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Technical Specification

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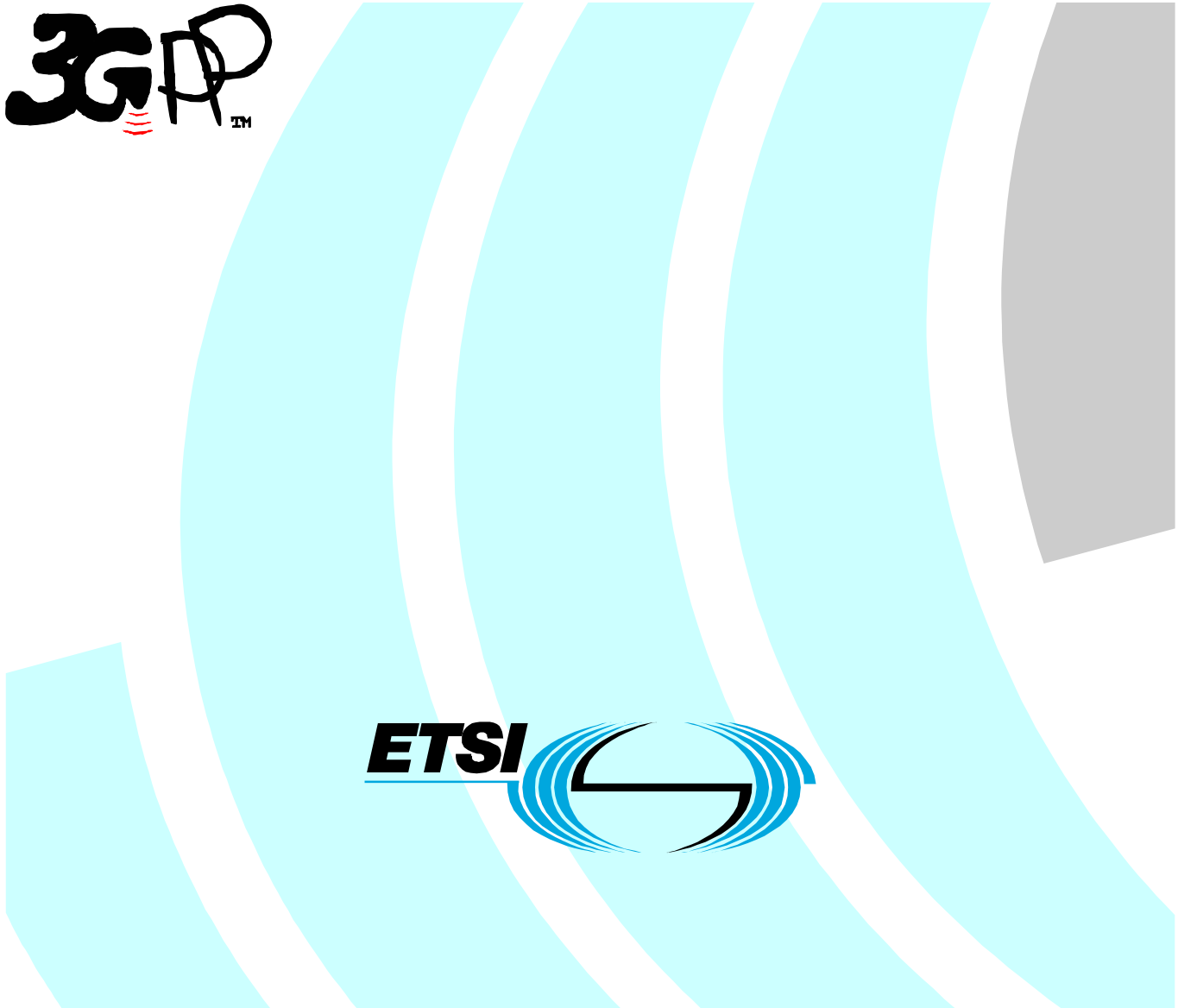
Telecommunication management;
Charging management;
Charging data description for application services
(3GPP TS 32.235 version 4.6.0 Release 4)



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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (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 the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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1 Scope

The present document is part of a series of documents specifying charging functionality in UMTS network with application services. The UMTS core network charging principles are specified in document TS 32.200 [2], which provides an umbrella for other charging documents that specify the structure and content of the CDRs and the interface protocol that is used to transfer them to the collecting node. The document structure is defined in figure 1. The CDR content and transport for application services are described in the present document especially for MMS. As the basis and reference for this work is taken the functional description of the MMS specified for stage 1 in TS 22.140[3] and stage 2 in TS 23.140 [4].

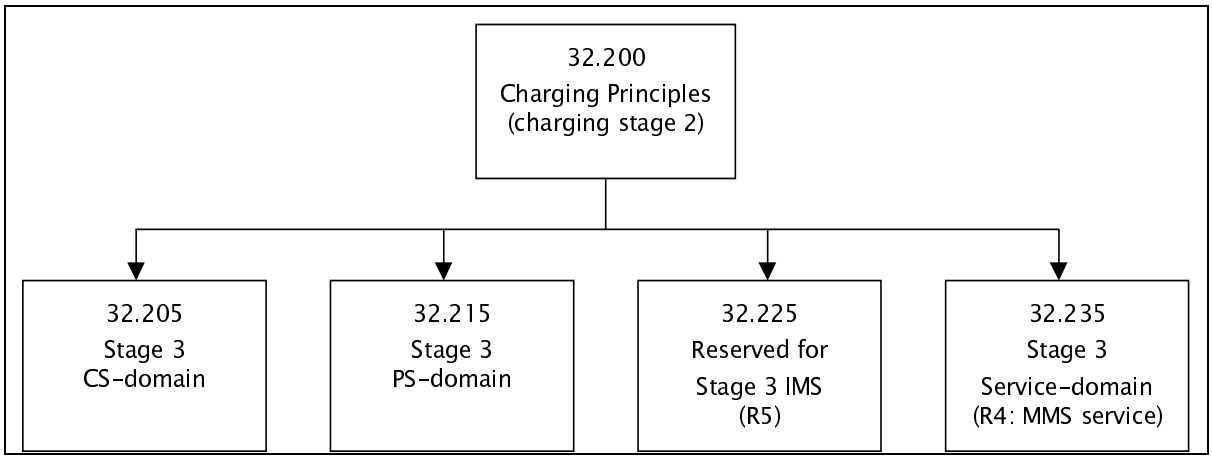

Figure 1 Charging Document Structure

All references, abbreviations, definitions, descriptions, principles and requirements that are common are defined in the 3GPP Vocabulary [1] and specialised to charging in UMTS domains or subsystems are provided in the umbrella document [2].

