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Technical Specification

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Charging management;
Multimedia Messaging Service (MMS) charging
(3GPP TS 32.270 version 6.1.0 Release 6)**



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Foreword

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1 Scope

The present document is part of a series of documents that specify charging functionality and charging management in GSM/UMTS networks. The GSM/UMTS core network charging architecture and principles are specified in document TS 32.240 [1], which provides an umbrella for other charging management documents that specify:

- the content of the CDRs per domain and subsystem (offline charging);
- the content of real-time charging messages per domain / subsystem (online charging);
- the functionality of online and offline charging for those domains and subsystems;
- the interfaces that are used in the charging framework to transfer the charging information (i.e. CDRs or charging events).

The complete document structure for these TSs is defined in TS 32.240 [1].

The present document specifies the offline and online charging description for MMS charging, based on the functional stage 2 descriptions of the MMS in TS 23.140 [201]. This charging description includes the offline and online charging architecture and scenarios specific to the MMS, as well as the mapping of the common 3GPP charging architecture specified in TS 32.240 [1] onto MMS. It further specifies the structure and content of the CDRs for offline charging, and the charging events for online charging. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1];
- The parameters, abstract syntax and encoding rules for these CDR types are specified in TS 32.298 [51].
- A transaction based mechanism for the transfer of CDRs within the network is specified in TS 32.295 [54].
- The file based mechanism used to transfer the CDRs from the network to the operator's billing domain (e.g. the billing system or a mediation device) is specified in TS 32.297 [52].
- The 3GPP Diameter application that is used for MMS online charging is specified in TS 32.299 [50].

All references, abbreviations, definitions, descriptions, principles and requirements, used in the present document, that are common across 3GPP TSs, are defined in the 3GPP Vocabulary, TR 21.905 [100]. Those that are common across charging management in GSM/UMTS domains or subsystems are provided in the umbrella document TS 32.240 [1] and are copied into clause 3 of the present document for ease of reading. Finally, those items that are specific to the present document are defined exclusively in the present document.

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*.

a) The 3GPP charging specifications

[1] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging Architecture and Principles".

[2]-[9] Void.

- [10] 3GPP TS 32.250: "Telecommunication management; Charging management; Circuit Switched (CS) domain charging".
- [11] 3GPP TS 32.251: "Telecommunication management; Charging management; Packet Switched (PS) domain charging".
- [12] 3GPP TS 32.252: "Telecommunication management; Charging management; Wireless Local Area Network (WLAN) charging".
- [13]-[19] Void.
- [20] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".
- [21]-[30] Void.
- [31] 3GPP TS 32.271: "Telecommunication management; Charging management; Location Services (LCS) charging".
- [32]-[49] Void
- [50] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging application".
- [51] 3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) parameter description".
- [52] 3GPP TS 32.297: "Telecommunication management; Charging management; Charging Data Records (CDR) file format and transfer".
- [53] 3GPP TS 32.296: "Telecommunication management; Charging management; Online Charging System (OCS) applications and interfaces".
- [54] 3GPP TS 32.295: "Telecommunication management; Charging management; Charging Data Record (CDR) transfer".
- [55]-[69] Void.
- [70] 3GPP TS 23.125: "Overall High Level Functionality and Architecture Impacts of Flow Based Charging; Stage 2"
- [70]-[99] Void.
- b) Common 3GPP specifications**
- [100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [101] 3GPP TS 22.101: "Service aspects; Service Principles".
- [102] 3GPP TS 22.115: "Service aspects; Charging and billing".
- [103] 3GPP TS 23.002: "Network Architecture".
- [104] 3GPP TS 23.003: "Numbering, addressing and identification".
- [105] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [106]-[199] Void.
- c) other Domain and Service specific 3GPP / ETSI specifications**
- [200] 3GPP TS 22.140: "Service aspects; Stage 1; Multimedia Messaging Service".
- [201] 3GPP TS 23.140: "Multimedia Messaging Service (MMS); Functional description; Stage 2".
- [202]-[299] Void.
- d) Relevant ITU Recommendations**

- [300] ITU-T Recommendation D.93: "Charging and accounting in the international land mobile telephone service (provided via cellular radio systems)".
- [301]-[309] Void.
- [310] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [311]-[329] Void.
- [330] ITU-T Recommendation Q.767: "Application of the ISDN user part of CCITT signalling System No.7 for international ISDN interconnections".
- [331]-[349] Void.
- [350] ITU-T Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [351] ITU-T Recommendation X.121: "International numbering plan for public data networks".
- [352]-[399] Void.
- e) Relevant IETF RFCs**
- [400] IETF RFC 959 (1985): "File Transfer Protocol".
- [401] IETF RFC 3588 (2003): "Diameter Base Protocol"
- [402] IETF Internet-Draft "Diameter Credit Control Application" V05

Editor's note: The reference shall be replaced with the RFC number.[403] IETF RFC 1350: "The TFT Protocol (Revision 2)"

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of the present document, the following terms and definitions given in 3GPP TR 21.905 [50], 3GPP TS 32.240 [1] and 3GPP TS 22.140 [200] and the following apply:

accounting: process of apportioning charges between the Home Environment, Serving Network and Subscriber.

application data: Information / data specific to an application other than the MMS User Agent / VASP which is intended to be transported without alteration by using MMS. Application Data may be of any content type and format.

billing: function whereby CDRs generated by the charging function(s) are transformed into bills requiring payment.

Billing Domain: part of the operator network, which is outside the telecommunications network, that receives and processes CDR files from the network charging functions. It includes functions that can provide billing mediation and billing or other (e.g. statistical) end applications. It is only applicable to offline charging (see "Online Charging System" for equivalent functionality in online charging).

CDR field categories: the CDR fields are defined in the present document. They are divided into the following categories:

- **Mandatory (M):** field that shall always be present in the CDR.
- **Conditional (C):** field that shall be present in a CDR if certain conditions are met.
- **Operator Provisionable: Mandatory (O_m):** A field that operators have provisioned to always be included in the CDR.

- **Operator Provisionable: Conditional (O_c):** A field that operators have provisioned to be included in the CDR if certain conditions are met.

chargeable event: activity utilizing telecommunications network resources and related services for:

- user to user communication (e.g. a single call, a data communication session or a short message); or
- user to network communication (e.g. service profile administration); or
- inter-network communication (e.g. transferring calls, signalling, or short messages); or
- mobility (e.g. roaming or inter-system handover); and
- that the network operator may want to charge for.

As a minimum, a chargeable event characterises the resource / service usage and indicates the identity of the involved end user(s).

charged party: user involved in a chargeable event who has to pay parts or the whole charges of the chargeable event, or a third party paying the charges caused by one or all users involved in the chargeable event, or a network operator.

charging: a function within the telecommunications network and the associated OCS/BD components whereby information related to a chargeable event is collected, formatted, transferred and evaluated in order to make it possible to determine usage for which the charged party may be billed.

Charging Data Record (CDR): a formatted collection of information about a chargeable event (e.g. time of call set-up, duration of the call, amount of data transferred, etc) for use in billing and accounting. For each party to be charged for parts of or all charges of a chargeable event a separate CDR shall be generated, i.e. more than one CDR may be generated for a single chargeable event, e.g. because of its long duration, or because more than one charged party is to be charged.

charging event: a set of charging information forwarded by the CTF towards the CDF (offline charging) or towards the OCS (online charging). Each charging event matches exactly one chargeable event.

charging function: entity inside the network domain, subsystem or service that is involved in charging for that domain, subsystem or service.

circuit switched domain: domain within GSM / UMTS in which information is transferred in circuit switched mode.

credit control: ffs.

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.

domain: part of a communication network that provides network resources using a certain bearer technology.

forwarded MM: 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.

Fully Qualified Partial CDR (FQPC): partial CDR that contains a complete set of the fields specified in the present document. This includes all the mandatory and conditional fields as well as those fields that the PLMN operator has provisioned to be included in the CDR. The first Partial CDR shall be a Fully qualified Partial CDR.

message ID: unique identifier for an MM.

middle tier (charging) TS: used for the 3GPP charging TSs that specify the domain / subsystem / service specific, online and offline, charging functionality. These are all the TSs in the numbering range from 3GPP TS 32.250 to 3GPP TS 32.279, e.g. 3GPP TS 32.250 [10] for the CS domain, or 3GPP TS 32.270 [30] for the MMS service. Currently, there is only one "tier 1" TS in 3GPP, which is TS 32.240 [1] that specifies the charging architecture and principles. Finally, there are a number of top tier TSs in the 32.29x numbering range ([50] ff) that specify common charging aspects such as parameter definitions, encoding rules, the common billing domain interface or common charging applications.

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

MMS Relay/Server: 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: application residing on a user equipment, a mobile station or an external device that performs MMS-specific operations on a user's behalf and/or on another application's behalf. An MMS user agent is not considered part of an MMSE.

near real-time: near real-time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 minute.

offline charging: charging mechanism where charging information **does not** affect, in real-time, the service rendered.

online charging: charging mechanism where charging information can affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with bearer/session/service control is required.

Online Charging System: ffs.

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.

packet switched domain: domain within GSM / UMTS in which data is transferred in packet switched mode. Corresponds to the term "GPRS".

partial CDR: CDR that provides information on part of a subscriber session. A long session may be covered by several partial CDRs. Two formats are considered for Partial CDRs. One that contains all of the specified fields (FQPC); the second has a reduced format (RPC).

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.

real-time: real-time charging and billing information is to be generated, processed, and transported to a desired conclusion in less than 1 second.

recipient MMS user agent: 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.

settlement: payment of amounts resulting from the accounting process.

subscriber: a subscriber is an entity (associated with one or more users) that is engaged in a Subscription with a service provider. The subscriber is allowed to subscribe and unsubscribe services, to register a user or a list of users authorised to enjoy these services, and also to set the limits relative to the use that associated users make of these services.

user: an entity, not part of the 3GPP System, that uses network resources by means of a subscription. The user may or may not be identical to the subscriber holding that subscription.

