Technical Specification Group Services and System Aspects **TSGS#13(01)0462**

Meeting #13, Beijing, China, 24-27 September 2001

Source: **SA5**

Title: **R99 CR32.005 (Telecommunications Management; Charging and billing; 3G call and event data for the Circuit Switched (CS) domain)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-1st-Level	Doc-2nd-Level	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Workitem
SP-010462	S5-010427	32.005	007		R99	Correction on Terminating CAMEL subscription information	F	3.4.0	3.5.0	OAM-CH
SP-010462	S5-010543	32.005	008		R99	Corrections for the delivered dialog parameter for CAMEL Phase 3	F	3.4.0	3.5.0	OAM-CH
SP-010462	S5-010546	32.005	009		R99	Addition of "Rate Indication" and "FNUR" in the CDRs, and other Corrections	F	3.4.0	3.5.0	OAM-CH

CR-Form-v4

CHANGE REQUEST

⌘ **32.005** **CR** **007** ⌘ ev **-** ⌘ Current version: **3.4.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction on Terminating CAMEL subscription information
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	20/07/2001
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change:	⌘	The advance to CAMEL Phase 3 has necessitated new CDR fields for the visited terminated CAMEL subscription information (VT-CSI) into the CAMEL affected records of TS 32.005.
Summary of change:	⌘	If the B-party has an active T-CSI in the GMSC or VT-CSI in the VMSC and the trigger criteria, if present, are fulfilled into Terminating CAMEL Record (TCR), then a CAMEL control relationship between the GMSC or VMSC and the gsmSCF shall be established.
Consequences if not approved:	⌘	Because of incomplete CDR definitions for the CAMEL phase 3 service, charging data may be lost and result in billing errors.

Clauses affected:	⌘	
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

A.9 Abstract syntax

```
}

TermCAMEL~~Int~~Record  ::= 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,
    vMSCIndication              [30] BOOLEAN OPTIONAL
}
```

B.1.7 CAMEL services

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 Originating service and Dialled service defined in O-CSI and D-CSI). If two services are active, the Originating CAMEL service information is stored in fields without '_2' suffix and Dialled CAMEL service information in corresponding fields with '_2' suffix. If only one CAMEL service is active, either Originating or Dialled service, then fields without '_2' suffix are used. 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. For more information about CAMEL service and interworking see 3GPP TS 23.078[23] and TS 29.078[24].

CAMEL Terminating service of the T-BCSM in the GMSC/VMSC indicated by T_CSI/VT_CSI affect the corresponding incoming CAMEL call leg part of the terminating CAMEL record.

B.2.19 Terminating CAMEL ~~interrogation~~ call attempt

If the generation of these records is enabled, a terminating CAMEL ~~interrogation~~ call attempt record shall be generated for each call toward a subscriber with a T-CSI or VT-CSI and if the terminating trigger criteria are met. 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 handling.

Table B.19: Terminating CAMEL ~~interrogation~~ record

Field		Description
Record Type	M	Terminating CAMEL interrogation.
Served IMSI	M	IMSI of the called party
Served MSISDN	O	The MSISDN of the called party.
Recording Entity	M	The E.164 number of the GMSC.
Int. time stamp	M	Time at which the interrogation was invoked.
CAMEL Destination Number	M	The number available for routing after the CAMEL server enquiry.
gsmSCF Address	M	The CAMEL server serving the subscriber.
Service key	M	The CAMEL service logic to be applied.
Network call reference	M	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.
MSC Address	M	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Default call handling	O	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	A set of network/ manufacturer specific extensions to the record.
Called Number	M	The address of the called party as received by the GMSC/gsmSSF.
Calling Number	C	The address of the calling party, if available.
Incoming TKGP	O	The GMSC trunk group on which the call originated.
Outgoing TKGP	O	The trunk group on which the call left the GMSC
Event time stamps:	C C O	Seizure of incoming traffic channel (for unsuccessful call attempts) Answer (for successful calls) Release of traffic channel
Call duration	M	The chargeable duration of the connection for successful calls, the holding time of call attempts.
Data volume	C	The number of data segments transmitted if available at the GMSC
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	A more detailed reason for the release of the connection.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Number of DP encountered	O	Number that counts how often armed detection points (TDP and EDP) were encountered.
Level of CAMEL service	O	Indicator of the complexity of the CAMEL feature used.
Free format Data	C	This field contains data sent by the gsmSCF in the FCI message(s). The data can be sent either in one FCI message or several FCI messages with append indicator.
CAMEL call leg information	C	Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.
Free format data append indicator	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.
VMSC indication	C	Indication if the CAMEL call handling is active in the VMSC.

B.3.50 VMSC indication

This field contains an indicator whether the CAMEL subscription information is active. The parameter is present for the VT-CSI in the VMSC and not present for the T-CSI in the GMSC.

This indication should be used for differentiation between the validity of the record content for T-CSI in the GMSC and VT-CSI in the VMSC.

B.4 Example scenarios

This clause 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 and VLR are co-located;
- that the records are sent to an OS "Administration/ Billing Center (ADC/BC)" for post-processing;
- that the generation of all of the record types described in this annex has been enabled;
- that the HLR interrogation records are produced in the HLR and not the interrogating MSC;
- that supplementary service actions are recorded in separate event records.

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 call records, are represented by means of dotted lines and referenced by letter e.g. (A).
3) The ADC/BC has been included in some, but not all, of the examples. The only reason for this decision is to simplify the resulting figures. For the avoidance of doubt, the presence of an ADC/BC 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 initated by CAMEL feature;
19) Incoming call handled by CAMEL in VMSC without redirection;
20) Incoming call handled by CAMEL in VMSC with redirection decided and forwarding leg handled by CAMEL

B.4.19 Incoming call handled by CAMEL in VMSC without redirection

Figure B.19 illustrates an incoming call from a fixed network subscriber "A" to a mobile CAMEL subscriber "B".

The incoming call is first routed to the GMSC (1). The GMSC shall create an incoming gateway record for fixed network accounting purposes.

The GMSC interrogates the HLR (2) of the called subscriber. The HLR shall create an HLR interrogation record. The call is routed to MSC-B(3). An MTC record shall be generated.

The "B" subscriber has an active VT-CSI (stored in the VLR). Therefore MSC-B requests instructions from the gsmSSF which passes the CAMEL service key to the gsmSCF to indicate which service logic it should apply (4).

The gsmSCF may interrogate the HLR for subscriber information. As a network option, the operator may refuse to provide the requested information.

When gsmSCF processing is complete the call control is returned to the MSC-B. The MSC-B shall generate a terminating CAMEL (TCR) record which contains VT-CSI data.

The MSC-B routes the call to the "B" subscriber (5).

For avoidance of doubt, even if the MSC and GMSC are co-located both the MTC/TCR and gateway records shall be produced.

The generated records are subsequently transferred to the OS (A) either as event reports following the release of the connection or when collected by the OS.