2 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] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 32.200: "Telecommunication management; Charging management; Charging Principles".

[3] 3GPP TS 22.140: "Service aspects; Stage 1; Multimedia Messaging Service".

[4] 3GPP TS 23 140: "Multimedia Messaging Service (MMS), Functional Description, Stage 2".

[5] STD 11 (RFC 822): "Standard for the format of ARPA Internet text messages".

[6] RFC 2046: "Multipurpose Internet Mail Extensions (MIME); Part Two: Media Types".

[7] RFC 2045: "Multipurpose Internet Mail Extensions (MIME); Part One : Format of Internet Message Bodies".

[8] 3GPP TS 32.205: "Charging Data Description for the Circuit Switched (CS) domain".

[9] 3GPP TS 32.215: "Charging Data Description for the Packet Switched (PS) domain".

[10] GSM 12.01: "Digital cellular telecommunication system (Phase 2); Common aspects of GSM Network Management (NM)".

[11] IETF RFC 959: "File Transfer Protocol (FTP)"; October 1985.

[12] IETF RFC 783: "Trivial File Transfer Protocol (TFTP)"; revision 2.

[13] IETF RFC 2045 and IANA:ftp://ftp.isi.edu/in-notes/iana/assignments/media-types/media-types

[14] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply in addition to those defined in 3GPP TR 21.905 [1] and 3GPP TS 23.140 [4]::

Delivery Report: feedback information provided to an originator MMS User Agent by an MMS Relay/Server about the status of the delivery of an MM.

Forwarded MM: An MM originally sent from a sender to an intended recipient which is then forwarded to other recipient(s) and to which a delivery report and/or read-reply report may refer and which may be subject to further forwarding.

Forwarding MMS User Agent: MMS User Agent that is the intended recipient of an MM and that requests forwarding of the MM for delivery to other recipient(s) without having to first download the MM.

Message ID: a unique identifier for an MM

MMSE: a collection of MMS-specific elements under the control of a single administration

MMS Relay/Server: an MMS-specific network entity/application that is under the control of an MMS service provider. An MMS Relay/Server transfers messages, provides operations of the MMS that are specific to or required by the mobile environment and provides (temporary and/or persistent) storage services to the MMS

MMS User Agent: an application residing on a User Equipment, an Mobile Station or an external device that performs MMS-specific operations on a user's behalf. An MMS User Agent is not considered part of an MMSE.

Original MM: (initial) MM sent from a sender to a recipient and to which a delivery report and/or a read-reply report and/or a reply-MM may refer and/or which may be subject to being forwarded

Originator MMS User Agent: an MMS User Agent associated with the sender of an MM

Read-Reply Report: feedback information to an originator MMS User Agent by a recipient MMS User Agent about the status of handling/rendering of an original MM in a recipient MMS User Agent

Recipient MMS User Agent: an MMS User Agent associated with the recipient of an MM

Reply-MM: In case of reply-charging the first reply accepted by the recipient MMS Relay/Server (after checking the reply charging limitations, such as the latest time of submission) is called a reply-MM.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [1], 3GPP TS 32.200 [2]and 3GPP TS 23 140 [4] and the following apply:

CDR	Charging Data Record
EM	Element Manager
MIME	Multipurpose Internet Mail Extensions
MM	Multimedia Message
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Element (can also be Multimedia Messaging Service Environment in other 3GPP TSs)
MMSO	Multimedia Messaging Service Originator
MMSR	Multimedia Messaging Service Recipient

4 Message Flow and CDR Definitions

4.1 Basic MMS Message Flow

The MMS Relay/Servers generate CDRs when receiving MMs from or when delivering MMs to the User Agent or another MMS Relay/Server. The label in the message flows identifies the CDR generation trigger.

The events triggering the generation of CDRs are events at the MM1 reference point and/or events at the MM4 reference point.

