST | - “location updating type” = normal  - “location area code” = A  - “mobile identity” = TMSI1 |
| 2 | 🡸 | IDENTITY REQUEST | - “identity type” = 1 (IMSI) |
| 3 | 🡺 | IDENTITY RESPONSE | UE responds with its IMSI |
| 6 | 🡺 | TMSI REALLOCATION COMMAND | - “mobile identity” = TMSI2 |
| 7 | 🡸 | TMSI REALLOCATION COMPLETE |  |
| 8 | 🡺 | LOCATION UPDATING ACCEPT | - “location area code” = B |

1. MT Voice call successfully received.

### 17.2.3 Normal Location Area Update – Rejected (Reject Cause #15: No Suitable Cells In Location Area)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 17.2.4 Normal Location Area Update – Rejected (Reject Cause #12: Location Area Not Allowed)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 17.2.5 Normal Location Area Update – Rejected (Reject Cause #3: Illegal MS)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 17.3 Periodic Location Area Update

### 17.3.1 Periodic Location Area Update – Successful

Description

The DUT shall successfully perform a Periodic Location Area Update after the T3212 timer has expired.

Related 3GPP core specifications

3GPP TS 24.008 4.4.2 (Periodic updating)

Reason for test

To verify the DUT successfully performs a Periodic Location Area Update after the T3212 timer has expired.

Initial configuration

DUT is powered off (or Flight Mode enabled).

T3212 timer value for network under test is known to the tester (X minutes).

Test procedure

1. Power on DUT (or disable Flight Mode).
2. Leave DUT in Idle until T3212 timer has expired (X minutes).
3. Observe behaviour when T3212 timer has expired.
4. Receive MT Voice Call / MT SMS.

Expected behaviour

1. DUT is powered on and T3212 timer commences.
2. DUT is in Idle mode and T3212 timer is running.
3. DUT sends a Location Update Request message to the network.

Within the Location Update Request message, confirm the “Location Updating Type” parameter holds the “periodic updating” value.

Confirm the DUT receives “Location Update Accept” from the network.

1. MT Voice Call / MT SMS is successful.

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | RRC CONNECTION REQUEST | “Establishment cause”: Registration. |
| 2 | 🡸 | RRC CONNECTION SETUP |  |
| 3 | 🡺 | RRC CONNECTION SETUP COMPLETE |  |
| 4 | 🡺 | LOCATION UPDATING REQUEST | “location updating type” = periodic |
| *(5)* | *🡸* | *AUTHENTICATION REQUEST* | *Optional* |
| *(6)* | *🡺* | *AUTHENTICATION RESPONSE* | *Optional* |
| *(7)* | *🡸* | *SECURITY MODE COMMAND* | *Optional* |
| *(8)* | *🡺* | *SECURITY MODE COMPLETE* | *Optional* |
| 9 | 🡸 | LOCATION UPDATING ACCEPT |  |
| *(10)* | *🡺* | *TMSI REALLOCATION COMPLETE* | *Optional* |
| 11 | 🡸 | RRC CONNECTION RELEASE |  |
| 12 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |

### 17.3.2 Periodic Location Area Update – Reset of T3212 timer

Description

The DUT shall successfully reset its T3212 timer when a Voice Call is made or received, an SMS is made or received, or a Supplementary service command is sent.

Related 3GPP core specifications

3GPP TS 24.008 4.4.2 (Periodic updating)

Reason for test

To verify the DUT successfully resets its periodic location update timer T3212.

Initial configuration

DUT is powered off (or Flight Mode enabled).

T3212 timer value for network under test is known to the tester (X minutes).

|  |  |  |
| --- | --- | --- |
| 1 | Power on DUT (or disable Flight Mode). Note the time (Time A). | DUT is powered on and T3212 timer commences. |
| 2 | After a time less than Time X, perform a CS service such as:  - MO/MT Voice Call  - MO/MT SMS  - SS Command.  Note the time (Time B). | The CS Service is successful.  The T3212 timer is reset at Time B by one of the following (depending on the CS service used):  - First MM message received  - SECURITY MODE COMPLETED sent  - PAGING RESPONSE sent |
| 3 | Wait for T3212 timer to expire (Time C). | Confirm T3212 timer expires at Time C. This should be X minutes after Time B.  DUT sends a Location Update Request message to the network.  Within the Location Update Request message, confirm the “Location Updating Type” parameter holds the “periodic updating” value.  Confirm the DUT receives “Location Update Accept” from the network. |

### 17.3.3 Periodic Location Area Update – DUT out of coverage (back in coverage before T3212 expiry)

Description

The DUT shall not reset its T3212 timer when it loses coverage or regains coverage until the T3212 timer has expired.

Related 3GPP core specifications

3GPP TS 24.008 4.4.2 (Periodic updating)

Reason for test

To verify the DUT successfully resets its periodic location update timer T3212.

Initial configuration

DUT is powered off (or Flight Mode enabled).

T3212 timer value for network under test is known to the tester (X minutes).

Test procedure

1. Power on DUT (or disable Flight Mode). Note the time (Time A).
2. Move DUT to out of coverage area. Note the time (Time B).

Leave DUT out of coverage for ¾ of the T3212 timer value (¾ of X minutes).

1. After ¾ of X minutes, bring DUT back into coverage. Note the time (Time C).
2. Wait for T3212 timer to expire (Time D).
3. Receive MT Voice Call / MT SMS.

Expected behaviour

1. DUT is powered on and T3212 timer commences.
2. DUT is out of coverage.
3. DUT is back in coverage.
4. Confirm T3212 timer expires at Time D. This should be X minutes after Time A.

DUT sends a Location Update Request message to the network.

Within the Location Update Request message, confirm the “Location Updating Type” parameter holds the “periodic updating” value.

Confirm the DUT receives “Location Update Accept” from the network.

1. MT Voice Call / MT SMS is successful.

### 17.3.4 Periodic Location Area Update – DUT out of coverage (back in coverage after T3212 expiry)

Description

The DUT immediately performs Periodic Location Area Update when it regains coverage when the T3212 timer has expired during out of coverage.

Related 3GPP core specifications

3GPP TS 24.008 4.4.2 (Periodic updating)

Reason for test

To verify the DUT successfully resets its periodic location update timer T3212.

Initial configuration

DUT is powered off (or Flight Mode enabled).

T3212 timer value for network under test is known to the tester (X minutes).

Test procedure

1. Power on DUT (or disable Flight Mode). Note the time (Time A).
2. Move DUT to out of coverage area. Note the time (Time B).

Leave DUT out of coverage for a period greater than the T3212 timer value (greater than X minutes).

1. After a period greater than X minutes, bring DUT back into coverage. Note the time (Time C).
2. Receive MT Voice Call / MT SMS.

Expected behaviour

1. DUT is powered on and T3212 timer commences.
2. DUT is out of coverage.
3. DUT is back in coverage.

DUT immediately sends a Location Update Request message to the network at Time C.

Within the Location Update Request message, confirm the “Location Updating Type” parameter holds the “periodic updating” value.

Confirm the DUT receives “Location Update Accept” from the network.

1. MT Voice Call / MT SMS is successful.

### 17.3.5 Periodic Location Area Update – DUT Emergency Camping (back in coverage before T3212 expiry)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 17.3.6 Periodic Location Area Update – DUT Emergency Camping (back in coverage after T3212 expiry)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

# 18 Network Registration – PS

## 18.1 GPRS Attach / Detach

### 18.1.1 GPRS Attach / Detach – Successful

Description

The DUT shall successfully perform GPRS Attach/Detach under default network conditions.

Related 3GPP core specifications

3GPP TS 24.008 4.7.3 (GPRS attach procedure), 4.7.4 (GPRS detach procedure)

Reason for test

To verify that the DUT can successfully perform the GPRS Attach/Detach procedure under default network conditions.

Initial configuration

DUT is powered off or in flight mode.

Automatic GPRS attach is enabled.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Power on DUT / disable flight mode and confirm successful attach procedure. | DUT sends an ATTACH REQUEST to the network.  The network shall respond to the DUT with an ATTACH ACCEPT that may contain a new P-TMSI.  If the ATTACH ACCEPT contained a new P-TMSI, then verify that the DUT acknowledges this message by sending an ATTACH COMPLETE. Otherwise, no ATTACH COMPLETE shall be sent  The UE registers the new P-TMSI correctly. |
| 2 | Open the browser and access a webpage (e.g. <https://www.gsma.com>). | The browser is opened and a page loads successfully |
| 3 | Power off DUT / enable Flight Mode | DUT sends a DETACH REQUEST indicating Detach type = “power switched off, GPRS detach” using the correct TMSI.  The network shall not acknowledge this message. |

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| ATTACH | | | |
| 1 |  | ATTACH REQUEST | GMM |
| 2 |  | AUTHENTICATION AND CIPHERING REQUEST | GMM |
| 3 |  | AUTHENTICATION AND CIPHERING RESPONSE | GMM |
| 4 |  | ATTACH ACCEPT | GMM |
| 5 |  | ATTACH COMPLETE (Depending on P-TMSI allocation) | GMM |
| DETACH | | | |
| 6 |  | DETACH REQUEST | GMM  Detach type = “power switched off, GPRS detach” |

### 18.1.2 GPRS Attach – Without E-UTRA capabilities

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 18.1.3 GPRS Attach – Rejected (GPRS services not allowed)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 18.1.4 GPRS Attach – Rejected (#17 Network Failure)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

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### 18.1.5 Void

### 18.1.6 GPRS Detach – Network Initiated GPRS Detach, Re-attach not required (#7 GPRS services not allowed)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 18.1.7 GPRS Detach – Network Initiated GPRS Detach, Re-attach not required (#14 GPRS service not allowed in this PLMN)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 18.2 Combined Attach / Detach

### 18.2.1 Combined Attach / Detach – Successful

Description

The DUT shall successfully perform the combined attach/detach procedures.

Related 3GPP core specifications

3GPP TS 24.008 4.7.3 (GPRS attach procedure) , 4.7.4 (GPRS detach procedure)

Reason for test

To verify that the DUT can successfully perform the combined attach/detach procedures.