User Equipment (UE): a device allowing a user access to network services. For the purpose of 3GPP specifications the interface between the UE and the network is the radio interface. A User Equipment can be subdivided into a number of domains, the domains being separated by reference points. Currently defined domains are the USIM and ME Domains. The ME Domain can further be subdivided into several components showing the connectivity between multiple functional groups. These groups can be implemented in one or more hardware devices. An example of such a connectivity is the TE – MT interface. Further, an occurrence of a User Equipment is an MS for GSM as defined in GSM TS 04.02.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [50], 3GPP TS 23.140 [201], 3GPP TS 32.240 [1] and the following apply:

3G	3 rd Generation
3GPP	3 rd Generation Partnership Project

AVP	Attribute Value Pair
BD	Billing Domain
CCA	Credit Control Answer
CCR	Credit Control Request
CDF	Charging Data Function
CDR	Charging Data Record
CGF	Charging Gateway Function
CS	Circuit Switched
CTF	Charging Trigger Function
DCCA	Diameter Credit Control Application
EBCF	Event Based Charging Function
ECUR	Event Charging with Unit Reservation
FTAM	File Transfer, Access and Management
GPRS	General Packet Radio Service
GSM	Global System for Mobile communication
HLR	Home Location Register
IEC	Immediate Event Charging
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ITU-T	International Telecommunication Union - Telecommunications standardization sector
LCS	LoCation Service
MCC	Mobile Country Code (part of IMSI)
ME	Mobile Equipment
MIME	Multipurpose Internet Mail Extensions
MM	Multimedia Message
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Element
MMSNA	Multimedia Messaging Service Network Architecture
MMSO	Multimedia Messaging Service Originator
MMSR	Multimedia Messaging Service Recipient
MMSR/S	Multimedia Messaging Relay/Server
MNC	Mobile Network Code (part of IMSI)
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
NE	Network Element
OCS	Online Charging System
PLMN	Public Land Mobile Network
PS	Packet-Switched
RPC	Reduced Partial CDR
TR	Technical Report
TS	Technical Specification
UA	User Agent
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
USIM	User Service Identity Module
VAS	Value Added Service
VASP	Value Added Service Provider

3.3 Symbols

For the purposes of the present document, the following symbols apply:

Ci	Charging Trigger in combined MMS Relay/Server.
Bm	Reference point for the CDR file transfer from the MMS CGF to the BD.
Mi	Charging Trigger in MMS Relay/Server for MMBox Management.
MM1	The reference point between the MMS User Agent and the MMS Relay/Server.
MM2	The reference point between the MMS Relay and the MMS Server.
MM3	The reference point between the MMS Relay/Server and external (legacy) messaging systems.

MM4	The reference point between the MMS Relay/Server and another MMS Relay/Server that is within another MMSE.
MM5	The reference point between the MMS Relay/Server and the Home Location Register (HLR).
MM6	The reference point between the MMS Relay/Server and the MMS User Databases.
MM7	The reference point between the MMS Relay/Server and MMS VAS Applications.
MM8	The reference point between the MMS Relay/Server and the post-processing system.
MM9	The reference point between the MMS Relay/Server and the online charging system.
Oi	Charging Trigger in Originator MMS Relay/Server.
Ri	Charging Trigger in Recipient MMS Relay/Server.

4 Architecture considerations

4.1 High level MMS architecture

Figure 4.1 depicts the MMS reference architecture, as described in 3GPP TS 23.140 [201].

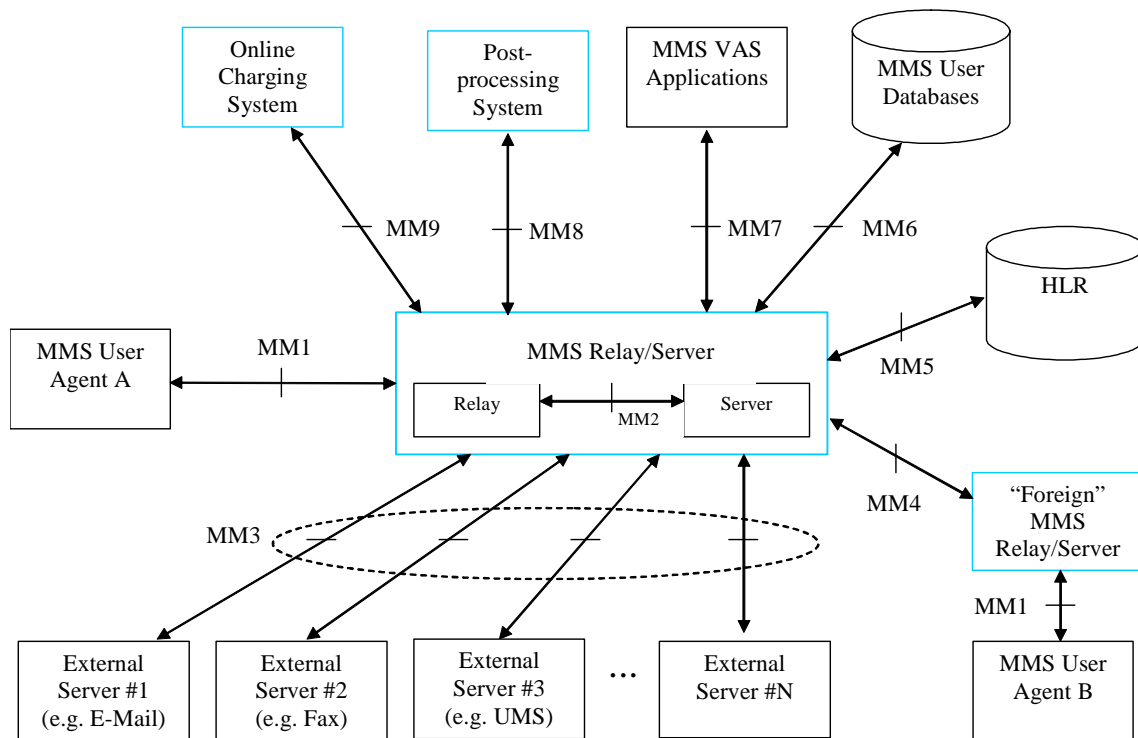


Figure 4.1: MMS reference architecture

As can be seen in figure 4.1, the following MMS elements are relevant for charging:

- MMS Relay/Server,
- "Foreign" MMS Relay/Server

4.2 MMS offline charging architecture

As described in TS 32.240 [1], the CTF (an integrated component in each charging relevant NE) generates charging events and forwards them to the CDF. The CDF, in turn, generates CDRs which are then transferred to the CGF. Finally, the CGF creates CDR files and forwards them to the Billing Domain.

In MMS, all charging functions (CTF, CDF and CGF) reside within the MMS R/S. I.e. the MMS R/S is connected directly to the Billing Domain via the Bm interface. Bm is the MMS specific variant of the common Bx interface and is functionally equivalent to MM8. This architecture implies that there exists no separate CDF and CGF for MMS, i.e. no corresponding open interfaces between any such functions, within the 3GPP standards.

Figure 4.2 depicts the mapping of the 3GPP common charging architecture, as laid down in 3GPP TS 32.240 [1], onto the MMS.

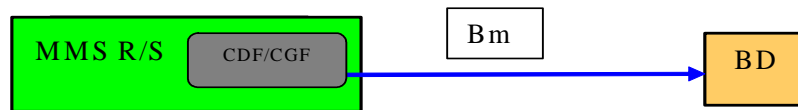


Figure 4.2 MMS offline charging architecture

In addition to the standard approach depicted in figure 4.2, vendors may choose to implement separate CDF and CGF for MMS. In that case, the interfaces between these functions should comply with the definition of the Rf and Ga interfaces (3GPP TS 32.299 [50] and 3GPP TS 32.295 [54], respectively) as much as possible.

4.3 MMS online charging architecture

MMS online charging is based on MMS R/S functionality that is further specified in the present document. For online charging, the MMS R/S utilises the Ro interface and application towards the OCS as specified in TS 32.299 [50]. The Ro reference point covers all online charging functionality required for MMS, i.e. it is functionally equivalent to the MM9 reference point.

The MMS online charging architecture is depicted in figure 4.3.

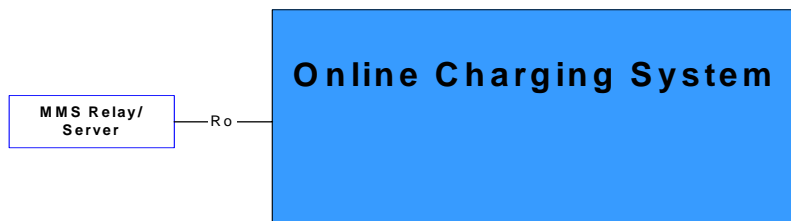


Figure 4.3: MMS online charging architecture

Details on the interfaces and functions can be found in TS 32.240 [1] for the general architecture components, TS 32.296 [53] for the OCS, and 32.299 [50] for the Ro application.

5 MMS charging principles and scenarios

5.1 MMS charging principles

The MMS Relay/Server collects charging information for each MM transaction that crosses the relevant reference points defined in 3GPP TS 22.140 [200]. The chargeable events that trigger the collection of charging information on the applicable reference points are identical for MMS offline and online charging and are specified below. The use of the events to generate CDRs (offline charging) or credit control requests (online charging) are described in clause 5.2 for offline charging and in clause 5.3 for online charging, respectively.

In line with the requirements laid down in TS 22.140 [200] and TS 23.140 [201] the MMS R/S collects charging information such as:

- the destination and source addresses used by the UA;
- identification of the MMS R/S(s) involved in the MM transaction;
- the amount and type of user data transmitted in MO and MT directions for the transfer of MM, i.e. the size of the MM and its components;
- storage duration, i.e. the time interval when a MM is saved on a non-volatile memory media;

- identification of the bearer resources used for the transport of the MM, i.e. the identity of the network and the network nodes;
- in scenarios involving a VASP, the charging information describes the identification of the VASP and the amount of user data sent and received between the MMS R/S and the VASP.

The information listed above is captured for use cases in relation to:

- MM submission;
- MM retrieval;
- MM forwarding;
- transactions involving the MMbox;
- transactions involving a VASP.

Refer to TS 23.140 [201] for further details on the above MM transactions.

The following scenarios can be distinguished in MMS charging:

- Combined originator and recipient MMS relay server. This scenario covers the case where the Originator MMS R/S and the Recipient MMS R/S are identical, which implies that that particular MMS R/S handles both MM submission and MM retrieval.
- Distributed originator and recipient MMS relay server. This scenario covers the case of the Originator MMS R/S and the Recipient MMS R/S being two different entities, where the Originator MMS R/S handles MM submission and the Recipient MMS R/S handles MM retrieval.
- MMBox management. MMBox is a logical entity of the MMS R/S that allow to support the persistent network-based storage of the MMs. This feature is an extension of the MM1 interface that enables a MMS User Agent to store, retrieve and delete incoming and submitted MMs.
- VASP transactions. MMS VAS Application offers value added services to the MMS Users. The MMS VASP are able to interact with the MMS R/S via the MM7 interface using transactions similar to those of the MM1 interface i.e. submission, reception, delivery-report, read-reply report, etc.

These scenarios all pertain to atomic actions related to MMs, e.g. submission, retrieval, storage, deletion, etc., implying that MMS only uses event based charging, as specified in TS 32.240 [1] (i.e. session based charging is not applicable for MMS). The following subclauses further describe the above scenarios and illustrate the conditions for the various types of chargeable events based on MMs crossing the reference points identified in TS 32.140 [201] (MM1, MM4 and MM7). The labels in the message flows identify the chargeable events in relation to the particular reference point.