4.1.1 Originator and Recipient MMS Relay Server are the same

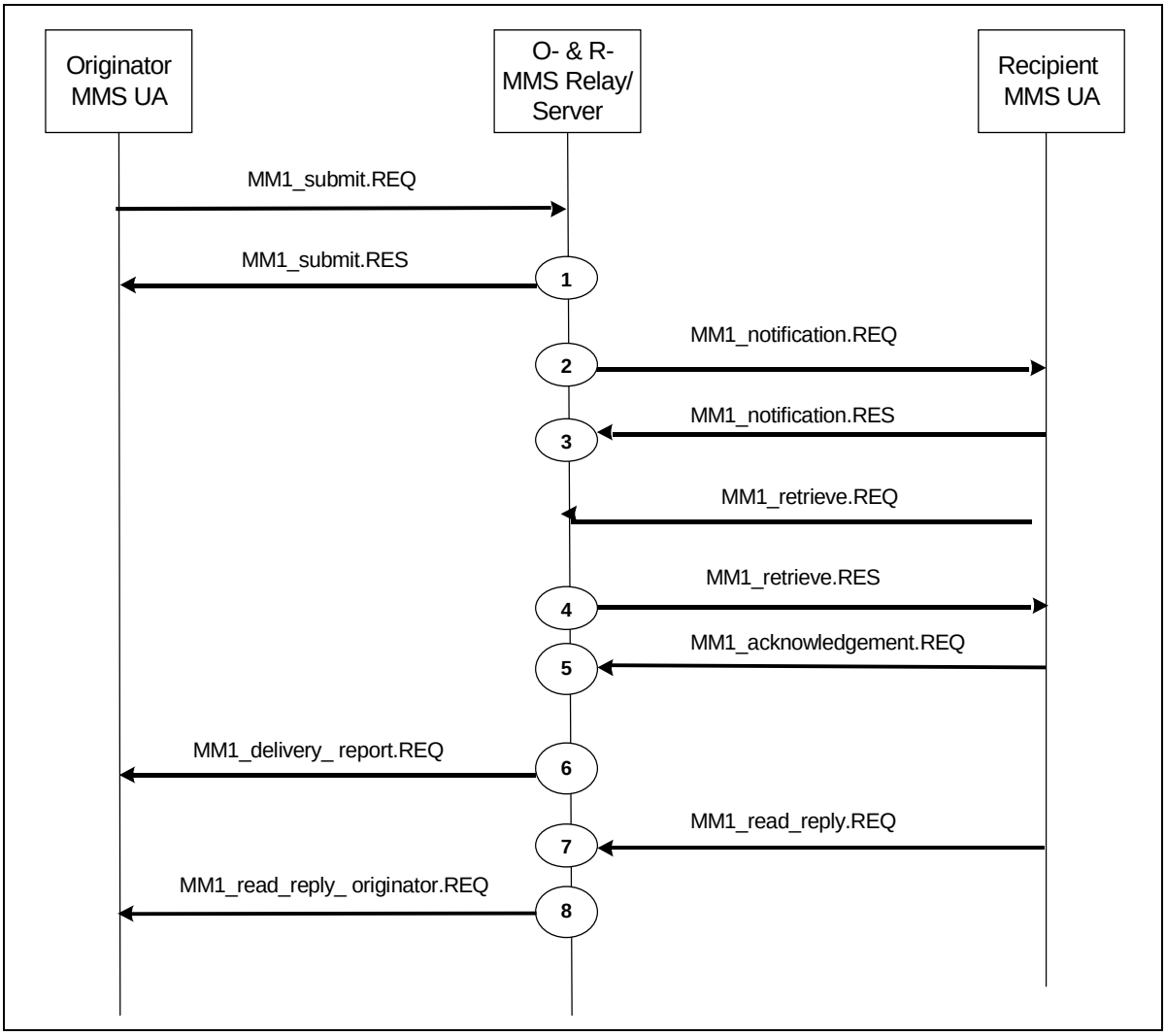

Figure 4.1: Record trigger overview for combined case

Table 4.1: Record type overview for combined MMS Relay/Server

Record trigger	1	2	3	4	5	6	7	8	Any time between 1 .. 9*
Record type	O1S	R1NRq	R1NRs	R1Rt	R1A	O1D	R1RR	O1R	OMD

NOTE: No CDR will be generated by receiving of the MM1_submit.REQ

4.1.2 Originator and Recipient MMS Relay Server are not the same

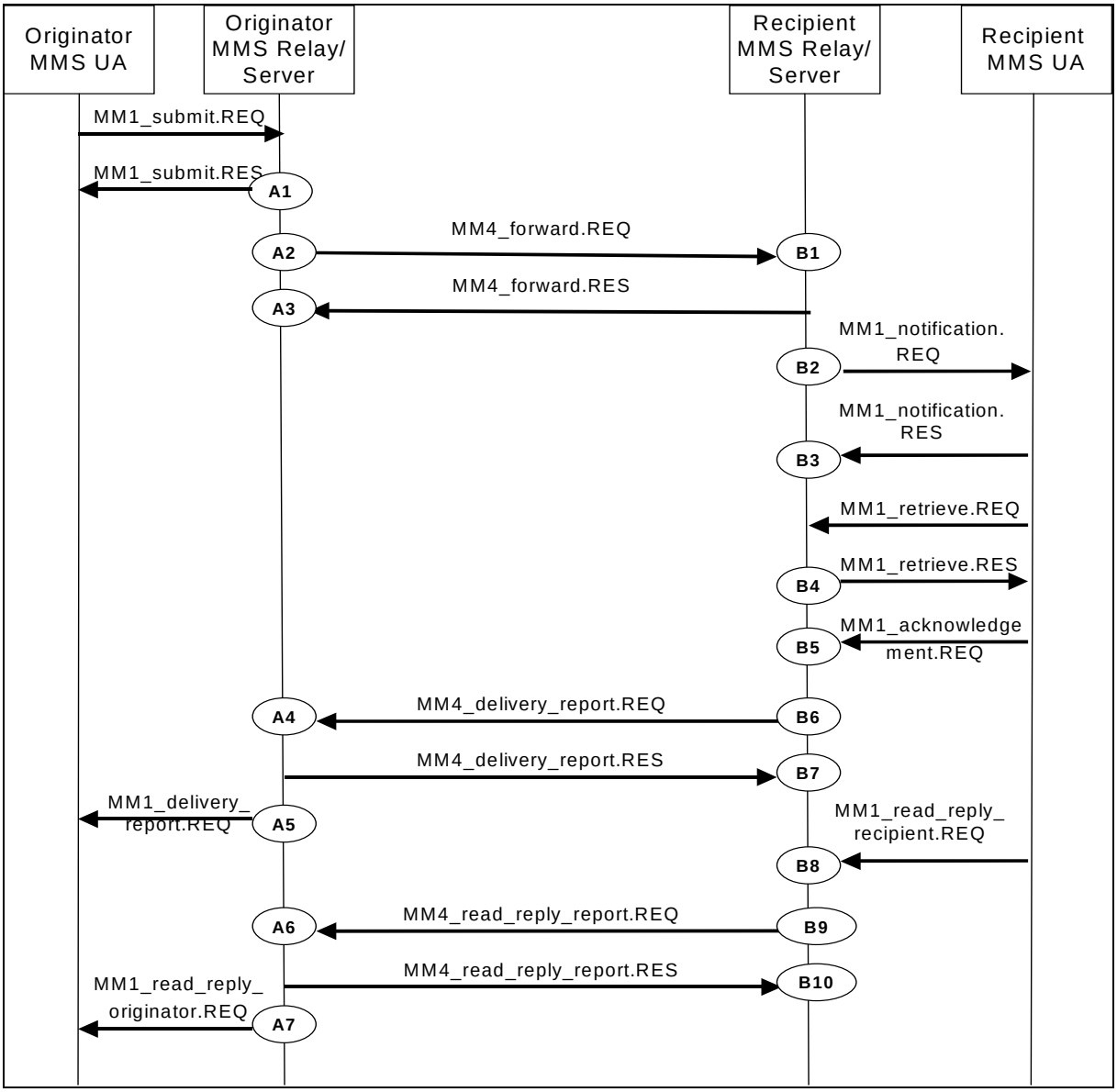

Figure 4.2: Record trigger overview for distributed case

Table 4.2: Record type overview for the Originator MMS Relay/Server

Record Trigger	A1	A2	A3	A4	A5	A6	A7	Any time between A1.. A7
Record Type	O1S	O4FRq	O4FRs	O4D	O1D	O4R	O1R	OMD

Table 4.3a: Record type overview for the Recipient MMS Relay/Server

Record Trigger	B1	B2	B3	B4	B5
Record type	R4F	R1NRq	R1NRs	R1Rt	R1A

Table 4.3b: Record type overview for the Recipient MMS Relay/Server

Record Trigger	B6	B7	B8	B9	B10	Anytime after B1
Record Type	R4DRq	R4DRs	R1RR	R4RRq	R4RRs	RMD

4.2 Record Description

Dedicated types of CDRs can be generated in the service domain for MMS by the MMS Relay/Servers. The content of each CDR type is defined in one of the tables that are part of this subclause. For each CDR type the field definition includes the field name, description and category.