Initial configuration

DUT is powered off or in flight mode.

|  |  |  |
| --- | --- | --- |
| **-** | **Test procedure** | **Expected behaviour** |
| 1 | Power on DUT / disable flight mode and confirm successful attach procedure. | DUT sends a combined ATTACH REQUEST to the network.  ATTACH REQUEST message, the “Attach type” parameter holds the “Combined GPRS / IMSI attach” value.  ATTACH ACCEPT message, the “Attach result” parameter holds the “Combined GPRS / IMSI attached” value.  If the ATTACH ACCEPT contained a new “TMSI/P-TMSI” value, then verify that the UE acknowledges this message by sending an ATTACH COMPLETE. Otherwise, no ATTACH COMPLETE shall be sent. |
| 2 | Receive MT call. | Voice Call is successful. |
| 3 | Open the browser and access a webpage (e.g. <https://www.gsma.com>). | The browser is opened and a page loads successfully. |
| 4 | Power off DUT / enable Flight Mode | DUT sends a DETACH REQUEST message, the “Detach type” parameter holds the “power switched off, combined GPRS / IMSI detach” value. |

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| ATTACH | | | |
| 1 |  | ATTACH REQUEST | GMM |
| 2 |  | AUTHENTICATION AND CIPHERING REQUEST | GMM |
| 3 |  | AUTHENTICATION AND CIPHERING RESPONSE | GMM |
| 4 |  | ATTACH ACCEPT | GMM |
| 5 |  | ATTACH COMPLETE (Depending on TMSI/P-TMSI allocation) | GMM |
| DETACH | | | |
| 6 |  | DETACH REQUEST | GMM  Detach type = “power switched off, combined GPRS / IMSI detach” |

Note: If it is the first time the handset attaches on the network (it was on another one beforehand), check that in the ATTACH REQUEST message the “type of identity” parameter holds the “IMSI” value. If it is not the first time the handset attaches, check that in the ATTACH REQUEST message the “type of identity” parameter holds the “TMSI/ P-TMSI” value.

### 18.2.2 Void

## 18.3 Routing Area Update

### 18.3.1 Routing Area Update – Normal – Successful

Description

The UE can successfully perform a normal Routing Area Update after camping onto a serving cell with a different RAC.

Related 3GPP core specifications

3GPP TS 24.008 4.7.5 (Routing area updating procedure)

Reason for test

To verify that the UE can successfully perform a normal Routing Area Update after camping onto a serving cell with a different RAC.

Initial configuration

The UE is attached in packet mode.

Test procedure

1. Move the UE from the initial cell into a cell with a different RAC till the UE performs a cell reselection.
2. The UE shall send a ROUTING AREA UPDATE REQUEST message to the network. Check whether the “update type” parameter holds the “RA updating” value.
3. The network shall then send a ROUTING AREA UPDATE ACCEPT message to the UE. This message contains a new P-TMSI for the UE and the RAC for the new cell.
4. Check that the UE can establish a packet switched data connection.

Expected behaviour

The UE performs a ‘Routing Area Update’ procedure and can establish a packet switched data connection.

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | RRC CONNECTION REQUEST | “Establishment cause”: Registration. |
| 2 | 🡸 | RRC CONNECTION SETUP |  |
| 3 | 🡺 | RRC CONNECTION SETUP COMPLETE |  |
| 4 | 🡺 | ROUTING AREA UPDATING REQUEST | Update type = ‘RA updating’  P-TMSI 1 signature  Routing area identity = RAI 1 |
| 5 | 🡸 | AUTHENTICATION AND CIPHERING REQUEST |  |
| 6 | 🡺 | AUTHENTICATION AND CIPHERING RESPONSE |  |
| 7 | 🡸 | SECURITY MODE COMMAND |  |
| 8 | 🡺 | SECURITY MODE COMPLETE |  |
| 9 | 🡸 | ROUTING AREA UPDATING ACCEPT | Update result = ‘RA updated’  P-TMSI 2 signature  Routing area identity = RAI 2 |
| 10 | 🡺 | ROUTING AREA UPDATING COMPLETE |  |
| 11 | 🡸 | RRC CONNECTION RELEASE |  |
| 12 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |

### 18.3.2 Routing Area Update – Normal – Without E-UTRA capabilities

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 18.3.3 Routing Area Update – Rejected (#9 MS identity cannot be derived by the network)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 18.3.4 Routing Area Update – Rejected (#17 Network Failure)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 18.3.5 Routing Area Update – Combined – Successful

Description

The UE shall successfully perform the combined Routing Area and Location Area Update procedures.

Related 3GPP core specifications

3GPP TS 24.008 4.7.5.2 (Combined routing area updating procedure)

Reason for test

To verify that the UE can successfully perform the combined Routing Area and Location Area Update procedures.

Initial configuration

The UE is attached in Packet and Circuit mode.

Test procedure

1. Move the UE from the initial cell into a cell with a different LAI/RAC till the UE performs a cell reselection.
2. Verify that the UE sends a combined ROUTING AREA UPDATING REQUEST message to the network.
3. Check that in the ROUTING AREA UPDATING REQUEST message, the “Update type” parameter holds the “Combined RA/LA updating” value.
4. Check that in the ROUTING AREA UPDATING ACCEPT message, the “Update result” parameter holds the “Combined RA/LA updated” value.
5. Verify that the UE stores the new “TMSI/P-TMSI” value and acknowledges the ROUTING AREA UPDATING ACCEPT message by sending a ROUTING AREA UPDATING COMPLETE message.
6. Check that the UE responds to paging in the new cell by calling the UE.
7. Check that the UE can establish a packet data connection in the new cell.

Expected behaviour

1. The UE performs a combined Routing Area Updating procedure as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Step | Direction UE – NW | Message | Comments |
| 1 | 🡺 | RRC CONNECTION REQUEST |  |
| 2 | 🡸 | RRC CONNECTION SETUP |  |
| 3 | 🡺 | RRC CONNECTION SETUP COMPLETE |  |
| 4 | 🡺 | ROUTING AREA UPDATING REQUEST | Update type = ‘Combined RA/LA updating’  P-TMSI 1 signature  Routing area identity = RAI 1 |
| 5 | 🡸 | AUTHENTICATION AND CIPHERING REQUEST |  |
| 6 | 🡺 | AUTHENTICATION AND CIPHERING RESPONSE |  |
| 7 | 🡸 | SECURITY MODE COMMAND |  |
| 8 | 🡺 | SECURITY MODE COMPLETE |  |
| 9 | 🡸 | ROUTING AREA UPDATING ACCEPT | Update result = ‘Combined RA/LA updated’  Mobile identity = P-TMSI 2  Routing area identity = RAI 2 |
| 10 | 🡺 | ROUTING AREA UPDATING COMPLETE |  |
| 11 | 🡸 | RRC CONNECTION RELEASE |  |
| 12 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |

1. In the ROUTING AREA UPDATING REQUEST message, the “Update type” parameter holds the “Combined RA/LA updating” value.
2. In the ROUTING AREA UPDATING ACCEPT message, the “Update result” parameter holds the “Combined RA/LA updated” value.
3. The UE stores the new “TMSI/P-TMSI” value and acknowledges the ROUTING AREA UPDATING ACCEPT message by sending a ROUTING AREA UPDATING COMPLETE message.
4. The UE receives an incoming call in the new cell.
5. The UE can establish a packet data connection in the new cell.

## 18.4 Periodic Routing Area Update

### 18.4.1 Periodic Routing Area Update – Successful

Description

Verify that the DUT shall successfully perform a Periodic Routing Area Update after the T3312 timer has expired.

Related 3GPP core specifications

3GPP TS 24.008 4.7.5 (Routing area updating procedure)

Reason for test

To verify that the DUT successfully performs a Periodic Routing Area Update after the T3312 timer has expired.

Initial configuration

Automatic PS attach at power on is enabled.

Mobile data is disabled by default.

DUT is Powered OFF (or Flight Mode enabled).

T3312 timer value for network under test is known to the tester (X minutes).

Test procedure

1. Power ON DUT (or disable Flight Mode).
2. Leave DUT in Idle until T3312 timer has expired (X minutes).
3. Observe behaviour when T3312 timer has expired.
4. Check PS service indication [Operating System Dependent].
5. Enable mobile data at DUT.
6. Open the embedded browser application and load a webpage.

Note: If DUT only supports PDP context activation when starting the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. DUT is successfully CS/PS registered on PLMN and T3312 timer is started.
2. DUT is in Idle mode and T3312 timer is running.
3. DUT sends a ROUTING AREA UPDATE REQUEST message to the network.

Within the ROUTING AREA UPDATE REQUEST message, confirm the “Routing Area Updating Type” parameter holds the “periodic updating” value (3).

Confirm the DUT receives the ROUTING AREA UPDATE ACCEPT message from the network.

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | RRC CONNECTION REQUEST | “Establishment cause”: Registration. |
| 2 | 🡸 | RRC CONNECTION SETUP |  |
| 3 | 🡺 | RRC CONNECTION SETUP COMPLETE |  |
| 4 | 🡺 | ROUTING AREA UPDATING REQUEST | “update type” = periodic updating |
| (5) | 🡸 | AUTHENTICATION REQUEST | Optional |
| (6) | 🡺 | AUTHENTICATION RESPONSE | Optional |
| (7) | 🡸 | SECURITY MODE COMMAND | Optional |
| (8) | 🡺 | SECURITY MODE COMPLETE | Optional |
| 9 | 🡸 | ROUTING AREA UPDATING ACCEPT |  |
| (10) | 🡺 | ROUTING AREA UPDATING COMPLETE | Optional |
| 11 | 🡸 | RRC CONNECTION RELEASE |  |
| 12 | 🡺 | RRC CONNECTION RELEASE COMPLETE |  |

1. DUT displays an Icon to indicate it is GPRS attached. [Operating System dependent]
2. Mobile data is enabled and PDP context is established successfully.
3. Webpage is loaded.

# 19 PS Data

The end-to-end performance tests may require the use of different means of connectivity connecting the device under test (DUT) to an external terminal equipment. In this case, the type of the connectivity shall be recorded.

