Source:	**SA5 (Telecom Management)**
Title:	**Rel-6 CR 32.250 Add missing charging principles for CAMEL CPH ñ Align with CN2's 23.078**
Document for:	**Approval**
Agenda Item:	**7.5.3**

Doc-1st-Level	Doc-2nd-Level	Spec	CR	Rev	Phase	Subject	Cat	Ver-Cur	Wi
SP-040549	S5-044563	32.250	001	--	Rel-6	Add missing charging principles for CAMEL CPH ñ Align with CN2's 23.078	F	6.0.0	CH-BC

CR-Form-v7

CHANGE REQUEST

| ⌘ | **32.250** CR **001** | ⌘**rev** | **-** | ⌘ | Current version: | **6.0.0** | ⌘ |

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

Proposed change affects: | UICC apps⌘ ☐   ME ☐   Radio Access Network ☐   Core Network **X**

Title:	⌘	Add missing charging principles for CAMEL CPH ñ Align with CN2's 23.078
Source:	⌘	SA5 (r.renkert@alcatel.de, gerald.goermer@icn.siemens.de)
Work item code: ⌘	CH-BC	***Date:*** ⌘ 19/08/2004

Category: ⌘   **F**   ***Release:*** ⌘   Rel-6

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

Use *one* of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   Rel-4   *(Release 4)*
   Rel-5   *(Release 5)*
   Rel-6   *(Release 6)*

Reason for change:	⌘	CPH charging has been added in Rel-5 but is not yet included in Rel-6.

Summary of change: ⌘	1.	CPH included to the list of events that need to be charged.
	2.	The principle of recording call legs in grouped fields is extended to accommodate CPH. One CDR is generated per CAMEL call segment. I.e. all details of CAMEL call legs per call segment are recorded into one CDR.
	3.	User interactions are recorded in the same manner as call legs. CPH operations per call leg are included to the list of events that may result in the generation of partial CDRs.
	4.	New MOC CDRs specified for: - 'MO call atempt (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)í.

Consequences if not approved:	⌘	Calls involving CPH cannot be charged.

Clauses affected:	⌘	3.2 Abbreviations 5.1.3.x CAMEL Call Party Handling service 5.1.3.6 Partial records 5.2.1 Basic principles 5.2.1.xy gsmSCF initiated wake-up call handled by CAMEL CPH 5.2.1.xz Three party conference handled by CAMEL CPH 5.2.3 CDR generation 6.1.3.23 Mobile originated call attempt (CAMEL CPH adapted version) 6.1.3.24 gsmSCF initiated CAMEL CPH call attempt 6.1.3.25 New Call Segment in a MO, CF and MT CAMEL Dialogue 6.1.3.26 Mobile originated call forwarding attempt (CAMEL CPH adapted version) 6.1.3.27 Terminating CAMEL call attempt (CAMEL CPH adapted version)

		Y	**N**	
Other specs affected:	⌘		**X**	Other core specifications ⌘
			X	Test specifications
			X	O&M Specifications

SP-040275	32.200	028	-	Rel-5	Add missing charging principles for CAMEL CPH ñ 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

SP-040275	32.200	028	-	Rel-5	Add missing charging principles for CAMEL CPH ñ 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 in Clause 3.2	

3.2 Abbreviations

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

3G	3rd Generation
3GPP	3rd Generation Partnership Project
AoC	Advice of Charge
BD	Billing Domain
BS	Billing System
CAI	Charge Advice Information
CAMEL	Customized Applications for Mobile network Enhanced Logic
CCF	Charging Collection Function
CDF	Charging Data Function
CDR	Charging Data Record
CGF	Charging Gateway Function
CPH	Call Party Handling
CS	Circuit Switched
CTF	Charging Trigger Function
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 Attempt4
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunications standardization sector
JIP	Jurisdiction Information Parameter
LAC	Location Area Code
LCS	LoCation Service
LR	Location Request
LRN	Location Routing Number
MAP	Mobile Application Part
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
NE	Network Element
NI-LR	Network Induced - Location Request
OCS	Online Charging System
O-CSI	Originating - CAMEL Subscription Information
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephony Network

RNC	Radio Network Controller
SAC	Service Area Code
SCF	Service Control Function
SCI	Subscriber Controlled Input
SCI	Send Charging Information
SMS	Short Message Service
SRF	Specialised Recource Function
T-CSI	Terminating - CAMEL Subscription Information
TDP	Trigger Detection Point
UI	User Interation
UMTS	Universal Mobile Telecommunications System
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 5.1.3

5.1.3.2   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.

