Technical Specification Group Services and System Aspects
Meeting #17, Biarritz, France, 9-12 September 2002

TSGS#17(02)0455

Source: **SA5 (Telecom Management)**

Title: **Rel-5 CR 32.235 (Charging data description for application services)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-1st-	Spec	CR	Rev	Phase	Subject	Cat	Version-	Doc-2nd-	Workitem
SP-020455	32.235	006	-	Rel-5	**Add support of Persistent Network-based storage in MMS charging**	B	4.2.0	S5-024333	OAM-CH

3GPP TSG-SA5 (Telecom Management) **S5-024333**
Meeting #30, Tampere, FINLAND, 19 - 23 August 2002

CR-Form-v5

CHANGE REQUEST

⌘ **32.235** **CR** **006** ⌘ **rev** **-** ⌘ 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 ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Add support of Persistent Network-based storage in MMS charging
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	23/08/2002
Category:	⌘	**B**
Release:	⌘	*REL-5*

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:	⌘	Support for Persistent Network-based storage (called "MMBox") is an optional feature added in stage 2 specifications of MMS (TS 23.140) for Release 5. This CR introduces dedicated CDRs and adaptations in the existing CDRs in TS 32.235 in order to provide charging functionality of the “MMBox” feature.
Summary of change:	⌘	The following "MMBox" related CDRs are introduced : 1) MMBox MM1 Store CDR (Bx1S-CDR) 2) MMBox MM1 View CDR (Bx1V-CDR) 3) MMBox MM1 Upload CDR (Bx1U-CDR) 4) MMBox MM1 Delete CDR (Bx1D-CDR) Parameters reflecting the persitent storage of the MM are included in the MM Submission and Forwarding CDRs.
Consequences if not approved:	⌘	It will not be possible for operators to charge their customers for the MMBox usage.

Clauses affected:	⌘	4,5 and 6		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

4.2 Service records for originator MMS Relay/Server

The following subsections specify CDRs created in the originator MMS Relay/Server based on messages flowing over the MM1 and MM4 reference points. The CDRs referring to MM4 messages (Originator MM4 *** CDR) are created only if the originator and recipient MMS Relay/Servers communicate over the MM4 interface (i.e. the originator MMS Relay/Server is not also the recipient MMS Relay/Server). The CDRs referring to MM1 messages (Originator MM1 *** CDR) are created regardless of whether the originator MMS Relay/Server is also the recipient MMS Relay/Server or not. Unless otherwise specified the CDR parameters are copied from the corresponding MM1 or MM4 message parameters as applicable.

4.2.1Originator MM1 Submission CDR

If enabled, an Originator MM1 Submission Charging Data Record (O1S-CDR) shall be produced in the originator MMS Relay/Server for each MM submitted in an MM1_submit.REQ by an originator MMS User Agent to the originator MMS Relay/Server if and when the originator MMS Relay/Server responds with an MM1_submit.RES. The operator can configure whether this CDR, if enabled, shall only be created for MM1_submit.RES indicating acceptance of the submitted MM, or also for the unsuccessful submissions.

Notes: (1) This includes the case where the MM is a reply-MM to an original MM. In this case the MMS User Agent sending the reply-MM is called the originator MMS User Agent of this reply-MM and the MMS Relay/Server receiving the reply-MM in an MM1_submit.REQ is called the originator MMS Relay/Server for this reply-MM.

(2) The case of an MMS Relay/Server receiving an MM1_forward.REQ is treated in section 4.4.

Table 1: Originator MM1 Submission CDR (O1S-CDR)

Field	Category	Description
Record Type	M	Originator MM1 Submission record.
Originator MMS Relay/Server Address	M	.IP address or domain name of originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Reply-Charging ID	C	This field is present in the CDR only if the MM is a reply-MM to an original MM. The Reply-Charging ID is the Message ID of the original MM.
Originator address	M	The address of the originator MMS User Agent (i.e., of the MMS User Agent that has sent the MM1_submit.REQ).
Recipients address list	M	The address(es) of the recipient MMS User Agent(s) of the MM. Multiple addresses are possible if the MM is not a reply MM.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Content type	M	The content type of the MM content.
MM component list	Mo	The list of media components with volume size.
Message size	M	The total size of the MM content.
Message class	C_o	The class selection such as personal, advertisement, information service if specified in the MM1_submit_REQ.
Charge Information	Mo	The charge indication and charge type.
Submission Time	C_o	The time at which the MM was submitted from the originator MMS User Agent if specified in the MM1_submit_REQ.
Time of Expiry	C_o	The desired date of expiry or duration of time prior to expiry for the MM if specified by the originator MMS User Agent.
Earliest Time Of Delivery	C	This field contains either the earliest time to deliver the MM or the number of seconds to wait before delivering the MM as specified by the originator MMS User Agent.
Duration Of Transmission	Mo	The time used for transmission of the MM between the User Agent and the MMS Relay/Server.
Request Status Code	Mo	The status code of the MM as received in the MM1_submit_REQ..
Delivery Report Requested	M_o	This field indicates whether a delivery report has been requested by the originator MMS User Agent or not.
Reply Charging	C_o	A request for reply-charging if specified by the originator MMS User Agent.
Reply Deadline	C_o	In case of reply-charging the latest time of submission of replies granted to the recipient(s) as specified by the originator MMS User Agent.
Reply Charging Size	C_o	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s) as specified by the originator MMS User Agent.
Priority	C_o	The priority (importance) of the message if specified by the originator MMS User Agent.
Sender visibility	M_o	A request to show or hide the sender's identity when the message is delivered to the recipient as specified by the originator MMS User Agent.
Read reply requested	M_o	A request for read reply report as specified in the MM1_submit.REQ.
Status Text	C_o	This field includes a more detailed technical status of the message at the point in time when the CDR is generated. This field is only present if the MM submission is rejected.
Record Time Stamp	M_o	Time of generation of the CDR.
Local Record Sequence Number	M_o	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
MMBox Storage Information	C_o	A set of parameters related to the MMBox management. This parameter is only present if the MMBox feature is supported by the MMS Relay/Server and storage of the MM was requested by originator MMS User Agent (i.e., of the MMS User Agent that has sent the MM1_submit.REQ).
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

…

<unmodified text>

…

4.4 Service records for forwarding MMS Relay/Server

4.4.1 Forwarding CDR

If enabled, a Forwarding Charging Data Record (F-CDR) shall be produced in the forwarding MMS Relay/Server on receipt of an MM1_forward.REQ if and when the forwarding MMS Relay/Server responds with an MM1_forward.RES indicating acceptance.