5.1.1 Combined originator and recipient MMS relay server

This scenario covers the case where the Originator MMS R/S and the Recipient MMS R/S are identical, which implies that that particular MMS R/S handles both MM submission and MM retrieval.

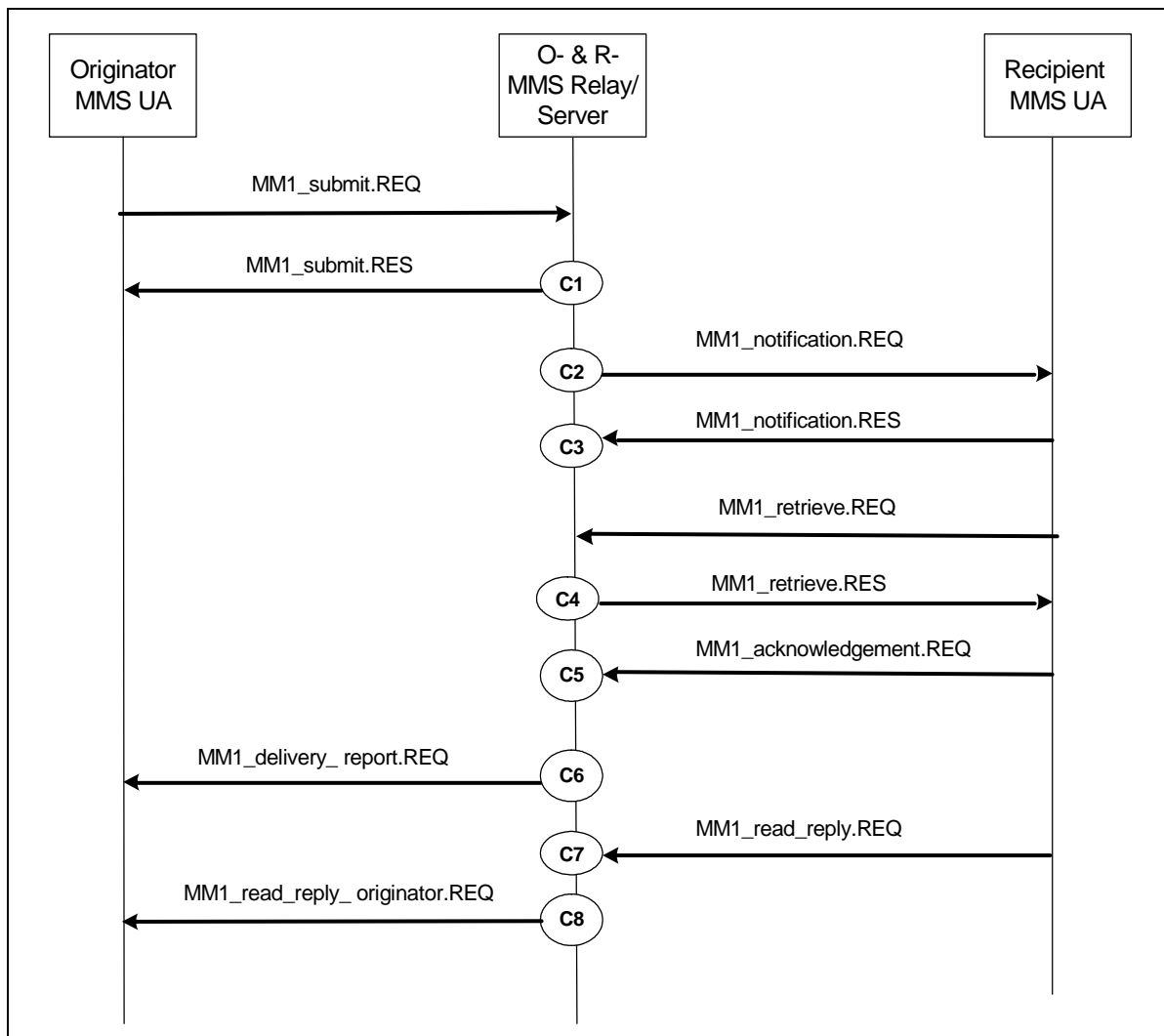


Figure 5.1: Chargeable event overview for combined case

Table 5.1: Trigger point overview for combined MMS Relay/Server

Trigger point	Trigger name
C1	Originator MM1 Submission
C2	Recipient MM1 Notification Request
C3	Recipient MM1 Notification Response
C4	Recipient MM1 Retrieval
C5	Recipient MM1 Acknowledgement
C6	Originator MM1 Delivery report
C7	Recipient MM1 Read reply Recipient
C8	Originator MM4 Read reply originator
Any time between C1 to C8	Originator MM Deletion

NOTE: Chargeable events for MM submission and retrieval are triggered by the MMS R/S responding to MM1_submit.REQ and MM1_retrieve.REQ, rather than upon receiving those requests.

5.1.2 Distributed originator and recipient MMS relay server

This scenario covers the case of the Originator MMS R/S and the Recipient MMS R/S being two different entities, where the Originator MMS R/S handles MM submission and the Recipient MMS R/S handles MM retrieval.

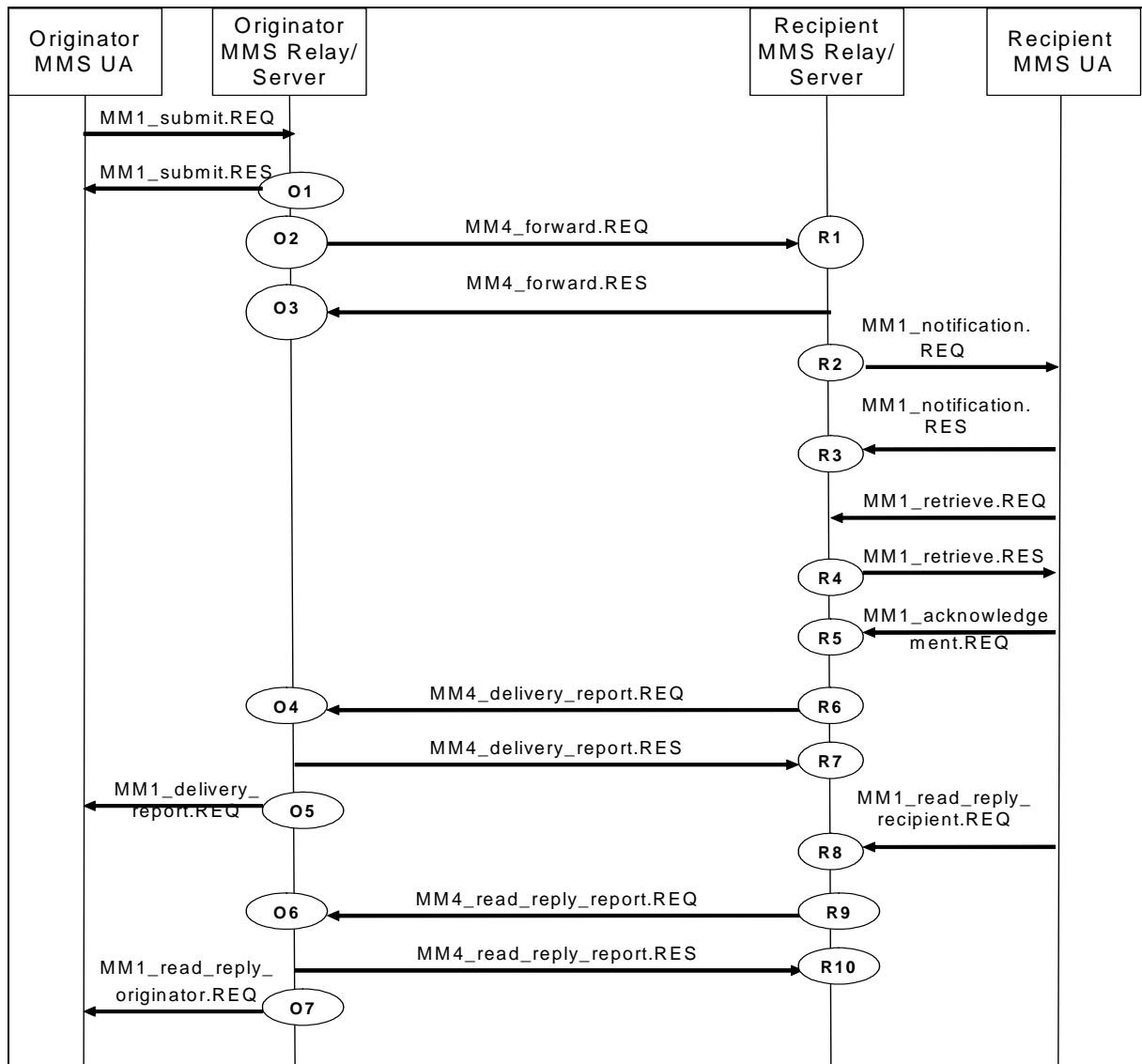


Figure 5.2: Chargeable event overview for distributed case

Table 5.2a: Trigger type overview for the Originator MMS Relay/Server

Trigger point	Trigger name
O1	Originator MM1 Submission
O2	Originator MM4 Forward Request
O3	Originator MM4 Forward Response
O4	Originator MM4 Delivery report
O5	Originator MM1 Delivery report
O6	Originator MM4 Read reply report
O7	Originator MM1 Read reply originator
Any time between O1... O7	Originator MM Deletion
NOTE: Chargeable events for MM submission are triggered by the MMS R/S responding to MM1_submit.REQ, rather than upon receiving those requests.	

Table 5.2b: Trigger type overview for the Recipient MMS Relay/Server

Trigger point	Trigger name
R1	Recipient MM4 Forward
R2	Recipient MM1 Notification Request
R3	Recipient MM1 Notification Response
R4	Recipient MM1 Retrieval
R5	Recipient MM1 Acknowledgement
R6	Recipient MM4 Delivery report Request
R7	Recipient MM4 Delivery report Response
R8	Recipient MM1 Read reply Recipient
R9	Recipient MM4 Read reply report Request
R10	Recipient MM4 Read reply report Response
Anytime after R1	Recipient MM Deletion

NOTE: Chargeable events for MM retrieval are triggered by the MMS R/S responding to MM1_retrieve.REQ, rather than upon receiving those requests.

5.1.3 MMBox management

MMBox is a logical entity of the MMS R/S that allows to support the persistent network-based storage of the MMs. This feature is an extension of the MM1 interface that enables the MMS User Agent to store, retrieve and delete incoming and submitted MMs. For further detailed description of "Persistent Network-Based Storage" see TS 23.140 [201].