5.1.3.x   CAMEL Call Party Handling service

The following applies to MSCs that are capable of CAMEL Call Party Handling (CPH):

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 (CAMEL call leg information) 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.

A CDR is closed when the last leg of the call segment disappeared (moved out, disconnected, etc.) from the call segment.

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 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.

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 'CAMLEL 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)

Editorís note: both parameters from the second FCI operation should be clarified, also in the CDR table

- Location Routing Number (LRN)

- LRN Source Indicator

- LRN Query Status Indicator

- JIP Parameter

- JIP Source Indicator

- JIP Query Status Indicator

End of Change in Clause 5.1.3

Change in Clause 5.1.3.6

5.1.3.6   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 the present document 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 summarize, 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.

End of Change in Clause 5.1.3.6

Change in Clause 5.2.1

5.2.1   Basic principles

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 ~~imitated~~ initiated by CAMEL feature;

19) Incoming call handled by CAMEL in MSC Server without redirection;

20) Outgoing call handled by CAMEL Dialled 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 of Clause 5.2.1

5.2.1.21 Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL with Dialled CSI Trigger

unmodified part of Clause 5.2.1

5.2.1.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 an adapted version of 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

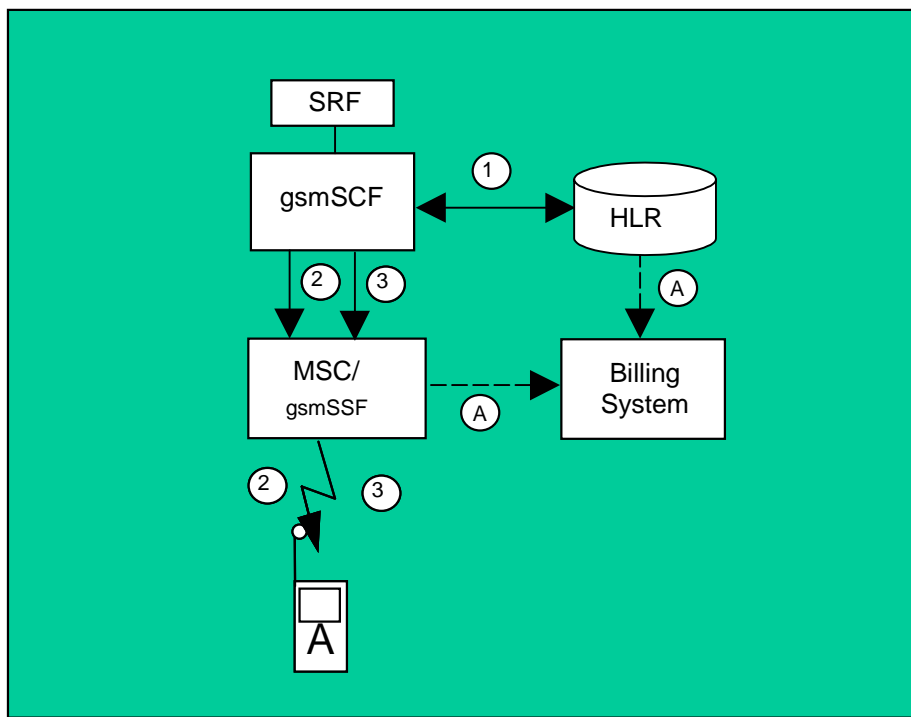| MSC	HLR
MOC record	HLR interrogation record
MTC record	

