Mobile Equipment (ME) Conformance Testing for cdma2000 Spread Spectrum Standards

Release 0

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No text.
1 FOREWORD

The present document provides the Conformance Test Specification for Removable User Identity Module (R-UIM) enabled Mobile Equipment (ME) terminals defined in [1], [2], [8] and [9].
No text.
2 REFERENCES


[2] 3GPP 51.011: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".


[8] GSM 11.12: "Digital cellular telecommunications system (Phase 2); Specification of the 3 Volt Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

[9] 3GPP 31.101: "Digital cellular telecommunications system (Phase 2+); Specification of the 1.8 Volt Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

[10] 3GPP 51.010: "Mobile Station (MS) conformance specification; Part 1: Conformance specification".

No text.
3 DEFINITIONS AND ABBREVIATIONS

3.1 Definitions
For the purposes of the present document, the following terms and definitions apply in addition to the terms defined in [1]:

**Implementation Conformance Statement (ICS):** A statement made by the supplier of an implementation or a system claimed to conform to a given specification, stating which capabilities have been implemented. The ICS can take several forms: protocol ICS, profile ICS, profile specific ICS, information object ICS, etc.

3.2 Abbreviations
For the purposes of the present document, the following abbreviations apply:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3GPP2</td>
<td>3rd Generation Partnership Project 2</td>
</tr>
<tr>
<td>CHV1</td>
<td>Card Holder Verification 1</td>
</tr>
<tr>
<td>CHV2</td>
<td>Card Holder Verification 2</td>
</tr>
<tr>
<td>CRn</td>
<td>Conformance Requirement 'n'</td>
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<tr>
<td>DF</td>
<td>Directory File</td>
</tr>
<tr>
<td>FT</td>
<td>Fixed Termination</td>
</tr>
<tr>
<td>ICS</td>
<td>Implementation Conformance Statement</td>
</tr>
<tr>
<td>IUT</td>
<td>Implementation Under Test</td>
</tr>
<tr>
<td>ME</td>
<td>Mobile Equipment</td>
</tr>
<tr>
<td>MF</td>
<td>Master File</td>
</tr>
<tr>
<td>MS</td>
<td>Mobile Station</td>
</tr>
<tr>
<td>PIN</td>
<td>Personal Identity Number</td>
</tr>
<tr>
<td>PIN2</td>
<td>Personal Identity Number 2</td>
</tr>
<tr>
<td>PRL</td>
<td>Preferred Roaming List</td>
</tr>
<tr>
<td>PUK</td>
<td>PIN Unblocking Key</td>
</tr>
<tr>
<td>PUK2</td>
<td>PIN2 Unblocking Key</td>
</tr>
<tr>
<td>R-UIM</td>
<td>Removable User Identity Module</td>
</tr>
<tr>
<td>SIM</td>
<td>Subscriber Identity Module</td>
</tr>
<tr>
<td>SS</td>
<td>System Simulator</td>
</tr>
<tr>
<td>TS</td>
<td>Test Specification</td>
</tr>
</tbody>
</table>
No text.
4 ME TEST ENVIRONMENT

The test environment shall comply with the requirements specified in Clause 4, “Physical Characteristics” and Clause 5, “Electronic Signals and Transmission Protocols” of [2].
No text.
5 TESTING OF THE ME

The following sequence of tests confirms:

1) the correct interpretation of data read from the R-UIM (Removable-User Identification Module) by the ME;
2) the correct writing of data to the R-UIM by the ME;
3) the initiation of appropriate procedures by the ME;
4) low level protocols;
5) electrical characteristics;
6) physical characteristics.

All tests apply to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

An R-UIM simulator may be included as part of the system simulator (SS). Alternatively, to perform the logical tests, R-UIMs programmed with specific data may be used. The R-UIM data is not defined within the initial conditions of the tests unless it differs from the default values defined below.

5.1 Definition of Default Values for R-UIM/ME Interface Testing

An R-UIM containing the following default values is used for all tests of this section unless otherwise stated.

For all data items, the logical default values and the coding within the elementary files (EFs) of the R-UIM follow.

NOTE 1: Bx represents Byte x of the coding starting from left to right, i.e. MSB to LSB.

NOTE 2: Unless otherwise defined, the coding values are hexadecimal.

5.1.1 EF\textsubscript{CST} (CDMA Service Table)

Unless otherwise specified, the CDMA Service Table (EF\textsubscript{CST}) shall be coded as defined by the entry “EF\textsubscript{CST} Setting 1” of Table 5-1.
### Table 5-1. Coding of EF<sub>CST</sub>

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
<th>Byte Coding (binary)</th>
</tr>
</thead>
</table>
| EF<sub>CST</sub> Setting 1 | • CHV1 disable function allocated and activated.  
• Abbreviated dialing numbers allocated and activated.  
• Fixed dialing numbers not activated. | B1 – xx0x1111       |
| EF<sub>CST</sub> Setting 2 | • CHV1 disable function allocated and activated.  
• Abbreviated dialing numbers allocated and activated.  
• Fixed dialing numbers allocated and activated. | B1 – xx111111      |
| EF<sub>CST</sub> Setting 3 | • CHV1 disable function not activated.  
• Abbreviated dialing numbers allocated and activated.  
• Fixed dialing numbers not activated. | B1 – xx0x110x       |

Note: The coding of bits designated 'x' shall conform to the capabilities of the R-UIM simulator used.