This scenario, as depicted in figure 5.3, covers the MM transactions related to MMBox usage and the associated chargeable events in the affected MMS R/S.

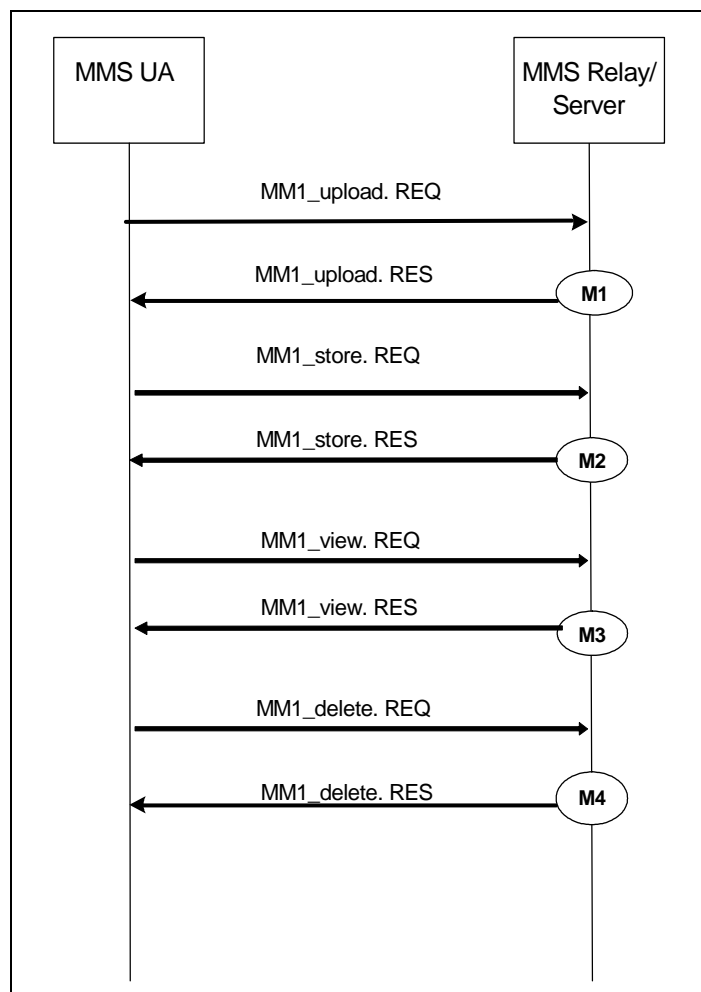


Figure 5.3: Chargeable event overview for MMBox management

Table 5.3: Trigger type overview for MMBox management

Trigger point	Trigger name
M1	MMBox MM1 Upload
M2	MMBox MM1 Store
M3	MMBox MM1 View
M4	MMBox MM1 Delete
NOTE:	Chargeable events for MM Upload, Store, View and Delete are triggered by the MMS R/S responding to these requests, rather than upon receiving them.

5.1.4 VASP transactions

MMS VAS Application offers value added services to the MMS Users. The MMS VASP are able to interact with the MMS R/S via the MM7 reference point using transactions similar to those of the MM1 interface i.e. submission, reception, delivery-report, read-reply report, etc.

The VASP may provide service codes that contain billing information which may be transferred to the MMS Relay/Server and passed directly to the billing system without intervention. In addition, the VASP may provide an indication to the MMS Relay/Server which party is expected to be charged for an MM submitted by the VASP, e.g. the sending, receiving, both parties or neither.

This scenario, as depicted in figure 5.4, covers the VASP related MM transactions and the associated chargeable events in the affected MMS R/S.

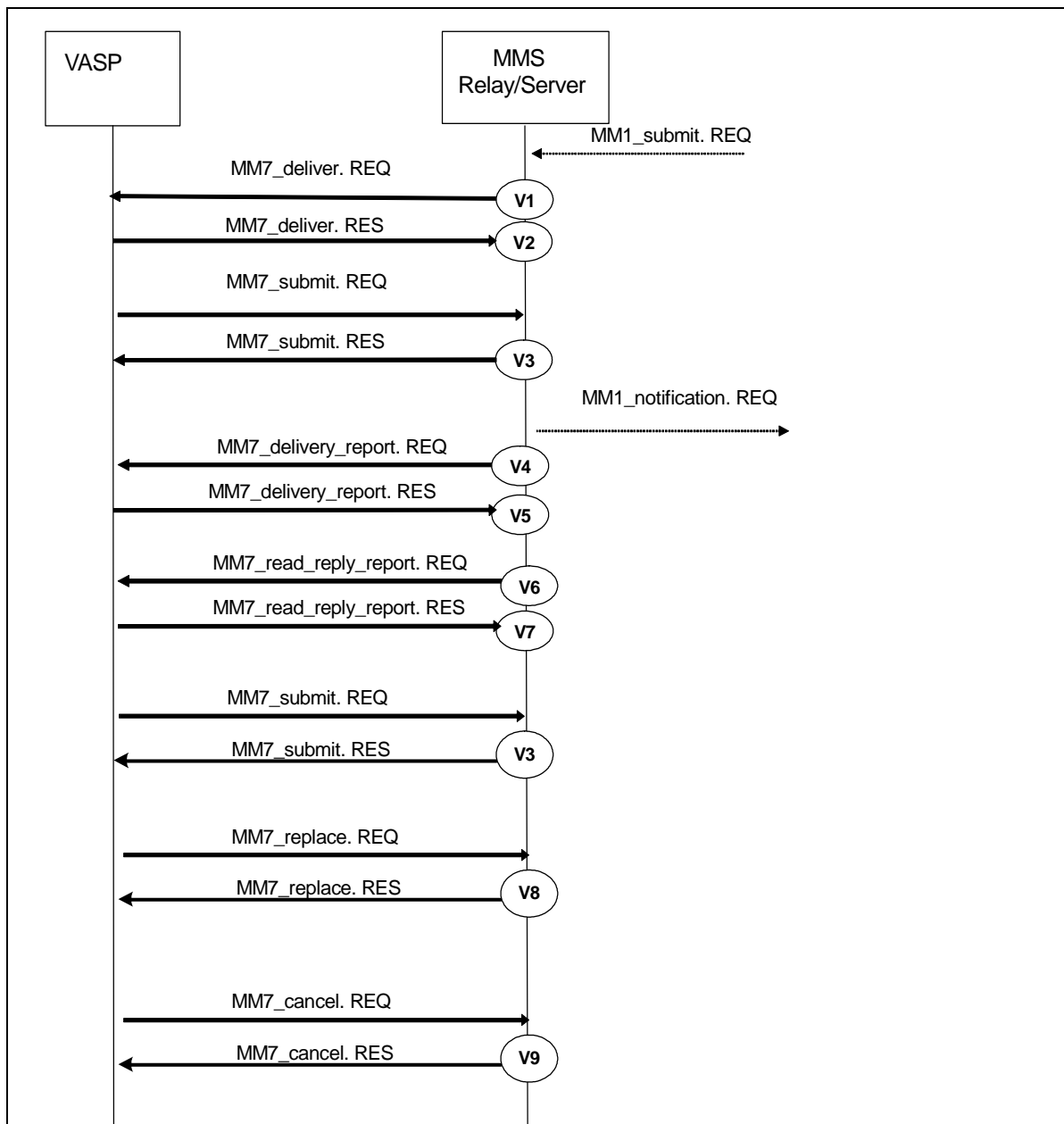


Figure 5.4: Chargeable event overview for VASP transactions

Table 5.4: Trigger type overview for VASP transactions

Trigger point	Trigger name
V1	MM7 Deliver report Request
V2	MM7 Deliver report Response
V3	MM7 Submission
V4	MM7 Delivery report Request
V5	MM7 Delivery report Response
V6	MM7 Read reply report Request
V7	MM7 Read reply report Response
V8	MM7 Replacement
V9	MM7 Cancellation

NOTE: Chargeable events for MM7 submission, replacement and cancellation are triggered by the MMS R/S responding to these requests, rather than upon receiving them.

5.2 MMS offline charging scenarios

5.2.1 Basic principles

MMS offline charging implies the generation of CDRs of various types by the involved MMS R/S(s). As explained in clause 5.1, only event based charging applies to MMS, i.e. there is no use of session based charging in the MMS R/S. In line with the principles for event based charging laid down in TS 32.240 [1], the relationship between chargeable events and charging events is 1:1, and the relationship between charging events and CDRs is also 1:1.

The chargeable event triggers are defined in clause 5.1.1 – 5.1.4 above and are identified by the labels within the figures 5.1. – 5.4 (message flows) in relation to the particular MMS reference point. As can be seen from these figures, the chargeable events relate to transactions at the MM1, MM4 and MM7 reference points.

An open Rf or Ga interface is not specified for MMS in the 3GPP standards, hence no charging events (Rf message flows) are specified in clause 5.2.2. In clause 5.2.3 below, CDR generation is described in relation to the chargeable event triggers specified in clause 5.1, given that there is a 1:1 relation all the way from chargeable event to CDR type as explained in the first paragraph above. However, due to the absence of a standard Ga interface for MMS, from the 3GPP standards perspective these CDRs are only visible in CDR files crossing the Bm interface.

5.2.2 Rf message flows

Not applicable, as the separation of the CTF and CDF is not in the scope of the MMS charging standards. Refer to clause 4.2 for further information.

Note: Vendors may nevertheless implement a separate CTF and CDF for MMS charging. In this case, it is recommended that the approach chosen conforms to the principles and protocol applications specified in TS 32.299 [50].

5.2.3 CDR generation

For MMS, the Ga interface is not applicable, as the separation of the CDF and CGF is not in the scope of the MMS charging standards. I.e the following CDR types are visible only in the CDR files transferred from the MMS R/S embedded CGF to the BD via the Bm interface.

Note: If vendors choose to implement the Ga interface for MMS, then it is recommended that the approach chosen conforms with the CDRs specified in this section and the Ga protocol conventions laid down in TS 32.295 [54].

5.2.3.1 Combined originator and recipient MMS relay server case

The chargeable events for the case of a combined originator and recipient MMS R/S are depicted in figure 5.1 and further listed in table 5.1. Due to the fact that only event based charging applies to MMS (cf. clause 5.2.1), these chargeable events translate 1:1 into the CDR types listed in table 5.5 below.

The first row in table 5.5 refers to the trigger labels in figure/table 5.1. The second row identifies the associated CDR type. The content of these CDR types is specified in clause 6.

