
Source: SA5 (Telecom Management)
Title: 2 Rel-5 CR 32.200 (Charging principles), 32.205 (Charging data description for CS domain)
Document for: Decision
Agenda Item: 7.5.3

Doc-1st-	Spec	CR	I	Phase	Subject	Ca	Ver	Doc-2nd-	Workitem
SP-040275	32.200	028	-	Rel-5	Add missing charging principles for CAMEL CPH – Align with CN2's 24.078	F	5.6.0	S5-044349	OAM-CH
SP-040275	32.205	026	-	Rel-5	Add Charging Data Description for CAMEL CPH - Align with CN2's 24.078	F	5.6.0	S5-044348	OAM-CH

CHANGE REQUEST

⌘ **32.200 CR 028** ⌘ rev - ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Add missing charging principles for CAMEL CPH – Align with CN2's 23.078		
Source:	⌘ SA5 SWG-B		
Work item code:	⌘ OAM-CH	Date:	⌘ 12/05/04
Category:	⌘ F	Release:	⌘ Rel-5
	<i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ Rel-5 includes CAMEL4 Call Party Handling (CPH). The charging and CDR details, especially for SCP initiated calls, are however, not specified.
Summary of change:	⌘ <ol style="list-style-type: none"> 1. CPH included to the list of events that need to be charged. 2. The principle to record call legs in grouped fields is extended to accommodate CPH. One record is generated per CAMEL call segment. I.e. all CAMEL call legs of one call segment are recorded in one record. 3. User interactions are recorded in the same manner as call legs. 4. CPH operations on call legs are included to the list of events that may result in the generation of partial call records.
Consequences if not approved:	⌘ Calls with CPH involved can not be charged.

Clauses affected:	⌘ 3.2, 5.2						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;"><input type="checkbox"/></td> <td style="width: 20px;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘	
Y	N						
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	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;"><input checked="" type="checkbox"/></td> <td style="width: 20px;"><input type="checkbox"/></td> </tr> </table> Test specifications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	⌘			
<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;"><input checked="" type="checkbox"/></td> <td style="width: 20px;"><input type="checkbox"/></td> </tr> </table> O&M Specifications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	⌘			
<input checked="" type="checkbox"/>	<input type="checkbox"/>						
Other comments:	⌘ Needs to approved in conjunction with CR to TS 32.205 available in S5-044348.						

Change in Clause 3.2

3.2 Abbreviations

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

3G	3 rd Generation
3GPP	3G Partnership Project
AoC	Advice of Charge
APN	Access Point Name
BMD	Billing Mediation Device
BS	Billing System
CAI	Charge Advice Information
CAMEL	Customised Applications for Mobile network Enhanced Logic
CDR	Charging Data Record
CG	Charging Gateway
CGF	Charging Gateway Function
CI	Cell Identity
<u>CPH</u>	<u>Call Party Handling</u>
CS	Circuit Switched
CUG	Closed User Group
DP	Detection Point
DRP	Data Record Packet
EDP	Event Detection Point
EIR	Equipment Identity Register
EM	Element Management
ETSI	European Telecommunications Standards Institute
FCI	Furnish Charging Information
FTAM	File Transfer, Access and Management
FTP	File Transfer Protocol
G-CDR	GGSN generated- CDR
GGSN	Gateway GPRS Service Node
GMLC	Gateway Mobile Location Center
GMSC	Gateway MSC
GPRS	General Packet Radio Service
gsmSCF	GSM Service Control Function
gsmSSF	GSM Service Switching Function
GSN	GPRS Support Node (either SGSN or GGSN)
GTP	GPRS Tunnelling Protocol
HLR	Home Location Register
HPLMN	Home PLMN
HSCSD	High Speed Circuit Switched Data
ICS	Implementation Conformance Statements
IE	Information Element
IHOSS:OSP	Internet Hosted Octet Stream Service: Octet Stream Protocol
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISP	Internal Standardized Profiles
Itf	Interface
ITU-T	International Telecommunication Union - Telecommunications Standardisation Sector
LAC	Location Area Code
LCS	LoCation Services
M-CDR	Mobility Management generated-Charging Data Record
ME	Mobile Equipment
MGW	Media Gateway
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Environment
MOC	Mobile Originated Call (attempt)
MS	Mobile Station

MSC	Mobile Services Switching Centre
MSISDN	Mobile Station ISDN number
MSRN	Mobile Station Roaming Number
MTC	Mobile Terminated Call (attempt)
NE	Network Element
NM	Network Management
NMC	Network Management Centre
NSS	Network and Switching Subsystem
OA&M	Operation, Administration and Maintenance
OACSU	Off air call set-up
O-CSI	Originating CAMEL Subscription Information
OMC	Operations and Maintenance Centre
PBX	Private Branch eXchange
PDN	Packet Data Network
PDP	Packet Data Protocol, e.g. IP
PDU	Packet Data Unit
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
PPS	Post-processing system
PS	Packet-Switched
PSPDN	Packet-Switched Public Data Network
PT	Protocol Type (Field in GTP' header)
QoS	Quality of Service
RAB	Radio Access Bearer
RAC	Routing Area Code
RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
SAC	Service Area Code
S-CDR	SGSN (PDP context) generated – CDR
SCF	Service Control Function
SCI	Subscriber Controlled (MMI) Input
SCS	System Conformance Statement
SGSN	Serving GPRS Service Node
SMF	System Management Function
SMS	Short Message Service
SRF	Specialised Resource Function
SS7	Signalling System No. 7
S-SMO-CDR	SGSN delivered Short message Mobile Originated – CDR
S-SMT-CDR	SGSN delivered Short message Mobile Terminated – CDR
TAP	Transferred Account Procedure
T-CSI	Terminating CAMEL Subscription Information
TDP	Trigger Detection Point
TID	Tunnel Identifier
TLV	Type, Length, Value (GTP header format)
TMN	Telecommunications Management Network
TS	Technical Specification
TV	Type, Value
UI	User Interaction
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
USIM	User Service Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	UMTS Terrestrial Radio Access Network
VAS	Value Added Service
VASP	Value Added Service Provider
VLR	Visitor Location Register
VMSC	Visited MSC
VPLMN	Visited PLMN

End of Change in Clause 3.2

Change in Clause 5.2

5.2.1 Charging Data Record Generation

In order to provide the data required for the management activities outlined in the previous subclauses (billing, accounting, statistics etc.), the NEF of the MSC server and/or Location Registers shall be able to produce an charging data record for each of the following:

- Mobile originated call attempt;
- Mobile originated emergency call attempt;
- Mobile originated, call forwarding attempt;
- Mobile terminated call attempt;
- Roaming call attempt in a gateway MSC server;
- Incoming call attempt in a gateway MSC server;
- Outgoing call attempt from a gateway MSC server;
- Transit call attempt;
- Terminating CAMEL call attempt;
- [CAMEL CPH call attempts/call modifications.](#)
- Supplementary service actions;
- HLR interrogation;
- Location updating (HLR & VLR);
- Short message service (point-to-point), mobile originated;
- Short message service (point-to-point), mobile terminated;
- Short message service (point-to-point), mobile originated interworking MSC server;
- Short message service (point-to-point), mobile terminated gateway MSC server;
- Common equipment usage;
- Mobile terminated location request;
- Mobile originated location request;
- Network induced location request.

The purpose of each of these records are described in the following subclauses. A detailed formal description of the data defined in the present document is to be found in 3GPP TS 32.205 [5].

...unmodified part in Clause 5.2...

5.2.1.2 CAMEL services

A CAMEL service can be activated for originating, forwarded and terminated calls and originating SMS. Several fields describing CAMEL subscription and free format data are recorded to appropriate CDR. For originating and forwarded calls two different CAMEL services can be active and part of stored information is different depending on the CAMEL call model and which triggers occur. CAMEL fields describing usage level of service, CAMEL modified parameters and CAMEL initiated call forwarding include information for one call leg including impacts on all CAMEL services.

5.2.1.x CAMEL Call Party Handling service

For calls where CAMEL Call Party Handling (CPH) is involved, one separate record is generated per call segment. The CAMEL CPH service may be applied to originating, forwarded and terminated calls as well as SCP initiated calls.

For MO, MT and CF call attempts, the fields related to the incoming leg are recorded in the main body. The fields related to the outgoing legs of that call segment are recorded in the respective grouped field per outgoing leg. User Interactions (UI) are recorded in a separate grouped field like outgoing legs.

Records for gsmSCF initiated call attempts differ to MO, MT and CF records in the following way: no leg information shall be recorded in the main body.

Where the use of CPH result in the creation of further call legs in one call segment, additional grouped fields shall be added to the respective CDR.

Where the use of CPH result in the creation of further call legs in a new call segment, a further CDR shall be generated.

When a call leg is moved from one call segment to another, the grouped field for that call leg is closed in the respective CDR and a new grouped field is opened in the CDR of the call segment the call leg was moved to. ~~When a leg is recorded in the main body of a CDR, it shall be recorded in that CDR (respectively subsequent partial CDRs of that CDR) for its complete lifetime. I.e.:~~

When the incoming leg (recorded in the main body), is moved from one call segment to another, the grouped field(s) for the outgoing call leg(s) is/are aligned to reflect the new call constellation.

User interactions (announcements etc.) are recorded in the CDR of the related call segment as a separate grouped field similar to call legs.

...unmodified part in Clause 5.2...

5.2.1.6 Partial records

In order to increase the security of the recording process and to simplify post-processing, it may be desirable to generate a sequence of CDRs to describe a single connection or transaction.

In case of connections of extended duration, the loss of a single CDR may result in an unacceptable loss of revenue. If the connection is, for example, recorded in a number of consecutive partial records generated at say hourly intervals, then the maximum loss of revenue is the equivalent of a one hour continuous connection.

Most modern billing systems employ some form of cumulative credit-limit checking based on the stream of input CDRs. If however, a CDR is only produced at the end of the connection then a subscriber may avoid such credit checking by employing a connection for days, weeks or even months without a single CDR being produced.

All of the records defined in TS 32.205 [5] are of variable length and some at least are potentially unlimited in size (SET OF, SEQUENCE OF etc.). However, the storage capacity of the internal records within the network element is normally subject to strict size limitations. Under such conditions a partial record may be required in order to circumvent internal resource limitations. For example, if an internal MOC record can only support the use of four supplementary service invocations then the use of a fifth may result in the generation of a partial record.

Alternatively, for those manufacturers whose systems are based on fixed length records, partial records may be employed instead of the various lists contained within the present document definitions. In such cases a partial record will be produced each time one of the key fields alters during the connection.

Finally, in case of radio link failure and subsequent call re-establishment partial records shall be generated to record the duration of the call prior to the radio link failure and the subsequent duration of the call once the call has been re-established.

To summarise, the following events may result in the generation of a partial record:

- expiry of the partial record timer;
- change of basic service during a connection;
- change of location (LAC or Cell Id. or the Service Access Code, for UMTS) during a connection;
- change of MS classmark during a connection;
- change of AoC Parameters during a call;
- change of Radio Channel Type (full/half rate) during a call;
- radio link failure and subsequent call re-establishment;
- change of HSCSD Parameters (for GSM only) during a call;
- change of CAMEL destination (CAMEL controlled/initiated) during a call;
- [CAMEL CPH operations on call legs.](#)

All partial records for the same connection shall contain the same call reference and shall be ordered via a running sequence number. The time stamps involved shall apply to the individual partial records rather than the connection as a whole i.e. the "end" time stamp (duration) of one record shall, in general, coincide with the "start" time stamp (answer time) of the next. Each time a new partial record is created the cause for termination field of the previous record shall contain the value "partial record". The cause for termination of the final partial record shall contain the true cause for termination of the connection.

It should be noted that the records produced in case of call re-establishment are not contiguous and that the value of the cause for term field in the record that is closed on radio link failure contains the value "partial record call re-establishment".

The partial records generated may repeat each of the non-varying fields contained in the original record. Alternatively, a form of reduced partial record may be generated which includes only those fields required to identify the original record together with the field(s) that actually change.

...unmodified part in Clause 5.2...

5.2.2 Charging scenarios

This subclause contains a number of example scenarios illustrating the purpose and practical usage of the various types of records defined in the previous subclauses. These examples are by no means exhaustive.

For the purpose of these examples, the following assumptions have been made:

- that the MSC server and VLR are co-located;
- that the records are sent to a post-processing system;
- that the generation of all of the record types described in this subclause has been enabled;
- that the HLR interrogation records are produced in the HLR and not the interrogating MSC server;
- that supplementary service actions are recorded in separate CDRs.

The following conventions have been used for the figures contained within this subclause:

- 1) Network connections and signalling transactions are illustrated by means of solid lines and referenced by number e.g. (1);

- 2) Operation & Maintenance actions, such as the transfer of CDRs, are represented by means of dotted lines and referenced by letter e.g. (A);
- 3) The Billing System has been included in some, but not all, of the examples. The only reason for this decision is to simplify the resulting figures. The presence of a Billing System is assumed even if not explicitly included.

The following examples are included:

- 1) Mobile to Land (outgoing) call;
- 2) Land to Mobile (incoming) call;
- 3) Mobile to Mobile call within the same network;
- 4) Incoming call to a roaming subscriber;
- 5) Incoming call to a PLMN Service Centre;
- 6) Call Forwarding Unconditional;
- 7) Call Forwarding conditional (on Busy);
- 8) Delivery of a Mobile Terminated Short Message;
- 9) Call Hold and Multi-party services;
- 10) Outgoing call handled by CAMEL;
- 11) Incoming call handled by CAMEL without redirection;
- 12) Incoming call to a roaming subscriber handled by CAMEL;
- 13) Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL;
- 14) Incoming call handled by CAMEL without redirection and forwarded early using GSM SS but controlled by CAMEL;
- 15) Incoming call handled by CAMEL without redirection and forwarded late using GSM SS but controlled by CAMEL;
- 16) Early forwarded call controlled by CAMEL;
- 17) Late forwarded call controlled by CAMEL;
- 18) Incoming call handled by CAMEL with redirection ~~initiated~~ [initiated](#) by CAMEL feature;
- 19) Incoming call handled by CAMEL in MSC Server without redirection;
- 20) Outgoing call handled by CAMEL Dialed CSI Trigger;
- 21) Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL;
- [22\) gsmSCF initiated wake-up call handled by CAMEL CPH](#)
- [23\) Three party conference handled by CAMEL CPH](#)
- ~~22)24)~~ Mobile terminated location request.

**...unmodified part in Clause 5.2...
continuing after section 5.2.2.21**

[5.2.2.xy gsmSCF initiated wake-up call handled by CAMEL CPH](#)

[Figure 5.22 illustrates a wake-up call initiated by gsmSCF to a mobile CAMEL subscriber "A".](#)

gsmSCF interrogates the HLR in order to determine the current location of subscriber "A" (1). The HLR provides the 'Roaming Number'. The HLR shall create an interrogation record.

gsmSCF initiates set-up of an outgoing leg towards mobile CAMEL subscriber "A" (2). The MSC shall create a MOC and a MTC record for that call leg.

The user interaction (UI), in this scenario an announcement from the Specialised Resource Function (SRF), is connected to mobile CAMEL subscriber "A" (3). The MSC shall update the MOC record to reflect the UI.

The following records are generated in HPLMN in this call scenario.

Table 5.xy: Records Generated for an Wake-up Call Handled by CAMEL CPH

MSC	HLR
MOC record	HLR interrogation record
MTC record	

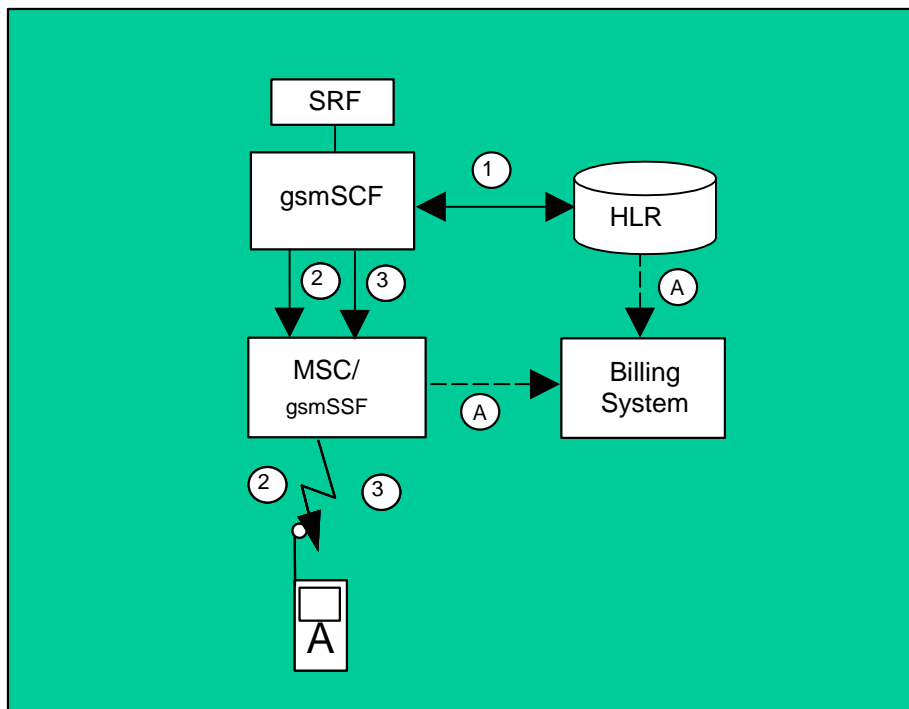


Figure 5.xy: Wake-up call handled by CAMEL CPH

5.2.2.xz Three party conference handled by CAMEL CPH

Figure 5.23 illustrates one example for establishment of a three party conference via CAMEL CPH..

