

1 3GPP2 S.R0064-A
2 Version 1.0
3 Version Date: 22 April 2004
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3RD GENERATION
PARTNERSHIP
PROJECT 2
"3GPP2"

10 **Multimedia Messaging Services (MMS)**

11 12 *Stage 1 Requirements*

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5 **REVISION HISTORY**

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REVISION HISTORY		
Rev. 1.0	<i>Initial Publication</i>	22 April 2004

1 FOREWORD

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1 INTRODUCTION AND SCOPE

2 This document defines the stage one description of the non real-time
3 Multimedia Messaging Service (MMS). MMS will allow users to send and receive
4 messages exploiting the whole array of media types available today, e.g. text,
5 images, audio, and video, while also making it possible to support new content
6 types as they become popular. A multimedia message (MM), as observed by the
7 user, is a combination of one or more different media elements in a multimedia
8 presentation that can be transferred without the requirements for the need to
9 be transferred in real-time. The multimedia messaging service shall be capable
10 of supporting current and future multimedia types, and exploit the advances
11 being made in the multimedia technology, with additional mobile requirements.
12 Stage one is the set of requirements seen primarily from the subscriber's and
13 service providers' points of view. It includes information of relevance to network
14 operators, media content suppliers, service providers, and terminal and
15 network manufacturers.

16 It contains core requirements for the Multimedia Messaging Service, sufficient
17 to provide a complete service.

18 Additional functionality not documented in this Technical Specification (TS),
19 and outside its scope, may apply. Such additional functionality may have
20 network-wide scope; nation-wide scope; or it may be particular to a group of
21 users. Any such additional functionality shall not compromise conformance to
22 the core requirements of the MMS.

23 This document defines the requirements for the MMS as a framework enabling
24 non real-time transmission of different types of media content, including:

- 25 ▪ Multiple media elements per single message
- 26 ▪ Individual handling of message elements
- 27 ▪ Different delivery methods for each message element
- 28 ▪ Negotiation or accommodation of different terminal and network MM
29 capabilities
- 30 ▪ Notification and acknowledgement of MM related events (e.g. delivery,
31 deletion, ...)
- 32 ▪ Handling of undeliverable MM
- 33 ▪ Personalized MMS configuration
- 34 ▪ Flexible charging

35

36 2 REFERENCES

37 The document references applicable to this specification include:

- 38 [1] **RFC-2045** Freed, N., and N. Borenstein, "Multipurpose Internet
39 Mail Extensions (MIME) Part One: Format of Internet Message
40 Bodies", RFC 2045, Innosoft, First Virtual Holdings, November
41 1996

- 1 **[2] RFC-2046** Freed, N., and N. Borenstein, "Multipurpose Internet
2 Mail Extensions (MIME) Part Two: Media Types", RFC 2046,
3 Innosoft, First Virtual Holdings, November 1996
- 4 **[3] RFC-2047** Moore, K., "Multipurpose Internet Mail Extensions
5 (MIME) Part Three: Representation of Non-ASCII Text in Internet
6 Message Headers", RFC 2047, University of Tennessee, November
7 1996
- 8 **[4] RFC-2048** Freed, N., Klensin, J., and J. Postel, "Multipurpose
9 Internet Mail Extensions (MIME) Part Four: MIME Registration
10 Procedures", RFC 2048, Innosoft, MCI, ISI, November 1996
- 11 **[5] RFC-2049** Freed, N. and N. Borenstein, "Multipurpose Internet
12 Mail Extensions (MIME) Part Five: Conformance Criteria and
13 Examples", RFC 2049, Innosoft, First Virtual Holdings, November
14 1996
- 15 **[6] ITU-T E.164 (1997):** "The International Public
16 Telecommunications Numbering Plan"
- 17 **[7] IETF; STD 0011 (RFC 2822):** "Internet Message Format", URL:
18 <http://www.ietf.org/rfc/rfc2822.txt>
- 19 **[8] Open Mobile Alliance OMA-Download-DRM-v1_0:** "Digital Rights
20 Management", URL: <http://www.openmobilealliance.org/>
- 21 **[9] RFC 1738** Berners-Lee, T., Masinter, L., McCahill, M., "Uniform
22 Resource Locators (URL)", RFC 1738, CERN, Xerox Corporation,
23 University of Minnesota, December 1994