Note 1: It is required USB 2.0 or higher as modem connection between DUT and PC in order to ensure the throughput expected.

Note 2: It is required Wi-Fi connection as per 802.11n standard in order to ensure the throughput expected.

## 19.1 PDP Context Activation / Deactivation

### 19.1.1 PDP Context Activation – IP

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.2 PDP Context Activation – PPP

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.3 PDP Context Activation / Deactivation – User initiated

#### 19.1.3.1 Void

#### 19.1.3.2 Void

#### 19.1.3.3 PDP Context Activation / Deactivation – User initiated

Description

Verify that the DUT can successfully activate/deactivate a Primary PDP Context which can be utilized by different applications.

Related core specifications

3GPP TS 24.008 6.1.3.1.1 (Successful PDP context activation initiated by the mobile station)

Reason for test

To ensure that the DUT is able to activate / deactivate a PDP context correctly.

Initial configuration

Mobile data is enabled by default.

Setup APN profile for default PDP connection using APN1.

Setup APN profile for Tethering / DUN connection using APN1.

DUT is Powered OFF.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Power ON DUT. | DUT is successfully CS/PS registered  DUT sends an ACTIVATE PDP CONTEXT REQUEST message to the network for APN1.  The network shall respond to the DUT with an ACTIVATE PDP CONTEXT ACCEPT message. |
| 2 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully. |
| 3 | Activate a Tethering / DUN connection. | The Tethering / DUN connection is established successfully.  Check that DUT does not send another ACTIVATE PDP CONTEXT REQUEST message to the network using APN1. |
| 4 | Using an external device such as a PC, connect to the hotspot. |  |
| 5 | Open browser on the external device and load a webpage. | Webpage is loaded successfully. |
| 6 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully. |
| 7 | Deactivate the Tethering / DUN connection. | The Tethering / DUN connection is deactivated successfully.  Check that DUT does not send a DEACTIVATE PDP CONTEXT REQUEST message to the network. |
| 8 | Open the browser on the external device and load a webpage. | Webpage is not loaded. |
| 9 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully. |
| 10 | Disable mobile data at DUT. | DUT sends a DEACTIVATE PDP CONTEXT REQUEST message to the network for APN1.  The network shall respond to the DUT with a DEACTIVATE PDP CONTEXT ACCEPT message.  Mobile data is disabled successfully. |
| 11 | Open the embedded browser application and load a webpage. | Web page is not loaded. |

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded Browser application and/or when activating/deactivating the Tethering/DUN connection, this behaviour is acceptable as part of this test case as well.

### 19.1.4 PDP Context Activation – User initiated – Roaming

Description

Verify that the DUT can successfully activate a primary PDP context for a Roaming PLMN.

Related core specifications

3GPP TS 24.008 6.1.3.1.1 (Successful PDP context activation initiated by the mobile station)

Reason for test

To ensure that the DUT is able to activate a PDP context correctly on a VPLMN.

Initial configuration

Mobile data is enabled by default.

Data Roaming is enabled by default.

DUT is Powered OFF.

Roaming SIM/USIM is required.

Test procedure

1. Power ON DUT on Roaming PLMN.
2. Open the embedded browser application and load a webpage.

Note: If DUT only supports PDP context activation when starting the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. DUT is successfully CS/PS registered on Roaming PLMN.
2. Webpage is loaded successfully.

### 19.1.5 PDP Context Activation – PDP Activation Time measure

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.6 PDP Context Activation – User initiated – Rejected by the network with cause unknown APN

Description

Verify that the DUT is correctly handling a PDP context activation which is rejected due to incorrect / unknown APN.

Related core specifications

3GPP TS 24.008

Reason for test

To ensure that the DUT is correctly handling a PDP context activation which is rejected due to incorrect / unknown APN.

Initial configuration

Mobile data is enabled by default.

Setup APN profile for default PDP connection using an incorrect / unknown APN.

DUT is Powered OFF.

Test procedure

1. Power ON DUT.
2. Open the embedded browser application and load a webpage. Note: If DUT only supports PDP context activation when starting the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. DUT is successfully CS/PS registered on PLMN.

DUT sends an ACTIVATE PDP CONTEXT REQUEST to the network using the incorrect/unknown APN.

The network shall respond to the DUT with an ACTIVATE PDP CONTEXT REJECT message with cause #27 (unknown APN).

| Step | Direction UE – NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | RRC (Direct Transfer – activate PDP Context Request) | SM |
| 2 | 🡸 | RRC (Direct Transfer – activate PDP Context reject) | SM |
| 3 | 🡸 | RRC (Radio Bearer Release) | RRC |
| 4 | 🡺 | RRC (Radio Bearer Release Complete) | RRC |
| 5 | 🡸 | RRC (Connection Release) | RRC |
| 6 | 🡺 | RRC (Connection Release Complete) | RRC |

1. Webpage is not loaded.

### 19.1.7 PDP Context Deactivation – PDP Deactivation Time measure

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.8 PDP Context Deactivation – No PDP context deactivation without user action

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.9 PDP Context Deactivation – Network initiated

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.10 Simultaneous PDP context Activation / Deactivation – User initiated

Description

Verify that the DUT can successfully activate/deactivate a second Primary PDP Context.

Related core specifications

3GPP TS 24.008 6.1.3.2.1

Reason for test

To ensure that the DUT is able to activate more than one Primary PDP context correctly.

Initial configuration

Mobile data is enabled by default.

Setup APN profile for default PDP connection using APN1.

Setup APN profile for Tethering / DUN connection using APN2.

DUT is Powered OFF.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Power ON DUT. | DUT is successfully CS/PS registered  DUT sends an ACTIVATE PDP CONTEXT REQUEST message to the network for APN1.  The network shall respond to the DUT with an ACTIVATE PDP CONTEXT ACCEPT message. |
| 2 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully. |
| 3 | Activate a Tethering / DUN connection. | DUT sends an ACTIVATE PDP CONTEXT REQUEST message to the network for APN2.  The network shall respond to the DUT with an ACTIVATE PDP CONTEXT ACCEPT message.  The Tethering / DUN connection is established successfully. |
| 4 | Using an external device such as a PC, connect to the hotspot. |  |
| 5 | Open the browser on the external device and load a webpage. | Webpage is loaded successfully. |
| 6 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully. |
| 7 | Deactivate the Tethering / DUN connection | DUT sends a DEACTIVATE PDP CONTEXT REQUEST message to the network for APN2.  The network shall respond to the DUT with a DEACTIVATE PDP CONTEXT ACCEPT message.  The Tethering / DUN connection is deactivated successfully. |
| 8 | Open the browser on the external device and load a webpage. | Webpage is not loaded. |
| 9 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully. |
| 10 | Disable mobile data at DUT. | DUT sends a DEACTIVATE PDP CONTEXT REQUEST message to the network for APN1.  The network shall respond to the DUT with a DEACTIVATE PDP CONTEXT ACCEPT message.  Mobile data is disabled successfully. |
| 11 | Open the embedded browser application and load a webpage. | Web page is not loaded. |

Note 1: If DUT only supports PDP context activation/deactivation when starting/closing the embedded Browser application and/or when activating/deactivating the Tethering/DUN connection, this behaviour is acceptable as part of this test case as well.

Note 2: If DUT is not supporting the setup of a separate APN for the Tethering/DUN connection, the usage of a different application provoking the establishment of a PDP context is acceptable as part of this test case as well.

### 19.1.11 Simultaneous PDP context Deactivation – Network initiated

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.12 Secondary PDP Context Activation – User initiated

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.1.13 Secondary PDP Context Deactivation – User initiated

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 19.2 Browser Capability

### 19.2.1 Browser Capability – Ping a Remote Destination

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.2.2 Browser Capability – Browse through HTML page

Description

The DUT shall be able to browse through HTML pages with an embedded browser application.

Related core specifications

3GPP TS 25.331

Reason for test

To ensure the DUT is able to browse through HTML pages using an embedded browser application with a reasonable performance.

Initial configuration

DUT is in idle mode.

DUT has an active PDP context.

Test procedure

1. Open the embedded browser application and load a feature rich web page containing pictures, text and CSS formatting.
2. Refresh the page once it’s loaded completely.
3. Load a different feature rich web page containing pictures, text and CSS formatting.
4. Refresh the page once it’s loaded completely.
5. Load a third feature rich web page containing pictures, text and CSS formatting.
6. Refresh the page once it’s loaded completely.

Expected behaviour

1. The page is loaded within a reasonable time and displayed/rendered appropriately.
2. The page is loaded within a reasonable time and displayed/rendered appropriately.
3. The page is loaded within a reasonable time and displayed/rendered appropriately.
4. The page is loaded within a reasonable time and displayed/rendered appropriately.
5. The page is loaded within a reasonable time and displayed/rendered appropriately.
6. The page is loaded within a reasonable time and displayed/rendered appropriately.

### 19.2.3 Browser Capability – Delay HTML (web page size / number of elements)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.2.4 Streaming test (Good radio condition)

Description

The DUT shall be able to perform streaming application.

Related core specifications

3GPP TS 25.331

Reason for test

To ensure the DUT is able to stream movies in HD with a reasonable performance.

Initial configuration

DUT and Reference are close to Node B or ensure that test is done with good coverage. To consider the mobile under test in “Close to Node B” conditions, you must have a CQI>27 and a RSCP>-80 dBm.

DUT and Reference in idle mode.

DUT and Reference have an active PDP context.

Note: MNO should also indicate area with UTRA good radio conditions

|  |  |  |
| --- | --- | --- |
| - | **Test procedure** | Expected behaviour |
| 1 | From a browsing application (e.g. YouTube)  Play the same video in High Definition (HD) on both reference and DUT | Video is displayed on both DUT and Reference |
| 2 | Skip to about the middle of the movie, so that you get a buffering notification and Repeat step 1-2 with Reference | Check that the video continues on DUT no later than 10s after the Reference |

## 19.3 FTP Capability

### 19.3.1 FTP Capability – Downlink

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.3.2 FTP Capability – Uplink

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.3.3 FTP Capability – Simultaneous Downlink and Uplink

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 19.4 Multi-RAB Capability

### 19.4.1 Multi-RAB Capability – MO CS call & MO PS Data. End CS Call first

Description

The DUT shall be able to handle Multi-RAB (CS call and PS data) connections correctly.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

To ensure that DUT handles Multi-RAB (CS call and PS data) connections correctly.