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

GMSC	MSC-B	HLR
Incoming gateway record	MTC record	HLR interrogation record
	Terminating CAMEL record	

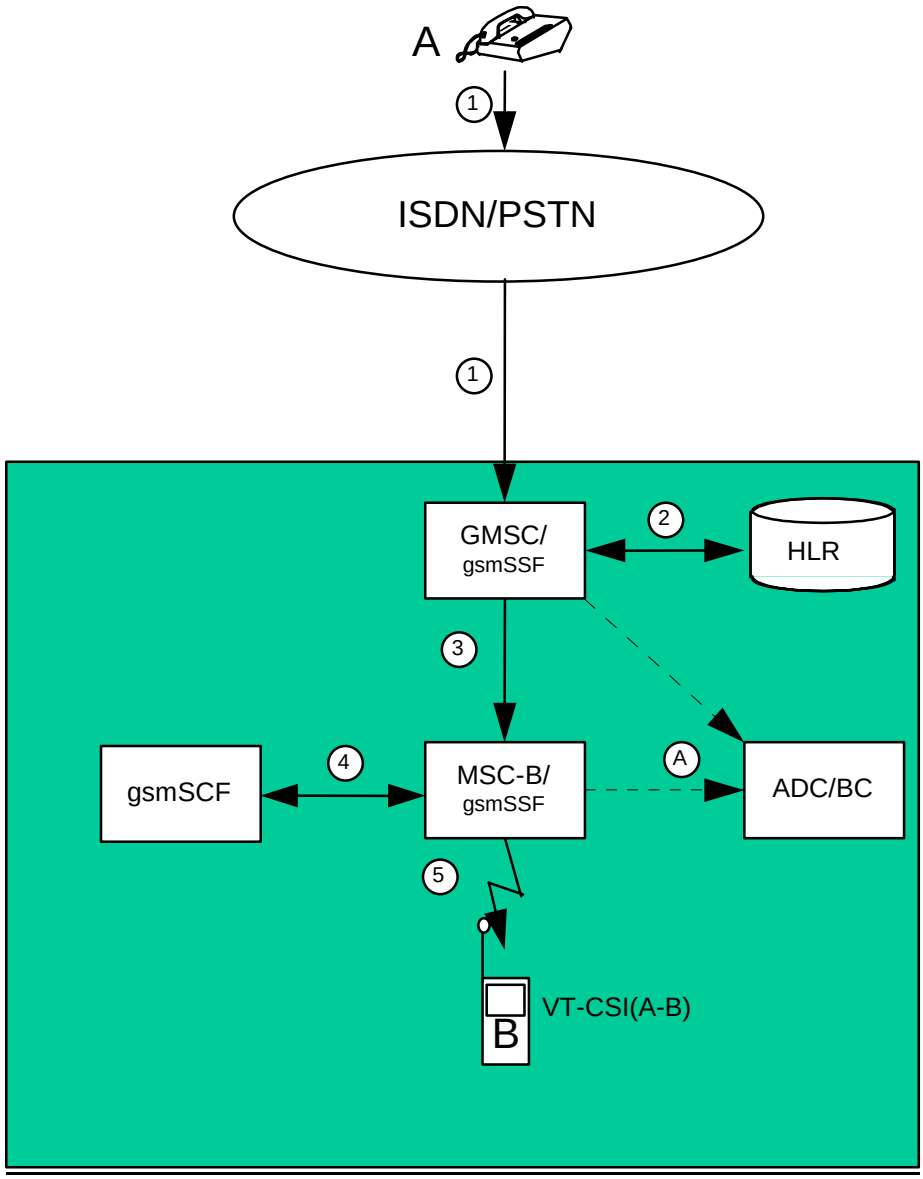

Figure B.19: Incoming call handled by CAMEL in VMSC without redirection

B.4.20 Incoming call handled by CAMEL in VMSC with redirection decided and forwarding leg handled by CAMEL

Figure B.Z illustrates an incoming call from a fixed network subscriber "A" to a mobile CAMEL subscriber "B". The call is subsequently forwarded to a second fixed network subscriber "C" by CAMEL initiated Call Forwarding.

The incoming call is routed to the GMSC (1). The GMSC shall create an incoming gateway record for fixed network accounting purposes.

The GMSC interrogates the HLR of the called subscriber(2). The call is routed to MSC-B(3).

The "B" subscriber has an active VT-CSI (stored in the VLR).. Therefore the MSC-B requests instructions from the gsmSSF which passes the CAMEL service key to a gsmSCF to indicate which service logic it should apply (4).

The gsmSCF may interrogate the HLR for subscriber information. As a network option, the operator may refuse to provide the requested information.

The gsmSCF modifies the Called Party number and sets the CAP parameter ‘Apply O-CSI’. When gsmSCF processing is complete the call control is returned to the MSC-B. The MSC-B shall generate a terminating CAMEL record(TCR) which contains VT-CSI data.

The "B" subscriber has also an active O-CSI (stored in the VLR). Therefore the MSC_B requests instructions from the gsmSSF which passes the CAMEL service key to a gsmSCF to indicate which service logic it should apply (5).

The gsmSCF may interrogate the HLR for subscriber information. As a network option, the operator may refuse to provide the requested information.

When gsmSCF processing is complete the call control is returned to the MSC-B

The MSC-B redirects the call to the fixed network subscriber "C" (6). The MSC-B shall generate an MTC record for the "B" subscriber for the call from "A" and an MOC (call forwarding) record for the "B" subscriber for the call to "C". The MOC record includes O-CSI data and the parameter ‘CAMEL initiated CF indicator’. The MSC-B shall also produce an outgoing gateway record as described in subclause B.4.1.

The generated records are subsequently transferred to the OS (A) either as event reports following the release of the connection or when collected by the OS.

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

GMSC	MSC	HLR
Incoming gateway record	Terminating CAMEL record	HLR interrogation record
	MTC record	
	MOC (CF) record	
	Outgoing gateway record	