A mobile CAMEL subscriber "A" sets up an outgoing call (1) to an ISDN subscriber ("B"). This call is recorded as outlined in subclause 5.2.2.1.

gsmSCF then invokes CPH operation 'initiate call attempt' (2). A new call segment (CS#2) with an outgoing leg "C" is created in MSC-A.

MSC-A interrogates the HLR in order to determine the current location of subscriber "C" (3). The HLR shall create an interrogation record.

MSC-A initiates set-up of an outgoing leg towards mobile subscriber "C" (4). MSC-A shall create an MOC record for the leg towards mobile subscriber "C". MSC-C shall create a MTC record for subscriber "C".

gsmSCF then invokes CPH operation 'MoveLeg' to join all three legs in one call segment (5). MSC-A shall close the MOC record for call segment CS#2 to outgoing leg "C". The MOC record for the outgoing call of the mobile CAMEL subscriber "A" to ISDN subscriber "B" shall be updated to cover the additional outgoing CAMEL call leg "C".

The following records are generated in HPLMN in this call scenario.

Table 5.xz: Records Generated for an Wake-up Call Handled by CAMEL CPH

<u>GMSC server</u>	<u>MSC-A</u>	<u>MSC-C</u>	<u>HLR</u>
<u>outgoing gateway record</u>	<u>MOC record ("A", "B", "C")</u>	<u>MTC record</u>	<u>HLR interrogation record</u>
	<u>MOC record ("C")</u>		

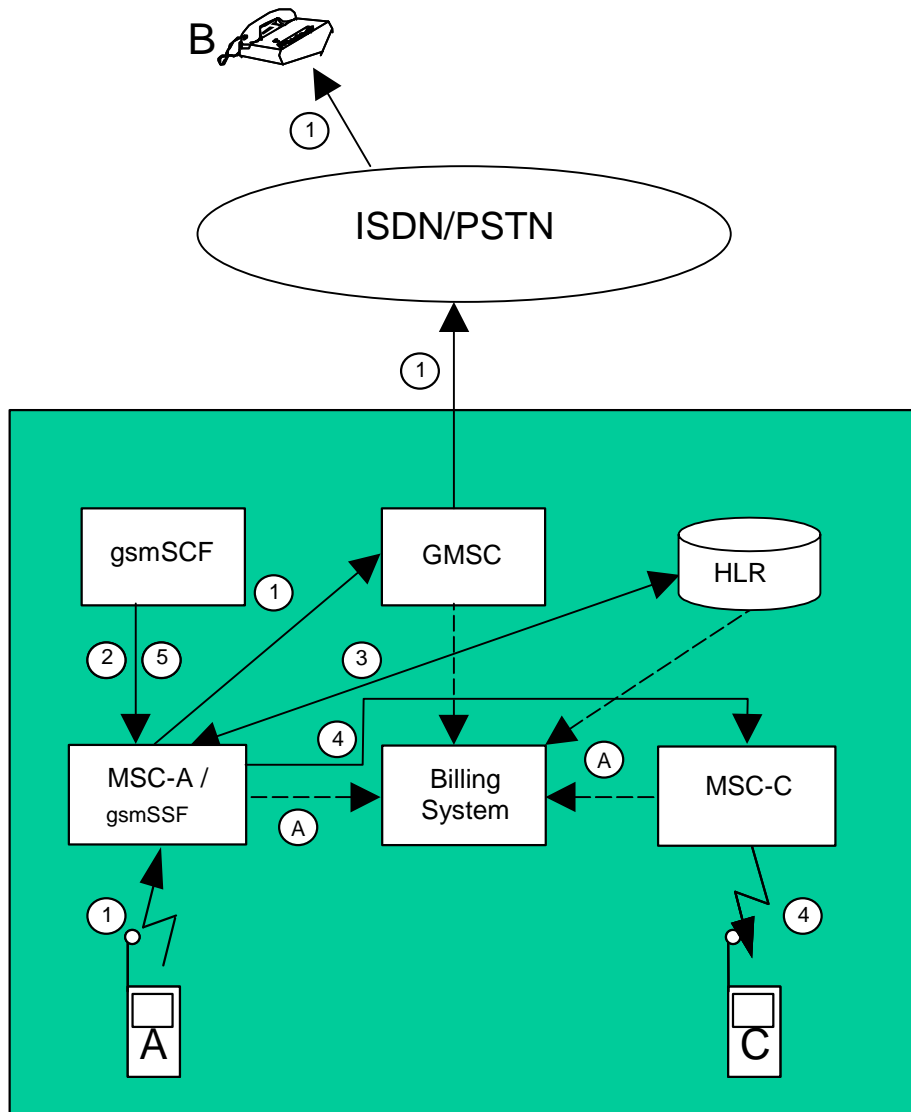


Figure 5.xz: Three Party Conference handled by CAMEL CPH

End of Change in Clause 5.2

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Jun 2001	S_12	SP-010236	--	--	Submitted to TSG SA #12 for Information	1.0.0	1.0.1
Sep 2001	S_13	SP-010464	--	--	Submitted to TSG SA #13 for Approval	2.0.0	4.0.0
Mar 2002	S_15	SP-020016	001	--	Alignment of terminology with 23.140 (MMS)	4.0.0	4.1.0
Mar 2002	S_15	SP-020016	002	--	Corrections on CAMEL D-CSI trigger function	4.0.0	4.1.0
Mar 2002	S_15	SP-020016	003	--	Correction of interface descriptions and terminology	4.0.0	4.1.0
Mar 2002	S_15	SP-020016	004	--	Incorporation of IMS Charging Architecture from SA2's TR 23.815	4.1.0	5.0.0
Mar 2002	S_15	SP-020016	005	--	Inclusion of on-line charging architecture from SA2's 23.815 into SA5's 32.200	4.1.0	5.0.0
Jun 2002	S_16	SP-020287	006	--	Naming of the interfaces to the Billing System	5.0.0	5.1.0
Jun 2002	S_16	SP-020287	007	--	Clarifying the off-line IMS Charging architecture	5.0.0	5.1.0
Jun 2002	S_16	SP-020287	008	--	Inclusion of content charging functions from 23.815	5.0.0	5.1.0
Jun 2002	S_16	SP-020287	009	--	Inclusion of generic flows for event-based charging at the Ro reference point from 23.815	5.0.0	5.1.0
Jun 2002	S_16	SP-020287	010	--	Adding definition for the Charging Collection Function (CCF)	5.0.0	5.1.0
Jun 2002	S_16	SP-020286	012	--	Align with 23.060 by adding 'intra-SGSN intersystem change' as record closure criterion for S-CDR	5.0.0	5.1.0
Dec 2002	S_18	SP-020740	016	--	Correction of interface descriptions	5.1.0	5.2.0
Dec 2002	S_18	SP-020741	018	--	Several alignments on MMS charging+ MMBBox CDRs have been added	5.1.0	5.2.0
Mar 2003	S_19	SP-030053	020	--	Correction of M-CDR usage - alignment with SA2's 23.060	5.2.0	5.3.0
Mar 2003	S_19	SP-030055	021	--	Addition of 'Inter-PLMN SGSN change' as partial output record trigger for G-CDR - alignment with CN4's 29.060	5.2.0	5.3.0
Jun 2003	S_20	SP-030268	022	--	Alignment with 32.235 on MMS charging scenarios with VASP MMS CDR types	5.3.0	5.4.0
Jun 2003	S_20	SP-030268	023	--	Correction of IMS charging architecture	5.3.0	5.4.0
Sep 2003	S_21	SP-030406	025	--	Stage 2/3 alignment of Location charging principles	5.4.0	5.5.0
Sep 2003	S_21	SP-030406	026	--	Corrections on service key related procedures - Alignment with CAMEL	5.4.0	5.5.0

CHANGE REQUEST

⌘ **32.205 CR 026** ⌘ rev - ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Add Charging Data Description for CAMEL CPH - Align with CN2's 23.078		
Source:	⌘ SA5 SWG-B		
Work item code:	⌘ OAM-CH	Date:	⌘ 14/05/04
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ CN2 Rel-5 TS 23.078 includes CAMEL4 Call Party Handling (CPH). The charging and CDR details, especially for SCP initiated calls, are not specified.		
Summary of change:	⌘ <ol style="list-style-type: none"> 1. New MOC CDRs specified for: <ul style="list-style-type: none"> - 'MO call attempt (CPH adapted version)', - 'gsmSCF initiated CAMEL CPH call attempt', - 'new call segment in a MO, CF and MT CAMEL dialogue', - 'MO call forwarding attempt, (CPH adapted version)', - 'Terminating CAMEL call attempt (CPH adapted version)'. 2. Update description of affected record fields. 3. Update of ASN.1 code 		
Consequences if not approved:	⌘ Calls with CPH involved can not be charged.		

Clauses affected:	⌘ 3.2, 4, 5, 6								
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;"> </td> <td style="width: 20px;">X</td> </tr> <tr> <td style="width: 20px;">X</td> <td style="width: 20px;">X</td> </tr> </table> Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘ Rel-6 TS 32.250	Y	N		X		X	X	X
Y	N								
	X								
	X								
X	X								
Other comments:	⌘ This CR should be approved in coordination with CR S5-044349 to Rel-5 TS 32.200.								

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply:

AoC	Advice of Charge
BCSM	Basic Call State Model
CAI	Charge Advice Information
CAMEL	Customised Applications for Mobile network Enhanced Logic
CDR	Charging Data Record
CPH	Call Party Handling
DP	Detection Point
EDP	Event Detection Point
EIR	Equipment Identity Register
EMS-Digits	North American Emergency Service Routing Digits
EMS-Key	North American Emergency Service Routing Key
FCI	Furnish Charging Information
FTAM	File Transfer, Access and Management
GMSC	Gateway MSC
gsmSCF	GSM Service Control Function
gsmSSF	GSM Service Switching Function
HLR	Home Location Register
HPLMN	Home PLMN
HSCSD	High Speed Circuit Switched Data
ICA	Initiate Call Attempt
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
ISDN	Integrated Services Digital Network
JIP	Jurisdiction Information Parameter
LAC	Location Area Code
LR	Location Request
LRN	Location Routing Number
MLC	Mobile Location Center
MOC	Mobile Originated Call (attempt)
MO-LR	Mobile Originated Location Request
MS	Mobile Station
MSC	Mobile Switching Centre
MSRN	Mobile Station Roaming Number
MTC	Mobile Terminated Call (attempt)
MT-LR	Mobile Terminated Location Request
NAR	North America Region
NE	Network Element
NI-LR	Network Induced Location Request
NP	Number Portability
NPDB	Number Portability Data Base
O_CSI	Originating CAMEL Subscription Information
PLMN	Public Land Mobile Network
SAC	Service Area Code
SCF	Service Control Function
SCI	Subscriber Controlled Input or Send Charging Information
SMS	Short Message Service
SS7	Signalling System No. 7
T_CSI	Terminating CAMEL Subscription Information
TDP	Trigger Detection Point
TMN	Telecommunications Management Network
USIM	User Service Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	Universal Terrestrial Radio Access Network
VAS	Value Added Service
VLR	Visitor Location Register

VMSC	Visited MSC
VPLMN	Visited PLMN
VT-CSI	Visited Terminating CAMEL Subscription Information

End of Change in Clause 3.2

Change in Clause 4

4 Record types and contents

The following tables describe the contents of each of the call and event records generated in the CS domain, e.g. by the MSCs (see the example scenarios in TS 32.200 [22]). For each CDR type the field definition includes the field name, description and category.

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

A field category can have one of two primary values:

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

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

Those fields that the operator wishes to be present are further divided into a mandatory and conditional categories:

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

The content of the CDRs shall be specified on the interface from the core network to the billing system that are used for CDR transport. The rules governing the CDR specifications on these interfaces are summarised in the following clause.

During a long user session several *Partial CDRs* may be generated for the same session. In this case, some information can be eliminated rather than repeated in all the partial CDRs for that session. Only changes from one CDR to the next, in addition to mandatory information, can be reported. All the missing information can be reconstructed from fields in previous partial CDRs for the session. For instance, if the subscriber did not change location, the *Reduced Partial CDR* would not include any location information.

Two formats are considered for *Partial CDRs*:

- a *Full Qualified Partial CDR* that contains the Complete CDR Fields; and
- a *Reduced Partial CDR* that contains all the Mandatory fields (**M**) and **ONLY** the changes that occurred in any other field relative to the previous *Partial CDR*.

The first CDR generated when a session is opened shall be a *Full Qualified Partial CDR*. Subsequent partial CDRs may be *Reduced Partial CDRs*.

Thus, the convention is that when any non-mandatory field is missing from a Reduced Partial CDR, it should be interpreted that the same field as in the previous partial CDR could be used. Only Mandatory (M) fields MUST always be included.

The anchor MSC is the creator of the CDRs. The column "2G" indicates a qualifier for the presence of the parameter in a 2G anchor MSC. The column "3G" indicates a qualifier for the presence of the parameter in a 3G anchor MSC.

For MSCs capable of CAMEL Call Party Handling (CPH), one separate record is generated per call segment. The record is closed when the last leg of the call segment disappeared (moved out, disconnected, etc.) from the call segment. The leg specific fields listed below shall be recorded in the grouped field 'CAMEL Call Leg Information' instead of using the counterpart in the main body. The counterparts of those fields in the main body are maintained for compatibility reasons to earlier releases.

- CAMEL Destination Number
- Translated Number
- Connected Number
- Roaming Number
- Outgoing TKGP (in 'CAMEL Call Leg Information' this item is called MSC outgoing TKGP)
- Additional Chg. Info
- Default call handling 2
- GsmSCF address 2
- Service key 2
- Free format data 2 (in 'CAMEL Call Leg Information' this item is called Free format data incoming 2)
- Free format data append indicator 2 (in 'CAMEL Call Leg Information' this item is called Free format data append incoming 2)
- Location Routing Number (LRN)
- LRN Source Indicator
- LRN Query Status Indicator
- JIP Parameter
- JIP Source Indicator
- JIP Query Status Indicator

...unmodified part in Clause 4

4.23 Mobile originated call attempt (CAMEL CPH adapted version)

If the MSC / gsmSCF is able to provide CAMEL CPH services, this kind of record shall replace records according to section 4.1 Mobile originated call attempt. This applies to all mobile originated call attempts, even if no CPH operations are used in the individual call. Record fields that are specific to individual outgoing legs are recorded in the grouped field 'Camel Call Leg Information'.

If the generation of this kind of record is enabled then the MSC shall produce one MOC record. The incoming leg is recorded in the main body. Whenever there is a CAMEL dialogue, outgoing legs of the same call segment are recorded in the grouped field "CAMEL call leg information". Further legs in new call segments are recorded in CDRs of type "4.y New Call Segment in a MO, CF or MT CAMEL Dialogue".

Examples for call situations where this type of record applies are the following:

- Mobile originating call without CPH being involved,
- Mobile originating call continuing after disconnect of the incoming leg in case of no partial record generation. When partial records are generated, they are of type "4.y New Call Segment in a MO, CF or MT CAMEL Dialogue",
- Mobile originating call with more than one outgoing leg on this call segment,
- Mobile originating call in which the original outgoing leg has been disconnected by gsmSCF.

Disconnect of the incoming leg is recorded by filling the related record fields in the main body of the record. Optionally a partial record may be generated. This partial record is of type 4.y gsmSSF initiated CAMEL CPH call attempt.

Disappearing (DisconnectLeg, SplitLeg, etc.) of an outgoing leg is recorded by filling the related record fields in the 'Camel Call Leg Information' field for the disappearing leg. Optionally a partial record may be generated. This partial record does not contain information of the leg that disappeared, i.e. it does not contain a 'Camel Call Leg Information' field for that leg.

Connection of a further leg to this call segment is recorded by adding a further field 'Camel Call Leg Information'. Optionally a partial record may be generated.