24 3 DEFINITIONS AND ABBREVIATIONS

25 The terms and abbreviations used within this specification are defined as
26 follows:

27 3.1 Definitions

EMS	Enhanced Messaging Service provides additional features of mail services
Media Formats	Within one media type different Media Formats are applicable for the media presentation, e.g. a picture can be GIF or JPEG format
Media Types	Form of presenting information to a user e.g. text, voice or fax
Message Element	Part of an MM consisting of only one media type
Message Qualification	A set of values that describe the Multimedia Message and are provided to the receiver. These values describe the message in ways

	meaningful to the receiver, and assist the receiver in deciding whether to take delivery of the Multimedia Message or to open the Message. Possible message qualifiers include: subject, originator's priority, message size, media types, etc.
Multimedia Messaging	Message composed of one or more message elements
Multimedia Message Service	Telecommunication Service allowing transfer of multimedia messages between users without the requirement for the transfer to occur in real-time
Network	Cellular network and any additional elements (e.g., fixed, Internet and multimedia technology elements), in support of MM functionality
Recipient	Entity to which an MM is sent
Sender	Entity that sends an MM
Short Code	A string of alphanumeric characters which addresses a specific service of a Value Added Service Provider.
SMS	Short Message Service that supports short text based messages
User	MM sender or MM recipient
VASP	Value Added Service Provider. Provides services other than basic telecommunications services for which additional charges may be incurred.

1 3.2 Abbreviations

DRM	Digital Rights Management
EMS	Enhanced Messaging Service
GIF	Graphics Interface Format
JPEG	Joint Photographic Experts Group
MM	Multimedia Message
MMS	Multimedia Messaging Service
MPEG	Moving Pictures Expert Group
R-UIM	Removable UIM

SMS	Short Message Service
UIM	User Identification Module
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
VASP	Value Added Service Provider

1

2 **4 GENERAL FEATURE DESCRIPTION**

3 The Multimedia Messaging Services provide non-real-time enhanced
4 messaging capable of transmitting message elements in various types of
5 media.

6 The MMS Message Elements are encoded using Multipurpose
7 Internet Mail Extension (MIME) objects, per References [1], [2], [3],
8 [4], and [5].

9 **4.1 Forward Compatibility**

10 The MMS mechanisms shall provide the capability to support current
11 and evolving multimedia messaging by re-using existing standards as far
12 as possible and proposing extensions (as necessary) to the existing
13 standards (i.e. the multimedia messaging service shall support the
14 evolution of multimedia messaging technologies).

15 **4.2 Consistency**

16 Regardless of the message type or format, the MMS should be capable of
17 supporting integration of all types of messaging (e.g., fax, SMS, EMS,
18 Multimedia, voicemail, e-mail, etc.) in a consistent and transparent
19 manner.

20 **4.3 Universality of Access**

21 Users shall be capable of accessing their own multimedia messages
22 through a number of different access technologies, e.g., 3G and 2G
23 networks, fixed networks, the Internet, etc.

24 **4.4 Interoperability**

25 The MMS shall support a minimum set of functionality and message
26 formats to ensure interoperability. (e.g., deletion of MM, standardized
27 message notification, message media types and message content
28 formats).

29 The MMS shall support version management.

1 **5 DETAILED FUNCTIONALITY REQUIREMENTS**

2 The MMS shall be supported in the network in a manner that allows
3 operators to deploy different configurations depending on the multitude
4 of their differing requirements. Thus, a specific set of functionality and
5 formats shall be standardized to ensure interoperability across networks
6 and terminals.

7 Sub-clauses use the term "*The MMS shall support a request for...*" and
8 similar phrases to allow different network models and business
9 requirements, permitting flexible architectures while ensuring MMS
10 interoperability. These requirements are considered intrinsic to the MMS
11 and their support is mandatory.

12 Sub-clauses use the term "*This requirement shall be supported at the*
13 *application layer in the terminal (and/or the network), and will not be*
14 *further elaborated.*" and similar phrases to identify those service
15 requirements that shall be supported by the MMS but do not require
16 standardization. While the support of these requirements is essential for
17 a viable MMS, they are not considered intrinsic to it, rather they may be
18 implementation-specific.

19 The criterion for distinguishing between these two types of requirements
20 is as follows:

21 If the requirement corresponds to an interaction and/or command
22 between the terminal and the network applications from the same
23 Service Provider (e.g. between the recipient's terminal resident messaging
24 application and the recipient's network resident application; likewise for
25 the sender), then this requirement shall be supported by the MMS but
26 does not require standardization.

27 The scenario of an MS acting as a proxy (e.g., MS acting on behalf of a
28 service in a laptop PC) is not addressed in this release of the MMS Stage
29 1 requirements and is considered "for further study".