Table 21: MM Forwarding CDR (F-CDR)

Field	Category	Description
Record Type	M	MM Forwarding record.
Forwarding MMS Relay/Server Address	M	IP address or domain name of the forwarding MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Forwarding address	M	One or more addresses of the forwarding MMS User Agent (i.e., of the MMS User Agent that has sent the MM1_forward.REQ).
Recipients address list	M	The address(es) of the recipient MMS User Agent(s) of the forwarded MM. Multiple addresses are possible.
Charge Information	M_o	The charge indication and charge type.
Time of Expiry	C_o	The desired date of expiry or duration of time prior to expiry for the MM if specified by the forwarding MMS User Agent.
Earliest Time Of Delivery	C_o	This field contains either the earliest time to deliver the MM or the number of seconds to wait before delivering the MM.
Delivery Report Requested	M_o	This field indicates whether a delivery report has been requested by the forwarding MMS User Agent or not.
Read reply requested	M_o	A request for read reply report as specified in the MM1_forward.REQ.
Message reference	M	A reference, e.g., URI, for the MM as specified in the MM1_forward.REQ.
MM Status Code	M_o	The status code of the MM at the time when the CDR is generated.
Status Text	M_o	This field includes a more detailed technical status of the message at the point in time when the CDR is generated.
Record Time Stamp	M_o	Time of generation of the CDR.
Local Record Sequence Number	M_o	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
MMBox Storage Information	C_o	A set of parameters related to the MMBox management. This parameter is only present if the MMBox feature is supported by the MMS Relay/Server and storage of the MM was requested by the forwarding MMS User Agent (i.e., of the MMS User Agent that has sent the MM1_forward.REQ).
~~Storage requested~~	~~M_o~~	~~This field indicates whether a storage of a copy of the MM into the user's MMBox has been requested by the originator MMS User Agent or not.~~
~~Storage Information~~		~~A set of parameters related to the MMBox management~~
~~MM State~~	~~C_o~~	~~The state of the MM if storage is requested.~~
~~MM Flags~~	~~C_o~~	~~The keyword flag(s) of the MM if storage is requested.~~
~~Store status~~	~~C_o~~	~~The status code of the request to store the MM as received in the MM1_submit.RES if storage was requested.~~
~~Store Status Text~~	~~C_o~~	~~This field includes a more detailed technical description of the store status at the point in time when the CDR is generated. This field is only present if the store status is present~~
~~Stored Message Reference~~	~~C_o~~	~~A refereence of the newly stored MM if storage was requested~~
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.5 Service records for MMS Relay/Server supporting MMBoxes

4.5.1 MMBox MM1 Store CDR (Bx1S-CDR)

If enabled, an MMBox MM1 Store Charging Data Record (Bx1S-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server responds with an MM1_mmbox_store.RES to the MMS User Agent.

Table 22: MMBox_MM1 Store record (Bx1S-CDR)

Field	Category	Description
Record Type	M	MMBox_MM1 Store record
MMS Relay/Server Address	M	An address of the MMS Relay/Server.
Managing address	M	The address of the managing MMS User Agent (i.e., of the MMS User Agent that has sent the MM1_mmbox_store.REQ).
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Content type	M_o	The content type of the MM content.
Message size	M_o	The size of the MM.
Message Reference	M_o	A reference to the newly stored or updated MM, suitable for subsequent usage (eg: with MM1_retrieve.REQ and MM1_mmbox_delete.REQ).
MM State	M_o	The state of the MM. If not present when the Message Reference is from a notification request, defaults to New. No value is assumed when the Message Reference refers to an already stored MM
MM Flags	C_o	If available, the keyword flags of the MM. There are no defaults.
Store status	C_o	The status code of the request to store the MM as received in the MM1_store.RES
Store Status Text	C_o	This field includes a more detailed technical description of the store status at the point in time when the CDR is generated. This field is only present if the store status is present
Sequence Number	M_o	Record number.
Time Stamp	M_o	Time of generation of the CDR.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record.

4.5.2 MMBox MM1 View CDR (Bx1V-CDR)

If enabled, an MMBox MM1 View Charging Data Record (Bx1V-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server has sent an MM1_mmbox_view.RES to the MMS User Agent.

Table 23: MMBox_MM1 View record (Bx1V-CDR)

Field	Category	Description
Record Type	M	MMBox_MM1 View record
MMS Relay/Server Address	M	An address of the MMS Relay/Server.
Managing address	M	The address of the managing MMS User Agent (i.e., of the MMS User Agent that has sent the MM1_mmbox_view.REQ).
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Attributes list	M_o	A list of information elements that are to be returned as a group for each MM to be listed in the MM1_mmbox_view.RES. If absent, the default list (i.e. Message ID, Date and time, Sender address, Subject, Message size, MM State, and MM Flags) shall apply.
Message Selection	M_o	A list of MM State or MM Flags keywords (e.g. new or draft) or a list of Message Reference by which MMs within the MMBox can be selected. If both are absent, a listing of all MMs currently stored within the MMBox shall be selected.
Start	M_o	A number, indicating the index of the first MM of those selected to have information elements returned in the response. If this is absent, the first item selected is returned.
Limit	M_o	A number indicating the maximum number of selected MMs to their information elements returned in the response. If this is absent, information elements from all remaining MMs are returned.
Totals requested	M_o	This field indicates whether the current total number of messages and/or size contained by the MMBox has been requested by the managing MMS User Agent.
Quotas requested	M_o	This field indicates whether the current message and/or size quotas (i.e. the maximum number of messages allowed and/or the maximum size allowed) has been requested by the managing MMS User Agent.
MM listing	M_o	The requested listing of the selected MMs, which shall be one or more groups of information elements, one for each MM listed. Each MM group shall include: a Message Reference, and may include additional information elements as well. If absent, no MMs were found or selected.
Request Status Code	M_o	The status code of the request to view the MM as received in the MM1_view.RES.
Status Text	C_o	This field includes the status text as received in the MM1_view.RES corresponding to the Request Status Code. Present only if provided in the MM1_view.RES.
Totals	C_o	The total number of messages and/or octets for the MMBox, identified with Messages or Octets, respectively, depending upon the presence of Totals in the request.
Quotas	C_o	The quotas of the MMBox in messages and/or octets identified with Messages or Octets, respectively, depending upon the presence of Quotas in the request.
Sequence Number	M_o	Record number.
Time Stamp	M_o	Time of generation of the CDR.

Field	Category	Description
Record extensions	C_o	A set of network/manufacturer specific extensions to the record.

4.5.3 MMBox MM1 Upload CDR (Bx1U-CDR)

If enabled, an MMBox MM1 Upload Charging Data Record (Bx1U-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server has sent an MM1_mmbox_upload.RES to the MMS User Agent.

Table 24: MMBox MM1 Upload record (Bx1U-CDR)

Field	Category	Description
Record Type	M	MMBox MM1 Upload record
MMS Relay/Server Address	M	An address of the MMS Relay/Server.
Managing address	M	The address of the managing MMS User Agent (i.e., of the MMS User Agent that sends the MM1_mmbox_upload.REQ).
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message class	C_o	The class of the MM (e.g., personal, advertisement, information service) if provided by the MMS User Agent.
Upload Time	M_o	The time and date at which the MM was uploaded (time stamp).
Time of Expiry	C_o	The desired date of expiry or duration of time prior to expiry for the MM if specified by the originator MMS User Agent
Earliest Time Of Delivery	C_o	This field contains either the earliest time to deliver the MM or the number of seconds to wait before delivering the MM if specified by the originator MMS User Agent
Priority	C_o	This field indicates the priority (importance) of the message if specified by the MMS User Agent,
MM State	M_o	The state of the MM. Will default to the Draft state if absent
MM Flags	C_o	If available, the keyword flags of the MM. There are no defaults.
Content type	M_o	The content type of the MM content.
Message size	M_o	The size of the MM.
Message Reference	M_o	A reference to the newly stored MM, suitable for subsequent usage (e.g.: with MM1_retrieve.REQ, MM1_mmbox_delete.REQ, etc.).