Table 4.23: MOC record (CAMEL CPH adapted version)

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>Record Type</u>	M	M	<u>Mobile originated.</u>
<u>Served IMSI</u>	M	M	<u>IMSI of the calling party.</u>
<u>Served IMEI</u>	C	C	<u>IMEI of the calling ME, if available.</u>
<u>Served MSISDN</u>	O M	O M	<u>The primary MSISDN of the calling party.</u>
<u>Called Number</u>	M	M	<u>The address of the called party i.e. the number dialed by the calling subscriber.</u>
<u>Recording Entity</u>	M	M	<u>The E.164 number of the visited MSC producing the record.</u>
<u>Incoming TKGP</u>	O M	O c	<u>The MSC trunk group on which the call originated, usually from the BSS. If available in 3G, this parameter shall be supplied.</u>
<u>Location</u>	M	M	<u>The identity of the cell or the SAC at the time of CDR creation, including the location area code.</u>
<u>Change of Location</u>	O c	O c	<u>A list of changes in Location Area Code / Service Area Code / Cell Id. Each time-stamped.</u>
<u>Basic service</u>	M	M	<u>Bearer or teleservice employed. 'speech' in case of CAMEL CPH calls.</u>
<u>Supp. Services</u>	C	C	<u>Supplementary services invoked as a result of this connection. This field shall be present when one or more supplementary services have been invoked.</u>
<u>AOC Parameters</u>	O c	O c	<u>The charge advice parameters sent to the MS on call set-up. This field shall be supplied only when AoC parameters have been sent.</u>
<u>Change of AOC Parameters</u>	O c	O c	<u>New AOC parameters sent to the MS e.g. as a result of a tariff switch over, including the time at which the new set was applied. This field shall be supplied only when AoC parameters have been sent.</u>
<u>MS Classmark</u>	M	M	<u>The mobile station classmark employed on call set-up.</u>
<u>Change of Classmark</u>	O c	O c	<u>A list of changes to the classmark during the connection each time-stamped.</u>
<u>Event time stamps:</u>	C C O M	C C O M	<u>Seizure time: time of incoming traffic channel seizure (for unsuccessful call attempts)</u> <u>Answer: time of answer (for successful calls)</u> <u>Release time: time of traffic channel release for the incoming leg.</u>
<u>Call duration</u>	M	M	<u>The chargeable duration of the connection of the incoming leg for successful calls, the holding time of the incoming leg for call attempts.</u>
<u>Radio Chan. Requested</u>	O M	-	<u>The type of radio traffic channel (full / half etc.) requested by the MS.</u>
<u>Radio Chan. Used</u>	M	-	<u>The type of radio channel actually used (full or half rate).</u>
<u>Change of Rad. Chan.</u>	O c	-	<u>A list of changes each time stamped.</u>
<u>Cause for termination</u>	M	M	<u>The reason for the release of the connection.</u>
<u>Diagnostics</u>	O M	O M	<u>A more detailed reason for the release of the connection.</u>
<u>Call reference</u>	M	M	<u>A local identifier distinguishing between transactions on the same MS</u>
<u>Sequence no.</u>	C	C	<u>Partial record sequence number, only present in case of partial records.</u>
<u>Record extensions</u>	O c	O c	<u>A set of network / manufacturer specific extensions to the record, when available.</u>
<u>GsmSCF address</u>	M	M	<u>Identifies the CAMEL server serving the subscriber.</u>
<u>Service key</u>	C	C	<u>The CAMEL service logic to be applied.</u>
<u>Network call reference</u>	M	M	<u>An identifier to correlate transactions on the same call taking place in different network nodes.</u>
<u>MSC Address</u>	M	M	<u>This field contains the E.164 number assigned to the MSC that generated the network call reference.</u>
<u>Default call handling</u>	O c	O c	<u>Indicates whether or not a CAMEL call encountered default call handling. This field shall be present only if default call handling has been applied.</u>
<u>Speech Version Supported</u>	O M	-	<u>Speech version supported by the MS with highest priority indicated by MS</u>
<u>Speech Version Used</u>	O M	-	<u>Speech version used for that call</u>
<u>Number of DP encountered</u>	O M	O M	<u>Number that counts how often armed detection points (TDP and EDP) were encountered. Sum of all DPs encountered in this call.</u>
<u>Level of CAMEL service</u>	O M	O M	<u>Indicator for the complexity of the CAMEL feature used.</u>
<u>Free format Data</u>	C	C	<u>This field contains data sent by the gsmSCF in the Furnish Charging Information (FCI) message(s). The data can be sent either in one FCI message or several FCI messages with append indicator.</u>

<u>Field</u>	<u>2 G</u>	<u>3 G</u>	<u>Description</u>
<u>CAMEL call leg information</u>	<u>C</u>	<u>C</u>	<u>Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.</u>
<u>CAMEL Destination Number</u>			<u>Destination modified by camel service.</u>
<u>Translated Number</u>			<u>Called number after digit translation within the MSC.</u>
<u>Connected Number</u>			<u>Number of connected party if different from 'CAMEL Destination Number'.</u>
<u>Roaming Number</u>			<u>MSRN to route this leg (if applicable).</u>
<u>MSC outgoing TKGP</u>			<u>Trunk on which the leg leaves the MSC.</u>
<u>Seizure Time</u>			<u>Time of traffic channel seizure for this leg.</u>
<u>Answer Time</u>			<u>Time when the answer message is received for this leg.</u>
<u>Release Time</u>			<u>Time when the leg is released or moved into another call segment.</u>
<u>Call Duration</u>			<u>Time between answer and release timestamp of this leg.</u>
<u>Additional Chg. Info</u>			<u>Charge/no charge indicator and additional charging parameters, when available.</u>
<u>Free Format Data</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data Append</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Diagnostics</u>			<u>Detailed reason for disappearing of the leg in this call segment.</u>
<u>Cause for Termination</u>			<u>The reason for disappearing of the leg in this call segment.</u>
<u>Default Call Handling 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>gsm-SCF Address 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Service Key 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Free Format Data Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Location Routing Number (LRN)</u>			<u>For Number Portability feature, not available in 2G records.</u>
<u>LRN Source Indicator</u>			<u>Source of the LRN, not available in 2G records.</u>
<u>LRN Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>JIP Parameter</u>			<u>Jurisdiction Information Parameter, not available in 2G records.</u>
<u>JIP Source Indicator</u>			<u>The source of the JIP, not available in 2G records.</u>
<u>JIP Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>Free Format Data Append Indicator</u>	<u>C</u>	<u>C</u>	<u>Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR. Shall be present only if CAMEL id applied.</u>
<u>System Type</u>	<u>-</u>	<u>M</u>	<u>This field indicates the use of GERAN, UTRAN (or a value of unknown) of the incoming leg. This field is present when either the UTRAN or GERAN air-interface is used on call set-up. For an open CDR in a 2G NE (responsible for the CDR), the field is not present (even if the call is handed off to a 3G air interface).For a CDR in a 3G NE (responsible for the CDR), the value unknown shall be used after handover.</u>
<u>Partial Record Type</u>	<u>-</u>	<u>O c</u>	<u>Indicates the event (time limit etc.) that caused the generation of a partial record.</u>

4.24 gsmSCF initiated CAMEL CPH call attempt

If the generation of these records is enabled then an MOC record shall be created for each gsmSCF initiated call attempt and for new parties in new call segments, which are created in a new call dialogue. Examples for call situations where this type of record applies are the following:

- gsmSCF initiated call segment association (new call):
There is only one call segment. It contains the outgoing leg, which is created via CPH initiate call attempt operation (ICA).
 - This outgoing leg can be connected to an SRF, which is recorded in the same record in the field 'Camel Call Leg Information'.
- gsmSCF initiated new party in an already established gsmSCF initiated CAP dialogue (new leg):
In a new call dialogue a further call leg in a new call segment is initiated via ICA operation.
 - This call segment contains one outgoing leg, which can be connected to an SRF. This leg and if used the SRF are recorded in the record for this call segment in the field 'Camel Call Leg Information'.
 - This leg can be connected to the other outgoing leg. This would terminate the call segment and thus the call record. The 'Cause for Termination' indicates the reason for disappearing of the leg in this call segment. The Timestamps ('Call Duration', 'Release Time', etc.) are filled in. The record of the call segment the leg is moved to records the leg in a further field 'Camel Call Leg Information'.
 - The other leg could be connected to this leg which is recorded by adding a further field 'Camel Call Leg Information'.

Record fields for an incoming leg do not exist, because there is no incoming leg in the call segment this record is created for.

Table 4.24: MOC CPH record (gsmSCF initiated)

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>Record Type</u>	M	M	<u>Mobile originated.</u>
<u>Served MSISDN</u>	O M	O M	<u>The number of the initiating party. "Calling Party Number" as received in the ICA operation.</u>
<u>Called Number</u>	M	M	<u>The address of the called party.</u>
<u>Recording Entity</u>	M	M	<u>The E.164 number of the visited MSC producing the record.</u>
<u>Basic service</u>	M	M	<u>Bearer or teleservice employed. 'speech' in case of CAMEL CPH calls.</u>
<u>Cause for termination</u>	M	M	<u>The reason for the release of the connection.</u>
<u>Diagnostics</u>	O M	O M	<u>A more detailed reason for the release of the connection.</u>
<u>Call reference</u>	M	M	<u>A local identifier distinguishing between transactions on the same MS</u>
<u>Sequence no.</u>	C	C	<u>Partial record sequence number, only present in case of partial records.</u>
<u>Record extensions</u>	O c	O c	<u>A set of network / manufacturer specific extensions to the record, when available.</u>
<u>GsmSCF address</u>	C	C	<u>Identifies the CAMEL server serving the subscriber (network call reference).</u>
<u>Network call reference</u>	M	M	<u>An identifier to correlate transactions on the same call taking place in different network nodes.</u>
<u>MSC Address</u>	M	M	<u>This field contains the E.164 number assigned to the MSC that generated the record.</u>
<u>Number of DP encountered</u>	O c	O c	<u>Number that counts how often armed detection points (TDP and EDP) were encountered. Sum of all DPs encountered in this call.</u>
<u>Level of CAMEL service</u>	O c	O c	<u>Indicator for the complexity of the CAMEL feature used.</u>

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>CAMEL call leg information</u>	<u>C</u>	<u>C</u>	<u>Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.</u>
<u>CAMEL Destination Number</u>			<u>Destination as received in the ICA operation.</u>
<u>Translated Number</u>			<u>Called number after digit translation within the MSC.</u>
<u>Connected Number</u>			<u>Number of connected party if different from 'CAMEL Destination Number'.</u>
<u>Roaming Number</u>			<u>MSRN to route this leg (if applicable).</u>
<u>MSC outgoing TKGP</u>			<u>Trunk on which the leg leaves the MSC.</u>
<u>Seizure Time</u>			<u>Time of traffic channel seizure for this leg.</u>
<u>Answer Time</u>			<u>Time when the answer message is received for this leg.</u>
<u>Release Time</u>			<u>Time when the leg is released or moved into another call segment.</u>
<u>Call Duration</u>			<u>Time between answer and release timestamp of this leg.</u>
<u>Additional Chg. Info</u>			<u>Charge/no charge indicator and additional charging parameters, when available.</u>
<u>Free Format Data</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data Append</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Diagnostics</u>			<u>Detailed reason for disappearing of the leg in this call segment.</u>
<u>Cause for Termination</u>			<u>The reason for disappearing of the leg in this call segment.</u>
<u>Default Call Handling 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>gsm-SCF Address 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Service Key 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Free Format Data Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Location Routing Number (LRN)</u>			<u>For Number Portability feature, not available in 2G records.</u>
<u>LRN Source Indicator</u>			<u>Source of the LRN, not available in 2G records.</u>
<u>LRN Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>JIP Parameter</u>			<u>Jurisdiction Information Parameter, not available in 2G records.</u>
<u>JIP Source Indicator</u>			<u>The source of the JIP, not available in 2G records.</u>
<u>JIP Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>Partial Record Type</u>	<u>:</u>	<u>O</u> <u>c</u>	<u>Indicates the event (time limit etc.) that caused the generation of a partial record.</u>

4.25 New Call Segment in a MO, CF and MT CAMEL Dialogue

If the generation of these records is enabled then an MOC record shall be created for call segments without incoming leg, generated by a CAMEL dialogue for mobile originated, call forwarding or mobile terminating call attempts. Examples for call situations where this type of record applies are the following:

- Additional call segment, which is created by means of a 'SplitLeg' operation or ICA (new party) operation.
 - This call segment contains one outgoing leg, which can be connected to an SRF. This leg and if used the SRF are recorded in the record for this call segment in the field 'Camel Call Leg Information'.
 - This leg can be connected to the other outgoing leg. This would terminate the call segment and thus the call record. The 'Cause for Termination' indicates the reason for disappearing of the leg in this call segment. The Timestamps ('Call Duration', 'Release Time', etc.) are filled in. The record of the call segment the leg is moved to records the leg in a further field 'Camel Call Leg Information'.
 - The other leg could be connected to this leg which is recorded by adding a further field 'Camel Call Leg Information'.
- Call segment where the incoming leg disappeared (e.g. due to SplitLeg or DisconnectLeg operation). A record of this type is generated if partial records are generated.

Although an incoming leg does not exist, the 'IMSI', the 'IMEI' and the 'Service Key' is recorded in the main body.

Table 4.25: MOC CPH record (new call segment)

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>Record Type</u>	M	M	Mobile originated.
<u>Served IMSI</u>	M	M	IMSI of the served party ('calling party' in case of MOC, 'forwarding party' in case of call forwarding respectively 'called party' in case of MTC).
<u>Served IMEI</u>	C	C	IMEI of the served ME, if available ('calling party' in case of MOC, 'forwarding party' in case of call forwarding respectively 'called party' in case of MTC).
<u>Served MSISDN</u>	O M	O M	The MSISDN of the served party ('calling party' in case of MOC, 'forwarding party' in case of call forwarding respectively 'called party' in case of MTC).
<u>Called Number</u>	M	M	The address of the called party.
<u>Recording Entity</u>	M	M	The E.164 number of the visited MSC producing the record.
<u>Basic service</u>	M	M	Bearer or teleservice employed, 'speech' in case of CAMEL CPH calls.
<u>Supp. Services</u>	C	C	Supplementary services invoked as a result of this connection. This field shall be present when one or more supplementary services have been invoked.
<u>Cause for termination</u>	M	M	The reason for the release of the connection.
<u>Diagnostics</u>	O M	O M	A more detailed reason for the release of the connection.
<u>Call reference</u>	M	M	A local identifier distinguishing between transactions on the same MS
<u>Sequence no.</u>	C	C	Partial record sequence number, only present in case of partial records.
<u>Record extensions</u>	O c	O c	A set of network / manufacturer specific extensions to the record, when available.
<u>GsmSCF address</u>	C	C	Identifies the CAMEL server serving the subscriber.
<u>Service Key</u>	C	C	The CAMEL service logic to be applied.
<u>Network call reference</u>	M	M	An identifier to correlate transactions on the same call taking place in different network nodes.
<u>MSC Address</u>	M	M	This field contains the E.164 number assigned to the MSC that generated the network call reference.
<u>Default call handling</u>	O c	O c	Indicates whether or not a CAMEL call encountered default call handling. This field shall be present only if default call handling has been applied.
<u>Number of DP encountered</u>	O c	O c	Number that counts how often armed detection points (TDP and EDP) were encountered. Sum of all DPs encountered in this call.
<u>Level of CAMEL service</u>	O c	O c	Indicator for the complexity of the CAMEL feature used.

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>CAMEL call leg information</u>	<u>C</u>	<u>C</u>	<u>Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.</u>
<u>CAMEL Destination Number</u>			<u>Destination as received in the ICA operation.</u>
<u>Translated Number</u>			<u>Called number after digit translation within the MSC.</u>
<u>Connected Number</u>			<u>Number of connected party if different from 'CAMEL Destination Number'.</u>
<u>Roaming Number</u>			<u>MSRN to route this leg (if applicable).</u>
<u>MSC outgoing TKGP</u>			<u>Trunk on which the leg leaves the MSC.</u>
<u>Seizure Time</u>			<u>Time of traffic channel seizure for this leg.</u>
<u>Answer Time</u>			<u>Time when the answer message is received for this leg.</u>
<u>Release Time</u>			<u>Time when the leg is released or moved into another call segment.</u>
<u>Call Duration</u>			<u>Time between answer and release timestamp of this leg.</u>
<u>Additional Chg. Info</u>			<u>Charge/no charge indicator and additional charging parameters, when available.</u>
<u>Free Format Data</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data Append</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Diagnostics</u>			<u>Detailed reason for disappearing of the leg in this call segment.</u>
<u>Cause for Termination</u>			<u>The reason for disappearing of the leg in this call segment.</u>
<u>Default Call Handling 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>gsm-SCF Address 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Service Key 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Free Format Data Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Location Routing Number (LRN)</u>			<u>For Number Portability feature, not available in 2G records.</u>
<u>LRN Source Indicator</u>			<u>Source of the LRN, not available in 2G records.</u>
<u>LRN Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>JIP Parameter</u>			<u>Jurisdiction Information Parameter, not available in 2G records.</u>
<u>JIP Source Indicator</u>			<u>The source of the JIP, not available in 2G records.</u>
<u>JIP Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>Partial Record Type</u>	<u>:</u>	<u>O</u> <u>c</u>	<u>Indicates the event (time limit etc.) that caused the generation of a partial record.</u>

4.26 Mobile originated call forwarding attempt (CAMEL CPH adapted version)

If the MSC / gsmSCF is able to provide CAMEL CPH services, this kind of record shall replace records according to section 4.3 Mobile originated call forwarding attempt. This applies to all mobile originated call forwarding attempts, even if no CPH operations are used in the individual call.

If the generation of MOC records is enabled in the forwarding MSC then the forwarding MSC shall produce an MOC record for the forwarded-leg of the call.

If further legs in new call segments are generated by this CAMEL dialogue, they are recorded in CDRs of type “4.y New Call Segment in a MO, CF or MT CAMEL Dialogue”.

Connection of a further leg to this call segment is recorded by adding a further field 'Camel Call Leg Information'. Optionally a partial record may be generated.