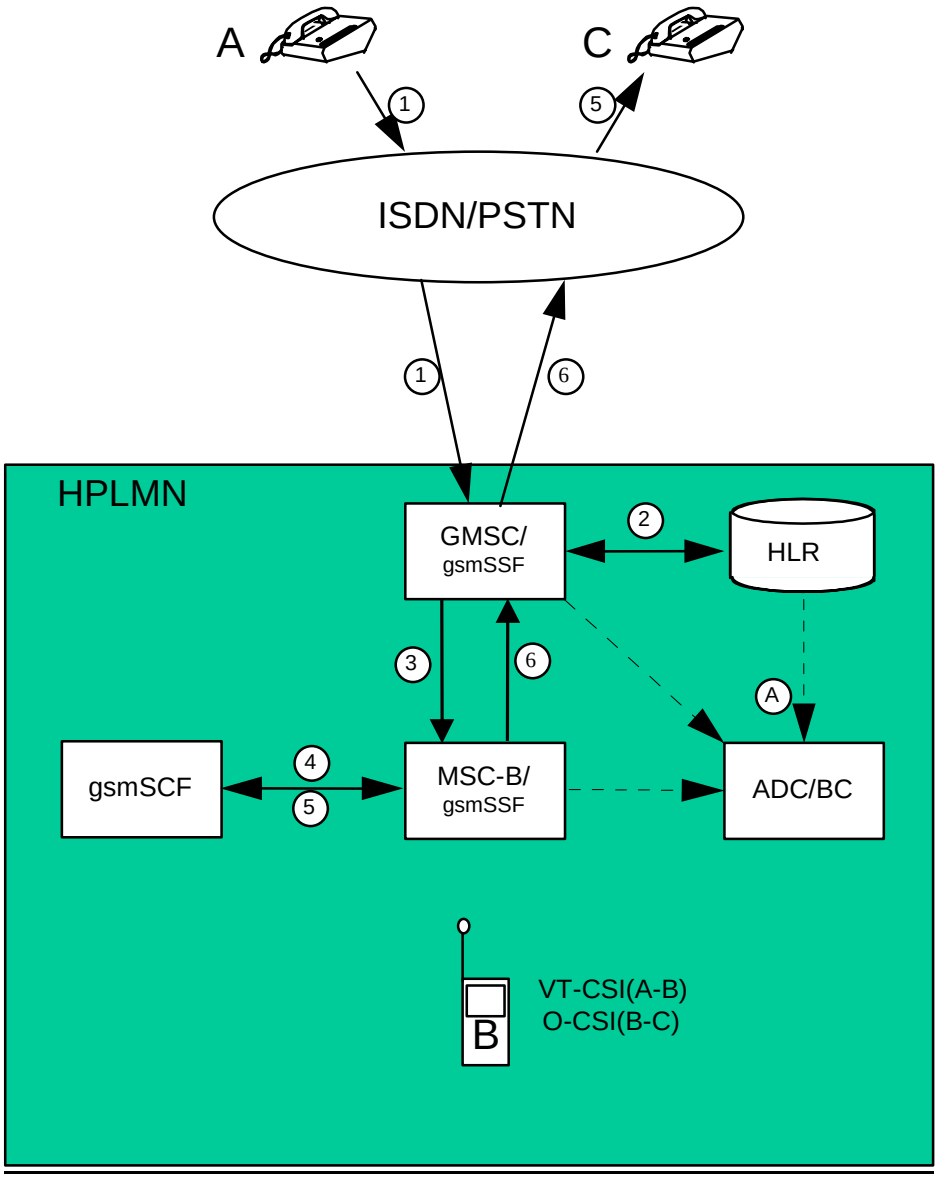

Figure B.20: Incoming call handled by CAMEL with redirection decided and forwarding leg handled by CAMEL in VMSC

CR-Form-v4

CHANGE REQUEST

⌘ **32.005** **CR** **008** ⌘ ev **-** ⌘ Current version: **3.4.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Corrections for the delivered dialog parameter for CAMEL Phase 3
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	07/09/2001
Category:	⌘	**F**
Release:	⌘	R99

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	CAMEL Phase 3 required a correction for the CAMEL dialog parameter
Summary of change:	⌘	The delivered CAMEL phases 3 parameter for T-CSI are no longer valid for the MTC record and the parameter for the second dialog will be included into the Terminating CAMEL Interrogation record.
Consequences if not approved:	⌘	Billing errors occur due to missing CAMEL parameter of the second dialog.

Clauses affected:	⌘	A9 and B2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

A.9 Abstract syntax

```
CS-Charging-DataTypes  {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-005 (5) informationModel (0) asn1Module (2) version1 (1)}


DEFINITIONS IMPLICIT TAGS   ::=

BEGIN

EXPORTS everything

IMPORTS

NumberOfForwarding, CallReferenceNumber
FROM MAP-CH-DataTypes { ccitt identified-organization (4) etsi(0) mobileDomain (0) gsmNetworkId (1)
moduleId (3) map-CH-DataTypes (13) version2 (2) }

AddressString, ISDN-AddressString, BasicServiceCode, IMSI, IMEI
FROM MAP-CommonDataTypes { ccitt identified-organization (4) etsi(0) mobileDomain (0) gsmNetworkId
(1) moduleId (3) map-CommonDataTypes (18) version2 (2) }

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


BearerServiceCode
FROM MAP-BS-Code { ccitt identified-organization (4) etsi(0) mobileDomain(0) gsmNetworkId (1)
moduleId (3) map-BS-Code (20) version2 (2) }

TeleserviceCode
FROM MAP-TS-Code { ccitt identified-organization (4) etsi(0) mobileDomain(0) gsmNetworkId (1)
moduleId (3) map-TS-Code (19) version2 (2) }

SS-Code
FROM MAP-SS-Code { ccitt identified-organization (4) etsi(0) mobileDomain(0) gsmNetworkId (1)
moduleId (3) map-SS-Code (15) version2 (2) }

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}

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
-- ITU-T Rec. X.227 / ISO 8650 corrigendum and not "ANY"
-------------------------------------------------------------------------------
--
--  CALL AND EVENT RECORDS
--
-------------------------------------------------------------------------------

CallEventRecord ::= CHOICE
{
    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,
    termCAMELIntRecord  [16] TermCAMELIntRecord,
--
-- Record values 20..24 are 3G packed switch specific
--
    sgsnPDPRecord       [20] SGSNPDPRecord,
    ggsnPDPRecord       [21] GGSNPDPRecord,
    sgsnMMRecord        [22] SGSNMMRecord,
    sgsnSMORecord       [23] SGSNSMORecord,
    sgsnSMTRecord       [24] SGSNSMTRecord
}

SystemType
FROM GPRS-Charging-DataTypes. {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-015 (15) informationModel (0) asn1Module (2) version1 (1)}

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,
    networkCallReference    [46] NetworkCallReference OPTIONAL,
    mSCAddress              [47] MSCAddress OPTIONAL,
    defaultCallHandling     [48] DefaultCallHandling OPTIONAL,
    freeFormatData          [49] FreeFormatData OPTIONAL,
```

```
    freeFormatDataAppend     [50] BOOLEAN OPTIONAL,
    systemType               [61] SystemType OPTIONAL
}


}
TermCAMELIntRecord  ::= 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
}

END
```

B.2 Record contents

The following tables describe the contents of each of the call and event records defined in the present document. Each table contains the name of the field, a key indicating whether or not the field is mandatory, and a description of the contents.

The key field has the following meaning:

M This field is mandatory and always present. Any exceptions to this rule are explicitly described.

C This field is only available under certain conditions. If available the field is present.
The conditions under which the field is available are individually described.

O This field is optional and configurable either via additional TMN management functions or manufacturer specific means. For the avoidance of doubt, optional does not mean that the parameter is not supported by the Network Element. Equipment manufacturers shall be capable of providing all of these fields in order to claim conformance with the present document.