Table 5.5: Record type overview for combined MMS Relay/Server

Record trigger	C1	C2	C3	C4	C5	C6	C7	C8	Any time between C1 .. C8
Record type	O1S	R1NRq	R1NRs	R1Rt	R1A	O1D	R1RR	O1R	OMD

5.2.3.2 Distributed originator and recipient MMS relay server case

The chargeable events for the case of distributed originator and recipient MMS R/Ss are depicted in figures 5.2a/b and further listed in table 5.2. Due to the fact that only event based charging applies to MMS (cf. clause 5.2.1), these chargeable events translate 1:1 into the CDR types listed in tables 5.6a/b below.

The first row in the tables refers to the trigger labels in figure/table 5.2. The second row identifies the associated CDR type. The content of these CDR types is specified in clause 6.

Table 5.6a: Record type overview for the Originator MMS Relay/Server

Record Trigger	O1	O2	O3	O4	O5	O6	O7	Any time between O1.. O7
Record Type	O1S	O4FRq	O4FRs	O4D	O1D	O4R	O1R	OMD

Table 5.6b: Record type overview for the Recipient MMS Relay/Server

Record trigger	R1	R2	R3	R4	R5
Record type	R4F	R1NRq	R1NRs	R1Rt	R1A

Table 5.4b (cont'd): Record type overview for the Recipient MMS Relay/Server

Record trigger	R6	R7	R8	R9	R10	Anytime after R1
Record type	R4DRq	R4DRs	R1RR	R4RRq	R4RRs	RMD

5.2.3.3 MMBox related CDRs

The chargeable events for the MMBox management are depicted in figure 5.3 and further listed in table 5.3. Due to the fact that only event based charging applies to MMS (cf. clause 5.2.1), these chargeable events translate 1:1 into the CDR types listed in table 5.7 below.

The first row in table 5.7 refers to the trigger labels in figure/table 5.3. The second row identifies the associated CDR type. The content of these CDR types is specified in clause 6.

Table 5.7: Trigger type overview for MMBox management

Record trigger	M1	M2	M3	M4
Record type	Bx1U	Bx1S	Bx1V	Bx1D

5.2.3.4 CDRs related to VASP transactions

The chargeable events for the VASP transactions are depicted in figure 5.4 and further listed in table 5.4. Due to the fact that only event based charging applies to MMS (cf. clause 5.2.1), these chargeable events translate 1:1 into the CDR types listed in table 5.8 below.

The first row in table 5.8 refers to the trigger labels in figure/table 5.4. The second row identifies the associated CDR type. The content of these CDR types is specified in clause 6.

Table 5.8a: Record type overview for VASP transactions

Record trigger	V1	V2	V3	V4	V5
Record type	MM7S	MM7DRq	MM7DRs	MM7C	MM7R

Table 5.8b: Record type overview for VASP transactions (cont')

Record trigger	V6	V7	V8	V9
Record type	MM7DRRq	MM7DRRs	MM7RRq	MM7RRs

5.2.4 Ga record transfer flows

Not applicable, as the separation of the CDF and CGF is not in the scope of the MMS charging standards. Refer to clause 4.2 for further information.

Note: Vendors may nevertheless implement a separate CDF and CGF for MMS charging. In this case, it is recommended that the approach chosen conforms to the principles and protocol applications specified in TS 32.295 [54].

5.2.5 Bm CDR file transfer

The integrated CGF of the MMS R/S transfers the CDR files to the BD as described in TS 32.297 [52]. In MMS, both fully qualified partial CDRs (FQPC) and reduced partial CDRs (RPC), as specified in TS 32.240 [1] may be supported on the Bm interface. In line with TS 32.240 [13], the support of FQPCs is mandatory, the support of RPCs is optional. For further details on the Bm protocol application refer to TS 32.297 [52].

5.3 MMS Online charging scenarios

MMS online charging uses the Credit Control application as specified in TS 32.299 [50].

5.3.1 Basic principles

ffs.

5.3.2 Ro message flows

The message flows described in the present document specify the charging communications between MMS R/S and the Online Charging System (OCS) for different charging scenarios. The MMS messages associated with these charging scenarios are shown primarily for general information and to illustrate the charging triggers that are also used for MMS offline charging.

5.3.2.1 MM submission

Figure 5.5 shows the credit control transactions that are required between MMS R/S and OCS during the MM submission. In this scenario the originator MMS User Agent is the party to charge for the MM submission.

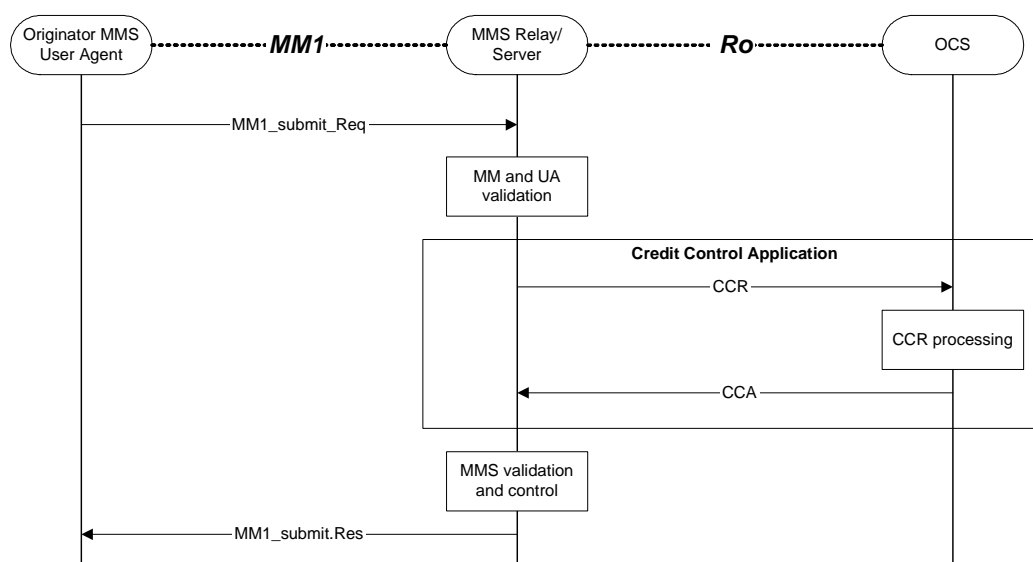


Figure 5.5: MMS Online charging scenario for MM submission

5.3.2.2 MM retrieval

Figure 5.6 shows the credit control transactions that are required between MMS R/S and OCS during the MM retrieval. In this scenario the recipient MMS User Agent is the party to charge for the reception.

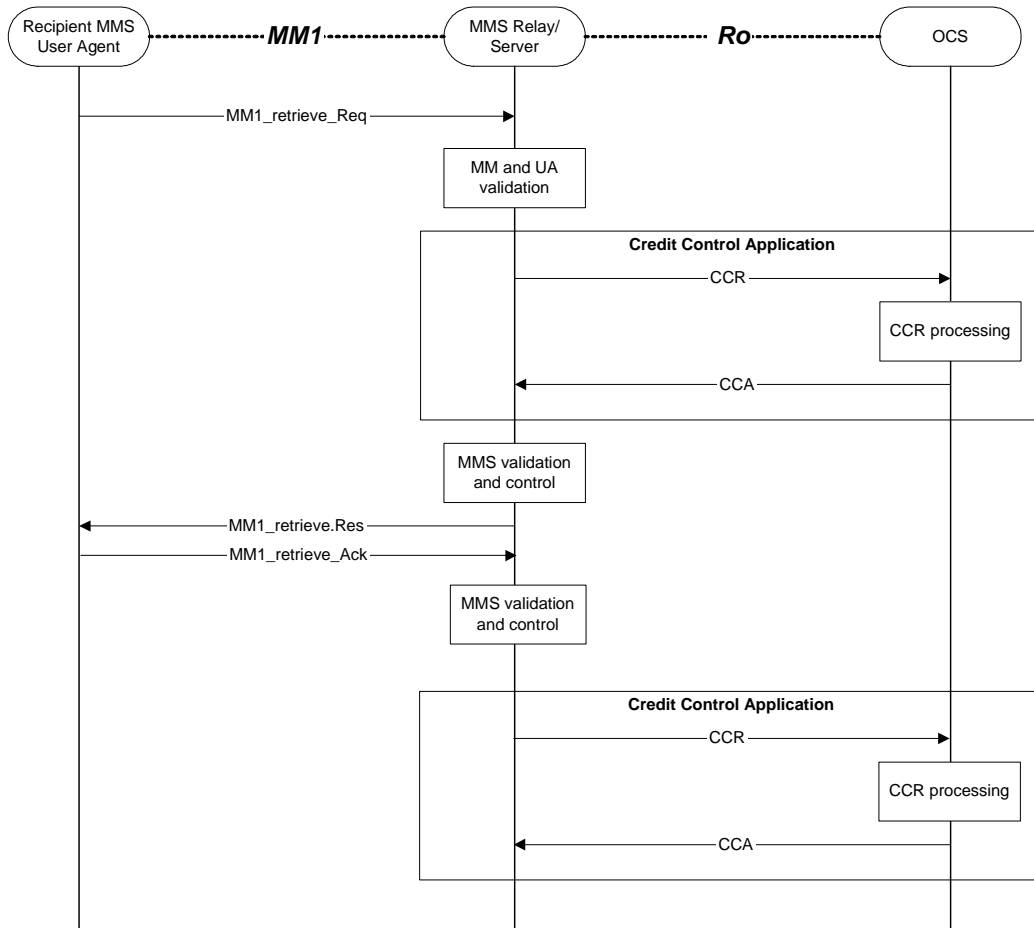


Figure 5.6: MMS Online charging scenario for MM retrieval

5.3.2.3 MMS reports

5.3.2.3.1 Delivery Report

FFS.

5.3.2.3.2 Read Report

FFS.

6 Definition of charging information

This clause provides Stage 3 specifications of the CDR type and content for MMS, in line with the CDR type definitions provided in clause 5.2.3.

6.1 Data description for MMS offline charging

Dedicated types of CDRs can be generated 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 clause. For each CDR type the parameter definition includes the parameter name, description and category.

Equipment vendors shall be able to provide all of the parameters 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 parameters that are not essential for their operation. This operator provisionable reduction is specified by the parameter category.

A parameter category can have one of two primary values:

- M** This parameter is **Mandatory** and shall always be present in the CDR;
- C** This parameter shall be present in the CDR only when certain **Conditions** are met. These **Conditions** are specified as part of the parameter definition.

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

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

- O_m** This is a parameter that, if provisioned by the operator to be present, shall always be included in the CDRs. In other words, a **O_m** parameter that is provisioned to be present is a mandatory parameter;
- O_c** This is a parameter that, if provisioned by the operator to be present, shall be included in the CDRs when the required conditions are met. In other words, a **O_c** parameter that is configured to be present is a conditional parameter.