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

5.2.1.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

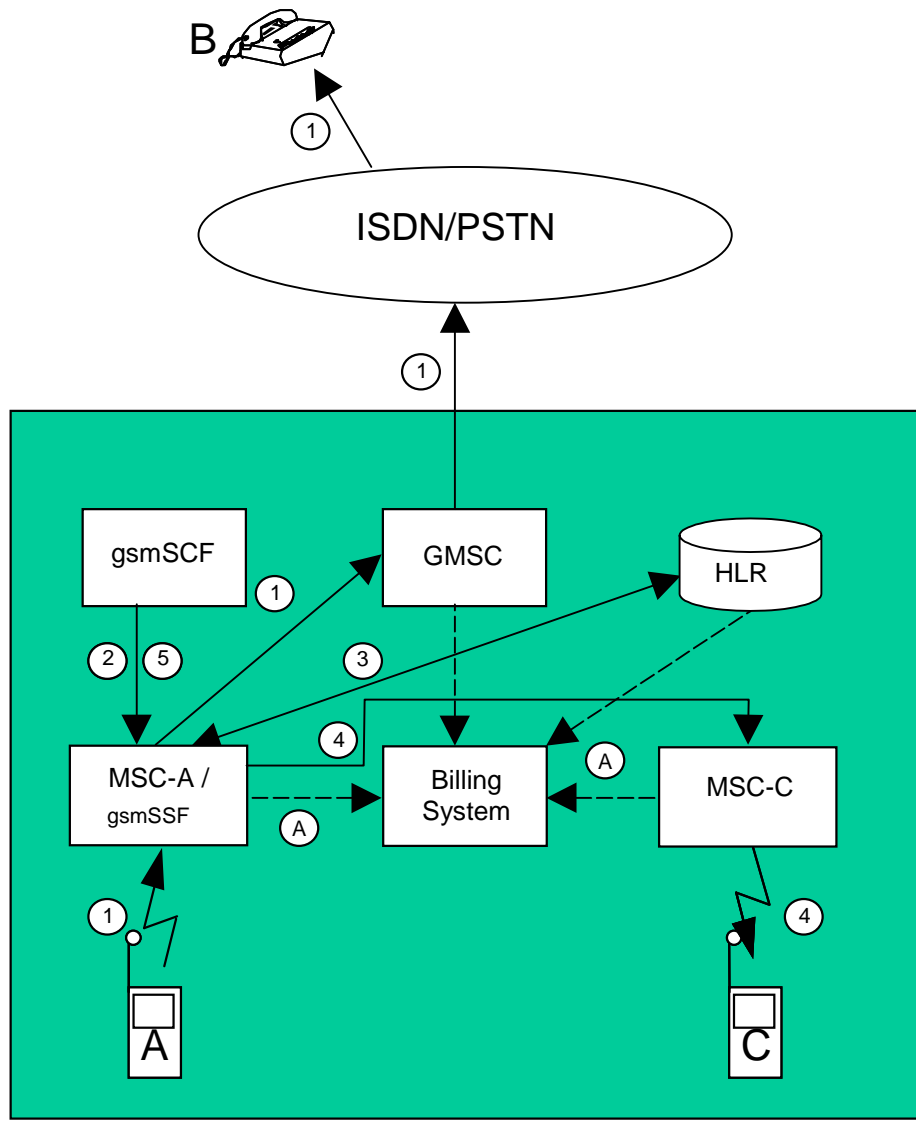| GMSC server	MSC-A	MSC-C	HLR
outgoing gateway record	MOC record ("A", "B", "C")	MTC record	HLR interrogation record
	MOC record ("C")		

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

End of Change in Clause 5.2.1

Change in Clause 5.2.3

5.2.3   CDR generation

In order to provide the data required for the management activities outlined in the previous subclauses (billing, accounting, statistics, etc.), the CGF of the MSC server and/or Location Registers shall be able to produce a 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 and 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.

A more detailed description of the records is found in subclause 6.1. The detailed formal description of the data defined in the present document is to be found in 3GPP TS 32.298 [51].

End of Change in Clause 5.2.3

Change in Clause 6.1.3

6.1.3.23   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 6.1.3.1 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 ëCamel Call Leg Informationí.

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 ì6.1.3.25 New Call Segment in a MO, CF or MT CAMEL Dialogueî.

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 typeì6.1.3.25 New Call Segment in a MO, CF or MT CAMEL Dialogueî,

-   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 ì6.1.3.24 gsmSSF initiated CAMEL CPH call attemptì.

Disappearing (DisconnectLeg, SplitLeg, etc.) of an outgoing leg is recorded by filling the related record fields in the ëCamel Call Leg Informationí 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 ëCamel Call Leg Informationí 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 6.1.3.23: MOC record (CAMEL CPH adapted version)