5.1.2 EF<sub>ADN</sub> (Abbreviated Dialing Number)

At least 10 records.

Record 1:

- Length of alpha identifier: 32 characters
- Alpha identifier: "ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEF"
- Length of BCD number: "03"
- TON and NPI: Telephony and Unknown
- Dialed number: 123
- CCI: None
- Ext1: None

Coding: B1 B2 B3 ... B32 B33 B34 B35 B36 B37 B38 B39 ... B46

Record 1: 41 42 43 ... 46 03 81 21 F3 FF FF FF ... FF
5.1.3 CHV1 (PIN)

Logically: 2468

Coding: B1 B2 B3 B4 B5 B6 B7 B8

32 34 36 38 FF FF FF FF

5.1.4 CHV2 (PIN2)

Logically: 3579

Coding: B1 B2 B3 B4 B5 B6 B7 B8

33 35 37 39 FF FF FF FF

5.1.5 Unblock CHV1 (PUK)

Logically: 13243546

Coding: B1 B2 B3 B4 B5 B6 B7 B8

31 33 32 34 33 35 34 36

5.1.6 Unblock CHV2 (PUK2)

Logically: 08978675

Coding: B1 B2 B3 B4 B5 B6 B7 B8

30 38 39 37 38 36 37 35

5.1.7 Definition of FDN R-UIM

Some test cases require a different configuration from the one described in the previous sections. For that purpose a default FDN R-UIM is defined. In general the values of the FDN R-UIM are identical to the default R-UIM, with the following exceptions:

5.1.8 EF\textsubscript{FDN} (Fixed Dialing Numbers)

Multiple records:

Record 1:

Length of alpha identifier: 6 characters

Alpha identifier: "FDN111"

Length of BCD number: "06"

TON and NPI: Telephony and Unknown

Dialed number: 1357924680

CCI: None

Ext1: None
Coding for record 1:

B1  B2  B3  B4  B5  B6  B7  B8  B9  B10  B11  B12  B13
46  44  4E  31  31  31  06  81  31  75  29  64  08

B14  B15  B16  B17  B18  B19  B20
FF  FF  FF  FF  FF  FF  FF

Record 2:

Length of alpha identifier: 6 characters
Alpha identifier: "FDN222"
Length of BCD number: "04"
TON and NPI: Telephony and Unknown
Dialed number: 24680
CCI: None
Ext1: None

Coding for record 2:

B1  B2  B3  B4  B5  B6  B7  B8  B9  B10  B11  B12  B13
46  44  4E  32  32  32  04  81  42  86  F0  FF  FF

B14  B15  B16  B17  B18  B19  B20
FF  FF  FF  FF  FF  FF  FF

Record 3:

Length of alpha identifier: 6 characters
Alpha identifier: "FDN333"
Length of BCD number: "0B"
TON and NPI: Telephony and Unknown
Dialed number: 12345678901234567890
CCI: None
Ext1: None
Coding for record 3:

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<th>B5</th>
<th>B6</th>
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<td>0B</td>
<td>81</td>
<td>21</td>
<td>43</td>
<td>65</td>
<td>87</td>
<td>09</td>
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6 ME TEST PROCEDURES

For each test procedure the following five (5) subsections are included:

1) Definition and Applicability
2) Conformance Requirement
3) Test Purpose
4) Method of Test
   (a) Initial Conditions
   (b) Procedure
5) Test Requirement

6.1 MS Identification

6.1.1 Mobile Station Identifier

6.1.1.1 Definition and Applicability
This test verifies the use of the Mobile Station Identifier (Mobile Station ID [MSID] or Mobile Station Identification Number [MSIN]), Mobile Country Code (MCC), and International Mobile Station Identity (IMSI) stored within the R-UIM.
This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.1.1.2 Conformance Requirement
The MS shall conform to the requirements specified in 2.12.3 of [11].

6.1.1.3 Test Purpose
The purpose of the test is to verify that the ME uses the IMSI_S, IMSI_11_12, and MCC of the R-UIM.

6.1.1.4 Method of Test
6.1.1.4.1 Initial Conditions
The default R-UIM is installed into the ME, and the MS is powered on.

6.1.1.4.2 Procedure
The tests shall be conducted in accordance with the procedures and requirements defined in 2.12 (MSID, MCC, and IMSI) of [11].