Equipment vendors shall be able to provide all of the fields listed in the CDR content table in order to claim compliance with the present document. However, since CDR processing and transport consume network resources, operators may opt to eliminate some of the fields that are not essential for their operation. This operator provisionable reduction is specified by the field category.

A field category can have one of two primary values:

M This field is **M**andatory and shall always be present in the CDR.

C This field shall be present in the CDR only when certain Conditions are met. These Conditions are specified as part of the field definition.

Some of these fields are designated as Operator (**O**) provisionable. Using TMN management functions or specific tools provided by an equipment vendor, operators may choose, if they wish, to include or omit the field from the CDR. Once omitted, this field is not generated in a CDR. To avoid any potential ambiguity, a CDR generating element MUST be able to provide all these fields. Only an operator can choose whether or not these fields should be generated in its system.

Those fields that the operator may configure to be present or absent are further qualified with the 'Operator provisionable' indicator as follows:

Mo This is a field that, if provisioned by the operator to be present, shall always be included in the CDRs. In other words, an Mo parameter that is provisioned to be present is a mandatory parameter.

Co This is a field that, if provisioned by the operator to be present, shall be included in the CDRs when the required conditions are met. In other words, an Co parameter that is configured to be present is a conditional parameter.

The MMS Relay/Server shall be able to provide the CDRs at the Billing System interface in the format and encoding described in the present document. Additional CDR formats and contents, generated by the MMS Relay/Server, may be available at the interface to the billing system to meet the requirements of the billing system, these are outside of the scope of 3GPP standardisation.

4.2.1 MMS records for originator MMS Relay/Server

The following subclauses 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.

4.2.1.1 Originator MM1 Submission CDR (O1S-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.

NOTE 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.

NOTE 2: The case of an MMS Relay/Server receiving an MM1_forward.REQ is treated in subclause 4.4.

Table 4.4: Originator MM1 Submission record (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	M_o	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	M_o	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	M_o	The time used for transmission of the MM between the User Agent and the MMS Relay/Server.
Request Status Code	M_o	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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.2 Originator MM4 Forward Request CDR (O4FRq-CDR)

If enabled, an Originator MM4 Forward Request Charging Data Record (O4FRq-CDR) shall be produced in the originator MMS Relay/Server if and when the originator MMS Relay Server has sent an MM4_forward.REQ to the recipient MMS Relay/Server, regardless of whether or not a MM4_forward.RES is received from the recipient. That is, the CDR is created upon completion of transmission of the MM4_forward.REQ.

The MM4_forward.REQ may be generated as a reaction to an incoming MM1_forward.REQ. In this case, the *Originator address* field specifies the address of the originator MMS User Agent of the original MM, whereas the address of the forwarding MMS User Agent is contained in the *Forwarding address* field.

Table 4.5: Originator MM4 Forward Request record (O4FRq-CDR)

Field	Category	Description
Record Type	M	Originator MM4 Forward Request record.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the originator MMS Relay/Server.
Originator address	M	The address of the originator MMS User Agent of the MM. (If the MM4_forward.REQ is generated as a reaction to an incoming MM1_forward.REQ, this is the address of the originator MMS User agent of the original MM.)
Recipients address list	M	The address(es) of the recipient MMS User Agent(s) of the MM as specified in the MM4_forward.REQ that triggered the CDR.
Content type	M	The content type of the MM content.
MM component list	M_o	The list of media components with volume size.
Message size	M	The total size of the MM content.
Message class	C	The class of the MM (e.g., personal, advertisement, information service) if specified by the originator MMS User Agent
Submission Time	M	The time at which the MM was submitted or forwarded as specified in the corresponding MM1_submit.REQ or MM1_forwarding.REQ.
Time of Expiry	C	The desired date of expiry or duration of time prior to expiry for the MM if specified by the originator MMS User Agent.
Delivery Report Requested	M	This field indicates whether a delivery report has been requested by the originator MMS User Agent or not.
Priority	C	The priority (importance) of the message if specified by the originator MMS User Agent.
Sender visibility	M	A request to show or hide the sender's identity when the message is delivered to the MM recipient if the originator MMS User Agent has requested her address to be hidden from the recipient.
Read reply requested	M	A request for read reply report if the originator MMS User Agent has requested a read-reply report for the MM.
Acknowledgement Request	M	Request for MM4_forward.RES
Forward counter	C	A counter indicating the number of times the particular MM was forwarded.
Forwarding address	C	The address(es) of the forwarding MMS User Agent(s). 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.
Record Time Stamp	M	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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.3 Originator MM4 Forward Response CDR (O4FRs-CDR)

If enabled, an Originator MM4 Forward Response Charging Data Record (O4FRs-CDR) shall be produced in the originator MMS Relay/Server if and when, after an MM has been forwarded with an MM4_forward.REQ to the recipient MMS Relay/Server, the originator MMS Relay/Server receives a corresponding MM4_forward.RES from the recipient MMS Relay/Server.

Table 4.6: Originator MM4 Forward Response record (O4FRs-CDR)

Field	Category	Description
Record Type	M	Originator MM4 Forward Response record.
Originator MMS Relay/Server Address	M_o	IP address or domain name of the originator MMS Relay/Server.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the recipient MMS Relay/Server.
Request Status Code	M_o	The status code of the request to route forward the MM as received in the MM4_forward.RES.
Status Text	C_o	This field includes the status text as received in the MM4_forward.RES corresponding to the Request Status Code. Present only if provided in the MM4_forward.RES.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.4 Originator MM4 Delivery report CDR (O4D-CDR)

If enabled, a Originator MM4 Delivery report Charging Data Record (O4D-CDR) shall be produced in the originator MMS Relay/Server if and when the originator MMS Relay/Server receives an MM4_delivery_report.REQ from the recipient MMS Relay/Server.

Table 4.7: Originator MM4 Delivery report record (O4D-CDR)

Field	Category	Description
Record Type	M	Originator MM4 Delivery report record.
Recipient MMS Relay/Server Address	M_o	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M_o	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the recipient MMS Relay/Server.
Originator address	M_o	The address of the originator MMS User Agent of the MM.
Recipient address	M	The address of the MM recipient of the MM.
MM Date and time	M	Date and time the MM was handled (retrieved, expired, rejected, etc.) as specified in the MM4_delivery_report.
Acknowledgement Request	M	Request for MM4_delivery_report.RES
MM Status Code	M	The status code of the delivered MM as received in the MM4_delivery_report.REQ.
Status Text	C_o	This field includes the status text as received in the MM4_delivery_report.REQ corresponding to the MM Status Code. Present only if provided in the MM4_delivery_report.REQ.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.5 Originator MM1 Delivery report CDR (O1D-CDR)

If enabled, an Originator MM1 Delivery report Charging Data Record (O1D-CDR) shall be produced in the originator MMS Relay/Server if and when the originator MMS Relay/Server sends an MM1_delivery_report.REQ to the originator MMS User Agent.

