**MMS Inter-working Tests**

**Version 3.1**

**19 October 2012**

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# 1 General description

## 1.1 Scope

The scope of this document is to define

- an initial set of MMS End-to-End Interworking tests
- an initial set of MM4 Interoperability tests
- an initial set of MMS Inter-Operator Charging tests

A reader only interested in the End-to-End Interworking test procedures themselves may start reading in section 15 and use backwards references when necessary.

This document is restricted to the cases where an MM4 reference point between two MMSE belonging to two different PLMNs is used.

See Figure 1-1. It shows the message flows for the basic MMS functionality in the case where neither the Originator nor the Recipient is roaming.



MM4 reference point
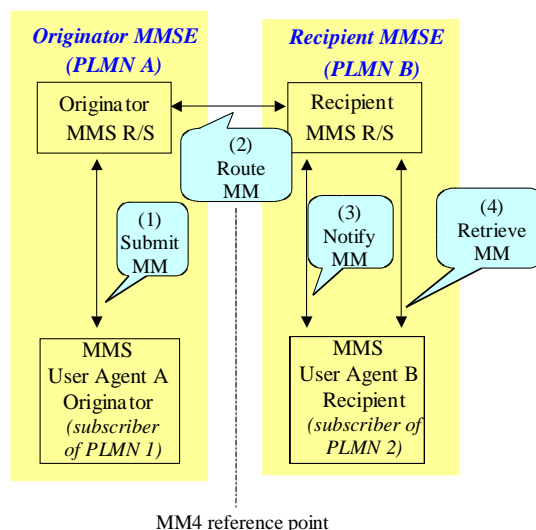
***Figure 1-1: MMS Inter-PLMN Interworking (no roaming)***

This document includes tests for Legacy Support and tests for the case of Mobile Number Portability, see Annex A.

Tests are chosen such that content adaptation is not applicable.

This set of tests is *initial* because:

- Only 3GPP Release 4 is considered
- Only essential tests related to End-to-End functions and to Inter-Operator Charging functions (for the meaning of 'essential', see section 4.2 and 11) are specified
- Only test purposes are considered that can be adequately covered
  - By end-to-end tests, that is by tests that can be executed by performing actions and observing events at MMS User Agents (these MMS User Agents may however have special capabilities for testing)
  - Where applicable, by observing in addition MM4 related CDRs generated during the tests
  - Where applicable, by observing in addition the MM4 reference point, the MM5 reference point (between the MMS Relay/Server and the HLR) and the MMS Relay/Server Operator interface (see section 13.1).

- For the Inter-Operator Charging tests only the basic MMS functionality is covered: The routing of MM from Originator MMSE to Recipient MMSE in the successful case. For additional MMS functionalities like delivery reporting and read-reply reporting, tests may be added when GSMA BARG has defined the inter-operator principles.

Currently out of scope are:

- Changes and additions of 3GPP Release 5 and later
- Procedures for re-testing and (periodic) re-testing
- Protocol conformance tests with the exception of header field compliance.

This document is based on Release 4 of 3GPP.

The following issues are to be considered in a later version:

- Forwarding of a Multimedia Message without prior Retrieval
- Support for Streaming in MMS
- Support for Prepaid Service in MMS
- Support for Reply-Charging in MMS

# 2 Terms and Abbreviations

## 2.1 Terms

See 3GPP Specifications. In addition, the following term is used:

| Term | Meaning |
|------|---------|
| Inter-Operator CDR | A CDR relevant for Inter-Operator charging |

## 2.2 Abbreviations

See 3GPP Specifications. In addition, the following abbreviations are used:

| Abbreviation | Meaning |
|--------------|---------|
| IE | Information Element |
| O-R/S | Originator MMS Relay/Server |
| O-UA | Originator User Agent |
| R/S | Relay/Server |
| R-R/S | Recipient MMS Relay/Server |
| R-UA | Recipient User Agent |
| UA | User Agent |

# 3 Test method

Inter-operator MMS testing is applicable for two different PLMNs A and B. The tests are symmetric 'modulo' the features supported by $MMSE_A$ and $MMSE_B$ in the following sense:

Calling the Originator PLMN 'PLMN O' and the Recipient PLMN 'PLMN R', the following cases are applicable:

Figure 1: Symmetry of Test Cases

| Case 1 | **O = A** | **R = B** |
|--------|-----------|-----------|

| Case 2 | O = B | R = A |
|--------|-------|-------|

Basic scenario is the transfer of MM from Originator MMS User Agent **o** of PLMN **O** to Recipient MMS User Agent **r** of PLMN **R**. Successful and unsuccessful cases are to be distinguished.

## 3.1 Principle test method

1. MM are sent from a mobile originator to a mobile recipient
2. If applicable, events at R-UA are observed.
3. If applicable, depending of events at R-UA, R-UA is caused to perform certain actions.
4. If applicable, the events at O-UA and R-UA are observed.
5. If applicable, MM4 CDRs are observed.

## 3.2 Test environment

Tests are performed in the field, that is within already established MMS Environments of PLMN A and PLMN B. It is a prerequisite that both MMS Environments of PLMN A and PLMN B are operational and have been tested and proven to work correctly for intra-PLMN MMS.

The network configuration is specified in section 3.5; the MMS terminal is specified in section 3.3.

## 3.3 Test equipment and configuration

**Test SIM cards:**

For the tests, the following SIM are needed:
- SIM-a1: A SIM of PLMN A not belonging to an imported subscriber (see Annex A.2) and with non-legacy SIM (see Annex A.1)
- SIM-a2: A SIM of PLMN A not belonging to an imported subscriber and with legacy SIM
- SIM-a3: A SIM of PLMN A belonging to an imported subscriber and with non-legacy SIM
- SIM-b1: A SIM of PLMN B not belonging to an imported subscriber and with non-legacy SIM
- SIM-b2: A SIM of PLMN B not belonging to an imported subscriber and with legacy SIM
- SIM-b3: A SIM of PLMN B belonging to an imported subscriber and with non-legacy SIM.

**Additional MSISDN**

For tests with multiple addresses, additional MSISDN are requested. However, no verification is performed for these MSISDN; a SIM need not be available:
- MSISDN-a4, MSISDN-a5: MSISDN of PLMN A not belonging to an imported subscriber (see Annex A.2) and associated to non-legacy SIM (see Annex A.1)
- MSISDN-b4, MSISDN-b5: MSISDN of PLMN B not belonging to an imported subscriber (see Annex A.2) and associated to non-legacy SIM (see Annex A.1)

**MMS Terminal configuration:**

MMS terminal:

The MMS User Agent is either integrated in a Mobile Station or realised on a computer attached to a Mobile Station. The latter case has the advantage to facilitate automatic testing. The MMS User Agent shall conform to [ConfDoc2] or [ConfDoc1.2].

In particular, the UA must support the subject field of an MM in creation, submission, retrieval and presentation.

The MMS terminal must be configured to work in the MMSE and in the PLMN where it is used for testing. The following settings have to be considered:

- o GPRS
  APN, UserID, Password Request, Allow Calls, IP address, DNS Address, Advanced Settings, Authentication, Data Compression, Header Compression, QoS
- o WAP Settings
  IP Address, Homepage, User ID, Password, Data Mode, Security, Show Pictures, Response Timer
- o MMS Setting
  Message Server, Validity Period, Read-reply, Delivery Report, Auto Delete, Auto Download

Legacy Terminal:

A mobile station with a legacy SIM (see Annex A.1)

Internet PC:

With email account and web access

## 3.4    Preconditions

Basic connectivity tests have been passed: The communication between the involved components is possible.

## 3.5    Network configuration

The following network configuration aspects are relevant for the tests:

- O-R/S and R-R/S are connected (MM4) via
  - o GPRS Inter PLMN Backbone (GRX) or
  - o Direct leased line or
  - o Pubic Internet (VPN or/and IPsec)
- Information on IP routing:
  - o IP Port for SMTP
  - o IP Port for DNS
- External components:
  - o external DNS/ENUM Server
  - o local DNS/ENUM Server
  - o SS7 routing to foreign PLMN

## 3.6    Role of Roaming

In the case of (inter-PLMN) Roaming, still the Originator and Recipient each use their home MMSE. As a consequence, roaming is not relevant for Inter-Operator Charging and has restricted impact on end-to-end testing. See Figures 3-1, 3-2, 3-3.
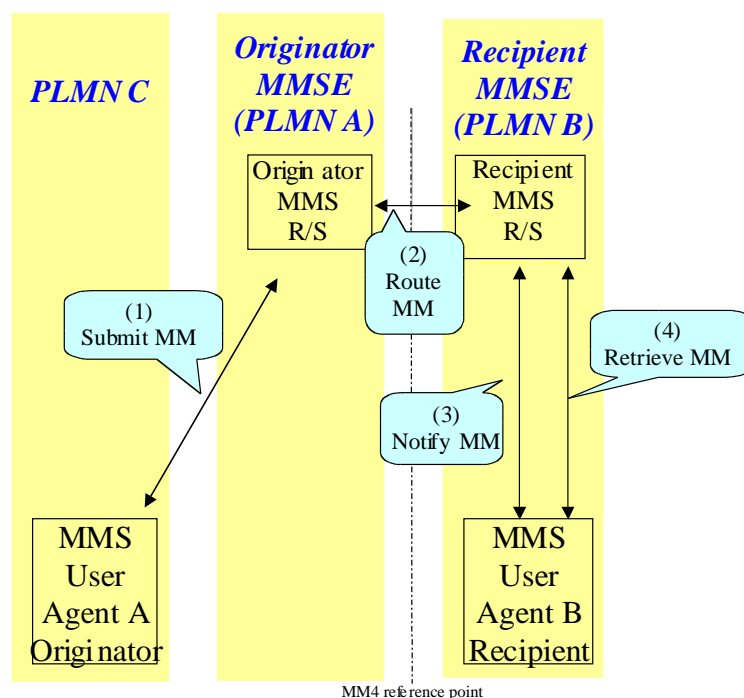
*Figure 3-1: MMS Inter-PLMN Interworking, Originator is roaming*

In Figure 2, User Agent A, subscriber of PLMN A, is roaming in PLMN C and sends an MM to User Agent B, subscriber of PLMN B. The fact that User Agent A is roaming has no impact on the Inter-Operator charging between PLMN A and PLMN B. Ideally, if the underlying bearer services between PLMN C and PLMN A work properly, roaming should not have impacts on MMS end-to-end functions (but reality is not always ideal).
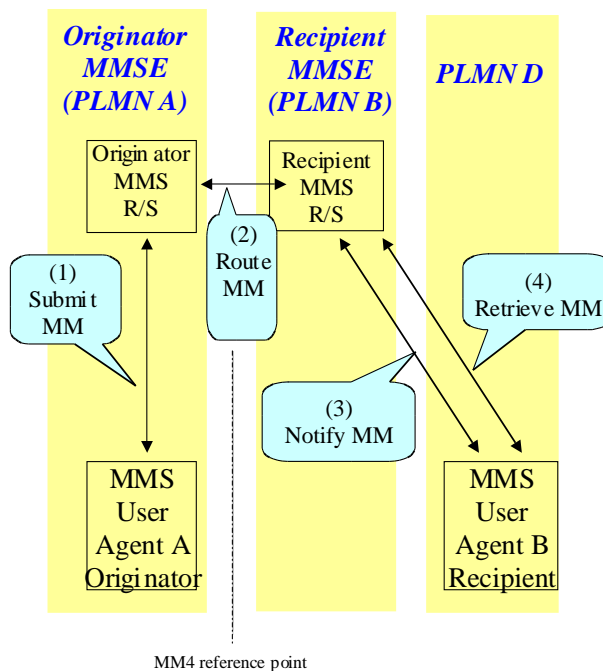
**Figure 3-2: MMS Inter-PLMN Interworking, Recipient is roaming**

In Figure 3, User Agent A, subscriber of PLMN A, sends an MM to User Agent B, subscriber of PLMN B, while User Agent B is roaming in PLMN D. The fact that User Agent B is roaming has again no impact on the Inter-Operator charging between PLMN A and PLMN D and has restricted impact on end-to-end MMS functions. (Restricted impact: There might in particular settings/functions in the Recipient MMSE and/or Recipient User Agent to permit delaying of retrieval while User Agent B is roaming.)
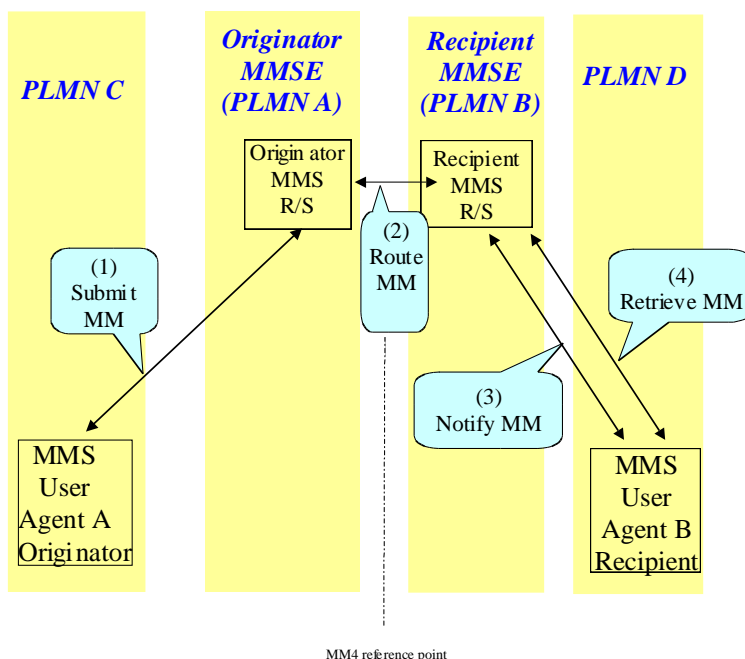


*Figure 3-3: MMS Inter-PLMN Interworking, Originator and Recipient are roaming*

Finally, in Figure 4, User Agent A, subscriber of PLMN A, is roaming in PLMN C and sends an MM to User Agent B, subscriber of PLMN B, while User Agent B is roaming in PLMN D.