Table 4.26: MOC, call forwarding record (CAMEL CPH adapted version)

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>Record Type</u>	M	M	<u>Mobile originated.</u>
<u>Served IMSI</u>	M	M	<u>IMSI of the forwarding party.</u>
<u>Served MSISDN</u>	O	O	<u>The MSISDN of the forwarding party.</u>
	M	M	
<u>Calling Number</u>	O	O	<u>The address of the calling party.</u>
	M	M	
<u>Called Number</u>	M	M	<u>The address of the “forwarded-to” party.</u>
<u>Recording Entity</u>	M	M	<u>The E.164 number of the forwarding MSC</u>
<u>Incoming TKGP</u>	O	O	<u>The MSC trunk group on which the call originated at the forwarding MSC.</u>
	M	M	
<u>Basic service</u>	C	C	<u>'speech' in case of CAMEL CPH, not always available e.g. in case of call forwarding unconditional.</u>
<u>Supplementary Services</u>	C	C	<u>Supplementary services invoked as a result of this connection, if this information is available to the forwarding node. This field shall be present when one or more supplementary services have been invoked.</u>
<u>Event time stamps:</u>	C	C	<u>Seizure time: time of incoming traffic channel seizure (for unsuccessful call attempts)</u>
	O	O	<u>Answer time: time of answer (for successful calls)</u>
	M	M	<u>Release time: time of traffic channel release</u>
<u>Call duration</u>	M	M	<u>The chargeable duration of the connection for successful calls, the holding time of call attempts.</u>
<u>Cause for termination</u>	M	M	<u>The reason for the release of the connection.</u>
<u>Diagnostics</u>	O	O	<u>A more detailed reason for the release of the connection.</u>
	M	M	
<u>Call reference</u>	M	M	<u>A local identifier distinguishing between transactions on the same MS</u>
<u>Sequence no.</u>	C	C	<u>Partial record sequence number, only present in case of partial records.</u>
<u>Record extensions</u>	O	O	<u>A set of network/ manufacturer specific extensions to the record, when available.</u>
	c	c	
<u>GsmSCF address</u>	C	C	<u>Identifies the CAMEL server serving the subscriber.</u>
<u>Service key</u>	C	C	<u>The CAMEL service logic to be applied.</u>
<u>Network call reference</u>	C	C	<u>An identifier to correlate transactions on the same call taking place in different network nodes.</u>
<u>MSC Address</u>	C	C	<u>This field contains the E.164 number assigned to the MSC that generated the network call reference.</u>
<u>CAMEL initiated CF indicator</u>	O	O	<u>Indicates that the CAMEL server initiated call forwarding. Not available in case of gsm call forwarding.</u>
	c	c	
<u>Default call handling</u>	O	O	<u>Indicates whether or not a CAMEL call encountered default call handling. This field shall be present only if default call handling has been applied.</u>
	c	c	
<u>Number of DP encountered</u>	O	O	<u>Number that counts how often armed detection points (TDP and EDP) were encountered. Sum of all DPs encountered in this call.</u>
	c	c	
<u>Level of CAMEL service</u>	O	O	<u>Indicator of the complexity of the CAMEL feature used.</u>
	c	c	

<u>Field</u>	<u>2 G</u>	<u>3 G</u>	<u>Description</u>
<u>Free format Data</u>	<u>C</u>	<u>C</u>	<u>This field contains data sent by the gsmSCF in the Furnish Charging Information (FCI) messages. The data can be sent either in one FCI message or several FCI messages with append indicator.</u>
<u>CAMEL call leg information</u>	<u>C</u>	<u>C</u>	<u>Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.</u>
<u>CAMEL Destination Number</u>			<u>Destination modified by CAMEL service.</u>
<u>Translated Number</u>			<u>Called number after digit translation within the MSC.</u>
<u>Connected Number</u>			<u>Number of connected party if different from 'CAMEL Destination Number'.</u>
<u>Roaming Number</u>			<u>MSRN to route this leg (if applicable).</u>
<u>MSC outgoing TKGP</u>			<u>Trunk on which the leg leaves the MSC.</u>
<u>Seizure Time</u>			<u>Time of traffic channel seizure for this leg.</u>
<u>Answer Time</u>			<u>Time when the answer message is received for this leg.</u>
<u>Release Time</u>			<u>Time when the leg is released or moved into another call segment.</u>
<u>Call Duration</u>			<u>Time between answer and release timestamp of this leg.</u>
<u>Additional Chg. Info</u>			<u>Charge/no charge indicator and additional charging parameters, when available.</u>
<u>Free Format Data</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data Append</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Diagnostics</u>			<u>Detailed reason for disappearing of the leg in this call segment.</u>
<u>Cause for Termination</u>			<u>The reason for disappearing of the leg in this call segment.</u>
<u>Default Call Handling 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>gsm-SCF Address 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Service Key 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Free Format Data Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Location Routing Number (LRN)</u>			<u>For Number Portability feature, not available in 2G records.</u>
<u>LRN Source Indicator</u>			<u>Source of the LRN, not available in 2G records.</u>
<u>LRN Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>JIP Parameter</u>			<u>Jurisdiction Information Parameter, not available in 2G records.</u>
<u>JIP Source Indicator</u>			<u>The source of the JIP, not available in 2G records.</u>
<u>JIP Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>Free format data append indicator</u>	<u>C</u>	<u>C</u>	<u>Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR. Shall be present only if CAMEL is applied.</u>
<u>Partial Record Type</u>	<u>-</u>	<u>O c</u>	<u>Indicates the event (time limit etc.) that caused the generation of a partial record.</u>

4.27 Terminating CAMEL call attempt (CAMEL CPH adapted version)

If the MSC / gsmSCF is able to provide CAMEL CPH services, this kind of record shall replace records according to section 4.18 Terminating CAMEL call attempt. This applies to all terminating CAMEL call attempts, even if no CPH operations are used in the individual call.

If the generation of these records is enabled, a terminating CAMEL call attempt record shall be generated for each call involving CAMEL CPH operations. The record is generated in the GMSC/gsmSSF carrying out the terminating CAMEL call handling and in the MSC server/gsmSSF carrying out the visited terminating CAMEL call attempt.

If further legs in new call segments are generated by this CAMEL dialogue, they are recorded in CDRs of type "4.y New Call Segment in a MO, CF or MT CAMEL Dialogue".

Table 4.27: Terminating CAMEL record (CPH adapted version)

<u>Field</u>	<u>2 G</u>	<u>3 G</u>	<u>Description</u>
<u>Record Type</u>	M	M	<u>Terminating CAMEL interrogation.</u>
<u>Served IMSI</u>	M	M	<u>IMSI of the called party</u>
<u>Served MSISDN</u>	O	O	<u>The MSISDN of the called party.</u>
	M	M	
<u>Recording Entity</u>	M	M	<u>The E.164 number of the GMSC.</u>
<u>Interrogation time stamp</u>	M	M	<u>Time at which the interrogation was invoked.</u>
<u>GsmSCF Address</u>	M	M	<u>The CAMEL server serving the subscriber.</u>
<u>Service key</u>	M	M	<u>The CAMEL service logic to be applied.</u>
<u>Network call reference</u>	M	M	<u>An identifier to correlate transactions on the same call taking place in different network nodes.</u>
<u>MSC Address</u>	M	M	<u>This field contains the E.164 number assigned to the MSC that generated the network call reference.</u>
<u>Default call handling</u>	O	O	<u>Indicates whether or not a CAMEL call encountered default call handling. This field shall be present only if default call handling has been applied.</u>
	c	c	
<u>Record extensions</u>	O	O	<u>A set of network/ manufacturer specific extensions to the record, when available.</u>
	c	c	
<u>Called Number</u>	M	M	<u>The address of the called party as received by the GMSC/gsmSSF.</u>
<u>Calling Number</u>	C	C	<u>The address of the calling party, if available.</u>
<u>Incoming TKGP</u>	O	O	<u>The GMSC trunk group on which the call originated. If available in 3G, this parameter shall be supplied.</u>
	M	c	
<u>Event time stamps:</u>	C	C	<u>Seizure time: time of incoming traffic channel seizure (for unsuccessful call attempts)</u>
	C	C	
	O	O	<u>Answer time: time of answer (for successful calls)</u>
	M	M	<u>Release time: time of traffic channel release</u>
<u>Call duration</u>	M	M	<u>The chargeable duration of the connection for successful calls, the holding time of call attempts.</u>
<u>Cause for termination</u>	M	M	<u>The reason for the release of the connection.</u>
<u>Diagnostics</u>	O	O	<u>A more detailed reason for the release of the connection.</u>
	M	M	
<u>Call reference</u>	M	M	<u>A local identifier distinguishing between transactions on the same MS</u>
<u>Sequence no.</u>	C	C	<u>Partial record sequence number, only present in case of partial records.</u>
<u>Number of DP encountered</u>	O	O	<u>Number that counts how often armed detection points (TDP and EDP) were encountered. Sum of all DPs encountered in this call.</u>
	c	c	
<u>Level of CAMEL service</u>	O	O	<u>Indicator of the complexity of the CAMEL feature used.</u>
	c	c	
<u>Free format Data</u>	C	C	<u>This field contains data sent by the gsmSCF in the Furnish Charging Information (FCI) message(s). The data can be sent either in one FCI message or several FCI messages with append indicator.</u>

<u>Field</u>	<u>2</u> <u>G</u>	<u>3</u> <u>G</u>	<u>Description</u>
<u>CAMEL call leg information</u>	<u>C</u>	<u>C</u>	<u>Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.</u>
<u>CAMEL Destination Number</u>			<u>Destination as received in the ICA operation or overwritten by TDP3.</u>
<u>Translated Number</u>			<u>Called number after digit translation within the MSC.</u>
<u>Connected Number</u>			<u>Number of connected party if different from 'CAMEL Destination Number'.</u>
<u>Roaming Number</u>			<u>MSRN or B-party (if applicable).</u>
<u>MSC outgoing TKGP</u>			<u>Trunk on which the leg leaves the MSC.</u>
<u>Seizure Time</u>			<u>Time of traffic channel seizure for this leg.</u>
<u>Answer Time</u>			<u>Time when the answer message is received for this leg.</u>
<u>Release Time</u>			<u>Time when the leg is released or moved into another call segment.</u>
<u>Call Duration</u>			<u>Time between answer and release timestamp of this leg.</u>
<u>CAMEL Init CF Indicator</u>			<u>Indicates that the CAMEL server initiated call forwarding.</u>
<u>Additional Chg. Info</u>			<u>Charge/no charge indicator and additional charging parameters, when available.</u>
<u>Free Format Data</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data Append</u>			<u>If received in the FCI message from SCF.</u>
<u>Free Format Data 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Diagnostics</u>			<u>Detailed reason for disappearing of the leg in this call segment.</u>
<u>Cause for Termination</u>			<u>The reason for disappearing of the leg in this call segment.</u>
<u>Default Call Handling 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>gsm-SCF Address 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Service Key 2</u>			<u>Present if a 2nd service (DP3) is triggered.</u>
<u>Free Format Data Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Free Format Data Append Incoming 2</u>			<u>If provided in the FCI message for a 2nd service.</u>
<u>Location Routing Number (LRN)</u>			<u>For Number Portability feature, not available in 2G records.</u>
<u>LRN Source Indicator</u>			<u>Source of the LRN, not available in 2G records.</u>
<u>LRN Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>JIP Parameter</u>			<u>Jurisdiction Information Parameter, not available in 2G records.</u>
<u>JIP Source Indicator</u>			<u>The source of the JIP, not available in 2G records.</u>
<u>JIP Query Status Indicator</u>			<u>Status of Number Portability query, not available in 2G records.</u>
<u>Free format data append indicator</u>	<u>C</u>	<u>C</u>	<u>Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.</u>
<u>MSC server indication</u>	<u>C</u>	<u>C</u>	<u>Indication if the CAMEL call handling is active in the MSC server.</u>
<u>Partial Record Type</u>	<u>-</u>	<u>O</u> <u>c</u>	<u>Indicates the event (time limit etc.) that caused the generation of a partial record.</u>

End of Change in Clause 4

5 Description of Record Fields

This clause contains a brief description of each field of the CDRs described in the previous clause.

...

5.13 Cause for termination

This field contains a generalised reason for the release of the connection including the following:

- normal release;
- CAMEL initiated call release;
- [change of call configuration due to CAMEL CPH operations;](#)
- partial record generation;
- partial record call re-establishment;
- unsuccessful call attempt;
- abnormal termination during the stable phase;
- unauthorized network originating a location service request;
- unauthorized client requesting a location service;
- position method failure at a location service execution;
- unknown or unreachable LCS client at a location service request.

A more detailed reason may be found in the diagnostics field.

...

5.24 Event time stamps

These fields contain the event time stamps relevant for each of the individual record types.

The call records may contain three significant call handling time stamps:

- The time at which the resource in question was seized (Seizure time).
- The time at which the call was answered or at which charging commences (Answer time).
- The time at which the resource was released (Release time).

For both Mobile Originated and Mobile Terminated calls, the Seizure time is the time at which the traffic channel is allocated i.e. the time at which the ASSIGN COMMAND message is sent to the MS. [For gsmCSF initiated calls, the 'seizure time' is the time when the ICA operation is received for the particular leg.](#)

For Mobile Originated calls the Answer time is the time at which the CONNECT message is sent to the calling party. For Mobile Terminated calls the time at which the CONNECT message is received from the called party. However, if the subscriber has subscribed to the advice of charge charging level service, then the answer time shall be derived from the time at which the FACILITY message is received from the MS containing the acknowledgement of receipt of the AOC parameters. Similarly, if the AOC parameters are changed during the call then the change time recorded for a subscriber with AOC charging level is the receipt of the FACILITY message from the MS. For a subscriber with AOC information level the change time recorded is the time at which the FACILITY is sent to the MS. Finally, in case of call re-establishment the answer time is the time at which the new traffic channel is allocated by the MSC i.e. when the ASSIGN COMMAND is sent to the MS. [For gsmSCF initiated calls the 'answer time' is the time when the answer message is received from the particular called party.](#)

The Release time is the time at which the connection is released by either party i.e. a DISCONNECT or RELEASE is sent by the network or a DISCONNECT is received from the MS. In the case of a radio link failure, the release time is the time at which the failure was detected by the MSC.

For unsuccessful call attempts the Seizure time is mandatory. The Release time is optional and the call duration recorded is the call holding time i.e. the difference between the two.

For successful calls the Answer time is mandatory and both the Seizure and Release times are optional. The call duration recorded is the chargeable duration i.e. the difference between the Answer and Release time stamps.

The event records include the following time stamps:

- HLR-int time: The receipt of a MAP_SEND_ROUTING_INFO request by the HLR.
- Loc.Upd. time: The receipt of a MAP_UPDATE_LOCATION_AREA request by the VLR or the receipt of a MAP_UPDATE_LOCATION request by the HLR.
- SS-Action: The receipt of a supplementary service request by the VLR.
e.g. MAP_REGISTER_SS, MAP_INVOKE_SS
- SMS-MO: The receipt of an RP_DATA message from the MS containing an SMS_SUBMIT PDU.
- SMS-MT: The transmission of an RP_DATA message to the MS containing an SMS_DELIVER PDU.
- LCS: The time the LR was processed.

It should be noted that the events listed above are only examples in order to demonstrate the principles and that the list is by no means exhaustive.

All time-stamps include a minimum of date, hour, minute and second.

5.28 GsmSCF address

This field identifies the CAMEL server serving the subscriber. Address is defined in HLR as part of CAMEL subscription information [or received from the gsmSCF in the ICA operation.](#)

5.43 Level of CAMEL service

This field describes briefly the complexity of CAMEL invocation.

- The flag 'basic' means that a CAMEL service is invoked during the set-up phase (e.g. to modify the destination) of the call. This flag shall be set when a CAMEL service is invoked for a call.
- The flag 'online charging' means that the CAMEL service has applied online charging for the call, by providing AoC parameters in the Send Charging Information message. This flag shall be set when the MSC has received the AoC parameters from the gsmSCF and has sent these AoC parameters to the MS.
- The flag 'call duration supervision' means that the CAMEL service has applied call duration control, with the Apply Charging message. This flag shall be set when the MSC has received the Apply Charging message from the gsmSCF.
- The flag 'call party handling' is set when MSC/gsmSSF executes following operations
 - Initiate Call Attempt
 - Split Leg
 - Move Leg
 - Disconnect Leg

5.77 Served MSISDN

This field contains the mobile station ISDN number (MSISDN) of the served party. The term "served" party is used to describe the mobile subscriber involved in the transaction recorded e.g. the called subscriber in case of an MTC record. In case of multi-numbering the MSISDN stored in a MOC record will be the primary MSISDN of the calling party. In the gsmSCF initiated calls the gsmSCF indicates the calling party number in the ICA operation.

The structure of the MSISDN is defined in TS 23.003 [2].