Table 4.8: Originator MM1 Delivery report record (O1D-CDR)

Field	Category	Description
Record Type	M	Originator MM1 Delivery report record.
Recipient MMS Relay/Server Address	M_o	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M_o	IP address or domain name of the originator MMS Relay/Server.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the originator MMS Relay/Server.
Originator address	M_o	The address of the originator MMS User Agent of the MM.
Recipient address	M	The address of the MM recipient of the MM.
MM Status Code	M_o	The status code of the MM as sent in the MM Status information element in the MM1_delivery_report.REQ.
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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.6 Originator MM4 Read reply report CDR (O4R-CDR)

If enabled, a Originator MM4 Read reply report Charging Data Record (O4R-CDR) shall be produced in the originator MMS Relay/Server if and when the originator MMS Relay/Server receives an MM4_read_reply_report.REQ from the recipient MMS Relay/Server.

Table 4.9: Originator MM4 Read reply report record (O4R-CDR)

Field	Category	Description
Record Type	M	Originator MM4 Read reply report record.
Recipient MMS Relay/Server Address	M_o	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M_o	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the recipient MMS Relay/Server.
Originator address	M_o	The address of the originator MMS User Agent of the MM.
Recipient address	M_o	The address of the MM recipient of the MM.
MM Date and time	M_o	Date and time the MM was handled (retrieved, expired, rejected, etc.).
Acknowledgement Request	M	Request for MM4_read_reply_report.RES
Read Status	M_o	The status of the MM as received in the MM4_read_reply_report.REQ.
Status Text	C_o	This field includes the status text if received in the MM4_read_reply_report.REQ corresponding to the Read Status. Present only if provided in the MM4_read_reply_report.REQ.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.7 Originator MM1 Read reply originator CDR (O1R-CDR)

If enabled, an Originator MM1 Read reply originator Charging Data Record (O1R-CDR) shall be produced in the originator MMS Relay/Server if and when the originator MMS Relay/Server sends an MM1_read_reply_originator.REQ to the originator MMS User Agent.

Table 4.10: Originator MM1 Read reply originator record (O1D-CDR)

Field	Category	Description
Record Type	M	Originator MM1 Read reply originator record.
Recipient MMS Relay/Server Address	M_o	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M_o	IP address or domain name of the originator MMS Relay/Server.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the originator MMS Relay/Server.
Originator address	M_o	The address of the originator MMS User Agent of the MM.
Recipient address	M_o	The address of the MM recipient of the MM.
Read Status	M_o	The status of the MM as sent in the MM1_read_reply originator.REQ.
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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.1.8 Originator MM Deletion CDR (OMD-CDR)

If enabled, an Originator MM Deletion Charging Data Record (OMD-CDR) shall be produced in the originator MMS Relay/Server, after sending an MM1_submit.RES to the originator MMS User Agent, if and when:

a) the originator MMS Relay/Server decides to abandon processing of the MM at any point after receiving the corresponding MM1_submit.REQ; or,

b) the originator MMS Relay/Server decides to delete the MM because of expiry of storage time, which may either be indicated in the submit request or governed by operator procedure (e.g. after successful MM delivery).

Abandoning the processing of the MM, or deleting the MM, implies that there remains no knowledge of the MM in the originator MMS Relay/Server.

The status code indicates the precise reason for abandoning or deleting the MM with respect to the MMS transactions specified in 3GPP TS 23 140 [4].

This CDR is created regardless of whether the originator MMS Relay/Server is also the recipient MMS Relay/Server or not.

Table 4.11: Originator MM Deletion record (OMD-CDR)

Field	Category	Description
Record Type	M	Originator MM Deletion record.
Originator MMS Relay/Server Address	M_o	IP address or domain name of the originator MMS Relay/Server.
Recipient MMS Relay/Server Address	C	IP address or domain name of the recipient MMS Relay/Server. This field is present, if such an address is known.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Message size	M_o	The total size of the MM content.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2 MMS records for recipient MMS Relay/server

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

4.2.2.1 Recipient MM4 Forward CDR (R4F-CDR)

If enabled, a Recipient MM4 Forward CDR Charging Data Record (R4F-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server receives an MM4_forward.REQ from the originator MMS Relay/Server.

Table 4.12: Recipient MM4 Forward record (R4F-CDR)

Field	Category	Description
Record Type	M	Recipient MM4 Forward record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the originator MMS Relay/Server.
Originator address	M	The address of the originator MMS User Agent of the MM.
Recipients address list	M	The address(es) of the recipient MMS User Agent(s) of the -MM
Content type	M	The content type of the MM content.
MM component list	M_o	The list of media components with volume size.
Message size	M	The total size of the MM content.
Message class	C	The class selection such as personal, advertisement, information service.
Submission Time	M	The time at which the MM was submitted or forwarded as specified in the MM4_forward.REQ.
Time of Expiry	C	The desired date of expiry or duration of time prior to expiry for the MM if specified by the originator MMS User Agent.
Delivery Report Requested	M	This field indicates whether a delivery report has been requested by the originator MMS User Agent or not.
Priority	C	The priority (importance) of the message if specified by the originator MMS User Agent.
Sender visibility	M	A request to show or hide the sender's identity when the message is delivered to the MM recipient if the originator MMS User Agent has requested her address to be hidden from the recipient.
Read reply Requested	M	A request for read reply report if the originator MMS User Agent has requested a read-reply report for the MM.
Request status code	M	The status of the request to route forward the MM. If the MM4_forward.REQ is responded by an MM4_forward.RES, this shall be the same information as specified in the Request Status Code information element in the MM4_forward.RES.
Status Text	C	This field includes a more detailed technical status of the message at the point in time when the CDR is generated. If the MM4_forward.REQ is responded by an MM4_forward.RES, this shall be the same information as specified in the Status Text information element in the MM4_forward.RES corresponding to the Request Status Code.
Acknowledgement Request	M	Request for MM4_forward.RES
Forward_counter	C	A counter indicating the number of times the particular MM was forwarded.
Forwarding address	C	The address(es) of the forwarding MMS User Agent(s). 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.
Record Time stamp	M	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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.2 Recipient MM1 Notification Request CDR (R1NRq-CDR)

If enabled, a Recipient MM1 Notification Request Charging Data Record (R1NRq-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server sends an MM1_notification.REQ to the recipient MMS User Agent.