The MMS Relay/Server' CGF shall be able to provide the CDRs at the Billing System interface in the format and encoding described in the present document. In MMS, both fully qualified partial CDRs (FQPC) and reduced partial CDRs (RPC), as specified in TS 32.240 [1] may be supported on the Bm interface. In line with TS 32.240 [13], the support of FQPCs is mandatory, the support of RPCs is optional.

The following tables provide a brief description of each CDR parameter. Full definitions of the parameters, sorted by the parameter name in alphabetical order, are provided in TS 32.298 [51].

6.1.1 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.

6.1.1.1 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 6.1.3.

Table 6.1: 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	O _m	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
Content Class	O _c	This field classifies the content of the MM to the smallest content class to which the MM belongs, if specified in the MM1_submit_REQ
DRM Content	O _c	This field indicates if the MM contains DRM-protected content, if specified in the MM1_submit_REQ
Adaptations	O _c	This field indicates if the originator allows adaptation of the content (default True), if specified in the MM1_submit_REQ
MM component list	O _m	The list of media components with volume size
Message size	M	The total size of the MM content
Message class	O _c	The class selection such as personal, advertisement, information service if specified in the MM1_submit_REQ
Charge Information	O _m	The charged party indication and charge type
Submission Time	O _c	The time at which the MM was submitted from the originator MMS User Agent if specified in the MM1_submit_REQ
Time of Expiry	O _c	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	O _m	The time used for transmission of the MM between the User Agent and the MMS Relay/Server
Request Status Code	O _m	The status code of the MM as received in the MM1_submit_REQ
Delivery Report Requested	O _m	This field indicates whether a delivery report has been requested by the originator MMS User Agent or not
Reply Charging	O _c	A request for reply-charging if specified by the originator MMS User Agent
Reply Deadline	O _c	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	O _c	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	O _c	The priority (importance) of the message if specified by the originator MMS User Agent
Sender visibility	O _m	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	O _m	A request for read reply report as specified in the MM1_submit.REQ
Status Text	O _c	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
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.

Field	Category	Description
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
MMS Storage Information	C _o	A set of parameters related to the MMS management. This parameter is only present if the MMS 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)
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	C _o	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.1.2 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 an 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 6.2: 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	O _m	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
Recipient address for routing	M	The address(es) of the recipient MMS User Agent(s) of the MM for that routing is requested as specified in the MM4_forward.REQ that triggered the CDR
Content type	M	The content type of the MM content
Content Class	O _c	This field classifies the content of the MM to the smallest content class to which the MM belongs, if specified in the MM4_forward_REQ
DRM Content	O _c	This field indicates if the MM contains DRM-protected content, if specified in the MM4_forward_REQ
Adaptations	O _c	This field indicates if the originator allows adaptation of the content (default True), if specified in the MM4_forward_REQ
MM component list	O _m	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
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.

Field	Category	Description
Record Time Stamp	M	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.1.3 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 6.3: Originator MM4 Forward Response record (O4FRs-CDR)

Field	Category	Description
Record Type	M	Originator MM4 Forward Response record
Originator MMS Relay/Server Address	O _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	O _m	The MMS version of the recipient MMS Relay/Server
Request Status Code	O _m	The status code of the request to route forward the MM as received in the MM4_forward.RES
Status Text	O _c	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	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.1.4 Originator MM4 Delivery report CDR (O4D-CDR)

If enabled, an 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 6.4: Originator MM4 Delivery report record (O4D-CDR)

Field	Category	Description
Record Type	M	Originator MM4 Delivery report record
Recipient MMS Relay/Server Address	O _m	IP address or domain name of the recipient MMS Relay/Server
Originator MMS Relay/Server Address	O _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	O _m	The MMS version of the recipient MMS Relay/Server
Originator address	O _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	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	O _c	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
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.1.5 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 6.5: Originator MM1 Delivery report record (O1D-CDR)

Field	Category	Description
Record Type	M	Originator MM1 Delivery report record
Recipient MMS Relay/Server Address	O _m	IP address or domain name of the recipient MMS Relay/Server
Originator MMS Relay/Server Address	O _m	IP address or domain name of the originator MMS Relay/Server
Access Correlation	O _m	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	O _m	The MMS version of the originator MMS Relay/Server
Originator address	O _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 Status Code	O _m	The status code of the MM as sent in the MM Status information element in the MM1_delivery_report.REQ
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMS are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

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

If enabled, an 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 6.6: 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	O _m	IP address or domain name of the recipient MMS Relay/Server
Originator MMS Relay/Server Address	O _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	O _m	The MMS version of the recipient MMS Relay/Server
Originator address	O _m	The address of the originator MMS User Agent of the MM
Recipient address	O _m	The address of the MM recipient of the MM
MM Date and time	O _m	Date and time the MM was handled (retrieved, expired, rejected, etc.)
Acknowledgement Request	M	Request for MM4_read_reply_report.RES
Read Status	O _m	The status of the MM as received in the MM4_read_reply_report.REQ
Status Text	O _c	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
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.1.7 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 6.7: 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	O _m	IP address or domain name of the recipient MMS Relay/Server
Originator MMS Relay/Server Address	O _m	IP address or domain name of the originator MMS Relay/Server
Access Correlation	O _m	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	O _m	The MMS version of the originator MMS Relay/Server
Originator address	O _m	The address of the originator MMS User Agent of the MM
Recipient address	O _m	The address of the MM recipient of the MM
Read Status	O _m	The status of the MM as sent in the MM1_read_reply originator.REQ
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.1.8 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 [201].

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

Table 6.8: Originator MM Deletion record (OMD-CDR)

Field	Category	Description
Record Type	M	Originator MM Deletion record
Originator MMS Relay/Server Address	O _m	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	O _m	The total size of the MM content
MM Status Code	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _m	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2 MMS records for recipient MMS Relay/server

The following subclauses 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.

6.1.2.1 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 6.9: 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	O _m	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	O _m	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	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.2 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 6.10: 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	O _m	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	O _m	The list of media components with volume size
Message size	O _m	The total size of the MM content
Time of Expiry	O _m	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	O _m	This field indicates whether a delivery report is requested or not as specified in the MM1_notification.REQ
Reply Charging	O _c	Information that a reply to this particular original MM is free of charge as specified in the MM1_notification.REQ
Reply Deadline	O _c	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	O _c	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	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated.
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.3 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 6.11: 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	O _m	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	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.4 Recipient MM1 Retrieve CDR (R1Rt-CDR)

If enabled, a Recipient MM1 Retrieve Charging Data Record (R1Rt-CDR) shall be produced in the recipient MMS Relay/Server if and when the recipient MMS Relay/Server has sent an 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 6.12: Recipient MM1 Retrieve 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	O _m	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
Original MM Content	M	This parameter contains a set of information elements related to the original MM.
Content type	M	The content type of the MM content.
Message size	O _m	The total size of the original MM content.
MM component list	O _m	The list of media components with volume size.
Adapted MM Content	C	If the MM content is adapted prior to its retrieval, this parameter is present and contains the resulting set of information elements related to the adapted MM.
Content type	C	The content type of the adapted MM content.
Message size	O _c	The total size of the adapted MM content.
MM component list	O _c	The list of media components with volume size of the adapted MM.
Message class	O _c	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
Delivery report Requested	O _m	A request for delivery report as specified in the Delivery Report information element in the MM1_retrieve.RES
Priority	O _c	The priority (importance) of the message if specified in the MM1_retrieve.RES
Read reply Requested	O _c	A request for read-reply report if specified in the Read Reply information element in the MM1_retrieve.RES
MM Status Code	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Reply Deadline	O _c	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	O _c	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	O _m	The time used for transmission of the MM between the User Agent and the MMS Relay/Server
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.5 Recipient MM1 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 6.13: 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	O _m	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	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.6 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 6.14: 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	O _m	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	O _m	Date and time the MM was handled (retrieved, expired, rejected, etc.)
Acknowledgement Request	M	Request for MM4_delivery_report.RES
MM Status Code	O _m	The status code of the MM as sent in the MM4_delivery_report.REQ
Status Text	O _c	This field includes the status text as sent in the MM4_delivery_report.REQ corresponding to the MM Status Code
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _m	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

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

If enabled, a 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 6.15: 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	O _m	The MMS version of the originator MMS Relay/Server
Request Status Code	O _m	The status code of the MM as received in the MM4_delivery_report.RES
Status Text	O _c	This field includes the status text as received in the MM4_delivery_report.RES corresponding to the Request Status Code
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.8 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 6.16: 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	O _m	A unique identifier delivered by the used access network domain of the originator MMS User Agent
MM Status Code	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.9 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 6.17: 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	O _m	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	O _m	Date and time the MM was handled (retrieved, expired, rejected, etc.)
Acknowledgement Request	M	Request for MM4_read_reply_report.RES
MM Status Code	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension

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

If enabled, a 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 6.18: 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	O _m	The MMS version of the originator MMS Relay/Server
Request Status Code	O _m	The status code of the MM as received in the MM4_read_reply_report.RES
Status Text	O _c	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	O _m	Time of generation of the CD
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension

6.1.2.11 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 [201].

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 6.1.1.8 is required.

Table 6.19: 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	O _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
Message size	O _m	The total size of the MM content
MM Status Code	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of delivering the message
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
Record extensions	O _c	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension

6.1.3 MMS records for forwarding MMS Relay/Server

6.1.3.1 Forwarding CDR (F-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 6.20: 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	O _m	The charged party indication and charge type
Time of Expiry	O _c	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	O _c	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	O _m	This field indicates whether a delivery report has been requested by the forwarding MMS User Agent or not
Read reply requested	O _m	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	O _m	The status code of the MM at the time when the CDR is generated
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types
MMBox Storage Information	O _c	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)
Reply Charging	O _c	A request for reply-charging if specified by the forwarding MMS User Agent
Reply Deadline	O _c	In case of reply-charging the latest time of submission of replies granted to the recipient(s) as specified by the forwarding MMS User Agent
Reply Charging Size	O _c	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s) as specified by the forwarding MMS User Agent
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension

6.1.4 Service records for MMS Relay/Server supporting MMBoxes

6.1.4.1 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 6.21: 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	O _m	A unique identifier delivered by the used access network domain of the originator MMS User Agent
Content type	O _m	The content type of the MM content
Message size	O _m	The size of the MM
Message Reference	O _m	A reference to the newly stored or updated MM, suitable for subsequent usage (e.g.: with MM1_retrieve.REQ and MM1_mmbox_delete.REQ)
MM State	O _m	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	O _c	If available, the keyword flags of the MM. There are no defaults
Store status	O _c	The status code of the request to store the MM as received in the MM1_store.RES
Store Status Text	O _c	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	O _m	Record number
Time Stamp	O _m	Time of generation of the CDR
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record
Record extensions	O _c	A set of network/manufacture specific extensions to the record

6.1.4.2 MMBBox MM1 View CDR (Bx1V-CDR)

If enabled, an MMBBox 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 6.22: MMBBox 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	O _m	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Attributes list	O _m	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	O _m	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 MMBBox can be selected. If both are absent, a listing of all MMs currently stored within the MMBBox shall be selected.
Start	O _m	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	O _m	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	O _m	This field indicates whether the current total number of messages and/or size contained by the MMBBox has been requested by the managing MMS User Agent.
Quotas requested	O _m	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	O _m	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	O _m	The status code of the request to view the MM as received in the MM1_view.RES.
Status Text	O _c	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	O _c	The total number of messages and/or octets for the MMBBox, identified with Messages or Octets, respectively, depending upon the presence of Totals in the request.
Quotas	O _c	The quotas of the MMBBox in messages and/or octets identified with Messages or Octets, respectively, depending upon the presence of Quotas in the request.
Sequence Number	O _m	Record number.
Time Stamp	O _m	Time of generation of the CDR.
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	O _c	A set of network/manufacturer specific extensions to the record.

