

TS.11- Annex A

Detailed Test Procedures for a 2G/2.5G Terminal Device

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# Annex A: Detailed Test Procedures for a 2G/2.5G Terminal Device

This Annex contains the detailed procedures that are recommended to be used for tests of a 2G/2.5G Terminal Device.

# 1 Cell selection/reselection

## 1.1 Cell Selection

### 1.1.1 Cell Selection - New 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Test case has been archived.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

## 1.2 Cell Reselection

### 1.2.1 Cell Reselection - Basic Cell Reselection

Test case has been archived.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

### 1.2.2 Cell Reselection - From No Service

Test case has been archived.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

### 1.2.3 Cell Reselection - To Emergency Camping

Test case has been archived.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

### 1.2.4 Cell Reselection - From Emergency Camping

Test case has been archived.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

# 2 Void

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

# 3 Network Registration - CS

## 3.1 IMSI Attach / Detach

### 3.1.1 IMSI Attach / Detach - Successful

Description

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

Related 3GPP core specifications

3GPP TS 24.008 sub clause 4.4.3

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 sends a "LOCATION UPDATING REQUEST" message using Location Updating Type = 2/0 (IMSI/Normal 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 DUT indicates Location Updating Type = 0 (Normal location updating), power the DUT off and on to verify that it then uses 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.  The DUT sends an "IMSI DETACH INDICATION" message |

## 3.2 Normal Location Area Update

### 3.2.1 Normal Location Area Update - Successful

Description

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

Initial configuration

The DUT is attached in Circuit mode

Ensure that the device is not GPRS attached.

Test procedure

1. Move the DUT from the initial cell into a cell with a different LAI till the DUT performs a cell reselection.
2. The DUT shall send a LOCATION UPDATE REPQUEST 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 DUT. This message contains a new TMSI for the DUT and the LAI for the new cell.
4. Check that the DUT responds to paging in the new cell by calling the DUT.

Expected behaviour

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

### 3.2.2 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 is 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 2G 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 |
| 4 | 🡺 | LOCATION UPDATING ACCEPT | - “location area code” = B  - "mobile identity" = TMSI2 |
| 5 | 🡸 | 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 |
| 64 | 🡺 | TMSI REALLOCATION COMMAND | - "mobile identity" = TMSI2 |
| 5 | 🡸 | TMSI REALLOCATION COMPLETE |  |
| 6 | 🡺 | LOCATION UPDATING ACCEPT | - “location area code” = B |

1. MT Voice call successfully received.

## 3.3 Periodic Location Area Update

### 3.3.1 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 | 🡺 | CHANNEL REQUEST | RR connection establishment |
| 2 | 🡸 | IMMEDIATE ASSIGNMENT |  |
| 3 | 🡺 | LOCATION UPDATING REQUEST | "location updating type" = periodic |
| *(4)* | *🡸* | *AUTHENTICATION REQUEST* | *Optional* |
| *(5)* | *🡺* | *AUTHENTICATION RESPONSE* | *Optional* |
| *(6)* | *🡸* | *CIPHER MODE COMMAND* | *Optional* |
| *(7)* | *🡺* | *CIPHER MODE COMPLETE* | *Optional* |
| 8 | 🡸 | *TMSI REALLOCATION COMMAND* | *Optional* |
| 9 | 🡸 | LOCATION UPDATING ACCEPT |  |
| *(10)* | *🡺* | *TMSI REALLOCATION COMPLETE* | *Optional* |
| 11 | 🡸 | CHANNEL RELEASE | RR connection Release |

### 3.3.2 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. |

### 3.3.3 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.

### 3.3.4 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.

### 3.3.5 Periodic Location Area Update - DUT in 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

### 3.3.6 Periodic Location Area Update - DUT in 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

### 3.3.7 Periodic Location Area Update - During on-going data connection (GPRS)

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

# 4 Network Registration - PS

## 4.1 GPRS Attach / Detach

### 4.1.1 GPRS Attach / Detach - Successful

Description

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

Reason for test

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

Related 3GPP core specifications

3GPP TS24.008, section 4.3.4.

**Initial configuration**

Automatic GPRS attach is enabled.