Here again, the fact that User Agent A and B are roaming has no impact on the Inter-Operator charging between PLMN A and PLMN 2 and has restricted impact on MMS end-to-end functions.

This fact might be used to perform MMS testing to a certain degree within one PLMN:

The PLMN A operator might perform certain MMS tests in PLMN A where

(a) The User Agent A, subscriber of PLMN A, is the originator, and the recipient User Agent B, subscriber of PLMN B, is roaming in PLMN A

(b) The User Agent A, subscriber of PLMN A, is the recipient, and the originator User Agent B, subscriber of PLMN B, is roaming in PLMN A.

See Figures 3-4 and 3-5:



MM4 reference point
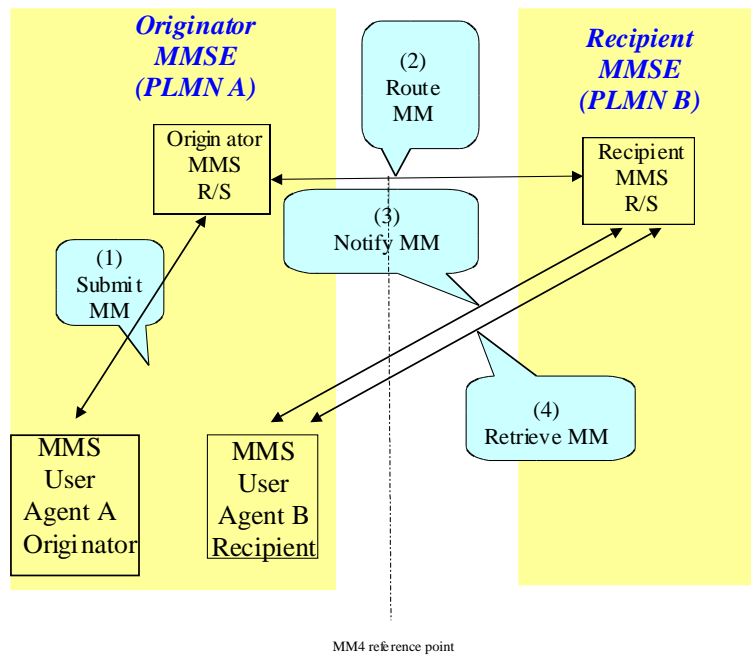
**Figure 3-4: MMS Inter-PLMN Inter-working, Recipient is roaming in PLMN A**
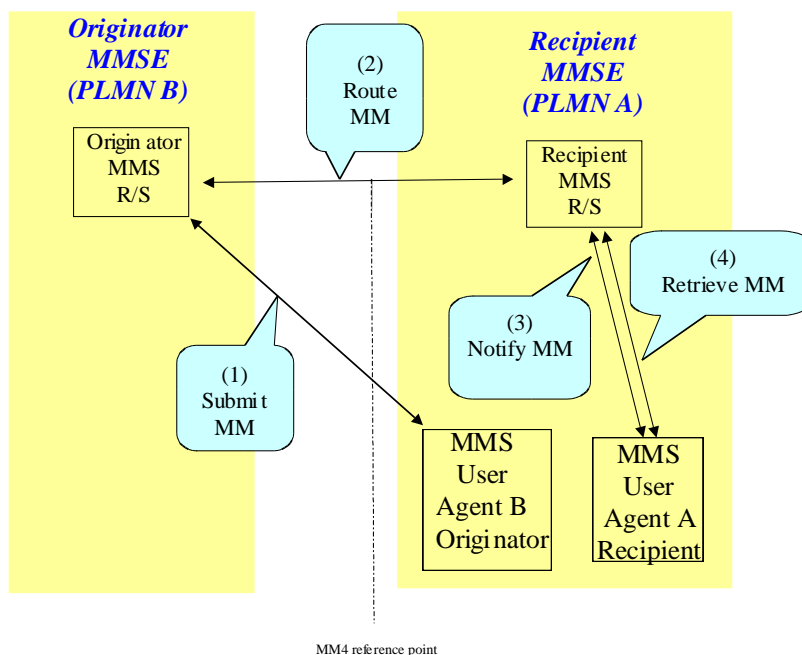
**Figure 3-5: MMS Inter-PLMN Interworking, Originator is roaming in PLMN A**

## 3.7   Test Execution Methods

**Text Execution Method 1:**

The Testing Team of PLMN-A has got all necessary suitable SIMs of PLMN-B the necessary information for the MMS terminal settings for the PLMN B terminal and performs the tests for the case of a PLMN-B subscriber roaming in PLMN-A (cf. Section 3.6). This scenario is applicable if there is a verified GPRS roaming relation between PLMN-A and PLMN-B.

**Text Execution Method 2:**

The tests are performed by a Testing Team of PLMN-A (disposing of the necessary suitable SIMs of PLMN A) and a Testing Team of PLMN-B (disposing of the necessary suitable SIMs of PLMN A). Test reports are exchanged between the Testing Team of PLMN-A and the Testing Team of PLMN-B.

# 4   High Level Test Purposes for end-to-end testing

## 4.1   Test purposes

The test purposes result from the combination of
- MMS functions (see section 4.3)

and
- Possible variations of scenario (see section 4.4).

From the resulting test purposes, the essential ones are selected. Selection criteria are developed in section 4.2.

Essential tests may be covered by one ore several test cases or variations of test cases.
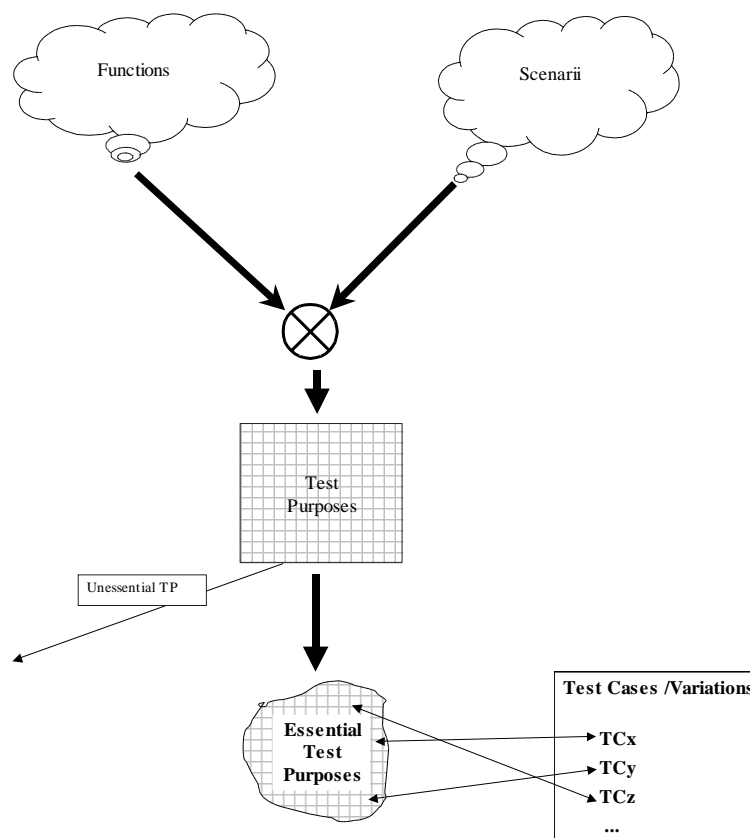
**Figure 4-1: Essential Test Purposes and Test Cases**

## 4.2    Selection of essential test purposes

An operator offering inter-PLMN MMS to his customers wants to ensure that
- The service works end-to-end without errors in a number of scenarios
- A certain degree of quality of service is available
- Inter-operator charging is done correctly


(J0)    Basic aim of end-to-end tests is to ensure that the service really works end-to-end. This is indicated as J0 in the tables below. It includes adequate delivery of headers and contents to the right addresses ('to', 'cc' and 'bcc').


The Recipient MMSE PLMN charges the Originator MMSE PLMN for MMS (typically, also in the case where the MM was not retrieved). Whence, the following reasons for essentiality ('justifications') result:
- The Originator MMSE PLMN wants to ensure that the Recipient MMSE PLMN carries out its duties with sufficient care
- The Recipient MMSE PLMN wants to ensure that the Originator MMSE PLMN doesn't impose inadequate efforts to the Recipient MMSE PLMN. An important consequential requirement is that erroneous and superfluous messages and protocol elements are avoided by the O-R/S at the MM4 reference point, however this is out of scope of end-to-end testing.

## 4.3    MMS functions

For the following basic end-to-end functions, tests are essential:

Table 4-1: Essential End-to-End Functions

| End-to-end Function | Reason why essential (indicated if not obvious) | Covered by test case(s) |
|---|---|---|
| **Sending and receiving MM** | **J0** | **TC1** |
| Message content retrieval (adequate integrity of content) | J0 | TC1, TC2, TC3 |
| Header fields mapping compliance end-to-end | J0 | all TC |
| Usage of multiple recipient addresses (in 'to', 'cc', 'bcc' field) beloging to the same recipient MMSE | J0 | TC34 |
| Usage of multiple recipient addresses (in 'to', 'cc', 'bcc' field) in same MMSE | J0 | TC3 |
| handling of delivery report: indication to R-UA if requested by O-UA | J1 | TC4, TC5, TC6 |
| handling of delivery report request when not forbidden by R-UA | J1 | TC4 (case 'delivered') TC5 (case 'rejected') TC6 (case 'deferred') TC7 (case 'expired') |
| handling of delivery report request when forbidden by R-UA | J1 | TC8 |
| handling of read-reply report: indication to R-UA if requested by O-UA | J1 | TC9 |
| handling of read-reply report request when not forbidden by R-UA | J1 | TC9 |
| handling of read-reply report request when forbidden by R-UA | J1 | TC10 |

For the following additional end-to-end functions, an Operator may consider tests as essential:

Table 4-2: Possibly essential End-to-End Functions

| End-to-end Function | Reason why essential | Covered by test case(s) |
|---|---|---|
| Checking terminal availability | J1 | |
| | | |
| Media type conversion | J1 | |
| Media format conversion | J1 | |
| MM notification to the MMS User Agent | J1 | |
| handling of rejection of MM by the R-UA | J1 | |
| retrieval of MM, either immediately or at a later time, either manually or automatically, as possibly | J1 | |

| End-to-end Function | Reason why essential | Covered by test case(s) |
|---|---|---|
| determined by the operator configuration and user profile | | |
| hiding of MM originator address by R-R/S to the MM recipient if the originator MMS User Agent requested its address to be hidden from the MM recipient, possibly with provision of an alias or clarifying text (e.g. "anonymous address" or "unknown address") in the originator address field instead of providing the originator address to the recipient MMS User Agent | J1 | |
| provision of MM originator address by R-R/S to the MM recipient if the originator MMS User Agent did not request its address to be hidden from the MM recipient and if the MM originator address is available at the recipient MMS Relay/Server | J1 | |
| indication of MIME content type of the MM to the recipient MMS User Agent | J1 | |
| provision by R-R/S of other available message qualifications unaltered to the recipient MMS User Agent | J1 | |
| provision by R-R/S of the time stamp of the MM unaltered to the recipient MMS User Agent | J1 | |
| handling of earliest desired time of delivery set by the O-UA (feature optional in the O-R/S) | J1 | |
| handling of desired expiry time set by the O-UA | J1 | |
| handling of further message qualifications (e.g. priority, message class, subject) | J1 | |
| storage by Recipient MMSE of MM until the recipient MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the MM expires | J1 | |
| R-R/S providing the recipient MMS User Agent with a list of addresses of forwarding MMS User Agents for the MM if the MM was forwarded and the address information is available to the recipient MMS Relay/Server | J1 | |
| Usage of different address formats | J2 | |

Table 4-3: Functions for that end-to-end testing is not required

| Function | Reason why end-to-end test not required *[tbe]* |
|---|---|
| enabling/disabling MMS function | Not specific for interworking |

| | |
|---|---|
| MM deletion based on user profile or filtering information | Requirements are unclear |
| personalising MMS based on user profile information | Not specific for interworking |
| screening of MM | Requirements are unclear |
| negotiation of terminal capabilities | Requirements are unclear |
| generating call data records (CDR) | not end-to-end; see however sections 9, 10, 11, 12 |
| address translation | ? |
| controlling the reply-charging feature of MMS | Requirements are unclear |
| handling of time stamp for the time of submission of the message provided by the O-UA | |
| provision of time stamp by the O-R/S (optional feature of O-R/S) | ? |
| message identification of MM | ? |
| resolution of the MM recipient's/recipients' address(es) | not end-to-end |
| ensuring that messages are not lost until successfully delivered to another MMSE element | not end-to-end |
| persistent storage of messages | ? |
| verification of the recipient's user profile(s) | ? |
| performance of data adaptation by R-R/S based on user profile and/or MMS User Agent capabilities | ? |
| provision of an alias or clarifying text (e.g. "anonymous address" or "unknown address") in the originator address field instead of providing the originator address to the recipient MMS User Agent, if the original message does not contain the originator address | ? |
| Error handling when address is faulty | Requirements are unclear |

**Note**: A question mark '?' in table 4-3 indicates that further investigation is required.

## 4.4   Variations of Scenario

Variations of scenario **essential** for Interworking End-to-End tests:

Table 4-4: Variation of Scenario

| No. | Variation of Scenario | Reason why essential for Interworking End-to-End tests | Covered by test case(s) |
|---|---|---|---|
| 1 | Terminal capabilities at the recipient side | (J1) | legacy terminal: TC11 |
| 2 | Load situations at Recipient MMSE | (J1) | - |

| 3 | Bearers supported in PLMN serving the recipient (recipient HPLMN or VPLMN) | (J1) | - |
|---|---|---|---|
| 4 | Addressing schemes used for the Recipient<br>1) MSISDN<br>  a) international format +CC/NDC/...<br>  b) national format 0/NDC/...<br>    (if applicable)<br>  c) unknown format 00/CC/NDC/...<br>2) E-mail Address (RFC 822) | (J1) | only international format tested |
| 5 | Recipient User Agent in his PLMN (y/n) | (J1) | - |
| 6 | Recipient Mobile Station status (GPRS attached, CS connected, idle updated, out of coverage, detached etc.) | (J1) | - |
| 7 | Mobile Number Portability applicable to recipient | mandatory requirement in several countries | TC2 |
|  | [further] |  |  |

For example, it is not acceptable for the Originator MMSE PLMN that the Recipient MMSE PLMN, by a systematic error, deletes MM to roaming recipients or MM to recipients out of coverage (Justification (J1)).