B.2.4 Mobile terminated call attempt

If the generation of these records is enabled, then an MTC record shall be created for each incoming call attempt made for a mobile station. The MTC records shall be produced in the terminating MSC.

Table B.4: MTC record

Field		Description
Record Type	M	Mobile Terminated.
Served IMSI	M	IMSI of the called party.
Served IMEI	O	IMEI of the called ME.
Served MSISDN	O	The MSISDN of the called party.
Calling Number	C	The number of the calling party if available.
Connected Number	O	Only relevant in case of call forwarding where the "forwarded-to" number is recorded.
Recording Entity	M	The E.164 number of the visited (terminating) MSC
Incoming TKGP	O	The MSC trunk group on which the call originated.
Outgoing TKGP	O	The trunk group on which the call left the MSC, usually to the BSS
Location	C	The identity of the cell or the SAC occupied by the called party when the call was set up including the location area code.
Change of Location	O	A list of changes in Location Area Code / Cell Identifier each time-stamped.
Basic Service	M	Bearer or teleservice employed
Transparency Indicator	C	Only provided for those teleservices which may be employed in both transparent and non-transparent mode.
Change of Service	O	A list of changes of basic service during a connection each time-stamped.
Supp. services	C	Supplementary services invoked as a result of this connection.
AOC Parameters	O	The charge advice parameters sent to the MS on call set-up
Change of AOC Parms.	O	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.
MS Classmark	M	The mobile station class mark
Change of Classmark	O	A list of changes to the classmark during the connection each time-stamped
Event time stamps:	C C O	Seizure of traffic channel for unsuccessful call attempts Answer time for successful calls Release of traffic channel
Call duration	M	The chargeable duration of the connection if successful, the holding time of the call if unsuccessful.
Radio Chan. Requested	O	The type of radio traffic channel (full / half etc.) requested by the MS.
Radio Chan. Used	M	The type of radio channel used (full or half rate).
Change of Rad. Chan	O	A list of changes each time stamped
Cause for term.	M	The reason for the release of the call.
Diagnostics	O	A more detailed reason for the release of the connection.
Data volume	C	The number of data segments transmitted, if available at the MSC
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions at the same MS
Additional Chg. Info	O	Charge/no charge indicator and additional charging parameters
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
Network call reference	C	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.
MSC Address	C	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Number of HSCSD Channels Requested	O	The maximum number of HSCSD channels requested as received from the MS at call set-up
Number of HSCSD Channels Allocated	O	The number of HSCSD channels allocated to the MS at call set-up
Change of HSCSD Parameters	O	A list of network or user initiated changes of number of HSCSD channels during a connection each timestamped. Shall only be present in case of an HSCSD call, if the basic HSCSD parameters are modified due the user or network initiated modification procedure.
Fixed Network User Rate	O	May be present for HSCSD connections.
Air Interface User Rate Requested	C	The total Air Interface User Rate Requested by the MS at call setup. Shall only be present for non-transparent HSCSD connections.
Channel Coding Accepted	C	A list of the traffic channels codings accepted by the MS. Shall only be present for HSCSD connections.

Field		Description
Channel Coding Used	C	The traffic channels codings negotiated between the MS and the network at call setup. Shall only be present for HSCSD connections.
Speech Version Used	O	Speech version used for that call
Speech Version Supported	O	Speech version supported by the MS with highest priority indicated by MS
~~GsmSCF address~~	~~C~~	~~Identifies the CAMEL server serving the subscriber.~~
~~Service Key~~	~~C~~	~~The CAMEL service logic to be applied.~~
~~Default Call handling~~	~~O~~	~~Indicates whether or not a CAMEL call encountered defeault call handling. This field shall be present only if default call handling has been applied.~~
~~Free format Data~~	~~C~~	~~Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.~~
~~Free format data append indicator~~	~~C~~	~~Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.~~
System Type	C	Indicates 3G-UMTS System; Not present for GSM.

B.2.19 Terminating CAMEL interrogation call attempt

If the generation of these records is enabled, a terminating CAMEL interrogation call attempt record shall be generated for each call toward a subscriber with a T-CSI and if the terminating trigger criteria are met. The record is generated in the GMSC/gsmSSF carrying out the terminating CAMEL call handling.

Table B.19: Terminating CAMEL interrogation record

Field		Description
Record Type	M	Terminating CAMEL interrogation.
Served IMSI	M	IMSI of the called party
Served MSISDN	O	The MSISDN of the called party.
Recording Entity	M	The E.164 number of the GMSC.
Int. time stamp	M	Time at which the interrogation was invoked.
CAMEL Destination Number	M	The number available for routing after the CAMEL server enquiry.
gsmSCF Address	M	The CAMEL server serving the subscriber.
Service key	M	The CAMEL service logic to be applied.
Network call reference	M	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.
MSC Address	M	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Default call handling	O	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	A set of network/ manufacturer specific extensions to the record.
Called Number	M	The address of the called party as received by the GMSC/gsmSSF.
Calling Number	C	The address of the calling party, if available.
Incoming TKGP	O	The GMSC trunk group on which the call originated.
Outgoing TKGP	O	The trunk group on which the call left the GMSC
Event time stamps: 	C C O	Seizure of incoming traffic channel (for unsuccessful call attempts) Answer (for successful calls) Release of traffic channel
Call duration	M	The chargeable duration of the connection for successful calls, the holding time of call attempts.
Data volume	C	The number of data segments transmitted if available at the GMSC
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	A more detailed reason for the release of the connection.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Number of DP encountered	O	Number that counts how often armed detection points (TDP and EDP) were encountered.
Level of CAMEL service	O	Indicator of the complexity of the CAMEL feature used.
Free format Data	C	This field contains data sent by the gsmSCF in the FCI message(s). The data can be sent either in one FCI message or several FCI messages with append indicator.
CAMEL call leg information	C	Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.
Free format data append indicator	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.
Default call handling 2	O	Indicates whether or not a CAMEL call encountered default call handling for 2nd service such as dialled service. This field shall be present only if default call handling has been applied.
GsmSCF address 2	C	Identifies the CAMEL server serving the subscriber for 2nd service such as dialled service.
Service key 2	C	The CAMEL service logic to be applied for 2nd service such as dialled service.
Free format Data 2	C	This field contains data sent by the gsmSCF in the FCI message(s) for 2nd service such as dialled service. The data can be sent either in one FCI message or several FCI messages with append indicator.
Free format data append indicator 2	C	Indicator if free format data for 2nd service from this CDR is to be appended to free format data in previous partial CDR.

CR-Form-v4

CHANGE REQUEST

⌘ **32.005** **CR** **009** ⌘ ev **-** ⌘ Current version: **3.4.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Addition of “Rate Indication” and “FNUR” in the CDRs, and other Corrections
Source:	⌘	SA5
Work item code:	⌘	OAM-CH
Date:	⌘	07/09/2001
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change: ⌘

a) To correct an error preventing accurate charging for CS data services based on fixed network user rates and rate adaptation used;
b) correction of a number of errors and inconsistencies in the CS CDRs.