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 GPRS attach procedure within a few seconds after the IMSI attach.  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 DUT registers the new P-TMSI correctly. |
| 2 | Check GPRS service indication | DUT displays an Icon to indicate it is GPRS attached. [Operating System dependent] |
| 3 | Power off DUT / enable Flight Mode | DUT sends a DETACH REQUEST indicating Detach type = “power switched off, GPRS detach” using the correct P-TMSI.  The network shall not acknowledge this message. |

…

### 4.1.3 GPRS Attach - With IMSI / with P-TMSI / with or without authentication procedure

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

### 4.1.4 GPRS Attach - Roaming 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

### 4.1.5 GPRS Attach - PLMN not allowed (Reject Cause #11)

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

### 4.1.6 GPRS Attach - GSM roaming allowed/GPRS roaming not allowed in this PLMN (Reject cause #14)

Description

Verify, that the DUT handles correctly the reject cause #14 (GPRS Roaming not allowed in this PLMN).

Reason for test

Ensure that the DUT handles correctly the reject cause #14 (GPRS Roaming not allowed in this PLMN).

Related 3GPP core specifications

3GPP TS 24.008, section 4.7.3

Initial configurations

Initially the DUT must be in power off (if automatic attach is implemented) or in idle state (if manual attach is implemented). A SIM is available which has a valid IMSI in the roaming network.

GSM Roaming is enabled in the visited PLMN. GPRS roaming is not enabled.

Test procedure

1. The DUT is powered on in the HOME PLMN and performs IMSI attach (GSM attach successful) and GPRS attach (GPRS attach successful).
2. The DUT is moved to the VISITED PLMN and shall attempt to register to the VISITED SGSN (GPRS attach does not succeed).
3. The DUT is moved back to the HOME PLMN and shall attempt the GPRS attach (GPRS attach successful).

Expected behaviour

The DUT is performing the GPRS Attach procedure accordingly and shall not attempt to perform a second GPRS Attach or a PDP Context Activation in the VISITED PLMN. Back in the HOME PLMN the DUT shall offer full GPRS functionality.

### 4.1.7 GPRS Attach - GSM roaming allowed/GPRS Service not allowed (Reject cause #7)

Note: Some networks do not use reject cause #7 anymore and use #14 instead.

Description

Verify that the DUT handles correctly the reject cause #7 (GPRS Roaming not allowed).

Reason for test

Ensure that the DUT handles correctly the reject cause #7 (GPRS Roaming not allowed).

Related 3GPP core specifications

3GPP TS 24.008, section 4.7.3

Initial configurations

Initially the DUT must be in power off (if automatic attach is implemented) or in idle state (if manual attach is implemented). A SIM is available which has a valid IMSI in the roaming network.

GSM Roaming is enabled in the visited PLMN. GPRS service is not enabled in the visited PLMN.

Test procedure

1. The DUT is powered on in the HOME PLMN and performs IMSI attach (GSM attach successful) and GPRS attach (GPRS attach successful).
2. The DUT is moved to the VISITED PLMN and shall attempt to register to the VISITED SGSN (GPRS attach does not succeed).
3. The DUT is moved back to the HOME PLMN and shall not attempt the GPRS attach.
4. The DUT is powered off then on. The DUT shall perform GSM and GPRS attach successfully.

Expected behaviour

The DUT is performing the GPRS Attach procedure accordingly and shall not attempt to perform a second GPRS Attach or a PDP Context Activation in the VISITED PLMN. Back in the HOME PLMN the DUT shall offer full GPRS functionality.

## 4.2 Combined Attach / Detach

### 4.2.1 Combined Attach / Detach - Successful

Description

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

Related 3GPP core specifications

3GPP TS 24.008, section 4.7.3, 4.7.4

Reason for test

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

Initial configuration

Automatic GPRS attach is enabled.

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 DUT acknowledges this message by sending an ATTACH COMPLETE. Otherwise, no ATTACH COMPLETE shall be sent. |
| 2 | Check GPRS service indication. | DUT displays an Icon to indicate it is GPRS attached. [Operating System dependent] |
| 3 | Receive MT Call. | Voice Call is successful |
| 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. |

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.

