3GPP TSG-T (Terminals) Meeting #13
Beijing, China, 19 - 21 September, 2001

Tdoc TP-010194

Agenda Item: 5.2.3

Source: T2

Title: "Messaging" Change Requests

Document for: Approval

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Spec	CR	Rev	Rel	Subject	Cat	Vers-Curr	Vers-New	T2 Tdoc	Workitem
23.038	007		Rel-4	Support to UCS2 and editorial corrections	F	4.2.0	4.3.0	T2-010840	TEI4
23.040	029		Rel-5	Hyperlink Information Element	B	5.0.0	5.1.0	T2-010817	TEI5
23.040	030		R99	Removal of EMS PID	F	3.5.0	3.6.0	T2-010818	TEI
23.040	031		Rel-5	Removal of EMS PID	A	5.0.0	5.1.0	T2-010819	MESS5-EMS
23.040	032		Rel-4	Removal of EMS PID	A	4.3.0	4.4.0	T2-010842	TEI4
23.040	033		Rel-5	EMS Delivery Request	B	5.0.0	5.1.0	T2-010847	MESS5-EMS
23.140	008		Rel-4	Clarification of REL-4 MMS authentication	F	4.3.0	4.4.0	T2-010736	MMS
23.140	009		Rel-4	MMS address hiding	F	4.3.0	4.4.0	T2-010737	MMS
23.140	010		Rel-5	New Figure 5: Interworking with different MMSEs	D	4.3.0	5.0.0	T2-010741	MESS5-MMS
23.140	011		Rel-5	Priority field in notification message	B	4.3.0	5.0.0	T2-010748	MESS5-MMS
23.140	012		Rel-5	Detailed Notification	B	4.3.0	5.0.0	T2-010803	MESS5-MMS
23.140	013		Rel-4	Correction to MMS MM4 interface	F	4.3.0	4.4.0	T2-010807	MMS
23.140	014		Rel-5	Editorial changes	D	4.3.0	5.0.0	T2-010816	MESS5-MMS
23.140	015		Rel-4	Refinement of the reply-charging service behaviour description.	F	4.3.0	4.4.0	T2-010848	MMS
23.140	016		Rel-4	Correction to MMS MM4 interface, delivery report	F	4.3.0	4.4.0	T2-010849	MMS
23.140	017		Rel-5	Clarifications and Editorial Changes	F	4.3.0	5.0.0	T2-010850	MESS5-MMS

3GPP TSG-T2 #14

Edinburgh, Scotland
3-7 September 2001

T2-010840

CR-Form-v4

CHANGE REQUEST

⌘ **23.038** CR **007** ⌘ ev **-** ⌘ Current version: **4.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title: ⌘	Support to UCS2 and editorial corrections	
Source: ⌘	T2	
Work item code: ⌘	TEI4	*Date:* ⌘ Sept. 5, 2001
Category: ⌘	**F**	*Release:* ⌘ REL-4

Use *one* of the following categories:
   F *(correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(addition of feature),*
   C *(functional modification of feature)*
   D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use *one* of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   REL-4   *(Release 4)*
   REL-5   *(Release 5)*

Reason for change: ⌘	Current version of TS 23.038 does not provide any useful information regarding the support of Latin- and Non-Latin-based characters that are not contained in GSM 7 bit default alphabet. The number of existing options for such characters coding could lead to serious end-end incompatibilities for SMS, CB or USSD in many regions as the receiving terminal may not properly interpret text sent by sender using a different character coding option. Language support in SMS, CB a USSD is a long term issue that cannot be easily resolved by a simple action. However, there is clear tendency in the industry to support UCS2 character set as it was expressed many times, e.g. by a number of MS manufacturers and also industry associations and experts. In addition to that, there is number of minor editorial errors in current version of the TS, including incorrect usage of the term "alphabet" for "character set". Further, standard ISO 1073 mentioned in section 6.1.1 is not referenced in section 2 of the TS.
Summary of change: ⌘	Section 6.2 has been re-phrased and additional text has been added to explain the preference to the UCS 2 character set option, especially for languages that are not satisfactory covered by GSM 7 bit default alphabet. One sentence under the table in section 6.2.1.1 also constrains the usage of existing extension mechanism in GSM 7 bit default table in order it not to be used for other national character codings. All other codings additional to GSM 7 bit default alphabet in current TS still remain as options in the proposal without changes. Number of minor editorial corrections is spread over sections 1, 2, 4, 5 and 6. Term "alphabet" was replaced by "character set" except for the case of "GSM 7 bit default alphabet". Both parts of ISO 1073 are referenced in section 2.
Consequences if not approved: ⌘	Without a preference given to one comprehensive and globally acceptable character set there may be growing number incompatibility issues and

consequently negative reactions to current TS 23.038, and it could also restrict future development of SMS, CB and USSD messaging in many regions. Some of the editorial errors, however minor, might mislead the user of the TS if not corrected.

Clauses affected:	⌘	1, 2, 4, 5 and 6.

Other specs affected:	⌘	☐ Other core specifications ⌘	
		☐ Test specifications	
		☐ O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Contents

Foreword

This Technical Specification has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   Indicates TSG approved document under change control.

y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the specification;

1 Scope

This TS defines the ~~alphabets~~ character sets, languages and message handling requirements for SMS, CBS and USSD and may additionally be used for Man Machine Interface (MMI) (3GPP TS 22.030 [2]).

The specification for the Data Circuit terminating Equipment/Data Terminal Equipment (DCE/DTE) interface (3GPP TS 27.005 [8]) will also use the codes specified herein for the transfer of SMS data to an external terminal.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2]   3GPP TS 22.030: "Man-Machine Interface (MMI) of the Mobile Station (MS)".

[3]   3GPP TS 23.090: "Unstructured Supplementary Service Data (USSD) - Stage 2".

[4]   3GPP TS 23.040: "Technical realization of the Short Message Service (SMS) ".

[5]   3GPP TS 23.041: "Technical realization of the Cell Broadcast Service (CBS)".

[6]   3GPP TS 24.011: "Short Message Service (SMS) support on mobile radio interface".

[7]   3GPP TS 24.012: "Cell Broadcast Service (CBS) support on the mobile radio interface".

[8]   3GPP TS 27.005: "Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".

[10]   ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (UCS)"; UCS2, 16 bit coding.

[11]   3GPP TS 24.090: "Unstructured Supplementary Service Data (USSD) - Stage 3".

[12]   ISO 639 "Code for the representation of names of languages".

[13]   3GPP TS 23.042: "Compression algorithm for text messaging services".

[14]   3GPP TR 21.905: "3G Vocabulary".

[15]   "Wireless Datagram Protocol Specification", Wireless Application Protocol Forum Ltd.

[16]   ISO 1073-1 and ISO 1073-2 Alphanumeric character sets for optical recognition – Parts 1 and 2: Character sets OCR-A and OCR-B, respectively - Shapes and dimensions of the printed image.

3 Abbreviations

Abbreviations used in this TS are listed in GSM TR 01.04 [1] and 3GPP TR 21.905 [14].

4 SMS Data Coding Scheme

The TP-Data-Coding-Scheme field, defined in 3GPP TS 23.040 [4], indicates the data coding scheme of the TP-UD field, and may indicate a message class. Any reserved codings shall be assumed to be the GSM 7 bit default alphabet (the same as codepoint 00000000) by a receiving entity. The octet is used according to a coding group which is indicated in bits 7..4. The octet is then coded as follows:

Coding Group Bits 7..4	Use of bits 3..0
00xx	General Data Coding indication Bits 5..0 indicate the following: Bit 5, if set to 0, indicates the text is uncompressed Bit 5, if set to 1, indicates the text is compressed using the compression algorithm defined in 3GPP TS 23.042 [13] Bit 4, if set to 0, indicates that bits 1 to 0 are reserved and have no message class meaning Bit 4, if set to 1, indicates that bits 1 to 0 have a message class meaning:~~.~~ Bit 1 Bit 0 Message Class 0 0 Class 0 0 1 Class 1 Default meaning: ME-specific. 1 0 Class 2 (U)SIM specific message 1 1 Class 3 Default meaning: TE specific (see 3GPP TS 27.005 [8]) Bits 3 and 2 indicate the ~~alphabet~~ character set being used, as follows : Bit 3 Bit2 ~~Alphabet~~Character set: 0 0 GSM 7 bit default alphabet 0 1 8 bit data 1 0 UCS2 (16bit) [10] 1 1 Reserved NOTE: The special case of bits 7..0 being 0000 0000 indicates the GSM 7 bit default alphabet with no message class
01xx	Message Marked for Automatic Deletion Group This group can be used by the SM originator to mark the message (stored in the ME or (U)SIM) for deletion after reading irrespective of the message class. The way the ME will process this deletion should be manufacturer specific but shall be done without the intervention of the End User or the targeted application. The mobile ~~manfacturer~~manufacturer may optionally provide a means for the user to prevent this automatic deletion. Bit 5..0 are coded exactly the same as Group 00xx
1000..1011	Reserved coding groups
1100	Message Waiting Indication Group: Discard Message The specification for this group is exactly the same as for Group 1101, except that: - after presenting an indication and storing the status, the ME may discard the contents of the message. The ME shall be able to receive, process and acknowledge messages in this group, irrespective of memory availability for other types of short message.
1101	Message Waiting Indication Group: Store Message This Group defines an indication to be provided to the user about the status of types of message waiting on systems connected to the GSM/UMTS PLMN. The ME should present this indication as an icon on the screen, or other MMI indication. The ME shall update the contents of the Message Waiting Indication Status on the USIM (see 3GPP TS 31.102) when present or otherwise should store the status in the ME. The contents of the Message Waiting Indication Status should control the ME indicator. For each indication supported, the mobile may provide storage for the Origination Address. The ME may take note of the Origination Address for messages in this group and group 1100.

Coding Group Bits 7..4	Use of bits 3..0

	Text included in the user data is coded in the GSM 7 bit default alphabet.
	Where a message is received with bits 7..4 set to 1101, the mobile shall store the text of the SMS message in addition to setting the indication. The indication setting should take place irrespective of memory availability to store the short message.
	
	    Bits 3 indicates Indication Sense:
	
	    Bit 3
	    0 Set Indication Inactive
	    1 Set Indication Active
	
	    Bit 2 is reserved, and set to 0
	
	    Bit 1 Bit 0 Indication Type:
	    0 0 Voicemail Message Waiting
	    0 1 Fax Message Waiting
	    1 0 Electronic Mail Message Waiting
	    1 1 Other Message Waiting*
	
	* Mobile manufacturers may implement the "Other Message Waiting" indication as an additional indication without specifying the meaning. The meaning of this indication is intended to be standardized in the future, so Operators should not make use of this indication until the standard for this indication is finalized.

1110	Message Waiting Indication Group: Store Message The coding of bits 3..0 and functionality of this feature are the same as for the Message Waiting Indication Group above, (bits 7..4 set to 1101) with the exception that the text included in the user data is coded in the uncompressed UCS2 ~~alphabet~~ character set.

1111	Data coding/message class
	
	    Bit 3 is reserved, set to 0.
	
	    Bit 2 Message coding:
	    0 GSM 7 bit default alphabet
	    1 8-bit data
	
	    Bit 1 Bit 0 Message Class:
	    0 0 Class 0
	    0 1 Class 1 default meaning: ME-specific.
	    1 0 Class 2 (U)SIM-specific message.
	    1 1 Class 3 default meaning: TE specific (see 3GPP TS 27.005 [8])

GSM 7 bit default alphabet indicates that the TP-UD is coded from the GSM 7 bit default alphabet given in subclause 6.2.1. When this ~~alphabet~~character set is used, the characters of the message are packed in octets as shown in subclause 6.1.2.1.1, and the message can consist of up to 160 characters. The GSM 7 bit default alphabet shall be supported by all MSs and SCs offering the service. If the GSM 7 bit default alphabet extension mechanism is used then the number of displayable characters will reduce by one for every instance where the GSM 7 bit default alphabet extension table is used. 8-bit data indicates that the TP-UD has user-defined coding, and the message can consist of up to 140 octets.

UCS2 ~~alphabet~~character set indicates that the TP-UD has a UCS2 [10] coded message, and the message can consist of up to 140 octets, i.e. up to 70 UCS2 characters. The General notes specified in subclause 6.1.1 override any contrary specification in UCS2, so for example even in UCS2 a <CR> character will cause the MS to return to the beginning of the current line and overwrite any existing text with the characters which follow the <CR>.

When a message is compressed, the TP-UD consists of the GSM 7 bit default alphabet or UCS2 ~~alphabet~~character set compressed message, and the compressed message itself can consist of up to 140 octets in total.

When a mobile terminated message is class 0 and the MS has the capability of displaying short messages, the MS shall display the message immediately and send an acknowledgement to the SC when the message has successfully reached the MS irrespective of whether there is memory available in the (U)SIM or ME. The message shall not be automatically stored in the (U)SIM or ME.

The ME may make provision through MMI for the user to selectively prevent the message from being displayed immediately.

If the ME is incapable of displaying short messages or if the immediate display of the message has been disabled through MMI then the ME shall treat the short message as though there was no message class, i.e. it will ignore bits 0 and 1 in the TP-DCS and normal rules for memory capacity exceeded shall apply.

When a mobile terminated message is Class 1, the MS shall send an acknowledgement to the SC when the message has successfully reached the MS and can be stored. The MS shall normally store the message in the ME by default, if that is possible, but otherwise the message may be stored elsewhere, e.g. in the (U)SIM. The user may be able to override the default meaning and select their own routing.

When a mobile terminated message is Class 2 ((U)SIM-specific), an MS shall ensure that the message has been transferred to the SMS data field in the (U)SIM before sending an acknowledgement to the SC. The MS shall return a "protocol error, unspecified" error message (see 3GPP TS 24.011 [6]) if the short message cannot be stored in the (U)SIM and there is other short message storage available at the MS. If all the short message storage at the MS is already in use, the MS shall return "memory capacity exceeded". This behaviour applies in all cases except for an MS supporting (U)SIM Application Toolkit when the Protocol Identifier (TP-PID) of the mobile terminated message is set to "(U)SIM Data download" (see 3GPP TS 23.040 [4]).

When a mobile terminated message is Class 3, the MS shall send an acknowledgement to the SC when the message has successfully reached the MS and can be stored, irrespective of whether the MS supports an SMS interface to a TE, and without waiting for the message to be transferred to the TE. Thus the acknowledgement to the SC of a TE-specific message does not imply that the message has reached the TE. Class 3 messages shall normally be transferred to the TE when the TE requests "TE-specific" messages (see 3GPP TS 27.005 [8]). The user may be able to override the default meaning and select their own routing.

The message class codes may also be used for mobile originated messages, to provide an indication to the destination SME of how the message was handled at the MS.

The MS will not interpret reserved or unsupported values but shall store them as received. The SC may reject messages with a Data Coding Scheme containing a reserved value or one which is not supported.

5 CBS Data Coding Scheme

The CBS Data Coding Scheme indicates the intended handling of the message at the MS, the ~~alphabet~~character set /coding, and the language (when applicable). Any reserved codings shall be assumed to be the GSM 7 bit default alphabet (the same as codepoint 00001111) by a receiving entity. The octet is used according to a coding group which is indicated in bits 7..4. The octet is then coded as follows:

Coding Group Bits 7..4	Use of bits 3..0
0000	Language using the GSM 7 bit default alphabet Bits 3..0 indicate the language: 0000 German 0001 English 0010 Italian 0011 French 0100 Spanish 0101 Dutch 0110 Swedish 0111 Danish 1000 Portuguese 1001 Finnish 1010 Norwegian 1011 Greek 1100 Turkish 1101 Hungarian 1110 Polish 1111 Language unspecified
0001	0000 GSM 7 bit default alphabet; message preceded by language indication. The first 3 characters of the message are a two-character representation of the language encoded according to ISO 639 [12], followed by a CR character. The CR character is then followed by 90 characters of text. 0001 UCS2; message preceded by language indication The message starts with a two GSM 7-bit default alphabet character representation of the language encoded according to ISO 639 [12]. This is padded to the octet boundary with two bits set to 0 and then followed by 40 characters of UCS2-encoded message. An MS not supporting UCS2 coding will present the two character language identifier followed by improperly interpreted user data. 0010..1111 Reserved
0010..	0000 Czech 0001 Hebrew 0010 Arabic 0011 Russian 0100 Icelandic 0101..1111 Reserved for other languages using the GSM 7 bit default alphabet, with unspecified handling at the MS
0011	0000..1111 Reserved for other languages using the GSM 7 bit default alphabet, with unspecified handling at the MS
01xx	General Data Coding indication Bits 5..0 indicate the following: Bit 5, if set to 0, indicates the text is uncompressed Bit 5, if set to 1, indicates the text is compressed using the compression algorithm defined in 3GPP TS 23.042 [13] Bit 4, if set to 0, indicates that bits 1 to 0 are reserved and have no message class meaning

Coding Group Bits 7..4	Use of bits 3..0
	Bit 4, if set to 1, indicates that bits 1 to 0 have a message class meaning: Bit 1 Bit 0 Message Class: 0 0 Class 0 0 1 Class 1 Default meaning: ME-specific. 1 0 Class 2 (U)SIM specific message. 1 1 Class 3 Default meaning: TE-specific (see 3GPP TS 27.005 [8]) Bits 3 and 2 indicate the ~~alphabet~~ character set being used, as follows: Bit 3 Bit 2 ~~Alphabet~~ Character set: 0 0 GSM 7 bit default alphabet 0 1 8 bit data 1 0 UCS2 (16 bit) [10] 1 1 Reserved
1000..1101	Reserved coding groups
1110	Defined by the WAP Forum [15]

1111	Data coding / message handling
	
	Bit 3 is reserved, set to 0.
	
	Bit 2 Message coding:
	0 GSM 7 bit default alphabet
	1 8 bit data
	
	Bit 1 Bit 0 Message Class:
	0 0 No message class.
	0 1 Class 1 user defined.
	1 0 Class 2 user defined.
	1 1 Class 3
	               default meaning: TE specific
	               (see 3GPP TS 27.005 [8])

These codings may also be used for USSD and MMI/display purposes.

See 3GPP TS 24.090 [11] for specific coding values applicable to USSD for MS originated USSD messages and MS terminated USSD messages. USSD messages using the default alphabet are coded with the GSM 7-bit default alphabet given in subclause 6.2.1. The message can then consist of up to 182 user characters.

Cell Broadcast messages using the default alphabet are coded with the GSM 7-bit default alphabet given in subclause 6.2.1. The message then consists of 93 user characters.

If the GSM 7 bit default alphabet extension mechanism is used then the number of displayable characters will reduce by one for every instance where the GSM 7 bit default alphabet extension table is used. Cell Broadcast messages using 8-bit data have user-defined coding, and will be 82 octets in length.

UCS2 ~~alphabet~~ character set indicates that the message is coded in UCS2 [10]. The General notes specified in subclause 6.1.1 override any contrary specification in UCS2, so for example even in UCS2 a <CR> character will cause the MS to return to the beginning of the current line and overwrite any existing text with the characters which follow the <CR>. Cell Broadcast messages encoded in UCS2 consist of 41 characters.

Class 1 and Class 2 messages may be routed by the ME to user-defined destinations, but the user may override any default meaning and select their own routing.

Class 3 messages will normally be selected for transfer to a TE, in cases where a ME supports an SMS/CBS interface to a TE, and the TE requests "TE-specific" cell broadcast messages (see 3GPP TS 27.005 [8]). The user may be able to override the default meaning and select their own routing.

6 Individual parameters

6.1 General principles

6.1.1 General notes

Except where otherwise indicated, the following shall apply to all character sets~~alphabet tables~~:

1: The characters marked "1)" are not used but are displayed as a space.

2: The characters of this set, when displayed, should approximate to the appearance of the relevant characters specified in ISO 1073 [16] and the relevant national standards.

3: Control characters:

Code	Meaning
LF	Line feed: Any characters following LF which are to be displayed shall be presented as the next line of the message, commencing with the first character position.
CR	Carriage return: Any characters following CR which are to be displayed shall be presented as the current line of the message, commencing with the first character position.
SP	Space character.

4: The display of characters within a message is achieved by taking each character in turn and placing it in the next available space from left to right and top to bottom.

6.1.2 Character packing

6.1.2.1 SMS Packing

6.1.2.1.1 Packing of 7-bit characters

If a character number α is noted in the following way:

$$b7\ b6\ b5\ b4\ b3\ b2\ b1$$
$$\alpha a\ \alpha b\ \alpha c\ \alpha d\ \alpha e\ \alpha f\ \alpha g$$

The packing of the 7-bits~~characters~~ in octets is done by completing the octets with zeros on the left.

For examples, packing: α

- one character in one octet:

    - bits number:

        $$7\ 6\ 5\ 4\ 3\ 2\ 1\ 0$$
        $$0\ 1a\ 1b\ 1c\ 1d\ 1e\ 1f\ 1g$$

- two characters in two octets:

    - bits number:

        $$7\ 6\ 5\ 4\ 3\ 2\ 1\ 0$$
        $$2g\ 1a\ 1b\ 1c\ 1d\ 1e\ 1f\ 1g$$
        $$0\ 0\ 2a\ 2b\ 2c\ 2d\ 2e\ 2f$$

- three characters in three octets:

- bits number:

```
7  6  5  4  3  2  1  0
2g 1a 1b 1c 1d 1e 1f 1g
3f 3g 2a 2b 2c 2d 2e 2f
0  0  0  3a 3b 3c 3d 3e
```

- seven characters in seven octets:

  - bits number:

```
7  6  5  4  3  2  1  0
2g 1a 1b 1c 1d 1e 1f 1g
3f 3g 2a 2b 2c 2d 2e 2f
4e 4f 4g 3a 3b 3c 3d 3e
5d 5e 5f 5g 4a 4b 4c 4d
6c 6d 6e 6f 6g 5a 5b 5c
7b 7c 7d 7e 7f 7g 6a 6b
0  0  0  0  0  0  0  7a
```

- eight characters in seven octets:

  - bits number:

```
7  6  5  4  3  2  1  0
2g 1a 1b 1c 1d 1e 1f 1g
3f 3g 2a 2b 2c 2d 2e 2f
4e 4f 4g 3a 3b 3c 3d 3e
5d 5e 5f 5g 4a 4b 4c 4d
6c 6d 6e 6f 6g 5a 5b 5c
7b 7c 7d 7e 7f 7g 6a 6b
8a 8b 8c 8d 8e 8f 8g 7a
```

The bit number zero is always transmitted first.

Therefore, in 140 octets, it is possible to pack (140x8)/7=160 characters.

6.1.2.2   CBS Packing

6.1.2.2.1   Packing of 7-bit characters

If a character number α is noted in the following way:

```
b7 b6 b5 b4 b3 b2 b1
αa αb αc αd αe αf αg
```

the packing of the 7-bits characters in octets is done as follows:

bit number

```
         7  6  5  4  3  2  1  0
```
octet number

```
1        2g 1a 1b 1c 1d 1e 1f 1g
2        3f 3g 2a 2b 2c 2d 2e 2f
3        4e 4f 4g 3a 3b 3c 3d 3e
4        5d 5e 5f 5g 4a 4b 4c 4d
5        6c 6d 6e 6f 6g 5a 5b 5c
6        7b 7c 7d 7e 7f 7g 6a 6b
7        8a 8b 8c 8d 8e 8f 8g 7a
8        10g    9a 9b 9c 9d 9e 9f 9g
                 .
                 .
81       93d  93e  93f93g  92a  92b  92c  92d
82       0  0  0  0  0  93a  93b  93c
```

The bit number zero is always transmitted first.

Therefore, in 82 octets, it is possible to pack (82x8)/7 = 93.7, that is 93 characters. The 5 remaining bits are set to zero as stated above.

6.1.2.3   USSD packing

6.1.2.3.1   Packing of 7 bit characters

If a character number α is noted in the following way:

```
b7  b6  b5  b4  b3  b2  b1
αa  αb  αc  αd  αe  αf  αg
```
The packing of the 7-bit characters in octets is done by completing the octets with zeros on the left.

For example, packing: α

- one character in one octet:

    - bits number:

```
7  6  5  4  3  2  1  0
0  1a 1b 1c 1d 1e 1f 1g
```

- two characters in two octets:

    - bits number:

```
7  6  5  4  3  2  1  0
2g 1a 1b 1c 1d 1e 1f 1g
0  0  2a 2b 2c 2d 2e 2f
```

- three characters in three octets:

    - bits number:

```
7  6  5  4  3  2  1  0
2g 1a 1b 1c 1d 1e 1f 1g
3f 3g 2a 2b 2c 2d 2e 2f
0  0  0  3a 3b 3c 3d 3e
```

- six characters in six octets:

    - bits number:

```
7   6   5   4   3   2   1   0
2g  1a  1b  1c  1d  1e  1f  1g
3f  3g  2a  2b  2c  2d  2e  2f
4e  4f  4g  3a  3b  3c  3d  3e
5d  5e  5f  5g  4a  4b  4c  4d
6c  6d  6e  6f  6g  5a  5b  5c
0   0   0   0   0   0   6a  6b
```

- seven characters in seven octets:

    - bits number:

```
7   6   5   4   3   2   1   0
2g  1a  1b  1c  1d  1e  1f  1g
3f  3g  2a  2b  2c  2d  2e  2f
4e  4f  4g  3a  3b  3c  3d  3e
5d  5e  5f  5g  4a  4b  4c  4d
6c  6d  6e  6f  6g  5a  5b  5c
7b  7c  7d  7e  7f  7g  6a  6b
0   0   0   1   1   0   1   7a
```

The bit number zero is always transmitted first.