Scenarii **not essential** for Inter-working End-to-End tests:

Table 4-5: Scenarii not essential for Interworking End-to-End tests

| **Scenario** | **Reason why not essential for Interworking End-to-End tests** |
|---|---|
| Addressing scheme used for the Originator | Matter between Originator MMSE PLMN and subscriber |
| Originator User Agent in own PLMN (y/n) | Matter between Originator MMSE PLMN and subscriber |
| Originator Mobile Station status (GPRS attached, ..., CS connected, idle updated, out of coverage, detached[1] etc.) | Matter between Originator MMSE PLMN and subscriber |
| Terminal capabilities at the originator side | Matter between Originator MMSE PLMN and subscriber |
| Load situations at the originator side | Matter between Originator MMSE PLMN and subscriber |
| Bearers supported in PLMN serving the originator | Matter between Originator MMSE PLMN and subscriber |

# 5   Supported features

Which tests are applicable depends on the features supported by each MMSE.

---

[1] The latter cases are relevant for delivery reports etc.

Depending on each test, the appropriate setting has to be set in the terminal(s) engaged. The terminals used for testing have to support the required options.

Tables 5-1 lists optional features in terms of functions and options of O-R/S *[to be completed]*.

Table 5-1: Implementation Conformance statements for Originator MMS Relay/Server

| **Function of O-R/S** | **Options** |
|---|---|
| feature of earliest time of delivery | May be supported by the originator MMS R/S or not. (If supported, the O-R/S is responsible to retain the MM until earliest time of delivery.) |
| Acknowledgement Request in MM4_forward.REQ | Optional (with this feature, O-R/S may request an MM4_forward.RES in response to the MM4_forward.REQ.) |
| Provision of time stamp by the O-R/S | May be supported by the originator MMS R/S or not |
| overriding of O-UA address indicated by O-UA during submission | May be configured by the MMS service provider |
| Address hiding | If not supported, MM requesting Address hiding shall be rejected. This option is irrelevant for inter-operator testing. |
| Pass unaltered indication whether read-reply report is requested | 'Should'; however doesn't make sense if O-MMSE doesn't support indication of read-reply report to originator |
| Read-Reply | Mandatory in 23.140; however not always supported by the Originator MMSE. |
| Delivery Report | Mandatory in 23.140; however not always supported by the Originator MMSE. |

Tables 5-2 lists optional features in terms of functions and options of R-R/S *[to be completed]*.

Table 5-2: Implementation Conformance statements for Recipient MMS Relay/Server

| **Function of R-R/S** | **Options** |
|---|---|
| Retrieval | Data adaptation based on user profile and/or MMS User Agent capabilities |
| | Maximum time until delivery (expiry time set by R-R/S) |
| | Behaviour in the roaming case |
| | Alternative retrieval (on WEB page ...) |
| | Provision of an alias or clarifying text (e.g. "anonymous address" or "unknown address") in the originator address field instead of providing the originator address to the recipient MMS User Agent, if the originator has requested address hiding |
| | Provision of an alias or clarifying text (e.g. "anonymous address" or "unknown address") in the originator address field instead of providing the originator address to the recipient MMS User Agent, if the original message does not contain the originator address |
| | Should provide recipient MMS User Agent with addresses of forwarding MMS User Agents if the MM was forwarded and the address information is available to R-R/S |
| Forwarding | Forwarding ('without retrieval') is optional |
| | If supported, |
| | provision of a time stamp of the MMS submisison is optional |

| Function of R-R/S | Options |
|---|---|
| | overriding the address provided by the forwarding MMS User Agent in the forwarding request is subject to MMS service provider's preferences |
| | Fields Previously-sent-by and Previously-sent-date-and-time are optional |
| Read-Reply | Mandatory in 23.140; however not always supportedby the Recipient MMSE. If supported:<br><br>R-R/S may provide a time stamp for the read-reply report, i.e. it may also override the MMS User Agent's time stamp<br><br>may override the address provided by the recipient MMS User Agent in the read-reply report (subject to MMS service provider's preferences) |
| Delivery Report | Mandatory in 23.140; however not always supported by the Recipient MMSE. |

# 6 Variations

From a test case, variations may be generated by:
- Attachment types of an MM (Combinations are possible):
  - Text:
    - Charset used
  - Speech
  - Still Image
  - Video
  - MP4 file format
  - SMIL based presentation part

# 7 Test cases

## 7.1 Basic Essential Test Cases

This section contains the basic essential end-to-end test cases relevant for inter-PLMN inter-working.

Applicability:

This section contains essential end-to-end test cases relevant for inter-PLMN inter-working that are conditional, i.e., they are mandatory if the corresponding functions are supported in PLMN O and/or PLMN R:
- TC 1 is mandatory
- TC 2 is mandatory if PLMN O supports Mobile Number Portability
- TC 3 is mandatory
- TC 4, 5, 6, 7, 8 are mandatory, if Delivery Report is supported in MMSE-O and MMSE-R
- TC 9, 10 are mandatory, if Read-Reply Report is supported in MMSE-O and MMSE-R
- TC 11: Mandatory, if legacy support is provided by MMSE-R.

| | Test Case | Expected result | Test variations | Test Procedures of section 15.5 |
|---|---|---|---|---|
| TC 1 | Send MM from PLMN O to a non ported subscriber of PLMN R. | Message with all attachments and all fields is delivered to the recipient. | None: Only recipient address format 'International' is tested (cf. Table 4-4 no. 4) | TProc A01, B01 |
| TC 2 | Send MM message to an imported subscriber of PLMN R (that is, a subscriber of PLMN R with an MSISDN ported from another PLMN in the country of PLMN R). This test case is only performed if there are imported subscribers of PLMN R. | Message with all attachments and all fields is delivered to the recipient. | None: Only ecipient address format 'International' is tested (cf. Table 4-4 no. 4) | TProc A02, B02 |
| TC 3 | MM sent to multiple recipients (in 'to' field and/or 'CC field' and/or 'BCC field'), some in R-MMSE, others not | MM received by selected recipients of PLMN R, addresses shown to recipients according to 'bcc'-restrictions | Variations:<br><br>to 2 MSISDN of PLMN-R (one is verified)<br>to 1 MSISDN of PLMN-O,<br>cc to 1 MSISDN of PLMN-R (verified)<br>to 1 MSISDN of PLMN-R,<br>cc 1 MSISDN of PLMN-O,<br>bcc 1 MSISDN of PLMN-R (verified)<br>to 1 MSISDN of PLMN O, 1 MSISDN of PLMN-R (verified), 1 e-mail address;<br>cc 1 MSISDN of PLMN O, 1 MSISDN of PLMN-R<br>bcc 1 MSISDN of PLMN-R | TProc A03, A04, A05, A06, B03, B04, B05, B06 |
| TC 4 | Delivery Report: O-UA sends MM to **R-UA** and request a delivery report. Let **R-UA** retrieve the MM and not forbid delivery report. | O-UA receives a delivery report, status 'delivered' | | TProc A07 |

| | Test Case | Expected result | Test variations | Test Procedures of section 15.5 |
|---|---|---|---|---|
| TC 5 | Delivery Report: O-UA sends MM to **R-UA** and request a delivery report. Let **R-UA** reject the message but not forbid delivery report. | O-UA receives a a delivery report with status "rejected". | | TProc A08 |
| TC 6 | Delivery Report support: O-UA sends MM to **R-UA** and request a delivery report. Let **R-UA** defer the retrieval of the message. | A receives a delivery report with status "deferred". | | TProc A09 |
| | | | | |
| TC 7 | Delivery Report support: O-UA sends MM to **R-UA** and request a delivery report. Let the message for **R-UA** expire on the **R-R/S**. | A receives a delivery report with status "expired". | | TProc A09 |
| TC 8 | Delivery Report support 5: O-UA sends MM to **R-UA** and request a delivery report. Let **R-UA** not allow the generation of a delivery report and let **R-UA** receive the message or reject the message or let the message expire on the **R-R/S**. | A does not receive any delivery report. | | TProc A10 |
| TC 9 | Read Reply Report support 1: O-UA sends MM to **R-UA** and request a Read Reply Report. Let **R-UA** receive the message and generate a Read Reply Report. | A receives a Read Reply Report from B | | TProc A11 |
| TC 10 | Read Reply Report support 2: O-UA sends MM to **R-UA** and request a Read Reply Report. Let **R-UA** receive the message, but not allow the generation of a read report. | A does not receive a Read Reply Report. | | TProc A12 |

| | Test Case | Expected result | Test variations | Test Procedures of section 15.5 |
|---|---|---|---|---|
| TC 11 | send MM to legacy phone | MM should be handled according to legacy support (SMS-notification and retrieval, e.g. via WEB) | | TProc A13 |
| | | | | |

# 8 Test Reports

See section 15.5.

# 9 Overview on Inter-Operator related CDRs

## 9.1 Overview on all CDRs as defined in 3GPP

The following Figure 9-1 and Tables 9-1, 9-2a and 9-2b are taken from [32.235]. They list all MMS CDRs and show the triggers for generation of each CDR.
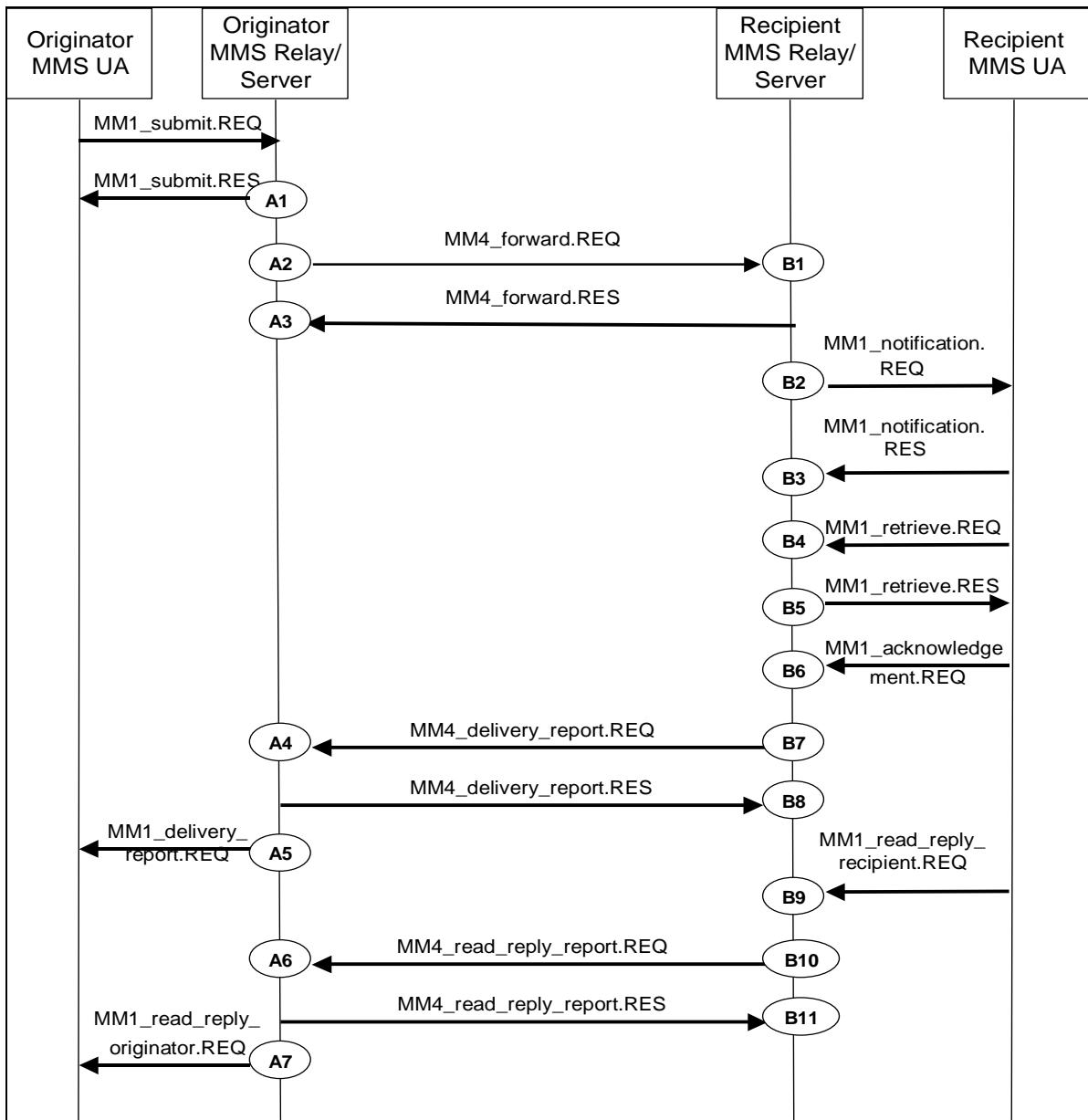
**Figure 9-1: Record trigger overview for distributed case**