6.1.1.5 Test Requirement
The ME shall conform to the requirements defined in 2.12.3 (Minimum Standard) of [11].
6.1.2  MS Recognizing the Home SID/NID

6.1.2.1 Definition and Applicability

This test verifies the ability of the ME to read the appropriate home system information from the R-UIM, compare that stored information to that received by the ME in the Sync Channel Message, and to display the appropriate roaming indication to the user.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.1.2.2 Conformance Requirement

The ME shall compare the values of SIDp and NIDp stored within EF_{CDMAHOME} with those received in the Sync Channel Message (SIDr and NIDr, respectively) as the basis for displaying a roaming indication to the user.

6.1.2.3 Test Purpose

The purpose of the test is to verify the ME is able to read, interpret, and apply during the normal course of operation the values of SIDp and NIDp stored within EF_{CDMAHOME}.

6.1.2.4 Method of Test

6.1.2.4.1 Initial Conditions

The values of the SID and NID fields of the Sync Channel Message transmitted by the system simulator shall be set to equal those stored in the R-UIM (EF_{CDMAHOME}).

6.1.2.4.2 Procedure

1) Power-on the mobile station.

2) Observe the status of any roaming indicator icon or display element on the mobile station.

3) Set the values of the SID and NID fields of the Sync Channel Message transmitted by the system simulator to values other than those stored in the R-UIM (EF_{CDMAHOME}).

4) Power cycle (power-off then power-on) the mobile station.

5) Observe the status of any roaming indicator icon or display element on the mobile station.

6.1.2.5 Test Requirement

1) In step 2) of the test procedure, the roaming indicator icon or display element of the mobile station shall indicate the mobile station is operating within its home system.

2) In step 5) of the test procedure, the roaming indicator icon or display element of the mobile station shall indicate the mobile station is operating in a roaming status.
6.2 UIM_ID/ESN_ME Selection

6.2.1 Removable UIM_ID Usage Indicator

6.2.1.1 Definition and Applicability
Removable UIM_ID Usage Indicator indicates whether the 32 bits of the UIM_ID or ESN_ME is used in the MS identification procedure.

6.2.1.2 Conformance Requirement
The ME shall use the UIM_ID or ESN_ME correctly for over-the-air messages as indicated by the Removable UIM_ID Usage Indicator stored in the R-UIM.

6.2.1.3 Test Purpose
This test verifies that the mobile station uses the UIM_ID or ESN_ME correctly depending on the setting of the Removable UIM_ID Usage Indicator.

6.2.1.4 Method of Test

6.2.1.4.1 Initial Conditions
The default R-UIM is installed into the ME, and the MS is powered on.

6.2.1.4.2 Procedure
1) Ensure that the system simulator selects ESN as PREF_MSID_TYPE.
2) Set the Removable UIM_ID Usage Indicator in R-UIM to ‘1’.
3) Initiate a mobile station originated call.
4) Verify that the UIM_ID is used for identification in the *Origination Message*.
5) End the call.
6) Set the Removable UIM_ID Usage Indicator in the R-UIM to ‘0’.
7) Power-cycle the mobile station (Power “Off” and then Power “On”).
8) Initiate a mobile station originated call.
9) Verify that the ESN_ME is used for identification in *Origination Message*.
10) End the call.

6.2.1.5 Test Requirement
1) If the Removable UIM_ID Usage Indicator is set to ‘1’, the ME shall use the UIM_ID to identify itself.
2) If the Removable UIM_ID Usage Indicator is set to ‘0’, the ME shall use the ESN_ME to identify itself.
6.2.2 ESN Management

6.2.2.1 Definition and Applicability
ESN_ME is the electronic serial number of the Mobile Equipment (ME) to which the R-UIM is attached. This number is transferred to the R-UIM when the Mobile Equipment determines that the R-UIM has been inserted.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.2.2.2 Conformance Requirement
This test verifies that the ME provides its ESN to the R-UIM during the ME and R-UIM initialization procedure.

6.2.2.3 Test Purpose
To ensure that the servicing ESN_ME is stored within the R-UIM.

6.2.2.4 Method of Test

6.2.2.4.1 Initial Conditions
EF_{ESN,ME} is initialized to the default value as defined in [1].

6.2.2.4.2 Procedure
1) Insert this R-UIM into the ME being tested.
2) During the ME and R-UIM initialization process, verify that the ME invokes the “Store ESN_ME” command to store its ESN in EF '6F38'.
3) Verify that the new ESN_ME is successfully stored in the R-UIM.
4) Verify the new ESN_ME stored in the EF_{ESN,ME} matches ESN of the ME being tested.

6.2.2.5 Test Requirement
The ME shall be able to store ESN_ME into the R-UIM as a result of the initialization process.

6.3 Security-related commands

6.3.1 SSD Update

6.3.1.1 Definition and Applicability
SSD is derived from the “A-key” stored in the R-UIM. SSD updates are initiated when the system simulator issues the command UPDATE SSD, containing the parameter RANDSSD, to the ME.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.
6.3.1.2 Conformance Requirement

This test verifies that the mobile equipment passes RANDSSD, RANDSeed and AUTHBS correctly to R-UIM when the system simulator initiates an SSD Update process.

6.3.1.3 Test Purpose

To make sure that SSD update procedures are executed properly.