End of Change in Clause 5

6 Charging Data Record Structure

6.1 ASN.1 definitions for CDR information

Within the current 3GPP TS 32-series of specifications the ASN.1 definitions are based on ITU-T Recommendation X.208 [8] which has been superseded by ITU-T Recommendation X.680. This newer version not only includes new features but also removes some that were present in ITU-T Recommendation X.208. It was agreed that where possible, the GPRS work would be based on those ASN.1 features that were common to both. However, where necessary, the new features in ITU-T Recommendation X.680 [7] be used in some places. ITU-T Recommendation X.208 [8] feature that are no longer in ITU-T Recommendation X.680 [7] will not be used.

```
TS32205-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) umts-Operation-
Maintenance (3) ts-32-205 (205) informationModel (0) asnlModule (2) version1 (1)}
```

```
DEFINITIONS IMPLICIT TAGS ::=
```

```
BEGIN
```

```
-- EXPORTS everything
```

```
IMPORTS
```

```
NumberOfForwarding, CallReferenceNumber
```

```
FROM MAP-CH-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1)
modules (3) map-CH-DataTypes (13) version6 (6) }
```

```
AddressString, ISDN-AddressString, BasicServiceCode, IMSI, IMEI, LCSCClientExternalID,
LCSCClientInternalID
```

```
FROM MAP-CommonDataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network
(1) modules (3) map-CommonDataTypes (18) version6 (6) }
```

```
DestinationRoutingAddress
```

```
FROM CAP-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0)
gsm-Network (1) modules (3) cap-datatypes (52) version1 (0) }
```

```
ServiceKey, DefaultCallHandling, DefaultSMS-Handling, NotificationToMSUser
```

```
FROM MAP-MS-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0)
gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6) }
```

```
MOLR-Type
```

```
FROM SS-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2)
modules (3) ss-DataTypes (2) version7 (7)}
```

```
BearerServiceCode
```

```
FROM MAP-BS-Code { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1)
modules (3) map-BS-Code (20) version6 (6) }
```

```
TeleserviceCode
```

```
FROM MAP-TS-Code { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1)
modules (3) map-TS-Code (19) version2 (2) }
```

```
SS-Code
```

```
FROM MAP-SS-Code { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1)
modules (3) map-SS-Code (15) version6 (6) }
```

```
Ext-GeographicalInformation, LCSCClientType, LCS-Priority, LocationType
```

```
FROM MAP-LCS-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1)
modules (3) map-LCS-DataTypes (25) version7 (7)}
```

```
PositionMethodFailure-Diagnostic
```

```
FROM MAP-ER-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1)
modules (3) map-ER-DataTypes (17) version7 (7)}
```

```
BasicService
```

```
FROM Basic-Service-Elements { ccitt identified-organization (4) etsi (0)
196 basic-service-elements (8) }
```

```
--
```

```
-- See "Digital Subscriber Signalling System No. one (DSS1) protocol"
```

```

-- ETS 300 196
--

ObjectInstance
FROM CMIP-1 {joint-iso-ccitt ms (9) cmip (1) version1 (1) protocol (3)}

ManagementExtension
FROM Attribute-ASN1Module {joint-iso-ccitt ms (9) smi (3) part2 (2) asn1Module (2) 1}

SystemType
FROM TS32215-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-215 (215) informationModel (0) asn1Module (2) version1 (1)}

S-CSCFRecord, P-CSCFRecord, I-CSCFRecord, MRFCRecord, MGCFRecord, BGCFRecord, ASRecord
FROM TS32225-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-225 (225) informationModel (0) asn1Module (2) version1 (1)}

SGSNPDPreCORD, GGSNPDPreCORD, SGSNMMReCORD, SGSNSMOReCORD, SGSNSMTReCORD, SGSNMTLCSReCORD,
SGSNMOLCSReCORD, SGSNNILCSReCORD
FROM TS32215-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-215 (215) informationModel (0) asn1Module (2) version1 (1)}

MMO1SReCORD, MMO4FRqReCORD, MMO4FRsReCORD, MMO4DReCORD, MMO1DReCORD, MMO4RReCORD, MMO1RReCORD,
MMOMDReCORD, MMR4FReCORD, MMR1NRqReCORD, MMR1NRsReCORD, MMR1RtReCORD, MMR1AReCORD, MMR4DRqReCORD,
MMR4DRsReCORD, MMR1RRReCORD, MMR4RRqReCORD, MMR4RRsReCORD, MMRMDReCORD, MMFReCORD, MMBx1SReCORD,
MMBx1VReCORD, MMBx1UReCORD, MMBx1DReCORD, MM7SReCORD, MM7DRqReCORD, MM7DRsReCORD, MM7CReCORD,
MM7RRReCORD, MM7DRRqReCORD, MM7DRRsReCORD, MM7RRqReCORD, MM7RRsReCORD
FROM TS32235-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-235 (235) informationModel (0) asn1Module (2) version1 (1)}

AE-title
FROM ACSE-1 {joint-iso-ccitt association-control (2) abstract-syntax (1) apdus (0) version (1) };
--
-- Note that the syntax of AE-title to be used is from
-- CCITT Rec. X.227 / ISO 8650 corrigendum and not "ANY"
-----
--
-- CALL AND EVENT RECORDS
--
-----

CallEventRecord ::= CHOICE
--
-- Record values 0..19 are 3G circuit switch specific
--          20..27 are 3G packet switch specific
--          30..63 are application specific
--          70..76 are IMS specific
--
{
    moCallRecord          [0] MOCallRecord,
    mtCallRecord          [1] MTCallRecord,
    roamingRecord         [2] RoamingRecord,
    incGatewayRecord      [3] IncGatewayRecord,
    outGatewayRecord      [4] OutGatewayRecord,
    transitRecord         [5] TransitCallRecord,
    moSMSRecord           [6] MOSMSRecord,
    mtSMSRecord           [7] MTSMSRecord,
    moSMSIWRecord         [8] MOSMSIWRecord,
    mtSMSGWRecord         [9] MTSMSGWRecord,
    ssActionRecord        [10] SSActionRecord,
    hlrIntRecord          [11] HLRIntRecord,
    locUpdateHLRRecord    [12] LocUpdateHLRRecord,
    locUpdateVLRRecord    [13] LocUpdateVLRRecord,
    commonEquipRecord     [14] CommonEquipRecord,
    recTypeExtensions     [15] ManagementExtensions,
    termCAMELRecord       [16] TermCAMELRecord,
    mtLCSRecord           [17] MTLCSRecord,
    moLCSRecord           [18] MOLCSRecord,
    niLCSRecord           [19] NILCSRecord,

    sgsnPDPRecord        [20] SGSNPDPRecord,
    ggsnPDPRecord        [21] GGSNPDPRecord,
    sgsnMMRecord          [22] SGSNMMRecord,
    sgsnSMOReCORD         [23] SGSNSMOReCORD,
    sgsnSMTReCORD         [24] SGSNSMTReCORD,
    sgsnLCTReCORD         [25] SGSNLCTReCORD,
    sgsnLCOReCORD         [26] SGSNLCOReCORD,

```

sgsnLCNRecord	[27] SGSNLCNRecord,
mm01SRecord	[30] MM01SRecord,
mm04FRqRecord	[31] MM04FRqRecord,
mm04FRsRecord	[32] MM04FRsRecord,
mm04DRecord	[33] MM04DRecord,
mm01DRecord	[34] MM01DRecord,
mm04RRecord	[35] MM04RRecord,
mm01RRecord	[36] MM01RRecord,
mmOMDRecord	[37] MMOMDRecord,
mmR4FRRecord	[38] MMR4FRRecord,
mmR1NRqRecord	[39] MMR1NRqRecord,
mmR1NRsRecord	[40] MMR1NRsRecord,
mmR1RtRqRecord	[41] MMR1RtRecord,
mmR1ARecord	[43] MMR1ARecord,
mmR4DRqRecord	[44] MMR4DRqRecord,
mmR4DRsRecord	[45] MMR4DRsRecord,
mmR1RRRecord	[46] MMR1RRRecord,
mmR4RRqRecord	[47] MMR4RRqRecord,
mmR4RRsRecord	[48] MMR4RRsRecord,
mmRMDRecord	[49] MMRMDRecord,
mmFRecord	[50] MMFRecord,
mmBx1SRecord	[51] MMBx1SRecord,
mmBx1VRecord	[52] MMBx1VRecord,
mmBx1URecord	[53] MMBx1URecord,
mmBx1DRecord	[54] MMBx1DRecord,
mm7SRecord	[55] MM7SRecord,
mm7DRqRecord	[56] MM7DRqRecord,
mm7DRsRecord	[57] MM7DRsRecord,
mm7CRecord	[58] MM7CRecord,
mm7RRecord	[59] MM7RRecord,
mm7DRRqRecord	[60] MM7DRRqRecord,
mm7DRRsRecord	[61] MM7DRRsRecord,
mm7RRqRecord	[62] MM7RRqRecord,
mm7RRsRecord	[63] MM7RRsRecord,
s-CSCFRecord	[70] S-SCSFRecord,
p-CSCFRecord	[71] P-SCSFRecord,
i-CSCFRecord	[72] I-SCSFRecord,
mRFCRecord	[73] MRFCRecord,
mGCFRecord	[74] MGCFRecord,
bGCFRecord	[75] BGCFRecord,
aSRecord	[76] ASRecord

}

MOCallRecord ::= SET

{

recordType	[0] CallEventRecordType,
servedIMSI	[1] IMSI OPTIONAL,
servedIMEI	[2] IMEI OPTIONAL,
servedMSISDN	[3] MSISDN OPTIONAL,
callingNumber	[4] CallingNumber OPTIONAL,
calledNumber	[5] CalledNumber OPTIONAL,
translatedNumber	[6] TranslatedNumber OPTIONAL,
connectedNumber	[7] ConnectedNumber OPTIONAL,
roamingNumber	[8] RoamingNumber OPTIONAL,
recordingEntity	[9] RecordingEntity,
mscIncomingTKGP	[10] TrunkGroup OPTIONAL,
mscOutgoingTKGP	[11] TrunkGroup OPTIONAL,
location	[12] LocationAreaAndCell OPTIONAL,
changeOfLocation	[13] SEQUENCE OF LocationChange OPTIONAL,
basicService	[14] BasicServiceCode OPTIONAL,
transparencyIndicator	[15] TransparencyInd OPTIONAL,
changeOfService	[16] SEQUENCE OF ChangeOfService OPTIONAL,
supplServicesUsed	[17] SEQUENCE OF SuppServiceUsed OPTIONAL,
aocParameters	[18] AOCParameters OPTIONAL,
changeOfAOCParms	[19] SEQUENCE OF AOCParmChange OPTIONAL,
msClassmark	[20] Classmark OPTIONAL,
changeOfClassmark	[21] ChangeOfClassmark OPTIONAL,
seizureTime	[22] TimeStamp OPTIONAL,
answerTime	[23] TimeStamp OPTIONAL,
releaseTime	[24] TimeStamp OPTIONAL,
callDuration	[25] CallDuration <u>OPTIONAL</u> ,
dataVolume	[26] DataVolume OPTIONAL,
radioChanRequested	[27] RadioChanRequested OPTIONAL,
radioChanUsed	[28] TrafficChannel OPTIONAL,
changeOfRadioChan	[29] ChangeOfRadioChannel OPTIONAL,


```

causeForTerm           [30] CauseForTerm,
diagnostics             [31] Diagnostics OPTIONAL,
callReference          [32] CallReference,
sequenceNumber         [33] INTEGER OPTIONAL,
additionalChgInfo      [34] AdditionalChgInfo OPTIONAL,
recordExtensions       [35] ManagementExtensions OPTIONAL,
gsm-SCFAddress         [36] Gsm-SCFAddress OPTIONAL,
serviceKey             [37] ServiceKey OPTIONAL,
networkCallReference   [38] NetworkCallReference OPTIONAL,
mSCAddress             [39] MSCAddress OPTIONAL,
cAMELInitCFIndicator   [40] CAMELInitCFIndicator OPTIONAL,
defaultCallHandling    [41] DefaultCallHandling OPTIONAL,
hSCSDChanRequested     [42] NumOfHSCSDChanRequested OPTIONAL,
hSCSDChanAllocated    [43] NumOfHSCSDChanAllocated OPTIONAL,
changeOfHSCSDParms    [44] SEQUENCE OF HSCSDParmsChange OPTIONAL,
fnur                  [45] Fnur OPTIONAL,
aiurRequested          [46] AiurRequested OPTIONAL,
chanCodingsAcceptable [47] SEQUENCE OF ChannelCoding OPTIONAL,
chanCodingUsed         [48] ChannelCoding OPTIONAL,
speechVersionSupported [49] SpeechVersionIdentifier OPTIONAL,
speechVersionUsed      [50] SpeechVersionIdentifier OPTIONAL,
numberOfDPENcountered [51] INTEGER OPTIONAL,
levelOfCAMELService    [52] LevelOfCAMELService OPTIONAL,
freeFormatData         [53] FreeFormatData OPTIONAL,
cAMELCallLegInformation [54] SEQUENCE OF CAMELInformation OPTIONAL,
freeFormatDataAppend  [55] BOOLEAN OPTIONAL,
defaultCallHandling-2 [56] DefaultCallHandling OPTIONAL,
gsm-SCFAddress-2      [57] Gsm-SCFAddress OPTIONAL,
serviceKey-2           [58] ServiceKey OPTIONAL,
freeFormatData-2      [59] FreeFormatData OPTIONAL,
freeFormatDataAppend-2 [60] BOOLEAN OPTIONAL,
systemType             [61] SystemType OPTIONAL,
rateIndication         [62] RateIndication OPTIONAL,
locationRoutNum       [63] LocationRoutingNumber OPTIONAL,
lrnSoInd              [64] LocationRoutingNumberSourceIndicator OPTIONAL,
lrnQueryStatus        [65] LocationRoutingNumberQueryStatus OPTIONAL,
jIPPara               [66] JurisdictionInformationParameter OPTIONAL,
jIPSoInd              [67] JurisdictionInformationParameterSourceIndicator OPTIONAL,
jIPQueryStatus        [68] JurisdictionInformationParameterQueryStatus OPTIONAL,
partialRecordType     [69] PartialRecordType OPTIONAL,
guaranteedBitRate     [70] GuaranteedBitRate OPTIONAL,
maximumBitRate        [71] MaximumBitRate OPTIONAL
}

```

```

MTCallRecord          ::= SET
{
  recordType           [0] CallEventRecordType,
  servedIMSI           [1] IMSI,
  servedIMEI           [2] IMEI OPTIONAL,
  servedMSISDN         [3] CalledNumber OPTIONAL,
  callingNumber        [4] CallingNumber OPTIONAL,
  connectedNumber      [5] ConnectedNumber OPTIONAL,
  recordingEntity      [6] RecordingEntity,
  mscIncomingTKGP     [7] TrunkGroup OPTIONAL,
  mscOutgoingTKGP     [8] TrunkGroup OPTIONAL,
  location             [9] LocationAreaAndCell OPTIONAL,
  changeOfLocation    [10] SEQUENCE OF LocationChange OPTIONAL,
  basicService         [11] BasicServiceCode OPTIONAL,
  transparencyIndicator [12] TransparencyInd OPTIONAL,
  changeOfService      [13] SEQUENCE OF ChangeOfService OPTIONAL,
  supplServicesUsed    [14] SEQUENCE OF SuppServiceUsed OPTIONAL,
  aocParameters        [15] AOCParameters OPTIONAL,
  changeOfAOCParms    [16] SEQUENCE OF AOCParmChange OPTIONAL,
  msClassmark         [17] Classmark OPTIONAL,
  changeOfClassmark    [18] ChangeOfClassmark OPTIONAL,
  seizureTime         [19] TimeStamp OPTIONAL,
  answerTime          [20] TimeStamp OPTIONAL,
  releaseTime         [21] TimeStamp OPTIONAL,
  callDuration        [22] CallDuration,
  dataVolume          [23] DataVolume OPTIONAL,
  radioChanRequested   [24] RadioChanRequested OPTIONAL,
  radioChanUsed        [25] TrafficChannel OPTIONAL,
  changeOfRadioChan    [26] ChangeOfRadioChannel OPTIONAL,
  causeForTerm        [27] CauseForTerm,
  diagnostics          [28] Diagnostics OPTIONAL,
  callReference        [29] CallReference,
  sequenceNumber       [30] INTEGER OPTIONAL,

```

```

additionalChgInfo      [31] AdditionalChgInfo OPTIONAL,
recordExtensions      [32] ManagementExtensions OPTIONAL,
networkCallReference  [33] NetworkCallReference OPTIONAL,
mSCAddress            [34] MSCAddress OPTIONAL,
hSCSDChanRequested   [35] NumOfHSCSDChanRequested OPTIONAL,
hSCSDChanAllocated   [36] NumOfHSCSDChanAllocated OPTIONAL,
changeOfHSCSDParms   [37] SEQUENCE OF HSCSDParmsChange OPTIONAL,
fnur                  [38] Fnur OPTIONAL,
aiurRequested         [39] AiurRequested OPTIONAL,
chanCodingsAcceptable [40] SEQUENCE OF ChannelCoding OPTIONAL,
chanCodingUsed        [41] ChannelCoding OPTIONAL,
speechVersionSupported [42] SpeechVersionIdentifier OPTIONAL,
speechVersionUsed     [43] SpeechVersionIdentifier OPTIONAL,
gsm-SCFAddress        [44] Gsm-SCFAddress OPTIONAL,
serviceKey            [45] ServiceKey OPTIONAL,
systemType            [46] SystemType OPTIONAL,
rateIndication        [47] RateIndication OPTIONAL,
locationRoutNum       [48] LocationRoutingNumber OPTIONAL,
lrnSoInd              [49] LocationRoutingNumberSourceIndicator OPTIONAL,
lrnQueryStatus        [50] LocationRoutingNumberQueryStatus OPTIONAL,
jIPPara              [51] JurisdictionInformationParameter OPTIONAL,
jIPSoInd              [52] JurisdictionInformationParameterSourceIndicator OPTIONAL,
jIPQueryStatus        [53] JurisdictionInformationParameterQueryStatus OPTIONAL,
partialRecordType     [54] PartialRecordType OPTIONAL,
guaranteedBitRate     [55] GuaranteedBitRate OPTIONAL,
maximumBitRate        [56] MaximumBitRate OPTIONAL
}