Table 4.13: Recipient MM1 Notification Request record (R1NRq -CDR)

Field	Category	Description
Record Type	M	Recipient MM1 Notification Request record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient 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.
Sender address	M	The address of the MMS User Agent as used in the MM1_notification_REQ. This parameter is present in the CDR regardless of address hiding.
Recipient address	M	The address of the MM recipient of the MM.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the recipient MMS User Agent.
Message class	M	The class selection such as personal, advertisement, information service; default = personal.
MM component list	Mo	The list of media components with volume size.
Message size	M_o	The total size of the MM content.
Time of Expiry	M_o	The date of expiry or duration of time prior to expiry for the MM.
Message Reference	M	A reference, e.g., URI, for the MM
Delivery Report Requested	M_O	This field indicates whether a delivery report is requested or not as specified in the MM1_notification.REQ.
Reply Charging	C_o	Information that a reply to this particular original MM is free of charge as specified in the MM1_notification.REQ.
Reply Deadline	C_o	In case of reply-charging the latest time of submission of a reply granted to the recipient as specified in the MM1_notification.REQ.
Reply Charging-Size	C_o	In case of reply-charging the maximum size of a reply-MM granted to the recipient as specified in the MM1_notification.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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.3 Recipient MM1 Notification Response CDR (R1NRs-CDR)

If enabled, a Recipient MM1 Notification Response Charging Data Record (R1NRs-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server receives an MM1_notification.RES from the recipient MMS User Agent.

Table 4.14: Recipient MM1 Notification Response record (R1NRs-CDR)

Field	Category	Description
Record Type	M	Recipient MM1 Notification Response record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Recipient address	M	The address of the MM recipient of the MM.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the recipient MMS User Agent.
Report allowed	C	Request to allow or disallow the sending of a delivery report to the MM originator if specified in the MM1_notification_RES.
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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.4 Recipient MM1 Retrieve CDR (R1Rt-CDR)

If enabled, a Recipient MM1 Retrieve Response Charging Data Record (R1Rt-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server has sent a MM1_retrieve.RES to the recipient MMS User Agent. That is, the CDR is created upon completion of transmission of the MM1_retrieve.RES.

Table 4.15: Recipient MM1 Retrieve Response record (R1Rt-CDR)

Field	Category	Description
Record Type	M	Recipient MM1 Retrieve record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient 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.
Sender address	C	The address of the MMS User Agent as used in the MM1_retrieve.RES. This parameter is present in the CDR regardless of address hiding.
Recipient address	M	The address of the recipient MM User Agent of the MM.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message Reference	M	Location of the content of the MM to be retrieved as specified in the MM1_retrieve.REQ.
Content type	M	The content type of the MM content.
MM component list	M_o	The list of media components with volume size.
Message class	C_o	The class of the message (e.g., personal, advertisement, information service) if specified in the MM1_retrieve.RES.
Submission Time	M	The time at which the MM was submitted or forwarded as specified in the MM1_retrieve.RES.
Message size	M_o	The total size of the MM content.
Delivery report Requested	M_o	A request for delivery report as specified in the Delivery Report information element in the MM1_retrieve.RES.
Priority	C_o	The priority (importance) of the message if specified in the MM1_retrieve.RES.
Read reply Requested	C_o	A request for read-reply report if specified in the Read Reply information element in the MM1_retrieve.RES.
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.
Reply Deadline	C_o	In case of reply-charging the latest time of submission of a reply granted to the recipient as specified in the MM1_retrieve.RES.
Reply Charging-Size	C_o	In case of reply-charging the maximum size of a reply-MM granted to the recipient as specified in the MM1_retrieve.RES.
Duration Of Transmission	M_o	The time used for transmission of the MM between the User Agent and the MMS Relay/Server.
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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.5 Acknowledgement CDR (R1A-CDR)

If enabled, a Recipient MM1 Acknowledgement Charging Data Record (R1A-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server receives an MM1_acknowledgement.REQ from the recipient MMS User Agent.

Table 4.16: Recipient MM1 Acknowledgement record (R1A-CDR)

Field	Category	Description
Record Type	M	Recipient MM1 Acknowledgement record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Recipient address	M	The address of the recipient MM User Agent of the MM.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Report allowed	C	Request to allow or disallow the sending of a delivery report to the MM originator if specified in the MM1_acknowledgement.RES.
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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.6 Recipient MM4 Delivery report Request CDR (R4DRq-CDR)

If enabled, a Recipient MM4 Delivery report Request Charging Data Record (R4DRq-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server sends an MM4_delivery_report.REQ to the originator MMS Relay/Server.

Table 4.17: Recipient MM4 Delivery report Request record (R4DRq-CDR)

Field	Category	Description
Record Type	M	Recipient MM4 Delivery report Request record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the recipient MMS Relay/Server.
Originator address	M	The address of the originator MMS User Agent of the MM.
Recipient address	M	The address of the MM recipient of the MM.
MM Date and time	M_o	Date and time the MM was handled (retrieved, expired, rejected, etc.).
Acknowledgement Request	M	Request for MM4_delivery_report.RES
MM Status Code	M_o	The status code of the MM as sent in the MM4_delivery_report.REQ.
Status Text	C_o	This field includes the status text as sent in the MM4_delivery_report.REQ corresponding to the MM Status Code.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.7 Recipient MM4 Delivery report Response CDR (R4DRs-CDR)

If enabled, an Recipient MM4 Delivery report Response Charging Data Record (R4DRs-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server receives an MM4_delivery_report.RES from the originator MMS Relay/Server.

Table 4.18: Recipient MM4 Delivery report Response record (R4DRs-CDR)

Field	Category	Description
Record Type	M	Recipient MM4 Delivery report Response record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the originator MMS Relay/Server.
Request Status Code	M_o	The status code of the MM as received in the MM4_delivery_report.RES.
Status Text	C_o	This field includes the status text as received in the MM4_delivery_report.RES corresponding to the Request Status Code.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.8 Recipient MM1 Read reply Recipient CDR (R1RR-CDR)

If enabled, a Recipient MM1 Read reply Recipient Charging Data Record (R1RR-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server receives an MM1_read_reply_recipient.REQ from the recipient MMS User Agent.