Field	2G	3G	Description
Record Type	M	M	Mobile originated.
Served IMSI	M	M	IMSI of the calling party.
Served IMEI	C	C	IMEI of the calling ME, if available.
Served MSISDN	O M	O M	The primary MSISDN of the calling party.
Called Number	M	M	The address of the called party i.e. the number dialled by the calling subscriber.
Recording Entity	M	M	The E.164 number of the visited MSC producing the record.
Incoming TKGP	O M	O c	The MSC trunk group on which the call originated, usually from the BSS. If available in 3G, this parameter shall be supplied.
Location	M	M	The identity of the cell or the SAC at the time of CDR creation, including the location area code.
Change of Location	O c	O c	A list of changes in Location Area Code / Service Area Code / Cell Id. Each time-stamped.
Basic service	M	M	Bearer or teleservice employed. 'speech' in case of CAMEL CPH calls.
Supp. Services	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.
AOC Parameters	O c	O c	The charge advice parameters sent to the MS on call set-up. This field shall be supplied only when AoC parameters have been sent.
Change of AOC Parameters	O c	O c	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.
MS Classmark	M	M	The mobile station classmark employed on call set-up.
Change of Classmark	O c	O c	A list of changes to the classmark during the connection each time-stamped.
Event time stamps:	C C O M	C C O M	Seizure time: time of incoming traffic channel seizure (for unsuccessful call attempts) Answer: time of answer (for successful calls) Release time: time of traffic channel release for the incoming leg.
Call duration	C	C	The chargeable duration of the connection of the incoming leg for successful calls, the holding time of the incoming leg for call attempts.
Radio Chan. Requested	O M	-	The type of radio traffic channel (full / half etc.) requested by the MS.
Radio Chan. Used	M	-	The type of radio channel actually used (full or half rate).
Change of Rad. Chan.	O c	-	A list of changes each time stamped.
Cause for termination	M	M	The reason for the release of the connection.
Diagnostics	O M	O M	A more detailed reason for the release of the connection.
Call reference	M	M	A local identifier distinguishing between transactions on the same MS
Sequence no.	C	C	Partial record sequence number, only present in case of partial records.
Record extensions	O c	O c	A set of network / manufacturer specific extensions to the record, when available.
GsmSCF address	M	M	Identifies the CAMEL server serving the subscriber.
Service key	C	C	The CAMEL service logic to be applied.
Network call reference	M	M	An identifier to correlate transactions on the same call taking place in different network nodes.
MSC Address	M	M	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Default call handling	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.
Speech Version Supported	O M	-	Speech version supported by the MS with highest priority indicated by MS
Speech Version Used	O M	-	Speech version used for that call
Number of DP encountered	O M	O M	Number that counts how often armed detection points (TDP and EDP) were encountered. Sum of all DPs encountered in this call.
Level of CAMEL service	O M	O M	Indicator for the complexity of the CAMEL feature used.
Free format Data	C	C	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.

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

6.1.3.24   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).

ñ   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.

ñ   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'.

ñ   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'.

ñ   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 6.1.3.24: MOC CPH record (gsmSCF initiated)

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

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

6.1.3.25 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 ëSplitLegí operation or ICA (new party) operation.

    ñ 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'.

    ñ 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'.

    ñ 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 exists, the 'IMSI', the 'IMEI' and the 'Service Key' is recorded in the main body.

Table 6.1.3.25: MOC CPH record (new call segment)

Field	2G	3G	Description
Record Type	M	M	Mobile originated.
Served IMSI	M	M	IMSI of the served party (ícalling partyí in case of MOC, íforwarding partyí in case of call forwarding respectively ícalled partyí in case of MTC).
Served IMEI	C	C	IMEI of the served ME, if available (ícalling partyí in case of MOC, íforwarding partyí in case of call forwarding respectively ícalled partyí in case of MTC).
Served MSISDN	O M	O M	The MSISDN of the served party (ícalling partyí in case of MOC, íforwarding partyí in case of call forwarding respectively ícalled partyí in case of MTC).
Called Number	M	M	The address of the called party.
Recording Entity	M	M	The E.164 number of the visited MSC producing the record.
Basic service	M	M	Bearer or teleservice employed. 'speech' in case of CAMEL CPH calls.
Supp. Services	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.
Cause for termination	M	M	The reason for the release of the connection.
Diagnostics	O M	O M	A more detailed reason for the release of the connection.
Call reference	M	M	A local identifier distinguishing between transactions on the same MS
Sequence no.	C	C	Partial record sequence number, only present in case of partial records.
Record extensions	O c	O c	A set of network / manufacturer specific extensions to the record, when available.
GsmSCF address	C	C	Identifies the CAMEL server serving the subscriber.
Service Key	C	C	The CAMEL service logic to be applied.
Network call reference	M	M	An identifier to correlate transactions on the same call taking place in different network nodes.
MSC Address	M	M	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Default call handling	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.
Number of DP encountered	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.
Level of CAMEL service	O c	O c	Indicator for the complexity of the CAMEL feature used.