```

```

RoamingRecord ::= SET
{
  recordType          [0] CallEventRecordType,
  servedIMSI          [1] IMSI,
  servedMSISDN        [2] MSISDN OPTIONAL,
  callingNumber        [3] CallingNumber OPTIONAL,
  roamingNumber        [4] RoamingNumber OPTIONAL,
  recordingEntity      [5] RecordingEntity,
  mscIncomingTKGP     [6] TrunkGroup OPTIONAL,
  mscOutgoingTKGP     [7] TrunkGroup OPTIONAL,
  basicService         [8] BasicServiceCode OPTIONAL,
  transparencyIndicator [9] TransparencyInd OPTIONAL,
  changeOfService      [10] SEQUENCE OF ChangeOfService OPTIONAL,
  supplServicesUsed    [11] SEQUENCE OF SuppServiceUsed OPTIONAL,
  seizureTime          [12] TimeStamp OPTIONAL,
  answerTime           [13] TimeStamp OPTIONAL,
  releaseTime          [14] TimeStamp OPTIONAL,
  callDuration         [15] CallDuration,
  dataVolume           [16] DataVolume OPTIONAL,
  causeForTerm         [17] CauseForTerm,
  diagnostics          [18] Diagnostics OPTIONAL,
  callReference        [19] CallReference,
  sequenceNumber       [20] INTEGER OPTIONAL,
  recordExtensions    [21] ManagementExtensions OPTIONAL,
  networkCallReference [22] NetworkCallReference OPTIONAL,
  mSCAddress           [23] MSCAddress OPTIONAL,
  locationRoutNum      [24] LocationRoutingNumber OPTIONAL,
  lrnSoInd             [25] LocationRoutingNumberSourceIndicator OPTIONAL,
  lrnQueryStatus       [26] LocationRoutingNumberQueryStatus OPTIONAL,
  jIPPara              [27] JurisdictionInformationParameter OPTIONAL,
  jIPSoInd             [28] JurisdictionInformationParameterSourceIndicator OPTIONAL,
  jIPQueryStatus       [29] JurisdictionInformationParameterQueryStatus OPTIONAL,
  partialRecordType    [30] PartialRecordType OPTIONAL
}

```

```

TermCAMELRecord ::= SET
{
  recordtype          [0] CallEventRecordType,
  servedIMSI          [1] IMSI,
  servedMSISDN        [2] MSISDN OPTIONAL,
  recordingEntity      [3] RecordingEntity,
  interrogationTime    [4] TimeStamp,
  destinationRoutingAddress [5] DestinationRoutingAddress,
  gsm-SCFAddress       [6] Gsm-SCFAddress,
  serviceKey           [7] ServiceKey,
  networkCallReference [8] NetworkCallReference OPTIONAL,
  mSCAddress           [9] MSCAddress OPTIONAL,

```

```

defaultCallHandling      [10] DefaultCallHandling OPTIONAL,
recordExtensions        [11] ManagementExtensions OPTIONAL,
calledNumber            [12] CalledNumber,
callingNumber           [13] CallingNumber OPTIONAL,
mscIncomingTKGP        [14] TrunkGroup OPTIONAL,
mscOutgoingTKGP        [15] TrunkGroup OPTIONAL,
seizureTime             [16] TimeStamp OPTIONAL,
answerTime              [17] TimeStamp OPTIONAL,
releaseTime             [18] TimeStamp OPTIONAL,
callDuration            [19] CallDuration,
dataVolume              [20] DataVolume OPTIONAL,
causeForTerm            [21] CauseForTerm,
diagnostics             [22] Diagnostics OPTIONAL,
callReference           [23] CallReference,
sequenceNumber          [24] INTEGER OPTIONAL,
numberOfDPENcountered  [25] INTEGER OPTIONAL,
levelOfCAMELService     [26] LevelOfCAMELService OPTIONAL,
freeFormatData          [27] FreeFormatData OPTIONAL,
cAMELCallLegInformation [28] SEQUENCE OF CAMELInformation OPTIONAL,
freeFormatDataAppend   [29] BOOLEAN OPTIONAL,
defaultCallHandling-2   [30] DefaultCallHandling OPTIONAL,
gsm-SCFAddress-2       [31] Gsm-SCFAddress OPTIONAL,
serviceKey-2            [32] ServiceKey OPTIONAL,
freeFormatData-2       [33] FreeFormatData OPTIONAL,
freeFormatDataAppend-2 [34] BOOLEAN OPTIONAL,
mscServerIndication    [35] BOOLEAN OPTIONAL,
locationRoutNum         [36] LocationRoutingNumber OPTIONAL,
lrnSoInd                [37] LocationRoutingNumberSourceIndicator OPTIONAL,
lrnQueryStatus          [38] LocationRoutingNumberQueryStatus OPTIONAL,
jIPPara                 [39] JurisdictionInformationParameter OPTIONAL,
jIPSoInd                [40] JurisdictionInformationParameterSourceIndicator OPTIONAL,
jIPQueryStatus          [41] JurisdictionInformationParameterQueryStatus OPTIONAL,
partialRecordType       [42] PartialRecordType OPTIONAL
}

```

```
IncGatewayRecord ::= SET
```

```

{
  recordType           [0] CallEventRecordType,
  callingNumber         [1] CallingNumber OPTIONAL,
  calledNumber         [2] CalledNumber,
  recordingEntity       [3] RecordingEntity,
  mscIncomingTKGP      [4] TrunkGroup OPTIONAL,
  mscOutgoingTKGP      [5] TrunkGroup OPTIONAL,
  seizureTime          [6] TimeStamp OPTIONAL,
  answerTime           [7] TimeStamp OPTIONAL,
  releaseTime          [8] TimeStamp OPTIONAL,
  callDuration          [9] CallDuration,
  dataVolume           [10] DataVolume OPTIONAL,
  causeForTerm         [11] CauseForTerm,
  diagnostics           [12] Diagnostics OPTIONAL,
  callReference         [13] CallReference,
  sequenceNumber        [14] INTEGER OPTIONAL,
  recordExtensions     [15] ManagementExtensions OPTIONAL,
  locationRoutNum      [16] LocationRoutingNumber OPTIONAL,
  lrnSoInd              [17] LocationRoutingNumberSourceIndicator OPTIONAL,
  lrnQueryStatus       [18] LocationRoutingNumberQueryStatus OPTIONAL,
  jIPPara               [19] JurisdictionInformationParameter OPTIONAL,
  jIPSoInd              [20] JurisdictionInformationParameterSourceIndicator OPTIONAL,
  jIPQueryStatus       [21] JurisdictionInformationParameterQueryStatus OPTIONAL,
  partialRecordType     [22] PartialRecordType OPTIONAL,
  iSDN-BC              [23] ISDN-BC OPTIONAL,
  LLC                   [24] LLC OPTIONAL,
  hLC                   [25] HLC OPTIONAL
}

```

```
OutGatewayRecord ::= SET
```

```

{
  recordType           [0] CallEventRecordType,
  callingNumber         [1] CallingNumber OPTIONAL,
  calledNumber         [2] CalledNumber,
  recordingEntity       [3] RecordingEntity,
  mscIncomingTKGP      [4] TrunkGroup OPTIONAL,
  mscOutgoingTKGP      [5] TrunkGroup OPTIONAL,
  seizureTime          [6] TimeStamp OPTIONAL,
  answerTime           [7] TimeStamp OPTIONAL,
  releaseTime          [8] TimeStamp OPTIONAL,
  callDuration          [9] CallDuration,
  dataVolume           [10] DataVolume OPTIONAL,

```

```

causeForTerm          [11] CauseForTerm,
diagnostics           [12] Diagnostics OPTIONAL,
callReference         [13] CallReference,
sequenceNumber       [14] INTEGER OPTIONAL,
recordExtensions     [15] ManagementExtensions OPTIONAL,
locationRoutNum     [16] LocationRoutingNumber OPTIONAL,
lrnSoInd             [17] LocationRoutingNumberSourceIndicator OPTIONAL,
lrnQryStatus         [18] LocationRoutingNumberQueryStatus OPTIONAL,
jIPPara             [19] JurisdictionInformationParameter OPTIONAL,
jIPSoInd            [20] JurisdictionInformationParameterSourceIndicator OPTIONAL,
jIPQryStatus        [21] JurisdictionInformationParameterQueryStatus OPTIONAL,
partialRecordType   [22] PartialRecordType OPTIONAL
}

TransitCallRecord ::= SET
{
    recordType          [0] CallEventRecordType,
    recordingEntity     [1] RecordingEntity,
    mscIncomingTKGP    [2] TrunkGroup OPTIONAL,
    mscOutgoingTKGP    [3] TrunkGroup OPTIONAL,
    callingNumber       [4] CallingNumber OPTIONAL,
    calledNumber        [5] CalledNumber,
    isdnBasicService   [6] BasicService OPTIONAL,
    seizureTimestamp   [7] TimeStamp OPTIONAL,
    answerTimestamp    [8] TimeStamp OPTIONAL,
    releaseTimestamp   [9] TimeStamp OPTIONAL,
    callDuration        [10] CallDuration,
    dataVolume         [11] DataVolume OPTIONAL,
    causeForTerm       [12] CauseForTerm,
    diagnostics        [13] Diagnostics OPTIONAL,
    callReference      [14] CallReference,
    sequenceNumber     [15] INTEGER OPTIONAL,
    recordExtensions   [16] ManagementExtensions OPTIONAL,
    locationRoutNum   [17] LocationRoutingNumber OPTIONAL,
    lrnSoInd          [18] LocationRoutingNumberSourceIndicator OPTIONAL,
    lrnQryStatus      [19] LocationRoutingNumberQueryStatus OPTIONAL,
    jIPPara           [20] JurisdictionInformationParameter OPTIONAL,
    jIPSoInd          [21] JurisdictionInformationParameterSourceIndicator OPTIONAL,
    jIPQryStatus      [22] JurisdictionInformationParameterQueryStatus OPTIONAL,
    partialRecordType [23] PartialRecordType OPTIONAL
}

MOSMSRecord ::= SET
{
    recordType          [0] CallEventRecordType,
    servedIMSI         [1] IMSI,
    servedIMEI         [2] IMEI OPTIONAL,
    servedMSISDN       [3] MSISDN OPTIONAL,
    msClassmark        [4] Classmark,
    serviceCentre      [5] AddressString,
    recordingEntity     [6] RecordingEntity,
    location           [7] LocationAreaAndCell OPTIONAL,
    messageReference   [8] MessageReference,
    originationTime    [9] TimeStamp,
    smsResult          [10] SMSResult OPTIONAL,
    recordExtensions   [11] ManagementExtensions OPTIONAL,
    destinationNumber [12] SmsTpDestinationNumber OPTIONAL,
    cAMELSMSInformation [13] CAMELSMSInformation OPTIONAL,
    systemType         [14] SystemType OPTIONAL
}

MTSMSRecord ::= SET
{
    recordType          [0] CallEventRecordType,
    serviceCentre      [1] AddressString,
    servedIMSI         [2] IMSI,
    servedIMEI         [3] IMEI OPTIONAL,
    servedMSISDN       [4] MSISDN OPTIONAL,
    msClassmark        [5] Classmark,
    recordingEntity     [6] RecordingEntity,
    location           [7] LocationAreaAndCell OPTIONAL,
    deliveryTime       [8] TimeStamp,
    smsResult          [9] SMSResult OPTIONAL,
    recordExtensions   [10] ManagementExtensions OPTIONAL,
    systemType         [11] SystemType OPTIONAL,
    cAMELSMSInformation [12] CAMELSMSInformation OPTIONAL
}

```

```

MOSMSIWRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    serviceCentre       [1] AddressString,
    servedIMSI          [2] IMSI,
    recordingEntity      [3] RecordingEntity,
    eventTime            [4] TimeStamp,
    smsResult            [5] SMSResult OPTIONAL,
    recordExtensions     [6] ManagementExtensions OPTIONAL
}

MTSMGWRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    serviceCentre       [1] AddressString,
    servedIMSI          [2] IMSI,
    servedMSISDN        [3] MSISDN OPTIONAL,
    recordingEntity      [4] RecordingEntity,
    eventTime            [5] TimeStamp,
    smsResult            [6] SMSResult OPTIONAL,
    recordExtensions     [7] ManagementExtensions OPTIONAL
}

SSActionRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    servedIMSI          [1] IMSI,
    servedIMEI          [2] IMEI OPTIONAL,
    servedMSISDN        [3] MSISDN OPTIONAL,
    msClassmark         [4] Classmark,
    recordingEntity      [5] RecordingEntity,
    location             [6] LocationAreaAndCell OPTIONAL,
    basicServices        [7] BasicServices OPTIONAL,
    supplService         [8] SS-Code OPTIONAL,
    ssAction             [9] SSActionType OPTIONAL,
    ssActionTime         [10] TimeStamp,
    ssParameters         [11] SSParameters OPTIONAL,
    ssActionResult       [12] SSActionResult OPTIONAL,
    callReference        [13] CallReference,
    recordExtensions     [14] ManagementExtensions OPTIONAL,
    systemType           [15] SystemType OPTIONAL
}

HLRIntRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    servedIMSI          [1] IMSI,
    servedMSISDN        [2] MSISDN,
    recordingEntity      [3] RecordingEntity,
    basicService         [4] BasicServiceCode OPTIONAL,
    routingNumber        [5] RoutingNumber,
    interrogationTime     [6] TimeStamp,
    numberOfForwarding   [7] NumberOfForwarding OPTIONAL,
    interrogationResult   [8] HLRIntResult OPTIONAL,
    recordExtensions     [9] ManagementExtensions OPTIONAL
}

LocUpdateHLRRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    servedIMSI          [1] IMSI,
    recordingEntity      [2] RecordingEntity,
    oldLocation          [3] Visited-Location-info OPTIONAL,
    newLocation          [4] Visited-Location-info,
    updateTime           [5] TimeStamp,
    updateResult         [6] LocUpdResult OPTIONAL,
    recordExtensions     [7] ManagementExtensions OPTIONAL
}

LocUpdateVLRRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    servedIMSI          [1] IMSI,
    servedMSISDN        [2] MSISDN OPTIONAL,
    recordingEntity      [3] RecordingEntity,
    oldLocation          [4] Location-info OPTIONAL,
    newLocation          [5] Location-info,
    msClassmark         [6] Classmark,
}

```

```

updateTime          [7] TimeStamp,
updateResult        [8] LocUpdResult OPTIONAL,
recordExtensions    [9] ManagementExtensions OPTIONAL
}

```

```

CommonEquipRecord ::= SET
{
  recordType          [0] CallEventRecordType,
  equipmentType       [1] EquipmentType,
  equipmentId         [2] EquipmentId,
  servedIMSI          [3] IMSI,
  servedMSISDN        [4] MSISDN OPTIONAL,
  recordingEntity     [5] RecordingEntity,
  basicService        [6] BasicServiceCode OPTIONAL,
  changeOfService     [7] SEQUENCE OF ChangeOfService OPTIONAL,
  supplServicesUsed   [8] SEQUENCE OF SuppServiceUsed OPTIONAL,
  seizureTime         [9] TimeStamp,
  releaseTime         [10] TimeStamp OPTIONAL,
  callDuration        [11] CallDuration,
  callReference       [12] CallReference,
  sequenceNumber      [13] INTEGER OPTIONAL,
  recordExtensions    [14] ManagementExtensions OPTIONAL,
  systemType          [15] SystemType OPTIONAL,
  rateIndication      [16] RateIndication OPTIONAL,
  fnur                [17] Fnur OPTIONAL,
  partialRecordType   [18] PartialRecordType OPTIONAL
}

```

```

-----
--
-- OBSERVED IMEI TICKETS
--
-----

```

```

ObservedIMEITicket ::= SET
{
  servedIMEI          [0] IMEI,
  imeiStatus          [1] IMEIStatus,
  servedIMSI          [2] IMSI,
  servedMSISDN        [3] MSISDN OPTIONAL,
  recordingEntity     [4] RecordingEntity,
  eventTime           [5] TimeStamp,
  location             [6] LocationAreaAndCell ,
  imeiCheckEvent      [7] IMEICheckEvent OPTIONAL,
  callReference       [8] CallReference OPTIONAL,
  recordExtensions    [9] ManagementExtensions OPTIONAL
}

```

```

-----
--
-- LOCATION SERICE TICKETS
--
-----

```

```

MTLCSRecord ::= SET
{
  recordType          [0] CallEventRecordType,
  recordingEntity     [1] RecordingEntity,
  lcsClientType       [2] LCSCClientType,
  lcsClientIdentity   [3] LCSCClientIdentity,
  servedIMSI          [4] IMSI,
  servedMSISDN        [5] MSISDN OPTIONAL,
  locationType        [6] LocationType,
  lcsQos              [7] LCSQoSInfo OPTIONAL,
  lcsPriority          [8] LCS-Priority OPTIONAL,
  mlc-Number          [9] ISDN-AddressString,
  eventTimeStamp      [10] TimeStamp,
  measureDuration     [11] CallDuration OPTIONAL,
  notificationToMSUser [12] NotificationToMSUser OPTIONAL,
  privacyOverride     [13] NULL OPTIONAL,
  location             [14] LocationAreaAndCell OPTIONAL,
  locationEstimate    [15] Ext-GeographicalInformation OPTIONAL,
  positioningData     [16] PositioningData OPTIONAL,
  lcsCause            [17] LCSCause OPTIONAL,
  diagnostics         [18] Diagnostics OPTIONAL,
  systemType          [19] SystemType OPTIONAL,
}