- eight characters in seven octets:

    - bits number:

```
7   6   5   4   3   2   1   0
2g  1a  1b  1c  1d  1e  1f  1g
3f  3g  2a  2b  2c  2d  2e  2f
4e  4f  4g  3a  3b  3c  3d  3e
5d  5e  5f  5g  4a  4b  4c  4d
6c  6d  6e  6f  6g  5a  5b  5c
7b  7c  7d  7e  7f  7g  6a  6b
8a  8b  8c  8d  8e  8f  8g  7a
```

- nine characters in eight octets:

    - bits number:

```
7   6   5   4   3   2   1   0
2g  1a  1b  1c  1d  1e  1f  1g
3f  3g  2a  2b  2c  2d  2e  2f
4e  4f  4g  3a  3b  3c  3d  3e
5d  5e  5f  5g  4a  4b  4c  4d
6c  6d  6e  6f  6g  5a  5b  5c
7b  7c  7d  7e  7f  7g  6a  6b
8a  8b  8c  8d  8e  8f  8g  7a
0   9a  9b  9c  9d  9e  9f  9g
```

- fifteen characters in fourteen octets:

    - bits number:

```
7   6   5   4   3   2   1   0
2g  1a  1b  1c  1d  1e  1f  1g
3f  3g  2a  2b  2c  2d  2e  2f
4e  4f  4g  3a  3b  3c  3d  3e
5d  5e  5f  5g  4a  4b  4c  4d
6c  6d  6e  6f  6g  5a  5b  5c
7b  7c  7d  7e  7f  7g  6a  6b
8a  8b  8c  8d  8e  8f  8g  7a
10g     9a  9b  9c  9d  9e  9f  9g
11f11g    10a    10b    10c    10d    10e    10f
12e    12f12g    11a    11b    11c    11d    11e
13d    13e    13f13g    12a    12b    12c    12d
14c    14d    14e    14f14g    13a    13b    13c
15b    15c    15d    15e    15f15g    14a    14b
0   0   0   1   1   0   1   15a
```

- sixteen characters in fourteen octets:

    - bits number:

```
7   6   5   4   3   2   1   0
2g  1a  1b  1c  1d  1e  1f  1g
3f  3g  2a  2b  2c  2d  2e  2f
4e  4f  4g  3a  3b  3c  3d  3e
5d  5e  5f  5g  4a  4b  4c  4d
6c  6d  6e  6f  6g  5a  5b  5c
7b  7c  7d  7e  7f  7g  6a  6b
8a  8b  8c  8d  8e  8f  8g  7a
10g     9a  9b  9c  9d  9e  9f  9g
11f11g    10a    10b    10c    10d    10e    10f
12e    12f12g    11a    11b    11c    11d    11e
13d    13e    13f13g    12a    12b    12c    12d
14c    14d    14e    14f14g    13a    13b    13c
15b    15c    15d    15e    15f15g    14a    14b
16a    16b    16c    16d    16e    16f16g    15a
```

The bit number zero is always transmitted first.

Therefore, in 160 octets, is it possible to pack (160*8)/7 = 182.8, that is 182 characters. The remaining 6 bits are set to zero as stated above.

Packing of 7 bit characters in USSD strings is done in the same way as for SMS (subclause 76.1.2.1).The character stream is bit padded to octet boundary with binary zeroes as shown above.

If the total number of characters to be sent equals (8n-1) where n=1,2,3 etc. then there are 7 spare bits at the end of the message. To avoid the situation where the receiving entity confuses 7 binary zero pad bits as the @ character, the carriage return or <CR> character (defined in subclause 76.1.1) shall be used for padding in this situation, just as for Cell Broadcast.

If <CR> is intended to be the last character and the message (including the wanted <CR>) ends on an octet boundary, then another <CR> must be added together with a padding bit 0. The receiving entity will perform the carriage return function twice, but this will not result in misoperation as the definition of <CR> in subclause 76.1.1 is identical to the definition of <CR><CR>.

The receiving entity shall remove the final <CR> character where the message ends on an octet boundary with <CR> as the last character.

6.2 Alphabet tables6.2 Character sets and coding

This section provides tables for all the alphabets to be supported by SMS, CBS and USSD. The GSM 7 bit default alphabet is mandatory. Additional alphabets are optional. Irrespective of support of an individual alphabet, a MS shall have the ability to store a short message coded in any alphabet on the (U)SIM.

This section provides list of character sets and codings to be supported by SMS, CBS and USSD. Implementation of the GSM 7 bit default alphabet is mandatory. Support of other character sets is optional.

It should be noted that support of Latin and non-Latin languages by GSM 7 bit default alphabet is limited. It is therefore essential to introduce UCS 2 character set in mobile stations, SCs and systems handling SMSs, CBSs and USSDs, especially in cases where users of such systems are expected to communicate in languages with characters not supported by GSM 7 bit default alphabet. Where implementation of the complete repertoire of the UCS 2 is not yet possible it is recommended to implement all character subsets encompassing reasonable potential users needs and frequently used characters.

6.2.1 GSM 7 bit Default Alphabet

Bits per character: 7

CBS/USSD pad character: CR

Character table:

B4	b3	b2	b1	b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
B4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0	@	Δ	SP	0	¡	P	¿	p
0	0	0	1	1	£	_	!	1	A	Q	a	q
0	0	1	0	2	$	Φ	"	2	B	R	b	r
0	0	1	1	3	¥	Γ	#	3	C	S	c	s
0	1	0	0	4	è	Λ	¤	4	D	T	d	t
0	1	0	1	5	é	Ω	%	5	E	U	e	u
0	1	1	0	6	ù	Π	&	6	F	V	f	v
0	1	1	1	7	ì	Ψ	'	7	G	W	g	w
1	0	0	0	8	ò	Σ	(	8	H	X	h	x
1	0	0	1	9	Ç	Θ	)	9	I	Y	i	y
1	0	1	0	10	LF	Ξ	*	:	J	Z	j	z
1	0	1	1	11	Ø	1)	+	;	K	Ä	k	ä
1	1	0	0	12	ø	Æ	,	<	L	Ö	l	ö
1	1	0	1	13	CR	æ	–	=	M	Ñ	m	ñ
1	1	1	0	14	Å	ß	.	>	N	Ü	n	ü
1	1	1	1	15	å	É	/	?	O	§	o	à

1) _____ This code is an escape to an extension of the GSM 7 bit default alphabet table. A receiving entity which does not understand the meaning of this escape mechanism shall display it as a space character.

6.2.1.1 GSM 7 bit default alphabet extension table

B4	b3	b2	b1	b7 b6 b5	0 0 0 0	0 0 1 1	0 1 0 2	0 1 1 3	1 0 0 4	1 0 1 5	1 1 0 6	1 1 1 7
0	0	0	0	0					|			
0	0	0	1	1								
0	0	1	0	2								
0	0	1	1	3								
0	1	0	0	4		^						
0	1	0	1	5							2)	
0	1	1	0	6								
0	1	1	1	7								
1	0	0	0	8			{					
1	0	0	1	9			}					
1	0	1	0	10	3)							
1	0	1	1	11		1)						
1	1	0	0	12				[				
1	1	0	1	13				~				
1	1	1	0	14				]				
1	1	1	1	15			\					

In the event that an MS receives a code where a symbol is not represented in the above table then the MS shall display the character shown in the main GSM 7 bit default alphabet table in section 6.2.1

1) This code value is reserved for the extension to another extension table. On receipt of this code, a receiving entity shall display a space until another extension table is defined. It is not intended that this extension mechanism should be used as an alternative to UCS2 to enhance the 7 bit default alphabet character repertoire for national specific character sets.

2) This code represents the EURO currency symbol. The code value is that used for the character 'e'. Therefore a receiving entity which is incapable of displaying the EURO currency symbol will display the character 'e' instead.

3) This code is defined as a Page Break character and may be used for example in compressed CBS messages. Any mobile station which does not understand the GSM 7 bit default alphabet table extension mechanism will treat this character as Line Feed

6.2.2 8 bit data

8 bit data is user defined

Padding: CR in the case of an 8 bit character set

          Otherwise - user defined

Character table: User Specific

6.2.3 UCS2

Bits per character: 16

CBS/USSD pad character: CR

Character table: ISO/IEC10646 [10]

CR-Form-v3

CHANGE REQUEST

| ⌘ | **23.040** CR **029** | ⌘ rev | **-** | ⌘ Current version: | **5.0.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Hyperlink Information Element
Source:	⌘	T2
Work item code: ⌘	TEI5	*Date:* ⌘ 5 September 2001
Category:	⌘ **B**	*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:
F (essential correction)
A (corresponds to a correction in an earlier release)
B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	There should be a way to send an hyperlink inside an SMS message
Summary of change:	⌘	Introduce a new information element in SMS
Consequences if not approved:	⌘	There will be no easy way for mobile phones users to exchange hyperlinks.

Clauses affected:	⌘	9.2.3.24, 9.2.3.24.12 (added)
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3GPP TS 23.040 V5.0.0 (2001-06)

3rd Generation Partnership Project;
Technical Specification Group Terminals;
Technical realization of the Short Message Service (SMS);
(Release 5)

Keywords
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9.2.3.24   TP-User Data (TP-UD)

The length of the TP-User-Data field is defined in the PDU's of the SM-TL (see subclause 9.2.2).

The TP-User-Data field may comprise just the short message itself or a Header in addition to the short message depending upon the setting of TP-UDHI.

Where the TP-UDHI value is set to 0 the TP-User-Data field comprises the short message only, where the user data can be 7 bit (default alphabet) data, 8 bit data, or 16 bit (UCS2 [24]) data.

Where the TP-UDHI value is set to 1 the first octets of the TP-User-Data field contains a Header in the following order starting at the first octet of the TP-User-Data field.

Irrespective of whether any part of the User Data Header is ignored or discarded, the MS shall always store the entire TPDU exactly as received.

FIELD	LENGTH
Length of User Data Header	1 octet
Information-Element-Identifier "A"	1 octet
Length of Information-Element "A"	1 octet
Information-Element "A" Data	1 to "n" octets
Information-Element-Identifier "B"	1 octet
Length of Information-Element "B"	1 octet
Information-Element "B" Data	1 to "n" octets
Information-Element-Identifier "n"	1 octet
Length of Information-Element "n"	1 octet
Information-Element "n" Data	1 to "n" octets

The diagram below shows the layout of the TP-User-Data-Length and the TP-User-Data for uncompressed GSM 7 bit default alphabet data. The UDHL field is the first octet of the TP-User-Data content of the Short Message.

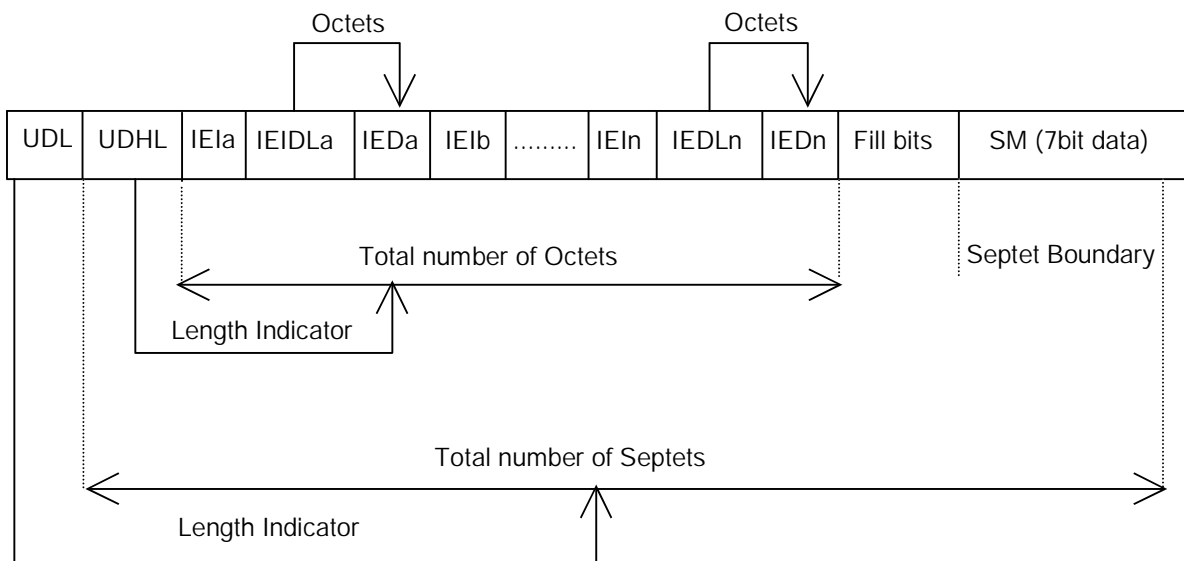
Figure 9.2.3.24 (a)

The diagram below shows the layout of the TP-User-Data-Length and the TP-User-Data for uncompressed 8 bit data or uncompressed UCS2 data. The UDHL field is the first octet of the TP-User-Data content of the Short Message.
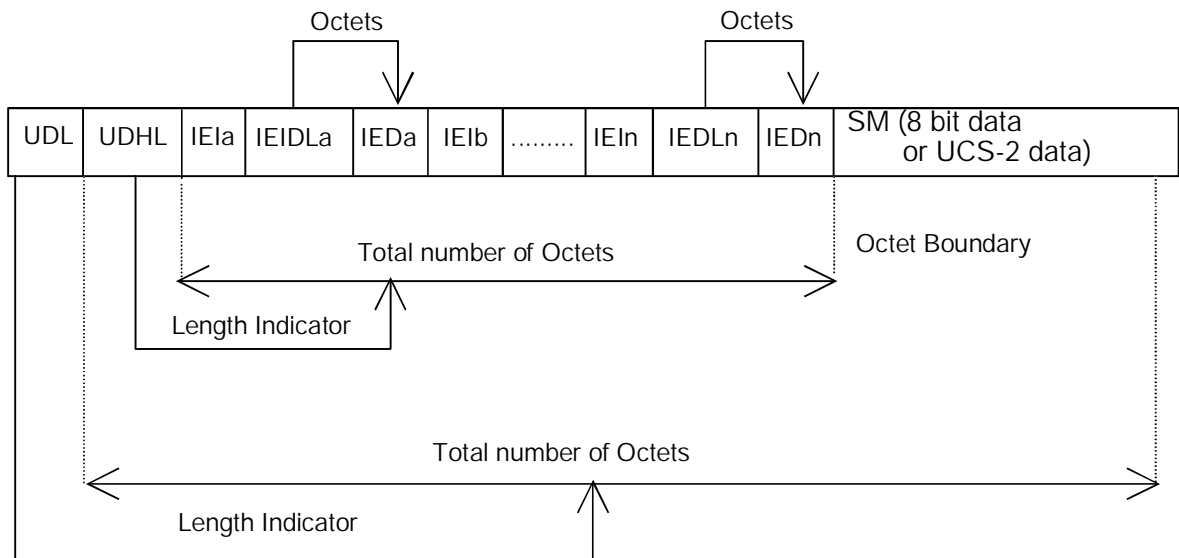
Octets   Octets

| UDL | UDHL | IEIa | IEIDLa | IEDa | IEIb | .... | IEIn | IEDLn | IEDn | SM (8 bit data or UCS-2 data) |

Total number of Octets   Octet Boundary

Length Indicator

Total number of Octets

Length Indicator

Figure 9.2.3.24 (b)

The diagram below shows the layout of the TP-User-Data-Length and the TP-User-Data for compressed GSM 7 bit default alphabet data, compressed 8 bit data or compressed UCS2 data. The UDHL field is the first octet of the TP-User-Data content of the Short Message.

Octets   Octets

| UDL | UDHL | IEIa | IEIDLa | IEDa | IEIb | .... | IEIn | IEDLn | IEDn | Compressed SM (octets) |

Total number of Octets   Octet Boundary

Length Indicator

Total number of Octets

Length Indicator
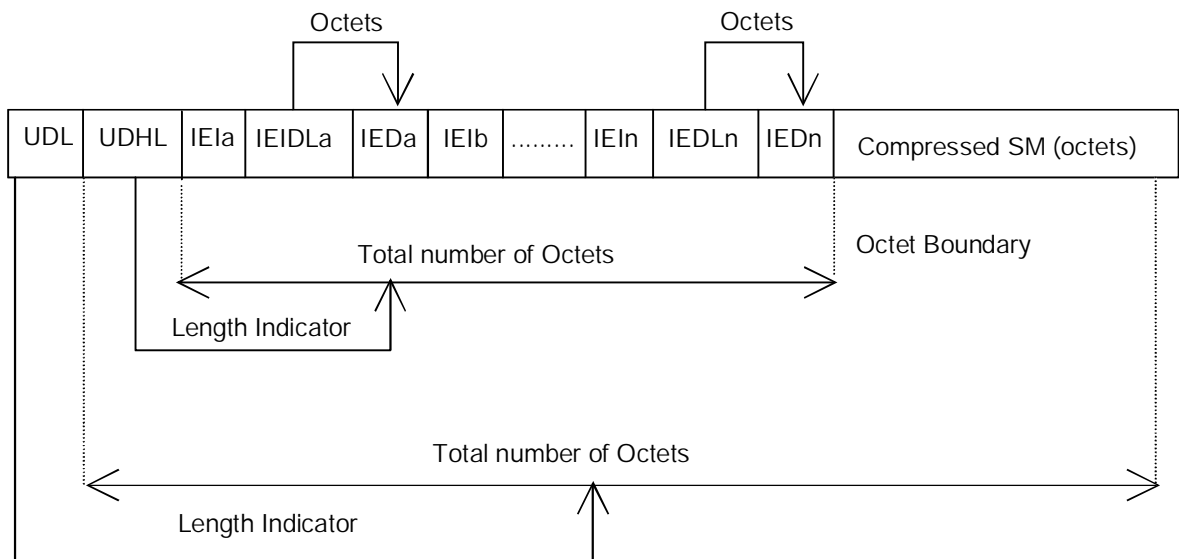
Figure 9.2.3.24 (c)

The definition of the TP-User-Data-Length field which immediately precedes the "Length of User Data Header" is unchanged and shall therefore be the total length of the TP-User-Data field including the Header, if present. (see 9.2.3.16)

The "Length-of-Information-Element" fields shall be the integer representation of the number of octets within its associated "Information-Element-Data" field which follows and shall not include itself in its count value.

The "Length-of-User-Data-Header" field shall be the integer representation of the number of octets within the "User-Data-Header" information fields which follow and shall not include itself in its count or any fill bits which may be present (see text below).

Information Elements may appear in any order and need not necessarily follow the order used in the present document.

In the case where there are no multiple instances of any Information Element type: If Information Elements are duplicated (either with the same or different content), within one single SM or within one segment of a concatenated message then the contents of the last occurrence of the Information Element shall be used.

In the case where there are multiple instances of any Information Element type: If certain types of Information Elements are duplicated (either with the same or different content) within one single SM or within one segment of a concatenated message and there is a contradiction in meaning (e.g. more than one Special Message Indication for voice) or there is a contradiction of Information Element types (e.g. an 8bit port address and a 16bit port address), then the contents of the last occurrence of the Information Element shall be used. Other types of Information Elements may occur more than once when there is additional information of the same type to be conveyed. The individual specifications for each Information Element will state if multiple use is permitted and in such a case will also indicate the maximum number of occurrences within one User Data Header.

If the length of the User Data Header overall is such that there appear to be too few or too many octets in the final Information Element then the whole User Data Header shall be ignored.

If any reserved values are received within the content of any Information Element then that part of the Information Element shall be ignored.

The Information Element Identifier octet shall be coded as follows:

VALUE (hex)	MEANING
00	Concatenated short messages, 8-bit reference number
01	Special SMS Message Indication
02	Reserved
03	Value not used to avoid misinterpretation as <LF> character
04	Application port addressing scheme, 8 bit address
05	Application port addressing scheme, 16 bit address
06	SMSC Control Parameters
07	UDH Source Indicator
08	Concatenated short message, 16-bit reference number
09	Wireless Control Message Protocol
0A	Text Formatting
0B	Predefined Sound
0C	User Defined Sound (iMelody max 128 bytes)
0D	Predefined Animation
0E	Large Animation (16*16 times 4 = 32*4 =128 bytes)
0F	Small Animation (8*8 times 4 = 8*4 =32 bytes)
10	Large Picture (32*32 = 128 bytes)
11	Small Picture (16*16 = 32 bytes)
12	Variable Picture
13	User prompt indicator
14	Extended Object
15	Reused Extended Object
16	Compression Control
17	Object Distribution Indicator
18-1F	Reserved for future EMS features (see subclause 3.10)
20	RFC 822 E-Mail Header
21	Hyperlink format element
2~~1~~2-6F	Reserved for future use
70 – 7F	(U)SIM Toolkit Security Headers
80 – 9F	SME to SME specific use
A0 – BF	Reserved for future use
C0 – DF	SC specific use
E0 – FF	Reserved for future use

A receiving entity shall ignore (i.e. skip over and commence processing at the next information element) any information element where the IEI is Reserved or not supported. The receiving entity calculates the start of the next information element by looking at the length of the current information element and skipping that number of octets.

The SM itself may be coded as 7, 8 or 16 bit data.

If 7 bit data is used and the TP-UD-Header does not finish on a septet boundary then fill bits are inserted after the last Information Element Data octet up to the next septet boundary so that there is an integral number of septets for the entire TP-UD header. This is to ensure that the SM itself starts on an septet boundary so that an earlier Phase mobile shall be capable of displaying the SM itself although the TP-UD Header in the TP-UD field may not be understood.

It is optional to make the first character of the SM itself a Carriage Return character encoded according to the default 7 bit alphabet so that earlier Phase mobiles, which do not understand the TP-UD-Header, shall over-write the displayed TP-UD-Header with the SM itself.

If 16 bit (USC2) data is used then padding octets are not necessary. The SM itself shall start on an octet boundary.

If 8 bit data is used then padding is not necessary. An earlier Phase mobile shall be able to display the SM itself although the TP-UD header may not be understood.

It is also possible for mobiles not wishing to support the TP-UD header to check the value of the TP-UDHI bit in the SMS-Deliver PDU and the first octet of the TP-UD field and skip to the start of the SM and ignore the TP-UD header.

...

9.2.3.24.12   Hyperlink format element

A hyperlink format element shall be structured as follows:

Octet 1 and 2 Absolute Element Position (integer representation)

The Absolute Element Position indicates the absolute character position within the message text. The absolute character position relates to the entire text within the concatenated message, the first character is numbered character 1.

Octet 3   Hyperlink Title length: an integer representation of the number of characters in the hyperlink title

Octet 4   URL length: an integer representation of the number of characters in the URL

A space character shall be inserted between the hyperlink title and the URL. The hyperlink title can be a mixture of text, animations and pictures. Elements (text, animations and pictures) for which the position is included in the range [Absolute hyperlink position…Absolute hyperlink position+hyperlink title length] are part of the hyperlink title. The string of text in the range [Absolute hyperlink position+hyperlink title length+1…Absolute hyperlink position+hyperlink title length+1+URL length] is to be interpreted as a URL.

CR-Form-v4

CHANGE REQUEST

⌘ **23.040 CR 030** ⌘ ev **-** ⌘ Current version: **3.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	Removal of EMS PID	
Source: ⌘	T2	
Work item code: ⌘	TEI	**Date:** ⌘ Sept. 6, 2001
Category: ⌘	**F**	**Release:** ⌘ R99

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘ A problem has been discovered with the Enhanced Message Service TP-Protocol-Identifier (TP-PID). The problem is that a consistent interpreted of the EMS PID is not being made by terminal vendors, SMSC vendors, or operators. Operator's interpretation is that this PID is to be used by an SMSC to identify EMS related content in a short message and bill appropriately. However, terminal vendors are not using the EMS PID to indicate EMS content in a short message. Some vendors have released terminals into the market that support EMS, and others are in the process of releasing EMS products in the near future.

Summary of change: ⌘ The EMS PID will be made obsolete.

Consequences if not approved: ⌘ SMSC and terminal vendors building to release 99 specifications will continue to implement the EMS feature differently.

Clauses affected: ⌘ 9.2.3.9

Other specs Affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

Other comments: ⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.2.3.9   TP-Protocol-Identifier (TP-PID)

The TP-Protocol-Identifier parameter serves the purposes indicated in subclause 3.2.3. It consists of one octet, and the bits in the octet are used as follows:

The MS shall interpret reserved, obsolete, or unsupported values as the value 00000000 but shall store them exactly as received.

The SC may reject messages with a TP-Protocol-Identifier containing a reserved value or one which is not supported.

```
    bits        usage

    7  6
    0  0        Assigns bits 0..5 as defined below
    0  1        Assigns bits 0..5 as defined below
    1  0        reserved
    1  1        Assigns bits 0-5 for SC specific use
```

In the case where bit 7 = 0 and bit 6 = 0,

bit 5   indicates telematic interworking:
value = 0 : no interworking, but SME-to-SME protocol
value = 1 : telematic interworking

In the case of telematic interworking, the following five bit patterns in bits 4..0 are used to indicate different types of telematic devices:

```
    4..  .0
    00000           implicit - device type is specific to this SC, or can be concluded on the basis of the address
    00001           telex (or teletex reduced to telex format)
    00010           group 3 telefax
    00011           group 4 telefax
    00100           voice telephone (i.e. conversion to speech)
    00101           ERMES (European Radio Messaging System)
    00110           National Paging system (known to the SC)
    00111           Videotex (T.100 [20] /T.101 [21])
    01000           teletex, carrier unspecified
    01001           teletex, in PSPDN
    01010           teletex, in CSPDN
    01011           teletex, in analog PSTN
    01100           teletex, in digital ISDN
    01101           UCI (Universal Computer Interface, ETSI DE/PS 3 01-3)
    01110..01111    (reserved, 2 combinations)
    10000           a message handling facility (known to the SC)
    10001           any public X.400-based message handling system
    10010           Internet Electronic Mail
    10011..10111    (reserved, 5 combinations)
    11000..11110    values specific to each SC, usage based on mutual agreement between the SME and the SC  (7
                    combinations available for each SC)
    11111           A GSM/UMTS mobile station. The SC converts the SM from the received
                    TP-Data-Coding-Scheme to any data coding scheme supported by that MS (e.g. the default).
```

If bit 5 has value 1 in an SMS-SUBMIT PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0, and requests the SC to convert the SM into a form suited for that device type. If the destination network is ISDN, the SC must also select the proper service indicators for connecting to a device of that type.

If bit 5 has value 1 in an SMS-DELIVER PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0.

If bit 5 has value 0 in an SMS-DELIVER PDU, the value in bits 4..0 identifies the SM-AL protocol being used between the SME and the MS.

Note that for the straightforward case of simple MS-to-SC short message transfer the Protocol Identifier is set to the value 0.

In the case where bit 7 = 0, bit 6 = 1, bits 5..0 are used as defined below

```
5 .. . .0
000000          Short Message Type 0
000001          Replace Short Message Type 1
000010          Replace Short Message Type 2
000011          Replace Short Message Type 3
000100          Replace Short Message Type 4
000101          Replace Short Message Type 5
000110          Replace Short Message Type 6
000111          Replace Short Message Type 7
001000..011101     Reserved
011110          Enhanced Message Service (ObsoleteEMS. Refer subclause 3.10)
001000..011110  Reserved
011111          Return Call Message
100000..111011  Reserved
111100          ANSI-136 R-DATA
111101          ME Data download
111110          ME De-personalization Short Message
111111          (U)SIM Data download
```

A short message type 0 indicates that the ME must acknowledge receipt of the short message but may discard its contents.

The Replace Short Message feature is optional for the ME and the (U)SIM but if implemented it shall be performed as described here.

For MT short messages, on receipt of a short message from the SC, the MS shall check to see if the associated Protocol Identifier contains a Replace Short Message Type code.