30 **5.1 Detailed Feature Characteristics and Requirements**

31 Following is the detailed list of MMS characteristics and requirements
32 with a brief description of each.

33 **5.1.1 Terminal Sensitive MM Management**

34 The MMS shall support terminal and network capability in a way
35 that it takes into account any limitations that may exist in user
36 terminal capability. For example, delivery of MM notification shall
37 be in a manner compatible with the terminal's capability.

38 **5.1.2 User Status Sensitive MM Management**

39 The MMS shall support the capability of the terminal and the
40 network to take into account the availability, and changes of the

1 state of availability of the user (e.g., store messages if the recipient
2 is not available).

3 **5.1.3 MMS Service Provider Control**

4 The MMS shall support a request from the MMS service provider to
5 enable/disable MM delivery and submission. MMS service provider
6 may or may not be the same as cellular network operator.

7 **5.1.4 MMS User Control**

8 The MMS shall support a request from the user to enable/disable
9 MM delivery and submission. This requirement shall be supported
10 at the application layer in the terminal, and will not be further
11 elaborated.

12 The MMS shall support a user profile or the capability to control
13 the amount of data the user will accept and submit. The limit may
14 be defined as a number of bytes per message, a number of bytes
15 per time period or aggregate amount. An unlimited amount of data
16 should also be allowed.

17 The User agent may be notified if a message was rejected due to
18 exceeding data amount limit, but this shall be supported at the
19 application layer in the terminal, and will not be further
20 elaborated.

21 **5.1.5 Personalized Multimedia Messaging**

22 The MMS shall support a request by the user to manage the MMS
23 Service Preferences of his/her MMS User Service Profile. It should
24 be possible to customize the user's MM environment with respect
25 to the capabilities of the terminal, the network and MM
26 application. Personalization could be unconditional or conditional
27 (e.g., it may depend on roaming conditions or operator
28 restrictions).
29

30 User shall be able to set MMS Preferences of his/her User Service
31 Profile. It shall be possible for a user to interrogate status of
32 his/her MMS Profile.

33 **5.1.6 MM Creation**

34 The MMS shall support the request to create a MM by the user or
35 an application.

36 This requirement shall be supported at the application layer in the
37 terminal and/or in the network, and will not be further elaborated.

5.1.7 MM Time-Stamping

The MMS shall be able to support the request to include a reliable time value in an MM, a notification and an acknowledgement as appropriate.

5.1.8 MM Cancellation

The MMS shall support the request to cancel a MM once submitted (i.e. recall a message) if the following conditions exist:

- MM type and MMS application are conducive to message cancellation
- MM cancellation is supported by the underlying cellular network
- MM cancellation is supported by the mobile station

The MMS shall be able to support a request by a VASP to delete a MM that had been previously sent from the VASP but not yet delivered to the recipient's terminal.

5.1.9 Multiple Media

Multimedia messages may be composed of either a single medium (e.g. voice) or multimedia (e.g., voice and video). Multiple media elements within a single MM may be of the same media type or different media types. The MMS shall support a request for media synchronization /sequencing.

5.1.10 Media Types

The MMS shall be able to support the following media types: voice, text, image, video, and audio. Specific formats and standards for these media types are left for stage 2 and stage 3 documents.

5.1.11 Media Type Conversion

The MMS shall support conversion between media types (e.g. fax to image).

The MMS shall be able to support an indication from a VASP that VASP originated content of an MM should not be converted or changed by the MMS service provider before it is delivered to the recipient.

This requirement shall be supported at the application layer in the network, and will not be further elaborated.

5.1.12 Media Format Conversion

The MMS shall support conversion between MM media formats (e.g. JPEG to GIF).

This requirement shall be supported at the application layer in the terminal and/or in the network, and will not be further elaborated.

5.1.13 Message Forwarding

It shall be possible to initiate MM forward before or after MM download to the user terminal. The MMS should provide a mechanism to prevent an MM forwarding loop (e.g. MMs are setup to be automatically forwarded from User A to B, then from B to C and from C back to A. Users A, B, and C are unaware that they have setup this undesirable situation).

5.1.14 Message Reply

The MMS shall support a request to reply to a MM without having to first download the MM to the terminal.

5.1.15 Storage of Multimedia Messages

The MMS shall support a request for multimedia messages or message elements to be stored until delivered to the recipient's terminal, until the message delivery timers expire, or until the user deletes them. Conditions for the treatment of stored messages shall be fully configurable by the operator. The MMS shall support requests to manage all MMs in a network-based depository.

The MMS shall support requests to store MMs in a network-based depository, on the mobile terminal, or on both.

NOTE: There is no requirement for the MMS to be responsible for the processing/presentation of the MM, after it has been delivered to the terminal.