Table 4.19: Recipient MM1 Read reply Recipient record (R1RR-CDR)

Field	Category	Description
Record Type	M	Recipient MM1 Read reply Recipient record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Recipient address	M	The address of the recipient MM User Agent of the MM.
Originator address	M	The address of the MM originator of the original MM, i.e., the recipient of the read-reply report.
Access Correlation	M_o	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.9 Recipient MM4 Read reply report Request CDR (R4RRq-CDR)

If enabled, a Recipient MM4 Read reply report Request Charging Data Record (R4RRq-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server sends an MM4_read_reply_report.REQ to the originator MMS Relay/Server.

Table 4.20: Recipient MM4 Read reply report Request record (R4RRq-CDR)

Field	Category	Description
Record Type	M	Recipient MM4 read reply report Request record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the recipient MMS Relay/Server.
Originator address	M	The address of the originator MMS User Agent of the MM.
Recipient address	M	The address of the MM recipient of the MM.
MM Date and time	M_o	Date and time the MM was handled (retrieved, expired, rejected, etc.).
Acknowledgement Request	M	Request for MM4_read_reply_report.RES
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.10 Recipient MM4 Read reply report Response CDR (R4RRs-CDR)

If enabled, an Recipient MM4 Read reply report Response Charging Data Record (R4RRs-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server receives an MM4_read_reply_report.RES from the originator MMS Relay/Server.

Table 4.21: Recipient MM4 DeliveryRead reply report Response record (R4DRRs-CDR)

Field	Category	Description
Record Type	M	Recipient MM4 Read reply report Response record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
3GPP MMS Version	M_o	The MMS version of the originator MMS Relay/Server.
Request Status Code	M_o	The status code of the MM as received in the MM4_read_reply_report.RES.
Status Text	C_o	This field includes a more detailed technical status if received in the MM4_read_reply_report.RES corresponding to the Request Status Code.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.2.11 Recipient MM Deletion CDR (RMD-CDR)

If enabled, a Recipient MM Deletion Charging Data Record (RMD-CDR) shall be produced in the recipient MMS Relay/Server if and when:

a) the recipient MMS Relay/Server decides to abandon processing of the MM at any point after receiving the corresponding MM4_forward.REQ; or,

b) the recipient MMS Relay/Server decides to delete the MM because of expiry of storage time, which may either be indicated in the submit request or governed by operator procedure(e.g. after successful MM delivery).

Abandoning the processing of the MM implies that there remains no knowledge of the MM in the recipient MMS Relay/Server.

The status code indicates the precise reason for abandoning or deleting the MM with respect to the MMS transactions specified in 3GPP TS 23 140 [4].

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case only the Originator MM Deletion CDR specified in subclause 4.2.8 is required.

Table 4.22: Recipient MM Deletion record (RMD-CDR)

Field	Category	Description
Record Type	M	Recipient MM Deletion record.
Originator MMS Relay/Server Address	M	IP address or domain name of the originator MMS Relay/Server.
Recipient MMS Relay/Server Address	M_o	IP address or domain name of the recipient MMS Relay/Server.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Message size	M_o	The total size of the MM content.
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 delivering the message.
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.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

4.2.3 MMS records for forwarding MMS Relay/Server

4.2.3.1 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 4.23: MM Forwarding record (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.
Serving network identity	M_o	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	C_o	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

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 Charge 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.

5.5 Content Type

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

5.6 Delivery 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.

5.7 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 that 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 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 Forward Counter

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

5.10 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 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.

5.12 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.

5.13 Message Class

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

5.14 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.

5.15 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.

5.16 Message Size

The Message size is defined as the sum of the Subject information element size and the size of all the MM element(s), including the Presentation object (e.g. SMIL). Other information elements of a MM shall be excluded from the message size calculation.

5.16.1 Size of Subject information element

The size of the Subject information element shall be calculated as the length of the subject field in octets excluding the "Subject: " token.

5.16.2 Size of an MM element

The size of an MM element shall be calculated as the total number of octets of the media object, i.e. raw data without any boundaries or additional headers which are due to MIME-based encodings of the MM.

In case of an MM element being a multipart/mixed or multipart/related MIME message, the total number of octets contained in the body of that MIME message (i.e. that MM element) shall be counted including only the boundaries and additional headers which are part of the MIME message (i.e. that MM element).

NOTE 1: It is understood that due to the different encoding used in the MM4 reference point for the Subject field, there can be a slight discrepancy in the message size calculated over the MM1 and MM4 reference points.

NOTE 2: The message size of a submitted MM might differ from the message size of a retrieved MM if content adaptation is performed prior to its retrieval.

5.17 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 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.

5.19 MM Status Code

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

5.20 Originator Address

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

5.21 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.

5.22 Priority

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

5.23 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 Read Status

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

5.25 Recipient Address

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

5.26 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 Recipients Address List

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

5.28 Record Extensions

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

5.29 Record Time Stamp

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

5.30 Record Type

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

5.31 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).

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 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.

5.33 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 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.

5.35 Report allowed

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

5.36 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, etc.). For further details see TS 23.140 [4].

5.37 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.

5.38 Sender Visibility

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

5.39 Serving network identity

In MM1related CDRs, this field contains a SGSN PLMN Identifier (Mobile Country Code and Mobile Network Code), of the SGSN that was used during the MM1 transaction. In the O4FRq-CDR, this field reflects the PLMN Identifier of the SGSN that was used when the MM1_forward.REQ was received. In case the SGSN changes during the transaction, only the ID of the SGSN that was used at the beginning of the transaction is included in the CDR.

The MCC and MNC are coded as described for 'Routing Area Identity' in [14].

5.40 Status Text

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

5.41 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.

5.42 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.

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, PLMN-Id
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,
      servingNetworkIdentity    [29] PLMN-Id
}
```

```
MMO4FRqRecord ::= SET
{
    recordType                  [0]  CallEventRecordType,
    originatorMmsRSAddress      [1]  MMSRSAddress,
    recipientMmsRSAddress       [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    mms3GPPVersion              [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,
    servingNetworkIdentity      [23] PLMN-Id
}

MMO4FRsRecord ::= SET
{
    recordType                  [0]  CallEventRecordType,
    originatorMmsRSAddress      [1]  MMSRSAddress OPTIONAL,
    recipientMmsRSAddress       [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    mms3GPPVersion              [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,
    mms3GPPVersion              [4]  OCTET STRING OPTIONAL,
    originatorAddress           [5]  MMSAgentAddress OPTIONAL,
    recipientAddress            [6]  MMSAgentAddress,
    mmDateAndTime               [7] TimeStamp,
    acknowledgementRequest      [8] BOOLEAN,
    mmStatusCode                [9] MMStatusCodeType,
    statusText                  [10] StatusTextType OPTIONAL,
    recordTimeStamp             [11] TimeStamp OPTIONAL,
    localSequenceNumber         [12] LocalSequenceNumber OPTIONAL,
    recordExtensions            [13] ManagementExtensions OPTIONAL
}