If such a code is present, then the MS shall check the originating address and replace any existing stored message having the same Protocol Identifier code and originating address with the new short message and other parameter values. If there is no message to be replaced, the MS shall store the message in the normal way. The MS may also check the SC address as well as the Originating Address. However, in a network which has multiple SCs, it is possible for a Replace Message type for a SM to be sent via different SCs and so it is recommended that the SC address should not be checked by the MS unless the application specifically requires such a check.

If a Replace Short Message Type code is not present then the MS shall store the message in the normal way.

In MO short messages the SC reacts similarly but only the address of the originating MS or any other source is checked.

The Enhanced Message Service PID value shall be set in a MO enhanced short message unless there is a need to set the PID to any other value (e.g. for telematic interworking). In the event where the message contains one or more IE that could not be understood by the receiving SME, this PID value may be used to assist the receiving SME and/or the SMSC to identify such a message (e.g. for diagnostic purposes). It is not a mandatory requirement for the SMSC or receiving SME to process this PID value or for the SMSC to pass the value to the receiving SME.

A Return Call Message indicates to the MS to inform the user that a call (e.g. a telephone call) can be established to the address specified within the TP-OA. The RP-OA contains the address of the SC as usual. The message content (if present) gives displayable information (e.g. the number of waiting voice messages). The message is handled in the same way as all other messages of the Replace Short Message Types.

The ME De-personalization Short Message is a ME-specific message which instructs the ME to de-personalities the ME (see 3G TS 22.022 [25]). The TP-DCS shall be set to Uncompressed, Default Alphabet, and Message Class 1 (ME-specific), which corresponds to a bit coding of 00010001. The TP-UD field contains de-personalization information coded according to 3G TS 22.022 [25]. This information shall not be displayed by an ME which supports the scheme. The acknowledgement to this message is a SMS-DELIVER-REPORT for RP-ACK in which the TP-User-Data shall be coded according to 3G TS 22.022 [25].

(U)SIM Data download is a facility whereby the ME must pass the short message in its entirety including all SMS elements contained in the SMS deliver to the (U)SIM using the mechanism described in GSM TS 11.11 [16] and 3G TS 31.102 [30]. The DCS shall be set to 8 bit message class 2 (either bit coding 1111 0110 or 00010110). The entire user data field is available for (U)SIM Data download. If the DCS is not set to 8-bit message class 2 then the message shall be handled in the normal way by the ME.

ME Data download is a facility whereby the ME shall process the short message in its entirety including all SMS elements contained in the SMS deliver to the ME. The DCS should normally be set to message class 1. If the DCS is set to message class 1 and no application in the ME exists, which is able to process the short message, the ME may discard the short message. The entire user data field is available for ME data download. The TPDU parameters required for the SMS-DELIVER should be passed transparently by all involved SCs, so no TPDU parameter in the entire short message is modified, other than the changes required to convert an SMS-SUBMIT into an SMS-DELIVER.

ANSI-136 R-DATA is a facility whereby the ME must pass the short message in its entirety, including all elements contained in the SMS DELIVER, to the (U)SIM using the mechanism described in GSM TS 11.14 [16] and 3G TS 31.102 [30]. The DCS shall be set to 8-bit message class 2 (either bit coding 11110110 or 00010110). If the DCS is not set to 8-bit message class 2 then the message shall be handled in the normal way by the ME.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.040** CR **031** | ⌘ | ev | **-** | ⌘ | Current version: | **5.0.0** | ⌘ |

For __HELP__ on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title: ⌘	Removal of EMS PID	
Source: ⌘	T2	
Work item code: ⌘	MESS5-EMS	*Date:* ⌘ Sept. 6, 2001
Category: ⌘ **A**		*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	A problem has been discovered with the Enhanced Message Service TP-Protocol-Identifier (TP-PID). The problem is that a consistent interpreted of the EMS PID is not being made by terminal vendors, SMSC vendors, or operators. Operator's interpretation is that this PID is to be used by an SMSC to identify EMS related content in a short message and bill appropriately. However, terminal vendors are not using the EMS PID to indicate EMS content in a short message. Some vendors have released terminals into the market that support EMS, and others are in the process of releasing EMS products in the near future.
Summary of change: ⌘	The EMS PID will be made obsolete.
Consequences if not approved: ⌘	SMSC and terminal vendors building to release 5 specifications will implement the EMS feature differently.

Clauses affected: ⌘	9.2.3.9
Other specs Affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.2.3.9   TP-Protocol-Identifier (TP-PID)

The TP-Protocol-Identifier parameter serves the purposes indicated in subclause 3.2.3. It consists of one octet, and the bits in the octet are used as follows:

The MS shall interpret reserved, obsolete, or unsupported values as the value 00000000 but shall store them exactly as received.

The SC may reject messages with a TP-Protocol-Identifier containing a reserved value or one which is not supported.

```
bits        usage

7  6
0  0        Assigns bits 0..5 as defined below
0  1        Assigns bits 0..5 as defined below
1  0        reserved
1  1        Assigns bits 0-5 for SC specific use
```

In the case where bit 7 = 0 and bit 6 = 0,

bit 5   indicates telematic interworking:
value = 0 : no interworking, but SME-to-SME protocol
value = 1 : telematic interworking

In the case of telematic interworking, the following five bit patterns in bits 4..0 are used to indicate different types of telematic devices:

```
4..  .0
00000        implicit - device type is specific to this SC, or can be concluded on the basis of the address
00001        telex (or teletex reduced to telex format)
00010        group 3 telefax
00011        group 4 telefax
00100        voice telephone (i.e. conversion to speech)
00101        ERMES (European Radio Messaging System)
00110        National Paging system (known to the SC)
00111        Videotex (T.100 [20] /T.101 [21])
01000        teletex, carrier unspecified
01001        teletex, in PSPDN
01010        teletex, in CSPDN
01011        teletex, in analog PSTN
01100        teletex, in digital ISDN
01101        UCI (Universal Computer Interface, ETSI DE/PS 3 01-3)
01110..01111 (reserved, 2 combinations)
10000        a message handling facility (known to the SC)
10001        any public X.400-based message handling system
10010        Internet Electronic Mail
10011..10111 (reserved, 5 combinations)
11000..11110 values specific to each SC, usage based on mutual agreement between the SME and the SC  (7
             combinations available for each SC)
11111        A GSM/UMTS mobile station. The SC converts the SM from the received
             TP-Data-Coding-Scheme to any data coding scheme supported by that MS (e.g. the default).
```

If bit 5 has value 1 in an SMS-SUBMIT PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0, and requests the SC to convert the SM into a form suited for that device type. If the destination network is ISDN, the SC must also select the proper service indicators for connecting to a device of that type.

If bit 5 has value 1 in an SMS-DELIVER PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0.

If bit 5 has value 0 in an SMS-DELIVER PDU, the value in bits 4..0 identifies the SM-AL protocol being used between the SME and the MS.

Note that for the straightforward case of simple MS-to-SC short message transfer the Protocol Identifier is set to the value 0.

In the case where bit 7 = 0, bit 6 = 1, bits 5..0 are used as defined below

```
5 .. . .0
000000          Short Message Type 0
000001          Replace Short Message Type 1
000010          Replace Short Message Type 2
000011          Replace Short Message Type 3
000100          Replace Short Message Type 4
000101          Replace Short Message Type 5
000110          Replace Short Message Type 6
000111          Replace Short Message Type 7
001000..011101     Reserved
011110          Enhanced Message Service (ObsoleteEMS. Refer subclause 3.10)
011111          Return Call Message
100000..111011  Reserved
111100          ANSI-136 R-DATA
111101          ME Data download
111110          ME De-personalization Short Message
111111          (U)SIM Data download
```

A short message type 0 indicates that the ME must acknowledge receipt of the short message but may discard its contents.

The Replace Short Message feature is optional for the ME and the (U)SIM but if implemented it shall be performed as described here.

For MT short messages, on receipt of a short message from the SC, the MS shall check to see if the associated Protocol Identifier contains a Replace Short Message Type code.

If such a code is present, then the MS shall check the originating address and replace any existing stored message having the same Protocol Identifier code and originating address with the new short message and other parameter values. If there is no message to be replaced, the MS shall store the message in the normal way. The MS may also check the SC address as well as the Originating Address. However, in a network which has multiple SCs, it is possible for a Replace Message type for a SM to be sent via different SCs and so it is recommended that the SC address should not be checked by the MS unless the application specifically requires such a check.

If a Replace Short Message Type code is not present then the MS shall store the message in the normal way.

In MO short messages the SC reacts similarly but only the address of the originating MS or any other source is checked.

The Enhanced Message Service PID value shall be set in a MO enhanced short message unless there is a need to set the PID to any other value (e.g. for telematic interworking). In the event where the message contains one or more IE that could not be understood by the receiving SME, this PID value may be used to assist the receiving SME and/or the SMSC to identify such a message (e.g. for diagnostic purposes). It is not a mandatory requirement for the SMSC or receiving SME to process this PID value or for the SMSC to pass the value to the receiving SME.

A Return Call Message indicates to the MS to inform the user that a call (e.g. a telephone call) can be established to the address specified within the TP-OA. The RP-OA contains the address of the SC as usual. The message content (if present) gives displayable information (e.g. the number of waiting voice messages). The message is handled in the same way as all other messages of the Replace Short Message Types.

The ME De-personalization Short Message is a ME-specific message which instructs the ME to de-personalities the ME (see 3GPP TS 22.022 [25]). The TP-DCS shall be set to Uncompressed, Default Alphabet, and Message Class 1 (ME-specific), which corresponds to a bit coding of 00010001. The TP-UD field contains de-personalization information coded according to 3GPP TS 22.022 [25]. This information shall not be displayed by an ME which supports the scheme. The acknowledgement to this message is a SMS-DELIVER-REPORT for RP-ACK in which the TP-User-Data shall be coded according to 3GPP TS 22.022 [25].

(U)SIM Data download is a facility whereby the ME must pass the short message in its entirety including all SMS elements contained in the SMS deliver to the (U)SIM using the mechanism described in GSM TS 51.011 [16] and 3GPP TS 31.102 [30]. The DCS shall be set to 8 bit message class 2 (either bit coding 1111 0110 or 00010110). The entire user data field is available for (U)SIM Data download. If the DCS is not set to 8-bit message class 2 then the message shall be handled in the normal way by the ME.

ME Data download is a facility whereby the ME shall process the short message in its entirety including all SMS elements contained in the SMS deliver to the ME. The DCS should normally be set to message class 1. If the DCS is set to message class 1 and no application in the ME exists, which is able to process the short message, the ME may discard the short message. The entire user data field is available for ME data download. The TPDU parameters required for the SMS-DELIVER should be passed transparently by all involved SCs, so no TPDU parameter in the entire short message is modified, other than the changes required to convert an SMS-SUBMIT into an SMS-DELIVER.

ANSI-136 R-DATA is a facility whereby the ME must pass the short message in its entirety, including all elements contained in the SMS DELIVER, to the (U)SIM using the mechanism described in GSM TS 11.14 [16] and 3GPP TS 31.102 [30]. The DCS shall be set to 8-bit message class 2 (either bit coding 11110110 or 00010110). If the DCS is not set to 8-bit message class 2 then the message shall be handled in the normal way by the ME.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.040** CR **032** | ⌘ | ev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title: ⌘	Removal of EMS PID	
Source: ⌘	T2	
Work item code: ⌘	TEI4	**Date:** ⌘ Sept. 6, 2001
Category: ⌘	**A**	**Release:** ⌘ REL-4

Use *one* of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use *one* of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change: ⌘	A problem has been discovered with the Enhanced Message Service TP-Protocol-Identifier (TP-PID). The problem is that a consistent interpreted of the EMS PID is not being made by terminal vendors, SMSC vendors, or operators. Operator's interpretation is that this PID is to be used by an SMSC to identify EMS related content in a short message and bill appropriately. However, terminal vendors are not using the EMS PID to indicate EMS content in a short message. Some vendors have released terminals into the market that support EMS, and others are in the process of releasing EMS products in the near future.
Summary of change: ⌘	The EMS PID will be made obsolete.
Consequences if not approved: ⌘	SMSC and terminal vendors building to release 4 specifications will implement the EMS feature differently.

Clauses affected: ⌘	9.2.3.9
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.2.3.9   TP-Protocol-Identifier (TP-PID)

The TP-Protocol-Identifier parameter serves the purposes indicated in subclause 3.2.3. It consists of one octet, and the bits in the octet are used as follows:

The MS shall interpret reserved, obsolete, or unsupported values as the value 00000000 but shall store them exactly as received.

The SC may reject messages with a TP-Protocol-Identifier containing a reserved value or one which is not supported.

```
        bits        usage

        7  6
        0  0        Assigns bits 0..5 as defined below
        0  1        Assigns bits 0..5 as defined below
        1  0        reserved
        1  1        Assigns bits 0-5 for SC specific use
```

In the case where bit 7 = 0 and bit 6 = 0,

bit 5   indicates telematic interworking:
value = 0 : no interworking, but SME-to-SME protocol
value = 1 : telematic interworking

In the case of telematic interworking, the following five bit patterns in bits 4..0 are used to indicate different types of telematic devices:

```
        4..  .0
        00000         implicit - device type is specific to this SC, or can be concluded on the basis of the address
        00001         telex (or teletex reduced to telex format)
        00010         group 3 telefax
        00011         group 4 telefax
        00100         voice telephone (i.e. conversion to speech)
        00101         ERMES (European Radio Messaging System)
        00110         National Paging system (known to the SC)
        00111         Videotex (T.100 [20] /T.101 [21])
        01000         teletex, carrier unspecified
        01001         teletex, in PSPDN
        01010         teletex, in CSPDN
        01011         teletex, in analog PSTN
        01100         teletex, in digital ISDN
        01101         UCI (Universal Computer Interface, ETSI DE/PS 3 01-3)
        01110..01111  (reserved, 2 combinations)
        10000         a message handling facility (known to the SC)
        10001         any public X.400-based message handling system
        10010         Internet Electronic Mail
        10011..10111  (reserved, 5 combinations)
        11000..11110  values specific to each SC, usage based on mutual agreement between the SME and the SC  (7
                      combinations available for each SC)
        11111         A GSM/UMTS mobile station. The SC converts the SM from the received
                      TP-Data-Coding-Scheme to any data coding scheme supported by that MS (e.g. the default).
```

If bit 5 has value 1 in an SMS-SUBMIT PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0, and requests the SC to convert the SM into a form suited for that device type. If the destination network is ISDN, the SC must also select the proper service indicators for connecting to a device of that type.

If bit 5 has value 1 in an SMS-DELIVER PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0.

If bit 5 has value 0 in an SMS-DELIVER PDU, the value in bits 4..0 identifies the SM-AL protocol being used between the SME and the MS.

Note that for the straightforward case of simple MS-to-SC short message transfer the Protocol Identifier is set to the value 0.

In the case where bit 7 = 0, bit 6 = 1, bits 5..0 are used as defined below

```
5 .. . .0
000000          Short Message Type 0
000001          Replace Short Message Type 1
000010          Replace Short Message Type 2
000011          Replace Short Message Type 3
000100          Replace Short Message Type 4
000101          Replace Short Message Type 5
000110          Replace Short Message Type 6
000111          Replace Short Message Type 7
001000..011101     Reserved
011110          Enhanced Message Service (ObsoleteEMS. Refer subclause 3.10)
011111          Return Call Message
100000..111011  Reserved
111100          ANSI-136 R-DATA
111101          ME Data download
111110          ME De-personalization Short Message
111111          (U)SIM Data download
```

A short message type 0 indicates that the ME must acknowledge receipt of the short message but may discard its contents.

The Replace Short Message feature is optional for the ME and the (U)SIM but if implemented it shall be performed as described here.

For MT short messages, on receipt of a short message from the SC, the MS shall check to see if the associated Protocol Identifier contains a Replace Short Message Type code.

If such a code is present, then the MS shall check the originating address and replace any existing stored message having the same Protocol Identifier code and originating address with the new short message and other parameter values. If there is no message to be replaced, the MS shall store the message in the normal way. The MS may also check the SC address as well as the Originating Address. However, in a network which has multiple SCs, it is possible for a Replace Message type for a SM to be sent via different SCs and so it is recommended that the SC address should not be checked by the MS unless the application specifically requires such a check.

If a Replace Short Message Type code is not present then the MS shall store the message in the normal way.

In MO short messages the SC reacts similarly but only the address of the originating MS or any other source is checked.

The Enhanced Message Service PID value shall be set in a MO enhanced short message unless there is a need to set the PID to any other value (e.g. for telematic interworking). In the event where the message contains one or more IE that could not be understood by the receiving SME, this PID value may be used to assist the receiving SME and/or the SMSC to identify such a message (e.g. for diagnostic purposes). It is not a mandatory requirement for the SMSC or receiving SME to process this PID value or for the SMSC to pass the value to the receiving SME.

A Return Call Message indicates to the MS to inform the user that a call (e.g. a telephone call) can be established to the address specified within the TP-OA. The RP-OA contains the address of the SC as usual. The message content (if present) gives displayable information (e.g. the number of waiting voice messages). The message is handled in the same way as all other messages of the Replace Short Message Types.

The ME De-personalization Short Message is a ME-specific message which instructs the ME to de-personalities the ME (see 3GPP TS 22.022 [25]). The TP-DCS shall be set to Uncompressed, Default Alphabet, and Message Class 1 (ME-specific), which corresponds to a bit coding of 00010001. The TP-UD field contains de-personalization information coded according to 3GPP TS 22.022 [25]. This information shall not be displayed by an ME which supports the scheme. The acknowledgement to this message is a SMS-DELIVER-REPORT for RP-ACK in which the TP-User-Data shall be coded according to 3GPP TS 22.022 [25].

(U)SIM Data download is a facility whereby the ME must pass the short message in its entirety including all SMS elements contained in the SMS deliver to the (U)SIM using the mechanism described in GSM TS 51.011 [16] and 3GPP TS 31.102 [30]. The DCS shall be set to 8 bit message class 2 (either bit coding 1111 0110 or 00010110). The entire user data field is available for (U)SIM Data download. If the DCS is not set to 8-bit message class 2 then the message shall be handled in the normal way by the ME.

ME Data download is a facility whereby the ME shall process the short message in its entirety including all SMS elements contained in the SMS deliver to the ME. The DCS should normally be set to message class 1. If the DCS is set to message class 1 and no application in the ME exists, which is able to process the short message, the ME may discard the short message. The entire user data field is available for ME data download. The TPDU parameters required for the SMS-DELIVER should be passed transparently by all involved SCs, so no TPDU parameter in the entire short message is modified, other than the changes required to convert an SMS-SUBMIT into an SMS-DELIVER.

ANSI-136 R-DATA is a facility whereby the ME must pass the short message in its entirety, including all elements contained in the SMS DELIVER, to the (U)SIM using the mechanism described in GSM TS 11.14 [16] and 3GPP TS 31.102 [30]. The DCS shall be set to 8-bit message class 2 (either bit coding 11110110 or 00010110). If the DCS is not set to 8-bit message class 2 then the message shall be handled in the normal way by the ME.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.040** CR **033** | ⌘ | ev | **-** | ⌘ | Current version: | **5.0.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	EMS Delivery Request	
Source: ⌘	T2	
Work item code: ⌘	MESS5-EMS	***Date:*** ⌘ Sept. 6, 2001
Category: ⌘	**B**	***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	Operators are demanding a new feature of EMS that provides a mechanism for SMEs to request delivery of data in a particular format. Currently, SMEs are inert in communicating a preferred data format. This new feature allows an SME to be pro-active in requesting data formats, and thus provides an increase of the end user's EMS experience and SMS traffic.
Summary of change: ⌘	A new data format in the Extended Object Information Element is being added that allows an SME to request the type of data formats it desires to be sent.
Consequences if not approved: ⌘	SMEs will have no means of indicating what EMS related data formats they desire receiving. Operators, service providers, and end users will not reap the full benefits of EMS.

Clauses affected: ⌘	9.2.3.24, E.12	
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications	
Other comments: ⌘		

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.2.3.24   TP-User Data (TP-UD)

....

9.2.3.24.10.1.11   Extended Object

The Extended Object allows an extended code range for format types. The Extended Object may extend across segment boundaries of a concatenated short message. Octets 1 through 7 of the first Extended Object IE shall be contained in a single segment. A single segment may include one or more Extended Object IEs.

If multiple SMs are concatenated and at least one of them contains an Extended Object information element, then concatenation of the SMs shall be done using the 'Concatenated short messages, 16-bit reference number', verses the 'Concatenated short messages, 8-bit reference number' information element. The re-assembly of the Extended Object segments shall be done according to the sequence number of the associated Concatenation IE.

One or more Extended Objects may be compressed using a compression algorithm as indicated in the Compression Control IE (see section 9.2.3.24.10.1.13).

An SME implementing the Extended Object IE shall be capable of interpreting an uncompressed concatenated message composed of at least **min_eo_msg** short messages which have been received. According to current content provider requirements and handset manufacturer constraints, variable **min_eo_msg** is set to 8.

The first Extended Object IE of an Extended Object contains a reference number, length, control data, type and position. The subsequent Extended Object IEs shall only contain Extended Object data as illustrated in Figure 9.2.24.10.11.

The IE length is variable.

Octet 1   Extended Object reference number
               a modulo 256 counter indicating the reference number for the Extended Object. Two different Extended
               Objects in a single concatenated message shall have different reference numbers.

Octet 2..3 Extended Object length in number of octets (integer representation) as shown in Figure 9.2.3.24.10.1.11.

Octet 4   Control data

               Bit 0   Object distribution

               0   Object may be forwarded
               1   Object shall not be forwarded by SMS

               Bit 1   User Prompt Indicator

               0   Object shall be handled normally
               1   Object shall be handled as a User Prompt (see 9.2.3.24.10.1.10)

               Bit 2..7   reserved

               Any reserved values shall be set to 0.

Octet 5   Extended Object Type
               This octet indicates the format of the Extended Object from the table below.
               If the value is reserved or if the associated format is not supported then the receiving entity shall ignore
               the Extend Object.

Format Type	Format Description
0x00	Predefined sound as defined in annex E.
0x01	iMelody as defined in annex E.
0x02	Black and white bitmap as defined in annex E.
0x03	2-bit greyscale bitmap as defined in annex E.
0x04	6-bit colour bitmap as defined in annex E.
0x05	Predefined animation as defined in annex E.

0x06	Black and white bitmap animation as defined in annex E.	
0x07	2-bit greyscale bitmap animation as defined in annex E.	
0x08	6-bit colour bitmap animation as defined in annex E.	
0x09	vCard as defined in annex E.	
0x0A	vCalendar as defined in annex E.	
0x0B..0xFe0x FF	Reserved	
0xFF	Data Format Delivery Request	

Octet 6..7   Extended Object Position (integer representation)
The Extended Object Position indicates the absolute character position within the message text after which the object shall be played or displayed. The absolute character position relates to the entire text within the concatenated message, the first character is numbered character 1.

If more than one Extended Object is located at the same position then they may be played or displayed in sequence or simultaneously.

Octet 8..n   Extended Object Data
This sequence of octets is structured as illustrated in the figure below and defined annex E.   This figure illustrates the construction of a number of SMs containing a large Extended Object which crosses a SM boundary and is encoded into 2 SM TPDUs. The figure illustrates only the User Data field of the SM (TPDUs). For a description of concatenation of SM refer to Figures 9.2.3.24 (a, b and c)

Figure 9.2.3.24.10.1.11

…………
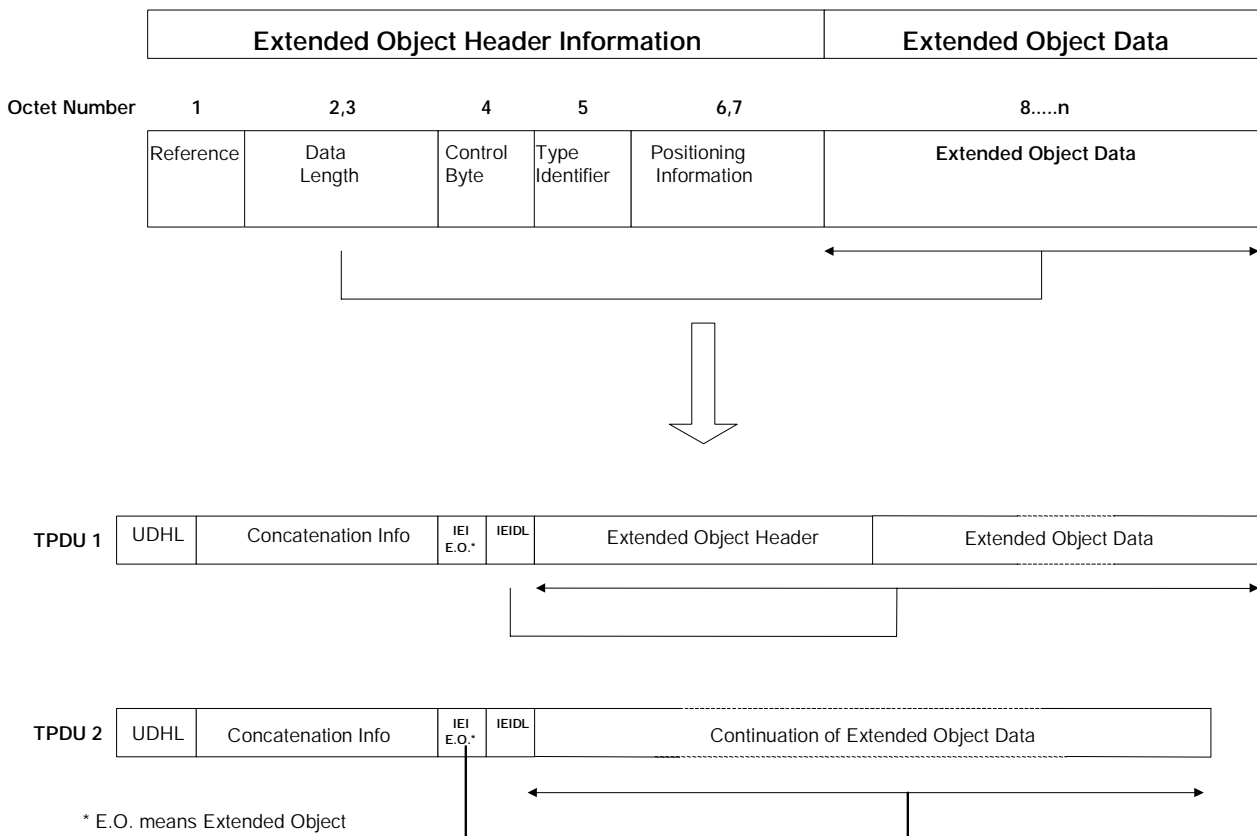
<u>E.12   Data Format Delivery Request</u>

This Data Format Delivery Request is an optional feature used by an SME to indicate which Extended Object data formats, listed in section 9.2.3.24.10.1.11, it supports and thus is requesting for delivery. This Data Format Delivery Request may be included by an SME in a MO SM containing other EMS related data, or in a MO SM independently.