5.1.16 Message Qualification

The MMS shall be capable of sending message qualifier values to the terminal device.

5.1.17 Message Priority

The MMS shall support a request for MM prioritization (e.g., sender may request to prioritize importance of the multimedia message).

Sender shall be able to set MM priority status of a submitted message. MM priority status shall be presented to the recipient.

1 This requirement shall be supported at the application layer in the
2 MMS and in the terminal, and will not be further elaborated at this
3 time.

4 Note that for an MM, “priority” refers to the sender’s determination
5 of importance, which is only for presentation to the recipient. For
6 an MM, “priority” is not related to underlying processing or
7 transmission; a high priority MM is not necessarily transmitted or
8 delivered before a low priority message.

9 **5.1.18 Message Screening**

10 The MMS shall support a MM screening capability. (E.g.,
11 automatically delete “junk mail” or anonymous messages without
12 delivery to the recipient’s terminal).

13 This requirement shall be supported at the application layer in the
14 MS or the network, and will not be further elaborated.

15 **5.1.19 Validity Period**

16 The MMS shall support a request by the originator of the message
17 to define validity periods (earliest and latest desired time) for
18 message delivery. If a message cannot be delivered within a
19 certain time, it will be automatically deleted. The MMS provider
20 shall be able to set the maximum allowable validity period for any
21 message.

22 If the MM is not delivered within the validity period, the MMS shall
23 support the capability to send an indication to the MM originator
24 with the appropriate reason or cause code.

25 **5.1.20 Replacing MM**

26 The MMS shall be able to support a request by the originator to
27 replace a previously sent MM with a second, newer MM, if the
28 previous MM has not been delivered.

29 **5.1.21 Delivery and Retrieval**

30 The MMS shall support the delivery of MM to the recipient’s
31 terminal. MMs shall be considered delivered to the terminal upon
32 receipt of an acknowledgement from the terminal by the MMS
33 System.

34 The terminal shall not make MM available to the recipient for
35 display or playback unless and until MM Delivery is complete.

36 If the recipient’s terminal is incapable of receiving the MM, the
37 MMS may send an indication to the intended MM recipient with
38 the appropriate reason or cause code.

1 The recipient may have the capability to cancel message retrieval
2 at any time during transmission.

3 The MMS shall support automatic MM delivery to the recipient's
4 terminal without the recipient's intervention.

5 The MMS shall support a request for MMs to be delivered to the
6 recipient's terminal on request by the recipient.

7 **5.1.22 Concurrency**

8 The MMS shall support MM delivery to and submission from the
9 user's terminal during the time the terminal is engaged in another
10 active service (e.g., voice call or a data session) subject to terminal
11 and network capabilities.

12 **5.1.23 Upload/Download**

13 The MMS shall support MM Upload (terminal to network) and
14 Download (network to terminal) between the MMS Server and the
15 user terminal. MMS Upload or Download is a process where the
16 entire content must be delivered before the application layer can
17 act upon that content.

18 **5.1.24 MM Submission**

19 The MMS shall support the ability for the terminal to submit MMs
20 to the network for delivery to a recipient.

21 **5.1.25 Streaming**

22 The MMS shall have the capability to include a link to a
23 multimedia source and shall also be able to start the multimedia
24 streaming across this link upon user request.

25 The MMS shall be able to support streaming for MM delivery from
26 the MMS System to the terminal as specified in S.R0021
27 Multimedia Streaming.

28 MMS Streaming is a process where the application layer can act
29 upon the content before delivery of the entire content is completed.

30 **5.1.26 Preferred Delivery Service**

31 It shall be possible to define a list of precedence for delivery service
32 in the configuration parameters for delivery and submission of
33 MM. The terminal shall be able to support automatic delivery
34 service selection (i.e., without user intervention) based on the order
35 of precedence defined in a list of delivery services. The user shall
36 be able to enable or disable automatic delivery service selection.
37 When disabled, manual delivery service selection shall be available
38 from the list of delivery services.

5.1.27 User Profile Management

The MMS shall support the ability to create, update, modify, store, transfer, interrogate, and retrieve a user's multimedia messaging profiles.

The multimedia messaging profiles shall allow the user to configure and personalize user's multimedia messaging environment with the multimedia messaging profiles (e.g., which media types and notifications shall be delivered to the recipient, such as voice only or text only).

The MMS profile shall support the user preference for message delivery (see section 5.1.22 Delivery and Retrieval).

The user profile shall allow the user to create and manipulate a list of users, identified by their addresses (see Section 5.1.29), from which the user does not want to receive messages. This list is called "user-level blacklist". It shall be possible for the user to add, remove and edit addresses in the user-level blacklist.