### 4.2.2 Void

## 4.3 Routing Area Update

### 4.3.1 Routing Area Update - Normal - Successful

Description

The DUT 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

Reason for test

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

Initial configuration

DUT is in Idle mode and GPRS Attached.

Test procedure

1. Move DUT into a cell with a different RAC so it performs a cell reselection.
2. Establish a PDP context and open the internal browser.

Expected behaviour

1. DUT shall send a ROUTING AREA UPDATE REPQUEST message to the network.

Check whether the “update type” parameter holds the “RA updating” value.

The network shall then send a ROUTING AREA UPDATE ACCEPT message to the DUT. This message contains a new P-TMSI for the DUT and the RAC for the new cell.

1. DUT can establish a PS data connection.

### 4.3.2 Routing Area Update - Combined - Successful

Description

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

Related 3GPP core specifications

3GPP TS 24.008 4.7.5.2

Reason for test

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

Initial configuration

DUT is in Idle mode (GPRS Attached & IMSI attached).

Test procedure

1. Move DUT into a cell with a different LAC/RAC so it performs a cell reselection.
2. Establish a PDP context and open the internal browser.
3. Receive MT Call.

Expected behaviour

1. DUT sends a combined ROUTING AREA UPDATING REQUEST message to the network.

Check that in the ROUTING AREA UPDATING REQUEST message, the “Update type” parameter holds the “Combined RA/LA updating” value.

Check that in the ROUTING AREA UPDATING ACCEPT message, the “Update result” parameter holds the “Combined RA/LA updated” value.

Verify that the DUT stores the new “TMSI/P-TMSI” value and acknowledges the ROUTING AREA UPDATING ACCEPT message by sending a ROUTING AREA UPDATING COMPLETE message.

1. DUT can establish a PS data connection.
2. MT call is successful.

## 4.4 Periodic Routing Area Update

### 4.4.1 Periodic Routing Area Update - Successful

Description

Periodic Routing Area Update after the T3312 timer has expired.

Reason for test

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

Related 3GPP core specifications

3GPP TS 24.008 sections 4.7.2.2 and 4.7.5

3GPP TS 24.060 sections 8,9,10 and 11

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 (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” information element has value 3 (“periodic updating” )

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

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.

# 5 PS Data (GPRS / EGPRS)

## 5.1 Access Point Name (APN)

### 5.1.1 Access Point Name - Manually set by MMI

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

### 5.1.2 Access Point Name - Manually set by Software 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

## 5.2 PDP Context Activation / Deactivation

### 5.2.1 PDP context Activation / Deactivation - User initiated

#### 5.2.1.1 Void

#### 5.2.1.2 Void

#### 5.2.1.3 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, section 6.1.3.1

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 CS/PS registered on Roaming PLMN and a PDP context is successfully established.
2. Webpage is loaded.

#### 5.2.1.4 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, section 6.1.3.1

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 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.

### 5.2.2 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 3GPP 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).

2. Webpage is not loaded.

### 5.2.3 PDP context Activation - User initiated - PDP context modification

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

### 5.2.4 PDP context Deactivation - DUT initiated

Description

Verify that the DUT doesn’t deactivate the PDP context by itself (without user action).

Reason for test

Ensure that the DUT doesn’t deactivate the PDP context by itself (without user action).

Related 3GPP core specifications

3GPP TS 24.008, section 6.1.3.3.3

Initial configuration

DUT has a successful PDP context activated according to test procedure in test case [5.2.1.4](#_5.2.1.4_PDP_Context)  “User initiated PDP context activation”.

Test procedure

**Scenario A: Browsing Application**

1. Load a page on the internal browser.
2. Wait for at least 20 minutes.

**Scenario B: Modem Application**

1. Load a page on the PC browser or Ping a known reachable IP address.
2. Wait for at least 20 minutes.

Expected behaviour

1. Page is loaded successfully.
2. The DUT doesn’t deactivate the PDP context by itself.

### 5.2.5 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

### 5.2.6 Simultaneous PDP context Activation / Deactivation - User initiated

Description

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

Reason for test

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

Related 3GPP core specifications

GSM 04.08, section 6.1.3.1

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: 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: 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.