Processing of this data format is optional in a MT short message. However, SME vendors fully supporting this Data Format Delivery Request feature in both MO and MT short messages will provide the highest level of EMS service to end users.

The information in this data format represents an extensible bit field with the first bit being mapped to the first Extended Object (EO) data format defined in the table in section 9.2.3.24.10.1.11.

Octet 8

      Bit 0: If set to 1 indicates support for EO data format 00

      Bit 1: If set to 1 indicates support for EO data format 01

      Bit 2: If set to 1 indicates support for EO data format 02

      ……

      ……

Octet n

      Bit 0: If set indicates support for EO data format ((n – 8) * 8)

      Bit 1: If set indicates support for EO data format ((n – 8) + 1

      Bit 2: If set indicates support for EO data format ((n – 8) + 2

      …….

Any unused bits in the last octet shall be set to zero.

CR-Form-v3

CHANGE REQUEST

| ⌘ | **23.140** CR **008** | ⌘ | rev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title: ⌘	Clarification of REL-4 MMS authentication	
Source: ⌘	T2	
Work item code: ⌘	MMS	*Date:* ⌘ 29.06.01
Category: ⌘	F	*Release:* ⌘ REL-4

Use one of the following categories:
F (essential correction)
A (corresponds to a correction in an earlier release)
B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	The re-use of underlying authentication mechanisms for the MM1 reference point in MMS has always been an implicit assumption which is now clarified.
Summary of change: ⌘	Clarification of REL-4 MMS authentication
Consequences if not approved: ⌘	Fraudulent use of MMS would not be prohibited

Clauses affected: ⌘	
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

...

8 MMS Application Protocol Framework and Technical Realisation of MMS Service Features

This subclause defines the application protocol framework and describes the technical realisation of MMS service features in terms of abstract messages. The abstract messages can be categorised into *transactions* consisting of *requests* and *responses*. The labelling of the MMS abstract messages follows these conventions:

- the transactions between the MMS UA and MMS Relay/Server are prefixed with "MM1";

- the transactions between the MMS Relay/Servers are prefixed with "MM4";

- requests are identified with ".REQ" as a suffix;

- responses are identified with the ".RES" suffix.

Each abstract message carries with it certain information elements, which may vary according to the specific message. All messages shall carry, as information elements, a protocol version and message type, in order that the MMSE components may be able to properly identify and manage the message contents.

Specific information regarding the message encapsulation, including order, possible values, and encoding are beyond the scope of this subclause. These details will be defined within each MMSE protocol environment.

The mapping of abstract messages to specific protocols is not necessarily a one-to-one relationship. Depending on the MMS Implementation (WAP etc.), one or more abstract messages may be mapped to a single lower layer PDU, and a single abstract message may be mapped to multiple lower layer PDUs, if the information carried in the PDU(s) serve the purpose of required information in the subjected abstract message(s).

In MM1 responses that provide a status information, the status information returned has no correspondence to the Status information returned in MM4 responses; they are independent of each other.

The MM1 response status, which are limited by design to as small a set of values as possible, may correlate to status and errors occurring within the communications protocols underlying the implementation of the MM4 abstract messages. Similarly, the MM4 status may correlate to those occurring within the communications protocols underlying the implementation of the MM1 abstract messages. The definition of these correlations is out of scope of this document, and should be provided by the MMS implementations.

The MMS application protocol shall provide means to uniquely identify the version number and message type in each abstract message defined here. The order, possible values and encoding of the information elements for each abstract message are beyond the scope of this subclause, and shall be dictated by the protocol environment.

The following figure shows an example abstract message flow when a multimedia message is sent from an originator MMS User Agent to a recipient MMS User Agent. The scope of this figure is limited to abstract messages on reference points MM1 and MM4 only.

Delivery reports are sent by the recipient MMS Relay/Server. Read-reply reports are sent by the recipient MMS User Agent.
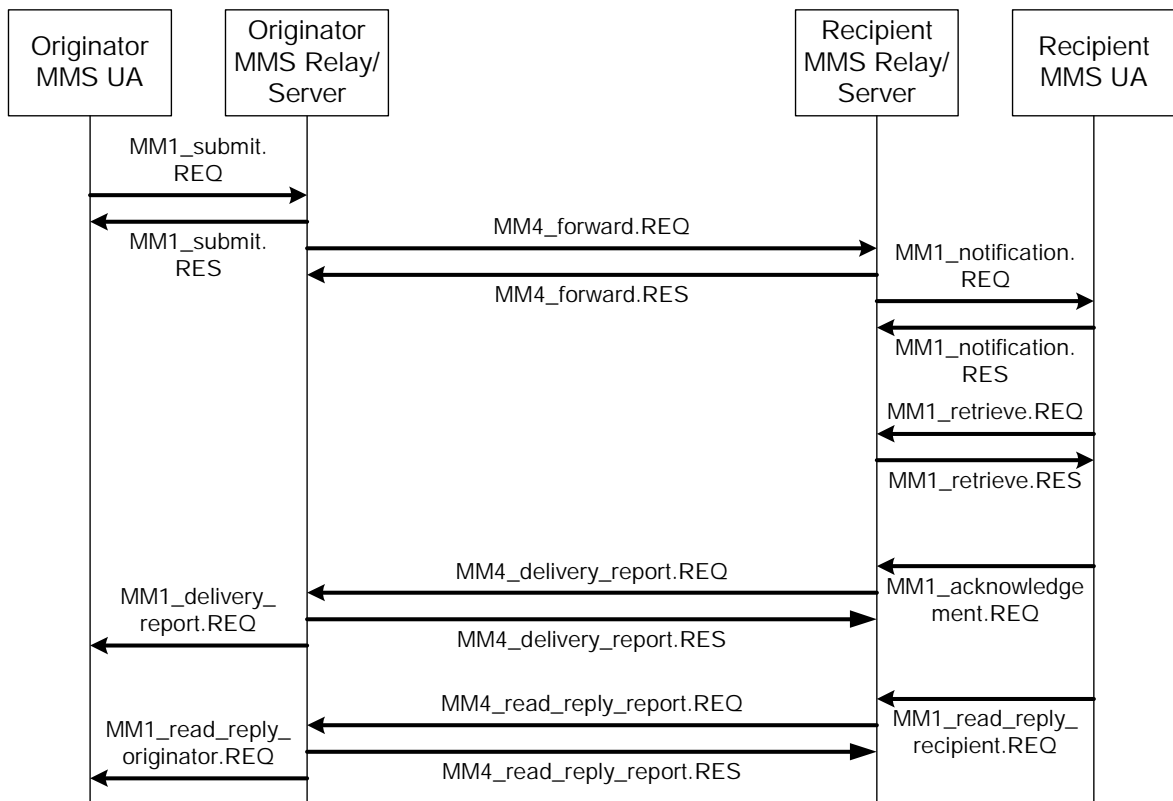
Figure 6: Example Abstract Message Flow

8.1 Technical realisation of MMS on reference point MM1

On the MM1 reference point an underlying authentication mechanism should be available.

8.1.1 Submission of Multimedia Message

This part of MMS service covers the submission of an MM. For sending purposes a terminal-originated MM shall always be submitted from the originator MMS User Agent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in Table 1 from type and direction points of view.

Table 1: Abstract messages for submission of MM in MMS

Abstract messages	Type	Direction
MM1_submit.REQ	Request	MMS UA -> MMS Relay/Server
MM1_submit.RES	Response	MMS Relay/Server -> MMS UA

8.1.1.1 Normal operation

The originator MMS User Agent shall submit a terminal-originated MM to the originator MMS Relay/Server using the MM1_submit.REQ, which contains MMS control information and the MM content. The MMS Relay/Server shall respond with an MM1_submit.RES, which provides the status of the request. The MM1_submit.RES shall unambiguously refer to the corresponding MM1_submit.REQ.

Support for MM1_submit.REQ is optional for the MMS UA, support for MM1_submit.RES is mandatory for the MMS Relay/Server.

8.1.1.2 Abnormal Operation

…

CR-Form-v3

CHANGE REQUEST

| | ⌘ | **23.140** CR **009** | ⌘ | rev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title:	⌘	MMS address hiding
Source:	⌘	T2
Work item code: ⌘	MMS	*Date:* ⌘ 29.06.01
Category:	⌘ **F**	*Release:* ⌘ REL-4

<table>
<tr><td></td><td>Use <u>one</u> of the following categories:</td><td>Use <u>one</u> of the following releases:</td></tr>
<tr><td></td><td>F (essential correction)</td><td>2 (GSM Phase 2)</td></tr>
<tr><td></td><td>A (corresponds to a correction in an earlier release)</td><td>R96 (Release 1996)</td></tr>
<tr><td></td><td>B (Addition of feature),</td><td>R97 (Release 1997)</td></tr>
<tr><td></td><td>C (Functional modification of feature)</td><td>R98 (Release 1998)</td></tr>
<tr><td></td><td>D (Editorial modification)</td><td>R99 (Release 1999)</td></tr>
<tr><td></td><td>Detailed explanations of the above categories can</td><td>REL-4 (Release 4)</td></tr>
<tr><td></td><td>be found in 3GPP TR 21.900.</td><td>REL-5 (Release 5)</td></tr>
</table>

Reason for change: ⌘	When an MMS Service Provider does not allow its subscribers to use the address hiding feature (sender anonymity) and a sender requests for her address to be hidden, the current MMS spec allows a service provider to overwrite the sender's request for address hiding although it also mandates the Service Provider to reject the MM.	
Summary of change: ⌘	It is clarified that allowing address hiding is optional for an MMSE but if a sender has requested anonymity then it is essential that his address is hidden from the recipient.	
Consequences if not approved: ⌘	A ambiguity in 6.1.9 (address hiding) of 23.140 would not be resolved.	

Clauses affected:	⌘	6.1.9
Other specs affected:	⌘ ☐	Other core specifications ⌘
	☐	Test specifications
	☐	O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

...

6.1.9   Address Hiding in MMS

An originator MMS User Agent may support a request for the sender's address to be hidden from the recipient(s). An MMSE may support such a request, i.e., it may allow address hiding. In any case, a recipient MMSE shall ensure that a sender's address is hidden from the recipient MMS User Agent when address hiding is requested for an MM.

If the originator's MMS Relay/Server does not allow address hiding (anonymous messages) (e.g. legislation does not permit anonymous messages) a message containing a request for address hiding ~~the message~~ shall be rejected upon submission and the originator's MMS Relay/Server shall return an error information to the originator MMS User Agent.

In the case of originator's MMS Relay/Server rejects the message because it does not allow address hiding the rejection information shall be delivered in a submit response together with optional status text.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has requested a delivery report, then the recipient MMS Relay/Server shall inform the originator of the message rejection within the delivery report.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has not requested a delivery report, then the originator MMS Relay/Server may inform the MM originator by generating a new MM which is sent back to the MM originator.

~~The originator MMS Relay/Server may have the possibility to override the originator's requirement of address hiding without informing the originator.~~

Independent of whether or not the originator's address is shown or hidden to the recipient, the originator may be able to ask for a delivery report to an MM and also receive the delivery report according to the normal behaviour of the MMS framework.

If the originator MMS User Agent has requested both its address to be hidden and a read-reply report the originator MMS User Agent might not receive the read-reply report.

If the recipient forwards the MM outside the MMSE and the peer entity is unknown to the forwarding MMS Relay/Server the recipient MMS Relay/Server shall not transfer the originator's address but replace it with either appropriate coded address or leave the originator address field blank.

6.1.10   Support for Reply-Charging in MMS

...

CHANGE REQUEST

⌘	**23.140**	CR	**010**	⌘	rev	**-**	⌘	Current version:	**4.3.0**	⌘

For HELP on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	New Figure 5: Interworking with different MMSEs	
Source: ⌘	T2	
Work item code: ⌘	MESS5-MMS	*Date:* ⌘ 30. August 2001
Category: ⌘	**D**	*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:
   F *(essential correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(Addition of feature),*
   C *(Functional modification of feature)*
   D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   REL-4 *(Release 4)*
   REL-5 *(Release 5)*

Reason for change: ⌘	In chapter 7.2 reference point MM1 is defined as the interface between an MMS Relay/Server and an MMS User Agent as depicted in figure 4. Current figure 5 is ambiguous to this definition, because reference point MM1 is depicted as the interface between an MMS Relay/Server and a Radio Network.
Summary of change: ⌘	This CR provides a change to align figure 5 with figure 4 which deletes the ambiguity.
Consequences if not approved: ⌘	Current figure 5 would not represent the description of reference point MM1 given in chapter 7.2 and would not be in-line with figure 4.

Clauses affected: ⌘	7.7	

Other specs affected: ⌘	☐ Other core specifications	⌘	
	☐ Test specifications		
	☐ O&M Specifications		

Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

…

7.7 MM4: Interworking of different MMSEs

Reference point MM4 between MMS Relay/Servers belonging to different MMSEs is used to transfer messages between them. Interworking between MMS Relay/Servers shall be based on SMTP according to STD 10 (RFC 821) [22] as depicted in figure 5.
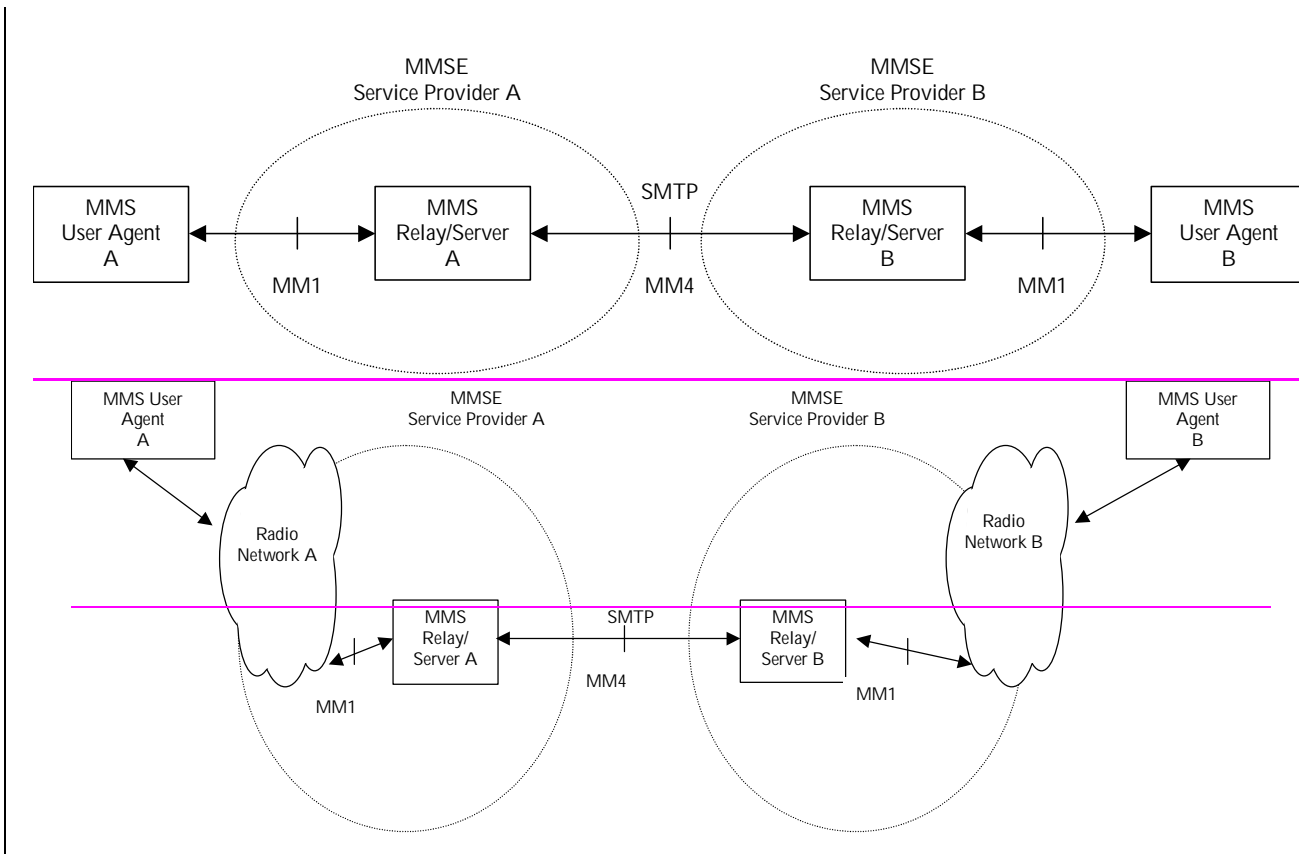

Figure 5: Interworking of different MMSEs

Interworking between different MMS service providers is further elaborated in subclause 8.4.

7.8 MM7: MMS Relay/Server – MMS VAS Applications

…

CR-Form-v3

CHANGE REQUEST

| ✿ | **TS 23.140** | **CR** | **011** | ✿ rev | **-** | ✿ | Current version: | **4.3.0** | ✿ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ✿ symbols.*

Proposed change affects: ✿   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title: ✿	Priority field in notification message	
Source: ✿	T2	
Work item code: ✿	MESS5-MMS	*Date:* ✿ 25 June 2001
Category: ✿	**B**	*Release:* ✿ REL-5

Use <u>one</u> of the following categories:
    F *(essential correction)*
    A *(corresponds to a correction in an earlier release)*
    B *(Addition of feature),*
    C *(Functional modification of feature)*
    D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
    2   *(GSM Phase 2)*
    R96 *(Release 1996)*
    R97 *(Release 1997)*
    R98 *(Release 1998)*
    R99 *(Release 1999)*
    REL-4 *(Release 4)*
    REL-5 *(Release 5)*

Reason for change: ✿	The sender of a message is enabled to assign a value that expresses the priority of the message to that message itself. This information may be conveyed within the submit request (MM1_submit.REQ) and the retrieve response (MM1_retrieve.RES). In consequence the priority of the message will be unknown to the recipient until the retrieval of the message. In order to enable the recipient to take the priority (importance) of the message into account when making his decision whether to download a message or not, the priority information should be added to the notification message (MM1_notification.REQ) optionally. This CR proposes to add the information element called "priority" to the MM1_notification.REQ message.
Summary of change: ✿	Introduction of a new information element containg the priority of a message to the notification. The introduction of this new feature requires changes in the technical realisation chapter
Consequences if not approved: ✿	The recipient will only be provided with some basic information about the message to be retrieved within the notification. The priority, assigned to the message by the sender, will not be known to the recipient of the message until he has retrieved the message.

Clauses affected: ✿	8.1.2 Multimedia Message Notification
Other specs affected: ✿	☐ Other core specifications ✿ ☐ Test specifications ☐ O&M Specifications
Other comments: ✿	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

...

8.1.2 Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1 Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2 Abnormal Operation

In this case the MMS UA shall respond with a MM1_notification.RES encapsulating a status which indicates the reason the notification could not be processed. If the MMS UA does not provide the MM1_notification.RES the MMS Relay/Server should be able to retransmit the notification at a later state.

8.1.2.3 Features

Addressing: The MM originator address may be provided to recipient MMS User Agent in the MM1_notification.REQ.

Time constraints: The recipient MMS User Agent shall be provided a time of expiry of the MM. In case of reply-charging the deadline for the latest time of submission of a reply-MM should be conveyed within the MM1_notification.REQ.

Reply-Charging: In case of reply-charging the MMS Relay/Server may indicate in the MM1_notification.REQ that a reply to the notified original MM is free of charge.

Message class, message size, priority and subject: The MM shall be qualified further by adding a message class and an approximate size to the MM in the MM1_notification.REQ. The MM may be qualified further by adding a priority and/or subject to the MM. Additional qualifiers may be added.

Reporting: If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_notification.REQ. The recipient MMS User Agent may indicate in the MM1_notification.RES that it would not wish a delivery report to be created.

Identification: In case of reply-charging when a reply-MM is notified within the MM1_notification.REQ the MMS Relay/Server should convey the identification of the original MM replied to within the same MM1_notification.REQ.

Message Reference: The recipient MMS Relay/Server shall always provide a reference, e.g., URI, for the MM in the MM1_notification.REQ.

MM Status: The recipient MMS User Agent may indicate in the MM1_notification.RES how it intends the MM to be handled, e.g. the immediate rejection of the MM.

8.1.2.4 Information Elements

Table 5: Information elements in the MM1_notification.REQ.

Information element	Presence	Description
Message class	Mandatory	The class of the MM (e.g., personal, advertisement, information service; default = personal)
Message size	Mandatory	The approximate size of the MM
Time of expiry	Mandatory	The time of expiry for the MM.
Message Reference	Mandatory	a reference, e.g., URI, for the MM
Priority	Optional	The priority (importance) of the message.
Subject	Optional	The title of the whole MM.
Sender address	Optional	The address of the MM originator.
Delivery report	Optional	Request for delivery report
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-ID	Optional	The identification of the original MM replied to if this notification indicates a reply-MM.

Table 6: Information elements in the MM1_notification.RES.

Information element	Presence	Description
MM Status	Optional	The status of the MM's retrieval
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

…

CR-Form-v3

CHANGE REQUEST

⌘	**TS 23.140**	**CR** **012**	⌘ rev	**-**	⌘	Current version:	**4.3.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Detailed Notification
Source:	⌘	T2
Work item code: ⌘	MESS5-MMS	*Date:* ⌘ 29 June 2001
Category:	⌘ **B**	*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:
   F *(essential correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(Addition of feature),*
   C *(Functional modification of feature)*
   D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   REL-4 *(Release 4)*
   REL-5 *(Release 5)*

Reason for change: ⌘	Multimedia messages may contain several elements of different sizes, types and formats. For some reasons a recipient of a message may prefer more detailed information about the elements of a multimedia message before he retrieves that message. One reason might be to have a better basis for the decision whether to retrieve the message or forward or reject it. One additional reason might be that a recipient may wish to download only parts of a message.

The first step towards a more flexible, user oriented approach of handling a message is the extension of the notification to optionally contain detailed information about the elements of the MM. In particular it should be possible to have a description for each message element containing one or more elements of the following list:

• name of the element

• type and format of the element

• size of the element.

This CR proposes to introduce a new information element called " Element-Descriptor " to the definition of the message MM1_notification.REQ which will contain a reference to an element of the MM. This information element additionally may contain one or more of the informations described in the list above (e.g. as parameters) in order to unambiguously be linked to the referenced message element.

The Element-Descriptor may be used for to retrieve a single element or a subset of the message. |
| *Summary of change:* ⌘ | This CR proposes an additional functional element to be included in the MM1_notification.REQ message. |
| *Consequences if* ⌘ | The recipient may only be provided with some basic information included in the |

not approved:	notification before he may retrieve a multimedia message. Information about the contents of the message, the types and sizes of the message elements can not be included in the notification.

Clauses affected:	⌘	8.1.2 Multimedia Message Notification		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

. . .

8.1.2   Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1   Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2   Abnormal Operation

In this case the MMS UA shall respond with a MM1_notification.RES encapsulating a status which indicates the reason the notification could not be processed. If the MMS UA does not provide the MM1_notification.RES the MMS Relay/Server should be able to retransmit the notification at a later state.

8.1.2.3   Features

Addressing: The MM originator address may be provided to recipient MMS User Agent in the MM1_notification.REQ.

Time constraints: The recipient MMS User Agent shall be provided a time of expiry of the MM. In case of reply-charging the deadline for the latest time of submission of a reply-MM should be conveyed within the MM1_notification.REQ.

Reply-Charging: In case of reply-charging the MMS Relay/Server may indicate in the MM1_notification.REQ that a reply to the notified original MM is free of charge.

Message class, message size and subject: The MM shall be qualified further by adding a message class and an approximate size to the MM in the MM1_notification.REQ. The MM may be qualified further by adding a subject to the MM. Additional qualifiers may be added.

Reporting: If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_notification.REQ. The recipient MMS User Agent may indicate in the MM1_notification.RES that it would not wish a delivery report to be created.

Identification: In case of reply-charging when a reply-MM is notified within the MM1_notification.REQ the MMS Relay/Server should convey the identification of the original MM replied to within the same MM1_notification.REQ.

Message Reference: The recipient MMS Relay/Server shall always provide a reference, e.g., URI, for the MM in the MM1_notification.REQ.

MM Status: The recipient MMS User Agent may indicate in the MM1_notification.RES how it intends the MM to be handled, e.g. the immediate rejection of the MM.

MM element descript~~orion~~: The recipient MMS Relay/Server may provide one or more description(s) of message elements in the MM1_notification.REQ. A description shall contain a reference to the message element, e.g. a URI, an index number etc.. A description of a message element may be further qualified by adding one or more of such parameters as:

- name of the message element
- type and format of the message element
- approximate size of the message element ~~in bytes~~.

8.1.2.4 Information Elements

Table 5: Information elements in the MM1_notification.REQ.

Information element	Presence	Description
Message class	Mandatory	The class of the MM (e.g., personal, advertisement, information service; default = personal)
Message size	Mandatory	The approximate size of the MM
Time of expiry	Mandatory	The time of expiry for the MM.
Message Reference	Mandatory	a reference, e.g., URI, for the MM
Subject	Optional	The title of the whole MM.
Sender address	Optional	The address of the MM originator.
Delivery report	Optional	Request for delivery report
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-ID	Optional	The identification of the original MM replied to if this notification indicates a reply-MM.
Element-Descriptor	Optional	The reference for an element of the MM, which may contain further information about the referenced element of the MM, e.g. the name, the size and/or the type and format of the message element

Table 6: Information elements in the MM1_notification.RES.

Information element	Presence	Description
MM Status	Optional	The status of the MM's retrieval
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.3 Retrieval of Multimedia Message

...

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.140** CR **013** | ⌘ | ev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title: ⌘	Correction to MMS MM4 interface	
Source: ⌘	T2	
Work item code: ⌘	MMS	*Date:* ⌘ 05.09.01
Category: ⌘	**F**	*Release:* ⌘ REL-4

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	Interoperability problems with MM4_Forward.RES if the return address is not defined in a normative way in MM4_Forward.REQ.
Summary of change: ⌘	Clarification for the system address that shall be used in MM4_Forward.REQ and MM4_Forward.RES
Consequences if not approved: ⌘	Interoperability problems with the 3GPP defined inter-Operator connection might arise.

Clauses affected: ⌘	8.4.4.2, 8.4.4.3

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

Other comments: ⌘	

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.4.4.2 MM4_Forward.REQ Header Mappings

The MM4 Forward request header mappings are detailed below.