Field	Category	Description
Request Status Code	M_o	The status code of the request to view the MM as received in the MM1_upload.RES.
Status Text	C_o	This field includes the status text as received in the MM1_upload.RES corresponding to the Request Status Code. Present only if provided in the MM1_upload.RES.
Sequence Number	M_o	Record number.
Time Stamp	M_o	Time of generation of the CDR.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record.

4.5.4 MMBox MM1 Delete CDR (Bx1D-CDR)

If enabled, an MMBox MM1 Delete Charging Data Record (Bx1D-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server has sent an MM1_mmbox_delete.RES to the MMS User Agent.

Table 25: MMBox MM1 Delete record (Bx1D-CDR)

Field	Category	Description
Record Type	M	MMBox MM1 Delete record
MMS Relay/Server Address	M	An address of the MMS Relay/Server.
Managing address	M	The address of the managing MMS User Agent (i.e., of the MMS User Agent that sends the MM1_mmbox_upload.REQ).
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message Reference	C_o	A reference to the message in error, if any, to which the following information elements apply
Request Status Code	M_o	The status code of the request to view the MM as received in the MM1_delete.RES.
Status Text	C_o	This field includes the status text as received in the MM1_delete.RES corresponding to the Request Status Code. Present only if provided in the MM1_delete.RES.
Sequence Number	M_o	Record number.
Time Stamp	M_o	Time of generation of the CDR.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record.

5 Parameter Description

5.1 3GPP MMS Version

The MMS version of the originator MMS Relay/Server as defined in TS 23.140[4].

5.2 Access Correlation

If the parameter is provided and is not an empty string, it is a unique identifier delivered by the used access network domain of the originator or recipient MMS User Agent. It may be used for correlation of the MMS CDRs with the corresponding MSC server CDRs in CS domain or GSN CDRs in PS domain. It is an empty string if the parameter is not delivered by the access network.

5.3 Acknowledgement Request

This boolean value indicates whether (value TRUE) or not (value FALSE) a response has been requested in a request at the MM4 reference point.

5.4 Attributes List

This field contains a list of information element names that are used in the MM1_mmbox_view.REQ, which request corresponding information elements from the MMs to be conveyed in the MM1_mmbox_view.RES. The list of known information element names are those currently defined for the MM1_retrieve.RES and MM1_notification.REQ. In the absence of the Attributes list information element, the MMS Relay/Server shall, by default and if available, select these information elements from each viewed MM: Message ID, Date and time, Sender address, Subject, Message size, MM State, and MM Flags.

5.54Charge Information

This field consists of two parts, the charge indicator and the charge type. The charge indicator (charge/no charge) should be defined by the MMS Relay/Server.

The charge types are as follows:

- Normal
- Prepaid
- Reply: An originator of the MMS may take over the charge for the sending of a reply-MM to their submitted MM from the recipient(s). Therefore the originator MMS Relay/Server should mark the MM as no charge (reply-charged). The originator's MMSE could either accept the user's settings for charge type "reply" or not and should be able to convey feedback to the originator.

5.65Content Type

The Content Type of the MM as defined in TS 23.140[4].

5.65.7Delivery Report Requested

This is an indication of type boolean whether (value TRUE) or not (value FALSE) the originator/forwarding MMS User Agent has requested a delivery report in the MM1_submit.REQ/MM1_forward.REQ.

5.8~~7~~ Duration of Transmission

This field contains the relevant time in seconds. The Duration of Transmission is the time from the beginning to the end of the MM transfer between the MMS User Agent and the MMS Relay/Server; e.g. for streaming purposes.

Note: The CDRs purposely do not contain any information about the duration of storage on the MMS Relay/Server. If such information is required it can be calculated by post-processing systems from the CDR timestamps. For instance, the total duration of storage on the originator MMS Relay/Server could be calculated by taking the difference between the 'Record Time Stamp' of the O1S-CDR and the 'Record Time Stamp' of the OMD-CDR.

5.8~~9~~ Earliest Time of Delivery

This field contains either the earliest time to deliver message or the number of seconds to wait before delivering the message.

~~5.9~~5.10 Forward Counter

A Counter indicating the number of times the particular MM was forwarded as defined in TS 23.140[4].

~~5.10~~5.11 Forwarding Address

This field contains a forwarding MMS User Agent address. The MMS supports the use of E-Mail addresses (RFC 822) [5], MSISDN (E.164) or IP addresses.

~~5.11~~5.12 Forwarding MMS Relay/Server Address

This field contains one or more addresses of the forwarding MMS Relay/Server. The address is either an IP address or a domain name.

5.13 Limit

This field contains a number that may be provided in the MM1_mmbox_view.REQ to specify a limit for the number of MMs the information elements to which shall be returned in the MM1_mmbox_view.RES.

5.1~~4~~2 Local Record Sequence Number

This field includes a unique record number created by this node. The number is allocated sequentially including all CDR types. The number is unique within one node, which is identified either by field Node ID or by record-dependent MMS Relay/Server.

The field can be used e.g. to identify missing records in post processing system.

5.15 Managing Address

This field contains the managing MMS User Agent address i.e. the MMS User Agent that sends and receives transactions related to the MMBox management . The MMS supports the use of E-Mail addresses (RFC 822) [5], MSISDN (E.164) or IP address.

5.16~~3~~ Message Class

A class of message such as personal, advertisement, information service etc. For more information see TS 23.140[4].

5.17~~4~~ Message ID

This field specifies the MM Message ID of the MM as defined in TS 23.140[4]. The concrete syntax of this MM Message ID is given by the body of the field introduced by the string "X-Mms-Message-ID:" in the concrete syntax of the message MM4_Forward.REQ. All CDRs pertaining to the same MM must employ the same value of this parameter, i.e. the value initially assigned by the originator MMS Relay/Server upon submission of the MM by the Originator MMS User Agent.

5.18~~5~~ Message Reference

A reference as specified in TS 23.140[4], e.g. URI, for the MM that can be used for retrieving the MM from the recipient MMS Relay/Server.

5.19 Message selection

Messages which are to be viewed may be selected by a list of Message References or by a selection based on MM State and/or MM Flags keywords.

~~5.16~~5.20 Message Size

The message size includes the number of octets of the subject information element and of all media components of the transmitted MM except the presentation description component.

Editor's Note: To be aligned with the pending CR T2-020564.

~~5.17~~5.21 MM component list

The MM component list is a set of subject and media components from type of media formats including the size of all elements in octets. For a complete description of media formats that may be supported by MMS, refer to IANA[13].

~~5.18~~5.22 MM Date and Time

The date and time field contains the time stamp relevant for the handling of the MM by the recipient MMS Relay/Server (read, deleted without being read, etc.). The time-stamp includes at a minimum: date, hour, minute and second.

5.23 MM Listing

This field contains a list of information elements from the MMs returned within the MM1_mmbox_view.RES. The listing shall consist of the following information elements, separately grouped for each MM returned in the list:

- Message reference: a unique reference to an MM
- Information elements corresponding to those requested in the Message Selection information element on the MM1_mmbox_view.REQ;

~~5.19~~5.24 MM Status Code

This field contains an appropriate status value of the delivered MM, e.g. retrieved, rejected, …

~~5.20~~5.25 Originator Address

This field contains an originator MMS User Agent address. The MMS supports the use of E-Mail addresses (RFC 822) [5], MSISDN (E.164) or IP addresses.