## 5.3 Coding schemes

### 5.3.1 Coding schemes - Support of CS1, CS2, CS3, CS4

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

## 5.4 Multi-slot Allocation

### 5.4.1 Multi-slot Allocation - PSET Downgrade / Upgrade

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

## 5.5 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.

### 5.5.1 Stationary Data Performance – Relative Downlink Throughput

Description

Measure the average downlink throughput for a GPRS / EGPRS connection.

Reason for test

To ensure that the downlink GPRS and downlink EGPRS data throughput of the DUT is acceptable in a stationary condition.

Related 3GPP core specifications

N/A

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 STANDBY 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 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. |

### 5.5.2 Void

### 5.5.3 Stationary Data Performance – Relative Uplink Throughput

Description

Measure the average uplink throughput for a GPRS / EGPRS connection.

Reason for test

To ensure that the uplink GPRS and uplink EGPRS data throughput of the DUT is acceptable in stationary condition

Related 3GPP core specifications

N/A

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 STANDBY 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 eference-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 |

### 5.5.4 Void

## 5.6 GPRS functionality

### 5.6.1 GPRS functionality - GSM services during GPRS

Description

Verify the GSM services while DUT is in GMM STANDBY/READY states.

Reason for test

To ensure that GSM services are not impacted by packet data activities.

Related 3GPP core specifications

3GPP TS 23.060

Initial configuration

DUT is IMSI and GPRS attached.

DUT is connected to a laptop.

For Scenario **B** and Scenario **C**, if the DUT does not have tethering functionality another means to execute the test case is to use an internal application to generate GPRS traffic such as the web browser. If the DUT has a multitasking operating system, all parts of this test case can be executed. If the DUT is only single tasking and hence the web browser can’t be closed with the GPRS session being closed as well, at least the mobile terminated tests shall be executed and a comment shall be made in the test case result documentation.

Test procedure

**Scenario A: GPRS Attached**

1. DUT is in IDLE mode (GMM STANDBY state).
2. Make MO Voice call to Client 1.
3. Receive MT Voice call from Client 1.
4. Send MO SMS to Client 1.
5. Receive MT SMS from Client 1.

**Scenario B: PDP context (no data transfer) (see initial configuration)**

1. Activate PDP context and block data. Wait until DUT is in GMM STANDBY state.
2. Make MO Voice call to Client 1.
3. Receive MT Voice call from Client 1.
4. Send MO SMS to Client 1.
5. Receive MT SMS from Client 1.

**Scenario C: PDP context (with data transfer) (see initial configuration)**

1. Activate PDP context and download a large non-compressible file during GMM Ready state.
2. Make MO Voice call to Client 1.
3. Receive MT Voice call from Client 1.
4. Send MO SMS to Client 1.
5. Receive MT SMS from Client 1.

Expected behaviour

1. DUT is in state according to desired scenario (A/B/C).
2. Voice call is successful. During Scenario C, the DUT SHOULD suspend data transfer when the voice call is active and resume data transfer once the voice call is ended.
3. Voice call is successful. During Scenario C, it is possible that MT voice calls MAY not be received during an active data transfer unless the network operates in NMO I or uses some form of paging coordination. This shall be known before the test so the tester can verify the according behaviour.
4. SMS is sent successfully.
5. SMS is received successfully. During Scenario C, it is possible that MT SMS MAY not be received during an active data transfer unless the network operates in NMO I or uses some form of paging coordination. This shall be known before the test so the tester can verify the according behaviour.

### 5.6.2 GPRS functionality - Link Adaptation and Incremental Redundancy

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

### 5.6.3 GPRS functionality - Verification of GPRS Ciphering Algorithm

Description

To verify that the DUT can successfully use the strongest GPRS ciphering algorithm supported by the DUT and the network.

Reason for test

Several ciphering algorithms are supported by mobile stations and networks today. This test verifies that the DUT sends information about all supported ciphering algorithms to the network so the network can select the strongest algorithm it supports.

Related 3GPP core specifications

3GPP TS 24.008

Initial configuration

Automatic GPRS attach at Power ON is enabled.

Mobile data is disabled by default.

DUT is Powered OFF (or Flight Mode enabled).

Supported GPRS ciphering algorithms for network under test are known (e.g. GEA3, GEA4, etc.)