6.3.1.4 Method of Test

6.3.1.4.1 Initial Conditions

The default R-UIM is installed into the ME, and the MS is powered on. Ensure that the A-key, ESN and IMSI are aligned between the mobile station and the system simulator.

6.3.1.4.2 Procedure

1) At the system simulator, initiate an SSD Update on the paging channel.

2) Verify that the ME sends a Base Station Challenge Command to R-UIM with a RANDSeed.

3) Verify that upon receipt of a Base Station Challenge Response from the R-UIM, the ME sends a Base Station Challenge Order to the system simulator with RANDBS set to the same value as that received from R-UIM.

4) Verify that the ME sends an Update SSD Command to the R-UIM, containing the parameter RANDSSD received from the SSD Update Message.

5) Verify that upon receipt of a Base Station Challenge Confirmation Order from the system simulator, the ME sends a Confirm SSD Command to the R-UIM with AUTHBS set to the same value as that received from the Base Station Challenge Confirmation Order.

6) Verify that the ME sends an SSD Update Confirmation Order upon receipt of a response from R-UIM with '90 00', SW1 = '90' and SW2='00'.

7) Modify the IMSI in the system simulator to a different value.

8) Repeat steps 2) through 5).

9) Verify that the ME sends an SSD Update Rejection Order upon receipt of response from R-UIM with '98 04', SW1= '98' and SW2='04'.

6.3.1.5 Test Requirement

1) The ME sends an SSD Update Confirmation Order upon receipt of success response from R-UIM.

2) The ME sends an SSD Update Rejection Order upon receipt of failure response from R-UIM.
6.3.2 Authentication Calculation for Global Challenge

6.3.2.1 Definition and Applicability
The ME shall be able to initiate the start of the CAVE algorithm in R-UIM when the system simulator enables authentication.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.3.2.2 Conformance Requirement
The ME shall initiate the start of the Run Cave Command and pass the response (AUTHR) from the R-UIM to the system simulator within the appropriate signaling message.

6.3.2.3 Test Purpose
This test verifies that the mobile equipment correctly sends the Run CAVE Command to the R-UIM and passes AUTHR from the R-UIM to the system simulator when the system simulator enables or initiates authentication.

6.3.2.4 Method of Test

6.3.2.4.1 Initial Conditions
The default R-UIM is installed into the ME and the ME is powered on.

6.3.2.4.2 Procedure

1) At the system simulator, enable global challenge.

2) Originate a voice call from the mobile station.

3) Verify that the ME sends a Run CAVE Command with RANDTYPE set to '00000000' and RAND to R-UIM.

4) Upon receipt of SW '9F 03', verify that ME sends a Get Response Command.

5) Upon receipt of the AUTHR, verify that AUTHR is included in the Origination Message.

6) Verify the audio traffic in both directions.

6.3.2.5 Test Requirement
The ME shall correctly send the Run CAVE Command to the R-UIM and pass AUTHR from the R-UIM to the system simulator within the Origination Message.

6.3.3 Unique Challenge While the Mobile Station is in Idle State

6.3.3.1 Definition and Applicability
The CAVE function is run in the R-UIM to calculate AUTHU when the ME sends Run CAVE Command.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.
6.3.3.2 Conformance Requirement

This test verifies that the ME sends the Run CAVE Command to the R-UIM during call origination when the system simulator initiates a unique challenge to the mobile station.

6.3.3.3 Test Purpose

To ensure proper execution of the Run CAVE procedures.

6.3.3.4 Method of Test

6.3.3.4.1 Initial Conditions

The default R-UIM is installed into the ME, and the MS is powered on.

6.3.3.4.2 Procedure

1) Enable authentication within the system simulator.
2) Originate a voice call from the mobile station.
3) Instruct the system simulator to send an Authentication Challenge Message.
4) Verify that the ME sends a Run CAVE Command with RANDTYPE set to ‘00000001’ and RANDU to R-UIM.
5) Upon receipt of SW ‘9F 03’, verify that ME sends a Get Response Command.
6) Upon receiving the AUTHU, verify that AUTHU is included in the Authentication Challenge Response Message with AUTHU same as sent from R-UIM.
7) Verify the audio traffic in both directions.

6.3.3.5 Test Requirement

The ME correctly sends the Run CAVE Command with RANDU to the R-UIM and passes AUTHU from the R-UIM to the system simulator.

6.3.4 Unique Challenge While the Mobile Station is in Mobile Station Control on the Traffic Channel State

6.3.4.1 Definition and Applicability

The CAVE function is executed within the R-UIM to calculate AUTHU when the ME sends the Run CAVE Command with RANDU when the mobile station is in the Mobile Station Control on the Traffic Channel State.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.3.4.2 Conformance Requirement

This test verifies that the ME sends the Run CAVE Command to the R-UIM when the system simulator initiates a unique challenge while the mobile station is in the Mobile Station Control on the Traffic Channel State.
6.3.4.3 Test Purpose
To ensure that Run CAVE procedures are executed correctly while the mobile station is in the Mobile Station Control on the Traffic Channel State.