~~5.21~~5.26 Originator MMS Relay/Server Address

This field contains an address of the originator MMS Relay/Server. This address is composed of a mandatory IP address and/or an optional domain name.

5.27 Quotas

The quotas of the MMBox in messages and/or ~~bytes~~octets identified with Messages or ~~Bytes~~Octets

5.28 Quotas requested

This is an indication that the Managing User Agent has requested the current message and/or size quotas.

~~5.22~~5.29 Priority

The priority (importance) of the message, see TS 23.140[4].

~~5.23~~5.30 Read Reply Requested

A boolean value indicating whether the originator MMS User Agent has requested a read-reply report (value TRUE) or not (value FALSE).

~~5.24~~5.31 Read Status

See TS 23.140[4]: Status of the MM, e.g. Read, Deleted without being read.

~~5.25~~5.32 Recipient Address

This field contains a recipient MMS User Agent address. The MMS supports the use of E-Mail addresses (RFC 822) [5], MSISDN (E.164) or IP addresses.

~~5.26~~5.33 Recipient MMS Relay/Server Address

This field contains an address of the recipient MMS Relay/Server. This address is composed of a mandatory IP address and/or an optional domain name.

~~5.27~~5.34 Recipients Address List

This field contains a list of recipient MMS User Agent addresses.

~~5.28~~5.35 Record Extensions

The field enables network operators and/or manufacturers to add their own extensions to the standard record definitions.

~~5.29~~5.36 Record Time Stamp

This field indicates the date and time when the CDR was produced.

~~5.30~~5.37 Record Type

The field identifies the type of the record, see TS 32.205[8].

~~5.31~~5.38 Reply Charging

In the Originator MM1 Submission CDR (O1S-CDR) this parameter indicates whether the originator MMS User Agent has requested reply-charging (value TRUE) or not (value FALSE).

Editor's Note: Check if this contains the same information as the 'Charge Information'.

In the Recipient MM1 Notification Request record (R1NRq -CDR) it indicates whether a reply to this particular original MM is free of charge (value TRUE) or not (value FALSE).

~~5.32~~5.39 Reply Charging ID

This field is present in the CDR only if the MM is a reply-MM to an original MM. The Reply Charging ID is the Message ID of the original MM.

Editor's Note: Check this is a duplicate parameter as the Message ID.

~~5.33~~5.40 Reply Charging Size

In the Originator MM1 Submission CDR (O1S-CDR), in case of reply-charging, this field indicates the maximum size for reply-MM(s) granted to the recipient(s) as specified by the originator MMS User Agent.

In the Recipient MM1 Notification Request CDR (R1NRq-CDR), in case of reply-charging, this field indicates the maximum size of a reply-MM granted to the recipient as specified in the MM1_notification.REQ.

~~5.34~~5.41 Reply Deadline

In the Originator MM1 Submission CDR (O1S-CDR), in case of reply-charging, this field indicates the latest time of submission of replies granted to the recipient(s) as specified by the originator MMS User Agent.

In the Recipient MM1 Notification Request CDR (R1NRq-CDR), in case of reply-charging, this field indicates the latest time of submission of a reply granted to the recipient as specified in the MM1_notification.REQ.

~~only if~~

~~5.35~~5.42 Report allowed

A boolean value indicating, if present whether sending of a delivery report is permitted (value TRUE) or not (value FALSE).

~~5.36~~5.43 Request Status code

The status of the MM as reflected in the corresponding MM4 message (e.g. error service denied, error network problem, error unsupported message…). For further details see TS 23.140[4].

5.4436 Sender Address

The address of the MMS User Agent as used in the MM1_notification_REQ/MM1_retrieve.RES. This parameter is present in the CDR even if address hiding was requested, resulting in the sender address is not being included in the above messages.

5.375.45 Sender Visibility

This boolean value indicates whether the the originator MMS User Agent has requested her address to be hidden from the recipient (value TRUE) or not (value FALSE).

5.46 Start

This field contains a number that may be used in the MM1_mmbox_view.REQ to index the first MM to be viewed, relative to the selected set of MMs, allowing partial views to be requested

5.47 MMBox Storage Information

This field includes following storage information elements for the MMBox containing the MM State, MM Flags, Store Status, Store Status Text and Stored Message Reference.

- **MM State**

  This field contains the state of the MM.

- **MM Flags**

  This field contains the keyword flags of the MM

- **Store Status**

  This field contains an appropriate status value of the stored MM, e.g. stored, error-transient-mailbox-full,…

- **Store Status Text**

  This field includes a more detailed technical descripton of the store status at the point in time when the CDR is generated

- **Stored Message Reference**

  A reference of the newly stored MM.

~~Storage Requested~~

~~This is an indication of type boolean whether (value TRUE) or not (value FALSE) the originator/forwarding MMS User Agent has requested a storage of the MM into the user's MMBox in the MM1_submit.REQ/MM1_forward.REQ.~~

5.385.49 Status Text

This field includes a more detailed technical status of the message at the point in time when the CDR is generated..

5.395.50 Submission Time

The submission time field contains the time stamps relevant for the submission of the MM. The time-stamp includes a minimum of date, hour, minute and second.

~~5.40~~5.51 Time of Expiry

This field contains the desired date or the number of seconds to expiry of the MM, if specified by the originator MMS User Agent.

5.52 Totals

The total number of messages and/or ~~bytes~~octets for the MMBox, identified with Messages or ~~Bytes~~Octets

5.53 Totals requested

This is an indication that the Managing User Agent has requested the current total number of messages and/or size contained by the MMBox.

5.54 Upload Time

The upload time field contains the time stamps relevant for the upload of the MM. The time-stamp includes a minimum of date, hour, minute and second.