**Table 28: MM4_Forward.REQ Information Elements to
STD 11 Header Mappings**

Information element	STD 11 Headers
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Recipient(s) address	To:, CC:
Sender address	From:
Content type	Content-Type:
Message class	X-Mms-Message-Class:
Date and time	Date:
Time of Expiry	X-Mms-Expiry:
Delivery report	X-Mms-Delivery-Report:
Priority	X-Mms-Priority:
Sender visibility	X-Mms-Sender-Visibility:
Read reply	X-Mms-Read-Reply:
Subject	Subject:
Acknowledgement Request	X-Mms-Ack-Request:
Content	*<message body>*
-	Sender:
-	X-Mms-Originator-System:
-	Message-ID:

The table above indicates the mappings from MM4_Forward.REQ information elements to the corresponding STD 11 headers.

The MM Message-ID is not directly mapped to a corresponding STD 11 [5] "Message-ID:" header. Each STD 11 message must have a unique message id, which is carried in the "Message-ID:" header.

Content-type maps directly since both are defined as being MIME content types as specified in RFC 2046 [6].

The STD 11 "From:" header is determined by the mail user agent, or, in this case, the MMS User Agent. This corresponds to the MM "Sender address", as set by the MMS User Agent or MMS Relay/Server.

STD 11 messages are required to have a Sender: header that indicates the originator address (as determined by the SMTP "MAIL From" command).

The STD 11 "X-Mms-Originator-System:" header shall be used to indicate the address that the recipient MMS Relay/Server shall use as the recipient address with MM4_Forward.RES.

8.4.4.3 MM4_Forward.RES Header Mappings

The MM4 Forward response information element mappings are detailed in the table below.

The transmission of the Forward Response from the recipient MMS Relay/Server requires a properly addressed STD 11 message. While the addressing of the MM4_Forward.REQ is clearly that of the intended recipients and originator, the MM4_Forward.RES addressing is related to neither the recipients nor the originator of the original MM. Instead, the MM4_Forward.RES addressing is based on special systems addresses. MMS Service Provider should configure appropriate system addresses which will be used as both the recipient and originator of these administrative messages. It is suggested that the administrative addressing be based on the pattern:

> *system-user@mms-relay-host.mmse-domain*.

The STD 11 "To:" header value shall be according to the STD 11 "X-Mms-Originator-System:" header value provided in MM4_Forward.REQ.

**Table 29: MM4_Forward.RES Information Elements to
STD 11 Header Mappings**

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: and To: headers contain system addresses as described above, and do not map to MM4_Forward.RES
information elements. The STD 11 message requires a Date: header, but there currently is no corresponding
MM4_Forward.RES information element.

<div style="text-align:right">*CR-Form-v4*</div>

CHANGE REQUEST

| ⌘ | **23.140 CR 014** | ⌘ | ev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

For HELP on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network **X**

Title: ⌘	Editorial changes	
Source: ⌘	T2	
Work item code: ⌘	MESS5-MMS	*Date:* ⌘ 04.07.2001
Category: ⌘	**D**	*Release:* ⌘ REL5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change: ⌘	1. Chapter 6 and 7 are swapped for better reading 2. MM1 and MM3 are mentioned in chapter 4.3 "Protocol Framework" before they are described in the current chapter 7. 3. The duplicated paragraph in 4.3 and the current 7.2 "Details for implementation of the MM1 transfer protocol using WAP [3] or applications conforming to MExE [4] (e.g. Java and TCP/IP) are elaborated within this specification. The WAP implementation option is described in Annex B.1. Implementations based on applications using MExE may be defined in detail in future releases. Other implementations (e.g. using other standardised Internet protocols) are not defined in this specification in this release" appears now only once in the new chapter 6.3. 4. Short text to describe the interfaces (MM1 to MM7) below the MMS Reference Architecture.
Summary of change: ⌘	1. Changing the order of chapter 6 and 7 2. Moving chapter 4.3 to a new chapter 6.2 3. Removing of duplicated paragraph from 4.3 and the current 7.2. Now only in 6.3 4. Adding a short text to describe the interfaces (MM1 to MM7) below the MMS Reference Architecture.
Consequences if not approved: ⌘	specification unclear to read

Clauses affected: ⌘	4.3, 6.2 (new clause), 6 and 7 swapped

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:

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http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

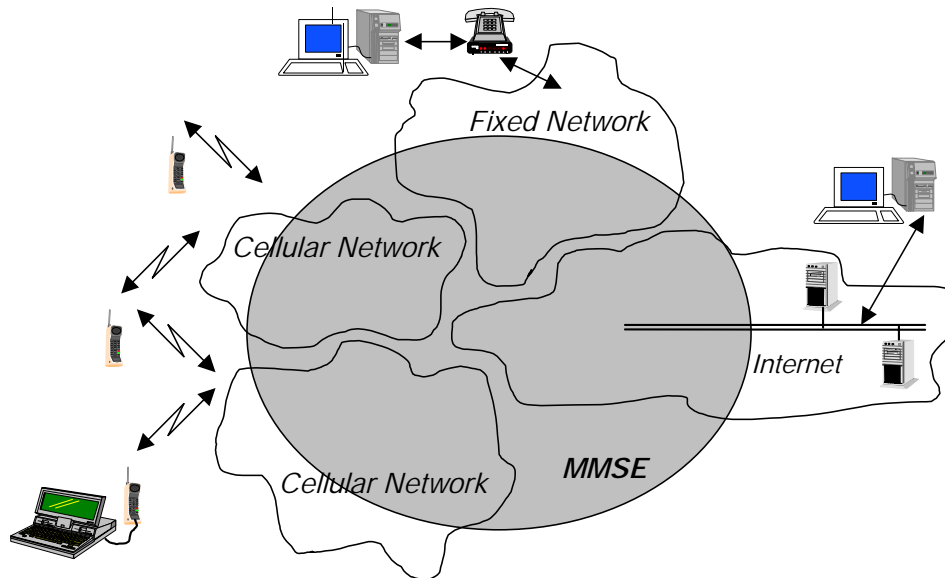# 4 General Architecture

4.1 Overview

Figure 1: General view of MMS provision within the different networks

Figure 1 shows a generalised view of the Multimedia Messaging Service architecture. It shall combine different networks and network types and shall integrate messaging systems already existent within these networks. The terminal operates with the Multimedia Messaging Service Environment, MMSE. This environment may comprise 2G and 3G networks, 3G networks with islands of coverage within a 2G network and roamed networks. The MMSE provides all the necessary service elements, e.g. delivery, storage and notification functionality. These service elements may be located within one network or distributed across several networks or network types.

4.2 Involved MMS Elements

Figure 2 shows that multimedia messaging may encompass many different network types. The basis of connectivity between these different networks shall be provided by the Internet protocol and its associated set of messaging protocols. This approach enables messaging in 2G and 3G wireless networks to be compatible with messaging systems found on the Internet.
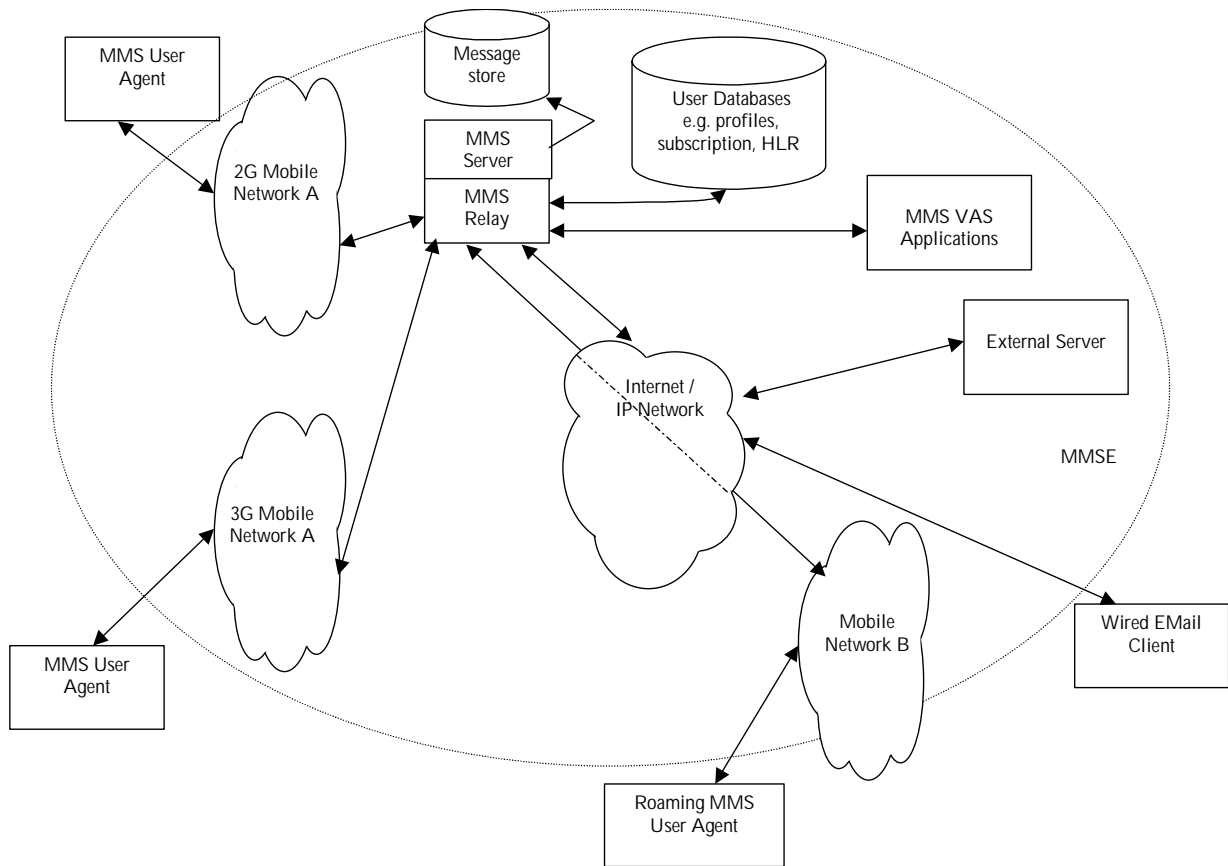

Figure 2: MMS Architectural Elements

MMSNA

The Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user (including interworking between service providers).

MMSE

The MMSE is a collection of MMS-specific network elements under the control of a single administration. In the case of roaming the visited network is considered a part of that user's MMSE. However, subscribers to another service provider are considered to be a part of a separate MMSE.

MMS Relay/Server

The MMS Relay/Server is responsible for storage and handling of incoming and outgoing messages and for the transfer of messages between different messaging systems. Depending on the business model, the MMS Relay/Server may be a single logical element or may be separated into MMS Relay and MMS Server elements. These may be distributed across different domains.

The MMS Relay/Server should be able to generate charging data (Call Data Record - CDR) when receiving MMs from or when delivering MMs to another element of the MMSNA.

MMS User Databases

This element may be comprised of one or more entities that contain user related information such as subscription and configuration (e.g. user profile, HLR).

MMS User Agent

The MMS User Agent resides on a UE, an MS or on an external device connected to a UE/MS. It is an application layer function that provides the users with the ability to view, compose and handle MMs (e.g. submitting, receiving, deleting of MMs).

MMS VAS Applications

The MMS VAS Applications offer Value Added Services to MMS users. There could be several MMS VAS Applications included in or connected to an MMSE. MMS VAS Applications may be able to generate CDRs.
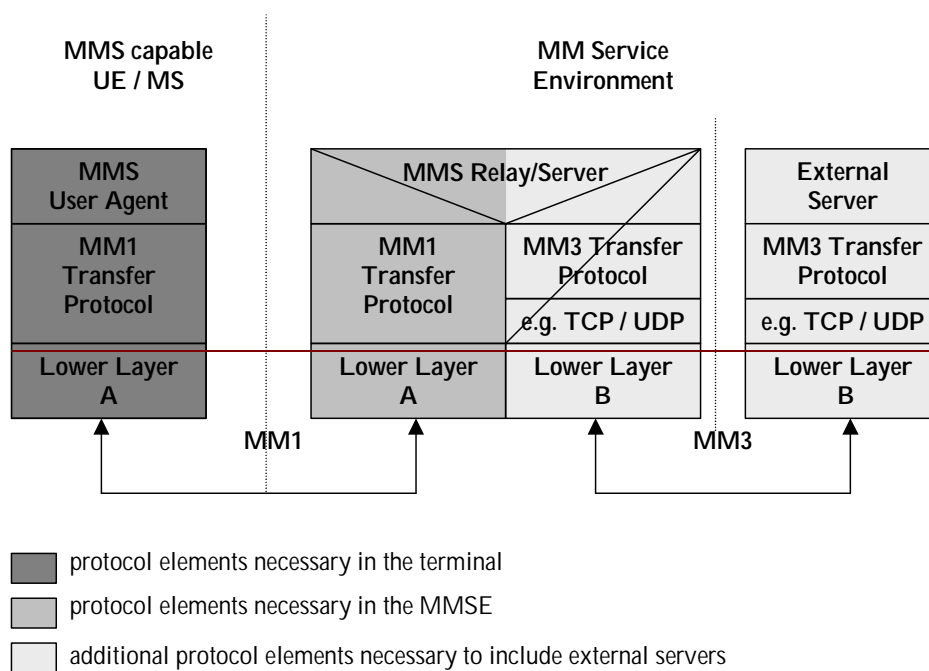
4.3 Protocol Framework

Figure 3: Protocol Framework to provide MMS

To provide implementation flexibility, integration of existing and new services together with interoperability across different networks and terminals, the MMS shall make use of the protocol framework outlined in figure 3. In this framework the MMS User Agent communicates with the MMS Relay/Server, which may communicate with External Servers. This MMS Relay/Server may provide convergence functionality between External Servers and MMS User Agents and thus enables the integration of different server types across different networks.

Details for implementation of the MM1 transfer protocol using WAP [3] or applications conforming to MExE [4] (e.g. Java and TCP/IP) are elaborated within this specification. The WAP implementation option is described in Annex B.1. Implementations based on applications using MExE may be defined in detail in future releases. Other implementations (e.g. using other standardised Internet protocols) are not defined in this specification in this release.

4.34 Addressing

MMS shall support the use of E-Mail addresses (RFC 822) [5] or MSISDN (E.164) or both to address the recipient of an MM. MMS may support the use of service provider specific addresses to address the recipient of an MM. In the case of E-Mail addresses standard internet message routing should be used.

The usage of MSISDN for addressing a recipient in a different MMS service provider's domain shall be possible. For that the need of MSISDN translation to a routable address has been identified. Service provider specific addresses may be used to e.g. deliver messages to MMS VAS Application within one MMSE.

MMS connectivity across different networks (MMSEs) is provided based on Internet protocols. According to this approach, each MMSE should be assigned a unique domain name (e.g. mms.operatora.net).

MMS recipient addresses provided by an MMS User Agent may be in a format of an RFC 822 routable address, e.g. E-Mail address, or other formats, such as E.164 or service provider specific addresses. In those cases where a non-routable address is used to specify a recipient and the recipient belongs to another MMSE or the recipient is outside of any MMSE, it is required to translate the address to an RFC 822 routable address format. It is the sender MMS Relay/Server's responsibility to make this mapping before routing forward the message to the recipient's MMS Relay/Server.

The mapping to the correct recipient's MMS Relay/Server domain name is left for standardisation in future releases. It is expected that ENUM (an IETF global numbering proposal) will be used in future releases as the mechanism to map MSISDN numbers to RFC 822 routable addresses. In the mean time, it is expected that MMS service providers or network operators may use solutions for their particular needs which may include static tables or other look-up methods.

MMS shall support address hiding i.e. anonymous messages where the sender's address is not shown to the recipient MMS User Agent. If the peer entity is not known to be an MMS Relay/Server the originator MMS Relay/Server shall not provide the originator address. If the peer entity is known to be an MMS Relay/Server, both the originator address and request of address hiding shall be forwarded to the recipient MMS Relay/Server. The recipient MMS Relay/Server is responsible not to show the originator address to the recipient MMS User Agent.

5 Functional Description of Involved MMS Elements

5.1 MMS User Agent

5.1.1 MMS User Agent operations

The MMS User Agent shall provide the following application layer functionalities:-

- the MM presentation;

- the presentation of notifications to the user;

- the retrieval of MMs (initiate MM delivery to the MMS User Agent).

The MMS User Agent may provide additional application layer functionalities such as:-

- the MM composition

- the MM submission

- the signing of an MM on an end-user to end-user basis;

- the decryption and encryption of an MM on an end-user to end-user basis;

- all aspects of storing MMs on the terminal and/or USIM;

- the handling of external devices;

- the user profile management.

This optional list of additional functionalities of the MMS User Agent is not exhaustive.

5.1.2 Minimum set of supported formats

Multiple media elements shall be combined into a composite single MM using MIME multipart format as defined in RFC 2046 [6]. The media type of a single MM element shall be identified by its appropriate MIME type whereas the media format shall be indicated by its appropriate MIME subtype.

In order to guarantee a minimum support and compatibility between multimedia messaging capable terminals, the following media and file formats shall be at least supported.

5.1.2.1 Text

Plain text. Any character encoding (charset) that contains a subset of the logical characters in Unicode [7] shall be used (e.g. US-ASCII [8], ISO-8859-1[9], UTF-8[10], Shift_JIS, etc.).

Unrecognised subtypes of "text" shall be treated as subtype "plain" as long as the MIME implementation knows how to handle the charset. Any other unrecognised subtype and unrecognised charset shall be treated as "application/octet - stream".

In order to guarantee SMS interoperability, SMS 3GPP TS 24.011 [11] RP-DATA RPDU encapsulation defined in subclause 7.3.1 shall be supported. MIME type application/x-sms shall be used for this purpose.

   NOTE: SMS MIME type shall be used as soon as the MIME registration has been completed.

5.1.2.2 Speech

MMS User Agents supporting media type Speech shall support AMR [12], organised in the format specified in chapters 6.2 and 6.3 of [39].

5.1.2.3 Still Image

MMS User Agents supporting media type Image shall support Baseline JPEG [17]. The usage of the Baseline JPEG shall follow the technical specifications and the implementation guidelines specified in 26.234 [41].

5.1.2.4 Video

In order to ensure alignment with the codecs specified for Packet Switched Streaming Services [41], ITU-T H.263 baseline [20] shall be supported in MMS User Agents that support media type Video.

5.1.2.5 File Format for dynamic media

To ensure interoperability for the transport of video and associated speech/audio in an MM, the MP4 file format shall be supported. The usage of the MP4 file format shall follow the technical specifications and the implementation guidelines specified in 26.234 [41].

   NOTE: 3GPP TS 26.234 [41] specifies a mechanism for the registration of AMR and H.263 codestreams to be included in MP4 files.

5.1.3 Additional suggested codecs

In order to facilitate interoperability with formats widely used e.g. in the Internet community, the optional support of the additional following codecs is suggested:

Media type Audio:-

        MP3 [14]

        MIDI [15]

        AAC [38]

Media type Image:

        GIF 89a [18]

Media type Video:

        MPEG-4 Visual Simple Profile Level 0 [19] and [16]

H.263 profile 3 level 10, according to [21]

5.2 MMS Relay/Server

The MMS Relay/Server is responsible for storage and handling of messages. It may provide convergence functionality between External Servers and MMS User Agents and thus enable the integration of different server types across different networks. An Example can be found in Annex A.

It should be possible to separate the MMS Relay/Server element into MMS Relay and MMS Server elements, but an allocation of the MMS Relay/Server functionalities to such elements is not defined in this release.

The MMS Relay/Server is responsible for the following functions:-

- receiving and sending MM;
- enabling/disabling MMS function;
- personalising MMS based on user profile information;
- MM deletion based on user profile or filtering information;
- media type conversion;
- media format conversion;
- conversion of messages arriving at the recipient MMS Relay/Server from legacy messaging systems to MM format (e.g. facsimile to MM)
- conversion of MMs leaving the originator MMS Relay/Server to legacy messaging systems to the appropriate message format (e.g. MM to internet email)
- message content retrieval;
- MM forwarding;
- screening of MM;
- negotiation of terminal capabilities;
- checking terminal availability;
- MM notification to the MMS User Agent;
- generating call data records (CDR);
- address translation.
- address hiding
- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency)
- temporary and/or persistent storage of messages
- ensuring that messages are not lost until successfully delivered to another MMSE element
- controlling the reply-charging feature of MMS

5.3 External Servers

Several External Servers may be included within or connected to an MMSE, e.g. E-Mail Server, SMS Server (SMSC), Fax. Convergence functionality between External Servers and MMS User Agents is provided by the MMS Relay/Server which enables the integration of different server types across different networks. Several Examples can be found in Annex A.

5.4 MMS User Databases and HLR

The MMS may have access to several User databases. These may consist of e.g. user profile database, subscription database, HLR.

These User Databases shall provide:-

- MMS user subscription information;

- information for the control of access to the MMS;

- information for the control of the extent of available service capability (e.g. server storage space);

- a set of rules how to handle incoming messages and their delivery;

- information of the current capabilities of the users terminal.

The location of the User Databases and the access to them are outside the scope of this release.

5.5 MMS VAS Applications

The MMS VAS Applications provide value added services to the MMS users. In many ways MMS VAS Applications behave like a fixed MMS User Agent. However, MMS VAS Applications may provide some additional features like MM recall between MMS VAS Applications and MMS Relay/Server which are not available for MMS User Agents.

This specification does not cover what kind of applications might be available and how the MMS VAS Application provide these services.

MMS VAS Applications may be able to generate CDRs when receiving MMs from MMS Relay/Server and when submitting MMs to MMS Relay/Server. The interaction between an MMS Relay/Server and the MMS VAS Application should be provided through the MM7 interface, as described in subclause 7.86.9.

6 MMS Service Behaviour Description

6.1 MMS services offered

6.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.

The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.

If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient

- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message

- Request a read reply report for the message

- Provide a time stamp for the time of submission of the message

- Set the earliest desired time of delivery for the message

- Set the desired time of expiry for the message

- Indicate the address of the MM originator

- Set further message qualifications (e.g. priority, message class, subject)

- Request the MM originator's address being hidden from the recipient MMS User Agent.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification

- is responsible for retaining the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.

- may provide a time stamp, i.e. it may also override the MMS User Agent's time stamp,

- shall insert the originator's address into the MM if not yet provided by the originator MMS User Agent

- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server

- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .

- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent

- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent

- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)

- is responsible for resolving the MM recipient's address(es),

- is responsible to route the MM towards the MM recipients.

- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)

- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)

- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)

- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

6.1.2   Reception of a Multimedia Message in the recipient MMSE

Upon reception of an MM the recipient MMS Relay/Server

- may verify the MM recipient's user profile(s)

- shall store the MM at least until

    - the associated time of expiry is reached,

- the MM is delivered,

- the recipient MMS User Agent requests the MM to be routed forward or

- the MM is rejected.

The term "associated time of expiry " refers to either the desired time of expiry set by the originator MMS User Agent or an MMS Relay/Server time of expiry setting.

- shall generate a notification to the recipient MMS User Agent.

Incoming messages from legacy systems may be expected to be converted to MMs.

6.1.2.1 Multimedia Message Notification

With the MM notification the recipient MMS User Agent shall receive a message reference that can be used for retrieving the MM from the recipient MMS Relay/Server. The message reference that is conveyed in a notification shall at least be valid throughout the message expiry period, till the successful retrieval of the MM or until the MM was rejected.

With the MM notification the recipient MMS User Agent may receive additional information on the MM.

If the originator MMS User Agent has requested address hiding the recipient MMS Relay/Server shall not include the originator address into the MM notification.

In a response to the notification the MMS User Agent shall be able to

- reject the MM or

- retrieve the MM, either immediately or at a later time, either manually or automatically, as possibly determined by the operator configuration and user profile.

6.1.3 Retrieval of a Multimedia Message in the recipient MMSE

The recipient MMS User Agent shall be able to request delivery of an MM from the recipient MMS Relay/Server based on the information received in the notification.

Upon delivery request the recipient MMS Relay/Server

- shall deliver the MM to the recipient MMS User Agent

- may perform data adaptation based on user profile and/or MMS User Agent capabilities

- shall not provide the MM originator address to the MM recipient if the originator MMS User Agent requested its address to be hidden from the MM recipient

- shall provide the MM originator address 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

- may provide 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 or the original message does not contain the originator address

- shall give an indication to the recipient MMS User Agent that a delivery report is requested if such a delivery report has been requested by the originator MMS User Agent

- shall give an indication to the recipient MMS User Agent that a read-reply report is requested if such a read reply report has been requested by the originator MMS User Agent

- shall indicate the MIME content type of the MM to the recipient MMS User Agent

- shall provide other available message qualifications unaltered to the recipient MMS User Agent

- shall provide the time stamp of the MM unaltered to the recipient MMS User Agent

- shall be responsible for the storage of messages in the network 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.

- may provide the recipient MMS User Agent with a count of the number of times that the particular MM was forwarded, if the MM was forwarded and the counter information is available to the recipient MMS Relay/Server.

- should provide 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.

In a response to an MM's delivery the recipient MMS User Agent may be able to

- request a delivery report not to be generated by the MMS Relay/Server.

6.1.4   Forwarding of a Multimedia Message without prior Retrieval

This part of the MMS service describes the mechanism by which an MMS User Agent may request the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

The support for originating a request that a specific MM be forwarded is optional for the MMS User Agent.

The support for forwarding an MM, in response to a request from a MMS User Agent that a specific MM be forwarded is optional for the MMS Relay/Server.

The original MM is forwarded to a new recipient(s) with the forwarding MMS User Agent's address being provided but without additional content, and without affecting the elements of the original MM. Some additional information elements e.g. delivery report, read-reply report, i.e. requests for reports which are to provide feedback on the forwarded MM to the forwarding MMS User Agent, may be supplied.

MM Element Forwarding, where particular elements of an MM are requested to be forwarded, is left for standardisation in future releases.

If a forwarding MMS User Agent supports requesting MM forwarding the MMS User Agent shall:

- indicate the address of the MM recipient(s).

- provide the message reference provided in the MM Notification.

- not generate a read-reply report to the originator MMS User Agent even if a read-reply report is requested.

If a MMS User Agent supports requesting forwarding of MMs the forwarding MMS User Agent may:

- Indicate the address of the Forwarding MMS User Agent (i.e. it's own address)

- Provide a time stamp for the time of submission of the request to forward the MM

- Set the desired time of expiry for the forwarded MM

- Set the earliest desired time of delivery for the forwarded MM

- Request a delivery report for the forwarded MM

- Request a read-reply report for the forwarded MM

Upon reception of a request from a forwarding MMS User Agent to forward an MM, the forwarding MMS Relay/Server

- shall assign a Message Identification to the forwarded MM and immediately provide the forwarding MMS User Agent with this Message Identification

- shall provide status information on the MM forward request to the forwarding MMS User Agent.