Table 9-1: Record type overview for the Originator MMS Relay/Server

| Record trigger | A1 | A2 | A3 | A4 | A5 | A6 | A7 | Any time between A1.. A7 |
|---|---|---|---|---|---|---|---|---|
| Record type | O1S | O4FRq | O4FRs | O4D | O1D | O4R | O1R | OMD |

Table 9-2a: Record type overview for the Recipient MMS Relay/Server

| Record trigger | B1 | B2 | B3 | B4 | B5 | B6 |
|---|---|---|---|---|---|---|
| Record type | R4F | R1NRq | R1NRs | R1RtRq | R1RtRs | R1A |

**Table 9-2b: Record type overview for the Recipient MMS Relay/Server**

| Record trigger | B7 | B8 | B9 | B10 | B11 | Anytime after B1 |
|---|---|---|---|---|---|---|
| Record type | R4Drq | R4DRs | R1RR | R4RRq | R4RRs | RMD |

## 9.2 CDRs relevant for Inter-Operator charging

This section describes which CDRs are relevant for Inter-Operator charging. This section doesn't intent to fix a specific inter-operator charging which is a bilateral matter between two operators. This section intends to describe the technical platform for all Inter-Operator charging strategies. If the requirements of an Operator cannot be mapped onto this description, the section should be completed.

### 9.2.1 Assumptions

The following assumptions on are made:
- Both MMSE supports the Delivery Report Service and the Read-Reply Report Service as required in the 3GPP specifications.
- Reply-Charging is not supported between MMSE A and MMSE B
- Inter-Operator charging does not depend on successful notification of the Recipient User or retrieval by the Recipient User
- Inter-operator charging may depend on a originator user's requirement of a delivery report and/or read-reply report; inter-operator charging does not depend on a permission of the recipient user to apply delivery report and/or read-reply report (in other words, it does not depend from the fact whether an MM4_read_reply.REQ or MM4_Delivery_report.REQ has been sent on MM4 or not.
- Inter-operator charging does not depend on a successful indication of delivery report and/or read-reply report to the Originator User.
- Inter-operator charging does not depend on a request of the Originator User Agent to show or hide the sender's identity when the message is delivered to the recipient (as specified in the *Sender visibility* IE).
- Both MMSE request sending of MM4_forward.RES. Both MMSE send MM4_forward.RES when requested in MM4_forward.REQ.

## 9.3 CDRs relevant for Inter-Operator charging

The following subsections recommend which of the MMS CDRs defined in [32.235] (Release 4) should be supported. The tables:
- List the CDRs
- Recommend usage or non-usage (sometimes under conditions)
- Indicate relevance for end-user and inter-operator charging
- Contain comments and explanations where applicable.

### 9.3.1 MMS records for originator MMS Relay/Server

See table below.

Table 9-3: Relevance of Originator MMS Relay/Server CDRs for inter-operator charging

| CDR type | Relevant for inter-operator charging | Comments / explanations |
|---|---|---|
| Originator MM1 Submission CDR (O1S-CDR) | No | |
| Originator MM4 Forward Request CDR (O4FRq-CDR) | Yes | |
| Originator MM4 Forward Response CDR (O4FRs-CDR) | Yes | |
| Originator MM4 Delivery report CDR (O4D-CDR) | No | due to (AI-4) |
| Originator MM1 Delivery report CDR (O1D-CDR) | No | |
| Originator MM4 Read reply report CDR (O4R-CDR) | No | due to (AI-4) |
| Originator MM1 Read reply originator CDR (O1R-CDR) | No | |
| Originator MM Deletion CDR (OMD-CDR) | Yes | for settlement purposes |

### 9.3.2    MMS records for recipient MMS Relay/server

See table below.

Table 9-4: Relevance of Recipient MMS Relay/Server CDRs for inter-operator charging

| CDR type | Relevant for inter-operator charging | Comments / explanations |
|---|---|---|
| Recipient MM4 Forward CDR (R4F-CDR) | Yes | |
| Recipient MM1 Notification Request CDR (R1NRq-CDR) | No | |
| Recipient MM1 Notification Response CDR (R1NRs-CDR) | No | |
| Recipient MM1 Retrieve Request CDR (R1RtRq-CDR) | No | |
| Recipient MM1 Retrieve Response CDR (R1RtRs-CDR) | No | |
| Acknowledgement CDR (R1A-CDR) | No | |
| Recipient MM4 Delivery report Request CDR (R4DRq-CDR) | No | due to (AI-4) |
| Recipient MM4 Delivery report Response CDR (R4DRs-CDR) | No | due to (AI-4) |
| Recipient MM1 Read reply Recipient CDR (R1RR-CDR) | No | |
| Recipient MM4 Read reply report Request CDR (R4RRq-CDR) | No | due to (AI-4) |
| Recipient MM4 Read reply report Response CDR (R4RRs-CDR) | No | due to (AI-4) |
| Recipient MM Deletion CDR (RMD-CDR) | Yes | for settlement purposes |

### 9.3.3    MMS records for forwarding MMS Relay/Server

See table below.

Table 9-5: Relevance of Forwarding MMS Relay/Server CDRs for inter-operator charging

| CDR type | Relevant for inter-operator charging | Comments / explanations |
|---|---|---|

| Forwarding CDR (F-CDR) | No | |
|---|---|---|

# 10 Inter-Operator Charging: Test scenarios

MMSE of two given PLMNs
- PLMN A and
- PLMN B

are connected via MM4 for MMS interworking.

(1) MM are sent from a selected Originator User Agent (UA-A) to a selected Recipient User Agent (UA-B). UA-B shall be idle updated. It is possible to run the tests when
- both UA-A and UA-B are registered in PLMN-A
- both UA-A and UA-B are registered in PLMN-B
- UA-A is registered in PLMN-A, UA-B is registered in PLMN-B.

(a) and (b) are convenient for international interworking, (c) is convenient for national interworking.

(2) The events at the Originator User Agent and at the Recipient User Agent are observed.

(3) The corresponding IO-CDRs are examined. In order to correlate the submission/notification of a test MM and the CDRs generated for that MM, two methods are described here:
- Correlation Method 1: This is the preferred method: If possible, the *Message ID* Information Element (IE) generated in the Originator MMS R/S and contained in the MM1_submit.RES is recorded. The same Message ID is contained in all CDRs belonging to the MM.
- Correlation Method 2: If this is not possible, the following work around is chosen: For each test MM, the time of sending is noted. Based on
    * the Originator Address and the time of sending recorded by the tester,
    * the Originator Address and the Record Time Stamp contained in the Originator MM4 Forward Request record (O4FRq-CDR)

the matching Originator MM1 Submission CDR (O1S-CDR) is determined. This is possible even if the clocks of the tester and the Originator MMS R/S are not well synchronised: The tester has to compare the sequence of MM that have been sent to the sequence of CDRs specifying the Originator Address.

In both cases, the further matching (that is, the further CDRs relating to the same submission of MM) CDRs are identified by use of the Message ID as recorded in the first CDR related to the submission of MM.

(4) It is observed whether the relevant IO-CDRs generated in the Originator MMSE and Recipient MMSE are consistent with the events at the Originator User Agent and Recipient User Agent.

# 11 Inter-Operator Charging: Essential test purposes and essential test cases

## 11.1 Test Purpose 1: Consistency of Inter-Operator CDRs in the successful case

TP1: To verify that for an MM successfully transferred via the MM4 reference point, the CDRs generated in the Originator MMS R/S and Recipient MMS R/S are consistent:

- ○ Originator MM4 Forward Request CDR (O4FRq-CDR),
- ○ Originator MM4 Forward Response CDR (O4FRs-CDR),
- ○ Recipient MM4 Forward CDR (R4F-CDR)

Variations: The following variations are performed:
- ○ Delivery report requested (Y/N)
- ○ Read-Reply Report requested (Y/N)
- ○ Attachments of different types and volume size

### 11.1.1 Test Case A1

#### 11.1.1.1 Test steps

(a) Test Procedure A01 (see section 15.5) has been executed successfully.

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(b) If (CORR-1) is applied, the Message ID as received in the MM1_submit.RES has been recorded in the test sheets of test procedure A01; if (CORR-2) is applied, the time of submitting the test MM (MM#01) and the subject field of MM#01 have been recorded in the test sheets of test procedure A01.

(c) The matching CDRs are analysed:
- ○ Originator MM4 Forward Request CDR (O4FRq-CDR)
- ○ Originator MM4 Forward Response CDR (O4FRs-CDR)
- ○ Recipient MM4 Forward CDR (R4F-CDR).

The following conditions are verified:
- ○ Originator MM4 Forward Request record (O4FRq-CDR):

| Field | Category | To be verified |
|---|---|---|
| Record Type | M | Shall specify Originator MM4 Forward Request record. |
| Originator MMS Relay/Server Address | M | Shall specify IP address or domain name of the originator MMS Relay/Server (Relay/Server A). |
| Recipient MMS Relay/Server Address | M | Shall specify IP address or domain name of the recipient MMS Relay/Server (Relay/Server B). |

| Field | Category | To be verified |
|---|---|---|
| Message ID | M | |
| 3GPP MMS Version | $M_o$ | |
| Originator address | M | shall specify MSISDN-a1, the address of UA-A belonging to SIM-a1 |
| Recipients address list | M | shall specify MSISDN-b1, the address of UA-B belonging to SIM-b1 |
| Content type | M | |
| MM component list | $M_o$ | |
| Message size | M | |
| Message class | C | |
| Submission Time | M | |
| Time of Expiry | C | shall not be present |
| Delivery Report Requested | M | shall specify FALSE |
| Priority | C | shall not be present |
| Sender visibility | M | shall specify FALSE |
| Read reply requested | M | shall specify FALSE |
| Acknowledgement Request | M | shall specify TRUE |
| Forward counter | C | |
| Forwarding address | C | |
| Record Time Stamp | M | |
| Local Record Sequence Number | $M_o$ | |
| Record extensions | $C_o$ | |

Originator MM4 Forward Response Charging Data Record (O4FRs-CDR):

| Field | Category | To be verified |
|---|---|---|
| Record Type | M | Shall specify Originator MM4 Forward Response record. |
| Originator MMS Relay/Server Address | $M_o$ | Shall specify IP address or domain name of the originator MMS Relay/Server (Relay/Server A). |
| Recipient MMS Relay/Server Address | M | Shall specify IP address or domain name of the recipient MMS Relay/Server (Relay/Server B). |
| Message ID | M | shall be equal to the Message ID in O4FRq-CDR |
| 3GPP MMS Version | $M_o$ | |
| Request Status Code | $M_o$ | |
| Status Text | $C_o$ | |
| Record Time Stamp | $M_o$ | |
| Local Record Sequence Number | $M_o$ | |

| Field | Category | To be verified |
|---|---|---|
| Record extensions | $C_o$ | |

Recipient MM4 Forward record (R4F-CDR):

| Field | Category | To be verified |
|---|---|---|
| Record Type | M | Shall specify Recipient MM4 Forward record. |
| Recipient MMS Relay/Server Address | M | Shall specify IP address or domain name of the recipient MMS Relay/Server (Relay/Server B). |
| Originator MMS Relay/Server Address | M | Shall specify IP address or domain name of the originator MMS Relay/Server (Relay/Server A). |
| Message ID | M | shall be equal to the Message ID in O4FRq-CDR |
| 3GPP MMS Version | $M_o$ | |
| Originator address | M | shall specify MSISDN-a1, the address of UA-A belonging to SIM-a1 |
| Recipients address list | M | shall specify MSISDN-b1, the address of UA-B belonging to SIM-b1 |
| Content type | M | |
| MM component list | $M_o$ | |
| Message size | M | shall be equal to the Message size in O4FRq-CDR |
| Message class | C | |
| Submission Time | M | |
| Time of Expiry | C | shall not be present |
| Delivery Report Requested | M | shall specify FALSE |
| Priority | C | shall not be present |
| Sender visibility | M | shall specify FALSE |
| Read reply Requested | M | shall specify FALSE |
| Request status code | M | |
| Status Text | C | |
| Acknowledgement Request | M | shall specify TRUE |
| Forward counter | C | |
| Forwarding address | C | |
| Record Time stamp | M | |
| Local Record Sequence Number | $M_o$ | |
| Record extensions | $C_o$ | |

### 11.1.1.2 Test result

If all verifications succeed, the verdict is **'pass'**.