6 Charging Data Record Structure

6.1 ASN.1 definitions for CDR information

The ASN.1 definitions are based on the charging specific data types within the current 3GPP 32-series, the TS 32.205 for CS domain[8] and TS 32.215 for PS domain[9].

```
TS32235-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) umts-Operation-Maintenance (3) ts-32-235 (235)
informationModel (0) asn1Module (2) version1 (1)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- EXPORTS everything

IMPORTS

CallEventRecord, CallEventRecordType, ChargeIndicator, CallDuration, TimeStamp, MSISDN, CallReference, MscNo, ManagementExtensions
FROM TS32205-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) umts-Operation-Maintenance (3) ts-32-205 (205)
informationModel (0) asn1Module (2) version1 (1)}
--
-- see TS 32.205[8]
--

ChargingID, IPAddress, GSNAddress, LocalSequenceNumber
FROM TS32215-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-Operation-Maintenance (3) ts-32-215 (215)
informationModel (0) asn1Module (2) version1 (1)}
--
-- see TS 32.215[9]
--

-------------------------------------------------------------------------------
--
-- CALL AND EVENT RECORDS
--
-------------------------------------------------------------------------------
```

```
MMO1SRecord ::= SET
{
    recordType                  [0] CallEventRecordType,
    originatorMmsRSAddress      [1] MMSRSAddress,
    messageID                   [2] OCTET STRING,
    replyChargingID             [3] OCTET STRING OPTIONAL,
    originatorAddress           [4] MMSAgentAddress,
    recipientAddresses          [5] MMSAgentAddresses,
    accessCorrelation           [6] AccessCorrelation OPTIONAL,
    contentType                 [7] ContentType,
    mmComponentType             [8] MMComponentType OPTIONAL,
    messageSize                 [9] DataVolume,
    messageClass                [10] MessageClass OPTIONAL,
    chargeInformation           [11] ChargeInformation OPTIONAL,
    submissionTime              [12] TimeStamp OPTIONAL,
    timeOfExpiry                [13] WaitTime OPTIONAL,
    earliestTimeOfDelivery      [14] WaitTime OPTIONAL,
    durationOfTransmission      [15] INTEGER OPTIONAL,
    requestStatusCode           [16] RequestStatusCodeType OPTIONAL,
    deliveryReportRequested     [17] BOOLEAN OPTIONAL,
    replyCharging               [18] BOOLEAN OPTIONAL,
    replyDeadline               [19] WaitTime OPTIONAL,
    replyChargingSize           [20] DataVolume OPTIONAL,
    priority                    [21] PriorityType OPTIONAL,
    senderVisibility            [22] BOOLEAN OPTIONAL,
    readReplyRequested          [23] BOOLEAN OPTIONAL,
    statusText                  [24] StatusTextType,
    recordTimeStamp             [25] TimeStamp,
    localSequenceNumber         [26] LocalSequenceNumber OPTIONAL,
    recordExtensions            [27] ManagementExtensions OPTIONAL,
    mMBoxstorageInformation     [28] MMBoxStorageInformation OPTIONAL
}

MMO4FRqRecord          ::= SET
{
    recordType                  [0]  CallEventRecordType,
    originatorMmsRSAddress      [1]  MMSRSAddress,
    recipientMmsRSAddress       [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    3GPPVersion                 [4]  OCTET STRING OPTIONAL,
    originatorAddress           [5]  MMSAgentAddress,
    recipientAddresses          [6]  MMSAgentAddresses,
    contentType                 [7]  ContentType,
    mmComponentType             [8]  MMComponentType OPTIONAL,
    messageSize                 [9]  DataVolume,
    messageClass                [10] MessageClass OPTIONAL,
    submissionTime              [11] TimeStamp,
    timeOfExpiry                [12] WaitTime OPTIONAL,
    deliveryReportRequested     [13] BOOLEAN,
    priority                    [14] PriorityType OPTIONAL,
    senderVisibility            [15] BOOLEAN,
    readReplyRequested          [16] BOOLEAN,
    acknowledgementRequest      [17] BOOLEAN,
    forwardCounter              [18] INTEGER OPTIONAL,
    forwardingAddress           [19] MMSAgentAddresses OPTIONAL,
    recordTimeStamp             [20] TimeStamp,
    localSequenceNumber         [21] LocalSequenceNumber OPTIONAL,
    recordExtensions            [22] ManagementExtensions OPTIONAL
}

MMO4FRsRecord          ::= SET
{
    recordType                  [0]  CallEventRecordType,
    originatorMmsRSAddress      [1]  MMSRSAddress OPTIONAL,
    recipientMmsRSAddress       [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    3GPPVersion                 [4]  OCTET STRING OPTIONAL,
    requestStatusCode           [5] RequestStatusCodeType OPTIONAL,
    statusText                  [6] StatusTextType OPTIONAL,
    recordTimeStamp             [7] TimeStamp OPTIONAL,
    localSequenceNumber         [8] LocalSequenceNumber OPTIONAL,
    recordExtensions            [9] ManagementExtensions OPTIONAL
}

MMO4DRecord       ::= SET
{
```

```
        recordType                  [0]  CallEventRecordType,
        recipientMmsRSAddress       [1]  MMSRSAddress OPTIONAL,
        originatorMmsRSAddress      [2]  MMSRSAddress OPTIONAL,
        messageID                   [3]  OCTET STRING,
        3GPPVersion                 [4]  OCTET STRING OPTIONAL,
        originatorAddress           [5]  MMSAgentAddress OPTIONAL,
        recipientAddress            [6]  MMSAgentAddress,
        mmDateAndTime               [7] TimeStamp,
        mmStatusCode                [8] MMStatusCodeType,
        statusText                  [9] StatusTextType OPTIONAL,
        recordTimeStamp             [10] TimeStamp OPTIONAL,
        localSequenceNumber         [11] LocalSequenceNumber OPTIONAL,
        recordExtensions            [12] ManagementExtensions OPTIONAL
}

MMO1DRecord       ::= SET
{
        recordType                  [0]  CallEventRecordType,
        recipientMmsRSAddress       [1]  MMSRSAddress OPTIONAL,
        originatorMmsRSAddress      [2]  MMSRSAddress OPTIONAL,
        accessCorrelation           [3] AccessCorrelation OPTIONAL,
        messageID                   [4]  OCTET STRING,
        3GPPVersion                 [5]  OCTET STRING OPTIONAL,
        originatorAddress           [6]  MMSAgentAddress OPTIONAL,
        recipientAddress            [7]  MMSAgentAddress,
        mmStatusCode                [8] MMStatusCodeType OPTIONAL,
        statusText                  [9] StatusTextType OPTIONAL,
        recordTimeStamp             [10] TimeStamp OPTIONAL,
        localSequenceNumber         [11] LocalSequenceNumber OPTIONAL,
        recordExtensions            [12] ManagementExtensions OPTIONAL
}

MMO4RRecord       ::= SET
{
        recordType                  [0]  CallEventRecordType,
        recipientMmsRSAddress       [1]  MMSRSAddress OPTIONAL,
        originatorMmsRSAddress      [2]  MMSRSAddress OPTIONAL,
        messageID                   [3]  OCTET STRING,
        3GPPVersion                 [4]  OCTET STRING OPTIONAL,
        originatorAddress           [5]  MMSAgentAddress OPTIONAL,
        recipientAddresses          [6]  MMSAgentAddresses OPTIONAL,
        mmDateAndTime               [7] TimeStamp OPTIONAL,
        acknowledgementRequest      [8] BOOLEAN,
        readStatus                  [9] MMStatusCodeType OPTIONAL,
        statusText                  [10] StatusTextType OPTIONAL,
        recordTimeStamp             [11] TimeStamp OPTIONAL,
        localSequenceNumber         [12] LocalSequenceNumber OPTIONAL,