6.1.4.3 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 6.23: 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	O _m	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message class	O _c	The class of the MM (e.g., personal, advertisement, information service) if provided by the MMS User Agent.
Upload Time	O _m	The time and date at which the MM was uploaded (time stamp).
Time of Expiry	O _c	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	O _c	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	O _c	This field indicates the priority (importance) of the message if specified by the MMS User Agent,
MM State	O _m	The state of the MM. Will default to the Draft state if absent
MM Flags	O _c	If available, the keyword flags of the MM. There are no defaults.
Content type	O _m	The content type of the MM content.
Message size	O _m	The size of the MM.
Message Reference	O _m	A reference to the newly stored MM, suitable for subsequent usage (e.g.: with MM1_retrieve.REQ, MM1_mmbox_delete.REQ, etc.).
Request Status Code	O _m	The status code of the request to view the MM as received in the MM1_upload.RES.
Status Text	O _c	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	O _m	Record number.
Time Stamp	O _m	Time of generation of the CDR.
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	O _c	A set of network/manufacture specific extensions to the record.

6.1.4.4 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 6.24: 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	O _m	A unique identifier delivered by the used access network domain of the originator MMS User Agent.
Message Reference	O _c	A reference to the message in error, if any, to which the following information elements apply
Request Status Code	O _m	The status code of the request to view the MM as received in the MM1_delete.RES.
Status Text	O _c	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	O _m	Record number.
Time Stamp	O _m	Time of generation of the CDR.
Serving network identity	O _m	SGSN PLMN Identifier (MCC and MNC) used during this record.
Record extensions	O _c	A set of network/manufacture specific extensions to the record.

6.1.5 MMS records for MMS VAS applications

The following subclauses specify CDRs created in the originator MMS Relay/Server based on messages flowing over the MM7 reference point. Unless otherwise specified, the CDR parameters are copied from the corresponding MM7 message parameters as applicable.

6.1.5.1 MM7 Submission CDR (MM7S-CDR)

If enabled, an MM7 Submission Charging Data Record (MM7S-CDR) shall be produced in the MMS Relay/Server for each MM submitted in an MM7_submit.REQ by a VASP to the MMS Relay/Server if and when the MMS Relay/Server responds with an MM7_submit.RES. The operator can configure whether this CDR, if enabled, shall only be created for MM7_submit.RES indicating acceptance of the submitted MM, or also for the unsuccessful submissions.

Table 6.25: MM7 Submission CDR (MM7S-CDR)

Field	Category	Description
Record Type	M	MM7 Submission record.
Originator MMS Relay/Server Address	M	.IP address or domain name of originator MMS Relay/Server.
Linked ID	C	This field is present in the CDR only if the MM defines a correspondence to a previous message that was delivered by the MMS Relay/Server. The MM identification provided by the originator MMS Relay/Server.
VASP ID	M	Identifier of the VASP for this MMS Relay/Server
VAS ID	M	Identifier of the originating application.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Originator Address	M	The address of the MM originator.
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.
Service code	O _c	Charging related information that is used directly for billing purposes
Content type	M	The content type of the MM content.
Content Class	O _c	This field classifies the content of the MM to the smallest content class to which the MM belongs, if specified in the MM7_submit_REQ
DRM Content	O _c	This field indicates if the MM contains DRM-protected content, if specified in the MM7_submit_REQ
Adaptations	O _c	This field indicates if the originator allows adaptation of the content (default True), if specified in the MM7_submit_REQ
MM component list	O _m	The list of media components with volume size.
Message size	M	The total size of the MM content.
Message class	O _c	The class selection such as personal, advertisement, information service if specified in the MM7_submit_REQ.
Charge Information	O _m	The charged party indication and charge type e.g. the sending, receiving, both parties, third party or neither.
Submission Time	O _c	The time at which the MM was submitted from the VASP if specified in the MM7_submit_REQ.
Time of Expiry	O _c	The desired date of expiry or duration of time prior to expiry for the MM if specified by the VASP
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 if specified by the VASP
Delivery Report Requested	O _m	This field indicates whether a delivery report has been requested by the VASP or not.
Reply Charging	O _c	A request for reply-charging if specified by the VASP
Read reply requested	O _m	A request for read reply report as specified in the MM7_submit.REQ.
Reply Deadline	O _c	In case of reply-charging the latest time of submission of replies granted to the recipient(s) as specified by the VASP
Reply Charging Size	O _c	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s) as specified by the VASP
Priority	O _c	The priority (importance) of the message if specified by the VASP
Charged Party ID	O _c	The address of the third party which is expected to pay for the MM.
Message Distribution Indicator	O _c	This field is present if specified in the MM7_submit.REQ If set to "false" the VASP has indicated that content of the MM is not intended for redistribution. If set to "true" the VASP has indicated that content of the MM can be redistributed.
Request Status Code	O _m	The status code of the associated MM7_submit_REQ
Status Text	O _c	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.
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.

Field	Category	Description
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR.
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

6.1.5.2 MM7 Deliver Request CDR (MM7DRq-CDR)

If enabled, a MM7 Deliver Request Charging Data Record (MM7DRq-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server sends an MM7_deliver.REQ to the recipient MMS VASP.

Table 6.26: MM7 Deliver Request record (MM7DRq -CDR)

Field	Category	Description
Record Type	M	MM7 Deliver Request record.
Recipient MMS Relay/Server Address	M	IP address or domain name of the recipient MMS Relay/Server.
Linked ID	C	This field is present in the CDR only if the MM defines a correspondence to a previous message that was delivered by the MMS Relay/Server. 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 MMS User Agent as used in the MM7_deliver_REQ.
Recipient address	M	The address of the MM recipient of the MM.
MM component list	O _m	The list of media components with volume size.
Message size	O _m	The total size of the MM content.
Content type	M	The content type of the MM content.
Priority	O _c	The priority (importance) of the message if specified by the VASP
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.

6.1.5.3 MM7 Deliver Response CDR (MM7DRs-CDR)

If enabled, a MM7 Deliver Response Charging Data Record (MM7DRs-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server receives an MM7_deliver.RES from the recipient MMS VASP.

Table 6.27: MM7 Deliver Response record (MM7DRs-CDR)

Field	Category	Description
Record Type	M	MM7 Deliver 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.
Service code	O _c	Charging related information that is used directly for billing purposes
Request Status Code	O _m	The status code of the associated MM7_deliver_REQ
Status Text	O _m	This field includes a more detailed technical status of the message at the point in time when the CDR is generated.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension.

6.1.5.4 MM7 Cancel CDR (MM7C-CDR)

If enabled, an MM7 Cancel Charging Data Record (MM7C-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server has sent an MM7_cancel.RES to the MMS VASP.

Table 6.28: MM7 Cancel record (MM7C-CDR)

Field	Category	Description
Record Type	M	MM7 Cancel record
Originator MMS Relay/Server Address	M	.IP address or domain name of originator MMS Relay/Server.
VASP ID	M	Identifier of the VASP for this MMS Relay/Server
VAS ID	M	Identifier of the originating application.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Originator Address	M	The address of the MM originator.
Content Class	O _c	This field classifies the content of the MM to the smallest content class to which the MM belongs, if specified in the MM7_cancel_REQ
DRM Content	O _c	This field indicates if the MM contains DRM-protected content, if specified in the MM7_cancel_REQ
Adaptations	O _c	This field indicates if the originator allows adaptation of the content (default True), if specified in the MM7_cancel_REQ
Request Status Code	O _m	The status code of the associated MM7_cancel.REQ.
Status Text	O _c	This field includes the status text as received in the MM7_cancel.RES corresponding to the Request Status Code. Present only if provided in the MM7_cancel.RES.
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Sequence Number	O _m	Record number.
Time Stamp	O _m	Time of generation of the CDR.
Record extensions	O _c	A set of network/manufacture specific extensions to the record.

6.1.5.5 MM7 Replace CDR (MM7R-CDR)

If enabled, an MM7 Replace Charging Data Record (MM7R-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server has sent an MM7_replace.RES to the MMS VASP.

Table 6.29: MM7 Replace record (MM7R-CDR)

Field	Category	Description
Record Type	M	MM7 Replace record
Originator MMS Relay/Server Address	M	.IP address or domain name of originator MMS Relay/Server.
VASP ID	M	Identifier of the VASP for this MMS Relay/Server
VAS ID	M	Identifier of the originating application.
Message ID	M	The MM identification provided by the originator MMS Relay/Server.
Originator Address	M	The address of the MM originator.
Service code	O _c	Charging related information that is used directly for billing purposes
Content type	M	The content type of the MM content.
Submission time	O _c	The time at which the MM was submitted from the VASP if specified in the MM7_replace_REQ.
Time of Expiry	O _c	The desired date of expiry or duration of time prior to expiry for the MM if specified by the VASP
Earliest Time Of Delivery	O _c	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 VASP
Request Status Code	O _m	The status code of associated MM7_replace.REQ.
Status Text	O _c	This field includes the status text as received in the MM7_replace.RES corresponding to the Request Status Code. Present only if provided in the MM7_replace.RES.
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Sequence Number	O _m	Record number
Time Stamp	O _m	Time of generation of the CDR.
Record extensions	O _c	A set of network/manufacturer specific extensions to the record.

6.1.5.6 MM7 Delivery Report Request CDR (MM7DRRq-CDR)

If enabled, a MM7 Delivery Report Request Charging Data Record (MM7DRRq-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server sends an MM7_delivery_report.REQ to the MMS VASP.