Otherwise the verdict is **'fail'**.

## 11.1.2   Test Case B1

### 11.1.2.1   Test steps

(a) Test Procedure B01 (see section 15.5) has been executed successfully.

(b) If (CORR-1) is applied, the Message ID as received in the MM1_submit.RES has been recorded in the test sheets of test procedure B01; if (CORR-2) is applied, the time of submitting the test MM (MM#02) and the subject field of MM#02 have been recorded in the test sheets of test procedure B01.

 (c) The matching CDRs are analysed:
- ₒ   Originator MM4 Forward Request CDR (O4FRq-CDR)
- ₒ   Originator MM4 Forward Response CDR (O4FRs-CDR)
- ₒ   Recipient MM4 Forward CDR (R4F-CDR).


The following conditions are verified:
- • Originator MM4 Forward Request record (O4FRq-CDR):

| Field | Category | To be verified |
|---|---|---|
| Record Type | M | Shall specify Originator MM4 Forward Request record. |
| Originator MMS Relay/Server Address | M | Shall specify IP address or domain name of O-R/S (= R/S B). |
| Recipient MMS Relay/Server Address | M | Shall specify IP address or domain name of R-R/S (= R/S A). |
| Message ID | M | |
| 3GPP MMS Version | $M_o$ | |
| Originator address | M | shall specify MSISDN-b1, the address of UA-B belonging to SIM-b1 |
| Recipients address list | M | shall specify MSISDN-a1, the address of UA-B belonging to SIM-a1 |
| Content type | M | |
| MM component list | $M_o$ | |
| Message size | M | |
| Message class | C | |
| Submission Time | M | |
| Time of Expiry | C | shall not be present |
| Delivery Report Requested | M | shall specify FALSE |
| Priority | C | shall not be present |
| Sender visibility | M | shall specify FALSE |
| Read reply requested | M | shall specify FALSE |
| Acknowledgement Request | M | shall specify TRUE |

| Field | Category | To be verified |
|---|---|---|
| Forward_counter | C | |
| Forwarding address | C | |
| Record Time Stamp | M | |
| Local Record Sequence Number | $M_o$ | |
| Record extensions | $C_o$ | |

Originator MM4 Forward Response Charging Data Record (O4FRs-CDR):

| Field | Category | To be verified |
|---|---|---|
| Record Type | M | Shall specify Originator MM4 Forward Response record. |
| Originator MMS Relay/Server Address | $M_o$ | Shall specify IP address or domain name of O-R/S (=R/S B). |
| Recipient MMS Relay/Server Address | M | Shall specify IP address or domain name of R-R/S (= R/S A). |
| Message ID | M | shall be equal to the Message ID in O4FRq-CDR |
| 3GPP MMS Version | $M_o$ | |
| Request Status Code | $M_o$ | |
| Status Text | $C_o$ | |
| Record Time Stamp | $M_o$ | |
| Local Record Sequence Number | $M_o$ | |
| Record extensions | $C_o$ | |

Recipient MM4 Forward record (R4F-CDR):

| Field | Category | To be verified |
|---|---|---|
| Record Type | M | Shall specify Recipient MM4 Forward record. |
| Recipient MMS Relay/Server Address | M | Shall specify IP address or domain name of R-R/S (= R/S A). |
| Originator MMS Relay/Server Address | M | Shall specify IP address or domain name of O-RS (=R/S B). |
| Message ID | M | shall be equal to the Message ID in O4FRq-CDR |
| 3GPP MMS Version | $M_o$ | |
| Originator address | M | shall specify MSISDN-b1, the address of UA-B belonging to SIM-b1 |
| Recipients address list | M | shall specify MSISDN-a1, the address of UA-B belonging to SIM-a1 |
| Content type | M | |
| MM component list | $M_o$ | |

| Message size | M | shall be equal to the Message size in O4FRq-CDR |
|---|---|---|
| Message class | C | |
| Submission Time | M | |
| Time of Expiry | C | shall not be present |
| Delivery Report Requested | M | shall specify FALSE |
| Priority | C | shall not be present |
| Sender visibility | M | shall specify FALSE |
| Read reply Requested | M | shall specify FALSE |
| Request status code | M | |
| Status Text | C | |
| Acknowledgement Request | M | shall specify TRUE |
| Forward_counter | C | |
| Forwarding address | C | |
| Record Time stamp | M | |
| Local Record Sequence Number | $M_o$ | |
| Record extensions | $C_o$ | |

#### 11.1.2.2   Test result

If all verifications succeed, the verdict is **'pass'**.

Otherwise the verdict is **'fail'**.

### 11.2  Test Purposes for further study

- o Variation of Test Purpose 1: Multiple addresses
- o Testing of Deletion CDRs
- o Consistency of Inter-Operator CDRs in various unsuccessful cases:
- o Recipient not reachable
- o Recipient not known in  MMSE B

## 12 Test Reports

For each test case, the following shall be recorded:
- <Test-reference> as defined in section 15.1
- All relevant CDRs
- Test result

## 13 MM4 Interoperability tests

MM4 Interoperability tests are performed as part of the system tests. In this section, several recommended MM4 interoperability tests are described.

## 13.1 Observation points

The observation points (inspection points) are those interfaces that are accessible to the testing group in order to check if a specific test case has been successfully passed or not. The inspection points that will be used in the MM4 Interface testing are the following:

- **MMS User Agent**: Both the originator and recipients´ User Agents will be use to check the result of some test cases.
- **MM4 Reference Point**: The SMTP messages interchanged between different MMS Relay/Servers through the MM4 interface will be analysed to check the result of some test cases.
- **MM5 Reference Point**: The MAP messages interchanged between the MMS Relay/Servers and the HLR.
- **MMS R/S Operator Interface**: Set of interfaces that make accessible all the information about the MMS R/S work and state (user databases, state of the messages, configuration of the system…)

## 13.2 MM4 Interoperability covered by end-to-end tests

Certain MMS End-to-End tests would not be passed if certain MM4 functions had not worked correctly during the tests. In this respect, certain MMS End-to-End tests implicitly test also MM4 functions. In this case, MM4 interoperability tests of these MM4 functions are called here to be *covered* by the corresponding end-to-end tests.

## 13.3 Test Cases

### 13.3.1 Address Resolution

When a *Multimedia Message* (**MM**) is sent from an originator belonging to the MMSE A to a recipient belonging to a different MMSE B the origin MMSC must resolve the address of the recipient MMSC in order to forward the message appropriately. The following test cases check if the different processes involved in the destination MMSC address resolution take place correctly.

#### 13.3.1.1 IMSI resolution from Subscriber of Operator A to a non-ported Subscriber in Operator B

- **Test Procedure:** An MM is sent from O-UA to a recipient belonging to a non ported subscriber of the R-PLMN. When detecting that the recipient belongs to an external MMSE the MAP operation SRI_for_SM must be invoked. The MMS Relay/Server must receive the IMSI of the recipient as response from the HLR.
- **Result:** (pass/fail) 'Pass' if the IMSI of the recipient is received after invoking the MAP operation SRI_for_SM. Message with all attachment is delivered to the recipient.
- **Inspection Point:** MM5 Reference Point.
  - o This test case is covered by end-to-end test case TC1.

#### 13.3.1.2 IMSI resolution from Subscriber of Operator A to a ported Subscriber in Operator B

- **Test Procedure:** An MM is sent from a User Agent belonging to the MMSE A to a recipient belonging to an imported subscriber in MMSE B. When detecting that the recipient belongs to an external MMSE the MAP operation SRI_for_SM must be invoked. The MMS Relay/Server must receive the IMSI of the recipient as response from the HLR.

- **Result:** (pass/fail) 'Pass' if the IMSI of the recipient is received after invoking the MAP operation SRI_for_SM. Message with all attachment is delivered to the recipient.
- **Inspection Point:** MM5 Reference Point
    - ○ This test case is covered by end-to-end test case TC2.

### 13.3.1.3    Recipient MMS Relay/Server address resolution

- **Test Procedure:** After receiving the IMSI of the recipient the origin MMS Relay/Server must use it to resolve the address of the destination MMS Relay/Server. This will be done by means of standard DNS procedures.
- **Result:** (pass/fail) 'Pass' if the address of the recipient MMS Relay/Server is correctly resolved.
- **Inspection Point:** Interface between MMS Relay/Server and DNS Server.
    - ○ This test case is covered by end-to-end test cases TC1 and TC2.

## 13.3.2    Events at MM4

### 13.3.2.1    Submission of MM with multiple addresses

- **Test Procedure:** A message is sent from User Agent A to MMS R/S A with multiple addresses in the 'To', 'CC' and 'BCC' fields. For each address belonging to PLMN B, an MM4_forward.REQ message with this address as the single address must be sent from MMS R/S A to MMS R/S B.
- **Result:** (pass/fail) 'Pass' if or each address belonging to PLMN B, an MM4_forward.REQ message with this address as the single address is sent from MMS R/S A to MMS R/S B
- Inspection Point: MM4.

### 13.3.2.2    Delivery report disabled in MMSE A

- This test case is applicable only if delivery reports are disabled in MMSE A.
- **Test Procedure:** A message is sent from User Agent A to MMS R/S A requesting a delivery report. MMS R/S A shall set the parameter 'Delivery Report' to false in the corresponding MM4_Forward.REQ.
- **Result:** (pass/fail) 'Pass' if MMS R/S A sends a corresponding MM4_Forward.REQ with parameter 'Delivery Report' set to false.
- Inspection Point: MM4.

### 13.3.2.3    MM header fields mapping compliance

- **Test Procedure**: A message is sent from UE A to UE B. Check Usage of different address formats
- **Result:** (pass/fail) 'Pass' if the MM is addressed to the MMSE B according to 3GPP 23.140.
- **Inspection Point:** MM4 Reference Point.
- This test is covered by end-to-end test cases TC1 and TC2.

### 13.3.2.4    MM header fields mapping compliance

- **Test Procedure:** A message is sent from MMSE A to a different MMSE B. Check header fields of message that is delivered to other MMSE domain..
- **Result:** (pass/fail) 'Pass' if the MMS header are mapped correctly according to 3GPP 23.140.
- **Inspection Point:** MM4 Reference Point.
- This test is covered by end-to-end test cases TC1 and TC2.

### 13.3.2.5  MM4_forward.REQ and MM4_forward.RES

- **Test Procedure:** A message is sent from MMSE A to a different MMSE B. The generated SMTP message (MM4_forward.REQ) and the response (MM4_forward.RES) are intercepted in the MM4 reference point. It must be checked that the headers of the SMTP message and the multimedia message encoding correspond to the specifications of 3GPP.
- **Result:** (pass/fail) 'Pass' if the information elements are mapped correctly to the SMTP message headers and the multimedia message encoding corresponds to the specifications of 3GPP.
- **Inspection Point:** MM4 Reference Point.
- This test is covered by end-to-end test cases TC1 and TC2.

### 13.3.2.6  MM4_Delivery_report.REQ and MM4_Delivery_report.RES

- **Test Procedure:** A message is sent from MMSE A to a different MMSE B with the parameter 'Delivery Report' set to true. The SMTP messages corresponding to the delivery report request (MM4_Delivery_report.REQ) and response (MM4_Delivery_report.RES) are intercepted in the MM4 reference point. It must be checked that the headers of the SMTP message correspond to the specifications of 3GPP.
- **Result:** (pass/fail) 'Pass' if the information elements are mapped correctly to the SMTP message headers.
- **Inspection Point:** MM4 Reference Point.
- This test is covered by end-to-end test cases TC1 and TC2.

### 13.3.2.7   MM4_Read_reply_report.REQ and MM4_ Read_reply _report.RES

- **Test Procedure:** A message is sent from MMSE A to a different MMSE B with the parameter 'Read Reply Report' set to true. The SMTP messages corresponding to the read reply report request (MM4_Read_reply_report.REQ) and response (MM4_Read_reply_report.RES) are intercepted in the MM4 reference point. It must be checked that the headers of the SMTP message correspond to the specifications of 3GPP.
- **Result:** (pass/fail) 'Pass' if the information elements are mapped correctly to the SMTP message headers.
- **Inspection Point:** MM4 Reference Point.
- This test is covered by end-to-end test cases TC1 and TC2.

## 13.3.3  Internal actions of the MMS R/S

### 13.3.3.1  Submission with expiry time sender defined

- **Test Procedure:** A message is sent from MMSE A to a different MMSE B with the optional parameter 'Time of Expiry' set to an appropriate date. The recipient User Agent must be unavailable for the message delivery. The message must be discarded by the MMSC when reaching the expiry time. The message will be therefore not delivered.
- **Result:** (pass/fail) 'Pass' if the Multimedia Message is discarded by the recipient MMSC at the expiry time and it does not reach the recipient User Agent.
- **Inspection Point:** MMS R/S Operator Interface.

# 14 Special Functions

## 14.1 Legacy support:

For Mobile Stations not supporting MMS ('legacy mobile stations'), the network will provide legacy support: When an MM is to be sent to a recipient known to use a legacy mobile station, the MMS stores the MM at an appropriate location (e.g., on the Web) and sends (instead of an MM1_notification.REQ) an SMS to the recipient indicating how the MM can be retrieved. Operator specific methods are used by the MMSE to conclude that the recipient uses a legacy mobile station. For testing purposes, the following types of SIM are required:

- *Non-legacy SIM*: The Home MMSE assumes that the recipient belonging to the SIM uses a MMS capable mobile station.
- *Legacy SIM*: The Home MMSE assumes that the recipient belonging to the SIM uses a mobile station that is not MMS capable (a legacy mobile station).