Initial configuration

Mobile data is disabled by default.

DUT is in Idle Mode.

Test procedure

**Scenario A: CS Voice call**

1. At DUT, make MO voice call to Client 1.
2. Confirm 2 way connection between DUT and Client 1.
3. Enable mobile data at DUT.
4. Open the embedded browser application and load a webpage.
5. Confirm 2 way connection between DUT and Client 1.
6. End voice call on DUT.
7. Open the embedded browser application and load a webpage.
8. Disable mobile data at DUT.

**Scenario B: CS Video call**

1. At DUT, make MO video call to Client 1.
2. Confirm 2 way connection between DUT and Client 1.
3. Enable mobile data at DUT.
4. Open the embedded browser application and load a webpage.
5. Confirm 2 way connection between DUT and Client 1.
6. End video call on DUT.
7. Open the embedded browser application and load a webpage.
8. Disable mobile data at DUT.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Call is established successfully between DUT and Client 1.
2. 2 way connection is established.
3. Mobile data is enabled successfully.
4. Webpage is loaded successfully.
5. 2 way connection is ongoing.
6. Call is ended.
7. Webpage is loaded successfully.
8. Mobile data is disabled successfully.

### 19.4.2 Multi-RAB Capability – MO PS Data & MO CS call. End PS Data first

Description

The DUT shall be able to handle Multi-RAB (CS call and PS data) connections correctly.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

To ensure that DUT handles Multi-RAB (CS call and PS data) connections correctly.

Initial configuration

Mobile data is disabled by default.

DUT is in Idle Mode.

Test procedure

**Scenario A: CS Voice call**

1. Enable mobile data at DUT.
2. Open the embedded browser application and load a webpage.
3. At DUT, make MO voice call to Client 1.
4. Confirm 2 way connection between DUT and Client 1.
5. Open the embedded browser application and load a webpage.
6. Disable mobile data at DUT.
7. Confirm 2 way connection between DUT and Client 1
8. End voice call on DUT.

**Scenario B: CS Video call**

1. Enable mobile data at DUT.
2. Open the embedded browser application and load a webpage.
3. At DUT, make MO video call to Client 1.
4. Confirm 2 way connection between DUT and Client 1.
5. Open the embedded browser application and load a webpage.
6. Disable mobile data at DUT.
7. Confirm 2 way connection between DUT and Client 1
8. End video call on DUT.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Mobile data is enabled successfully.
2. Webpage is loaded successfully.
3. Call is established successfully between DUT and Client 1.
4. 2 way connection is established.
5. Webpage is loaded successfully.
6. Mobile data is disabled successfully.
7. 2 way connection is ongoing.
8. Call is ended.

### 19.4.3 Multi-RAB Capability – MO PS Data & MT CS call. End PS Data first

Description

The DUT shall be able to handle Multi-RAB (CS call and PS data) connections correctly.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

To ensure that DUT handles Multi-RAB (CS call and PS data) connections correctly.

Initial configuration

Mobile data is disabled by default.

DUT is in Idle Mode.

Test procedure

**Scenario A: CS Voice call**

1. Enable mobile data at DUT.
2. Open the embedded browser application and load a webpage.
3. At DUT, receive MT voice call from Client 1.
4. Confirm 2 way connection between DUT and Client 1.
5. Open the embedded browser application and load a webpage.
6. Disable mobile data at DUT.
7. Confirm 2 way connection between DUT and Client 1
8. End voice call on Client 1.

**Scenario B: CS Video call**

1. Enable mobile data at DUT.
2. Open the embedded browser application and load a webpage.
3. At DUT, receive MT video call from Client 1.
4. Confirm 2 way connection between DUT and Client 1.
5. Open the embedded browser application and load a webpage.
6. Disable mobile data at DUT.
7. Confirm 2 way connection between DUT and Client 1
8. End video call on Client 1.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Mobile data is enabled successfully.
2. Webpage is loaded successfully.
3. Call is established successfully between DUT and Client 1.
4. 2 way connection is possible.
5. Webpage is loaded successfully.
6. Mobile data is disabled successfully.
7. 2 way connection is ongoing.
8. Call is ended.

### 19.4.4 Multi-RAB Capability – MO PS Data & MT CS call. End CS Call first

Description

The DUT shall be able to handle Multi-RAB (CS call and PS data) connections correctly.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

To ensure that DUT handles Multi-RAB (Voice and PS data) connections correctly.

Initial configuration

Mobile data is disabled by default.

DUT is in Idle Mode.

Test procedure

**Scenario A: CS Voice call**

1. Enable mobile data at DUT.
2. Open the embedded browser application and load a webpage.
3. At DUT, receive MT voice call from Client 1.
4. Confirm 2 way connection between DUT and Client 1.
5. Open the embedded browser application and load a webpage.
6. End voice call on DUT.
7. At DUT, load a new webpage on the embedded browser.
8. Disable mobile data at DUT.

**Scenario B: CS Video call**

1. Enable mobile data at DUT.
2. Open the embedded browser application and load a webpage.
3. At DUT, receive MT video call from Client 1.
4. Confirm 2 way connection between DUT and Client 1.
5. Open the embedded browser application and load a webpage.
6. End voice call on DUT.
7. At DUT, load a new webpage on the embedded browser.
8. Disable mobile data at DUT.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Mobile data is enabled successfully.
2. Webpage is loaded successfully.
3. Call is established successfully between DUT and Client 1
4. 2 way connection is possible.
5. Webpage is loaded successfully.
6. Call is ended.
7. Webpage is loaded successfully.
8. Mobile data is disabled successfully.

### 19.4.5 Multi-RAB Capability – Simultaneous PS Services

Description

The DUT and the network should perform as expected using the PS RAB.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

To ensure that the PS RABs are performed as expected.

Initial configuration

DUT is switched on in UTRAN environment.

APNs for different services are configured according to the network default.

Client 1 – Attached to same PLMN as DUT.

Test procedure

1. DUT is in a PS data session (DUN / Tethered)
2. Download a large file (e.g. with FTP)

**Scenario A**

1. Receive an MT MMS from Client 1.

**Scenario B**

1. Retrieve an Email using DUT’s email application.

**Scenario C**

1. Open Internal Browser and load a content rich page.

Expected behaviour

A. Data download continues while the MMS is received.

B. Data download continues while the Email is retrieved.

C. Data download continues while Internal Browser Page is loaded.

## 19.5 Quality of Service

### 19.5.1 Quality of Service – Subscribed QOS accepted by DUT

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.5.2 Quality Of Service – QoS requested is higher than subscribed QoS / Negotiated QoS is higher than minimum QoS set in the UE (success case)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 19.5.3 Quality Of Service – QoS requested is higher than subscribed QoS / Negotiated QoS is lower than minimum QoS set in the UE (failure case)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 19.6 Channel Type Switching

### 19.6.1 Channel Type Switching – Resume data in CELL\_FACH

Description

This test describes the test method for testing channel type switching from CELL\_DCH to CELL\_FACH and back to CELL\_DCH.

Related core specifications

3GPP TS 25.331

Reason for test

To ensure the DUT is able to resume sending data when in RRC channel state CELL\_FACH.

Initial configuration

Mobile data is enabled by default.

DUT is in Idle Mode.

Supported Channel Types for network under test are known.

Different Channel Type Switching In-activity timers for network under test are preferably known (X seconds).

Test procedure

1. Open the embedded browser application and load a webpage.
2. Confirm with a trace tool / test monitor that DUT is in RRC state CELL\_DCH.
3. Ensure there is no further data traffic and wait for in-activity timer to expire.
4. Confirm with a trace tool / test monitor that DUT switches to RRC state CELL\_FACH.
5. While DUT is in CELL\_FACH, reload the webpage.
6. Confirm with a trace tool / test monitor that DUT is back in RRC state CELL\_DCH.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Webpage is loaded successfully.
2. DUT is in CELL\_DCH.
3. No further data packets are sent or received.
4. DUT is in CELL\_FACH.
5. Webpage is loaded successfully.
6. DUT is in CELL\_DCH.

### 19.6.2 Channel Type Switching – Resume data in CELL\_PCH

Description

This test describes the test method for testing channel type switching from CELL\_DCH to CELL\_PCH and back to CELL\_DCH.

Related core specifications

3GPP TS 25.331

Reason for test

To ensure the DUT is able to resume sending data when in RRC channel state CELL\_PCH.

Initial configuration

Mobile data is enabled by default.

DUT is in Idle Mode.

Supported Channel Types for network under test are known.

Different Channel Type Switching In-activity timers for network under test are preferably known (X seconds).

Test procedure

1. Open the embedded browser application and load a webpage.
2. Confirm with a trace tool / test monitor that DUT is in RRC state CELL\_DCH.
3. Ensure there is no further data traffic and wait for in-activity timer to expire.
4. Confirm with a trace tool / test monitor that DUT switches to RRC state CELL\_PCH.
5. While DUT is in CELL\_PCH, reload the webpage.
6. Confirm with a trace tool / test monitor that DUT is back in RRC state CELL\_DCH.

Note: Depending on the network implementation the transition to RRC channel state CELL\_PCH from CELL\_DCH can happen directly or via an intermediate step through CELL\_FACH.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Webpage is loaded successfully.
2. DUT is in CELL\_DCH.
3. No further data packets are sent or received.
4. DUT is in CELL\_PCH.
5. Webpage is loaded successfully.
6. DUT is in CELL\_DCH.

### 19.6.3 Channel Type Switching – Resume data in URA\_PCH

Description

This test describes the test method for testing channel type switching from CELL\_DCH to URA\_PCH and back to CELL\_DCH.

Related core specifications

3GPP TS 25.331

Reason for test

To ensure the DUT is able to resume sending data when in RRC channel state URA\_PCH.

Initial configuration

Mobile data is enabled by default.

DUT is in Idle Mode.

Supported Channel Types for network under test are known.

Different Channel Type Switching In-activity timers for network under test are preferably known (X seconds).