Summary of change: ⌘

The following list summarizes the proposed changes:

a) Inclusion of “Rate Indication” and “Fixed Network User Rate” (FNUR) into the applicable CDR types:

- added Rate Indication and allowed use of FNUR for UMTS data services in MOC and MTC CDR;
- added Rate Indication and FNUR for UMTS to MOC call forwarding and Commom Equipment Usage CDRs;
- added/changed description of FNUR parameter accordingly;
- added description of Rate Indication parameter;
- updated ASN.1 according to the above changes;
- allowed ASN.1 of "ChangeOfService" parameter to also include RA and FNUR.

b) Fix of deficiencies and errors in the TS as follows:

- changed the FNUR in ASN.1 to correctly match the definition of TS 24.008;
- changed in the definition of "Transparency Indicator" in the CDR parameter tables from "teleservices" to "services" as the "Transparency Indicator" applies not only to teleservices;
- corrected "MCCMNC" construct in ASN.1 from 5 to 6 octets, which is necessary to accommodate 3 digit MNCs;
- removed duplication of "mscAddress” (tag # 47 and 34) and "networkCallReference” (tag # 46 and 33) in the ASN.1 of the MTC record;
- added “system type” to the Common Equipment Usage CDR, in line with previous decisions for Release 4 (TS 32.205);

		- the "systemType" is suggested to also allow “GERAN”, in addition to the "unknown" and "iuUtran" values, and is therefore imported from TS 32.215.
Consequences if not approved:	⌘	a) Billing errors for 3G CS data services. b) Billing errors.

Clauses affected:	⌘	Subclauses A.9, B2, B3			
Other specs affected:	⌘	☐	Other core specifications	⌘	
		☐	Test specifications		
		☐	O&M Specifications		
Other comments:	⌘				

A.9 Abstract syntax

CS-Charging-DataTypes {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0) umts-Operation-Maintenance (3) ts-32-005 (5) informationModel (0) asn1Module (2) version1 (1)}

```
DEFINITIONS IMPLICIT TAGS   ::=

BEGIN

EXPORTS everything

IMPORTS

NumberOfForwarding, CallReferenceNumber
FROM MAP-CH-DataTypes { ccitt identified-organization (4) etsi(0) mobileDomain (0) gsmNetworkId (1)
moduleId (3) map-CH-DataTypes (13) version2 (2) }

AddressString, ISDN-AddressString, BasicServiceCode, IMSI, IMEI
FROM MAP-CommonDataTypes { ccitt identified-organization (4) etsi(0) mobileDomain (0) gsmNetworkId
(1) moduleId (3) map-CommonDataTypes (18) version2 (2) }

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


BearerServiceCode
FROM MAP-BS-Code { ccitt identified-organization (4) etsi(0) mobileDomain(0) gsmNetworkId (1)
moduleId (3) map-BS-Code (20) version2 (2) }

TeleserviceCode
FROM MAP-TS-Code { ccitt identified-organization (4) etsi(0) mobileDomain(0) gsmNetworkId (1)
moduleId (3) map-TS-Code (19) version2 (2) }

SS-Code
FROM MAP-SS-Code { ccitt identified-organization (4) etsi(0) mobileDomain(0) gsmNetworkId (1)
moduleId (3) map-SS-Code (15) version2 (2) }

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
--

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)}

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}

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
-- ITU-T Rec. X.227 / ISO 8650 corrigendum and not "ANY"

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,
    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

}


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,
    networkCallReference    [46] NetworkCallReference OPTIONAL,
    mSCAddress              [47] MSCAddress OPTIONAL,
    defaultCallHandling     [48] DefaultCallHandling OPTIONAL,
    freeFormatData          [49] FreeFormatData OPTIONAL,
    freeFormatDataAppend    [50] BOOLEAN OPTIONAL,
    systemType              [61] SystemType OPTIONAL,
    rateIndication          [53] RateIndication 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

}


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


Fnur                    ::= ENUMERATED
```

```
{
   --
   -- See Bearer Capability TS 24.008
   --
   fnurNotApplicable          (0),
   Fnur9600-BitsPerSecond     (1),
   Fnur14400BitsPerSecond     (2),
   Fnur19200BitsPerSecond     (3),
   Fnur28800BitsPerSecond     (4),
   Fnur38400BitsPerSecond     (5),
   Fnur48000BitsPerSecond     (6),
   Fnur56000BitsPerSecond     (7),
   Fnur64000BitsPerSecond     (8),
   fnur33600BitsPerSecond     (9),
   fnur32000BitsPerSecond     (10),
   fnur31200BitsPerSecond     (11)
}


MCCMNC  ::= GraphicString (SIZE(56))
    --
    -- This type contains the mobile country code (MCC) and the mobile
    -- network code (MNC) of a PLMN.
    --


Rate Indication ::= OCTET STRING(SIZE(1))
```

B.2 Record contents

The following tables describe the contents of each of the call and event records defined in the present document. Each table contains the name of the field, a key indicating whether or not the field is mandatory, and a description of the contents.

The key field has the following meaning:

M This field is mandatory and always present. Any exceptions to this rule are explicitly described.

C This field is only available under certain conditions. If available the field is present.
The conditions under which the field is available are individually described.

O This field is optional and configurable either via additional TMN management functions or manufacturer specific means. For the avoidance of doubt, optional does not mean that the parameter is not supported by the Network Element. Equipment manufacturers shall be capable of providing all of these fields in order to claim conformance with the present document.

B.2.1 Mobile originated call attempt

If the generation of these records is enabled then an MOC record shall be created for each outgoing call attempt made by a mobile station. These MOC records shall be produced in the originating MSC.

Table B.1: MOC record

Field		Description
Record Type	M	Mobile originated.
Served IMSI	M	IMSI of the calling party.
Served IMEI	C	IMEI of the calling ME, if available.
Served MSISDN	O	The primary MSISDN of the calling party.
Called Number	M	The address of the called party e.g. the number dialled by the calling sub.
Translated Number	O	The called number after digit translation within the MSC (if applicable)
Connected Number	O	The number of the connected party if different to the Called Number
Roaming Number	O	The Mobile Station Roaming Number employed to route this connection, if applicable.
Recording Entity	M	The E.164 number of the visited MSC producing the record.
Incoming TKGP	O	The MSC trunk group on which the call originated , usually from the BSS
Outgoing TKGP	O	The trunk group on which the call left the MSC
Location	M	The identity of the cell or the SAC in which the call originated including the location area code.
Change of Location	O	A list of changes in Location Area Code / Cell Identifier each time-stamped.
Basic service	M	Bearer or teleservice employed.
Rate Indication	O	Present if “rate adaption” parameters for the basic service were signalled between the MS/UE and the network, see TS 24.008.
Transparency Indicator	C	Only provided for those basic ~~tele~~services which may be employed in both transparent and non-transparent mode.
ChangeOfService	O	A list of changes of basic service during a connection each time-stamped.
Supp. Services	C	Supplementary services invoked as a result of this connection.
AOC Parameters	O	The charge advice parameters sent to the MS on call set-up
Change of AOC Parms	O	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.
MS Classmark	M	The mobile station classmark employed on call set-up.
Change of Classmark	O	A list of changes to the classmark during the connection each time-stamped
Event time stamps:	C C O	Seizure of incoming traffic channel (for unsuccessful call attempts) Answer (for successful calls) Release of traffic channel
Call duration	M	The chargeable duration of the connection for successful calls, the holding time for call attempts.
Radio Chan. Requested	O	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	A list of changes each time stamped
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	A more detailed reason for the release of the connection.
Data volume	C	The number of data segments transmitted if available at the MSC
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Additional Chg. Info	O	Charge/no charge indicator and additional charging parameters
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
gsmSCF address	C	Identifies the CAMEL server serving the subscriber.
Service key	C	The CAMEL service logic to be applied.
Network call reference	C	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.
MSC Address	C	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Default call handling	O	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 HSCSD Channels Requested	C	The maximum number of HSCSD channels requested as received from the MS at call set-up
Number of HSCSD Channels Allocated	C	The number of HSCSD channels allocated to the MS at call set-up