        recordExtensions            [13] ManagementExtensions OPTIONAL
}

MMO1Rrecord       ::= SET
{
        recordType                  [0]  CallEventRecordType,
        recipientMmsRSAddress       [1]  MMSRSAddress OPTIONAL,
        originatorMmsRSAddress      [2]  MMSRSAddress OPTIONAL,
        accessCorrelation           [3] AccessCorrelation OPTIONAL,
        messageID                   [4]  OCTET STRING,
        3GPPVersion                 [5]  OCTET STRING OPTIONAL,
        originatorAddress           [6]  MMSAgentAddress OPTIONAL,
        recipientAddress            [7]  MMSAgentAddress OPTIONAL,
        readStatus                  [8] MMStatusCodeType OPTIONAL,
        recordTimeStamp             [9] TimeStamp OPTIONAL,
        localSequenceNumber         [10] LocalSequenceNumber OPTIONAL,
        recordExtensions            [11] ManagementExtensions OPTIONAL
}

MMOMDRecord       ::= SET
{
        recordType                  [0]  CallEventRecordType,
        originatorMmsRSAddress      [1]  MMSRSAddress OPTIONAL,
        recipientMmsRSAddress       [2]  MMSRSAddress OPTIONAL,
        messageID                   [3]  OCTET STRING,
        messageSize                 [4] DataVolume OPTIONAL,
        mmStatusCode                [5] MMStatusCodeType OPTIONAL,
        statusText                  [6] StatusTextType OPTIONAL,
        recordTimeStamp             [7] TimeStamp OPTIONAL,
        localSequenceNumber         [8] LocalSequenceNumber OPTIONAL,
```

```
    recordExtensions                [9] ManagementExtensions OPTIONAL
}


MMR4FRecord      ::= SET
{
    recordType                      [0]  CallEventRecordType,
    recipientMmsRSAddress           [1]  MMSRSAddress,
    originatorMmsRSAddress          [2]  MMSRSAddress,
    messageID                       [3]  OCTET STRING,
    3GPPVersion                     [4]  OCTET STRING OPTIONAL
    originatorAddress               [5]  MMSAgentAddress,
    recipientAddresses              [6]  MMSAgentAddresses,
    contentType                     [7]  ContentType,
    mmComponentType                 [8]  MMComponentType OPTIONAL,
    messageSize                     [9]  DataVolume,
    messageClass                    [10] MessageClass OPTIONAL,
    submissionTime                  [11] TimeStamp,
    timeOfExpiry                    [12] WaitTime OPTIONAL,
    deliveryReportRequested         [13] BOOLEAN
    priority                        [14] PriorityType OPTIONAL,
    senderVisibility                [15] BOOLEAN,
    readReplyRequested              [16] BOOLEAN,
    requestStatusCode               [17] RequestStatusCodeType,
    statusText                      [18] StatusTextType,
    acknowledgementRequest          [19] BOOLEAN
    forwardCounter                  [20] INTEGER OPTIONAL
    forwardingAddress               [21] MMSAgentAddresses OPTIONAL,
    recordTimeStamp                 [22] TimeStamp,
    localSequenceNumber             [23] LocalSequenceNumber OPTIONAL,
    recordExtensions                [24] ManagementExtensions OPTIONAL
}

MMR1NrqRecord        ::= SET
{
    recordType                      [0] CallEventRecordType,
    recipientMmsRSAddress           [1] MMSRSAddress,
    messageID                       [2] OCTET STRING,
    replyChargingID                 [3] OCTET STRING OPTIONAL,
    senderAddress                   [4] MMSAgentAddress,
    recipientAddress                [5] MMSAgentAddress,
    accessCorrelation               [6] AccessCorrelation OPTIONAL,
    messageClass                    [7] MessageClass OPTIONAL,
    mmComponentType                 [8] MMComponentType OPTIONAL,
    messageSize                     [9] DataVolume,
    timeOfExpiry                    [10] WaitTime OPTIONAL,
    messageReference                [11] OCTET STRING,
    deliveryReportRequested         [12] BOOLEAN OPTIONAL,
    replyCharging                   [13] BOOLEAN OPTIONAL,
    replyDeadline                   [14] WaitTime OPTIONAL,
    replyChargingSize               [15] DataVolume OPTIONAL,
    mmStatusCode                    [16] MMStatusCodeType OPTIONAL,
    statusText                      [17] StatusTextType OPTIONAL,
    recordTimeStamp                 [18] TimeStamp OPTIONAL
    localSequenceNumber             [19] LocalSequenceNumber OPTIONAL,
    recordExtensions                [20] ManagementExtensions OPTIONAL
}

MMR1NRsRecord        ::= SET
{
    recordType                      [0]  CallEventRecordType,
    recipientMmsRSAddress           [1]  MMSRSAddress,
    messageID                       [2]  OCTET STRING,
    recipientAddress                [3] MMSAgentAddress,
    accessCorrelation               [4] AccessCorrelation OPTIONAL,
    reportAllowed                   [5] BOOLEAN OPTIONAL,
    mmStatusCode                    [6] MMStatusCodeType OPTIONAL,
    statusText                      [7] StatusTextType OPTIONAL,
    recordTimeStamp                 [8] TimeStamp OPTIONAL,
    localSequenceNumber             [9] LocalSequenceNumber OPTIONAL,
    recordExtensions                [10] ManagementExtensions OPTIONAL
}

MMR1RtRqRecord       ::= SET
{
    recordType                      [0]  CallEventRecordType,
    recipientMmsRSAddress           [1]  MMSRSAddress,
```

```
    messageID                   [2]  OCTET STRING,
    originatorAddress           [3] MMSAgentAddress,
    recipientAddress            [4] MMSAgentAddress,
    accessCorrelation           [5] AccessCorrelation OPTIONAL,
    messageReference            [6] OCTET STRING,
    mmStatusCode                [7] MMStatusCodeType OPTIONAL,
    statusText                  [8] StatusTextType OPTIONAL,
    recordTimeStamp             [9] TimeStamp OPTIONAL,
    localSequenceNumber         [10] LocalSequenceNumber OPTIONAL,
    recordExtensions            [11] ManagementExtensions OPTIONAL
}

MMR1RtRsRecord      ::= SET
{
    recordType                  [0] CallEventRecordType,
    recipientMmsRSAddress       [1] MMSRSAddress,
    messageID                   [2] OCTET STRING,
    replyChargingID             [3] OCTET STRING OPTIONAL,
    senderAddress               [4] MMSAgentAddress OPTIONAL,
    recipientAddress            [5] MMSAgentAddress,
    accessCorrelation           [6] AccessCorrelation OPTIONAL,
    contentType                 [7] ContentType,
    mmComponentType             [8] MMComponentType OPTIONAL,
    messageClass                [9] MessageClass OPTIONAL,
    submissionTime              [10] TimeStamp,
    messageSize                 [11] DataVolume OPTIONAL,
    deliveryReportRequested     [12] BOOLEAN OPTIONAL,
    priority                    [13] PriorityType OPTIONAL,
    readReplyRequested          [14] BOOLEAN OPTIONAL,
    mmStatusCode                [15] MMStatusCodeType OPTIONAL,
    statusText                  [16] StatusTextType OPTIONAL,
    replyDeadline               [17] WaitTime OPTIONAL,
    replyChargingSize           [18] DataVolume OPTIONAL,
    durationOfTransmission      [19] INTEGER OPTIONAL,
    timeOfExpiry                [20] WaitTime OPTIONAL,
    recordTimeStamp             [21] TimeStamp OPTIONAL,
    localSequenceNumber         [22] LocalSequenceNumber OPTIONAL,
    recordExtensions            [23] ManagementExtensions OPTIONAL
}

MMR1ARecord      ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    messageID                   [2]  OCTET STRING,