Test procedure

1. Open the embedded browser application and load a webpage.
2. Confirm with a trace tool / test monitor that DUT is in RRC state CELL\_DCH.
3. Ensure there is no further data traffic and wait for in-activity timer to expire.
4. Confirm with a trace tool / test monitor that DUT switches to RRC state URA\_PCH.
5. While DUT is in URA\_PCH, reload the webpage.
6. Confirm with a trace tool / test monitor that DUT is back in RRC state CELL\_DCH.

Note: Depending on the network implementation the transition to RRC channel state URA\_PCH from CELL\_DCH can happen directly or via an intermediate step through CELL\_FACH.

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Webpage is loaded successfully.
2. DUT is in CELL\_DCH.
3. No further data packets are sent or received.
4. DUT is in URA\_PCH.
5. Webpage is loaded successfully.
6. DUT is in CELL\_DCH.

### 19.6.4 Void

### 19.6.5 Channel type switching – Release 8 Fast Dormancy

Description

This test describes the method for testing channel type switching from Cell\_DCH or Cell\_FACH to Cell\_PCH using the Signalling Connection Release Indication (SCRI) Message with the Release Cause set to “UE Requested PS Data Session End” as described in 3GPP TS 25.331, 8.1.14.2 (beginning with 3GPP Release 8). This method is also referred to as “Release 8 Fast Dormancy”.

Related core specifications

3GPP TS 25.331

Reason for test

The test ensures that the Release 8 or later Fast Dormancy Functionality is properly implemented in the device.

Initial configuration

Mobile data is enabled by default.

DUT is in Idle Mode.

“Release 8 Fast Dormancy” must be supported by network and DUT.

Test procedure

1. Open the embedded browser application and load a webpage.
2. Confirm with a trace tool / test monitor that DUT is in RRC state CELL\_DCH.
3. Ensure there is no further data traffic and wait for DUT internal data in-activity timer to expire.
4. Confirm with a trace tool / test monitor that DUT switches to another RRC state.
5. Reload the webpage.
6. Confirm with a trace tool / test monitor that DUT is back in RRC state CELL\_DCH.

Note: Depending on the network implementation the DUT is moved to CELL\_FACH, CELL\_PCH or URA\_PCH by the network after reception of the SCRI message…

Note: If DUT only supports PDP context activation/deactivation when starting/closing the embedded browser application, this behaviour is acceptable as part of this test case as well.

Note: If DUT does not support embedded browser application use a Tethering / DUN connection.

Expected behaviour

1. Webpage is loaded successfully.
2. DUT is in CELL\_DCH.
3. DUT sends a SIGNALING CONNECTION RELEASE INDICATION message to the network.

Within the SIGNALING CONNECTION RELEASE INDICATION message, confirm the indication cause parameter hold the “UERequestedPSDataSessionEnd” value.

1. DUT is switched to another RRC state.
2. Webpage is loaded successfully.
3. DUT is in CELL\_DCH.

## 19.7 Stationary Data Performance

It is essential for the tester to build up a knowledge base of the maximum throughput achievable in the test location and for the device capability. This can be done using different Reference devices with similar capabilities to the DUT. Once a maximum achievable throughput is known for the location then this can be used as a base figure to validate the test result. Please note, that with networks continuously improving, this maximum achievable figure shall be monitored regularly and updated with the latest known maximum achievable throughput. The model name(s) used to build up the knowledge base shall be noted in the test result.

Note: There are several ways to check the throughput:

- DUT tethered to a laptop (USB/Wi-Fi). A speedtest tool on the laptop can then be used to measure the throughput.

- A speedtest tool directly on the DUT can be used to measure the throughput.

- For modules or devices without a UI, a DUN connection to a laptop can be used along with a speedtest tool on the laptop to measure the throughput.

- Other valid methods are available such as an FTP client.

### 19.7.1 Stationary Data Performance – Relative Downlink Throughput

Description

Measure the average downlink throughput for a R99/HSPA Radio Access Bearer.

Related core specifications

3GPP TS 25.331

Reason for test

Obtain a measure of average downlink throughput for a R99/HSPA Radio Access Bearer.

Initial configuration

Ensure optimal testing conditions (optimum RF signal, low traffic hours to avoid contention with other devices, etc.).

Knowledge base of the maximum throughput achievable in the test location and for the device capability is available.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Prepare the DUT and Reference-1 with the method of measuring the throughput. | DUT and Reference-1 are setup with the appropriate tool/method. |
| 2 | Perform 1 x Downlink throughput measurement on DUT using the appropriate method. | Measurement is taken and recorded. |
| 3 | Perform 1 x Downlink throughput measurement on the Reference-1 using the appropriate method. | Measurement is taken and recorded. |
| 4 | Repeat and perform at least 5 Downlink throughput measurements on DUT and Reference-1 in alternating sequence.  Ensure DUT and Reference-1 are in CELL\_PCH/URA\_PCH state before performing the next throughput measurement. | Measurements are taken and recorded on DUT and Reference-1 |
| 5 | Calculate average Downlink throughput for DUT and reference-1 |  |
| 6 | Evaluate the data performance by comparing the DUT’s average throughput with the reference-1 average throughput and with the known maximum throughput for the test location and device capability from the knowledge base. | Ensure that the DUT’s data performance is no more than 10% worse than the reference-1 device and that the DUT’s performance is no more than 20% worse than the known maximum throughput from the knowledge base. |

### 19.7.2 Stationary Data Performance – Absolute Downlink Throughput

NOTE: This test needs to be conducted under lab conditions (optimum RF signal, no contention with other Ues, sufficient bandwidth of NodeB).

Description

Measure the average downlink throughput for a R99/HSPA RAB.

Related 3GPP core specifications

3GPP TS 25.306, TS 25.331

Reason for test

Obtain a measure of average downlink throughput for a R99/HSPA RAB.

Initial configuration

Check the Lab Environment with a Reference Device (recommended by an Operator) to ensure that the Minimum Realistic Throughput Values can be achieved.

Connect the DUT to a PC and use it as a modem. Ensure that the Connection Manager from the device supplier is used. Where possible, the DUT shall be connected via USB.

The device under test (DUT) is IMSI attached and PS attached on a 3G cell in its 3G HPLMN.

The UE has a PDP context already active.

Test procedure

1. Verify that a packet data session is already established for the DUT.
2. Start an FTP/TFTP download for the DUT using the R99/HSPA RAB. Use an uncompressible file larger than 20 Mbytes up to cat 8 and larger than 50 Mbytes for cat 9 and higher. Utilize a server with minimal latency to the GGSN.
3. Measure the average throughput on FTP/TFTP level using a suitable application.
4. Perform 3 times the steps from 1 to 3, selecting the best result for the DUT.

Expected behaviour

The best result on DUT shall be proportional to the capability of the device and the RAB available of the cell used. The following minimum values are to be fulfilled:

| **Downlink HSPA / R99** | **Advertised Throughput FDD** (ref. 3GPP 25.306 & 3GPP 25.825) | **Minimum Realistic Throughput in Lab** |
| --- | --- | --- |
| Cat 23 & 24 (64 QAM+DC-HSDPA) | 43.2Mbit/s | 37.5 Mbit/s |
| Cat 21 & 20 (16 QAM+DC-HSDPA) | 28.8 Mbit/s | [TBD] Mbit/s |
| Cat 16 & 18 (MIMO) | 28.8 Mbit/s | 24.7 Mbit/s |
| Cat 14 & 18 (no MIMO) | 21.6 Mbit/s | 18.4 Mbit/s |
| Cat 10 | 14.4 Mbit/s | 12.2 Mbit/s |
| Cat 9 | 10.2 Mbit/s | 8.9 Mbit/s |
| Cat 8 | 7.21 Mbit/s | 6.2 Mbit/s |
| Cat 6 | 3.65 Mbit/s | 3.1 Mbit/s |
| Cat 4 | 1.8 Mbit/s | 1.5 Mbit/s |
| R99 (384) | 384 kbit/s | 380 kbit/s |
| R99 (128) | 128 kbit/s | TBD |
| R99 (64) | 64 kbit/s | TBD |

Report the obtained throughput value for DUT.

### 19.7.3 Stationary Data Performance – Relative Uplink Throughput

Description

Measure the average uplink throughput for a R99/HSPA Radio Access Bearer.

Related core specifications

3GPP TS 25.331

Reason for test

Obtain a measure of average uplink throughput for a R99/HSPA Radio Access Bearer.

Initial configuration

Ensure optimal testing conditions (optimum RF signal, low traffic hours to avoid contention with other devices, etc.).

Knowledge base of the maximum throughput achievable in the test location and for the device capability is available.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Prepare the DUT and Reference-1 with the method of measuring the throughput. | DUT and Reference-1 are setup with the appropriate tool/method. |
| 2 | Perform 1 x Uplink throughput measurement on DUT using the appropriate method. | Measurement is taken and recorded. |
| 3 | Perform 1 x Uplink throughput measurement on the Reference-1 using the appropriate method. | Measurement is taken and recorded. |
| 4 | Repeat and perform at least 5 Uplink throughput measurements on DUT and Reference-1 in alternating sequence.  Ensure DUT and Reference-1 are in CELL\_PCH/URA\_PCH state before performing the next throughput measurement. | Measurements are taken and recorded on DUT and Reference-1 |
| 5 | Calculate average Uplink throughput for DUT and reference-1 |  |
| 6 | Evaluate the data performance by comparing the DUT’s average throughput with the reference-1 average throughput and with the known maximum throughput for the test location and device capability from the knowledge base. | Ensure that the DUT’s data performance is no more than 10% worse than the reference-1 device and that the DUT’s performance is no more than 20% worse than the known maximum throughput from the knowledge base. |

### 19.7.4 Stationary Data Performance – Absolute Uplink Throughput

NOTE: This test needs to be conducted under lab conditions (optimum RF signal, no contention with other Ues, sufficient bandwidth of NodeB).

Description

Measure the average uplink throughput for an R99/HSPA PS RAB.

Related 3GPP core specifications

3GPP TS 25.331

Reason for test

Obtain a measure of average uplink throughput for an R99/HSPA PS RAB.