Note: User-level blacklist augments the operator defined blacklist. Users can decide from whom they do not want to receive messages by adding the corresponding address to the user profile. The data that the user is allowed to personalize shall be managed and controlled by the MMS. This requirement shall be supported at the application layer in the terminal and service, and will not be further elaborated.

5.1.28 Security

An MM sender may be able to authorize disclosure of the sender's identity, or alternatively to request anonymity. The MMS shall not disclose the sender's identity if such disclosure is not authorized. If disclosure is authorized, the MMS shall reliably inform the recipient of the sender's identity.

The integrity of the MM shall be protected during transit and while stored on the MMS server.

The content of the MM shall be protected from unauthorized eavesdropping.

The MMS subscriber shall be authenticated for access to the MMS. Only authorized subscribers shall be allowed access to MMS..

The MMS and the MM subscriber shall mutually authenticate.

5.1.29 Addressing

The MMS shall support different addressing formats for both the sender and recipient. It shall be possible to submit one message to multiple recipients.

The MMS shall support the capability for both Mobile Directory Number (MDN) [6] and e-mail addressing schemes [7] to be used, and the user may use either form of addressing to send a message.

The MMS shall be able to support the request to hide the sender's address from the recipient.

The MMS may support short code addresses to address Value Added Services. If supported, and routing of messages to a MMS VASP service based on a short code address is enabled, the MMS shall be able to translate the short code address to a routable address to be used in the transport layer, e.g. a URI.

5.1.30 MMS Charge

The MMS System shall support prepaid and postpaid charging methods.

5.1.31 MMS Operator Control

The MMS shall be able to support a request from the operator to enable/disable MM delivery and submission.

This requirement shall be supported at the application layer in the network, and will not be further elaborated.

5.1.32 Configuration Information

It shall be possible to store a number of sets of configuration information to allow access to MMS services. One of these sets of configuration information is preset by the network operator. Such preset configuration information set shall only be configurable by the network operator.

The preset configuration information is selected unless otherwise specified by the user.

Other types of data that should be stored are:

- a number of sets of user configuration information to allow access to MMS services.

If more than one set of configuration information is present, it shall be possible for the user to select which set is used. If the user has not selected any of the configuration information sets, then the default set in the UIM is used.

- MMS notification types

1 MMS user preferences For devices that support R-UIM, it shall be
 2 possible to retain this configuration information when the R-UIM is
 3 used in different terminals.

4 **5.1.33 Multimedia Messaging Processing by a VASP**

5 The MMS shall be able to support a request for messages to be
 6 processed by a VASP. An example of such processing may be
 7 where a MM is sent to a VASP before delivery to a recipient so that
 8 the VASP can add multimedia element(s) to the original message.

9 **5.1.34 MM delivery to and submission from a VASP**

10 VASP submission mechanism: The MMS shall support multimedia
 11 messages or messages elements to be submitted from a VASP.

12 VASP delivery mechanism: The MMS shall be able to support
 13 multimedia messages or messages elements to be delivered to a
 14 VASP.

15 VASP mass distribution: The MMS shall be able to support a
 16 request from a VASP for mass distribution of MMs to recipients
 17 (e.g., single MM to a very large number of users).

18 Additional VASP data: The MMS shall be able to convey additional
 19 data associated with an MM from a VASP to the MMS service
 20 provider and vice versa.

21 **5.1.35 Hyperlinks Support**

22 It shall be possible to embed a hyperlink (URL) [9] in a MM
 23 regardless of the text format (e.g., HTML, plain text).

24 The following guidelines on editing, presenting and following of
 25 hyperlinks should be followed regardless of the text format:

- 26 • There should be no restriction to the position in the MM where
 27 a hyperlink can be added.
- 28 • It should be possible to clearly recognize the presence of a
 29 hyperlink; e.g., per the delineation of the URL within free text as
 30 specified in [9].

31 NOTE: It is preferable to display the title of a hyperlink rather
 32 than the complete address (URI).

- 33 • Presence of a hyperlink in an MM should not impact the
 34 presentation of the MM (i.e., due to immediate following or
 35 storage of the link)
- 36 • The recipient of an MM should be able to follow a hyperlink.

37 The hyperlink should not be followed automatically by default
 38 (explicit user interaction should be required)

5.1.36 Digital Rights Management (DRM) Support

The MMS shall be able to support controlling the distribution of controlled content as defined in Reference [8]. MMS Content Providers shall be able to invoke DRM to prevent unauthorized copying and forwarding of controlled content through the MMS.

5.1.37 Conditional delivery

If the conditional delivery is supported, the following requirements in this section are applicable.