    recipientAddress            [3] MMSAgentAddress,
    accessCorrelation           [4] AccessCorrelation OPTIONAL,
    reportAllowed               [5] BOOLEAN OPTIONAL,
    mmStatusCode                [6] MMStatusCodeType OPTIONAL,
    statusText                  [7] StatusTextType OPTIONAL,
    recordTimeStamp             [8] TimeStamp OPTIONAL,
    localSequenceNumber         [9] LocalSequenceNumber OPTIONAL,
    recordExtensions            [10] ManagementExtensions OPTIONAL
}

MMR4DRqRecord       ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    originatorMmsRSAddress      [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    3GPPVersion                 [4]  OCTET STRING OPTIONAL,
    originatorAddress           [5] MMSAgentAddress,
    recipientAddress            [6] MMSAgentAddress,
    mmDateAndTime               [7] TimeStamp OPTIONAL,
    acknowledgementRequest      [8] BOOLEAN,
    mmStatusCode                [9] MMStatusCodeType OPTIONAL,
    statusText                  [10] StatusTextType OPTIONAL,
    recordTimeStamp             [11] TimeStamp OPTIONAL,
    localSequenceNumber         [12] LocalSequenceNumber OPTIONAL,
    recordExtensions            [13] ManagementExtensions OPTIONAL
}

MMR4DRsRecord       ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
```

```
    originatorMmsRSAddress      [3]  MMSRSAddress,
    messageID                   [4]  OCTET STRING,
    3GPPVersion                 [5]  OCTET STRING OPTIONAL,
    requestStatusCode           [6] RequestStatusCodeType OPTIONAL,
    statusText                  [7] StatusTextType OPTIONAL,
    recordTimeStamp             [8] TimeStamp OPTIONAL,
    localSequenceNumber         [9] LocalSequenceNumber OPTIONAL,
    recordExtensions            [10] ManagementExtensions OPTIONAL
}

MMR1RRRecord            ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    recipientAddress            [4] MMSAgentAddress,
    originatorAddress           [5] MMSAgentAddress,
    accessCorrelation           [6] AccessCorrelation OPTIONAL,
    mmStatusCode                [7] MMStatusCodeType OPTIONAL,
    statusText                  [8] StatusTextType OPTIONAL,
    recordTimeStamp             [9] TimeStamp OPTIONAL,
    localSequenceNumber         [10] LocalSequenceNumber OPTIONAL,
    recordExtensions            [11] ManagementExtensions OPTIONAL
}

MMR4RRqRecord           ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    originatorMmsRSAddress      [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    3GPPVersion                 [4]  OCTET STRING OPTIONAL,
    originatorAddress           [5] MMSAgentAddress,
    recipientAddress            [6] MMSAgentAddress,
    mmDateAndTime               [7] TimeStamp OPTIONAL,
    acknowledgementRequest      [8] BOOLEAN,
    mmStatusCode                [9] MMStatusCodeType OPTIONAL,
    statusText                  [10] StatusTextType OPTIONAL,
    recordTimeStamp             [11] TimeStamp OPTIONAL,
    localSequenceNumber         [12] LocalSequenceNumber OPTIONAL,
    recordExtensions            [13] ManagementExtensions OPTIONAL
}

MMR4RRsRecord           ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    originatorMmsRSAddress      [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    3GPPVersion                 [4]  OCTET STRING OPTIONAL,
    requestStatusCode           [5] RequestStatusCodeType OPTIONAL,
    statusText                  [6] StatusTextType OPTIONAL,
    recordTimeStamp             [7] TimeStamp OPTIONAL,
    localSequenceNumber         [8] LocalSequenceNumber OPTIONAL,
    recordExtensions            [9] ManagementExtensions OPTIONAL
}

MMRMDRecord         ::= SET
{
    recordType                  [0]  CallEventRecordType,
    originatorMmsRSAddress      [1]  MMSRSAddress,
    recipientMmsRSAddress       [2]  MMSRSAddress OPTIONAL,
    messageID                   [3]  OCTET STRING,
    messageSize                 [4] DataVolume,
    mmStatusCode                [5] MMStatusCodeType OPTIONAL,
    statusText                  [6] StatusTextType OPTIONAL,
    recordTimeStamp             [7] TimeStamp OPTIONAL,
    localSequenceNumber         [8] LocalSequenceNumber OPTIONAL,
    recordExtensions            [9] ManagementExtensions OPTIONAL
}

MMFRecord           ::= SET
{
    recordType                  [0] CallEventRecordType,
    forwardingMmsRSAddress      [1] MMSRSAddress,
    messageID                   [2] OCTET STRING,
    forwardingAddress           [3] MMSAgentAddress,
```

```
        recipientAddresses          [4] MMSAgentAddresses,
        chargeInformation           [5] ChargeInformation OPTIONAL,
        timeOfExpiry                [6] WaitTime OPTIONAL,
        earliestTimeOfDelivery      [7] WaitTime OPTIONAL,
        deliveryReportRequested     [8] BOOLEAN OPTIONAL,
        readReplyRequested          [9] BOOLEAN OPTIONAL,
        messageReference            [10] OCTET STRING,
        mmStatusCode                [11] MMStatusCodeType OPTIONAL,
        statusText                  [12] StatusTextType OPTIONAL,
        recordTimeStamp             [13] TimeStamp OPTIONAL,
        localSequenceNumber         [14] LocalSequenceNumber OPTIONAL,
        recordExtensions            [15] ManagementExtensions OPTIONAL,
        ———mMBoxstorageInformation          [16] MMBoxStorageInformation OPTIONAL
}

MMBx1SRecord ::= SET
{
        recordType                  [0] CallEventRecordType,
        mmsRelayAddress             [1] IPAddress,
        managingAddress             [2] MMSAgentAddress,
        accessCorrelation           [3] AccessCorrelation OPTIONAL,
        contentType                 [4] ContentType OPTIONAL,
        messageSize                 [5] DataVolume OPTIONAL,
        messageReference            [6] OCTET STRING OPTIONAL,
        mmState                     [7] OCTET STRING OPTIONAL,
        mmFlags                     [8] OCTET STRING OPTIONAL,
        storeStatus                 [9] StoreStatus OPTIONAL,
        storeStatusText             [10] StatusTextType OPTIONAL,
        sequenceNumber              [11] INTEGER OPTIONAL,
        timeStamp                   [12] TimeStamp OPTIONAL,
        recordExtensions            [13] ManagementExtensions OPTIONAL
}

MMBx1VRecord ::= SET
{
        recordType                  [0] CallEventRecordType,
        mmsRelayAddress             [1] IPAddress,
        managingAddress             [2] MMSAgentAddress,
        accessCorrelation           [3] AccessCorrelation OPTIONAL,
        attributesList              [4] AttributesList OPTIONAL,
        messageSelection            [5] MessageSelection OPTIONAL,
        start                       [6] INTEGER OPTIONAL,
        limit                       [7] INTEGER OPTIONAL,
        totalsRequested             [8] BOOLEAN OPTIONAL,
        quotasRequested             [9] BOOLEAN OPTIONAL,
        mmListing                   [10] AttributesList OPTIONAL,
        requestStatusCode           [11] RequestStatusCodeType OPTIONAL,
        statusText                  [12] StatusTextType OPTIONAL,
        totals                      [13] Totals OPTIONAL,
        quotas                      [14] Quotas OPTIONAL,
        sequenceNumber              [15] INTEGER OPTIONAL,
        timeStamp                   [16] TimeStamp OPTIONAL,
        recordExtensions            [17] ManagementExtensions OPTIONAL