The status of a SIM to be legacy SIM may change if certain actions are performed. Such actions must be avoided. The PLMN issuing the SIM must provide information what these actions are.

Example:

A PLMN may apply the following strategy: By default, a subscriber is considered to use a legacy mobile station. As soon as the subscriber sends an MM, the subscriber is considered to use an MMS capable mobile station. In this example, it should be avoided to send an MM from a mobile station with a legacy SIM, because this action would change the status to non-legacy SIM.

## 14.2 Mobile Number Portability

In the country of the Recipient PLMN (PLMN R), **Mobile Number Portability** may be applicable. In this case, a SIM may belong to an *imported subscriber*, i.e., a subscriber of PLMN R with an MSISDN ported from another PLMN of the PLMN R country.

PLMN R will dispose of such SIMs belonging to imported subscribers for testing purposes. It may be difficult to make such SIMs available to other PLMNs for testing purposes. However, the test procedures A02 and B02 (see section 15.5) can be performed so that the testing team of a PLMN has only to use SIMs belonging to imported subscribers of the own PLMN, not of another PLMN.

# 15 Test procedures and test reports [new section, revision marks not shown]

## 15.1 Settings

- PLMN A is the PLMN with lower MCC, or, if both MCC are equal, with lower MNC. The other PLMN is PLMN B.
- MSISDN-a1 is the MSISDN (in international format) belonging to SIM-a1, see section 3.3
- MSISDN-b1 is the MSISDN (in international format) belonging to SIM-b1, see section 3.3
- UA-a1 is the User Agent A using SIM-a1 etc...
- UA-b1 is the User Agent B using SIM-b1 etc...
- Text field-1: Consists of <Test-reference> followed by <CR> < LF> followed by 2kB of text in a character set that can be handled by MMS terminal A and MMS terminal B.

- Text field-2: Consists of <Test-reference> followed by <CR> < LF> followed by 1kB of text in a character set that can be handled by MMS terminal A and MMS terminal B.
- Image-1: This is a still image in  Baseline JPEG format, size 10 kB.
- Image-2: This is a still image in  Baseline JPEG format, size 5 kB.
- Image-3: This is a still image in  Baseline JPEG format, size 20 kB.
- Speech-1: This is a AMR coded speech attachment, size around 10 kB
- Speech-2: This is a AMR coded speech attachment, size around 20 kB

The <Test-reference> is used in the subject field and the beginning of the contents part of an MM to identify the test case and execution. It is given in Backus-Naur form as:

<Test-reference> ::=

O  <MCC-A> <MNC-A> R <MCC-A> <MNC-A> T <Test procedure reference> D <date and time> I <test execution identifier>

| <MCC-A> | -- MCC of PLMN A (3 digits) |
| <MNC-A> | -- MNC of PLMN A (2 or 3 digits) |
| <MCC-B> | -- MCC of PLMN B (3 digits) |
| <MNC-B> | -- MNC of PLMN B (2 or 3 digits) |

<Test procedure reference>  ::=

{A|B} <digit> <digit>    -- reference of test procedure as given below

<date and time>                         -- YYYYMMDDHHMMSS specifying year, month, day,

   hour (24 format), minutes and seconds of UTC-time when

   message was sent

<test execution identifier>            -- unique integer number (unique for the two given PLMN)

The length of the <Test-reference> is <= 32 characters if the <test execution identifier> has <= 4 digits.

Example:

O13202R14004TA01D20030821100325I5013

specifies

the Originator PLMN with MCC 132 and MNC 02 (this is PLMN A)

the Recipient PLMN with MCC 140 and MNC 004 (this is PLMN B, because 132 < 140)

test procedure A01

Date and time 2003-08-21 (21 August 2003), 10:03:25 UTC

Test execution identifier 5013

## 15.2  Test reports - General Information

| HPLMN-A Operator Name | |
|---|---|
| PLMN-B Operator Name | |
| Date of Tests | |
| Testing persons  PLMN-A | |

| | |
|---|---|
| Phone/Fax | |
| E-mail | |
| Testing persons  PLMN-B[1] | |
| Phone/Fax[1] | |
| E-mail [1] | |
| PLMN-B HLR  Manufacturer(s) | |
| PLMN-B HLR Software Build  Level(s) | |
| PLMN-A WAP Gateway Identity/Identities | |
| PLMN-A WAP Gateway Manufacturer(s) | |
| PLMN-A WAP Software Build Level(s) | |
| PLMN-A SGSN Identity/Identities | |
| PLMN-A SGSN  Manufacturer(s) | |
| PLMN-A SGSN Software Build Level(s) | |
| PLMN-A GGSN Identity/Identities | |
| MMS R/S Identity / Identities | |
| MMS R/S Manufacturer(s) | |
| MMS R/S Software Build Level(s) | |
| Comments | |

_____

[1]        Only relevant if test scenario 2 is applied.


MS configuration parameters

| | |
|---|---|
| MSISDN A | |
| IMSI A | |
| MSISDN B | |
| IMSI B | |
| MMS APN | |
| WAP GW IP address | |
| WAP GW CSD MSISDN | |
| URL/Relay Server | |
| Login | |
| Password | |


Cf. also PRD IR21 for network configuration parameters that need to be exchanged for MMS
Interworking to be implemented:
- IP address range for MMSC
- MMSC Vendor
- MMSC software level.

## 15.3  Test preparation

The content parts of the following Multimedia Messages are generated. If The Text Execution Method 2 (see section 3.7) is used, these content parts are exchanged between the Testing Teams of PLMN A and B (e.g., via e-mail).

## 15.4  Contents of test MM

MM#01:

| | |
|---|---|
| Recipient Address: | MSISDN-b1 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | None |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: None | |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-1 Page 2: Image-1 with text: "Image 1" |

Note: the Content type Information Element in the MM1_Submit.REQ is automatically generated by the originator User Agent.


MM#02:

| | |
|---|---|
| Recipient Address: | MSISDN-a1 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | None |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |

Reply-Charging-ID:          None
Content:                    Page 1: Text-field-1 Page 2: Image-1 with text: "Image
1"

MM#03:

Recipient Address:          MSISDN-b3
Sender Address:             MSISDN-a1
Subject:                    <Test-reference>
Message class:              Personal
Date and time:              The time and date of the submission of the MM.
Time of Expiry:             None
Earliest delivery time:     None
Delivery report:            No
Reply-Charging:             No
Reply-Deadline:             None
Reply-Charging-Size:        None
Priority:                   None
Sender visibility:          Request to show the sender's identity
Read reply:                 No
Subject:                    <Test-reference>
Reply-Charging-ID:          None
Content:                    Page 1: Text-field-2 Page 2: Speech-1

MM#04:

Recipient Address:          MSISDN-a3
Sender Address:             MSISDN-b1
Subject:                    <Test-reference>
Message class:              Personal
Date and time:              The time and date of the submission of the MM.
Time of Expiry:             None
Earliest delivery time:     None
Delivery report:            No
Reply-Charging:             No
Reply-Deadline:             None
Reply-Charging-Size:        None
Priority:                   None
Sender visibility:          Request to show the sender's identity
Read reply:                 No
Subject:                    <Test-reference>
Reply-Charging-ID:          None
Content:                    Page 1: Text-field-2 Page 2: Image-3

MM#05:

Recipient Addresses:        MSISDN-b1, MSISDN-b4

| | |
|---|---|
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-2 |

MM#06:

| | |
|---|---|
| Recipient Addresses: | MSISDN-a4 |
| cc: | MSISDN-b1 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Image 1 Page 3: Image 2 |

MM#07:

| | |
|---|---|
| Recipient Addresses: | MSISDN-b4 |
| cc: | MSISDN-a4 |
| bcc: | MSISDN-b1 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |

| | |
|---|---|
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-1 |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-1 |

MM#08:

| | |
|---|---|
| Recipient Addresses: | MSISDN-a4, MSISDN-b1, e-mail address of tester |
| cc: | MSISDN-b5, MSISDN-a5 |
| bcc: | MSISDN-a5 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |

|  |  |
|---|---|
| Subject: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-1 |

MM#09:

|  |  |
|---|---|
| Recipient Addresses: | MSISDN-a1, MSISDN-a4 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-2 |

MM#10:

|  |  |
|---|---|
| Recipient Addresses: | MSISDN-b4 |
| cc: | MSISDN-a1 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Image 1 Page 3: Image 2 |

MM#11:

|  |  |
|---|---|
| Recipient Addresses: | MSISDN-a4 |
| cc: | MSISDN-b4 |

| | |
|---|---|
| bcc: | MSISDN-a1 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-1 |

MM#12:

| | |
|---|---|
| Recipient Addresses: | MSISDN-b4, MSISDN-a1, e-mail address of tester |
| cc: | MSISDN-a5, MSISDN-b5 |
| bcc: | MSISDN-b5 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | Personal |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Page 1: Text-field-2 Page 2: Speech-1 |

MM#13:

| | |
|---|---|
| Recipient Address: | MSISDN-b1 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | none |

| | |
|---|---|
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | Yes |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Text-field-2 |

MM#14:

| | |
|---|---|
| Recipient Address: | MSISDN-a1 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | none |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | Yes |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Text-field-2 |

MM#15:

| | |
|---|---|
| Recipient Address: | MSISDN-b1 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | none |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |

|  |  |
|---|---|
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | Yes |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Text-field-2 |

MM#16:

|  |  |
|---|---|
| Recipient Address: | MSISDN-a1 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | none |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | Yes |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Text-field-2 |

MM#17:

|  |  |
|---|---|
| Recipient Address: | MSISDN-b2 |
| Sender Address: | MSISDN-a1 |
| Subject: | <Test-reference> |
| Message class: | none |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |

       Content:                          Text-field-2

MM#18:

| | |
|---|---|
| Recipient Address: | MSISDN-a2 |
| Sender Address: | MSISDN-b1 |
| Subject: | <Test-reference> |
| Message class: | none |
| Date and time: | The time and date of the submission of the MM. |
| Time of Expiry: | None |
| Earliest delivery time: | None |
| Delivery report: | No |
| Reply-Charging: | No |
| Reply-Deadline: | None |
| Reply-Charging-Size: | None |
| Priority: | None |
| Sender visibility: | Request to show the sender's identity |
| Read reply: | No |
| Subject: | <Test-reference> |
| Reply-Charging-ID: | None |
| Content: | Text-field-2 |

## 15.5  Test procedures

### 15.5.1   Test Procedure A01

Reference: A01

Actions at UA-A:

UA-a1 sends MM#01 to MSISDN-b1

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A01 |
| MSISDN-A | MSISDN-B | Time of MM submission | Message Id if available from MM1_Submit.RES | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A01 in the subject field , UA-B retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1

- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#01

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A01 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

## 15.5.2   Test Procedure B01

Reference: B01

Actions at UA-B:

UA-b1 sends MM#02

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B01 |
| MSISDN-A | MSISDN-B | Time of MM submission | Message Id if available from MM1_Submit.RES | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure B01 in the subject field , UA-a retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#02

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B01 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |

| Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
|---|---|---|---|---|
| | | | | |
| Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | |
| Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | |

### 15.5.3  Test Procedure A02

This test procedure is only applicable if PLMN B supports Mobile Number Portability.

Reference: A02

Actions at UA-A:

UA-a1 sends MM#03 to MSISDN-b3

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A02 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A02 in the subject field , UA-B retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The Message class is 'Personal'
- The content of the MM is as specified for MM#03

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A02 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

### 15.5.4   Test Procedure B02

This test procedure is only applicable if PLMN A supports Mobile Number Portability.