- is responsible for retaining the forwarded MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the MMS Relay/Server of the forwarding MMS User Agent. If this feature is not supported then the MM is immediately routed forward.

- may provide a time stamp for the forwarded MM, i.e. it may also override the forwarding MMS User Agent's time stamp,

- shall insert the forwarding MMS User Agent's address into the forwarded MM if not yet provided

- may override the address provided by the forwarding MMS User Agent in the forwarded MM (subject to MMS service provider's preferences)

- is responsible for resolving the recipient's address(es) of the forwarded MM,

- is responsible to route the forwarded MM towards the MM recipients.

- shall pass the indication whether or not a delivery report is requested unaltered when routing the forwarded MM towards the MM recipients.

- shall pass the indication whether or not a read-reply report is requested unaltered when routing the forwarded MM towards the MM recipient(s)

- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the forwarding MMS User Agent and if the peer entity the MM is routed forward to is not known to the MMS Relay/Server of the forwarding MMS User Agent.

- shall provide the recipient(s) MMS Relay/Server with a count of the number of times that the particular MM was forwarded.

- shall provide the recipient(s) MMS Relay/Server with a list of addresses of forwarding MMS User Agents for the MM.

- shall generate a delivery report to the originator MMS User Agent if a delivery report is requested.

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case the MM does not have to be routed forward.

6.1.5 Delivery Report

The MMS Relay/Server shall support the delivery reporting service. Delivery reports shall only be generated for MMs.

The originator MMS User Agent may be able to request a delivery report for a specific MM.

Within an MM notification or upon MM retrieval the recipient MMS User Agent may receive an indication that a delivery report is requested for the MM.

Within either a response to a notification or a response to an MM's delivery, the recipient MMS User Agent may request a delivery report not to be generated by the MMS Relay/Server.

The originator MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent

- upon routing forward the MM, in case the peer entity is not known by the MMS Relay/Server

The recipient MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated

- upon receipt of a response to a notification, in case the MM is rejected by the recipient MMS User Agent

- upon receipt of a forwarding request, in case the MM is forwarded by the recipient MMS User Agent to other MM recipient(s), without prior retrieval.

- upon receipt of a response to an MM's delivery, in case the MM is retrieved by the MM recipient

- upon expiry of the MM, in case the MM is not rejected and not retrieved by the MM recipient before the expiry

The originator MMS User Agent, i.e. the MMS User Agent receiving the delivery report, may match the delivery report to the sent MM by retaining the message identification of the sent MM and comparing it to the received delivery report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for

the originator MMS User Agent to retain the MM recipient addresses as well, to match the delivery report to the sent MM.

If a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated, the recipient MMS Relay/Server

- shall generate the delivery report

- shall deliver the delivery report to the originator MMS Relay/Server.

- shall be responsible for the storage of delivery reports in the network until the originator MMS Relay/Server becomes reachable or until the delivery report expires

Within the delivery report the recipient MMS Relay/Server

- shall provide the MM originator address to the originator MMS Relay/Server.

- shall provide the MM recipient address to the originator MMS Relay/Server.

- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS Relay/Server.

- shall provide status information how the MM was handled (e.g. expired, rejected, delivered, forwarded or indeterminate) to the originator MMS Relay/Server

- shall provide a time stamp when the MM was handled to the originator MMS Relay/Server

For each MM recipient of the original MM for which the delivery report has been generated and becomes available at the originator MMS Relay/Server, the originator MMS Relay/Server

- shall deliver the delivery report to the originator MMS User Agent (i.e. the recipient MMS User Agent of the delivery report).

Within the delivery report the originator MMS Relay/Server

- shall provide the MM recipient's address to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).

- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).

- shall be responsible for the storage of delivery reports in the network until the originator MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the delivery report expires

6.1.6 Read-Reply Report

The MMS Relay/Server shall support the read-reply reporting service. Read-reply reports shall only be generated for MMs.

Upon MM submission the originator MMS User Agent may be able to request a read-reply report for a specific MM.

Upon MM retrieval the recipient MMS User Agent may receive an indication that a read-reply report is requested for the MM.

After having handled/rendered the MM the recipient MMS User Agent may generate a read-reply report if requested by the originator MMS User Agent and if the originator MMS User Agent address is available.

The originator MMS User Agent, i.e. the MMS User Agent receiving the read-reply report, may match the read-reply report to the sent MM by retaining the message identification of the sent MM and comparing it to the received read-reply report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent to retain the MM recipient addresses as well as to match the read-reply report to the sent MM.

If a read-reply report has been requested by the originator MMS User Agent and if the recipient MMS User Agent supports the read-reply feature and if the recipient allows its creation the recipient MMS User Agent shall submit the read-reply report to the recipient MMS Relay/Server at the earliest opportunity.

NOTE: Since the MM recipient has the right to deny this service not receiving a read-reply report does not mean the message has not been rendered.

A read-reply report:

- shall contain the MM originator's address

- shall contain the MM recipient's address

- shall contain the message identification of the original MM for which the read-reply report has been generated.

- shall provide status information how the MM was rendered (e.g. read, deleted without being read)

- shall provide a time stamp for when the MM was rendered

The recipient MMS User Agent shall be responsible for the storage of read-reply reports in the UE until the recipient MMS Relay/Server becomes reachable (subject to support of the read-reply reporting service by the recipient MMS User Agent and storage place being available).

Upon reception of a read-reply report from a recipient MMS User Agent the recipient MMS Relay/Server

- may provide a time stamp for the read-reply report, i.e. it may also override the MMS User Agent's time stamp,

- shall pass the MM originator address unaltered when routing the read-reply report towards the originator MMS User Agent (the recipient MMS User Agent of the read reply report)

- shall insert the MM recipient's address into the read-reply report if not yet provided

- may override the address provided by the recipient MMS User Agent in the read-reply report (subject to MMS service provider's preferences)

- is responsible for resolving the MM originator's address,

- is responsible to route the read-reply report towards the originator MMS User Agent of the original MM.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

6.1.7   Support for Streaming in MMS

This section defines the service behaviour specific to support for streaming in MMS. The term "According to the normal MMS framework.." indicates those paragraphs which are not specific to streaming but described elsewhere in subclause 6.

MMS supports streaming for the retrieval of MM contents (one or more MM elements). The use of streaming for the retrieval of MM contents is independent of the MM submission. The retrieval of MM contents to the recipient MMS User Agent depends on the configuration and the capability of the recipient MMS User Agent and the recipient MMS Relay/Server. MM contents may be either delivered as non-streaming MM elements, or made available for streaming retrieval. The recipient MMS Relay/Server decides whether to use streaming based on the media type and the media format of the subjected MM contents, capability negotiation and/or user settings/preferences. The recipient MMS Relay/Server may convert media types and/or formats of MM contents to make it available for streaming retrieval. If streaming retrieval is used, the streaming-specific protocols, codecs, presentation, session negotiation and control are according to [40] and [41].

According to the normal MMS framework, the recipient MMS Relay/Server shall generate a notification which contains information to enable the recipient MMS User Agent to request for the delivery of the corresponding MM

Upon delivery request, the recipient MMS Relay/Server shall deliver a modified MM with one or several presentation descriptions, as one or several MM elements, in place of the corresponding streamable MM contents to the recipient MMS User Agent, if it has made the MM contents available for streaming retrieval. The format of the presentation

description is as defined in [41]. MIME type of the format of the presentation description shall be used to indicate the content type of the MM elements, which contain the corresponding presentation description. The presentation description carries all required information to initiate the streaming process by the recipient MMS User Agent in order to retrieve the streamable MM content.

According to the normal MMS framework, the recipient MMS Relay/server shall base the generation of a delivery report on the receipt of a response to the delivery of the modified MM from the recipient MMS User Agent.

After the successful reception of the MM, which includes the presentation description, the recipient MMS User Agent may initiate a streaming process to retrieve the streamable MM contents depending on the information in the presentation description. According to the normal MMS framework, the recipient MMS User Agent may base the generation of a read-reply report either on the rendering/handling of the modified MM, or on the rendering/handling of the streamable MM contents.

6.1.8 Support for Prepaid Service in MMS

An MMS Relay/Server may support the prepaid concept. A prepaid customer may be charged for submitting or retrieving MMs/abstract messages.

In the submission case the originator MMS Relay/Server may first ascertain that the originator of the MM/abstract message is a prepaid customer. The MMS Relay/Server may then initiate a credit check and further processing of the MM/abstract message is put on hold. In the case the customers credit is insufficient for submitting this particular MM/abstract message the originator MMS Relay/Server may reject it. The check may be based on several criteria like:

- size of the MM

- content type

- settings of information elements

- type of the abstract message

In case an MM/abstract message can not be accepted, the originator MMS Relay/Server shall respond with an appropriate status value to the submit request. The MMS User Agent should bring this information to the user's attention.

In case an MM/abstract message is accepted it is further processed by the MMS Relay/Server.

In the retrieving case the recipient MMS Relay/Server may first ascertain that the recipient of the MM/abstract message is a prepaid customer. The MMS Relay/Server may then initiate a credit check for the particular customer. The check may be performed at the time the MM/abstract message arrives at the recipient MMS Relay/Server. Based on the result the MMS Relay/Server may reject or accept the MM/abstract message. If the MM/abstract message was accepted (with or without previous check) the MMS Relay/Server may perform a credit check at the time the MMS User Agent sends a retrieve request. The check may be based on several criteria as in the sending case.

In case an MM/abstract message can not be retrieved because the customers account balance is too low, the recipient MMS Relay/Server may respond with an appropriate status value to the retrieve request. The MMS User Agent should bring this information to the user's attention.

Otherwise the MM/abstract message is delivered to the MMS User Agent.

6.1.9 Address Hiding in MMS

If the originator's MMS Relay/Server does not allow address hiding (anonymous messages) (e.g. legislation does not permit anonymous messages) the message shall be rejected upon submission and the originator's MMS Relay/Server shall return an error information to the originator MMS User Agent.

In the case of originator's MMS Relay/Server rejects the message because it does not allow address hiding the rejection information shall be delivered in a submit response together with optional status text.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has requested a delivery report, then the recipient MMS Relay/Server shall inform the originator of the message rejection within the delivery report.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has not requested a delivery report, then the originator MMS Relay/Server may inform the MM originator by generating a new MM which is sent back to the MM originator.

The originator MMS Relay/Server may have the possibility to override the originator's requirement of address hiding without informing the originator.

Independent of whether or not the originator's address is shown or hidden to the recipient, the originator may be able to ask for a delivery report to an MM and also receive the delivery report according to the normal behaviour of the MMS framework.

If the originator MMS User Agent has requested both its address to be hidden and a read-reply report the originator MMS User Agent might not receive the read-reply report.

If the recipient forwards the MM outside the MMSE and the peer entity is unknown to the forwarding MMS Relay/Server the recipient MMS Relay/Server shall not transfer the originator's address but replace it with either appropriate coded address or leave the originator address field blank.

6.1.10 Support for Reply-Charging in MMS

The MMS User Agent may support reply-charging. If the MMS User Agent supports this feature it is expected that the MMS User Agent supports the following behaviour.

The MMS Relay/Server may support reply-charging. If the MMS Relay/Server supports this feature it is expected that the MMS Relay/Server supports the following behaviour.

A User of the MMS may be able to take over the charge for the sending of a reply-MM to their submitted MM from the recipient(s). Therefore the originator of an MM should be able to mark the MM as reply-charged. The originator's MMS Relay/Server could either accept the user's settings for reply-charging or not and should be able to convey feedback to the originator. It should be possible to take over the charge for reply-MMs from different recipients.

The recipient should be notified that the originator is willing to pay for a reply-MM to this particular MM. However, the indication of reply-charging covers only the willingness to pay for a reply-MM to an original MM, not for the retrieval of the original MM marked as reply-charged. Both the originator and the recipient MMS Relay/Server shall be able to control that not more than one reply-MM per recipient is charged to the originator. The MMS User Agent may indicate to the user if an MM has already been replied to.

The request for reply-charging shall not be passed on to the recipient

 if the recipient is not known to belong to an MMSE peer entity or

 in the case the MM is forwarded.

NOTE: For this release the following limitations apply: Support for reply-charging in MMS is restricted to MMS User Agents belonging to the same MMSE, i.e. originator and recipient MMSE are identical. Reply-charging allows only one reply-MM per recipient, i.e. reply-charging applies to the first successful submission of an MM sent as a reply. Furthermore, a reply-MM is restricted to text only. These limitations may be elaborated further in future releases.

In addition to the service behaviour described in previous sections the following behaviour is expected to support reply-charging in MMS.

Within the submission of an MM the MM originator may indicate a willingness to pay the charge for one reply-MM per MM recipient. In this case the originator MMS User Agent:

 shall indicate the sender's willingness to pay the charge for one reply-MM per MM recipient

 may define a reply-charging limitation request (e.g. may specify the latest time of submission of the reply-MMs or a maximum size of reply-MMs)

In a response to the MM submission the originator MMS Relay/Server shall inform the originator MMS User Agent whether or not it accepts

- the originator's request for reply-charging in the original MM

- the reply-charging limitations set by the originator MMS User Agent in the original MM

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- may provide reply-charging limitations, i.e. it may also override the MMS User Agent's reply-charging limitations

- shall pass the indication whether or not a reply-MM is requested unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

- shall pass the latest time of submission for the reply-MM unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

If the MM recipient has requested the original MM to be forwarded to some other address the recipient MMS Relay/Server

- shall not pass any information about the reply-charging request towards the addressee(s) of the forwarding request

If reply-charging has been requested by the MM originator the recipient MMS Relay/Server should inform the recipient MMS User Agent with the MM notification and upon MM delivery

- that the MM originator is willing to pay for reply-MM to this original MM.

- It may also notify the recipient about the reply-charging limitations set by the orginator (e.g. the latest time of submission of a reply-MM to the original MM).

When a user intends to send a reply-MM to the MM originator the recipient MMS User Agent (which is the originator MMS User Agent of the reply-MM):

- shall mark the MM as a reply-MM.

- shall provide the message-ID of the original MM which it replies to (if it is the reply-MM)

- shall submit the reply-MM to the recipient MMS Relay/Server

- may be able to indicate to the user whether this MM has already been replied to

- may be able to indicate to the user if the reply-charging limitations can not be met

Upon submission the recipient MMS Relay/Server

- shall reject the reply-MM and should convey this information back to the recipient MMS User Agent if the reply-MM does not meet the limitations set by the originator MMS User Agent

- shall be able to uniquely map the reply-MM to the original MM

6.2   MMSE Addressing responsibilities

Address parsing:

MMS Relay/Server should parse the recipient address field provided by the originator MMS User Agent upon MM submission. If an error is found in the address format, an error indication should be sent back to the MMS User Agent in the submit response.

Locating the recipient:

For each recipient that appears in an MM, the MMS Relay/Server shall be able to resolve whether the recipient belongs to the same MMSE, another MMSE or is not known to belong to any MMSE. If the recipient belongs to the same MMSE, the MMS Relay/Server shall notify the recipient of the new MM as described in subclause 6.1.2. If the recipient appears to belong to another MMSE, the MMS Relay/Server has to locate the external recipient's MMSE domain. If the recipient is not known to belong to any MMSE, the MMS Relay/Server shall perform the necessary conversion and route forward the message to the recipient.

6.2.1   Address Formats on MM4

Resolving the recipient's MMSE IP address:

For those recipients that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server has to send the message to the recipient's MMS Relay/Server using the protocol described in subclause 7.7. The MMS Relay/Server has to resolve the recipient's MMS Relay/Server domain name to an IP address, e.g. using DNS, based on the recipient's address. The mapping for the recipient's address to the recipient's MMS Relay/Server if the MM recipient belongs to another MMSE is left for standardisation in future releases. It is expected that ENUM mechanism will be used for this resolution. In the mean time, MMS service providers or network operators may use solutions for their particular needs, which may include static tables or other look-up methods.

Re-formatting the sender's and recipient's address to FQDN format

When delivering a message from an MMSE to another MMSE, both the sender and the recipient addresses shall be extended to include the FQDN to enable transport over SMTP. This FQDN format shall be used in the MM4 reference point. It is required that FQDN format address is used in "MAIL FROM: and "RCPT TO:" commands in SMTP, it is not necessary that the originator's and recipient's addresses in RFC 822 "From:" or "To:" fields are re-formatted to FQDN format.

The encoding of FQDN addressing is defined in Subclause 8.4.5.1.

6.2.2   Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's and the recipient's address could be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The reference point MM1 should support E.164 (MSISDN) and/or RFC822 addressing, and it should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

1) RFC 822 address (FQDN) ["/TYPE=rfc822"]

2) +E.164 ["/TYPE=PLMN"] as [[CC] + NC] + SN

3) Other "/TYPE="

The "/TYPE=" field specifies the address type. When E.164 or RFC822 formats are used the type is optional. The "/TYPE=" convention provides flexibility for future enhancements.

76   MMSE Architecture and Interfaces

This subclause defines the Multimedia Messaging framework. The application protocol framework described by the means of abstract messages and the technical realisation of MMS service features are defined in subclause 8.

~~7~~6.1 MMS Reference Architecture

Figure 4 shows the MMS Reference Architecture and identifies reference points within an MMSNA that are further described below. Abstract messages are indicated in subclause 8 that describe the logical message exchange on these reference points on a high-level basis.
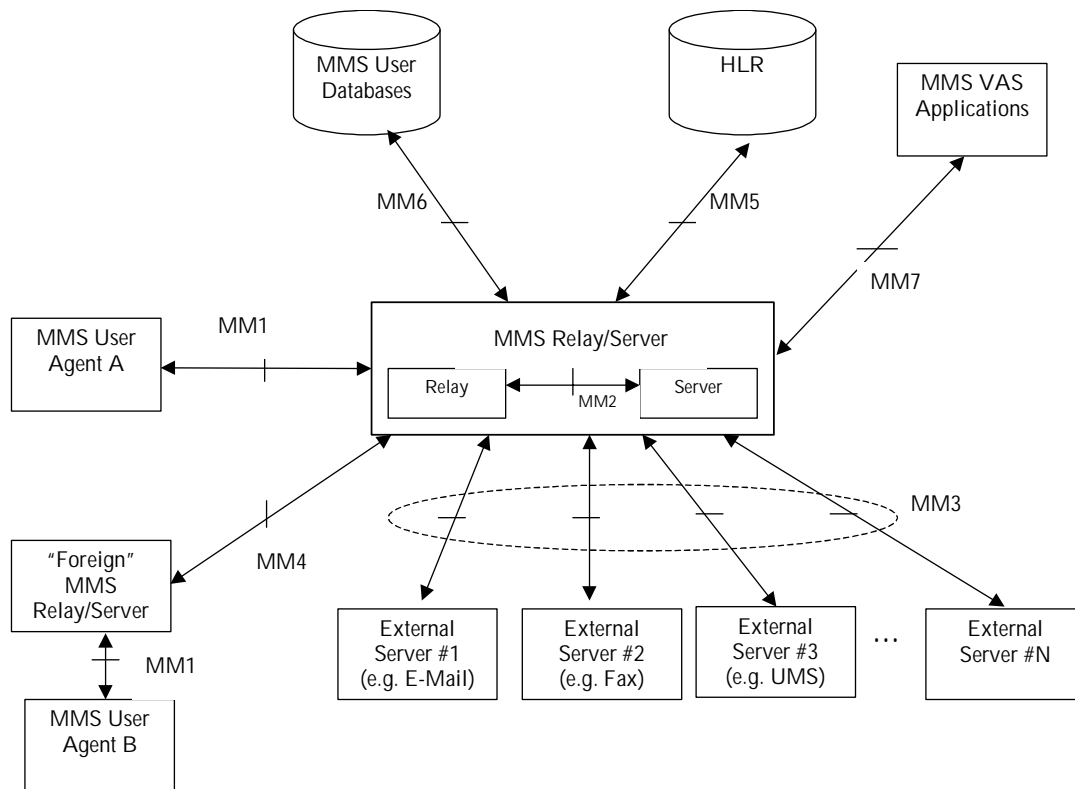
Figure 4: MMS Reference Architecture

The interfaces in the MMS Reference Architecture are:

MM1: The reference point between the MMS User Agent and the MMS Relay/Server.

MM2: The reference point between the MMS Relay and the MMS Server.

MM3: The reference point between the MMS Relay/Server and external (legacy) messaging systems.

MM4: The reference point between the MMS Relay/Server and another MMS Relay/Server that is within another MMSE.

MM5: The reference point between the MMS Relay/Server and the Home Location Register (HLR).

MM6: The reference point between the MMS Relay/Server and the MMS User Databases.

MM7: The reference point between the MMS Relay/Server and MMS VAS Applications.

6.2   Protocol Framework

Figure x: Protocol Framework to provide MMS

To provide implementation flexibility, integration of existing and new services together with interoperability across different networks and terminals, the MMS shall make use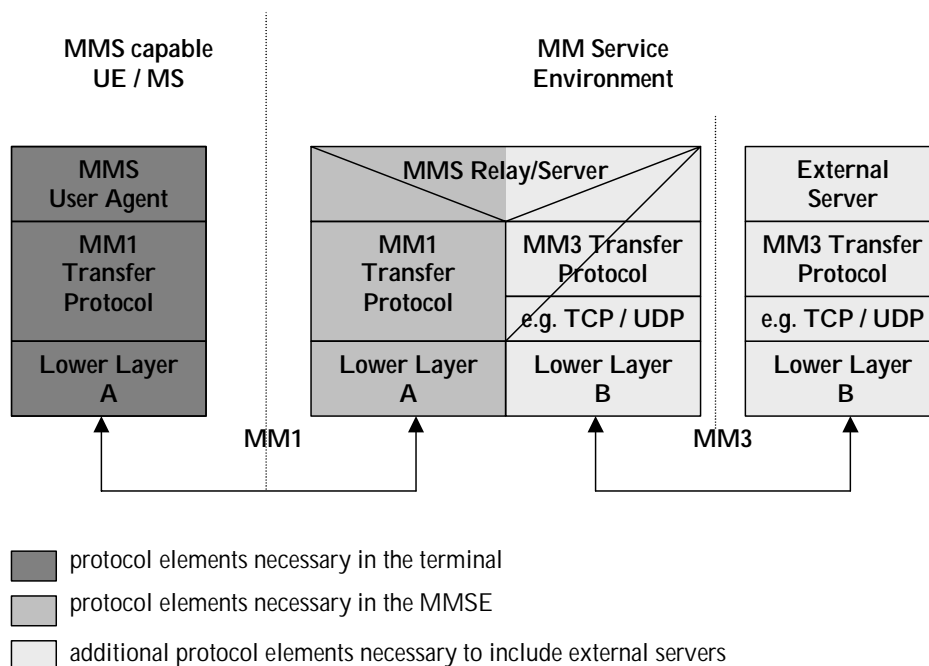 of the protocol framework outlined in figure x. In this framework the MMS User Agent communicates with the MMS Relay/Server, which may communicate with External Servers. This MMS Relay/Server may provide convergence functionality between External Servers and MMS User Agents and thus enables the integration of different server types across different networks.

67.32   MM1: MMS Relay/Server – MMS User Agent

Reference point MM1 is used to submit Multimedia Messages from MMS User Agent to MMS Relay/Server, to let the MMS User Agent pull MMs from the MMS Relay/Server, let the MMS Relay/Server push MMs to the UA and to exchange notifications and delivery reports between MMS Relay/Server and MMS User Agents.

Details for implementation of the MM1 transfer protocol using WAP [3] or applications conforming to MExE [4] (e.g. Java and TCP/IP) are elaborated within this specification. The WAP implementation option is described in Annex B.1. Implementations based on applications using MExE may be defined in detail in future releases. Other implementations (e.g. using other standardised Internet protocols) are not defined in this specification in this release.

67.43   MM2: MMS Relay – MMS Server

This reference point is not specified in this release of this specification. It may be specified in a future release of this specification.

67.54   MM3: MMS Relay/Server – External Servers

Reference point MM3 is used by the MMS Relay/Server to send Multimedia Messages to and retrieve MMs from servers of external (legacy) messaging systems that are connected to the service provider's MMS Relay/Server.

This reference point is further elaborated in subclause 8.3. In addition, several examples of realisations of reference point MM3 between the MMS Relay/Servers and External Servers can be found in Annex A.

6~~7~~.6~~5~~ MM6: MMS Relay/Server – MMS User Databases

This reference point is outside the scope of this release of this specification.

6~~7~~.7~~6~~ MM5: MMS Relay/Server – HLR

Reference point MM5 may be used to provide information to the MMS Relay/Server about the subscriber. If this reference point is provisioned then it shall use existing MAP operations (e.g. procedures for determining the location of the mobile, procedures for alerting SMS service centres). Future releases may elaborate this area further.

In case of using SMS as the bearer for notification this reference point is not necessary.

6~~7~~.8~~7~~ MM4: Interworking of different MMSEs

Reference point MM4 between MMS Relay/Servers belonging to different MMSEs is used to transfer messages between them. Interworking between MMS Relay/Servers shall be based on SMTP according to STD 10 (RFC 821) [22] as depicted in figure 5.
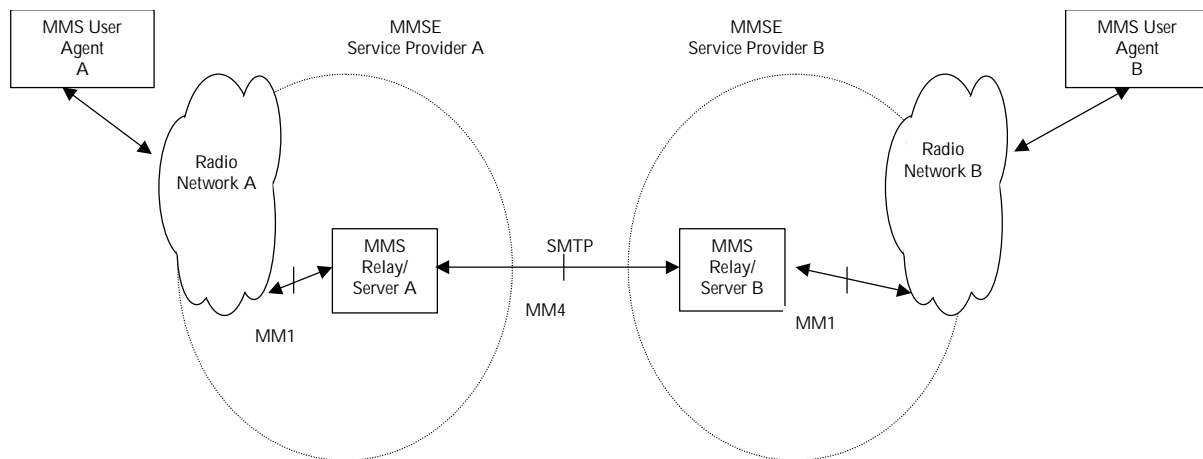
Figure 5: Interworking of different MMSEs

Interworking between different MMS service providers is further elaborated in subclause 8.4.