Supported GPRS ciphering algorithms by DUT are known (e.g. GEA3, GEA4, etc.).

Test procedure

1. Power ON DUT (or disable Flight Mode).
2. Enable mobile data at DUT.
3. 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 registered to the network (Applicable to NMO2 networks only).

DUT sends an ATTACH REQUEST message to the network.

Within ATTACH REQUEST message, confirm the DUT indicates the support for all the supported ciphering algorithms correctly.

The network SHALL respond to the DUT with an AUTHENTICATION AND CIPHERING REQUEST message.

Within AUTHENTICATION AND CIPHERING REQUEST message, confirm the strongest ciphering algorithm supported by DUT and network is assigned to DUT.

The network SHALL respond to the DUT with an ATTACH ACCEPT message.

1. Mobile data is enabled successfully.
2. Webpage is loaded successfully.

### 5.6.4 GPRS functionality - GPRS Service indication - Cell reselection

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

### 5.6.5 GPRS functionality – Non-support of GEA1

Description

To verify that MS does not include GEA1 ciphering algorithm in the list of supported algorithms.

Reason for test

Several ciphering algorithms are supported by mobile stations and networks today. This test verifies that DUT does not indicate the support of GEA1.

Related 3GPP core specifications

3GPP TS 24.008, 3GPP TS 43.020, Anned D.4.9

Initial configuration

Automatic GPRS attach at Power ON is enabled.

Mobile data is disabled by default.

DUT is Powered OFF (or Flight Mode enabled).

Test procedure

|  |  |  |
| --- | --- | --- |
| **-** | **Test procedure** | **Expected behaviour** |
| 1 | Power ON DUT (or disable Flight Mode). | DUT is successfully CS registered to the network (Applicable to NMO2 networks only). |
|  | DUT sends an ATTACH REQUEST message to the network. | Within ATTACH REQUEST message, confirm the DUT indicates the supported ciphering algorithms correctly and **does not include GEA1 in the list of algorithms**.  The network shall respond to the DUT with an AUTHENTICATION AND CIPHERING REQUEST message.  Within AUTHENTICATION AND CIPHERING REQUEST message, confirm the ciphering algorithm asssigned by the network to DUT  The network shall respond to the DUT with an ATTACH ACCEPT message |
| 2 | Enable mobile data at DUT | Mobile data is enabled successfully. |
| 3 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully |

### 5.6.6 GPRS functionality – Non-support of GEA2

Description

To verify that MS does not include GEA2 ciphering algorithm in the list of supported algorithms.

Reason for test

Several ciphering algorithms are supported by mobile stations and networks today. This test verifies that DUT does not indicate the support of GEA2.

Related 3GPP core specifications

3GPP TS 24.008, 3GPP TS 43.020, Anned D.4.9

Initial configuration

Automatic GPRS attach at Power ON is enabled.

Mobile data is disabled by default.

DUT is Powered OFF (or Flight Mode enabled).

Test procedure

|  |  |  |
| --- | --- | --- |
| **-** | **Test procedure** | **Expected behaviour** |
| 1 | Power ON DUT (or disable Flight Mode). | DUT is successfully CS registered to the network (Applicable to NMO2 networks only). |
|  | DUT sends an ATTACH REQUEST message to the network. | Within ATTACH REQUEST message, confirm the DUT indicates the supported ciphering algorithms correctly and **does not include GEA2 in the list of algorithms**.  The network shall respond to the DUT with an AUTHENTICATION AND CIPHERING REQUEST message.  Within AUTHENTICATION AND CIPHERING REQUEST message, confirm the ciphering algorithm asssigned by the network to DUT  The network shall respond to the DUT with an ATTACH ACCEPT message |
| 2 | Enable mobile data at DUT | Mobile data is enabled successfully. |
| 3 | Open the embedded browser application and load a webpage. | Webpage is loaded successfully |

# 6 Mobility

## 6.1 Void

### 6.1.1 Void

### 6.1.2 Void

### 6.1.3 Void

### 6.1.4 Void

### 6.1.5 Void

## 6.2 Void

### 6.2.1 Void

### 6.2.2 Void

### 6.2.3 Void

## 6.3 Mobility Management

Description

The DUT should perform reselections and handovers without losing service.