Field		Description
Change of HSCSD Parameters	C	A list of network or user initiated changes of number of HSCSD channels during a connection each timestamped. Shall only be present in case of an HSCSD call, if the basic HSCSD parameters are modified due the user or network initiated modification procedure.
Fixed Network User Rate	O	Indicates the user data rate applied for the connection in the fixed network. Shall only be present for 2G HSCSD connections and for UMTS data connections.
Air Interface User Rate Requested	C	The total Air Interface User Rate Requested by the MS at call setup. Shall only be present for non-transparent HSCSD connections.
Channel Coding Accepted	C	A list of the traffic channels codings accepted by the MS. Shall only be present for HSCSD connections.
Channel Coding Used	C	The traffic channels codings negotiated between the MS and the network at call setup. Shall only be present for HSCSD connections.
Speech Version Used	O	Speech version used for that call
Speech Version Supported	O	Speech version supported by the MS with highest priority indicated by MS
Number of DP encountered	O	Number that counts how often armed detection points (TDP and EDP) were encountered.
Level of CAMEL service	O	Indicator for the complexity of the CAMEL feature used.
Free format Data	C	This field contains data sent by the gsmSCF in the FCI message(s). The data can be sent either in one FCI message or several FCI messages with append indicator.
CAMEL call leg information	C	Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.
Free format data append indicator	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.
Free format Data	C	This field contains data sent by the gsmSCF in the FCI messages. The data can be sent either in one FCI message or several FCI messages with append indicator.
CAMEL call leg information	C	Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.
Free format data append indicator	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.
Default call handling 2	O	Indicates whether or not a CAMEL call encountered default call handling for 2nd service such as dialled service. This field shall be present only if default call handling has been applied.
GsmSCF address 2	C	Identifies the CAMEL server serving the subscriber for 2nd service such as dialled service.
Service key 2	C	The CAMEL service logic to be applied for 2nd service such as dialled service.
Free format Data 2	C	This field contains data sent by the gsmSCF in the FCI message(s) for 2nd service such as dialled service. The data can be sent either in one FCI message or several FCI messages with append indicator.
Free format data append indicator 2	C	Indicator if free format data for 2nd service from this CDR is to be appended to free format data in previous partial CDR.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.

B.2.2 Mobile originated emergency call attempt

If the generation of MOC records is enabled then an MOC emergency record shall be created for each outgoing emergency call attempt made by a mobile station. These records shall be produced in the originating MSC.

Table B.2: MOC emergency record

Field		Description
Record Type	M	Mobile originated.
Served IMSI	C	IMSI of the calling party in case of an emergency call with a SIM card.
Served IMEI	C	IMEI of the calling mobile equipment if available.
Served MSISDN	O	The primary MSISDN of the calling party.
Translated Number	O	The called number after digit translation within the MSC (if applicable)
Recording Entity	M	The E.164 number of the visited MSC producing the record.
Incoming TKGP	O	The MSC trunk group on which the call originated, usually from the BSS
Outgoing TKGP	O	The trunk group on which the call left the MSC
Location	M	The identity of the cell or the SAC in which the call originated including the location area code.
Change of Location	O	A list of changes in Location Area Code / Cell Identifier each time-stamped.
Basic service	M	Teleservice 'emergency call'.
AOC Parameters	O	The charge advice parameters sent to the MS on call set-up
Change of AOC Parms	O	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.
MS Classmark	M	The mobile station classmark employed on call set-up.
Change of classmark	O	A list of changes to the classmark during the connection each time-stamped
Event time stamps:	C C O	Seizure of incoming traffic channel (for unsuccessful call attempts) Answer (for successful calls) Release of traffic channel
Call duration	M	The chargeable duration of the connection for successful calls, the holding time for call attempts.
Radio Chan. Requested	O	The type of radio traffic channel (full / half etc.) requested by the MS.
Radio Chan. Used	M	The type of radio channel used (full or half rate).
Change of Rad. Chan.	O	A list of changes each time stamped
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	A more detailed reason for the release of the connection.
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.

B.2.3 Mobile originated call forwarding attempt

If the generation of MOC records is enabled then, In case of call forwarding, the forwarded-leg of the call shall also result in the production of an MOC record in the MSC that forwards the call (see the example scenarios in subclause B.4.6 and B.4.7).

Table B.3: MOC, call forwarding record

Field		Description
Record Type	M	Mobile originated.
Served IMSI	M	IMSI of the calling party.
Served MSISDN	O	The MSISDN of the forwarding party.
Calling Number	O	The address of the calling party.
Called Number	M	The address of the "forwarded-to" party.
Translated Number	O	The called number after digit translation within the MSC (if applicable)
Connected Number	O	The number of the connected party if different to the Called Number
Roaming Number	O	The Mobile Station Roaming Number employed to route this connection, if applicable.
Recording Entity	M	The E.164 number of the forwarding MSC
Incoming TKGP	O	The MSC trunk group on which the call originated at the forwarding MSC.
Outgoing TKGP	O	The trunk group on which the call left the forwarding MSC
Basic service	C	Bearer or teleservice employed, not always available e.g. in case of call forwarding unconditional.
Rate ~~Adaptation~~Indication	O	Present if "rate adaption" parameters for the basic service were signalled between the MS/UE and the network, see TS 24.008. May not always be available in this CDR type.
Transparency Indicator	C	Only provided for those basic ~~tele~~services which may be employed in both transparent and non-transparent mode.
Fixed Network User Rate	O	Indicates the user data rate applied for the connection in the fixed network. Shall only be present for 2G HSCSD connections and for UMTS data connections.
ChangeOfService	O	A list of changes of basic service during a connection each time-stamped.
Supp. Services	C	Supplementary services invoked as a result of this connection.
Event time stamps:	C C O	Seizure of incoming traffic channel (for unsuccessful call attempts) Answer (for successful calls) Release of traffic channel
Call duration	M	The chargeable duration of the connection for successful calls, the holding time of call attempts.
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	A more detailed reason for the release of the connection.
Data volume	C	The number of data segments transmitted if available at the MSC
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Additional Chg. Info	O	Charge/no charge indicator and additional charging parameters
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
gsmSCF address	C	Identifies the CAMEL server serving the subscriber.
Service key	C	The CAMEL service logic to be applied.
Network call reference	C	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.
MSC Address	C	This field contains the E.164 number assigned to the MSC that generated the network call reference.
CAMEL initiated CF indicator	C	Indicates that the CAMEL server initiated call forwarding.
Default call handling	O	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	Number that counts how often armed detection points (TDP and EDP) were encountered.
Level of CAMEL service	O	Indicator of the complexity of the CAMEL feature used.
Free format Data	C	This field contains data sent by the gsmSCF in the FCI messages. The data can be sent either in one FCI message or several FCI messages with append indicator.
CAMEL call leg information	C	Set of CAMEL information IEs. Each of these IEs contains information related to one outgoing CAMEL call leg.
Free format data append indicator	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.