Reference: B02

Actions at UA-B:

UA-b1 sends MM#04 to MSISDN-a3

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B02 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |

| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
|---|---|---|---|---|
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B02 in the subject field , UA-A retrieves the MM. The following points are verified:
- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The Message class is 'Personal'
- The content of the MM is as specified for MM#04

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B02 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on UA-A) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |

| Short explanation if content is not correct: | If Subject is not correct, Subject as received in the MM |
| --- | --- |
| | |

### 15.5.5  Test Procedure A03 (multiple addresses)

Reference: A03

Actions at UA-A:

UA-a1 sends MM#05

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
| --- | --- | --- | --- | --- |
| | | | | A03 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A03 in the subject field , UA-B retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#05

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
| --- | --- | --- | --- | --- |
| | | | | A03 |
| Test result (Pass or Fail): | | | | |
| | | | | |

| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
|---|---|---|---|---|
|  |  |  |  |  |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
|  |  |  |  |  |
| Fields of MM: |  |  |  |  |
|  | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
|  |  |  |  |  |  |
|  | Content correct (Yes/No) |  |  | Subject correct (Yes/No) |  |
|  |  |  |  |  |  |
|  | Short explanation if content is not correct: |  |  | If Subject is not correct, Subject as received in the MM |  |
|  |  |  |  |  |  |

### 15.5.6   Test Procedure B03 (multiple addresses)

Reference: B03

Actions at UA-B:

UA-b1 sends MM#09

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | B03 |
| MSISDN-A | MSISDN-B |  |  |  |
|  |  |  |  |  |
| Time of MM submission | Message Id if available from MM1_Submit.RES |  |  |  |
|  |  |  |  |  |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure A04 in the subject field , UA-A retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested

- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#09

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A04 |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |

| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
|---|---|---|---|---|---|
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

## 15.5.7 Test Procedure A04 (multiple addresses)

Reference: A04

Actions at UA-A:

UA-a1 sends MM#06

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A04 |

| MSISDN-A | MSISDN-B | | | |
|---|---|---|---|---|
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A04 in the subject field , UA-B retrieves the MM. The following points are verified:

The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1

The Message class is not specified in the MM1_Notify.REQ

The MM1_Notify.REQ does not indicate the request for a delivery report

The MM1_Notify.REQ does not indicate that reply-charging is possible

The MM1_Retrieve.RES does not indicate that a delivery report is requested

The MM1_Retrieve.RES does not indicate a priority

The MM1_Retrieve.RES does not indicate that a read-reply report is requested

The Subject field has the exact content

The content of the MM is as specified for MM#06

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A04 |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |

| Content correct (Yes/No) | Subject correct (Yes/No) |
|---|---|
| | |
| Short explanation if content is not correct: | If Subject is not correct, Subject as received in the MM |
| | |

### 15.5.8 Test Procedure B04 (multiple addresses)

Reference: B04

Actions at UA-B:

UA-a1 sends MM#10

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B04 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B04 in the subject field , UA-A retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#06

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B04 |

| Test result (Pass or Fail): | | | | |
|---|---|---|---|---|
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |

| Fields of MM: | | | | | |
|---|---|---|---|---|---|
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

### 15.5.9   Test Procedure A05 (multiple addresses)

Reference: A05

Actions at UA-A:

UA-a1 sends MM#07

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A05 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A05 in the subject field , UA-B retrieves the MM. The following points are verified:
- The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1
- The Recipient address field only specifies MSISDN-b1

- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#07

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A05 |
| further recipient addresses visible (Yes/No) |  |  |  |  |
|  |  |  |  |  |
| Test result (Pass or Fail): |  |  |  |  |
|  |  |  |  |  |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
|  |  |  |  |  |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
|  |  |  |  |  |
| Fields of MM: |  |  |  |  |
| Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
|  |  |  |  |  |
| Content correct (Yes/No) |  |  | Subject correct (Yes/No) |  |
|  |  |  |  |  |
| Short explanation if content is not correct: |  |  | If Subject is not correct, Subject as received in the MM |  |
|  |  |  |  |  |

## 15.5.10  Test Procedure B05 (multiple addresses)

Reference: B05

Actions at UA-B:

UA-b1 sends MM#11

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B05 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B05 in the subject field , UA-A retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The Recipient address field only specifies MSISDN-a1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content

The content of the MM is as specified for MM#11

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A04 |
| further recipient addresses visible (Yes/No) | | | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |

| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
|---|---|---|---|---|
|  |  |  |  |  |

| Fields of MM: | | | | |
|---|---|---|---|---|
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

## 15.5.11 Test Procedure A06 (multiple addresses)

Reference: A06

Actions at UA-A:

UA-a1 sends MM#08

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A06 |
| MSISDN-A | MSISDN-B |  |  |  |
|  |  |  |  |  |
| Time of MM submission | Message Id if available from MM1_Submit.RES |  |  |  |
|  |  |  |  |  |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A06 in the subject field , UA-B retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content

- The content of the MM is as specified for MM#08

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A06 |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

## 15.5.12  Test Procedure B06 (multiple addresses)

Reference: B06

Actions at UA-B:

UA-b1 sends MM#12

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B06 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |

| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
|---|---|---|---|---|
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B06 in the subject field , UA-A retrieves the MM. The following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The Message class is not specified in the MM1_Notify.REQ
- The MM1_Notify.REQ does not indicate the request for a delivery report
- The MM1_Notify.REQ does not indicate that reply-charging is possible
- The MM1_Retrieve.RES does not indicate that a delivery report is requested
- The MM1_Retrieve.RES does not indicate a priority
- The MM1_Retrieve.RES does not indicate that a read-reply report is requested
- The Subject field has the exact content
- The content of the MM is as specified for MM#12

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B06 |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | Recipient address indicated in MM | Message class indicated in MM |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

### 15.5.13  Test Procedure A07

Reference: A07

Actions at UA-A:

UA-a1 sends MM#13

When UA-a1 receives an MM1_delivery_report.REQ matching MM#13, it verifies that

the MM Status in the MM1_delivery_report.REQ specifies 'delivered'.

If this is true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A07 |
| MSISDN-A | MSISDN-B | MM Status |  |  |
|  |  |  |  |  |
| Test result (Pass or Fail): |  |  |  |  |
|  |  |  |  |  |
| Time of MM submission | Message Id if available from MM1_Submit.RES | Recipient address in MM1_delivery_report.REQ | Event Date | Time of receipt of MM1_delivery_report.REQ |
|  |  |  |  |  |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A07 in the subject field , UA-B retrieves the MM without forbidding a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A07 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
|  |  |  |  |  |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) |  |  |
|  |  |  |  |  |

### 15.5.14  Test Procedure B07

Reference: B07

Actions at UA-B:

UA-a1 sends MM#14

When UA-a1 receives an MM1_delivery_report.REQ matching MM#14, it verifies that the MM Status in the MM1_delivery_report.REQ specifies 'delivered'.

If this is true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B07 |
| MSISDN-A | MSISDN-B | MM Status | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | Recipient address in MM1_delivery_report.REQ | Event Date | Time of receipt of MM1_delivery_report.REQ |
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B07 in the subject field , UA-A retrieves the MM without forbidding a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B07 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | Request for delivery report in Notification (Yes/No) | Reply-charging indicated as possible in Notification (Yes/No) |
| | | | | |
| MM retrieved | Time of MM retrieval | Message ID (if visible on the UA) | | |
| | | | | |

## 15.5.15  Test Procedure A08

Reference: A08

Actions at UA-A:

UA-a1 sends MM#13

When UA-a1 receives an MM1_delivery_report.REQ matching MM#13, it verifies that

the MM Status in the MM1_delivery_report.REQ specifies 'rejected'.

If this is true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A08 |
| MSISDN-A | MSISDN-B | MM Status | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | Recipient address in MM1_delivery_report.REQ | Event Date | Time of receipt of MM1_delivery_report.REQ |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A08 in the subject field , UA-B rejects the MM without forbidding a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A08 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | | |
| | | | | |

### 15.5.16  Test Procedure B08

Reference: B08

Actions at UA-B:

UA-a1 sends MM#14

When UA-b1 receives an MM1_delivery_report.REQ matching MM#14, it verifies that

the MM Status in the MM1_delivery_report.REQ specifies 'rejected'.

If this is true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B08 |
| MSISDN-A | MSISDN-B | MM Status | | |
| | | | | |

| Test result (Pass or Fail): | | | | |
|---|---|---|---|---|
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | Recipient address in MM1_delivery_report.REQ | Event Date | Time of receipt of MM1_delivery_report.REQ |
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B08 in the subject field , UA-A rejects the MM without forbidding a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B08 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | | |
| | | | | |

### 15.5.17  Test Procedure A09

Reference: A09

Actions at UA-A:

UA-a1 sends MM#13

If UA-a1 receives an MM1_delivery_report.REQ matching MM#13, it verifies that the MM Status in the MM1_delivery_report.REQ specifies 'deferred'.

When UA-a1 receives a further MM1_delivery_report.REQ matching MM#13, it verifies that the MM Status in the MM1_delivery_report.REQ specifies 'expired'.

If both verifications yield true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A09 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

| Recipient address in first MM1_delivery_report.REQ | Event Date of first MM1_delivery_report.REQ | Time of receipt of first MM1_delivery_report.REQ | MM Status of first MM1_delivery_report.REQ |
|---|---|---|---|
|  |  |  |  |
| Recipient address in 2nd MM1_delivery_report.REQ | Event Date of 2nd MM1_delivery_report.REQ | Time of receipt of 2nd MM1_delivery_report.REQ | MM Status of 2nd MM1_delivery_report.REQ |
|  |  |  |  |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A09 in the subject field , UA-B defers the MM without forbidding a delivery report. UA-B never retrieves the MM.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A09 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification |  |  |
|  |  |  |  |  |

### 15.5.18 Test Procedure B09

Reference: B09

Actions at UA-B:

UA-b1 sends MM#14

If UA-b1 receives an MM1_delivery_report.REQ matching MM#14, it verifies that the MM Status in the MM1_delivery_report.REQ specifies 'deferred'.

When UA-b1 receives a further MM1_delivery_report.REQ matching MM#14, it verifies that the MM Status in the MM1_delivery_report.REQ specifies 'expired'.

If both verifications yield true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | B09 |
| MSISDN-A | MSISDN-B |  |  |  |
|  |  |  |  |  |
| Test result (Pass or Fail): |  |  |  |  |
|  |  |  |  |  |
| Time of MM submission | Message Id if available from MM1_Submit.RES |  |  |  |

| Recipient address in first MM1_delivery_report.REQ | Event Date of first MM1_delivery_report.REQ | Time of receipt of first MM1_delivery_report.REQ | MM Status of first MM1_delivery_report.REQ | |
|---|---|---|---|---|
| Recipient address in 2nd MM1_delivery_report.REQ | Event Date of 2nd MM1_delivery_report.REQ | Time of receipt of 2nd MM1_delivery_report.REQ | MM Status of 2nd MM1_delivery_report.REQ | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure A10 in the subject field, UA-A defers the MM without forbidding a delivery report. UA-B never retrieves the MM.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B09 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | | |
| | | | | |

### 15.5.19 Test Procedure A10

Reference: A10

Actions at UA-A:

UA-a1 sends MM#13

If UA-a1 receives an MM1_delivery_report.REQ matching MM#13 within the next [24] hours, the test result is 'fail', otherwise it is 'pass'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A10 |
| MSISDN-A | MSISDN-B | MM Status | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A10 in the subject field, UA-B rejects the MM and forbids a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | | PLMN B MCC | PLMN B MNC | Test proc reference |
|---|---|---|---|---|---|
| | | | | | A10 |
| Notification received (Yes/No) | Time of receipt of Notification | | Sender address given in Notification | | |
| | | | | | |

### 15.5.20  Test Procedure B10

Reference: B10

Actions at UA-b1:

UA-b1 sends MM#14

If UA-b1 receives an MM1_delivery_report.REQ matching MM#13 within the next [24] hours, the test result is 'fail', otherwise it is 'pass'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A10 |
| MSISDN-A | MSISDN-B | MM Status | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Time of MM submission | Message Id if available from MM1_Submit.RES | | | |
| | | | | |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B10 in the subject field, UA-A rejects the MM and forbids a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B10 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | | |

|  |  |  |  |  |
|---|---|---|---|---|
|  |  |  |  |  |

### 15.5.21  Test Procedure A11

Reference: A11

Actions at UA-A:

UA-a1 sends MM#15

When UA-a1 receives an MM1_read_reply_originator.REQ matching MM#15, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A11 |
| MSISDN-A | MSISDN-B | MM Status |  |  |
|  |  |  |  |  |
| Test result (Pass or Fail): | | | | |
|  | | | | |
| Time of MM submission | | | Message Id if available from MM1_Submit.RES | |
|  | | | | |
| Recipient address in MM1_dread_reply_originator.REQ | Date and Time in MM1_dread_reply_origi nator.REQ | Read Status in MM1_read_reply_originator.REQ | | |
|  | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A08 in the subject field , UA-B rejects the MM without forbidding a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A08 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification |  |  |
|  |  |  |  |  |

### 15.5.22  Test Procedure B11

Reference: B11

Actions at UA-B:

UA-b1 sends MM#16

When UA-b1 receives an MM1_read_reply_originator.REQ matching MM#16, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B11 |
| MSISDN-A | MSISDN-B | MM Status | | |
| | | | | |
| Test result (Pass or Fail): | | | | |
| | | | | |
| Time of MM submission | | Message Id if available from MM1_Submit.RES | | |
| | | | | |
| Recipient address in MM1_dread_reply_originator.REQ | Date and Time in MM1_dread_reply_originator.REQ | Read Status in MM1_read_reply_originator.REQ | | |
| | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A08 in the subject field , UA-B rejects the MM without forbidding a delivery report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A08 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification | | |
| | | | | |

### 15.5.23 Test Procedure A12

Reference: A12

Actions at UA-A:

UA-a1 sends MM#15

If UA-a1 receives an MM1_read_reply_originator.REQ matching MM#15 within [24 hours], the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A12 |
| MSISDN-A | MSISDN-B |  |  |  |
|  |  |  |  |  |
| Test result (Pass or Fail): | | | | |
|  | | | | |
| Time of MM submission | | Message Id if available from MM1_Submit.RES | | |
|  | | | | |

Actions at UA-B:

On receipt of an MM1_Notify.REQ indicating test procedure A08 in the subject field , UA-B retrieves the MM, but forbids a read-reply report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A12 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification |  |  |
|  |  |  |  |  |

### 15.5.24 Test Procedure B12

Reference: B12

Actions at UA-B:

UA-b1 sends MM#16

If UA-b1 receives an MM1_read_reply_originator.REQ matching MM#16 within [24 hours], the test result is 'fail', otherwise it is 'pass'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | B12 |
| MSISDN-A | MSISDN-B |  |  |  |
|  |  |  |  |  |
| Test result (Pass or Fail): | | | | |
|  | | | | |

| Time of MM submission | Message Id if available from MM1_Submit.RES |
|---|---|
|  |  |

Actions at UA-A:

On receipt of an MM1_Notify.REQ indicating test procedure B12 in the subject field , UA-A retrieves the MM, but forbids a read-reply report.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | B12 |
| Notification received (Yes/No) | Time of receipt of Notification | Sender address given in Notification |  |  |
|  |  |  |  |  |

### 15.5.25  Test Procedure A13

Reference: A13

Actions at UA-A:

UA-a1 sends MM#17

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
|  |  |  |  | A13 |
| MSISDN-A | MSISDN-B |  |  |  |
|  |  |  |  |  |
| Time of MM submission |  | Message Id if available from MM1_Submit.RES | | |
|  |  |  | | |

Actions at UA-B:

If an SMS is not received indicating that the MM can be retrieved via legacy support or if retrieval via legacy support is not successful, the test result is 'fail'.