6~~7~~.9~~8~~ MM7: MMS Relay/Server – MMS VAS Applications

Reference point MM7 is used to transfer MMs from MMS Relay/Server to MMS VAS applications and to transfer MMs from MMS VAS applications to MMS Relay/Server. This reference point shall be based on existing protocols e.g. SMTP or HTTP for this release of the specification. Future releases may propose a mandatory protocol and encoding schemes. The service provider may decide to use an encoding format in this reference point, which uses the encoding implementation used in the MM1 reference point.

7 MMS Service Behaviour Description

7.1 MMS services offered

7.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.

The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.

If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient

- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message

- Request a read-reply report for the message

- Provide a time stamp for the time of submission of the message

- Set the earliest desired time of delivery for the message

- Set the desired time of expiry for the message

- Indicate the address of the MM originator

- Set further message qualifications (e.g. priority, message class, subject)

- Request the MM originator's address being hidden from the recipient MMS User Agent.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification

- is responsible for retaining the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.

- may provide a time stamp, i.e. it may also override the MMS User Agent's time stamp,

- shall insert the originator's address into the MM if not yet provided by the originator MMS User Agent

- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server

- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .

- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent

- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent

- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)

- is responsible for resolving the MM recipient's address(es),

- is responsible to route the MM towards the MM recipients.

- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)

- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)

- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)

- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.2   Reception of a Multimedia Message in the recipient MMSE

Upon reception of an MM the recipient MMS Relay/Server

- may verify the MM recipient's user profile(s)

- shall store the MM at least until

    - the associated time of expiry is reached,

    - the MM is delivered,

    - the recipient MMS User Agent requests the MM to be routed forward or

    - the MM is rejected.

The term "associated time of expiry " refers to either the desired time of expiry set by the originator MMS User Agent or an MMS Relay/Server time of expiry setting.

- shall generate a notification to the recipient MMS User Agent.

Incoming messages from legacy systems may be expected to be converted to MMs.

7.1.2.1   Multimedia Message Notification

With the MM notification the recipient MMS User Agent shall receive a message reference that can be used for retrieving the MM from the recipient MMS Relay/Server. The message reference that is conveyed in a notification shall at least be valid throughout the message expiry period, till the successful retrieval of the MM or until the MM was rejected.

With the MM notification the recipient MMS User Agent may receive additional information on the MM.

If the originator MMS User Agent has requested address hiding the recipient MMS Relay/Server shall not include the originator address into the MM notification.

In a response to the notification the MMS User Agent shall be able to

- reject the MM or

- retrieve the MM, either immediately or at a later time, either manually or automatically, as possibly determined by the operator configuration and user profile.

7.1.3   Retrieval of a Multimedia Message in the recipient MMSE

The recipient MMS User Agent shall be able to request delivery of an MM from the recipient MMS Relay/Server based on the information received in the notification.

Upon delivery request the recipient MMS Relay/Server

- shall deliver the MM to the recipient MMS User Agent

- may perform data adaptation based on user profile and/or MMS User Agent capabilities

- shall not provide the MM originator address to the MM recipient if the originator MMS User Agent requested its address to be hidden from the MM recipient

- shall provide the MM originator address 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

- may provide 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 or the original message does not contain the originator address

- shall give an indication to the recipient MMS User Agent that a delivery report is requested if such a delivery report has been requested by the originator MMS User Agent

- shall give an indication to the recipient MMS User Agent that a read-reply report is requested if such a read reply report has been requested by the originator MMS User Agent

- shall indicate the MIME content type of the MM to the recipient MMS User Agent

- shall provide other available message qualifications unaltered to the recipient MMS User Agent

- shall provide the time stamp of the MM unaltered to the recipient MMS User Agent

- shall be responsible for the storage of messages in the network 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.

- may provide the recipient MMS User Agent with a count of the number of times that the particular MM was forwarded, if the MM was forwarded and the counter information is available to the recipient MMS Relay/Server.

- should provide 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.

In a response to an MM's delivery the recipient MMS User Agent may be able to

- request a delivery report not to be generated by the MMS Relay/Server.

7.1.4 Forwarding of a Multimedia Message without prior Retrieval

This part of the MMS service describes the mechanism by which an MMS User Agent may request the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

The support for originating a request that a specific MM be forwarded is optional for the MMS User Agent.

The support for forwarding an MM, in response to a request from a MMS User Agent that a specific MM be forwarded is optional for the MMS Relay/Server.

The original MM is forwarded to a new recipient(s) with the forwarding MMS User Agent's address being provided but without additional content, and without affecting the elements of the original MM. Some additional information elements e.g. delivery report, read-reply report, i.e. requests for reports which are to provide feedback on the forwarded MM to the forwarding MMS User Agent, may be supplied.

MM Element Forwarding, where particular elements of an MM are requested to be forwarded, is left for standardisation in future releases.

If a forwarding MMS User Agent supports requesting MM forwarding the MMS User Agent shall:

- indicate the address of the MM recipient(s).

- provide the message reference provided in the MM Notification.

- not generate a read-reply report to the originator MMS User Agent even if a read-reply report is requested.

If a MMS User Agent supports requesting forwarding of MMs the forwarding MMS User Agent may:

- Indicate the address of the Forwarding MMS User Agent (i.e. it's own address)

- Provide a time stamp for the time of submission of the request to forward the MM

- Set the desired time of expiry for the forwarded MM

- Set the earliest desired time of delivery for the forwarded MM

- Request a delivery report for the forwarded MM

- Request a read-reply report for the forwarded MM

Upon reception of a request from a forwarding MMS User Agent to forward an MM, the forwarding MMS Relay/Server

- shall assign a Message Identification to the forwarded MM and immediately provide the forwarding MMS User Agent with this Message Identification

- shall provide status information on the MM forward request to the forwarding MMS User Agent.

- is responsible for retaining the forwarded MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the MMS Relay/Server of the forwarding MMS User Agent. If this feature is not supported then the MM is immediately routed forward.

- may provide a time stamp for the forwarded MM, i.e. it may also override the forwarding MMS User Agent's time stamp,

- shall insert the forwarding MMS User Agent's address into the forwarded MM if not yet provided

- may override the address provided by the forwarding MMS User Agent in the forwarded MM (subject to MMS service provider's preferences)

- is responsible for resolving the recipient's address(es) of the forwarded MM,

- is responsible to route the forwarded MM towards the MM recipients.

- shall pass the indication whether or not a delivery report is requested unaltered when routing the forwarded MM towards the MM recipients.

- shall pass the indication whether or not a read-reply report is requested unaltered when routing the forwarded MM towards the MM recipient(s)

- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the forwarding MMS User Agent and if the peer entity the MM is routed forward to is not known to the MMS Relay/Server of the forwarding MMS User Agent.

- shall provide the recipient(s) MMS Relay/Server with a count of the number of times that the particular MM was forwarded.

- shall provide the recipient(s) MMS Relay/Server with a list of addresses of forwarding MMS User Agents for the MM.

- shall generate a delivery report to the originator MMS User Agent if a delivery report is requested.

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.5   Delivery Report

The MMS Relay/Server shall support the delivery reporting service. Delivery reports shall only be generated for MMs.

The originator MMS User Agent may be able to request a delivery report for a specific MM.

Within an MM notification or upon MM retrieval the recipient MMS User Agent may receive an indication that a delivery report is requested for the MM.

Within either a response to a notification or a response to an MM's delivery, the recipient MMS User Agent may request a delivery report not to be generated by the MMS Relay/Server.

The originator MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent

- upon routing forward the MM, in case the peer entity is not known by the MMS Relay/Server

The recipient MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated

- upon receipt of a response to a notification, in case the MM is rejected by the recipient MMS User Agent

- upon receipt of a forwarding request, in case the MM is forwarded by the recipient MMS User Agent to other MM recipient(s), without prior retrieval.

- upon receipt of a response to an MM's delivery, in case the MM is retrieved by the MM recipient

- upon expiry of the MM, in case the MM is not rejected and not retrieved by the MM recipient before the expiry

The originator MMS User Agent, i.e. the MMS User Agent receiving the delivery report, may match the delivery report to the sent MM by retaining the message identification of the sent MM and comparing it to the received delivery report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent to retain the MM recipient addresses as well, to match the delivery report to the sent MM.

If a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated, the recipient MMS Relay/Server

- shall generate the delivery report

- shall deliver the delivery report to the originator MMS Relay/Server.

- shall be responsible for the storage of delivery reports in the network until the originator MMS Relay/Server becomes reachable or until the delivery report expires

Within the delivery report the recipient MMS Relay/Server

- shall provide the MM originator address to the originator MMS Relay/Server.

- shall provide the MM recipient address to the originator MMS Relay/Server.

- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS Relay/Server.

- shall provide status information how the MM was handled (e.g. expired, rejected, delivered, forwarded or indeterminate) to the originator MMS Relay/Server

- shall provide a time stamp when the MM was handled to the originator MMS Relay/Server

For each MM recipient of the original MM for which the delivery report has been generated and becomes available at the originator MMS Relay/Server, the originator MMS Relay/Server

- shall deliver the delivery report to the originator MMS User Agent (i.e. the recipient MMS User Agent of the delivery report).

Within the delivery report the originator MMS Relay/Server

- shall provide the MM recipient's address to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).

- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).

- shall be responsible for the storage of delivery reports in the network until the originator MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the delivery report expires

7.1.6   Read-Reply Report

The MMS Relay/Server shall support the read-reply reporting service. Read-reply reports shall only be generated for MMs.

Upon MM submission the originator MMS User Agent may be able to request a read-reply report for a specific MM.

Upon MM retrieval the recipient MMS User Agent may receive an indication that a read-reply report is requested for the MM.

After having handled/rendered the MM the recipient MMS User Agent may generate a read-reply report if requested by the originator MMS User Agent and if the originator MMS User Agent address is available.

The originator MMS User Agent, i.e. the MMS User Agent receiving the read-reply report, may match the read-reply report to the sent MM by retaining the message identification of the sent MM and comparing it to the received read-reply report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent to retain the MM recipient addresses as well as to match the read-reply report to the sent MM.

If a read-reply report has been requested by the originator MMS User Agent and if the recipient MMS User Agent supports the read-reply feature and if the recipient allows its creation the recipient MMS User Agent shall submit the read-reply report to the recipient MMS Relay/Server at the earliest opportunity.

   NOTE: Since the MM recipient has the right to deny this service not receiving a read-reply report does not mean the message has not been rendered.

A read-reply report:

- shall contain the MM originator's address

- shall contain the MM recipient's address

- shall contain the message identification of the original MM for which the read-reply report has been generated.

- shall provide status information how the MM was rendered (e.g. read, deleted without being read)

- shall provide a time stamp for when the MM was rendered

The recipient MMS User Agent shall be responsible for the storage of read-reply reports in the UE until the recipient MMS Relay/Server becomes reachable (subject to support of the read-reply reporting service by the recipient MMS User Agent and storage place being available).

Upon reception of a read-reply report from a recipient MMS User Agent the recipient MMS Relay/Server

- may provide a time stamp for the read-reply report, i.e. it may also override the MMS User Agent's time stamp,

- shall pass the MM originator address unaltered when routing the read-reply report towards the originator MMS User Agent (the recipient MMS User Agent of the read reply report)

- shall insert the MM recipient's address into the read-reply report if not yet provided

- may override the address provided by the recipient MMS User Agent in the read-reply report (subject to MMS service provider's preferences)

- is responsible for resolving the MM originator's address,

- is responsible to route the read-reply report towards the originator MMS User Agent of the original MM.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.7 Support for Streaming in MMS

This section defines the service behaviour specific to support for streaming in MMS. The term "According to the normal MMS framework.." indicates those paragraphs which are not specific to streaming but described elsewhere in subclause 7.

MMS supports streaming for the retrieval of MM contents (one or more MM elements). The use of streaming for the retrieval of MM contents is independent of the MM submission. The retrieval of MM contents to the recipient MMS User Agent depends on the configuration and the capability of the recipient MMS User Agent and the recipient MMS Relay/Server. MM contents may be either delivered as non-streaming MM elements, or made available for streaming retrieval. The recipient MMS Relay/Server decides whether to use streaming based on the media type and the media format of the subjected MM contents, capability negotiation and/or user settings/preferences. The recipient MMS Relay/Server may convert media types and/or formats of MM contents to make it available for streaming retrieval. If streaming retrieval is used, the streaming-specific protocols, codecs, presentation, session negotiation and control are according to [40] and [41].

According to the normal MMS framework, the recipient MMS Relay/Server shall generate a notification which contains information to enable the recipient MMS User Agent to request for the delivery of the corresponding MM

Upon delivery request, the recipient MMS Relay/Server shall deliver a modified MM with one or several presentation descriptions, as one or several MM elements, in place of the corresponding streamable MM contents to the recipient MMS User Agent, if it has made the MM contents available for streaming retrieval. The format of the presentation description is as defined in [41]. MIME type of the format of the presentation description shall be used to indicate the content type of the MM elements, which contain the corresponding presentation description. The presentation description carries all required information to initiate the streaming process by the recipient MMS User Agent in order to retrieve the streamable MM content.

According to the normal MMS framework, the recipient MMS Relay/server shall base the generation of a delivery report on the receipt of a response to the delivery of the modified MM from the recipient MMS User Agent.

After the successful reception of the MM, which includes the presentation description, the recipient MMS User Agent may initiate a streaming process to retrieve the streamable MM contents depending on the information in the presentation description. According to the normal MMS framework, the recipient MMS User Agent may base the generation of a read-reply report either on the rendering/handling of the modified MM, or on the rendering/handling of the streamable MM contents.

7.1.8 Support for Prepaid Service in MMS

An MMS Relay/Server may support the prepaid concept. A prepaid customer may be charged for submitting or retrieving MMs/abstract messages.

In the submission case the originator MMS Relay/Server may first ascertain that the originator of the MM/abstract message is a prepaid customer. The MMS Relay/Server may then initiate a credit check and further processing of the MM/abstract message is put on hold. In the case the customers credit is insufficient for submitting this particular MM/abstract message the originator MMS Relay/Server may reject it. The check may be based on several criteria like:

- size of the MM

- content type

- settings of information elements

- type of the abstract message

In case an MM/abstract message can not be accepted, the originator MMS Relay/Server shall respond with an appropriate status value to the submit request. The MMS User Agent should bring this information to the user's attention.

In case an MM/abstract message is accepted it is further processed by the MMS Relay/Server.

In the retrieving case the recipient MMS Relay/Server may first ascertain that the recipient of the MM/abstract message is a prepaid customer. The MMS Relay/Server may then initiate a credit check for the particular customer. The check may be performed at the time the MM/abstract message arrives at the recipient MMS Relay/Server. Based on the result the MMS Relay/Server may reject or accept the MM/abstract message. If the MM/abstract message was accepted (with or without previous check) the MMS Relay/Server may perform a credit check at the time the MMS User Agent sends a retrieve request. The check may be based on several criteria as in the sending case.

In case an MM/abstract message can not be retrieved because the customers account balance is too low, the recipient MMS Relay/Server may respond with an appropriate status value to the retrieve request. The MMS User Agent should bring this information to the user's attention.

Otherwise the MM/abstract message is delivered to the MMS User Agent.

7.1.9 Address Hiding in MMS

If the originator's MMS Relay/Server does not allow address hiding (anonymous messages) (e.g. legislation does not permit anonymous messages) the message shall be rejected upon submission and the originator's MMS Relay/Server shall return an error information to the originator MMS User Agent.

In the case of originator's MMS Relay/Server rejects the message because it does not allow address hiding the rejection information shall be delivered in a submit response together with optional status text.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has requested a delivery report, then the recipient MMS Relay/Server shall inform the originator of the message rejection within the delivery report.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has not requested a delivery report, then the originator MMS Relay/Server may inform the MM originator by generating a new MM which is sent back to the MM originator.

The originator MMS Relay/Server may have the possibility to override the originator's requirement of address hiding without informing the originator.

Independent of whether or not the originator's address is shown or hidden to the recipient, the originator may be able to ask for a delivery report to an MM and also receive the delivery report according to the normal behaviour of the MMS framework.

If the originator MMS User Agent has requested both its address to be hidden and a read-reply report the originator MMS User Agent might not receive the read-reply report.

If the recipient forwards the MM outside the MMSE and the peer entity is unknown to the forwarding MMS Relay/Server the recipient MMS Relay/Server shall not transfer the originator's address but replace it with either appropriate coded address or leave the originator address field blank.

7.1.10 Support for Reply-Charging in MMS

The MMS User Agent may support reply-charging. If the MMS User Agent supports this feature it is expected that the MMS User Agent supports the following behaviour.

The MMS Relay/Server may support reply-charging. If the MMS Relay/Server supports this feature it is expected that the MMS Relay/Server supports the following behaviour.

A User of the MMS may be able to take over the charge for the sending of a reply-MM to their submitted MM from the recipient(s). Therefore the originator of an MM should be able to mark the MM as reply-charged. The originator's MMS Relay/Server could either accept the user's settings for reply-charging or not and should be able to convey feedback to the originator. It should be possible to take over the charge for reply-MMs from different recipients.

The recipient should be notified that the originator is willing to pay for a reply-MM to this particular MM. However, the indication of reply-charging covers only the willingness to pay for a reply-MM to an original MM, not for the retrieval of the original MM marked as reply-charged. Both the originator and the recipient MMS Relay/Server shall be able to

control that not more than one reply-MM per recipient is charged to the originator. The MMS User Agent may indicate to the user if an MM has already been replied to.

The request for reply-charging shall not be passed on to the recipient

- if the recipient is not known to belong to an MMSE peer entity or

- in the case the MM is forwarded.

NOTE: For this release the following limitations apply: Support for reply-charging in MMS is restricted to MMS User Agents belonging to the same MMSE, i.e. originator and recipient MMSE are identical. Reply-charging allows only one reply-MM per recipient, i.e. reply-charging applies to the first successful submission of an MM sent as a reply. Furthermore, a reply-MM is restricted to text only. These limitations may be elaborated further in future releases.

In addition to the service behaviour described in previous sections the following behaviour is expected to support reply-charging in MMS.

Within the submission of an MM the MM originator may indicate a willingness to pay the charge for one reply-MM per MM recipient. In this case the originator MMS User Agent:

- shall indicate the sender's willingness to pay the charge for one reply-MM per MM recipient

- may define a reply-charging limitation request (e.g. may specify the latest time of submission of the reply-MMs or a maximum size of reply-MMs)

In a response to the MM submission the originator MMS Relay/Server shall inform the originator MMS User Agent whether or not it accepts

- the originator's request for reply-charging in the original MM

- the reply-charging limitations set by the originator MMS User Agent in the original MM

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- may provide reply-charging limitations, i.e. it may also override the MMS User Agent's reply-charging limitations

- shall pass the indication whether or not a reply-MM is requested unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

- shall pass the latest time of submission for the reply-MM unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

If the MM recipient has requested the original MM to be forwarded to some other address the recipient MMS Relay/Server

- shall not pass any information about the reply-charging request towards the addressee(s) of the forwarding request

If reply-charging has been requested by the MM originator the recipient MMS Relay/Server should inform the recipient MMS User Agent with the MM notification and upon MM delivery

- that the MM originator is willing to pay for reply-MM to this original MM.

- It may also notify the recipient about the reply-charging limitations set by the orginator (e.g. the latest time of submission of a reply-MM to the original MM).

When a user intends to send a reply-MM to the MM originator the recipient MMS User Agent (which is the originator MMS User Agent of the reply-MM):

- shall mark the MM as a reply-MM.

- shall provide the message-ID of the original MM which it replies to (if it is the reply-MM)

- shall submit the reply-MM to the recipient MMS Relay/Server

- may be able to indicate to the user whether this MM has already been replied to

- may be able to indicate to the user if the reply-charging limitations can not be met

Upon submission the recipient MMS Relay/Server

- shall reject the reply-MM and should convey this information back to the recipient MMS User Agent if the reply-MM does not meet the limitations set by the originator MMS User Agent

- shall be able to uniquely map the reply-MM to the original MM

7.2   MMSE Addressing responsibilities

Address parsing:

MMS Relay/Server should parse the recipient address field provided by the originator MMS User Agent upon MM submission. If an error is found in the address format, an error indication should be sent back to the MMS User Agent in the submit response.

Locating the recipient:

For each recipient that appears in an MM, the MMS Relay/Server shall be able to resolve whether the recipient belongs to the same MMSE, another MMSE or is not known to belong to any MMSE. If the recipient belongs to the same MMSE, the MMS Relay/Server shall notify the recipient of the new MM as described in subclause 7.1.2. If the recipient appears to belong to another MMSE, the MMS Relay/Server has to locate the external recipient's MMSE domain. If the recipient is not known to belong to any MMSE, the MMS Relay/Server shall perform the necessary conversion and route forward the message to the recipient.

7.2.1   Address Formats on MM4

Resolving the recipient's MMSE IP address:

For those recipients that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server has to send the message to the recipient's MMS Relay/Server using the protocol described in subclause 7.7. The MMS Relay/Server has to resolve the recipient's MMS Relay/Server domain name to an IP address, e.g. using DNS, based on the recipient's address. The mapping for the recipient's address to the recipient's MMS Relay/Server if the MM recipient belongs to another MMSE is left for standardisation in future releases. It is expected that ENUM mechanism will be used for this resolution. In the mean time, MMS service providers or network operators may use solutions for their particular needs, which may include static tables or other look-up methods.

Re-formatting the sender's and recipient's address to FQDN format

When delivering a message from an MMSE to another MMSE, both the sender and the recipient addresses shall be extended to include the FQDN to enable transport over SMTP. This FQDN format shall be used in the MM4 reference point. It is required that FQDN format address is used in "MAIL FROM: and "RCPT TO:" commands in SMTP, it is not necessary that the originator's and recipient's addresses in RFC 822 "From:" or "To:"–fields are re-formatted to FQDN format.

The encoding of FQDN addressing is defined in Subclause 8.4.5.1.

7.2.2   Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's and the recipient's address could be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The reference point MM1 should support E.164 (MSISDN) and/or RFC822 addressing, and it should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

4)1)RFC 822 address (FQDN) ["/TYPE= rfc822"]

5)2)+E.164 ["/TYPE= PLMN"] as [[CC] + NC] + SN

6)3)Other "/TYPE= "

The "/TYPE= " field specifies the address type. When E.164 or RFC822 formats are used the type is optional. The "/TYPE= " convention provides flexibility for future enhancements.

<table>
<tr><td colspan="9" align="right">CR-Form-v3</td></tr>
<tr><td colspan="9" align="center">CHANGE REQUEST</td></tr>
</table>

| ⌘ | **TS 23.140** | CR | **015** | ⌘ | rev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

For __HELP__ on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	Refinement of the reply-charging service behaviour description	
Source: ⌘	T2	
Work item code: ⌘	MMS	*Date:* ⌘ 22 August 2001
Category: ⌘	F	*Release:* ⌘ REL-4

Use one of the following categories:
    F *(essential correction)*
    A *(corresponds to a correction in an earlier release)*
    B *(Addition of feature),*
    C *(Functional modification of feature)*
    D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
    2   (GSM Phase 2)
    R96 (Release 1996)
    R97 (Release 1997)
    R98 (Release 1998)
    R99 (Release 1999)
    REL-4 (Release 4)
    REL-5 (Release 5)

Reason for change: ⌘	*Two contradictions have been identified in an LS from WAP Forum MMDC:* 1. The MMS Relay/Server may provide and override the reply-charging limitations, but shall pass on the *latest time of submission* for the reply-MM (which is part of the limitations) unaltered. *2.* The *latest time of submission* and the *maximum size of a reply-MM* are mentioned as examples for reply-charging limitations, but there is no information element in any of the abstract messages to specify this maximum size.
Summary of change: ⌘	- minor editorial changes - alignment of information elements for the reply-charging limitation *maximum size of a reply-MM* with the current service behaviour description.
Consequences if not approved: ⌘	The service behaviour description and the technical realisation on MM1 of the reply-charging feature would be inconsistent.

Clauses affected: ⌘	6.1.10 and 8.1
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

…

6.1.10   Support for Reply-Charging in MMS

The MMS User Agent may support reply-charging. If the MMS User Agent supports this feature it is expected that the MMS User Agent supports the following behaviour.

The MMS Relay/Server may support reply-charging. If the MMS Relay/Server supports this feature it is expected that the MMS Relay/Server supports the following behaviour.

A User of the MMS may be able to take over the charge for the sending of a reply-MM to their submitted MM from the recipient(s). Therefore the originator of an MM should be able to mark the MM as reply-charged. The originator's MMS Relay/Server could either accept the user's settings for reply-charging or not and should be able to convey feedback to the originator. It should be possible to take over the charge for reply-MMs from different recipients.

The recipient should be notified that the originator is willing to pay for a reply-MM to this particular MM. However, the indication of reply-charging covers only the willingness to pay for a reply-MM to an original MM, not for the retrieval of the original MM marked as reply-charged. Both the originator and the recipient MMS Relay/Server shall be able to control that not more than one reply-MM per recipient is charged to the originator. The MMS User Agent may indicate to the user if an MM has already been replied to.

The request for reply-charging shall not be passed on to the recipient

- if the recipient is not known to belong to an MMSE peer entity or

- in the case the MM is forwarded.

NOTE: For this release the following limitations apply: Support for reply-charging in MMS is restricted to MMS User Agents belonging to the same MMSE, i.e. originator and recipient MMSE are identical. Reply-charging allows only one reply-MM per recipient, i.e. reply-charging applies to the first successful submission of an MM sent as a reply. Furthermore, a reply-MM is restricted to text only. These limitations may be elaborated further in future releases.

In addition to the service behaviour described in previous sections the following behaviour is expected to support reply-charging in MMS.