Related 3GPP core specifications

3GPP TS 44.018

3GPP TS 25.304

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 cells available on the same PLMN.



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) (2G -> 2G)**

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 MSC.
* Cells not sharing a MSC.
* Cells sharing a Location Area and Routing Area.
* Cells not sharing a Location Area and/or a Routing Area.
* Cells with and without frequency hopping
* Synchronised cells.
* Non-synchronised cells.
* Cells supporting GPRS and EGPRS.

|  |  |  |
| --- | --- | --- |
| - | 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 (2G(Band A) -> 2G(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 2G 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 2G cell (Band B). |

**Scenario C: Inter-Ciphering (2G(A5/4) -> 2G(A5/3))**

The test route should contain the following scenario:

* Cells operating with different ciphering modes (A5/4 -> A5/3).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G cell supporting A5/4 ciphering. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING in HANDOVER COMMAND from the network.  DUT is in a 2G cell supporting A5/3 ciphering. |

**Scenario D: Inter-Ciphering (2G(A5/4) -> 2G(A5/1))**

The test route should contain the following scenario:

* Cells operating with different ciphering modes (A5/4 -> A5/1).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G cell supporting A5/4 ciphering. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT receives “cipher with algorithm A5/1” within CIPHER MODE SETTING in HANDOVER COMMAND from the network.  DUT is in a 2G cell supporting A5/1 ciphering. |

**Scenario E: Inter-Ciphering (2G(A5/3) -> 2G(A5/4))**

The test route should contain the following scenario:

* Cells operating with different ciphering modes (A5/3 -> A5/4).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G cell supporting A5/3 ciphering. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING in HANDOVER COMMAND from the network.  DUT is in a 2G cell supporting A5/4 ciphering. |

**Scenario F: Inter-Ciphering (2G(A5/3) -> 2G(A5/1))**

The test route should contain the following scenario:

* Cells operating with different ciphering modes (A5/3 -> A5/1).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G cell supporting A5/3 ciphering. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT receives “cipher with algorithm A5/1” within CIPHER MODE SETTING in HANDOVER COMMAND from the network.  DUT is in a 2G cell supporting A5/1 ciphering. |

**Scenario G: Inter-Ciphering (2G(A5/1) -> 2G(A5/4))**

The test route should contain the following scenario:

* Cells operating with different ciphering modes (A5/1 -> A5/4).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G cell supporting A5/1 ciphering. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING in HANDOVER COMMAND from the network.  DUT is in a 2G cell supporting A5/4 ciphering. |

**Scenario H: Inter-Ciphering (2G(A5/1) -> 2G(A5/3))**

The test route should contain the following scenario:

* Cells operating with different ciphering modes (A5/1 -> A5/3).

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G cell supporting A5/1 ciphering. |
| 2 | Move DUT along the route.  Check the Cell ID details as the DUT moves through the route. | DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING in HANDOVER COMMAND from the network.  DUT is in a 2G cell supporting A5/3 ciphering. |

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

The test route should contain the following scenario:

2G cells and 3G cells.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G 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 3G cell. |

**Scenario J: Inter-RAT (2G -> 4G)**

The test route should contain the following scenario:

2G cells and 4G cells.

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | DUT is at start location. | DUT is in a 2G 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

### 6.3.1 GPRS Detached (IDLE)

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | No GPRS Attach (At+CGATT=0) | Ensure DUT is not GPRS attached (GMM IDLE state). |
| 2 | *Follow instruction of the appropriate scenario.* | |
| 3 | Page (Voice/SMS) the DUT after the scenario. | DUT can be successfully paged (Voice/SMS). |

### 6.3.2 PDP Activated - No data transfer (STANDBY)

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Ensure PDP Context is activated.  DUT is in STANDBY 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). |

### 6.3.3 PDP Activated - Data Transfer (READY)

|  |  |  |
| --- | --- | --- |
| - | 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. Reselection. | DUT is actively transferring data. |

### 6.3.4 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. |

### 6.3.5 PDP Deactivated (STANDBY)

|  |  |  |
| --- | --- | --- |
| - | Test procedure | Expected behaviour |
| 1 | Ensure PDP Context is deactivated.  DUT is in STANDBY state. | Ensure DUT is GPRS attached (GMM STANDBY state). |
| 2 | Follow instruction of the appropriate scenario. | |
| 3 | Page (Voice/SMS) the DUT after the scenario. | DUT can be successfully paged (Voice/SMS). |

# 7 A5/3 Ciphering

## 7.1 A5/3 Ciphering - Location Updating

### 7.1.1 A5/3 Ciphering - Normal Location Area Update

Description

Location Updating with A5/3 ciphering is performed.