```

```

    recordExtensions      [20] ManagementExtensions OPTIONAL,
    causeForTerm         [21] CauseForTerm
}

MOLCSRecord             ::= SET
{
    recordType           [0] CallEventRecordType,
    recordingEntity      [1] RecordingEntity,
    lcsClientType        [2] LCSCClientType OPTIONAL,
    lcsClientIdentity    [3] LCSCClientIdentity OPTIONAL,
    servedIMSI          [4] IMSI,
    servedMSISDN        [5] MSISDN OPTIONAL,
    molr-Type           [6] MOLR-Type,
    lcsQos               [7] LCSQoSInfo OPTIONAL,
    lcsPriority          [8] LCS-Priority OPTIONAL,
    mlc-Number          [9] ISDN-AddressString OPTIONAL,
    eventTimeStamp      [10] TimeStamp,
    measureDuration     [11] CallDuration OPTIONAL,
    location             [12] LocationAreaAndCell OPTIONAL,
    locationEstimate    [13] Ext-GeographicalInformation OPTIONAL,
    positioningData     [14] PositioningData OPTIONAL,
    lcsCause            [15] LCSCause OPTIONAL,
    diagnostics         [16] Diagnostics OPTIONAL,
    systemType          [17] SystemType OPTIONAL,
    recordExtensions    [18] ManagementExtensions OPTIONAL,
    causeForTerm       [19] CauseForTerm
}

NILCSRecord            ::= SET
{
    recordType           [0] CallEventRecordType,
    recordingEntity      [1] RecordingEntity,
    lcsClientType        [2] LCSCClientType OPTIONAL,
    lcsClientIdentity    [3] LCSCClientIdentity OPTIONAL,
    servedIMSI          [4] IMSI OPTIONAL,
    servedMSISDN        [5] MSISDN OPTIONAL,
    servedIMEI          [6] IMEI OPTIONAL,
    emsDigits           [7] ISDN-AddressString OPTIONAL,
    emsKey              [8] ISDN-AddressString OPTIONAL,
    lcsQos              [9] LCSQoSInfo OPTIONAL,
    lcsPriority          [10] LCS-Priority OPTIONAL,
    mlc-Number          [11] ISDN-AddressString OPTIONAL,
    eventTimeStamp      [12] TimeStamp,
    measureDuration     [13] CallDuration OPTIONAL,
    location             [14] LocationAreaAndCell OPTIONAL,
    locationEstimate    [15] Ext-GeographicalInformation OPTIONAL,
    positioningData     [16] PositioningData OPTIONAL,
    lcsCause            [17] LCSCause OPTIONAL,
    diagnostics         [18] Diagnostics OPTIONAL,
    systemType          [19] SystemType OPTIONAL,
    recordExtensions    [20] ManagementExtensions OPTIONAL,
    causeForTerm       [21] CauseForTerm
}

```

```

-----
--
-- FTAM / FTP / TFTP FILE CONTENTS
--
-----

```

```

CallEventDataFile      ::= SEQUENCE
{
    headerRecord         [0] HeaderRecord,
    callEventRecords    [1] SEQUENCE OF CallEventRecord,
    trailerRecord        [2] TrailerRecord,
    extensions           [3] ManagementExtensions
}

ObservedIMEITicketFile ::= SEQUENCE
{
    productionDateTime  [0] TimeStamp,
    observedIMEITickets [1] SEQUENCE OF ObservedIMEITicket,
    noOfRecords         [2] INTEGER,
    extensions          [3] ManagementExtensions
}

HeaderRecord           ::= SEQUENCE
{

```

```

    productionDateTime      [0] TimeStamp,
    recordingEntity         [1] RecordingEntity,
    extensions              [2] ManagementExtensions
}

TrailerRecord              ::= SEQUENCE
{
    productionDateTime      [0] TimeStamp,
    recordingEntity         [1] RecordingEntity,
    firstCallDateTime       [2] TimeStamp,
    lastCallDateTime        [3] TimeStamp,
    noOfRecords             [4] INTEGER,
    extensions              [5] ManagementExtensions
}

-----
--
-- NP Fields
--
-----

LocationRoutingNumber      ::= OCTET STRING (SIZE (5))
--
-- The format is selected to meet the existing standards for the wireline in Telcordia
-- Belcore GR-1100-CORE, BAF Module 720.
--

LocationRoutingNumberSourceIndicator ::= INTEGER
{
    lRN-NP-Database         (1),
    switchingSystemData     (2),
    incomingsignaling       (3),
    unknown                 (9)
}

LocationRoutingNumberQueryStatus ::= INTEGER
{
    successfulQuery          (1),
    noQueryResponseMsg      (2),
    queryProtocolErr        (4),
    queryResponseDataErr    (5),
    queryRejected           (6),
    queryNotPerformed       (9),
    queryUnsuccessful       (99)
}

JurisdictionInformationParameter ::= OCTET STRING (SIZE (5))
--
-- /* JIP Parameter */
--

JurisdictionInformationParameterSourceIndicator ::= INTEGER
{
--
-- Identical to LocationRoutingNumberSourceIndicator
--
    lRN-NP-Database         (1),
    switchingSystemData     (2),
    incomingsignaling       (3),
    unknown                 (9)
}

JurisdictionInformationParameterQueryStatus ::= INTEGER
{
    successfulQuery          (1),
    noQueryResponseMsg      (2),
    queryProtocolErr        (4),
    queryResponseDataErr    (5),
    queryRejected           (6),
    queryNotPerformed       (9),
    queryUnsuccessful       (99)
}

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

```



```

AdditionalChgInfo      ::= SEQUENCE
{
    chargeIndicator     [0] ChargeIndicator OPTIONAL,
    chargeParameters    [1] OCTET STRING OPTIONAL
}

AiurRequested         ::= ENUMERATED
{
    --
    -- See Bearer Capability TS 24.008
    -- (note that value "4" is intentionally missing
    -- because it is not used in TS 24.008)
    --
    aiur09600BitsPerSecond    (1),
    aiur14400BitsPerSecond    (2),
    aiur19200BitsPerSecond    (3),
    aiur28800BitsPerSecond    (5),
    aiur38400BitsPerSecond    (6),
    aiur43200BitsPerSecond    (7),
    aiur57600BitsPerSecond    (8),
    aiur38400BitsPerSecond1    (9),
    aiur38400BitsPerSecond2    (10),
    aiur38400BitsPerSecond3    (11),
    aiur38400BitsPerSecond4    (12)
}

AOCParameters        ::= SEQUENCE
{
    --
    -- See TS 22.024.
    --
    e1                  [1] EParameter OPTIONAL,
    e2                  [2] EParameter OPTIONAL,
    e3                  [3] EParameter OPTIONAL,
    e4                  [4] EParameter OPTIONAL,
    e5                  [5] EParameter OPTIONAL,
    e6                  [6] EParameter OPTIONAL,
    e7                  [7] EParameter OPTIONAL
}

AOCParamChange       ::= SEQUENCE
{
    changeTime          [0] TimeStamp,
    newParameters       [1] AOCParameters
}

BasicServices        ::= SET OF BasicServiceCode

BCDDirectoryNumber   ::= OCTET STRING
-- This type contains the binary coded decimal representation of
-- a directory number e.g. calling/called/connected/translated number.
-- The encoding of the octet string is in accordance with the
-- the elements "Calling party BCD number", "Called party BCD number"
-- and "Connected number" defined in TS 24.008.
-- This encoding includes type of number and number plan information
-- together with a BCD encoded digit string.
-- It may also contain both a presentation and screening indicator
-- (octet 3a).
-- For the avoidance of doubt, this field does not include
-- octets 1 and 2, the element name and length, as this would be
-- redundant.

CallDuration         ::= INTEGER
--
-- The call duration in seconds.
-- For successful calls this is the chargeable duration.
-- For call attempts this is the call holding time.
--

CallEventRecordType  ::= INTEGER
{
    moCallRecord        (0),
    mtCallRecord        (1),
    roamingRecord       (2),
    incGatewayRecord    (3),
    outGatewayRecord    (4),
    transitCallRecord   (5),
    moSMSRecord         (6),
    mtSMSRecord         (7),
}

```

```

moSMSIWRecord      (8),
mtSMSGWRecord      (9),
ssActionRecord     (10),
hlrIntRecord       (11),
locUpdateHLRRecord (12),
locUpdateVLRRecord (13),
commonEquipRecord  (14),
moTraceRecord      (15),
mtTraceRecord      (16),
termCAMELRecord    (17),
--
-- Record values 18..22 are GPRS specific.
-- The contents are defined in TS 32.015
--
sgsnPDPRecord      (18),
ggsnPDPRecord      (19),
sgsnMMRecord       (20),
sgsnSMORecord     (21),
sgsnSMTRecord      (22),
--
-- Record values 23..25 are CS-LCS specific.
-- The contents are defined in the present document
--
mtLCSRecord        (23),
moLCSRecord        (24),
niLCSRecord        (25),
--
-- Record values 26..28 are PS-LCS specific.
-- The contents are defined in TS 32.215
--
sgsnMtLCSRecord    (26),
sgsnMoLCSRecord    (27),
sgsnNiLCSRecord    (28),
--
-- Record values 29..62 are MMS specific.
-- The contents are defined in TS 32.235
--
mmO1SRecord        (29),
mmO4FRqRecord      (30),
mmO4FRsRecord      (31),
mmO4DRecord        (32),
mmO1DRecord        (33),
mmO4RRecord        (34),
mmO1RRecord        (35),
mmOMDRecord        (36),
mmR4FRecord        (37),
mmR1NRqRecord      (38),
mmR1NRsRecord      (39),
mmR1RtRecord       (40),
mmR1AFRecord       (42),
mmR4DRqRecord      (43),
mmR4DRsRecord      (44),
mmR1RRRecord       (45),
mmR4RRqRecord      (46),
mmR4RRsRecord      (47),
mmRMDRecord        (48),
mmFRecord          (49),
mmBx1SRecord       (50),
mmBx1VRecord       (51),
mmBx1URecord       (52),
mmBx1DRecord       (53),
mM7SRecord         (54),
mM7DRqRecord       (55),
mM7DRsRecord       (56),
mM7CRecord         (57),
mM7RRecord         (58),
mM7DRRqRecord      (59),
mM7DRRsRecord      (60),
mM7RRqRecord       (61),
mM7RRsRecord       (62),
--
-- Record values 63..69 are IMS specific.
-- The contents are defined in TS 32.225
--
s-CSCFRecord       (63),
p-CSCFRecord       (64),
i-CSCFRecord       (65),
mRFCRecord         (66),

```

```

    mGCFRecord      (67),
    bGCFRecord      (68),
    aSRecord        (69)
}

CalledNumber      ::= BCDDirectoryNumber

CallingNumber      ::= BCDDirectoryNumber

CallingPartyCategory ::= Category

CallReference      ::= INTEGER

CallType           ::= INTEGER
{
    mobileOriginated (0),
    mobileTerminated (1)
}

CallTypes         ::= SET OF CallType

CAMELDestinationNumber ::= DestinationRoutingAddress

CAMELInformation   ::= SET
{
    CAMELDestinationNumber [1] CAMELDestinationNumber OPTIONAL,
    connectedNumber        [2] ConnectedNumber OPTIONAL,
    roamingNumber          [3] RoamingNumber OPTIONAL,
    mscOutgoingTKGP        [4] TrunkGroup OPTIONAL,
    seizureTime            [5] TimeStamp OPTIONAL,
    answerTime              [6] TimeStamp OPTIONAL,
    releaseTime            [7] TimeStamp OPTIONAL,
    callDuration           [8] CallDuration OPTIONAL,
    dataVolume             [9] DataVolume OPTIONAL,
    CAMELInitCFIndicator   [10] CAMELInitCFIndicator OPTIONAL,
    causeForTerm           [11] CauseForTerm OPTIONAL,
    CAMELModification      [12] ChangedParameters OPTIONAL,
    freeFormatData         [13] FreeFormatData OPTIONAL,
    diagnostics            [14] Diagnostics OPTIONAL,
    freeFormatDataAppend   [15] BOOLEAN OPTIONAL,
    freeFormatData-2       [16] FreeFormatData OPTIONAL,
    freeFormatDataAppend-2 [17] BOOLEAN OPTIONAL,
    translatedNumber       [18] TranslatedNumber OPTIONAL,
    additionalChgInfo      [19] AdditionalChgInfo OPTIONAL,
    defaultCallHandling-2 [20] DefaultCallHandling OPTIONAL,
    gsm-SCFAddress-2       [21] Gsm-SCFAddress OPTIONAL,
    serviceKey-2           [22] ServiceKey OPTIONAL,
    freeFormatDataIncoming-2 [23] FreeFormatData OPTIONAL,
    freeFormatDataAppendInc-2 [24] BOOLEAN OPTIONAL,
    locationRoutNum        [25] LocationRoutingNumber OPTIONAL,
    lrnSoInd               [26] LocationRoutingNumberSourceIndicator OPTIONAL,
    lrnQueryStatus         [27] LocationRoutingNumberQueryStatus OPTIONAL,
    jIPPara                [28] JurisdictionInformationParameter OPTIONAL,
    jIPSoInd               [29] JurisdictionInformationParameterSourceIndicator OPTIONAL,
    jIPQueryStatus         [30] JurisdictionInformationParameterQueryStatus OPTIONAL,
}

CAMELInitCFIndicator ::= ENUMERATED
{
    noCAMELCallForwarding (0),
    CAMELCallForwarding   (1)
}

CAMELModificationParameters ::= SET
{
    --
    -- The list contains only parameters changed due to CAMEL call
    -- handling.
    --
    callingPartyNumber      [0] CallingNumber OPTIONAL,
    callingPartyCategory    [1] CallingPartyCategory OPTIONAL,
    originalCalledPartyNumber [2] OriginalCalledNumber OPTIONAL,
    genericNumbers          [3] GenericNumbers OPTIONAL,
    redirectingPartyNumber  [4] RedirectingNumber OPTIONAL,
    redirectionCounter      [5] NumberOfForwarding OPTIONAL
}

CAMELSMSInformation ::= SET
{

```

```

gsm-SCFAddress      [1] Gsm-SCFAddress OPTIONAL,
serviceKey          [2] ServiceKey OPTIONAL,
defaultSMShandling  [3] DefaultSMS-Handling OPTIONAL,
freeFormatData      [4] FreeFormatData OPTIONAL,
callingPartyNumber  [5] CallingNumber OPTIONAL,
destinationSubscriberNumber [6] SmsTpDestinationNumber OPTIONAL,
cAMELSMSCAddress    [7] AddressString OPTIONAL,
smsReferenceNumber  [8] CallReferenceNumber OPTIONAL
}

Category ::= OCTET STRING (SIZE(1))
--
-- The internal structure is defined in ITU-T Recommendation Q.763.
--

CauseForTerm ::= INTEGER
{
--
-- Cause codes from 16 up to 31 are defined in GSM12.15 as 'CauseForRecClosing'
-- (cause for record closing).
-- There is no direct correlation between these two types.
-- LCS related causes belong to the MAP error causes acc. TS 29.002.
--
normalRelease          (0),
partialRecord          (1),
partialRecordCallReestablishment (2),
unsuccessfulCallAttempt (3),
stableCallAbnormalTermination (4),
cAMELInitCallRelease  (5),
cAMELCPHCallConfigurationChange (6),
unauthorizedRequestingNetwork (52),
unauthorizedLCSCClient (53),
positionMethodFailure (54),
unknownOrUnreachableLCSCClient (58)
}

CellId ::= OCTET STRING (SIZE(2))
--
-- Coded according to TS 24.008
--

ChangedParameters ::= SET
{
changeFlags [0] ChangeFlags,
changeList  [1] CAMELModificationParameters OPTIONAL
}

ChangeFlags ::= BIT STRING
{
callingPartyNumberModified (0),
callingPartyCategoryModified (1),
originalCalledPartyNumberModified (2),
genericNumbersModified (3),
redirectingPartyNumberModified (4),
redirectionCounterModified (5)
}

ChangeOfClassmark ::= SEQUENCE
{
classmark [0] Classmark,
changeTime [1] TimeStamp
}

ChangeOfRadioChannel ::= SEQUENCE
{
radioChannel [0] TrafficChannel,
changeTime [1] TimeStamp,
speechVersionUsed [2] SpeechVersionIdentifier OPTIONAL
}

ChangeOfService ::= SEQUENCE
{
basicService [0] BasicServiceCode,
transparencyInd [1] TransparencyInd OPTIONAL,
changeTime [2] TimeStamp,
rateIndication [3] RateIndication OPTIONAL,
fnur [4] Fnur OPTIONAL
}

```

```

ChannelCoding                ::= ENUMERATED
{
    tchF4800                  (1),
    tchF9600                  (2),
    tchF14400                 (3)
}

ChargeIndicator              ::= INTEGER
{
    noCharge                  (0),
    charge                    (1)
}

Classmark                    ::= OCTET STRING
--
-- See Mobile station classmark 2, TS 24.008
--

ConnectedNumber              ::= BCDDirectoryNumber

DataVolume                   ::= INTEGER
--
-- The volume of data transferred in segments of 64 octets.
--

Day                          ::= INTEGER (1..31)

DayClass                     ::= ObjectInstance

DayClasses                   ::= SET OF DayClass

DayDefinition                ::= SEQUENCE
{
    day                       [0] DayOfTheWeek,
    dayClass                  [1] ObjectInstance
}

DayDefinitions               ::= SET OF DayDefinition

DateDefinition               ::= SEQUENCE
{
    month                     [0] Month,
    day                       [1] Day,
    dayClass                  [2] ObjectInstance
}

DateDefinitions              ::= SET OF DateDefinition

DayOfTheWeek                 ::= ENUMERATED
{
    allDays                   (0),
    sunday                    (1),
    monday                    (2),
    tuesday                   (3),
    wednesday                 (4),
    thursday                  (5),
    friday                    (6),
    saturday                  (7)
}

Diagnostics                   ::= CHOICE
{
    gsm0408Cause              [0] INTEGER,
    -- See TS 24.008
    gsm0902MapErrorValue      [1] INTEGER,
    -- Note: The value to be stored here corresponds to
    -- the local values defined in the MAP-Errors and
    -- MAP-DialogueInformation modules, for full details
    -- see TS 29.002.
    ccittQ767Cause           [2] INTEGER,
    -- See CCITT Q.767
    networkSpecificCause      [3] ManagementExtension,
    -- To be defined by network operator
    manufacturerSpecificCause [4] ManagementExtension,
    -- To be defined by manufacturer
    positionMethodFailureCause [5] PositionMethodFailure-Diagnostic,
    -- see TS 29.002
    unauthorizedLCSCClientCause [6] UnauthorizedLCSCClient-Diagnostic
}