It shall be possible for the user to define in the User Profile a set of conditions that determine the delivery of a MM.

Such conditions should include:

- Roaming status of the recipient (e.g. inside or outside the home network)
- Identity of the MM originator
- Time of day (of the recipient's home network)
- Upper limit to the MM size

The MMS shall relay the information of the user's conditional delivery preferences to the MS, if such information is made available by the user's profile in the network. If a mismatch is identified between the delivery preferences configured in the MS and the suggested delivery preferences indicated in the notification message, a warning should be displayed to the user. It shall be possible for the user to select either the delivery preferences configured in the UE or the recommendation delivery preferences indicated in the notification message.

Furthermore, the terminal may also display a warning prior to the download of a message depending on some terminal parameters such as:

- Available storage capacity
- Remaining battery life
- Available Delivery Service

For example, the user may elect to have all MMs downloaded automatically when in the home network, be able to manually select whether to download a MM or not when roaming.

1 It shall be possible for the network operator to program a default
2 set of rules for the delivery preferences in the User profile. Such
3 rules can be overridden by the user.

4 Note: the way the user profile is accessed and modified is not
5 subject of standardization.
6

7 **5.1.38 MM not intended for presentation**

8 The MMS shall support MMs that are not intended for presentation
9 but used to originate and deliver information to applications
10 residing on the MS.

11 When an application sends a MM not intended for presentation, it
12 shall identify that originating application and the target application
13 on the recipient MS as well as the instance of the application if
14 more than one instance can be active. The originating application
15 may reside on a MS or within the network.

16 The message payload shall not be modified by the MMS.

17 If the MM is originated by the subscriber's home network, it shall
18 be possible to protect the MM from accidental deletion by the user.

19 **5.2 Management and Control of a Network Based Repository**

20 Network based repository is optional. If supported, MMS shall be
21 able to support the following functionalities:-

- 22 • The MMS shall allow an MMS service provider to configure MMS
23 in such a way that one, several or all incoming MMs of a
24 particular user be stored persistently in a network based
25 repository
- 26 • The MMS shall allow an MMS service provider to configure MMS
27 in such a way that one, several or all submitted MMs of a
28 particular user be stored persistently in a network based
29 repository
- 30 • The MMS shall be able to support a request from a user to
31 upload one or more MMs into a network based repository for
32 persistent storage
- 33 • The MMS shall be able to support a request from a sender to
34 persistently store a sent MM in a network based repository at
35 the time of sending
- 36 • The MMS shall be able to support a request from a user to
37 persistently store a MM for which he received a notification in a
38 network based repository

- 1 • The MMS shall be able to support a request from a user to
2 retrieve one or more MMs that are stored in a network based
3 repository
- 4 • The MMS shall be able to support a request from a user to
5 delete one or more MMs that are stored in a network based
6 repository
- 7 • The MMS shall be able to support a request from a user to
8 forward one or more MMs that are stored in a network based
9 repository to another destination without being delivered first to
10 that user.
- 11 • The MMS shall be able to support a request from a user to view
12 the list of MMs and MM related attributes, such as sender,
13 recipient, size, subject and date/time, that are in a network
14 based repository

15 **5.3 Error Message**

16 It shall be possible for the operator to configure the content of the error
17 message displayed to the MMS user

18 **5.4 Roaming**

19 It shall be possible to support MMS during roaming between network
20 operators

21 **5.5 Notifications and Acknowledgements**

22 The MMS shall support generic notification and acknowledgement
23 capability informing the user of MMS events. Examples may include:

- 24 • Notify recipient about received messages (including description of
25 message, e.g., content type, size, type).
- 26 • Acknowledge the sender about successful or failed MM or storage of a
27 MM.
- 28 • Acknowledge the sender about successful or failed MM submission.
- 29 • Acknowledge the sender about successful or failed MM delivery to the
30 recipient terminal.
- 31 • Acknowledge the sender about successful or failed MM recall.
- 32 • If requested during submission, acknowledge the sender about the
33 status of the MM (e.g., delivered / not delivered).

35 **5.6 Normal Procedures with Successful Outcome**

36 **5.6.1 Authorization**

37 Multimedia Messaging Services may be made generally available to
38 all users, or it may be provided after pre-arrangement with the
39 service provider.

5.6.2 Real-Time Authorization

Upon users' request or operators' offer, a real-time flexible MMS access authorization scheme shall be made available through either pre-paid or post-paid arrangements.

5.6.3 De-Authorization

Multimedia Messaging Services may be withdrawn at the subscriber's request or for administrative reasons.