}

MMBx1URecord ::= SET
{
        recordType                  [0] CallEventRecordType,
        mmsRelayAddress             [1]   IPAddress,
        managingAddress             [2] MMSAgentAddress,
        accessCorrelation           [3] AccessCorrelation OPTIONAL,
        recipientsAddressList       [4] MMSAgentAddresses,
        messageClass                [5] MessageClass OPTIONAL,
        uploadTime                  [6] TimeStamp OPTIONAL,
        timeOfExpiry                [7] WaitTime OPTIONAL,
        earliestTimeOfDelivery      [8] WaitTime OPTIONAL,
        priority                    [9] Priority OPTIONAL,
        mmState                     [10] OCTET STRING OPTIONAL,
        mmFlags                     [11] OCTET STRING OPTIONAL,
        contentType                 [12] ContentType OPTIONAL,
        messageSize                 [13] DataVolume OPTIONAL,
        messageReference            [14] OCTET STRING OPTIONAL,
        requestStatusCode           [15] RequestStatusCodeType OPTIONAL,
        statusText                  [16] StatusTextType OPTIONAL,
        sequenceNumber              [17] INTEGER OPTIONAL,
        timeStamp                   [18] TimeStamp OPTIONAL,
        recordExtensions            [19] ManagementExtensions OPTIONAL
```

```
}

MMBx1DRecord ::= SET
{
    recordType                  [0] CallEventRecordType,
    mmsRelayAddress             [1] IPAddress,
    managingAddress             [2] MMSAgentAddress,
    accessCorrelation           [3] AccessCorrelation OPTIONAL,
    messageReference            [4] OCTET STRING OPTIONAL,
    requestStatusCode           [5] RequestStatusCodeType OPTIONAL,
    statusText                  [6] StatusTextType OPTIONAL,
    sequenceNumber              [7] INTEGER OPTIONAL,
    timeStamp                   [8] TimeStamp OPTIONAL,
    recordExtensions            [9] ManagementExtensions OPTIONAL
}

-------------------------------------------------------------------------------
--
--  COMMON DATA TYPES
--
-------------------------------------------------------------------------------

AccessCorrelation ::= CHOICE
{
    circuitSwitched     [0]   CircuitSwitchedAccess,
    packetSwitched      [1]   PacketSwitchedAccess
}

AttributesList              ::= SEQUENCE
{
    messageID               [0] OCTET STRING,
    DateAndTime             [1] TimeStamp,
    senderAddress           [2] MMSRSAddress,
    subject                 [3] OCTET STRING,
    messageSize             [4] DataVolume ,
    mmFlags                 [5] OCTET STRING,
    mmState                 [6] MMState
}

--
-- Note: the above values are subject to WAP Forum ongoing standardization
--


ChargeInformation     ::= SEQUENCE
{
    chargeindication    [0] ChargeIndicator,
    chargetype          [1] ChargeType
}

ChargeType                  ::= ENUMERATED
{
    normal                      (0),
    pre-paid                    (1),
    reply                       (2)
}

CircuitSwitchedAccess ::= SEQUENCE
{
    mSCIdentifier               [0] MscNo,
    callReferenceNumber         [1] CallReference
}

ContentType                 ::= OCTET STRING

MMComponentType         ::= SEQUENCE
{   subject     [0] SubjectComponent,
    media       [1] MediaComponents
}

DataVolume                  ::= INTEGER
    --
    -- The volume of data transfered in octets.
    --

MMStatusCodeType        ::= ENUMERATED
{
```

```
        retrieved       (0),
        forwarded       (1),
        expired         (2),
        rejected        (3),
        deferred        (4),
        unrecognised    (5)
}

MMState         ::= ENUMERATED
{
        draft           (0),
        sent            (1),
        new             (2),
        retrieved       (3),
        forwarded       (4)
}
--
-- Note: the above values are subject to WAP Forum ongoing standardization
--

DeltaSeconds            ::= OCTET STRING[8]

MediaComponent  = SEQUENCE
{
        mediaType       [0] OCTET STRING,
        mediaSize       [1] DataVolume
}

MediaComponents         = Set of MediaComponent

MessageType             ::= ENUMERATED
{
        notification            (0),
        message-MM              (1),
        delivery-report         (2),
        read-reply              (3)
}

MessageClass            ::= ENUMERATED
{
        personal                (0),
        advertisement           (1),
        information-service (2)
}

MMSAgentAddress         ::= SEQUENCE-- usage of SEQUENCE instead of CHOICE allows several address types to be present at the same time
{
        eMail-address   [0] OCTET STRING,
        mSISDN          [1] MSISDN OPTIONAL,
        iPAddress       [2] IPAddress OPTIONAL
}

MMSAgentAddresses  ::= SET OF MMSAgentAddress

MMSRSAddress            ::= SEQUENCE  -- usage of SEQUENCE instead of CHOICE allows both address types to be present at the same time
{
        domainName      [0] OCTET STRING OPTIONAL,
        iPAddress       [2] IPAddress OPTIONAL
}

PacketSwitchedAccess ::= SEQUENCE
{
        gSNAddress      [0] GSNAddress,
        chargingID      [1] ChargingID
}

PriorityType        ::= ENUMERATED
{
        low                     (0),
        normal                  (1),
        high                    (2)
}

Quotas      ::= SEQUENCE
{
        numberOfMessages    [0] INTEGER OPTIONAL,
        numberOfOctets      [1] INTEGER OPTIONAL
```

```
}

RequestStatusCodeType       ::= OCTET STRING

StatusCode ::= INTEGER
{
        --
        -- cause codes 0 to 15 are defined in TS 32.205[8] as 'CauseForTerm'
        -- (cause for termination) and cause code 16 to 20 are defined
        -- in TS 32.215 [9] as 'CauseForRecClosing'
        --
        normalRelease                   (0),    -- ok
        abnormalRelease                 (4),    -- error unspecified
        serviceDenied                   (30),
        messageFormatCorrupt            (31),
        sendingAddressUnresolved        (32),
        messageNotFound                 (33),
        networkProblem                  (34),
        contentNotAccepted              (35),
        unsupportedMessage              (36)
}

StatusTextType          ::= OCTET STRING

MMBoxStorageInformation     ::= SET
{
        mmState                         [0] MMState -OPTIONAL,,
        mmFlag                          [1] OCTET STRING -OPTIONAL,
        storeStatus                     [2] StoreStatus -OPTIONAL,,
        storeStatusText                 [3] StatusTextType -OPTIONAL,
        storedMessageReference          [4] OCTET STRING -OPTIONAL
}

StoreStatus ::= INTEGER
{
        stored                          (0),
        errorTransientFailure           (1),
        errorTransientMailboxFull       (2),
        errorTransientNetworkProblems   (3),
        errorPermanentFailure           (4),
        errorPermanentPermissionDenied  (5),
        errorPermanentMessageFormat     (6),
        errorPermanentMessageNotFound   (7)
}
--
-- Note: the above values are subject to WAP Forum ongoing standardization
--

SubjectComponent        ::= SEQUENCE
{
        subjectType  [0] OCTET STRING,
        subjectSize  [1] DataVolume
}

Totals      ::= SEQUENCE
{
        numberOfMessages        [0] INTEGER OPTIONAL,
        numberOfOctets          [1] INTEGER OPTIONAL
}

WaitTime            ::= CHOICE
{
        http-date           [0]     TimeStamp,
        delta-seconds       [1]     DeltaSeconds
}

END
```