Field		Description
Default call handling 2	O	Indicates whether or not a CAMEL call encountered default call handling for 2nd service such as dialled service. This field shall be present only if default call handling has been applied.
GsmSCF address 2	C	Identifies the CAMEL server serving the subscriber for 2nd service such as dialled service.
Service key 2	C	The CAMEL service logic to be applied for 2nd service such as dialled service.
Free format Data 2	C	This field contains data sent by the gsmSCF in the FCI message(s) for 2nd service such as dialled service. The data can be sent either in one FCI message or several FCI messages with append indicator.
Free format data append indicator 2	C	Indicator if free format data for 2nd service from this CDR is to be appended to free format data in previous partial CDR.

B.2.4 Mobile terminated call attempt

If the generation of these records is enabled, then an MTC record shall be created for each incoming call attempt made for a mobile station. The MTC records shall be produced in the terminating MSC.

Table B.4: MTC record

Field		Description
Record Type	M	Mobile Terminated.
Served IMSI	M	IMSI of the called party.
Served IMEI	O	IMEI of the called ME.
Served MSISDN	O	The MSISDN of the called party.
Calling Number	C	The number of the calling party if available.
Connected Number	O	Only relevant in case of call forwarding where the "forwarded-to" number is recorded.
Recording Entity	M	The E.164 number of the visited (terminating) MSC
Incoming TKGP	O	The MSC trunk group on which the call originated.
Outgoing TKGP	O	The trunk group on which the call left the MSC, usually to the BSS
Location	C	The identity of the cell or the SAC occupied by the called party when the call was set up including the location area code.
Change of Location	O	A list of changes in Location Area Code / Cell Identifier each time-stamped.
Basic Service	M	Bearer or teleservice employed
Rate Indication	O	Present if “rate adaption” parameters for the basic service were signalled between the MS/UE and the network, see TS 24.008.
Transparency Indicator	C	Only provided for those basic ~~tele~~services which may be employed in both transparent and non-transparent mode.
Change of Service	O	A list of changes of basic service during a connection each time-stamped.
Supp. services	C	Supplementary services invoked as a result of this connection.
AOC Parameters	O	The charge advice parameters sent to the MS on call set-up
Change of AOC Parms.	O	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.
MS Classmark	M	The mobile station class mark
Change of Classmark	O	A list of changes to the classmark during the connection each time-stamped
Event time stamps:	C C O	Seizure of traffic channel for unsuccessful call attempts Answer time for successful calls Release of traffic channel
Call duration	M	The chargeable duration of the connection if successful, the holding time of the call if unsuccessful.
Radio Chan. Requested	O	The type of radio traffic channel (full / half etc.) requested by the MS.
Radio Chan. Used	M	The type of radio channel used (full or half rate).
Change of Rad. Chan	O	A list of changes each time stamped
Cause for term.	M	The reason for the release of the call.
Diagnostics	O	A more detailed reason for the release of the connection.
Data volume	C	The number of data segments transmitted, if available at the MSC
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions at the same MS
Additional Chg. Info	O	Charge/no charge indicator and additional charging parameters
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
Network call reference	C	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.

Field		Description
MSC Address	C	This field contains the E.164 number assigned to the MSC that generated the network call reference.
Number of HSCSD Channels Requested	O	The maximum number of HSCSD channels requested as received from the MS at call set-up
Number of HSCSD Channels Allocated	O	The number of HSCSD channels allocated to the MS at call set-up
Change of HSCSD Parameters	O	A list of network or user initiated changes of number of HSCSD channels during a connection each timestamped. Shall only be present in case of an HSCSD call, if the basic HSCSD parameters are modified due the user or network initiated modification procedure.
Fixed Network User Rate	O	Indicates the user data rate applied for the connection in the fixed network. Shall only be present for 2G HSCSD connections and for UMTS data connections.
Air Interface User Rate Requested	C	The total Air Interface User Rate Requested by the MS at call setup. Shall only be present for non-transparent HSCSD connections.
Channel Coding Accepted	C	A list of the traffic channels codings accepted by the MS. Shall only be present for HSCSD connections.
Channel Coding Used	C	The traffic channels codings negotiated between the MS and the network at call setup. Shall only be present for HSCSD connections.
Speech Version Used	O	Speech version used for that call
Speech Version Supported	O	Speech version supported by the MS with highest priority indicated by MS
GsmSCF address	C	Identifies the CAMEL server serving the subscriber.
Service Key	C	The CAMEL service logic to be applied.
Default Call handling	O	Indicates whether or not a CAMEL call encountered defeault call handling. This field shall be present only if default call handling has been applied.
Free format Data	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.
Free format data append indicator	C	Indicator if free format data from this CDR is to be appended to free format data in previous partial CDR.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.~~3G-UMTS System; Not present for GSM.~~

B.2.5 Roaming call attempt

If the generation of these records is enabled then, a roaming record shall be created for each call redirected to a mobile subscriber roaming outside the HPLMN. These roaming records shall be produced in the GMSC.

Table B.5: Roaming record

Field		Description
Record Type	M	Roaming record.
Served IMSI	M	IMSI of the called (roaming) party.
Served MSISDN	O	The MSISDN of the called (roaming) party.
Calling Number	C	The address of the calling party, if available.
Roaming Number	M	The Mobile Station Roaming Number employed to route this connection.
Recording Entity	M	The E.164 number of the GMSC
Incoming TKGP	O	The GMSC trunk group on which the call originated.
Outgoing TKGP	O	The trunk group on which the call left the GMSC
Basic service	M	Bearer or teleservice employed.
Transparency Indicator	C	Only provided for those ~~tele~~basic services which may be employed in both transparent and non-transparent mode.
ChangeOfService	O	A list of changes of basic service during a connection each time-stamped.
Supp. Services	C	Supplementary services invoked as a result of this connection.
Event time stamps:	C C O	Seizure of incoming traffic channel (for unsuccessful call attempts) Answer (for successful calls) Release of traffic channel
Call duration	M	The chargeable duration of the connection for successful calls, the holding time of call attempts.
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	A more detailed reason for the release of the connection.
Data volume	C	The number of data segments transmitted if available at the GMSC
Sequence no.	C	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
Network call reference	C	An identifier to correlate transactions on the same call taking place in different network nodes, shall be present if CAMEL is applied.
MSC Address	C	This field contains the E.164 number assigned to the MSC that generated the network call reference.