6.3.4.4 Method of Test
6.3.4.4.1 Initial Conditions
The default R-UIM is installed into the ME, and the MS is powered on.

6.3.4.4.2 Procedure
1) At the system simulator, enable authentication.
2) Originate a voice call from the mobile station.
3) Verify the audio traffic in both directions.
4) While the call is in progress, instruct the system simulator to send an Authentication Challenge Message.
5) Verify that the ME sends a Run CAVE Command with RANDTYPE set to ‘00000001’ and RANDU to R-UIM.
6) Upon receipt of SW ‘9F 03’, verify that ME sends a Get Response Command.
7) Upon receipt of AUTHU from R-UIM, verify that the ME sends an Authentication Challenge Response Message with AUTHU same as sent from R-UIM.

6.3.4.5 Test Requirement
The ME correctly sends the Run CAVE Command with RANDU to the R-UIM and passes AUTHU from the R-UIM to the system simulator.

6.3.5 Generate Key/VPM
6.3.5.1 Definition and Applicability
The CAVE function is run in the R-UIM to generate the encryption key/VPM when the ME sends a Generate Key/VPM command.
This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.3.5.2 Conformance Requirement
This test verifies that the ME sends a Generate Key/VPM command to the R-UIM when the user enables voice privacy.

6.3.5.3 Test Purpose
To ensure that Run CAVE procedures are executed correctly to generate the encryption key/VPM.
6.3.5.4 Method of Test

6.3.5.4.1 Initial Conditions
The default R-UIM is installed into the ME, and the MS is powered on.

6.3.5.4.2 Procedure

1) At the system simulator, enable authentication. On the mobile station, enable voice privacy.
2) Originate a voice call from the mobile station.
3) Verify that the ME sends a Run CAVE Command with the following:
   - RANDTYPE is set to ‘00000000’, Bit 4 of Process_Control is set to ‘1’
   - and a RAND.
4) Upon receipt of SW ‘9F 03’, verify that the ME sends a Get Response Command.
5) Upon receiving the AUTHR, verify that AUTHR is included in the Origination Message.
6) Verify that the ME sends a Generate Key/VPM command to the R-UIM.

6.3.5.5 Test Requirement
The ME correctly sends a Generate Key/VPM command to R-UIM after sending a Run CAVE with Save Register On.

6.4 Reserved

6.5 OTASP/OTAPA Functionality

6.5.1 Preferred Roaming List

6.5.1.1 Definition and Applicability
This test verifies that a mobile station can respond to an OTAPA mobile terminated call, download a preferred roaming list (PRL) and correctly store the list in the R-UIM. The size of the PRL downloaded to the mobile station shall be 4096 octets or MAX_PRL_LIST_SIZE octets, whichever is smaller.
This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.5.1.2 Conformance Requirement
The network-initiated OTAPA session shall result in the mobile station responding to a General Page Message and downloading a new PRL. The ME shall update EF\_PRL with the PRL downloaded from the system simulator.

6.5.1.3 Test Purpose
This test verifies that an ME can respond to an OTAPA mobile terminated call, download a PRL and correctly store and retrieve the PRL from the R-UIM.
6.5.1.4 Method of Test

6.5.1.4.1 Initial Conditions
The default R-UIM is installed into the ME, and the MS is powered on.

6.5.1.4.2 Procedure
1) The test shall be conducted in accordance with the procedures defined in 15.5 (OTAPA Service Provisioning for System Selection and Preferred Roaming for a Mobile Station in the Mobile Station Idle State) of [11].

6.5.1.5 Test Requirement
The ME shall conform to the test requirements defined in 15.5.3 (Minimum Standard) of [11]. The ME shall update EF\textsc{PRL} with the PRL downloaded from the system simulator.

6.5.2 OTASP/OTAPA Commands

6.5.2.1 Definition and Applicability
The ME maps OTASP/OTAPA messages sent from the system simulator correctly to the OTASP/OTAPA commands to R-UIM and maps responses from R-UIM to OTASP/OTAPA messages.
This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.5.2.2 Conformance Requirement
The ME shall map between messages and command/responses correctly.

6.5.2.3 Test Purpose
This test verifies that an ME can respond to OTASP/OTAPA messages sent from the system simulator correctly and map responses from R-UIM to OTASP/OTAPA message correctly to the system simulator.

6.5.2.4 Method of Test

6.5.2.4.1 Initial Conditions
The default R-UIM is installed into the ME, and the MS is powered on.

6.5.2.4.2 Procedure
The test shall be conducted in accordance with the procedures defined in [11].

6.5.2.5 Test Requirement
The ME shall correctly map the OTASP/OTAPA messages to corresponding commands and map responses from R-UIM to OTASP/OTAPA messages. In addition, the ME shall conform to the test requirements defined in [11].
6.6 Reserved

6.7 Reserved

6.8 Reserved

6.9 Reserved

6.10 Reserved

6.11 Exchange Protocol Tests
The ME shall conform to the requirements specified in subclause 27.11 of [10].

6.12 Evaluation of Directory Characteristics

6.12.1 Operating Speed in Authentication Procedure

6.12.1.1 Definition and Applicability
Authentication is performed in a cdma2000® network on an R-UIM enabled mobile station by the ME sending a random number received from the network to the R-UIM. The R-UIM then performs a calculation on the random number, and sends the result to the network for verification.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.12.1.2 Conformance Requirement
If bit b2 of the file characteristics is set to 1, the ME shall provide a clock frequency of at least 13/4 MHz to enable the R-UIM to run the authentication process in the required time.