5.6.4 Registration

Multimedia Messaging Services has no registration.

5.6.5 Deregistration

Multimedia Messaging Services has no de-registration.

5.6.6 Activation

Multimedia Messaging Services shall be activated upon authorization.

5.6.7 Deactivation

Multimedia Messaging Services shall be de-activated upon de-authorization.

5.6.8 Invocation

Multimedia Messaging Services may be invoked in each of the following instances (non-exhaustive list):

- MM submission by a subscriber;
- MM arrival to the network (e.g., to the MMS server) from an outside source (e.g., Internet);
- MMS delivery attempt of a stored message to an activated recipient (e.g., upon recipient registration on the cellular network);
- Notification of change of subscriber availability status;
- Any MMS management actions (e.g., MM delivery control);
- MM creation by an application residing either in the terminal or in the network;
- Activation or de-activation procedure invocation;
- Service Provider control action invocation;

5.6.9 Normal Operation with Successful Outcome

Invocation of MMS in each of the specific instances identified above should result in normal operation with successful outcome as outlined herein.

MM submission from a subscriber should result in:

- 1 • Transmission of the MM from the subscriber terminal to the
- 2 network;
- 3 • Deposition of the MM in the network, where it is stored awaiting
- 4 delivery;

5 MM arrival to the network from an external network (e.g. Internet,
6 voice mail system, etc.) should result in its deposition in the
7 network, where it is stored awaiting delivery.

8 Delivery attempt of a stored message may be triggered by various
9 events. Example given herein is when recipient registration on the
10 cellular network triggers MMS to notify the recipient of stored MMs
11 awaiting delivery. If there are MMs that use automatic MM
12 delivery, these MMs are queued for delivery according to priority
13 and sequential order.

14 Notification that subscriber has become available should cause the
15 MMS to examine if there are any MMs in the MMS depository
16 awaiting delivery, appropriately notifying the subscriber of any
17 such messages, and delivering those messages that use Push
18 mechanism. Notification that subscriber has become unavailable
19 should cause the MMS to suspend delivery of further messages
20 and message notifications.

21 MMS management actions, such as delivery control options,
22 should result in the appropriate changes to the subscriber MMS
23 profile.

24 Invocations of activation or deactivation procedures, or service
25 provider control actions, are part of MMS management actions
26 already discussed.

27

28 **5.6.10 Accounting Record**

29 The MMS shall be able to support various charging models, for
30 example:

- 31 • Sender pays;
- 32 • Recipient pays;
- 33 • both Sender and Recipient pay their respective charges for
- 34 message delivery;
- 35 • Recipient pays for receipt of solicited messages from trusted
- 36 sources;
- 37 • Sender pays for reply message on a per message basis.

- The third party who has a commercial agreement with the VASP (and possibly additional agreement with the operator and/or recipient) is charged for the delivery of the message to the recipient.

The following parameters should be considered for accounting records creation:

- Message types, length, storage time in the network, etc,
- Message Size,
- Bearer or service delivery mechanism of the message
- Time of delivery, upload / download method,
- MM-sender / -recipient,
- Number of messages sent,
- Number of messages received,
- Roaming conditions,
- Location conditions,
- Notification/Acknowledgement method used.
- Billed party,
- Indication of charging (The MMS indicates to the recipient prior to the recipient downloading a multi media message whether the sender has paid or the recipient is expected to pay for the message.)
- Prepaid subscriptions
- Dropped, Denied, Undeliverable delivery status

The MMS should record call detail information for the following:

- All message submittals, with time of occurrence, message type, size, number of message elements, size of each element, source, notification method and destination address;
- All message deliveries, with time of occurrence, message type, size, number of message elements, size of each element, storage time in the network, source, acknowledgement method and destination address;
- All other invocation instances not associated with MM handling, with source of invocation, time of occurrence, and type of activity;
- Support prepaid charging (e.g., the MMS should be able to query a prepaid server, etc.) and post-paid charging.

5.7 Exception Procedures or Unsuccessful Outcome

5.7.1 Authorization

None identified.

5.7.2 De-Authorization

None identified.

5.7.3 Registration

N/A

5.7.4 De-registration

N/A

5.7.5 Activation

None identified.

5.7.6 Deactivation

None identified.