Within the submission of an MM the MM originator may indicate a willingness to pay the charge for one reply-MM per MM recipient. In this case the originator MMS User Agent:

- shall indicate the sender's willingness to pay the charge for one reply-MM per MM recipient

- may define a reply-charging limitation request (e.g. may specify the latest time of submission of the reply-MMs or a maximum size of reply-MMs)

In a response to the MM submission the originator MMS Relay/Server shall inform the originator MMS User Agent whether or not it accepts

- the originator's request for reply-charging in the original MM

- the reply-charging limitations set by the originator MMS User Agent in the original MM

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- may provide reply-charging limitations, i.e. it may also override by further limiting the MMS User Agent's settings for reply-charging limitations

- shall pass the indication whether or not a reply-MM is requested unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

- shall pass the reply-charging limitations latest time of submission for the reply-MM unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

If the MM recipient has requested the original MM to be forwarded to some other address the recipient MMS Relay/Server

- shall not pass any information about the reply-charging request towards the addressee(s) of the forwarding request

If reply-charging has been requested by the MM originator the recipient MMS Relay/Server ~~should inform the recipient MMS User Agent with the MM notification and upon MM delivery~~

- ~~that the MM originator is willing to pay for reply-MM to this original MM.~~

- should inform the recipient MMS User Agent with the MM notification and upon MM delivery that the MM originator is willing to pay for a reply-MM to this original MM.

- ~~It~~ may ~~also~~ notify the recipient about the reply-charging limitations set by the orginator (e.g. the latest time of submission of a reply-MM to the original MM).

When a user intends to send a reply-MM to the MM originator the recipient MMS User Agent (which is the originator MMS User Agent of the reply-MM):

- shall mark the MM as a reply-MM.

- shall provide the message-ID of the original MM which it replies to (if it is the reply-MM)

- shall submit the reply-MM to the recipient MMS Relay/Server

- may be able to indicate to the user whether this MM has already been replied to

- may be able to indicate to the user if the reply-charging limitations can not be met

Upon submission the recipient MMS Relay/Server

- shall reject the reply-MM submission attempt and should convey this information back to the recipient MMS User Agent if the reply-MM submission attempt does not meet the limitations set by the originator MMS User Agent

- shall be able to uniquely map the reply-MM to the original MM

6.2 MMSE Addressing responsibilities

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8.1 Technical realisation of MMS on reference point MM1

8.1.1 Submission of Multimedia Message

This part of MMS service covers the submission of an MM. For sending purposes a terminal-originated MM shall always be submitted from the originator MMS User Agent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in Table 1 from type and direction points of view.

Table 1: Abstract messages for submission of MM in MMS

Abstract messages	Type	Direction
MM1_submit.REQ	Request	MMS UA -> MMS Relay/Server
MM1_submit.RES	Response	MMS Relay/Server -> MMS UA

8.1.1.1   Normal operation

The originator MMS User Agent shall submit a terminal-originated MM to the originator MMS Relay/Server using the MM1_submit.REQ, which contains MMS control information and the MM content. The MMS Relay/Server shall respond with an MM1_submit.RES, which provides the status of the request. The MM1_submit.RES shall unambiguously refer to the corresponding MM1_submit.REQ.

Support for MM1_submit.REQ is optional for the MMS UA, support for MM1_submit.RES is mandatory for the MMS Relay/Server.

8.1.1.2   Abnormal Operation

In this case the originator MMS Relay/Server shall respond with a MM1_submit.RES encapsulating a status which indicates the reason the multimedia message was not accepted, e.g. no subscription, corrupt message structure, service not available.

If the MMS Relay/Server does not provide the MM1_submit.RES the MMS User Agent should be able to recover.

8.1.1.3   Features

Addressing: One or several MM recipients of a submitted MM shall be indicated in the addressing-relevant information field(s) of the MM1_submit.REQ. The originator of a submitted MM may be indicated in addressing-relevant information field(s) of the MM1_submit.REQ. The originator MMS User Agent may request to hide its identity from the MM recipient.

Time stamping: The originator MMS User Agent may time stamp the MM.

Time constraints: The originator MMS User Agent may also request an earliest desired time of delivery of the MM. The originator MMS User Agent may request a time of expiry for the MM. In case of reply-charging the originator MMS User Agent may also request a deadline for the latest time of submission of reply-MMs granted to the recipient(s).

Reply-Charging: The originator MMS User Agent may indicate that the sender wants to pay for a reply-MM *and convey the reply-charging limitations (e.g. the latest time of submission and/or the maximum size of a reply-MM)* in the MM1_submit.REQ.

Message class, priority and subject: The MM may be qualified further by adding a message class, priority and/or subject to the MM in the MM1_submit.REQ. Additional qualifiers may be added.

Reporting: The originator MMS User Agent may request a delivery report for the MM. In addition, the originator MMS User Agent may request a read-reply report when the user has viewed the MM.

Identification: The originator MMS Relay/Server shall always provide a message identification for an MM, which it has accepted for submission in the MM1_submit.RES. In case of reply-charging the MMS User Agent which submits a reply-MM (i.e. the MMS User Agent that received the original MM) shall provide the message-ID of the original MM which it replies to in the MM1_submit.REQ.

Content Type: The MIME type of the multimedia content shall always be identified in the MM1_submit.REQ.

Content: The originator MMS User Agent may add content in the MM1_submit.REQ.

Request Status: The originator MMS Relay/Server shall indicate the status of the MM1_submit.REQ in the associated MM1_submit.RES. The reason code given in the status information element of the MM1_submit.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.1.4 Information Elements

Table 2: Information elements in the MM1_submit.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the recipient MMS User Agent. Multiple addresses are possible.
Content type	Mandatory	The content type of the MM's content.
Sender address	Optional	The address of the MM originator.
Message class	Optional	The class of the MM (e.g., personal, advertisement, information service)
Date and time	Optional	The time and date of the submission of the MM (time stamp).
Time of Expiry	Optional	The desired time of expiry for the MM or reply-MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Delivery report	Optional	A request for delivery report.
Reply-Charging	Optional	A request for reply-charging.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of replies granted to the recipient(s).
Reply-Charging-Size	Optional	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s).
Priority	Optional	The priority (importance) of the message.
Sender visibility	Optional	A request to show or hide the sender's identity when the message is delivered to the recipient.
Read reply	Optional	A request for read reply report.
Subject	Optional	The title of the whole multimedia message.
Reply-Charging-ID	Optional	In case of reply-charging when the reply-MM is submitted within the MM1_submit.REQ this is the identification of the original MM that is replied to.
Content	Optional	The content of the multimedia message

Table 3: Information elements in the MM1_submit.RES.

Information element	Presence	Description
Request Status	Mandatory	The status of the MM submit request.
Request Status Text	Optional	Description which qualifies the status of the MM submit request.
Message ID	Mandatory	The identification of the MM given to an accepted MM.

8.1.2 Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1 Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2 Abnormal Operation

In this case the MMS UA shall respond with a MM1_notification.RES encapsulating a status which indicates the reason the notification could not be processed. If the MMS UA does not provide the MM1_notification.RES the MMS Relay/Server should be able to retransmit the notification at a later state.

8.1.2.3 Features

Addressing: The MM originator address may be provided to recipient MMS User Agent in the MM1_notification.REQ.

Time constraints: The recipient MMS User Agent shall be provided a time of expiry of the MM. In case of reply-charging the deadline for the latest time of submission of a reply-MM should be conveyed within the MM1_notification.REQ.

Reply-Charging: In case of reply-charging the MMS Relay/Server may indicate in the MM1_notification.REQ that a reply to the notified original MM is free of charge and the reply-charging limitations.

Message class, message size and subject: The MM shall be qualified further by adding a message class and an approximate size to the MM in the MM1_notification.REQ. The MM may be qualified further by adding a subject to the MM. Additional qualifiers may be added.

Reporting: If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_notification.REQ. The recipient MMS User Agent may indicate in the MM1_notification.RES that it would not wish a delivery report to be created.

Identification: In case of reply-charging when a reply-MM is notified within the MM1_notification.REQ the MMS Relay/Server should convey the identification of the original MM replied to within the same MM1_notification.REQ.

Message Reference: The recipient MMS Relay/Server shall always provide a reference, e.g., URI, for the MM in the MM1_notification.REQ.

MM Status: The recipient MMS User Agent may indicate in the MM1_notification.RES how it intends the MM to be handled, e.g. the immediate rejection of the MM.

8.1.2.4 Information Elements

Table 5: Information elements in the MM1_notification.REQ.

Information element	Presence	Description
Message class	Mandatory	The class of the MM (e.g., personal, advertisement, information service; default = personal)
Message size	Mandatory	The approximate size of the MM
Time of expiry	Mandatory	The time of expiry for the MM.
Message Reference	Mandatory	a reference, e.g., URI, for the MM
Subject	Optional	The title of the whole MM.
Sender address	Optional	The address of the MM originator.
Delivery report	Optional	Request for delivery report
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Reply-Charging-ID	Optional	The identification of the original MM replied to if this notification indicates a reply-MM.

Information element	Presence	Description
MM Status	Optional	The status of the MM's retrieval
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.3   Retrieval of Multimedia Message

This part of MMS service covers the retrieval of an MM. For retrieval purposes an MM shall always be retrieved by the recipient MMS User Agent from the recipient MMS Relay/Server. Involved abstract messages are outlined in Table 7 from type and direction points of view.

Table 7: Abstract messages for retrieval of MM in MMS

Abstract messages	Type	Direction
MM1_retrieve.REQ	Request	MMS UA -> MMS Relay/Server
MM1_retrieve.RES	Response	MMS Relay/Server -> MMS UA
MM1_acknowledgement.REQ	Request	MMS UA -> MMS Relay/Server

8.1.3.1   Normal Operation

The recipient MMS User Agent shall issue an MM1_retrieve.REQ to the recipient MMS Relay/Server to initiate the retrieval process. The MMS Relay/Server shall respond with an MM1_retrieve.RES, which contains MMs control information and the MM content.

After receiving the MM1_retrieve.RES, the recipient MMS User Agent shall send an MM1_acknowledgement.REQ to the corresponding MMS Relay/Server, if requested by the MMS Relay/Server. The MM1_acknowledgement.REQ shall unambiguously refer to the corresponding MM1_retrieve.RES.

8.1.3.2   Abnormal Operation

If the recipient MMS Relay/Server can not process the MM1_retrieve.REQ, for example due to invalid content location or expiration of the message, the recipient MMS Relay/Server shall respond with either an MM1_retrieve.RES or a lower protocol layer error message encapsulating a status which indicates the reason to the MMS User Agent the multimedia message was not delivered.

If the MMS Relay/Server does not provide the MM1_retrieve.RES or the lower protocol layer error message the MMS User Agent should be able to recover.

8.1.3.3   Features

Message Reference: The recipient MMS User Agent shall always provide a reference, e.g., URI, for the MM in the MM1_retrieve.REQ.

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the addressing-relevant information field of MM1_retrieve.RES. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. One or several address(es) of the MM recipient(s) may be provided to the recipient MMS User Agent in the addressing-relevant information field(s) of the MM1_retrieve.RES.

Time stamping: The MM1_retrieve.RES shall carry the time and date of submission of the MM or the time and date of the forwarding of the MM.

Time constraints: In case of reply-charging the deadline for the latest time of submission of a reply-MM shall be conveyed within the MM1_retrieve.RES.

Message class, priority and subject: Information about class, priority, subject of the MM shall be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server. Information about additional end-to-end qualifiers of the MM should be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server.

Reporting: If the originator MMS User Agent has requested to have a read-reply report, the recipient MMS Relay/Server shall convey this information in the MM1_retrieve.RES. If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_retrieve.RES. If a request for a delivery report is included in the MM1_retrieve.RES the recipient MMS User Agent shall convey the information whether it accepts or denies the sending of a delivery report to the MM originator in MM1_acknowledgement.REQ. If a delivery report is not requested, it is up to the recipient MMS User Agent to include this information in MM1_acknowledgement.REQ or not.

Reply-Charging: In case of reply-charging the MMS Relay/Server should indicate in the MM1_retrieve.RES that a reply to this particular original MM is free of charge and the reply-charging limitations.

Identification: The MMS Relay/Server shall provide a message identification for a message, which it has accepted for delivery in the MM1_retrieve.RES. In case of reply-charging the MMS Relay/Server shall provide the message-ID of the original MM which is replied to in the MM1_retrieve.RES.

Content Type: The type of the MM's content shall always be identified in the MM1_retrieve.RES.

Content: The content of the multimedia message if added by the originator MMS User Agent of the MM may be conveyed in the MM1_retrieve.RES.

Status: In case of normal operation the recipient MMS Relay/Server may indicate in the MM1_retrieve.RES that the retrieval of the MM was processed correctly. In case of abnormal operation the recipient MMS Relay/Server shall indicate in the MM1_retrieve.RES the reason why the multimedia message could not be retrieved. The corresponding reason codes should cover application level errors (e.g. 'the media format could not be converted', 'insufficient credit for retrieval'). Lower layer errors may be handled by corresponding protocols.

Forward_Counter: A Counter indicating the number of times the particular MM was forwarded.

Forwarded_by: The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.

8.1.3.4   Information Elements

Table 8: Information elements in the MM1_retrieve.REQ .

Information element	Presence	Description
Message Reference	Mandatory	Location of the content of the MM to be retrieved.

Table 9: Information elements in the MM1_retrieve.RES .

Information element	Presence	Description
Message ID	Mandatory	The message ID of the MM.
Sender address	Conditional	The address of the originator of MM unless the originator MMS User Agent has requested her address to be hidden from the MM recipient.
Content type	Mandatory	The content type of the MM's content.
Recipient address	Optional	The address of the MM recipient. Multiple addresses are possible.
Message class	Optional	The class of the message (e.g., personal, advertisement, information service)
Date and time	Mandatory	The time and date of the submission of the MM or the time and date of the forwarding of the MM (time stamp)
Delivery report	Optional	A request for delivery report.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent..
Read reply	Conditional	A request for read-reply report if the originator MMS User Agent of the MM has requested a read-reply report.
Subject	Conditional	The title of the whole multimedia message if specified by the originator MMS User Agent of the MM.
Status	Optional	The status of the MM retrieve request.
Status Text	Optional	Description which qualifies the status of the MM retrieve request.
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Charging-ID	Optional	In case of reply-charging this is the identification of the original MM replied to.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Forward_counter	Conditional	A Counter indicating the number of times the particular MM was forwarded.
Forwarded_by	Conditional	The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.
Content	Conditional	The content of the multimedia message if specified by the originator MMS User Agent of the MM.

Table 10: Information elements in the MM1_acknowledgement.REQ .

Information element	Presence	Description
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

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CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.140** CR **016** | ⌘ | ev | **-** | ⌘ | Current version: | **4.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Correction to MMS MM4 interface, delivery report	
Source: ⌘	T2	
Work item code: ⌘	MMS	*Date:* ⌘ 30.08.01
Category: ⌘	**F**	*Release:* ⌘ REL-4

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2   *(GSM Phase 2)*
R96   *(Release 1996)*
R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	Definition for returning the MM4_delivery_report.RES is incorrect
Summary of change: ⌘	Clarification as which entity sends the MM4_delivery_report.RES abstract message
Consequences if not approved: ⌘	REL-4 specification of MMS will be unclear

Clauses affected: ⌘	8.4.2.1
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.4.2   Routing Forward of a Delivery Report

This part of MMS service covers the routing forward of a delivery report from recipient MMS Relay/Server to originator MMS Relay/Server. The involved abstract messages are outlined in Table 22 from type and direction points of view.

Table 22: Abstract messages for routing delivery reports forward in MMS

Abstract Message	Type	Direction
MM4_delivery_report.REQ	Request	Recipient MMS Relay/Server -> originator MMS Relay/Server
MM4_delivery_report.RES	Response	Originator MMS Relay/Server -> recipient MMS Relay/Server

8.4.2.1   Normal Operation

After successful discovery of its peer entity the recipient MMS Relay/Server shall route a previously created delivery report forward to the originator MMS Relay/Server using the MM4_delivery_report.REQ which contains MMS control information only. The ~~recipient~~ originator MMS Relay/Server shall respond with a MM4_delivery_report.RES, which provides the status of the MM4_delivery_report.REQ if an MM4_delivery_report.RES was requested.

Support for MM4_delivery_report.REQ and MM4_delivery_report.RES is mandatory for the MMS Relay/Server.

8.4.2.2   Abnormal Operation

In this case the originator MMS Relay/Server shall respond with a MM4_delivery_report.RES encapsulating a status which indicates the reason the delivery report was not accepted, if an MM4_delivery_report.RES was requested.

CR-Form-v3

CHANGE REQUEST

⌘ **23.140 CR 017** ⌘ rev **-** ⌘ Current version: **4.3.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	Clarifications and Editorial Changes	
Source: ⌘	T2	
Work item code: ⌘	MESS5-MMS	*Date:* ⌘ 6/27/01
Category: ⌘	F	*Release:* ⌘ REL-5

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	General clarifications and other editorial changes, leading to improved readability
Summary of change: ⌘	• Editorial changes to improve readability, formatting, etc. • Clarification of Relay/Server functions
Consequences if not approved: ⌘	Possible confusion and misinterpretation

Clauses affected: ⌘	Sections 5 through 8
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
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http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5 Functional Description of Involved MMS Elements

5.1 MMS User Agent

5.1.1 MMS User Agent operations

The MMS User Agent shall provide the following application layer functionalities:-

- the MM presentation;
- the presentation of notifications to the user;
- the retrieval of MMs (initiate MM delivery to the MMS User Agent).

The MMS User Agent may provide additional application layer functionalities such as:-

- the MM composition
- the MM submission
- the signing of an MM on an end-user to end-user basis;
- the decryption and encryption of an MM on an end-user to end-user basis;
- all aspects of storing MMs on the terminal and/or USIM;
- the handling of external devices;
- the user profile management.

This optional list of additional functionalities of the MMS User Agent is not exhaustive.

5.1.2 Minimum set of supported formats

Multiple media elements shall be combined into a composite single MM using MIME multipart format as defined in RFC 2046 [6]. The media type of a single MM element shall be identified by its appropriate MIME type whereas the media format shall be indicated by its appropriate MIME subtype.

In order to guarantee a minimum support and compatibility between multimedia messaging capable terminals, the following media and file formats shall be at least supported.

5.1.2.1 Text

Plain text. Any character encoding (charset) that contains a subset of the logical characters in Unicode [7] shall be used (e.g. US-ASCII [8], ISO-8859-1[9], UTF-8[10], Shift_JIS, etc.).

Unrecognised subtypes of "text" shall be treated as subtype "plain" as long as the MIME implementation knows how to handle the charset. Any other unrecognised subtype and unrecognised charset shall be treated as "application/octet - stream".

In order to guarantee SMS interoperability, SMS 3GPP TS 24.011 [11] RP-DATA RPDU encapsulation defined in subclause 7.3.1 shall be supported. MIME type "application/x-sms" shall be used for this purpose.

NOTE: SMS MIME type shall be used as soon as the MIME registration has been completed.

5.1.2.2 Speech

MMS User Agents supporting media type Speech shall support AMR [12], organised in the format specified in chapters 6.2 and 6.3 of [39].

5.1.2.3 Still Image

MMS User Agents supporting media type Image shall support Baseline JPEG [17]. The usage of the Baseline JPEG shall follow the technical specifications and the implementation guidelines specified in 26.234 [41].

5.1.2.4 Video

In order to ensure alignment with the codecs specified for Packet Switched Streaming Services [41], ITU-T H.263 baseline [20] shall be supported in MMS User Agents that support media type Video.

5.1.2.5 File Format for dynamic media

To ensure interoperability for the transport of video and associated speech/audio in an MM, the MP4 file format shall be supported. The usage of the MP4 file format shall follow the technical specifications and the implementation guidelines specified in 26.234 [41].

> NOTE: 3GPP TS 26.234 [41] specifies a mechanism for the registration of AMR and H.263 codestreams to be included in MP4 files.

5.1.3 Additional suggested codecs

In order to facilitate interoperability with formats widely used e.g. in the Internet community, the optional support of the additional following codecs is suggested:

Media type Audio:-

       MP3 [14]

       MIDI [15]

       AAC [38]

Media type Image:

       GIF 89a [18]

Media type Video:

       MPEG-4 Visual Simple Profile Level 0 [19] and [16]

       H.263 profile 3 level 10, according to [21]

5.2 MMS Relay/Server

The MMS Relay/Server is responsible for storage and notification, reports, and general handling of messages. The MMS Relay/ServerIt may also provide convergence functionality between External Servers and MMS User Agents and thus enable the integration of different server types across different networks. An Example can be found in Annex A.

It should be is possible to separate the MMS Relay/Server element into MMS Relay and MMS Server elements, but an allocation of the MMS Relay/Server functionalities to such elements is not defined in this release.

The MMS Relay/Server is responsible for the following functions:-

- receiving and sending MM;

- enabling/disabling MMS function;

- personalising MMS based on user profile information;

- MM deletion based on user profile or filtering information;

- media type conversion;

- media format conversion;

- conversion of messages arriving at the recipient MMS Relay/Server from legacy messaging systems to MM format (e.g. facsimile to MM)

- conversion of MMs leaving the originator MMS Relay/Server to legacy messaging systems to the appropriate message format (e.g. MM to internet email)

- message content retrieval;

- MM forwarding;

- screening of MM;

- negotiation of terminal capabilities;

- checking terminal availability;

- MM notification to the MMS User Agent;

- generating delivery reports;

- routing forward MMs and read-reply reports;

- generating call data records (CDR);

- address translation.

- address hiding

- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency)

- temporary and/or persistent storage of messages

- ensuring that messages are not lost until successfully delivered to another MMSE element

- controlling the reply-charging feature of MMS

5.3   External Servers

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7.2   MM1: MMS Relay/Server – MMS User Agent

Reference point MM1 is used to submit Multimedia Messages from MMS User Agent to MMS Relay/Server, to let the MMS User Agent pull MMs from the MMS Relay/Server, let the MMS Relay/Server push information about MMs to the UA MMS User Agent as part of an MM notification, and to exchange notifications and delivery reports between MMS Relay/Server and MMS User Agents.

Details for implementation of the MM1 transfer protocol using WAP [3] or applications conforming to MExE [4] (e.g. Java and TCP/IP) are elaborated within this specification. The WAP implementation option is described in Annex B.1. Implementations based on applications using MExE may be defined in detail in future releases. Other implementations (e.g. using other standardised Internet protocols) are not defined in this specification in this release.

7.3   MM2: MMS Relay – MMS Server

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8.1.2   Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1   Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2   Abnormal Operation

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8.1.3   Retrieval of Multimedia Message

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8.1.3.3   Features

Message Reference: The recipient MMS User Agent shall always provide a reference, e.g., URI, for the MM in the MM1_retrieve.REQ.

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the addressing-relevant information field of MM1_retrieve.RES. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. One or several address(es) of the MM recipient(s) may be provided to the recipient MMS User Agent in the addressing-relevant information field(s) of the MM1_retrieve.RES.

Time stamping: The MM1_retrieve.RES shall carry the time and date of submission of the MM or the time and date of the forwarding of the MM.

Time constraints: In case of reply-charging the deadline for the latest time of submission of a reply-MM shall be conveyed within the MM1_retrieve.RES.

Message class, priority and subject: Information about class, priority, subject of the MM shall be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server. Information about additional end-to-end qualifiers of the MM should be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server.

Reporting: If the originator MMS User Agent has requested to have a read-reply report, the recipient MMS Relay/Server shall convey this information in the MM1_retrieve.RES. If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_retrieve.RES. If a request for a delivery report is included in the MM1_retrieve.RES the recipient MMS User Agent shall convey the information whether it accepts or denies the sending of a delivery report to the MM originator in MM1_acknowledgement.REQ. If a delivery report is not requested, it is up to the recipient MMS User Agent to include this information in MM1_acknowledgement.REQ or not.

Reply-Charging: In case of reply-charging the MMS Relay/Server should indicate in the MM1_retrieve.RES that a reply to this particular original MM is free of charge

Identification: The MMS Relay/Server shall provide a message identification for a message, which it has accepted for delivery in the MM1_retrieve.RES. In case of reply-charging the MMS Relay/Server shall provide the message-ID of the original MM which is replied to in the MM1_retrieve.RES.

Content Type: The type of the MM's content shall always be identified in the MM1_retrieve.RES.

Content: The content of the multimedia message if added by the originator MMS User Agent of the MM may be conveyed in the MM1_retrieve.RES.

Status: In case of normal operation the recipient MMS Relay/Server may indicate in the MM1_retrieve.RES that the retrieval of the MM was processed correctly. In case of abnormal operation the recipient MMS Relay/Server shall indicate in the MM1_retrieve.RES the reason why the multimedia message could not be retrieved. The corresponding reason codes should cover application level errors (e.g. 'the media format could not be converted', 'insufficient credit for retrieval'). Lower layer errors may be handled by corresponding protocols.

Status Text: The status text is optional, and may be returned to provide explanatory text corresponding to the Status code.

Forward_Counter: A Counter indicating the number of times the particular MM was forwarded.

Forwarded_by: The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.

8.1.3.4   Information Elements

Table 8: Information elements in the MM1_retrieve.REQ .

Information element	Presence	Description
Message Reference	Mandatory	Location of the content of the MM to be retrieved.

Table 9: Information elements in the MM1_retrieve.RES .

Information element	Presence	Description
Message ID	Mandatory	The message ID of the MM.
Sender address	Conditional	The address of the originator of MM unless the originator MMS User Agent has requested her address to be hidden from the MM recipient.
Content type	Mandatory	The content type of the MM's content.
Recipient address	Optional	The address of the MM recipient. Multiple addresses are possible.
Message class	Optional	The class of the message (e.g., personal, advertisement, information service)
Date and time	Mandatory	The time and date of the submission of the MM or the time and date of the forwarding of the MM (time stamp)
Delivery report	Optional	A request for delivery report.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent..
Read reply	Conditional	A request for read-reply report if the originator MMS User Agent of the MM has requested a read-reply report.
Subject	Conditional	The title of the whole multimedia message if specified by the originator MMS User Agent of the MM.
Status	Optional	The status of the MM retrieve request.
Status Text	Optional	Description which qualifies the status of the MM retrieve request.
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Charging-ID	Optional	In case of reply-charging this is the identification of the original MM replied to.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Forward_counter	Conditional	A Counter indicating the number of times the particular MM was forwarded.
Forwarded_by	Conditional	The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.
Content	Conditional	The content of the multimedia message if specified by the originator MMS User Agent of the MM.

Table 10: Information elements in the MM1_acknowledgement.REQ .

Information element	Presence	Description
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

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8.1.4 Forwarding of Multimedia Message

This part of the MMS service describes the mechanism by which a forwarding MMS User Agent can request from the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and ishas been notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

For forwarding purposes an MM forward request shall always be requested by the forwarding MMS User Agent from of the forwarding MMS Relay/Server. Involved abstract messages are outlined in Table 11 from type and direction points of view.

Table 11: Abstract messages for forwarding of MM without prior retrieval

Abstract messages	Type	Direction
MM1_forward.REQ	Request	MMS UA -> MMS Relay/Server
MM1_forward.RES	Response	MMS Relay/Server -> MMS UA

8.1.4.1   Normal operation

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