Make sure that the PS throughput is on appropriate level during a simultaneous CS and PS call.

Initial configuration

Check the Lab Environment with a Reference Device (recommended by an Operator) to ensure that the Minimum Realistic Throughput Values can be achieved.

Connect the DUT to a PC and use it as a modem. Ensure that the Connection Manager from the device supplier is used. Where possible, the DUT shall be connected via USB.

The device under test (DUT) is IMSI attached and PS attached on a 3G cell in its 3G HPLMN.

The UE has a PDP context already active by means of an externally initiated packet data session.

Test procedure

1. Verify that an externally initiated packet data session is already established for the DUT.
2. Start an FTP/TFTP upload for the DUT using the R99/HSPA RAB. Use an uncompressible file larger than 20 Mbytes. Utilize a server with minimal latency to the GGSN.
3. Measure the average throughput on FTP/TFTP level using a suitable application.
4. Perform 3 times the steps from 1 to 3, selecting the best result for the DUT.

Expected behaviour

The best result on DUT shall be proportional to the capability of the device and the PS RAB available of the cell used. The following minimum values are to be fulfilled:

|  |  |  |
| --- | --- | --- |
| **Uplink EUL / R99** | **Advertised Throughput FDD** (ref. 3GPP 25.306) | **Minimum Realistic Throughput in Lab** |
| Cat 6 | 5,7 Mbit/s | 3.9 Mbit/s |
| Cat 5 | 2 Mbit/s | 1.8 Mbit/s |
| Cat 3 | 1,45 Mbit/s | 1.2 Mbit/s |
| R99 | 64 kbit/s | TBD |

Report the obtained throughput value for DUT.

### 19.7.5 Stationary Data Performance – Relative Downlink and Uplink Throughput

Description

Measure the average simultaneous uplink and downlink throughput for a R99/HSPA Radio Access Bearer.

Related core specifications

3GPP TS 25.331

Reason for test

Obtain a measure of average simultaneous uplink and downlink throughput for a R99/HSPA Radio Access Bearer.

Initial configuration

Ensure optimal testing conditions (optimum RF signal, low traffic hours to avoid contention with other devices, etc.).

The UDP server should be configured to meet the following requirements:

* UDP blast duration shall be selected to meet the minimum test time using a sufficient rate to prevent physical layer DTX based upon the UE Category

The following settings are to be used:

* The UDP MTU size is set to a value comprised between 1280 and 1500 bytes as recommended by the manufacturer.
* The UDP transfers are always carried out in Binary mode.
* The contents of the files to be transferred over UDP are chosen in such a way that they are statistically random, with least compressibility.
* No application-level compression protocols are used to compress the UDP files.
* Either IPv4 or IPv6 can be used, but only results obtained with the same IP address type can be compared, since the IP address type will affect the measured throughput.
* UDP bidirectional duration shall be set to the duration of the test with a sufficient blast rate to prevent physical layer DTX on either the UL or DL

The UDP application used on the tethered PC for tethered testing should meet the following requirements:

* The tethered UDP application should allow the user to transfer files of any format supported by the tethered PC, in binary mode, in both the Downlink and the Uplink

The UDP application used for embedded testing should meet the following requirements:

* The embedded UDP application should allow the user to transfer files of formats supported by the UE, in binary mode, both in the Downlink and the Uplink.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Activate tethering (USB/Wi-Fi) / DUN / client connection at DUT. | Data connection is successfully established. |
| 2 | Start bi-directional UDP throughput | Download and upload is ongoing |
| 4 | Measure the average downlink and uplink throughput using a suitable application over a 10 minutes period. | Measurement is taken and recorded. |
| 6 | Evaluate the data performance by comparing the DUT’s throughput measurements with the throughput measurements of (a) reference device(s) with similar capabilities. | Ensure the DUT’s data performance is comparable to the reference data performance (no more than 10% worse). |

## 19.8 Multi-RAB – Stationary Data Performance

### 19.8.1 Multi-RAB – Stationary Data Performance – Relative Downlink Throughput

Description

Measure the average PS downlink throughput for a R99/HSPA Radio Access Bearer during a simultaneous CS and PS call.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

Obtain a measure of average downlink throughput for a R99/HSPA Radio Access Bearer when simultaneously being engaged in a Circuit Switched (CS) connection.

Initial configuration

Ensure optimal testing conditions (optimum RF signal, low traffic hours to avoid contention with other devices, etc.).

Knowledge base of the maximum throughput achievable in the test location and for the device capability is available.

**Scenario A: CS Voice Call**

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Prepare the DUT and Reference-1 with the method of measuring the throughput. | DUT and Reference-1 are setup with the appropriate tool/method. |
| 2 | On DUT, make a CS voice call to Client-1. | CS call is successfully established. |
| 3 | On Reference, make a CS voice call to Client-2. | CS call is successfully established. |
| 4 | Perform 1 x Downlink throughput measurement on DUT using the appropriate method. | Measurement is taken and recorded. |
| 5 | Perform 1 x Downlink throughput measurement on the Reference-1 using the appropriate method. | Measurement is taken and recorded. |
| 6 | Repeat and perform at least 5 Downlink throughput measurements on DUT and Reference-1 in alternating sequence. | Measurements are taken and recorded on DUT and Reference-1 |
| 7 | Calculate average Downlink throughput for DUT and reference-1 |  |
| 8 | Evaluate the data performance by comparing the DUT’s average throughput with the reference-1 average throughput and with the known maximum throughput for the test location and device capability from the knowledge base. | Ensure that the DUT’s data performance is no more than 10% worse than the reference-1 device and that the DUT’s performance is no more than 20% worse than the known maximum throughput from the knowledge base. |

**Scenario B: CS Video Call**

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Prepare the DUT and Reference-1 with the method of measuring the throughput. | DUT and Reference-1 are setup with the appropriate tool/method. |
| 2 | On DUT, make a CS video call to Client-1. | CS call is successfully established. |
| 3 | On Reference, make a CS video call to Client-2. | CS call is successfully established. |
| 4 | Perform 1 x Downlink throughput measurement on DUT using the appropriate method. | Measurement is taken and recorded. |
| 5 | Perform 1 x Downlink throughput measurement on the Reference-1 using the appropriate method. | Measurement is taken and recorded. |
| 6 | Repeat and perform at least 5 Downlink throughput measurements on DUT and Reference-1 in alternating sequence. | Measurements are taken and recorded on DUT and Reference-1. |
| 7 | Calculate average Downlink throughput for DUT and reference-1 |  |
| 8 | Evaluate the data performance by comparing the DUT’s average throughput with the reference-1 average throughput and with the known maximum throughput for the test location and device capability from the knowledge base. | Ensure that the DUT’s data performance is no more than 10% worse than the reference-1 device and that the DUT’s performance is no more than 20% worse than the known maximum throughput from the knowledge base. |

### 19.8.2 Multi-RAB – Stationary Data Performance – Absolute Downlink Throughput

NOTE: This test needs to be conducted under lab conditions (optimum RF signal, no contention with other Ues, sufficient bandwidth of NodeB).

Description

Measure the average PS downlink throughput for a R99/HSPA RAB during the simultaneous CS and PS calls.

Related 3GPP core specifications

3GPP TS 34.108, TS 25.331

Reason for test

Obtain a measure of average downlink throughput for the R99/HSPA RAB.

Make sure that the PS throughput is on appropriate level while simultaneous CS and PS call.

Initial configuration

Check the Lab Environment with a Reference Device (recommended by an Operator) to ensure that the Minimum Realistic Throughput Values can be achieved.

Connect the DUT to a PC and use it as a modem. Ensure that the Connection Manager from the device supplier is used. Where possible, the DUT shall be connected via USB.

The device under test (DUT) is IMSI attached and PS attached on a 3G cell in its 3G HPLMN.

The UE has a PDP context already active.

Test procedure

Verify that a packet data session is already established for the DUT.

**Scenario A**

1. Make a voice call and start an FTP/TFTP download for the DUT using the R99/HSPA RAB. Use an uncompressible file larger than 20 Mbytes up to cat 8 and larger than 50 Mbytes for cat 9 and higher. Utilize a server with minimal latency to the GGSN.
2. Measure the average throughput on FTP/TFTP level using a suitable application.
3. Perform 3 times the steps from 1 to 3, selecting the best result for the DUT.

**Scenario B**

1. Make a video call and start an FTP/TFTP download for the DUT using the R99/HSPA RAB. Use an uncompressible file larger than 20 Mbytes up to cat 8 and larger than 50 Mbytes for cat 9 and higher. Utilize a server with minimal latency to the GGSN.
2. Measure the average throughput on FTP/TFTP level using a suitable application.
3. Perform 3 times the steps from 1 to 3, selecting the best result for the DUT.

Expected behaviour

The best result on DUT shall be proportional to the capability of the device and the RAB available of the cell used. The following minimum values are to be fulfilled:

|  |  |  |
| --- | --- | --- |
| **Downlink HSPA / R99** | **Advertised Throughput FDD** (ref. 3GPP 25.306 & 3GPP 25.825) | **Minimum Realistic Throughput in Lab** |
| Cat 23 & 24 (64 QAM+DC-HSDPA) | 43.2Mbit/s | [TBD] Mbit/s |
| Cat 21 & 20 (16 QAM+DC-HSDPA) | 28.8 Mbit/s | [TBD] Mbit/s |
| Cat 16 & 18 (MIMO) | 28.8 Mbit/s | [TBD] Mbit/s |
| Cat 14 & 18 (no MIMO) | 21.6 Mbit/s | 18 (tbc) Mbit/s |
| Cat 10 | 14.4 Mbit/s | 10.4 Mbit/s |
| Cat 9 | 10.2 Mbit/s | 8.7 Mbit/s |
| Cat 8 | 7.21 Mbit/s | 6.1 Mbit/s |
| Cat 6 | 3.65 Mbit/s | 3.1 Mbit/s |
| Cat 4 | 1.8 Mbit/s | 1.5 Mbit/s |
| R99 (384) | 384 kbit/s | 380 kbit/s |
| R99 (128) | 128 kbit/s | TBD |
| R99 (64) | 64 kbit/s | TBD |

Report the obtained throughput value for DUT.