Otherwise, it is tried to retrieve the MM using the methods described in the SMS. If retrieval is not possible, the test result is 'fail'; otherwise, the following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-a1
- The Subject field has the exact content
- The content of the MM is as specified for MM#17

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | A0#13 |
| Test result (Pass or Fail): | | | | |
| | | | | |
| SMS received (Yes/No) | Time of receipt of SMS | | | |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

## 15.5.26  Test Procedure B13

Reference: B13

Actions at UA-B:

UA-a1 sends MM#18

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B13 |
| MSISDN-A | MSISDN-B | | | |
| | | | | |
| Time of MM submission | | Message Id if available from MM1_Submit.RES | | |
| | | | | |

Actions at UA-A:

If an SMS is not received indicating that the MM can be retrieved via legacy support or if retrieval via legacy support is not successful, the test result is 'fail'.

Otherwise, it is tried to retrieve the MM using the methods described in the SMS. If retrieval is not possible, the test result is 'fail'; otherwise, the following points are verified:

- The Sender address in the MM1_Notify.REQ is equal to MSISDN-b1
- The Subject field has the exact content
- The content of the MM is as specified for MM#18

If all points are true, the test result is 'pass', otherwise it is 'fail'.

The following information is recorded:

| PLMN A MCC | PLMN A MNC | PLMN B MCC | PLMN B MNC | Test procedure reference |
|---|---|---|---|---|
| | | | | B0#13 |
| Test result (Pass or Fail): | | | | |
| | | | | |
| SMS received (Yes/No) | Time of receipt of SMS | | | |
| | | | | |
| Fields of MM: | | | | |
| | Message class | Delivery report requested | Priority indicated | Read reply requested | Reply-Charging possible |
| | | | | | |
| | Content correct (Yes/No) | | | Subject correct (Yes/No) | |
| | | | | | |
| | Short explanation if content is not correct: | | | If Subject is not correct, Subject as received in the MM | |
| | | | | | |

# 16 MMS hub service provider scenarios

## 16.1 Utilizing MMS hub services

A PLMN may chose to use a MMS IW hub service provider. The advantage of utilizing such a service results in a limited amount of MMS IW testing. The part of the document shall address the issues which need to be considered if a MMS hub service provider is used.
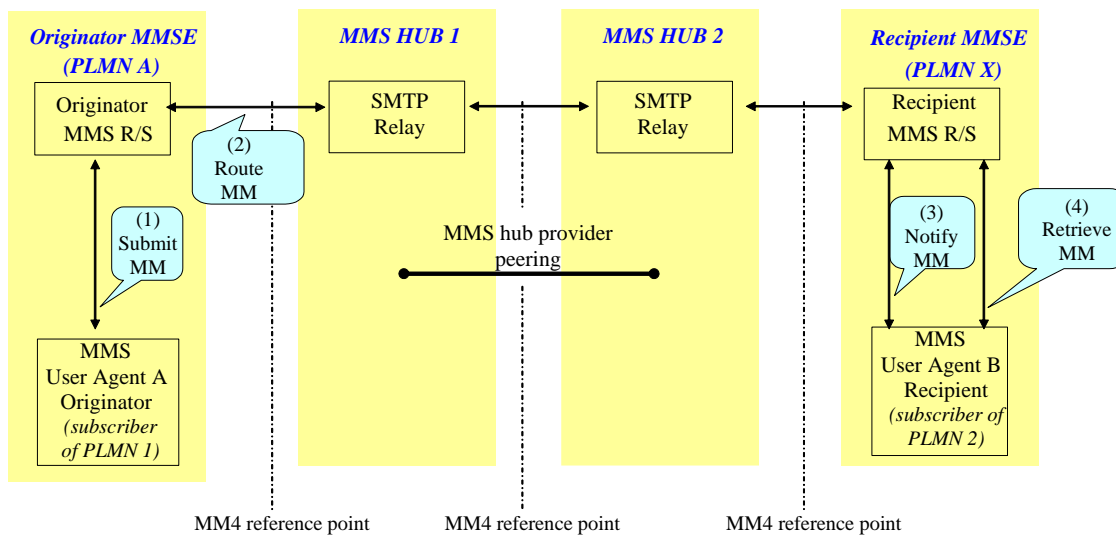
There are two types of interconnection scenarios which include MMS hub provider.

See figure 17-1 for both networks have the same MMS hub provider.
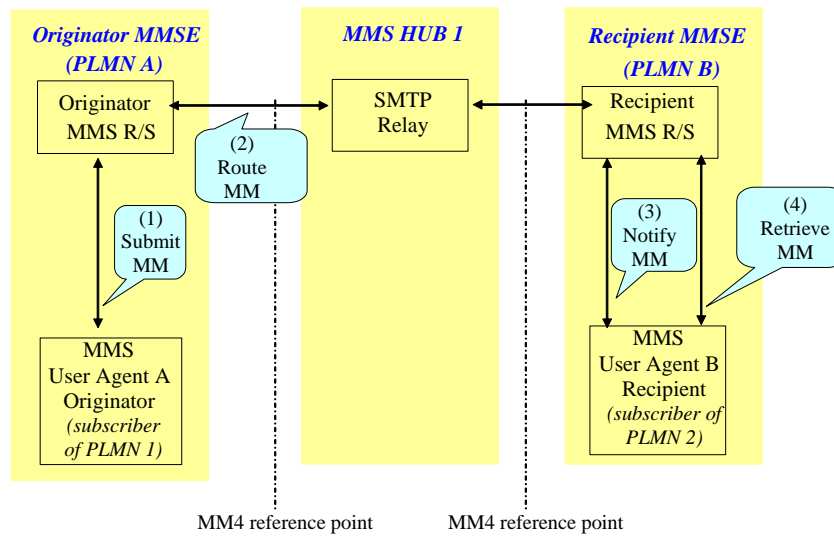
**Figure 17-1: Both PLMNs use same MMS Hub provider**

If both network uses different MMS hub service providers, a MMS hub peering is required to assure the End-to-End connectivity to deliver the service. Please see figure 16-2.



**Figure 17-2: Both PLMNs have different MMS Hub provider**

## 16.2  Testing responsibilities using MMS hub services provider

In order to reduce the amount of testing, the PLMN and hub service provider have to assure their system are operating according the 3GPP standard. Therefore, it is required that any direct interconnecting party complete initial the entire set of test case as described in this document.

This initial test shall the PLMN guarantee that the hub provider are following the standard of MMS interworking.

The MMS hub service provider will be able to guarantee to its other interconnection partner that the PLMN is following the standards and has proven to inter-work with the MMS hub service provider.

In order to avoid to involving the same counterpart PLMN with performing complete IR53 testing, the MMS hub service provider should use a simulator in order to check new PLMNs compatibility with the platform.

When two different MMS hub service provider peer with each other, they will need to perform IR.53 test cases for conformance. A simulator will help the MMS hub service provider to perform these tests. If the HUB would like to use SIM cards for these tests, they need to negotiate the conditions with the PLMN owner of the SIM cards.

See figure 16-3. Direct interconnecting parties have to execute an initial IR53 tests.
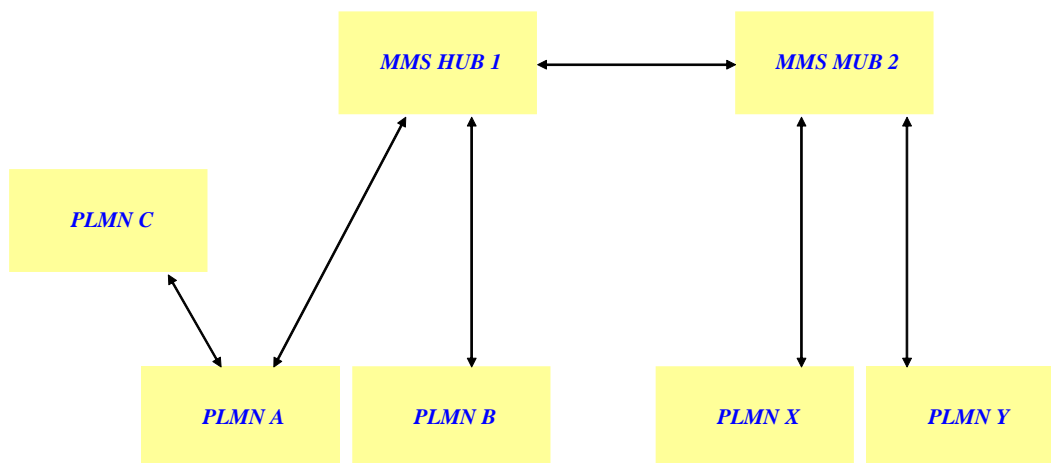
*Figure 16-3: Direct interconnection parties*

The main advantages of using a MMS hub service provider allows for new PLMN to PLMN MMS interworking to limit the amount testing.

When all direct connected partners have successfully completed the initial intensive testing on their interfaces the End-to-End testing for PLMNs can be reduced to a functional test. This test shall guarantee that all necessary configurations for the new MMS interworking destination have been setup up correct. If the originating PLMN uses multiple links for MMS interworking (direct or via Hub), the destination PLMN it should allow to query the HLR using the MAP operation for getting the IMSI.

If MMS interworking is enabled in both directions a similar test shall be executed for the opposite direction.

Figure 16-4 shows the new MMS interworking relation between PLMN A and PLMN Y.
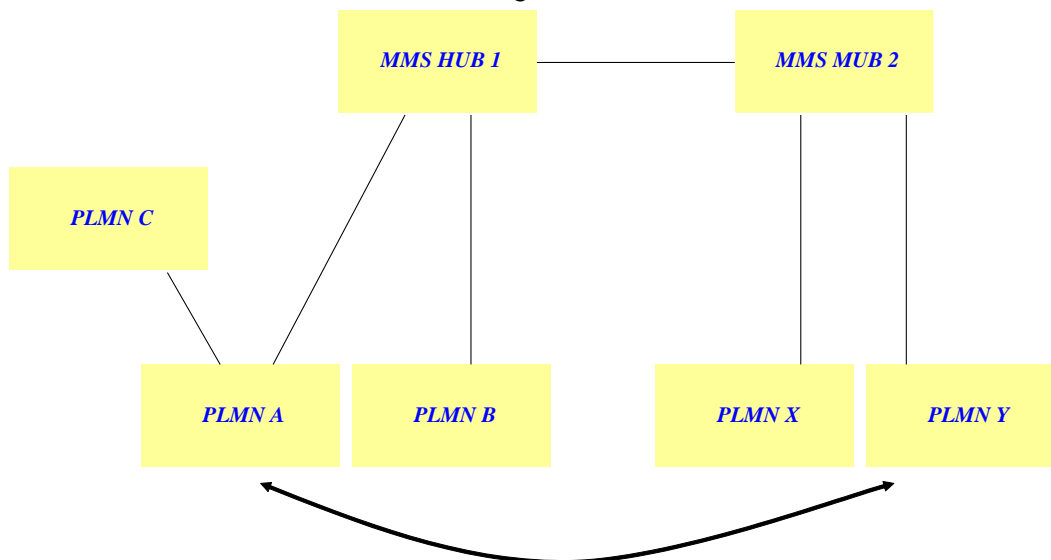


*Figure 16-4: Functional End-to-End testing*

The End-to-End test case is described as TC1 in the section 7.1 basic essential test cases of this document.

## 16.3  Multiple routes to destinations and MNP applies

A MMS hub service provider can offer to carry out the domain resolution and address the correct destination PLMN.

When MNP applies for the destination country the originating MMSE has to make sure that the recipient belongs to the addressed PLMN. Only if all PLMNs of the destination country where MNP applies are reached via the same MMS hub service provider, the MMS can be forwarded to the MMS hub service provider without domain resolution.

Most countries use a C7 based solution for MNP. Operators in "Country Code One" are creating an ENUM-based solution for MNP because many of their operators do not have an HLR. The ENUM solution will enter service some time from 2006 onwards. Work is in progress to define how operators inter-work with the Country Code One ENUM solution.

# Annex A    Document Management

## A.1    Document History

| Version | Date | Brief Description of Change | Approval Authority | Editor / Company |
|---|---|---|---|---|
| 3.1 | 19 October 2012 | - initial set of MMS End-to-End Interworking tests<br>- initial set of MM4 Interoperability tests<br>- initial set of MMS Inter-Operator Charging tests | Networks Group | Javier Sendin GSMA |
|  |  |  |  |  |
|  |  |  |  |  |

## A.2    Other Information

| Type | Description |
|---|---|
| Document Owner | Networks Group - PACKET |
| Editor / Company | Dave Wittekind (Commnet Wireless, LLC) |

It is our intention to provide a quality product for your use. If you find any errors or omissions, please contact us with your comments. You may notify us at prd@gsma.com

Your comments or suggestions & questions are always welcome.