6.12.1.3 Test Purpose
To verify that the authentication procedure is performed with a frequency of at least 13/4 MHz if the bit b2 of the file characteristics (byte 1 of the directory characteristics) is set to 1.

6.12.1.4 Method of Test

6.12.1.4.1 Initial Conditions
The ME shall be powered on and connected to an R-UIM simulator with bit b2 of the file characteristics set to ‘1’. 

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1 cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States.
The test shall be conducted in accordance with the procedures defined in 6.11 (Authentication Upon Originations) of [11].

6.12.1.5 Test Requirement

The frequency of the clock shall be at least 13/4 MHz during the authentication procedure.

6.12.2 Clock Stop

6.12.2.1 Definition and Applicability

The ME may switch off the clock signal to the R-UIM if the R-UIM indicates that it supports this feature.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.12.2.2 Conformance Requirement

The ME shall not stop the clock, unless the requirements indicated in byte 1 of the file characteristics are met.

The ME shall wait at least 860 clock cycles after having received the last character including the minimum guard time (2 elementary time units [etu]) of the response before switching off the clock. The ME shall wait at least 744 clock cycles before it sends the first command after having restarted the clock.

6.12.2.3 Test Purpose

1) To verify that the clock is only switched off if requirements are met as indicated in the file characteristics (byte 1 of the directory characteristics).

2) To verify that the timing of the clock switching is as specified.

6.12.2.4 Method of Test

6.12.2.4.1 Initial Conditions

The ME is connected to an R-UIM simulator. CHV1 is enabled.

6.12.2.4.2 Procedure

1) An R-UIM simulator is used with the file characteristics bits set as follows:

   Bit b1   Bit b3   Bit b4
   0        0        0

2) The ME is powered on. When the ME is in mode PIN check, 10 seconds shall elapse before the PIN is entered.

3) The ME is powered off, and an R-UIM simulator is used with the file characteristics bits set as follows:

   Bit b1   Bit b3   Bit b4
4) The ME is powered on. When the ME is in mode PIN check, 10 seconds shall elapse before the PIN is entered.

5) The ME is powered off, and an R-UIM simulator is used with the file characteristics bits set as follows:

<table>
<thead>
<tr>
<th>Bit b1</th>
<th>Bit b3</th>
<th>Bit b4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

6) The ME is powered on. When the ME is in mode PIN check, 10 seconds shall elapse before the PIN is entered.

7) The ME is powered off, and an R-UIM simulator is used with the file characteristics bits set as follows:

<table>
<thead>
<tr>
<th>Bit b1</th>
<th>Bit b3</th>
<th>Bit b4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

8) The ME is powered on. When the ME is in mode PIN check, 10 seconds shall elapse before the PIN is entered.

6.12.2.5 Test Requirement

1) During step 2), the ME shall not switch off the clock.

2) During step 4), the ME shall not switch off the clock, unless at high level.

3) During step 6), the ME shall not switch off the clock, unless at low level.

4) During steps 4), 6) and 8), the ME shall not switch off the clock until at least 1,860 clock cycles after having received the last character of the response including the minimum guard time (2 etu).

5) During steps 4), 6) and 8), the ME shall wait at least 744 clock cycles before it sends the first command after having restarted the clock.

6.12.3 Authentication

The ME shall conform to the test requirements defined in 6 (Authentication Tests) of [11].

6.13 Mechanical Tests

The ME shall conform to the requirements specified in subclause 27.13 of [10].

6.14 Secret Code Usage

6.14.1 Entry of PIN

The ME shall conform to the requirements specified in subclause 27.14.1 of [10].

6.14.2 Change of PIN

The ME shall conform to the requirements specified in subclause 27.14.2 of [10].
6.14.3 Disabling the PIN

6.14.3.1 Definition and Applicability
Entry of the PIN may be disabled by the user, depending on the service table of the R-UIM. It is the responsibility of the ME to check the R-UIM service table.

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM that support a feature to disable the PIN.

6.14.3.2 Conformance Requirement
Disabling PIN is achieved through the DISABLE CHV command. If the PIN disable function in the R-UIM service table is not allocated or activated, the ME shall not attempt to disable the PIN.

6.14.3.3 Test Purpose
To verify that the ME does not attempt to disable the PIN.

6.14.3.4 Method of Test

6.14.3.4.1 Initial Conditions
The ME is connected to the R-UIM simulator.
Elementary files in the R-UIM simulator shall be set to the default values. EF_{CST} (CDMA Service Table) shall be set to the value defined for “EF_{CST} Setting 3” in Table 5-1.
The ME is powered on and a correct PIN entered.