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

6.1.3.26   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 ì6.1.3.3 Mobile originated call forwarding attemptì. 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 ì6.1.3.25 New Call Segment in a MO, CF or MT CAMEL Dialogueî.

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

Field	2G	3G	Description
Record Type	M	M	Mobile originated.
Served IMSI	M	M	IMSI of the forwarding party.
Served MSISDN	O M	O M	The MSISDN of the forwarding party.
Calling Number	O M	O M	The address of the calling party.
Called Number	M	M	The address of the ìforwarded-toî party.
Recording Entity	M	M	The E.164 number of the forwarding MSC
Incoming TKGP	O M	O M	The MSC trunk group on which the call originated at the forwarding MSC.
Basic service	C	C	'speech' in case of CAMEL CPH, not always available e.g. in case of call forwarding unconditional.
Supplementary Services	C	C	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.
Event time stamps:	C C O M	C C O M	Seizure time: time of incoming traffic channel seizure (for unsuccessful call attempts) Answer time: time of answer (for successful calls) Release time: time of traffic channel release
Call duration	C	C	The chargeable duration of the connection for successful calls, the holding time of call attempts.
Cause for termination	M	M	The reason for the release of the connection.
Diagnostics	O M	O M	A more detailed reason for the release of the connection.
Call reference	M	M	A local identifier distinguishing between transactions on the same MS
Sequence no.	C	C	Partial record sequence number, only present in case of partial records.
Record extensions	O c	O c	A set of network/ manufacturer specific extensions to the record, when available.
GsmSCF address	C	C	Identifies the CAMEL server serving the subscriber.
Service key	C	C	The CAMEL service logic to be applied.
Network call reference	C	C	An identifier to correlate transactions on the same call taking place in different network nodes.
MSC Address	C	C	This field contains the E.164 number assigned to the MSC that generated the network call reference.
CAMEL initiated CF indicator	O c	O c	Indicates that the CAMEL server initiated call forwarding. Not available in case of gsm call forwarding.
Default call handling	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.
Number of DP encountered	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.
Level of CAMEL service	O c	O c	Indicator of the complexity of the CAMEL feature used.
Free format Data	C	C	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.

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

6.1.3.27 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 ì6.1.3.18 Terminating CAMEL call attemptì. 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 ì6.1.3.25 New Call Segment in a MO, CF or MT CAMEL Dialogueî.

Table 6.1.3.27: Terminating CAMEL record (CPH adapted version)

Field	2G	3G	Description

Field	2G	3G	Description
Record Type	M	M	Terminating CAMEL interrogation.
Served IMSI	M	M	IMSI of the called party
Served MSISDN	O M	O M	The MSISDN of the called party.
Recording Entity	M	M	The E.164 number of the GMSC.
Interrogation time stamp	M	M	Time at which the interrogation was invoked.
GsmSCF Address	M	M	The CAMEL server serving the subscriber.
Service key	M	M	The CAMEL service logic to be applied.
Network call reference	M	M	An identifier to correlate transactions on the same call taking place in different network nodes.
MSC Address	M	M	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Default call handling	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.
Record extensions	O C	O C	A set of network/ manufacturer specific extensions to the record, when available.
Called Number	M	M	The address of the called party as received by the GMSC/gsmSSF.
Calling Number	C	C	The address of the calling party, if available.
Incoming TKGP	O M	O C	The GMSC trunk group on which the call originated. If available in 3G, this parameter shall be supplied.
Event time stamps:	C C O M	C C O M	Seizure time: time of incoming traffic channel seizure (for unsuccessful call attempts) Answer time: time of answer (for successful calls) Release time: time of traffic channel release
Call duration	C	C	The chargeable duration of the connection for successful calls, the holding time of call attempts.
Cause for termination	M	M	The reason for the release of the connection.
Diagnostics	O M	O M	A more detailed reason for the release of the connection.
Call reference	M	M	A local identifier distinguishing between transactions on the same MS
Sequence no.	C	C	Partial record sequence number, only present in case of partial records.
Number of DP encountered	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.
Level of CAMEL service	O C	O C	Indicator of the complexity of the CAMEL feature used.
Free format Data	C	C	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.

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

Change in Clause 6.1.3

Annex B (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Dec 2003	S_22	SP-030624	--	--	Submitted to TSG SA#22 for Information	1.0.0	
Mar 2004	S_23	SP-040140	--	--	Submitted to TSG SA#23 for Approval	2.0.0	6.0.0