Table 6.30: MM7 Delivery Report Request record (MM7DRRq-CDR)

Field	Category	Description
Record Type	M	MM7 Delivery Report Request record.
Recipient MMS Relay/Server Address	O _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.
Originator address	O _m	The address of the VAS that submitted the original 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 MM7_delivery_report.REQ.
MM Status Code	M	The status code of the delivered MM as received in the MM7_delivery_report.RES.
MM Status Text	O _c	This field includes the status text as received in the MM7_delivery_report.RES corresponding to the MM Status Code. Present only if provided in the MM7_delivery_report.RES.
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension.

6.1.5.7 MM7 Delivery Report Response CDR (MM7DRRs-CDR)

If enabled, an MM7 Delivery Report Response Charging Data Record (MM7DRRs-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server receives an MM7_delivery_report.RES from the MMS VASP.

Table 6.31: MM7 Delivery Report Response record (MM7DRRs-CDR)

Field	Category	Description
Record Type	M	MM7 Delivery Report Response record.
Recipient MMS Relay/Server Address	O _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.
Originator address	O _m	The address of the VAS that submitted the original MM.
Recipient address	M	The address of the MM recipient of the MM.
Request Status Code	O _m	The status code of the associated MM7_delivery_report.REQ.
Status Text	O _c	This field includes the status text as received in the MM7_delivery_report.RES corresponding to the Request Status Code. Present only if provided in the MM7_delivery_report.RES.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension.

6.1.5.8 MM7 Read reply report Request CDR (MM7RRq-CDR)

If enabled, a MM7 Read reply report Request Charging Data Record (MM7RRq-CDR) shall be produced in the MMS Relay/Server if and when the recipient MMS Relay/Server sends an MM7_read_reply_report.REQ to the MMS VASP.

Table 6.32: MM7 Read reply report Request record (MM7RRq-CDR)

Field	Category	Description
Record Type	M	MM7 Read reply report Request record.
Recipient MMS Relay/Server Address	O _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.
Originator address	O _m	The address of the VAS that submitted the original 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 MM7_Read_reply_report.REQ.
Read Status	M	The status of the MM (e.g. Read, deleted without being read, etc.) as sent in the MM7_read_reply_report.REQ.
MM Status Text	O _c	This field includes the status text as received in the MM7_read_reply_report.RES corresponding to the Read Status. Present only if provided in the MM7_read_reply_report.REQ.
Applic-ID	O _c	If present, this field holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	If present, this parameter indicates a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMs are addressed.
Aux-Applic-Info	O _c	If present, this parameter indicates additional application/implementation specific control information.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension.

6.1.5.9 MM7 Read reply report Response CDR (MM7RRs-CDR)

If enabled, an MM7 Read reply report Response Charging Data Record (MM7RRs-CDR) shall be produced in the MMS Relay/Server if and when the MMS Relay/Server receives an MM7_Read_reply_report.RES from the originator MMS VASP.

Table 6.33: MM7 Read reply report Response record (MM7RRs-CDR)

Field	Category	Description
Record Type	M	MM7 Read reply report Response record.
Recipient MMS Relay/Server Address	O _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.
Originator address	O _m	The address of the VAS that submitted the original MM.
Recipient address	M	The address of the MM recipient of the MM.
Request Status Code	O _m	The status code of the associated MM7_read_reply_report.REQ.
Status Text	O _c	This field includes the status text as received in the MM7_read_reply_report.RES corresponding to the Request Status Code. Present only if provided in the MM7_read_reply_report.RES.
Record Time Stamp	O _m	Time of generation of the CDR
Local Record Sequence Number	O _m	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
Record extensions	O _c	A set of network/manufacture specific extensions to the record. Conditioned upon the existence of an extension.

6.2 Data description for MMS online charging

6.2.1 Ro message contents

Table 6.34 describes the use of these messages for online charging.

Table 6.34: Online Charging Messages Reference Table

Command-Name	Source	Destination	Abbreviation
Credit-Control-Request	MMS Relay/Server	OCS	CCR
Credit-Control-Answer	OCS	MMS Relay/Server	CCA

The specific parameters for MMS Charging are defined MMS specific Service-Information AVP which is defined of type grouped as follows:

```
[MMS-Information] ::= < AVP Header: TBD >
    [Originator-Address]
    * [Recipient-Address]
    [Submission Time]
    [Content Type]
    [Priority]
    [Message ID]
    [Message-Type]
    [Message-Size]
    [Message-Class]
    [Delivery Report Requested]
    [Read Reply Report Requested]
    [MMBox Storage Information]
    [Applic-ID]
    [Reply-Applic-ID]
    [Aux-Applic-Info]
    [Content Class]
    [DRM Content]
    [Adaptations]
```

6.2.1.1 MMS Credit-Control-Request Message

Table 6.35 illustrates the basic structure of a Diameter credit control request message from MMS Relay/Server as used for MMS online charging.

Table 6.35: Credit-Control-Request (CCR) Message Contents for MMS

AVP	Category	Description
Session-Id	M	Described in RFC 3588, diameter base protocol [401]
Origin-Host	M	Described in RFC 3588, diameter base protocol [401]
Origin-Realm	M	Described in RFC 3588, diameter base protocol [401]

AVP	Category	Description
Destination-Realm	M	Described in RFC 3588, diameter base protocol [401]
Auth-Application-Id	M	Described in RFC 3588, diameter base protocol [401]
Destination-Host	O _c	Described in RFC 3588, diameter base protocol [401]
User-Name	O _c	Described in RFC 3588, diameter base protocol [401]
Origin-State-Id	O _c	Described in RFC 3588, diameter base protocol [401]
Event-Timestamp	O _c	Described in RFC 3588, diameter base protocol [401]
CC-Request-Type	M	Described in Internet-Draft, Diameter Credit Control Application [402]
CC-Request-Number	M	Described in Internet-Draft, Diameter Credit Control Application [402]
CC-Sub-Session-Id	M	Described in Internet-Draft, Diameter Credit Control Application [402]
Acct-Multi-Session-Id	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Subscription-Id	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Service-Identifier	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Termination-Cause	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Requested-Service-Unit	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Requested-Action	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Used-Service-Unit	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Multiple-Services-Indicator	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Multiple-Services-Credit Control	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Service-Parameter-Info	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
CC-Correlation-Id	?	Described in Internet-Draft, Diameter Credit Control Application [402]
User-Equipment-Info	?	Described in Internet-Draft, Diameter Credit Control Application [402]
3GPP Diameter credit control AVPs		
MMS-Information		Grouped MMS specific Service-Information
Originator-Address	O _c	This AVP holds the address (Public User ID: SIP URL, E.164, etc.) of the party generating the MMS.
Recipient-Address	O _c	This AVP holds the address (Public User ID: SIP URL, E.164, etc.) of the party to whom the MMS is sent.
Correlation-Information	O _m	Bearer correlation information
Submission Time	O _c	
Content Type	O _c	
Priority	O _c	
Message ID	O _c	This AVP holds the MM identification provided by the originator MMS Relay/Server.
Message-Type	O _c	This AVP holds the type of the message according to the MMS transactions e.g. submission, delivery
Message-Size	O _c	This AVP holds the total size of the MMS.
Message Class	O _c	
Delivery Report Requested	O _c	
Read Reply Report Requested	O _c	
MMSBox Storage Information	O _c	
Applic-ID	O _c	This AVP holds the identification of the destination application that the underlying MMS abstract message was addressed to.
Reply-Applic-ID	O _c	This AVP holds the identifier of a 'reply path', i.e. the identifier of the application to which delivery reports, read-reply reports and reply-MMSs are addressed.
Aux-Applic-Info	O _c	This AVP holds additional application/implementation specific control information.
Content Class	O _c	This AVP classifies the content of the MM to the smallest content class to which the MM belongs
DRM Content	O _c	This AVP indicates if the MM contains DRM-protected content
Adaptations	O _c	This AVP indicates if the originator allows adaptation of the content (default True)

A full description and the detailed use of the AVPs for MMS Relay/Server and for each CCR request type (initial/update/termination/event) is specified in TS 32.299 [50].

6.2.1.2 MMS Credit-Control-Answer Message

Table 6.36 illustrates the basic structure of a Diameter credit control answer message as used for MMS charging. This message is always used by the OCS as specified below, independent of the receiving MMS Relay/Server and the CCR request type that is being replied to.

Table 6.36: Credit-Control-Answer (CCA) Message Contents for MMS

AVP	Category	Description
Session-Id	M	Described in RFC 3588, diameter base protocol [401]
Result-Code	M	Described in RFC 3588, diameter base protocol [401]
Origin-Host	M	Described in RFC 3588, diameter base protocol [401]
Origin-Realm	M	Described in RFC 3588, diameter base protocol [401]
Auth-Application-Id	M	Described in RFC 3588, diameter base protocol [401]
User-Name	O _c	Described in RFC 3588, diameter base protocol [401]
Origin-State-Id	O _c	Described in RFC 3588, diameter base protocol [401]
Event-Timestamp	O _c	Described in RFC 3588, diameter base protocol [401]
CC-Request-Type	M	Described in Internet-Draft, Diameter Credit Control Application [402]
CC-Request-Number	M	Described in Internet-Draft, Diameter Credit Control Application [402]
CC-Session-Failover	?	Described in Internet-Draft, Diameter Credit Control Application [402]
CC-Sub-Session-Id	M	Described in Internet-Draft, Diameter Credit Control Application [402]
Acct-Multi-Session-Id	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Subscription-Id	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Granted-Service-Unit	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Multiple-Services-Credit Control	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Cost-Information	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Final-Unit-Indication	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Check-Balance-Result	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Credit-Control-Failure-Handling	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Direct-Debiting-Failure-Handling	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Validity-Time	O _c	Described in Internet-Draft, Diameter Credit Control Application [402]
Redirect-Host AVP	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Redirect-Host-Usage	?	Described in Internet-Draft, Diameter Credit Control Application [402]
Redirect-Max-Cache-Time	?	Described in Internet-Draft, Diameter Credit Control Application [402]
3GPP Diameter credit control AvPs		

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Sep 2003	S_21	SP-030412	--	--	Submitted to TSG SA#21 for Information	1.0.0	
Sep 2004	S_25	SP-040555	--	--	Submitted to TSG SA#25 for Approval	2.0.0	6.0.0
Dec 2004	SA_26	SP-040780	001	--	Introduce Application Data in MMS Charging – Align with T2's TS 23.140 (MMS6)	6.0.0	6.1.0
Dec 2004	SA_26	SP-040780	002	--	Introduce Content Adaptation in MMS Charging – Align with T2's 23.140 (MMS6)	6.0.0	6.1.0
Dec 2004	SA_26	SP-040780	003	--	Correction on VASP MMS CDR triggers	6.0.0	6.1.0

History

Document history		
V6.1.0	December 2004	Publication