Reason for test

To ensure ciphering with A5/3 algorithm during location updating.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216

Initial configuration

A5/3 ciphering supported by network.

DUT in 2G 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. (For some networks, ciphering will only occur when a TMSI reallocation process takes place during the Location updating procedure).

Test procedure

1. Power on DUT and check the protocol details using a suitable trace tool.

Expected behaviour

1. DUT sends “A5/3 available” within MOBILE STATION CLASSMARK section of the CLASSMARK CHANGE message to the Network.

DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING section of the CIPHERING MODE COMMAND message from the network.

DUT receives the LOCATION UPDATING ACCEPT message from the network.

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | CLASSMARK CHANGE | “A5/3 supported” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/3” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |
| 4 | 🡸 | LOCATION UPDATING ACCEPT | New TMSI (optional) |

## 7.2 A5/3 Ciphering - Voice Call

### 7.2.1 A5/3 Ciphering - MO Voice Call

Description

A mobile originated voice call is established using A5/3 ciphering.

Reason for test

To ensure ciphering with A5/3 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216

Initial configuration

A5/3 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT make MO voice call to Client 1 and check the protocol details using a suitable trace tool.
2. Answer call on Client 1.

Expected behaviour

1. DUT sends “A5/3 available” within MOBILE STATION CLASSMARK 2 in CM SERVICE REQUEST to the network.

DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | CM SERVICE REQUEST | “A5/3 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/3” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. 2-Way audio connection is established.

### 7.2.2 A5/3 Ciphering - MT Voice Call

Description

A mobile terminated voice call is established using A5/3 ciphering.

Reason for test

To ensure ciphering with A5/3 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216.

Initial configuration

A5/3 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT receive MT voice call from Client 1 and check the protocol details using a suitable trace tool.
2. Answer call on DUT.

Expected behaviour

1. DUT sends “A5/3 available” within MOBILE STATION CLASSMARK 2 in PAGING RESPONSE to the network.

DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | PAGING RESPONSE | “A5/3 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/3” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. 2-Way audio connection is established.

## 7.3 A5/3 Ciphering - SMS

### 7.3.1 A5/3 Ciphering - MO SMS

Description

Send an MO SMS using A5/3 Ciphering

Reason for test

To ensure ciphering with A5/3 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216.

Initial configuration

A5/3 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT send a MO SMS to Client 1 and check the protocol details using a suitable trace tool.
2. Open the SMS at Client 1 and check the content.

Expected behaviour

1. DUT sends “A5/3 available” within MOBILE STATION CLASSMARK 2 in CM SERVICE REQUEST to the network.

DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | CM SERVICE REQUEST | “A5/3 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/3” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. SMS is successfully received on Client 1. Content is identical to the message prepared on DUT.

### 7.3.2 A5/3 Ciphering - MT SMS

Description

Receive an MT SMS using A5/3 Ciphering

Reason for test

To ensure ciphering with A5/3 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216.

Initial configuration

A5/3 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT receive a MT SMS from Client 1 and check the protocol details using a suitable trace tool.
2. Open the SMS at DUT and check the content.

Expected behaviour

1. DUT sends “A5/3 available” within MOBILE STATION CLASSMARK 2 in PAGING RESPONSE to the network.

DUT receives “cipher with algorithm A5/3” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | PAGING RESPONSE | “A5/3 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/3” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. SMS is successfully received on DUT. Content is identical to the message prepared on Client 1.

# 8 Void

Note: chapter removed due to legacy test cases # see FT53-029

# 9 Void

Note: chapter removed due to legacy test cases # see FT53-030

# 10 A5/4 Ciphering

## 10.1 A5/4 Ciphering - Location Updating

### 10.1.1 A5/4 Ciphering - Normal Location Area Update

Description

Location Updating with A5/4 ciphering is performed.