MMO1DRecord ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress OPTIONAL,
    originatorMmsRSAddress      [2]  MMSRSAddress OPTIONAL,
    accessCorrelation           [3] AccessCorrelation OPTIONAL,
    messageID                   [4]  OCTET STRING,
    mms3GPPVersion              [5]  OCTET STRING OPTIONAL,
    originatorAddress           [6]  MMSAgentAddress OPTIONAL,
    recipientAddress            [7]  MMSAgentAddress,
    mmStatusCode                [8] MMStatusCodeType OPTIONAL,
    recordTimeStamp             [9] TimeStamp OPTIONAL,
    localSequenceNumber         [10] LocalSequenceNumber OPTIONAL,
    recordExtensions            [11] ManagementExtensions OPTIONAL,
    servingNetworkIdentity      [12] PLMN-Id
}
```

```
MMO4RRecord ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress OPTIONAL,
    originatorMmsRSAddress      [2]  MMSRSAddress OPTIONAL,
    messageID                   [3]  OCTET STRING,
    mms3GPPVersion              [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,
    mms3GPPVersion              [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,
    servingNetworkIdentity      [12] PLMN-Id
}

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,
    mms3GPPVersion              [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,
      servingNetworkIdentity        [21] PLMN-Id
}

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,
      servingNetworkIdentity        [11] PLMN-Id

}

MMR1RtRecord           ::= 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,
      messageReference              [24] OCTET STRING,
      servingNetworkIdentity        [25] PLMN-Id
}

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,
    servingNetworkIdentity      [11] PLMN-Id
}

MMR4DRqRecord          ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    originatorMmsRSAddress      [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    mms3GPPVersion              [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      [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    mms3GPPVersion              [4]  OCTET STRING OPTIONAL,
    requestStatusCode           [5] RequestStatusCodeType OPTIONAL,
    statusText                  [6] StatusTextType OPTIONAL,
    recordTimeStamp             [7] TimeStamp OPTIONAL,
    localSequenceNumber         [8] LocalSequenceNumber OPTIONAL,
    recordExtensions            [9] ManagementExtensions OPTIONAL
}

MMR1RRecord            ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    messageID                   [2]  OCTET STRING,
    recipientAddress            [3] MMSAgentAddress,
    originatorAddress           [4] MMSAgentAddress,
    accessCorrelation           [5] AccessCorrelation OPTIONAL,
    mmStatusCode                [6] MMStatusCodeType OPTIONAL,
    statusText                  [7] StatusTextType OPTIONAL,
    recordTimeStamp             [8] TimeStamp OPTIONAL,
    localSequenceNumber         [9] LocalSequenceNumber OPTIONAL,
    recordExtensions            [10] ManagementExtensions OPTIONAL,
    servingNetworkIdentity      [11] PLMN-Id
}

MMR4RRqRecord          ::= SET
{
    recordType                  [0]  CallEventRecordType,
    recipientMmsRSAddress       [1]  MMSRSAddress,
    originatorMmsRSAddress      [2]  MMSRSAddress,
    messageID                   [3]  OCTET STRING,
    mms3GPPVersion              [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,
        mms3GPPVersion                  [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,
        servingNetworkIdentity          [17] PLMN-Id
}

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

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

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

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

DeltaSeconds            ::= OCTET STRING (SIZE(8))

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

MediaComponents         = SET OF MediaComponent

MessageClass            ::= ENUMERATED
{
        personal                (0),
        advertisement           (1),
        information-service     (2),
        auto                    (3)
}

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

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
}

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
}

MMStatusCodeType        ::= ENUMERATED
{
        retrieved                       (0),
        forwarded                       (1),
        expired                         (2),
        rejected                        (3),
        deferred                        (4),
        unrecognised                    (5),
        read                            (6),
        deletedWithoutBeingRead         (7)
}

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

PriorityType    ::= ENUMERATED
{
        low             (0),
        normal          (1),
```

```
        high                (2)
}

RequestStatusCodeType       ::= 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

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

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

END
```

7 Charging Data Record Transfer

The generated MMS-CDR in the MMS Relay/Server shall be transferred to the Billing System by the use of FTAM protocol on X.25 or TCP/IP, or FTP or TFTP over TCP/IP. For further details of the use of FTAM see GSM 12.01 [10] and of the use of FTP see [11] and TFTP see [12].

Annex A (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Jun 2001	S_12	SP-010236	--	--	Submitted to TSG SA #12 for Information	1.0.0	1.0.1
Sep 2001	S_13	SP-010464	--	--	Submitted to TSG SA #13 for Approval	2.0.0	4.0.0
Mar 2002	S_15	SP-020017	001	--	Corrections for consistency with 23.140 (MMS)	4.0.0	4.1.0
Jun 2002	S_16	SP-020285	002	--	Align 32.200 (Charging Principles) with 32.235 (Service Charging) on MMS CDRs and parameter definitions for Charging Scenarios	4.1.0	4.2.0
Sep 2002	S_17	SP-020454	003	--	Corrections based on synchronisation of MMS ASN.1 and CDR definition tables	4.2.0	4.3.0
Sep 2002	S_17	SP-020454	004	--	Combine the Recipient MM1 Retrieve Request and Recipient MM1 Retrieve Response CDRs	4.2.0	4.3.0
Sep 2002	S_17	SP-020454	005	--	Alignment of the Message size definition with TS 23.140	4.2.0	4.3.0
Dec 2002	S_18	SP-020808	007	--	Correction of ASN.1 syntax errors	4.3.0	4.4.0
Mar 2003	S_19	SP-030058	009	--	Corrections on MMS addressing - alignment with T2's 23.140 (MMS stage 2)	4.4.0	4.5.0
Mar 2003	S_19	SP-030059	011	--	Correction of Message Size Definition - alignment with T2's 23.140	4.4.0	4.5.0
Jun 2003	S_20	SP-030267	015	--	Correction on charging for roaming MMS subscribers - alignment with 22.140, 29.061 and 29.060	4.5.0	4.6.0

History

Document history		
V4.0.0	September 2001	Publication
V4.1.0	March 2002	Publication
V4.2.0	June 2002	Publication
V4.3.0	September 2002	Publication
V4.4.0	December 2002	Publication
V4.5.0	March 2003	Publication
V4.6.0	June 2003	Publication