6.14.3.4.2 Procedure
Using the ME’s user interface procedure, an attempt is made to disable the PIN.

6.14.3.5 Test Requirement
The ME shall not send a DISABLE CHV command across the R-UIM/ME interface.

6.14.4 PUK Entry
The ME shall conform to the requirements specified in subclause 27.14.4 of [10].

6.14.5 Entry of PIN2
The ME shall conform to the requirements specified in subclause 27.14.5 of [10].

6.14.6 Change of PIN2
The ME shall conform to the requirements specified in subclause 27.14.6 of [10].

6.14.7 PUK2 Entry
The ME shall conform to the requirements specified in subclause 27.14.7 of [10].
6.14.8 CDMA Service Table

6.14.8.1 Definition and Applicability
This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.14.8.2 Conformance Requirement
The ME shall read the contents of EF\textsubscript{CST} from the R-UIM and shall provide user access and/or service to the functions and services allocated and activated within EF\textsubscript{CST}.

6.14.8.3 Test Purpose

6.14.8.4 Method of Test
6.14.8.4.1 Initial Conditions
Byte 1 of EF\textsubscript{CST} shall be coded as ‘01010101’ to indicate “service allocated” and “service not activated” for the following services: SMS, FDN, ADN, and CHV1.

6.14.8.4.2 Procedure
1) Insert the R-UIM into the ME being tested and power on the MS.
2) Verify that the SMS, FDN, ADN, and CHV functions and services are inoperative.
3) Power off the MS and remove the R-UIM.
4) Code Byte 1 of EF\textsubscript{CST} on the R-UIM to ‘11111111’ to indicate “service allocated” and “service activated” for SMS, FDN, ADN, and CHV1.
5) Insert the R-UIM into the ME being tested and power on the MS.
6) Verify that the SMS, FDN, ADN, and CHV1 functions and services are operational.

6.14.8.5 Test Requirement
The services and functions should be operational only when coded as “service allocated” and “service activated” within EF\textsubscript{CST}.

6.15 Abbreviated Dialing Numbers (ADN)

6.15.1 Definition and Applicability
Abbreviated Dialing Numbers contain subscriber number and supplementary service control strings. They may also contain alpha identifiers.

This test applies to both MEs conforming to [1] using either ID-1 or plug-in R-UIMs, that support ADN.

6.15.2 Conformance Requirement
The ME shall be able to update and retrieve ADNs from the R-UIM and set up calls to these numbers.
6.15.3 Test Purpose
To verify that the ME can update and retrieve ADNs from the R-UIM.

6.15.4 Method of Test

6.15.4.1 Initial Conditions
EF\textsubscript{CST} shall be set in accordance with "EF\textsubscript{CST} Setting 2" described in Table 5-1.
Coding of elementary files in the R-UIM shall be as default, with the addition of:

EF\textsubscript{ADN} (Abbreviated Dialing Number)
Logically:
At least 101 records.

Record 1:
Length of alpha identifier: 32 characters
Alpha identifier: "ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEF"
Length of BCD number: "03"
TON and NPI: Telephony and Unknown
Dialed number: 123
CCI: None
Ext1: None

Coding for record 1:
B1 B2 B3 ... B32 B33 B34 B35 B36 B37 B38 B39 ... B46
41 42 43 ... 46 03 81 21 F3 FF FF FF ... FF

The ME is installed with the default R-UIM or R-UIM simulator, and switched on.

6.15.4.2 Procedure
1) The code "1234567890123456" is stored (entered) in the MS as abbreviated
dialing entry number 7 on the R-UIM.
2) The code "00112233" is stored (entered) in the MS as abbreviated dialing entry
number 6 on the R-UIM.
3) The code "**21*44556677#" is stored (entered) in the MS as abbreviated dialing
entry number 101 on the R-UIM.
4) Retrieve data from R-UIM entry number 7 using the procedure N(N)(N)#.
5) Retrieve data from R-UIM entry number 6 using the procedure N(N)(N)#.
6) Retrieve data from R-UIM entry number 101 using the procedure N(N)(N)#.
7) Retrieve data from R-UIM entry number 1 using the procedure N(N)(N)#, and 
display the alpha identifier.

6.15.5 Test Requirements
1) After step 4), the number "1234567890123456" shall be displayed.
2) After step 5), the number "00112233" shall be displayed.
3) After step 6), the number "**21*44556677#" (or an equivalent representation) 
shall be displayed.
4) After step 7), the ME shall display at least part of the alpha identifier, and shall 
sustain normal operation.

6.16 UI Reaction to R-UIM Status Encoding
The ME shall conform to the requirements specified in subclause 27.16 of [10].

6.17 Electrical Tests
The ME shall conform to the requirements specified in subclause 27.17 of [10] with the 
following exception: the command “SELECT CDMA” shall be used in place of “SELECT 
GSM”.