Reason for test

To ensure ciphering with A5/4 algorithm during location updating.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216

Initial configuration

A5/4 ciphering supported by network.

DUT in 2G 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. (For some networks, ciphering will only occur when a TMSI reallocation process takes place during the Location updating procedure).

Test procedure

1. Power on DUT and check the protocol details using a suitable trace tool.

Expected behaviour

1. DUT sends “A5/4 available” within MOBILE STATION CLASSMARK section of the CLASSMARK CHANGE message to the Network.

DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING section of the CIPHERING MODE COMMAND message from the network.

DUT receives the LOCATION UPDATING ACCEPT message from the network.

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | CLASSMARK CHANGE | “A5/4 supported” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/4” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |
| 4 | 🡸 | LOCATION UPDATING ACCEPT | New TMSI (optional) |

## 10.2 A5/4 Ciphering - Voice Call

### 10.2.1 A5/4 Ciphering - MO Voice Call

Description

A mobile originated voice call is established using A5/4 ciphering.

Reason for test

To ensure ciphering with A5/4 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216

Initial configuration

A5/4 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT make MO voice call to Client 1 and check the protocol details using a suitable trace tool.
2. Answer call on Client 1.

Expected behaviour

1. DUT sends “A5/4 available” within MOBILE STATION CLASSMARK 2 in CM SERVICE REQUEST to the network.

DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | CM SERVICE REQUEST | “A5/4 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/4” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. 2-Way audio connection is established.

### 10.2.2 A5/4 Ciphering - MT Voice Call

Description

A mobile terminated voice call is established using A5/4 ciphering.

Reason for test

To ensure ciphering with A5/4 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216.

Initial configuration

A5/4 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT receive MT voice call from Client 1 and check the protocol details using a suitable trace tool.
2. Answer call on DUT.

Expected behaviour

1. DUT sends “A5/4 available” within MOBILE STATION CLASSMARK 2 in PAGING RESPONSE to the network.

DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | PAGING RESPONSE | “A5/4 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/4” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. 2-Way audio connection is established.

## 10.3 A5/4 Ciphering - SMS

### 10.3.1 A5/4 Ciphering - MO SMS

Description

Send an MO SMS using A5/4 Ciphering

Reason for test

To ensure ciphering with A5/4 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216.

Initial configuration

A5/4 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT send a MO SMS to Client 1 and check the protocol details using a suitable trace tool.
2. Open the SMS at Client 1 and check the content.

Expected behaviour

1. DUT sends “A5/4 available” within MOBILE STATION CLASSMARK 2 in CM SERVICE REQUEST to the network.

DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | CM SERVICE REQUEST | “A5/4 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/4” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. SMS is successfully received on Client 1. Content is identical to the message prepared on DUT.

### 10.3.2 A5/4 Ciphering - MT SMS

Description

Receive an MT SMS using A5/4 Ciphering

Reason for test

To ensure ciphering with A5/4 algorithm is possible when this is supported in the network.

Related 3GPP core specifications

3GPP TS 44.018, 24.008, 55.216.

Initial configuration

A5/4 ciphering supported by network.

DUT in 2G only mode.

DUT in idle mode.

Test procedure

1. At DUT receive a MT SMS from Client 1 and check the protocol details using a suitable trace tool.
2. Open the SMS at DUT and check the content.

Expected behaviour

1. DUT sends “A5/4 available” within MOBILE STATION CLASSMARK 2 in PAGING RESPONSE to the network.

DUT receives “cipher with algorithm A5/4” within CIPHER MODE SETTING in CIPHER MODE COMMAND from the network:

| Step | Direction UE - NW | Message | Comments |
| --- | --- | --- | --- |
| 1 | 🡺 | PAGING RESPONSE | “A5/4 available” |
| 2 | 🡸 | CIPHERING MODE COMMAND (DCCH) | “Cipher with Algorithm A5/4” |
| 3 | 🡺 | CIPHERING MODE COMMAND COMPLETE (DCCH) |  |

1. SMS is successfully received on DUT. Content is identical to the message prepared on Client 1.

# Document Management

## Document History

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## Other Information

|  |  |
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