### 19.8.3 Multi-RAB – Stationary Data Performance – Relative Uplink Throughput

Description

Measure the average PS uplink throughput for a R99/HSPA Radio Access Bearer during a simultaneous CS and PS call.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

Obtain a measure of average uplink throughput for a R99/HSPA Radio Access Bearer when simultaneously being engaged in a Circuit Switched (CS) connection.

Initial configuration

Ensure optimal testing conditions (optimum RF signal, low traffic hours to avoid contention with other devices, etc.).

Knowledge base of the maximum throughput achievable in the test location and for the device capability is available.

**Scenario A: CS Voice Call**

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Prepare the DUT and Reference-1 with the method of measuring the throughput. | DUT and Reference-1 are setup with the appropriate tool/method. |
| 2 | On DUT, make a CS voice call to Client-1. | CS call is successfully established. |
| 3 | On Reference-1, make a CS voice call to Client-2. | CS call is successfully established. |
| 4 | Perform 1 x Uplink throughput measurement on DUT using the appropriate method. | Measurement is taken and recorded. |
| 5 | Perform 1 x Uplink throughput measurement on the Reference-1 using the appropriate method. | Measurement is taken and recorded. |
| 6 | Repeat and perform at least 5 Uplink throughput measurements on DUT and Reference-1 in alternating sequence. | Measurements are taken and recorded on DUT and Reference-1 |
| 7 | Calculate average Uplink throughput for DUT and reference-1 |  |
| 8 | Evaluate the data performance by comparing the DUT’s average throughput with the reference-1 average throughput and with the known maximum throughput for the test location and device capability from the knowledge base. | Ensure that the DUT’s data performance is no more than 10% worse than the reference-1 device and that the DUT’s performance is no more than 20% worse than the known maximum throughput from the knowledge base. |

**Scenario B: CS Video Call**

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Prepare the DUT and Reference-1 with the method of measuring the throughput. | DUT and Reference-1 are setup with the appropriate tool/method. |
| 2 | On DUT, make a CS video call to Client-1. | CS call is successfully established. |
| 3 | On Reference-1, make a CS video call to Client-2. | CS call is successfully established. |
| 4 | Perform 1 x Uplink throughput measurement on DUT using the appropriate method. | Measurement is taken and recorded. |
| 5 | Perform 1 x Uplink throughput measurement on the Reference-1 using the appropriate method. | Measurement is taken and recorded. |
| 6 | Repeat and perform at least 5 Uplink throughput measurements on DUT and Reference-1 in alternating sequence. | Measurements are taken and recorded on DUT and Reference-1. |
| 7 | Calculate average Uplink throughput for DUT and reference-1 |  |
| 8 | Evaluate the data performance by comparing the DUT’s average throughput with the reference-1 average throughput and with the known maximum throughput for the test location and device capability from the knowledge base. | Ensure that the DUT’s data performance is no more than 10% worse than the reference-1 device and that the DUT’s performance is no more than 20% worse than the known maximum throughput from the knowledge base. |

### 19.8.4 Multi-RAB – Stationary Data Performance – Absolute Uplink Throughput

NOTE: This test needs to be conducted under lab conditions (optimum RF signal, no contention with other Ues, sufficient bandwidth of NodeB).

Description

Measure the average PS uplink throughput for the R99/HSPA uplink RAB during the simultaneous CS and PS calls.

Related 3GPP core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

Obtain a measure of average uplink throughput for an R99/HSPA PS RAB.

Initial configuration

Check the Lab Environment with a Reference Device (recommended by an Operator) to ensure that the Minimum Realistic Throughput Values can be achieved.

Connect the DUT to a PC and use it as a modem. Ensure that the Connection Manager from the device supplier is used. Where possible, the DUT shall be connected via USB.

The device under test (DUT) is IMSI attached and PS attached on a 3G cell in its 3G HPLMN.

The UE has a PDP context already active.

Test procedure

Verify that an externally initiated packet data session is already established for the DUT.

**Scenario A**

1. Make a voice call and start an FTP/TFTP upload for the DUT using the R99/HSPA RAB. Use an uncompressible file larger than 20 Mbytes. Utilize a server with minimal latency to the GGSN.
2. Measure the average throughput on FTP/TFTP level using a suitable application.
3. Perform 3 times the steps from 1 to 3, selecting the best result for the DUT.

**Scenario B**

1. Make a video call and start an FTP/TFTP upload for the DUT using the R99/HSPA RAB. Use an uncompressible file larger than 20 Mbytes. Utilize a server with minimal latency to the GGSN.
2. Measure the average throughput on FTP/TFTP level using a suitable application.
3. Perform 3 times the steps from 1 to 3, selecting the best result for the DUT.

Expected behaviour

The best result on DUT shall be proportional to the capability of the device and the PS RAB available of the cell used. The following minimum values are to be fulfilled:

|  |  |  |
| --- | --- | --- |
| **Uplink EUL / R99** | **Advertised Throughput FDD** (ref. 3GPP 25.306) | **Minimum Realistic Throughput in Lab** |
| Cat 6 | 5,7 Mbit/s | 3.8 (tbc) Mbit/s |
| Cat 5 | 2 Mbit/s | 1.6 Mbit/s |
| Cat 3 | 1,45 Mbit/s | 1.2 Mbit/s |
| R99 | 64 kbit/s | TBD |

Report the obtained throughput value for DUT.

### 19.8.5 Multi-RAB – Stationary Data Performance – Relative Downlink and Uplink Throughput

Description

Measure the average PS uplink and downlink throughput for the R99/HSPA Radio Access Bearer during a simultaneous CS and PS call.

Related core specifications

3GPP TS 34.108 and 3GPP TS 25.331

Reason for test

Obtain a measure of average uplink and downlink throughput for a R99/HSPA Radio Access Bearer when simultaneously being engaged in a Circuit Switched (CS) connection.

Initial configuration

Ensure optimal testing conditions (optimum RF signal, low traffic hours to avoid contention with other devices, etc.).

Reference device(s) used to validate the result with similar capabilities is/are available. The model name(s) shall be noted in the test result.

The UDP server should be configured to meet the following requirements:

* UDP blast duration shall be selected to meet the minimum test time using a sufficient rate to prevent physical layer DTX based upon the UE Category

The following settings are to be used:

* The UDP MTU size is set to a value comprised between 1280 and 1500 bytes as recommended by the manufacturer.
* The UDP transfers are always carried out in Binary mode.
* The contents of the files to be transferred over UDP are chosen in such a way that they are statistically random, with least compressibility.
* No application-level compression protocols are used to compress the UDP files.
* Either IPv4 or IPv6 can be used, but only results obtained with the same IP address type can be compared, since the IP address type will affect the measured throughput.
* UDP bidirectional duration shall be set to the duration of the test with a sufficient blast rate to prevent physical layer DTX on either the UL or DL

The UDP application used on the tethered PC for tethered testing should meet the following requirements:

* The tethered UDP application should allow the user to transfer files of any format supported by the tethered PC, in binary mode, in both the Downlink and the Uplink

The UDP application used for embedded testing should meet the following requirements:

* The embedded UDP application should allow the user to transfer files of formats supported by the UE, in binary mode, both in the Downlink and the Uplink.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Activate tethering (USB/Wi-Fi) / DUN / client connection at DUT. | Data connection is successfully established. |
| 2 | Make a CS voice call to Client 1. | CS call is successfully established. |
| 2 | Start bi-directional UDP throughput | Download and upload is ongoing |
| 5 | Measure the average downlink and uplink throughput using a suitable application over a 10 minute period. | Measurement is taken and recorded. |
| 7 | Evaluate the data performance by comparing the DUT’s throughput measurements with the throughput measurements of (a) reference device(s) with similar capabilities. | Ensure the DUT’s data performance is comparable to the reference data performance (no more than 10% worse). |

# 20 Mobility

## 20.1 Void

### 20.1.1 Void

### 20.1.2 Void

### 20.1.3 Void

### 20.1.4 Void

## 20.2 Void

### 20.2.1 Void

### 20.2.2 Void

### 20.2.3 Void

### 20.2.4 Void

### 20.2.5 Void

### 20.2.6 Void

## 20.3 Mobility Management

Description

The DUT should perform reselections and handovers without losing service.

Related core specifications

3GPP TS 25.304, 3GPP TS 25.331, 3GPP TS 05.08, 3GPP TS 04.18, 3GPP TS 24.008, TS 45.008

3GPP TS 26.190, 3GPP TS 26.201, 3GPP TS 26.194, 3GPP TS 26.173

Reason for test

To ensure that the DUT performs reselections and handovers correctly without losing service.

Initial configuration

There must be an appropriate number of GERAN and UTRA cells available on the same PLMN.

Test procedures (Overview)



The above table shows the combinations of test cases that can be performed with each scenario.

Please see the test scenario and apply the required test procedure (below) as per the requirement in the table.

**Test Scenario**

Use an internal test monitor or protocol tool to confirm the scenario has been successfully performed.

**Scenario A: Intra-Band (Long Route / Multi Cell) (3G -> 3G)**

Test route should contain a substantial number of different Cell ID’s.

The test route should contain as many of the scenarios as possible:

Cells sharing a Location Area and Routing Area.

Cells not sharing a Location Area and/or a Routing Area.

Cells using the same frequency.

Cells using different frequencies.

Cells using different frequency bands.