5.7.7 Invocation

The following non-exhaustive exception procedures that may result in unsuccessful outcome are required from the MMS as a minimum:

- If an MM submission is not successful due to network limitation (e.g. storage exhaustion, network element congestion condition, network element lack of availability, activity timeout), the entity submitting the MM should be notified, and the appropriate cause code returned;
- If an MMS delivery attempt fails, the failure cause should be returned to the sender (e.g. subscription not active, recipient not available, delivery timeout, storage overflow, etc.);
- For MMs requiring automatic MM delivery, delivery retries should be considered by the MMS. Number of retries, their spacing in time, and retry reporting requirements may be application dependent, and is not subject to standardization.
- If notification of change of subscriber availability status results in failure, the subscriber should be notified;
- If a failure occurs in activation or de-activation procedure invocation, the entity invoking the procedure should be notified.

5.7.8 Exceptions While Roaming

None identified.

5.7.9 Exceptions During Intersystem Handoff

None identified.

5.8 Alternate Procedures

None identified.

1 **5.9 Interactions with Other Wireless Services**

2 None identified

3

4 **6 HIGH LEVEL SYSTEM DESIGN**

5 **6.1 Interface Support**

6 Multimedia Messaging Services will require external interfaces for
7 controlling and delivering MM between the terminal and an external
8 device, e.g., portable computer, should be supported.

9 **6.2 System Interfaces**

10 Multimedia Messaging Services will require the following support:

11 **6.2.1 Open Interfaces**

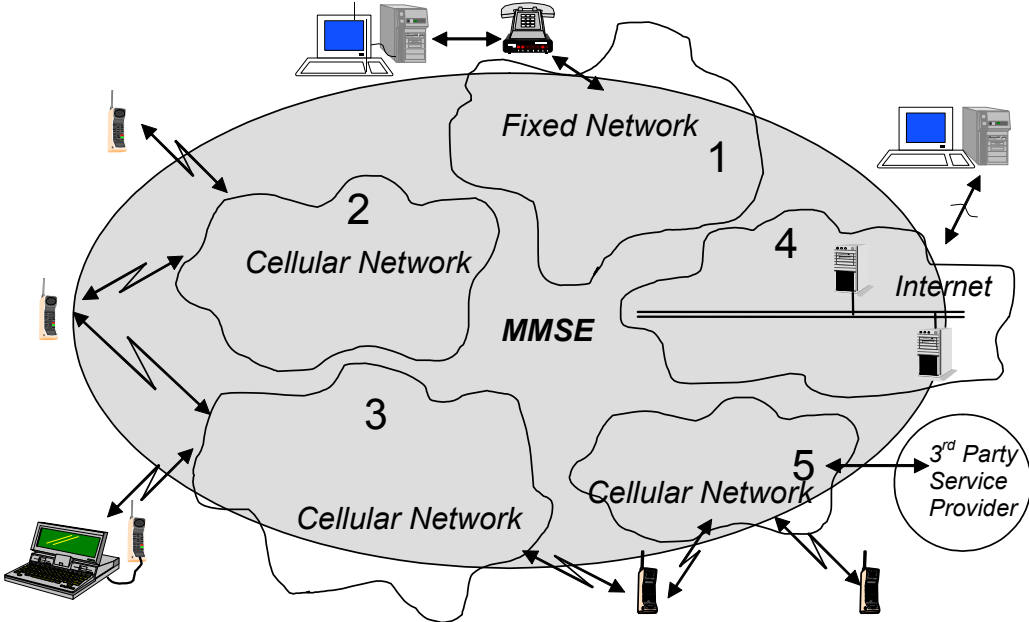
12 The standard shall permit interworking with other or existing
13 messaging technologies, messaging services, intelligent network
14 services, and supplementary services, either located within or
15 outside cellular network, 3rd party service providers. In
16 consideration of Internet as the universal packet-based
17 communication standard, MMS should have maximum level of
18 compatibility with IETF defined messaging technologies.

19 **6.2.2 MMS System Architecture Flexibility**

20 Network operators may wish to design and configure networks in
21 different ways (see Figure 1). Detailed Functionality Requirements
22 herein are identified to allow flexibility in how the MMS
23 functionality is supported. For example, some network operators
24 may wish to implement the MMS functionality within the core
25 network (e.g., Scenarios 1 and 2), whereas other may wish to place
26 the MMS functionality on the periphery of the core network (e.g.,
27 Scenario 3 as a centralized network model instead of a distributed
28 architecture). Further, some network operators may wish to
29 support a limited set of MMS functionality, while others may
30 require extensive and elaborate MMS support according to their
31 business models (e.g., basic MMS instead of advanced MMS,
32 Scenario 4). And still, some network operators may wish to allow
33 a 3rd Party MMS Provider to use their networks for provisioning
34 MMS (e.g., Scenario 5). Interoperability shall always be
35 maintained within this flexible architecture.

36

37



- 1
- 2
- 3

Figure 1 MMS Environment Architecture