6.18 Fixed Dialing Number (FDN)
The ME shall conform to the requirements specified in subclause 27.18 of [10] with the 
following exceptions:
1) Appropriate cdma2000 system simulator settings shall be used in place of the 
GSM-specific settings identified in [10].
2) Rehabilitation of EF LOCI is not applicable.
3) EF CST shall be set in accordance with “EF CST Setting 2” described in Table 5-1.

6.19 Version Identification
6.19.1 Definition and Applicability
The version of the R-UIM is indicated in the Elementary File EFRevision. This allows the ME to 
identify the version of the R-UIM and adapt its functionality accordingly.
This test applies to MEs conforming to [1] using either ID-1 or plug-in R-UIMs.

6.19.2 Conformance Requirement
The version of the card shall be determined as part of the initialization procedure.

6.19.3 Test Purpose
To verify that the ME requests the R-UIM version (EFRevision) as part of the initialization 
procedure.
6.19.4 Method of Test

6.19.4.1 Initial Conditions
The ME is connected to the R-UIM simulator and powered off.

The default values are used.

6.19.4.2 Procedure
1) The mobile is powered on.
2) The R-UIM simulator monitors the R-UIM initialization procedure.

6.19.5 Test Requirement
The ME shall request the version (EFRevision) of the R-UIM as part of the initialization procedure.

6.20 R-UIM Presence Detection
The ME shall conform to the requirements specified in subclause 27.20 of [10].

6.21 Reserved

6.22 Suggested Slot Cycle Index

6.22.1 Definition and Applicability
This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.22.2 Conformance Requirement
The ME shall read the contents of EFSSCI (Suggested Slot Cycle Index) and apply it to mobile station processing.

6.22.3 Test Purpose
The purpose of this test is to ensure that the ME is able to read the contents of the EFSSCI and compare this value with MAX_SLOT_CYCLE_INDEX obtained from the System Parameters Message in determining the appropriate value to set SLOT_CYCLE_INDEX.

6.22.4 Method of Test

6.22.4.1 Initial Conditions
1) The mobile station shall be connected to a mobile station diagnostic monitor.
2) The mobile station shall be connected to a network system simulator.
3) The network system simulator shall be configured such that the value of MAX_SLOT_CYCLE_INDEX within the System Parameters Message is set to ‘011’.
4) EFSSCI shall be set to the value ‘00000010’.
6.22.4.2 Procedure

1) Power on the mobile station.

2) Allow a sufficient time for the mobile station to complete power-up registration with the network system simulator. Determine the value of the Slot Cycle Index used by the mobile station. Also note the value of the preferred Slot Cycle Index (SLOT_CYCLE_INDEX) reported by the mobile station in the Registration Message.

3) Power off the mobile station.

4) Configure the network system simulator such that the MAX_SLOT_CYCLE_INDEX within the System Parameters Message is set to ‘001’.

5) Power on the mobile station.

6) Allow a sufficient time for the mobile station to complete power-up registration with the network system simulator. Determine the value of the Slot Cycle Index used by the mobile station. Also note the value of the preferred Slot Cycle Index (SLOT_CYCLE_INDEX) reported by the mobile station in the Registration Message.

6.22.5 Test Requirement

As part of step 2 of the test procedure, the mobile station shall send a Registration Message to the network system simulator with a preferred Slot Cycle Index (SLOT_CYCLE_INDEX) value of ‘010’. Similarly, the mobile station shall be operating using a value of ‘010’ for the Slot Cycle Index.

As part of step 6 of the test procedure, the mobile station shall send a Registration Message to the network system simulator with a preferred Slot Cycle Index (SLOT_CYCLE_INDEX) value of ‘010’. The mobile station shall also, however, be operating using a value of ‘001’ for the Slot Cycle Index.

6.23 Service Provider Name

6.23.1 Definition and Applicability

This test applies to MEs conforming to [1] using either ID-1 or Plug-in R-UIM.

6.23.2 Conformance Requirement

The ME shall be capable of reading the contents of EF_SPN and displaying the corresponding information to the mobile station user.

6.23.3 Test Purpose

To verify that the ME is capable of reading and displaying the contents of EF_SPN.
6.23.4 Method of Test

6.23.4.1 Initial Conditions

6.23.4.2 Procedure

1) Input the Service Provider Name with a length not more than 16 bytes on the R-UIM using a card reader/programmer.

2) Insert the R-UIM into the mobile station and power up the mobile station. Note the appearance of the mobile station display.

3) Input the Service Provider Name with a length more than 16 bytes on the R-UIM using a card reader/programmer.

4) Insert the R-UIM into the mobile station and power up the mobile station. Note the appearance of the mobile station display.

6.23.5 Test Requirement

1) Following step 2 of the test procedure, verify the Service Provider Name is displayed on the screen of the mobile station while in the idle state.

2) Following step 4 of the test procedure, verify the first 16 bytes of the Service Provider Name is displayed on the screen of the mobile station while in the Mobile Station Idle State.