Cells supporting PS (R99), HSPA or HSPA+.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Move DUT along the route, ensuring as many scenarios as possible are covered.  Check the Cell ID details as the DUT moves through the route. | The scenarios are successfully performed and DUT stays in service the whole time. |

**Scenario B: Inter-Band (3G(Band A) -> 3G(Band B))**

The test route should contain the following scenario:

* Cells operating on different frequency bands (Band A -> Band B).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 3G cell (Band A). |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT is in a 3G cell (Band B). |

**Scenario C: Inter-RAT (3G -> 2G)**

The test route should contain the following scenario:

3G cells and 2G cells.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 3G cell. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | Reselection, Cell Change Order, Redirect or Handover is successfully performed as per the network and DUT implementation.  DUT is in a 2G cell. |

**Scenario D: Inter-RAT (3G(WB) -> 2G(WB))**

The test route should contain the following scenario:

3G cells supporting WB-AMR and 2G cells supporting WB-AMR.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 3G cell supporting WB-AMR. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT is in a 2G cell supporting WB-AMR. |

**Scenario E: Inter-RAT (3G(WB) -> 2G(NB))**

The test route should contain the following scenario:

3G cells supporting WB-AMR and 2G cells supporting NB-AMR.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 3G cell supporting WB-AMR. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT is in a 2G cell supporting NB-AMR. |

**Scenario F: Inter-RAT (3G(NB) -> 2G(NB))**

The test route should contain the following scenario:

3G cells supporting NB-AMR and 2G cells supporting NB-AMR.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 3G cell supporting NB-AMR. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT is in a 2G cell supporting NB-AMR. |

**Scenario G: Inter-RAT (3G -> 4G)**

The test route should contain the following scenario:

3G cells and 4G cells.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 3G cell. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | Reselection, Cell Change Order, Redirect or Handover is successfully performed as per the network and DUT implementation.  DUT is in a 4G cell. |

Test Procedure

### 20.3.1 PDP Deactivated (IDLE)

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Deactivate Mobile Data (No PDP Context). | Ensure DUT is GPRS attached and has no PDP context active. |
| 2 | Follow instruction of the appropriate scenario. | |
| 3 | Page (Voice/SMS) the DUT after the scenario. | DUT can be successfully paged (Voice/SMS). |

### 20.3.2 PDP Activated – No Data Transfer (PCH)

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Ensure PDP Context is activated.  DUT is in PCH state. | No data transfer is on-going. |
| 2 | Follow instruction of the appropriate scenario. | |
| 3 | Page (Voice/SMS) the DUT after the scenario. | DUT can be successfully paged (Voice/SMS). |

### 20.3.3 PDP activated – Data Transfer

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Ensure PDP Context is activated.  Start data transfer. This can be via a tethered connection, DUN, an internal application on DUT or via continuous PINGs. | DUT is actively transferring data. |
| 2 | Follow instruction of the appropriate scenario. | |
| 3 | Check data transfer continues after the scenario. | DUT is actively transferring data. |

### 20.3.4 Voice

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Set up MO Voice call to Client 1 in a static location.  When the DUT and network support WB-AMR, this should be used as priority over NB-AMR. | Voice call set up successfully. |
| 2 | Follow instruction of the appropriate scenario. | |
| 3 | Check the voice call is still active after the scenario. | Voice call is on-going. |

# 21 Security Mode (Integrity and Ciphering)

## 21.1 Authentication

### 21.1.1 Authentication – IMSI Attach (incl. Security Mode Command)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 21.1.2 Authentication – Mobile Originated Speech Call

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 21.1.3 Authentication – GPRS Attach

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 21.1.4 Authentication – Primary PDP context activation

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 21.1.5 Authentication – Security Mode Command in Signalling Connection Establish Request (CS/PS)

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

# 22 Equivalent PLMN functionality

NOTE: Complete tests covering the following subjects will be added at a later date. The headlines provided below are for guidance and shall create motivation for voluntary contributions.

## 22.1 Storage of ePLMNs

### 22.1.1 Reception of PLMN and ePLMN identities in SIB 3, 4 and 18

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.1.2 Location Updating Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.1.3 Attach Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.1.4 Routing Area Updating Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 22.2 Deletion of stored ePLMNs

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.2.1 Location Updating Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.2.2 Attach Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.2.3 Routing Area Updating Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 22.3 Use of stored ePLMN in the UE

### 22.3.1 On switch on

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.3.2 Preservation of stored ePLMN list upon removal of SIM

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.3.3 When the ePLMN list is full

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.3.4 Automatic mode

#### 22.3.4.1 Across different ePLMNs with MS in different states

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.4.2 From ePLMN to non-ePLMN with MS in different states

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.4.3 From non-ePLMN to ePLMN with MS in different states

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.4.4 Timer rescan of higher priority ePLMNs

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.4.5 Return to HPLMN from ePLMN

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.4.6 Support of MM/ GMM reject cause #15

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.3.5 Manual mode

#### 22.3.5.1 Across different ePLMNs with MS in PMM Connected state

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.5.2 Across different ePLMNs with MS in PMM Idle state

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.5.3 Across different ePLMNs with MS in MM Standby state

[Test to be defined]

#### 22.3.5.4 Across different ePLMNs with MS in MM Ready state

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

#### 22.3.5.5 Selection of non-ePLMN

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 22.4 Removal of Forbidden ePLMN list

### 22.4.1 Location Updating Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.4.2 Attach Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 22.4.3 Routing Area Updating Accept

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

# 23 Multi Operator Core Network (MOCN)

In a Multi Operator Core Network (MOCN) setup, Network Operator A shares his radio network with Network Operator B. The single radio network is then connected to the core network of each network operator. On the air interface, the Mobile Network Code (MNC) of each operator is broadcast on each radio carrier in a MNC list. The following test cases validate that a DUT is capable to properly operate in a MOCN shared radio network.

## 23.1 MOCN Cell Selection and Reselection scenarios from Idle, Cell-PCH and URA-PCH State

### 23.1.1 MOCN during Initial Attach

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

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### 23.1.2 Moving from a non-shared UMTS Cell to a MOCN shared UMTS Cell

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 23.1.3 Moving from a non-shared GSM Cell to a MOCN shared UMTS Cell

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 23.1.4 Moving between MOCN shared UMTS Cells of different Network Operators

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

# 24 Physical Radio Layer FDD

## 24.1 Power Control

Note: To perform the following tests, some kind of tracing tool is needed by the tester in order to check the signalling exchange between UE and UTRAN. The purpose is to ensure that the power transmitted by the UE is raised or lowered as ordered by the UTRAN as needed.

Power control is an important feature to be tested, as this kind of misbehaviour produces excessive interference which reduces the total system capacity.

### 24.1.1 Open loop power control – To PRACH

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 24.1.2 Open loop power control – Upon establishment of DPCCH

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

### 24.1.3 Closed loop power control – Algorithm 1 for processing TPC commands

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

## 24.2 Transmit Diversity

### 24.2.1 Time Switched Transmit Diversity (TSTD)

Description

Verification that UE performs correctly TSTD for SCH.

Related 3GPP core specifications

TS 25.211 (section 5.3.3.5.1).

Reason for test

To ensure UE supports TSTD.

Initial configuration

UE is switched off.

Test procedure

This test shall be done in an urban scenario where the signal received by the UE from one of the antennas of Node B is much dimmer than the signal received from the other antenna. The ideal case for testing would be to have complete obstruction of one of both antennas while the other one is not obstructed.

It is very helpful to the field engineers if the network operator provides the details of a suitable location to perform this test.

Note: The UE should be able to detect the Secondary Synchronization Codes sequence transmitted by the cell SCH even if it receives only one every two SSCs, (note, the actual SSCs do not need to be captured as part of the test).

Switch the UE on. Ensure that the UE gets connected to the network in appropriate time.

Expected behaviour

UE attaches to the network in appropriate time.

### 24.2.2 Space Time transmit Diversity (STTD)

Description

Verification that UE performs correctly STTD for P-CCPCH, S-CCPCH, PICH, AICH, DPCH, HS-PDSCH, and HS-SCCH, F-DPCH, MICH, E-AGCH, E-RGCH, and E-HICH.

Related 3GPP core specifications

TS 25.211 (Section 5.3.1.1).

Reason for test

To ensure UE supports STTD

Initial configuration

UE is switched off.

Test procedure

Switch the UE on in an area where the network uses STTD and check it connects to the network in appropriate time.

Establish a voice or video-telephony call, keep it on for a long time in order to make sure the connection does not drop (P-CCPCH, AICH, DPCH are used to perform this test).

Arrange to receive an incoming Voice or Video-Telephony call, ensure the connection is established, the quality is good and the call is not dropped (P-CCPCH, S-CCPCH, PICH and DPCH are used to perform this test).

In case of Ues supporting HSDPA, establish a packet call (HSDPA connection), keep it downloading packet data for a long time in order to make sure the connection does not drop (HS-PDSCH and HS-SCCH are used to perform this test).

In case of Ues supporting HSUPA/HSDPA, establish a packet call (HSUPA/HSDPA connection), keep it uploading/downloading packet data for a long time in order to make sure the connection does not drop in both of up and down link (HS-PDSCH, HS-SCCH, F-DPCH, MICH, E-AGCH, E-RGCH, and E-HICH are used to perform this test).

Expected behaviour

UE has a correct behaviour.

### 24.2.3 Closed Loop Transmit Diversity

Description

Verification that the UE manages correctly mode 1 and mode 2 of closed loop transmit diversity for DPCH. There isn’t any expected difference in quality for CL mode 1 and mode 2, as quality will be driven by outer loop power control independently of Closed Loop Transmit Diversity.

Verification that the UE manages correctly mode 1 of closed loop transmit diversity for HS-PDSCH.

Related 3GPP core specifications

TS 25.214 (section 7)

Reason for test

To ensure UE supports both modes of Closed loop transmit diversity.

Initial configuration

UE is in idle state.

Test procedure

Operator should provide information about a right location where these tests can be done.

Make a voice or video-telephony call in an area where closed loop mode 1 transmit diversity is used by the UTRAN. Make sure the call is not dropped and its quality is acceptable (DPCH is used to perform this test).

Repeat the procedure in an area where closed loop mode 2 transmit diversity is used by the UTRAN.

Make sure the call is not dropped and its quality is acceptable (DPCH is used to perform this test).

Establish a packet call (HSDPA connection) in an area where closed loop mode 1 transmit diversity is used by the UTRAN, keep it downloading packet data for a long time in order to make sure the connection does not drop (HS-PDSCH is used to perform this test).

Expected behaviour

The call is not dropped and its quality is good.

## 24.3 PRACH Network Combinations

### 24.3.1 PRACH configurations

Test case has been archived. Please refer to TS.11 v22.0 for the full test procedure. A copy of which can be requested by emailing [terminals@gsma.com](mailto:terminals@gsma.com)

# Document Management

## Document History

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