```

```

    -- see TS 29.002
}
Destinations ::= SET OF AE-title
EmergencyCallIndEnable ::= BOOLEAN
EmergencyCallIndication ::= SEQUENCE
{
    cellId [0] CellId,
    callerId [1] IMSIorIMEI
}
EParameter ::= INTEGER (0..1023)
--
-- Coded according to TS 22.024 and TS 24.080
--
EquipmentId ::= INTEGER
EquipmentType ::= INTEGER
{
    conferenceBridge (0)
}
FileType ::= INTEGER
{
    callRecords (1),
    traceRecords (9),
    observedIMEITicket (14)
}
Fnur ::= ENUMERATED
{
    --
    -- See Bearer Capability TS 24.008
    --
    fnurNotApplicable (0),
    fnur9600BitsPerSecond (1),
    fnur14400BitsPerSecond (2),
    fnur19200BitsPerSecond (3),
    fnur28800BitsPerSecond (4),
    fnur38400BitsPerSecond (5),
    fnur48000BitsPerSecond (6),
    fnur56000BitsPerSecond (7),
    fnur64000BitsPerSecond (8),
    fnur33600BitsPerSecond (9),
    fnur32000BitsPerSecond (10),
    fnur31200BitsPerSecond (11)
}
ForwardToNumber ::= AddressString
FreeFormatData ::= OCTET STRING (SIZE(1..160))
--
-- Free formatted data as sent in the FCI message
-- See TS 29.078
--
GenericNumber ::= BCDDirectoryNumber
GenericNumbers ::= SET OF GenericNumber
Gsm-SCFAddress ::= ISDN-AddressString
--
-- See TS 29.002
--
GuaranteedBitRate ::= ENUMERATED
{
    GBR14400BitsPerSecond (1), -- BS20 non-transparent
    GBR28800BitsPerSecond (2), -- BS20 non-transparent and transparent,
    -- BS30 transparent and multimedia
    GBR32000BitsPerSecond (3), -- BS30 multimedia
    GBR33600BitsPerSecond (4), -- BS30 multimedia
    GBR56000BitsPerSecond (5), -- BS30 transparent and multimedia
    GBR57600BitsPerSecond (6), -- BS20 non-transparent
    GBR64000BitsPerSecond (7) -- BS30 transparent and multimedia
}

```

```

HLC ::= OCTET STRING

-- this parameter is a 1:1 copy of the contents (i.e. starting with octet 3) of the "high layer
compatibility" parameter of ITU-T Q.931 [35].

HLRIntResult ::= Diagnostics

HSCSDParamsChange ::= SEQUENCE
{
    changeTime [0] TimeStamp,
    hSCSDChanAllocated [1] NumOfHSCSDChanAllocated,
    initiatingParty [2] InitiatingParty OPTIONAL,
    aiurRequested [3] AiurRequested OPTIONAL,
    chanCodingUsed [4] ChannelCoding,
    hSCSDChanRequested [5] NumOfHSCSDChanRequested OPTIONAL
}

IMEICheckEvent ::= INTEGER
{
    mobileOriginatedCall (0),
    mobileTerminatedCall (1),
    smsMobileOriginating (2),
    smsMobileTerminating (3),
    ssAction (4),
    locationUpdate (5)
}

IMEIStatus ::= ENUMERATED
{
    greyListedMobileEquipment (0),
    blackListedMobileEquipment (1),
    nonWhiteListedMobileEquipment (2)
}

IMSIorIMEI ::= CHOICE
{
    imsi [0] IMSI,
    imei [1] IMEI
}

InitiatingParty ::= ENUMERATED
{
    network (0),
    subscriber (1)
}

ISDN-BC ::= OCTET STRING

-- this parameter is a 1:1 copy of the contents (i.e. starting with octet 3) of the "bearer
capability" parameter of ITU-T Q.931 [35].

LCSCause ::= OCTET STRING (SIZE(1))
--
-- See LCS Cause Value, 3GPP TS 49.031
--

LCSCClientIdentity ::= SEQUENCE
{
    lcsClientExternalID [0] LCSCClientExternalID OPTIONAL,
    lcsClientDialedByMS [1] AddressString OPTIONAL,
    lcsClientInternalID [2] LCSCClientInternalID OPTIONAL
}

LCSQoSInfo ::= OCTET STRING (SIZE(4))
--
-- See LCS QoS IE, 3GPP TS 49.031
--

LevelOfCAMELService ::= BIT STRING
{
    basic (0),
    callDurationSupervision (1),
    onlineCharging (2),
    callPartyHandling (3)
}

```

```

LLC ::= OCTET STRING

-- this parameter is a 1:1 copy of the contents (i.e. starting with octet 3) of the "low layer
compatibility" parameter of ITU-T Q.931 [35].

LocationAreaAndCell ::= SEQUENCE
{
    locationAreaCode [0] LocationAreaCode,
    cellId [1] CellId
}

LocationAreaCode ::= OCTET STRING (SIZE(2))
--
-- See TS 24.008
--

LocationChange ::= SEQUENCE
{
    location [0] LocationAreaAndCell,
    changeTime [1] TimeStamp
}

Location-info ::= SEQUENCE
{
    mscNumber [1] MscNo OPTIONAL,
    location-area [2] LocationAreaCode,
    cell-identification [3] CellId OPTIONAL
}

LocUpdResult ::= Diagnostics

ManagementExtensions ::= SET OF ManagementExtension

MaximumBitRate ::= ENUMERATED
{
    MBR14400BitsPerSecond (1), -- BS20 non-transparent
    MBR28800BitsPerSecond (2), -- BS20 non-transparent and transparent,
    -- BS30 transparent and multimedia
    MBR32000BitsPerSecond (3), -- BS30 multimedia
    MBR33600BitsPerSecond (4), -- BS30 multimedia
    MBR56000BitsPerSecond (5), -- BS30 transparent and multimedia
    MBR57600BitsPerSecond (6) -- BS20 non-transparent
}

MCCMNC ::= GraphicString (SIZE(6))
--
-- This type contains the mobile country code (MCC) and the mobile
-- network code (MNC) of a PLMN.
--

MessageReference ::= OCTET STRING

Month ::= INTEGER (1..12)

MSCAddress ::= AddressString

MscNo ::= ISDN-AddressString
--
-- See TS 23.003
--

MSISDN ::= ISDN-AddressString
--
-- See TS 23.003
--

MSPowerClasses ::= SET OF RFPowerCapability

NetworkCallReference ::= CallReferenceNumber --
-- See TS 29.002
--

NetworkSpecificCode ::= INTEGER
--
-- To be defined by network operator
--

```



```

NetworkSpecificServices ::= SET OF NetworkSpecificCode

NumOfHSCSDChanRequested ::= INTEGER

NumOfHSCSDChanAllocated ::= INTEGER

ObservedIMEITicketEnable ::= BOOLEAN

OriginalCalledNumber ::= BCDDirectoryNumber

OriginDestCombinations ::= SET OF OriginDestCombination

OriginDestCombination ::= SEQUENCE
{
    origin          [0] INTEGER OPTIONAL,
    destination     [1] INTEGER OPTIONAL
    --
    -- Note that these values correspond to the contents
    -- of the attributes originId and destinationId
    -- respectively. At least one of the two must be present.
    --
}

PartialRecordTimer ::= INTEGER

PartialRecordType ::= ENUMERATED
{
    timeLimit          (0),
    serviceChange     (1),
    locationChange     (2),
    classmarkChange   (3),
    aocParmChange     (4),
    radioChannelChange (5),
    hSCSDParmChange   (6),
    changeOfCAMELDestination (7)
}

PositioningData ::= OCTET STRING (SIZE(1..33))
--
-- See Positioning Data IE (octet 3..n), 3GPP TS 49.031
--

RadioChannelsRequested ::= SET OF RadioChanRequested

RadioChanRequested ::= ENUMERATED
{
    --
    -- See Bearer Capability TS 24.008
    --
    halfRateChannel      (0),
    fullRateChannel      (1),
    dualHalfRatePreferred (2),
    dualFullRatePreferred (3)
}

RateIndication ::= OCTET STRING(SIZE(1))

RecordClassDestination ::= CHOICE
{
    osApplication [0] AE-title,
    fileType      [1] FileType
}

RecordClassDestinations ::= SET OF RecordClassDestination

RecordingEntity ::= AddressString

RecordingMethod ::= ENUMERATED
{
    inCallRecord (0),
    inSSRecord   (1)
}

RedirectingNumber ::= BCDDirectoryNumber

RFPowerCapability ::= INTEGER
--
-- This field contains the RF power capability of the
-- Mobile station

```

```

-- classmark 1 and 2 of TS 24.008 expressed as an integer.
--

RoamingNumber          ::= ISDN-AddressString
--
-- See TS 23.003
--

RoutingNumber          ::= CHOICE
{
    roaming              [1] RoamingNumber,
    forwarded            [2] ForwardToNumber
}

Service                ::= CHOICE
{
    teleservice          [1] TeleserviceCode,
    bearerService        [2] BearerServiceCode,
    supplementaryService [3] SS-Code,
    networkSpecificService [4] NetworkSpecificCode
}

ServiceDistanceDependencies ::= SET OF ServiceDistanceDependency

ServiceDistanceDependency ::= SEQUENCE
{
    aocService           [0] INTEGER,
    chargingZone         [1] INTEGER OPTIONAL
--
-- Note that these values correspond to the contents
-- of the attributes aocServiceId and zoneId
-- respectively.
--
}

SimpleIntegerName      ::= INTEGER

SimpleStringName       ::= GraphicString

SMSResult              ::= Diagnostics

SmsTpDestinationNumber ::= OCTET STRING
--
-- This type contains the binary coded decimal representation of
-- the SMS address field the encoding of the octet string is in
-- accordance with the definition of address fields in TS 23.040.
-- This encoding includes type of number and numbering plan indication
-- together with the address value range.
--

SpeechVersionIdentifier ::= OCTET STRING (SIZE(1))
--
-- see GSM 08.08
--
-- 000 0001   GSM speech full rate version 1
-- 001 0001   GSM speech full rate version 2   used for enhanced full rate
-- 010 0001   GSM speech full rate version 3   for future use
-- 000 0101   GSM speech half rate version 1
-- 001 0101   GSM speech half rate version 2   for future use
-- 010 0101   GSM speech half rate version 3   for future use
--

SSActionResult         ::= Diagnostics

SSActionType           ::= ENUMERATED
{
    registration        (0),
    erasure              (1),
    activation           (2),
    deactivation         (3),
    interrogation        (4),
    invocation           (5),
    passwordRegistration (6)
}

SSParameters           ::= CHOICE
{
    forwardedToNumber    [0] ForwardToNumber,
    unstructuredData     [1] OCTET STRING
}

```

```

}

SupplServices          ::= SET OF SS-Code

SuppServiceUsed       ::= SEQUENCE
{
  ssCode               [0] SS-Code,
  ssTime               [1] TimeStamp OPTIONAL
}

SwitchoverTime        ::= SEQUENCE
{
  hour                 INTEGER (0..23),
  minute               INTEGER (0..59),
  second               INTEGER (0..59)
}

TariffId               ::= INTEGER

TariffPeriod           ::= SEQUENCE
{
  switchoverTime       [0] SwitchoverTime,
  tariffId             [1] INTEGER
  --
  -- Note that the value of tariffId corresponds
  -- to the attribute tariffId.
  --
}

TariffPeriods         ::= SET OF TariffPeriod

TariffSystemStatus    ::= ENUMERATED
{
  available             (0),    -- available for modification
  checked              (1),    -- "frozen" and checked
  standby              (2),    -- "frozen" awaiting activation
  active               (3) -- "frozen" and active
}

TimeStamp              ::= OCTET STRING (SIZE(9))
--
-- The contents of this field are a compact form of the UTCTime format
-- containing local time plus an offset to universal time. Binary coded
-- decimal encoding is employed for the digits to reduce the storage and
-- transmission overhead
-- e.g. YYMMDDhhmmssShhmm
-- where
-- YY   = Year 00 to 99      BCD encoded
-- MM   = Month 01 to 12    BCD encoded
-- DD   = Day 01 to 31      BCD encoded
-- hh   = hour 00 to 23     BCD encoded
-- mm   = minute 00 to 59   BCD encoded
-- ss   = second 00 to 59   BCD encoded
-- S    = Sign 0 = "+", "-" ASCII encoded
-- hh   = hour 00 to 23     BCD encoded
-- mm   = minute 00 to 59   BCD encoded
--
--

TrafficChannel         ::= ENUMERATED
{
  fullRate             (0),
  halfRate             (1)
}

TranslatedNumber       ::= BCDDirectoryNumber

TransparencyInd        ::= ENUMERATED
{
  transparent          (0),
  nonTransparent       (1)
}

TrunkGroup             ::= CHOICE
{
  tkgpNumber           [0] INTEGER,
  tkgpName             [1] GraphicString
}

```

```

TSCheckError ::= SEQUENCE
{
    newActiveTS      [0] INTEGER,
    newStandbyTS     [1] INTEGER,
    changeoverTime   [2] GeneralizedTime OPTIONAL,
    authkey           [3] OCTET STRING OPTIONAL,
    checksum          [4] OCTET STRING OPTIONAL,
    versionNumber    [5] OCTET STRING OPTIONAL
    --
    -- Note that if the changeover time is not
    -- specified then the change is immediate.
    --
}

TSCheckErrorId ::= CHOICE
{
    globalForm       [0] OBJECT IDENTIFIER,
    localForm        [1] INTEGER
}

TSCheckResult ::= CHOICE
{
    success          [0] NULL,
    fail             [1] SET OF TSCheckError
}

TSCopyTariffSystem ::= SEQUENCE
{
    oldTS            [0] INTEGER,
    newTS            [1] INTEGER
}

TSNextChange ::= CHOICE
{
    noChangeover     [0] NULL,
    tsChangeover     [1] TSCheckError
}

TypeOfSubscribers ::= ENUMERATED
{
    home              (0), -- HPLMN subscribers
    visiting          (1), -- roaming subscribers
    all               (2)
}

TypeOfTransaction ::= ENUMERATED
{
    successful        (0),
    unsuccessful      (1),
    all               (2)
}

Visited-Location-info ::= SEQUENCE
{
    mscNumber         [1] MscNo,
    vlrNumber         [2] VlrNo
}

VlrNo ::= ISDN-AddressString
--
-- See TS 23.003
--

```

END

End of Change in Clause 6

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Mar 2001	S_11	SP-010025	--	--	Replaces Release 99 of 3GPP 32.005, which will be discontinued from Release 4 onwards.	-	1.0.0
Jun 2001	S_12	SP-010236	--	--	Re-submitted to SA#12 for Information	1.1.0	1.1.1
Sep 2001	S_13	SP-010464	--	--	Submitted to TSG SA #13 for Approval	2.0.0	4.0.0
Mar 2002	S_15	SP-020022	001	--	Addition of CAMEL phase 3 extensions in SMS-MO CDR	4.0.0	4.1.0
Mar 2002	S_15	SP-020035	002	--	Addition of Charging Data Record definition for Location Service in CS domain	4.1.0	5.0.0
Mar 2002	S_15	SP-020025	003	--	Addition of CAMEL phase 4 extensions in SMS-MT CDRs	4.1.0	5.0.0
Jun 2002	S_16	SP-020285	005	--	Corrections of parameter CallEventRecord	5.0.0	5.1.0
Dec 2002	S_18	SP-020734	007	--	Corrections on parameter Destination Number	5.1.0	5.2.0
Dec 2002	S_18	SP-020736	009	--	Corrections on LCS error cause definitions	5.1.0	5.2.0
Dec 2002	S_18	SP-020737	010	--	Charging for Mobile Number Portability (MNP) - Alignment with 23.066	5.1.0	5.2.0
Dec 2002	S_18	SP-020808	012	1	Corrections on MMS records ASN.1 definition and addition of the MMBBox CDR types	5.1.0	5.2.0
Mar 2003	S_19	SP-030054	014	--	CDR correction for data services over Iu-interface - alignment with SA1's 22.002	5.2.0	5.3.0
Mar 2003	S_19	SP-030056	015	--	Corrections to ASN.1 Syntax associated with Wireless Number Portability (WNP)	5.2.0	5.3.0
Jun 2003	S_20	SP-030269	016	--	Correction of record contents regarding Partial Record Type	5.3.0	5.4.0
Jun 2003	S_20	SP-030269	017	--	Correction on MMS records ASN.1 definition	5.3.0	5.4.0
Jun 2003	S_20	SP-030269	018	--	Correction on IMS record definitions	5.3.0	5.4.0
Dec 2003	S_22	SP-030765	022	1	Add inter-network accounting in the GMSC (only if CN#22 approved CN3 CR 29.007)	5.4.0	5.5.0
Dec 2003	S_22	SP-030620	023	--	Correction to Level of CAMEL Service	5.4.0	5.5.0
Mar 2004	S_23	SP-040139	025	--	Correction to ASN.1 Charging Data Record (CDR) - Alignment with R99 32.005	5.5.0	5.6.0