B.2.9 Supplementary service actions

A supplementary service record may be produced in the NEF of the appropriate MSC or HLR for each supplementary service action (activation, deactivation, invocation etc.) performed or initiated by the subscriber.

There are two basic types of SS-actions:

- Call related i.e. as a result of a connection e.g. Invocation of CLIP / CLIR / AOC etc.
- Non-call related i.e. as a result of subscriber controlled input (SCI) e.g. Registration of call forwarding

Each supplementary service action shall be performed on one or more basic service groups. If the action applies to all tele and all bearer services (i.e. to all basic services) then the basic services field shall be omitted.

SCI actions may be recorded in individual SS-action records. Call related actions may be recorded in either the appropriate call record (MOC/MTC) or in separate SS-action records. For further details concerning the generation of supplementary service records see subclause 8.2.1.1.3.

Additional non-standard supplementary service actions may be made available within some networks in the form of Unstructured Supplementary Service Data (USSD). These actions may also be recorded in SS-action records. However, as these actions are non-standard they may not include an appropriate action type, supplementary service code or basic service code.

Table B.9: SS-action record

Field		Description
Record Type	M	Supplementary service action.
Served IMSI	M	The IMSI of the MS performing the action.
Served IMEI	O	The IMEI of the ME performing the action.
Served MSISDN	O	The primary MSISDN of the party performing the action.
MS Classmark	M	The mobile station classmark.
Recording Entity	M	The E.164 number of the visited MSC / HLR.
Location	O	The Location Area Code and Cell Identifier from which the request originated.
Supp. Service	C	The supplementary service or group of supplementary services for which the request was made. May not be available in case of USSD.
Basic Services	C	The basic service group(s) to which the supplementary service applies. This field is not provided if the action applies to all basic services.
SS Action	C	Activation, deactivation, interrogation etc. May not be available in case of USSD.
SS Action time stamp	M	The time at which the action was requested.
SS Parameters	C	Service dependent parameters or unstructured suppl. service data.
SS Action Result	C	Result of the requested transaction if unsuccessful.
Call Reference	M	A local identifier distinguishing between transactions at the same MS.
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.~~Indicates 3G-UMTS System; Not present for GSM.~~

B.2.13 Short Message Service, mobile originated

If enabled, an SMS-MO record shall be produced, within the originating MSC, for each short message sent by a mobile subscriber.

Table B.13: SMS-MO record

Field		Description
Record Type	M	SMS-Mobile originated.
Served IMSI	M	The IMSI of the subscriber sending the short message.
Served IMEI	O	The IMEI of the ME sending the message, if available.
Served MSISDN	O	The primary MSISDN of the subscriber sending the message.
MS Classmark	M	The mobile station classmark.
Service Centre	M	The address (E.164) of the SMS-service centre.
Recording Entity	M	The E.164 number of the visited MSC
Location	O	The Location Area Code and Cell Identifier from which the message originated.
Event Time stamp	M	The time at which the message was received by the MSC from the subscriber.
Message Reference	M	A reference, provided by the MS uniquely identifying this message.
SMS Result	C	The result of the attempted delivery if unsuccessful.
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
Destination number	O	The destination short message subscriber number.
CAMELSMSInformation	C	Set of CAMEL information IEs. Each of these IEs contains information related to CAMEL call leg related for the SMS.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.~~Indicates 3G-UMTS System; Not present for GSM.~~

B.2.14 Short Message Service, mobile terminated

If enabled, an SMS-MT record shall be produced, within the terminating MSC, for each short message received by a mobile subscriber.

Table B.14: SMS-MT record

Field		Description
Record Type	M	SMS-Mobile Terminated.
Service Centre	M	The E.164 address of the SMS service centre.
Served IMSI	M	The IMSI of the receiving party.
Served IMEI	O	The IMEI of the receiving party, if available.
Served MSISDN	O	The MSISDN of the receiving party.
MS Classmark	M	The mobile station classmark.
Recording Entity	M	The E.164 number of the visited MSC.
Location	O	The Location Area Code and Cell Identifier to which the message was delivered.
Event time stamp	M	Delivery time stamp, time at which message was sent to the MS by the MSC.
SMS Result	C	The result of the attempted delivery if unsuccessful.
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.~~Indicates 3G-UMTS System; Not present for GSM.~~

B.2.18 Reduced partial records

In order to minimise the amount of data transferred, the contents of partial record may be reduced to those fields required to uniquely identify the connection and those fields that actually change. Table B.18 contains an example of such a record for a mobile originated call attempt. Reduced partial records may be generated for any of the relevant call records.

Table B.18: Reduced partial (MOC) record

Field		Description
Record Type	M	Mobile originated.
Served IMSI	C	IMSI of the calling party, if available
Called Number	C	If available.
Recording Entity	M	The E.164 number of the visited MSC producing the record.
Change of Location	C	A list of changes in Location Area Code / Cell Identifier each time-stamped.
ChangeOfService	C	A list of changes of basic service during a connection each time-stamped.
Change of AOC Parms	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.
Change of Classmark	C	A list of changes to the classmark during the connection each time-stamped
Event time stamps:	M	Answer time, start of this partial record.
Call duration	M	The chargeable duration of this partial record.
Change of Rad. Chan.	C	A list of changes each time stamped
Cause for termination	M	The reason for the release of the connection.
Diagnostics	O	Only relevant for the last record in the sequence.
Data volume	C	The number of data segments transmitted during this partial output
Sequence no.	M	Partial record sequence number, only present in case of partial records.
Call reference	M	A local identifier distinguishing between transactions on the same MS
Record extensions	O	A set of network/ manufacturer specific extensions to the record.
System Type	C	This field indicates the use of GERAN, UTRAN (or a value of unknown). This field is present when either the UTRAN or GERAN air-interface is used on call setup. 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.~~Indicates 3G-UMTS System; Not present for GSM.~~

B.3.34 Rate Indication

This parameter specifies the rate adaptation that was used for the connection. The field is constructed from the information in the parameters “rate adaption” and “other rate adaption” signalled between the MS/UE and the network, see TS 24.008.

The format of this field is a single octet with the following format:

- Bits 0-1: the Rate Adaption field as defined in TS 24.008
- Bits 2-3: the Other Rate Adaption field as defined in TS 24.008
- Bits 4-7: not used