
Source: SA5 (Telecom Management)

Title: 4 Rel-4/5 CR 32.205/32.215 (CS/PS Charging): "Alignment of LCS"

Document for: Approval

Agenda Item: 7.5.3

| Doc-1st- | Spec | CR | R | Phase | Subject | Cat | Version | Doc-2nd- | Workitem |
|-----------|--------|-----|---|-------|--|-----|---------|-----------|----------|
| SP-020736 | 32.205 | 008 | - | Rel-4 | Alignment of LCS charging | F | 4.2.0 | S5-024474 | OAM-CH |
| SP-020736 | 32.205 | 009 | - | Rel-5 | Corrections on LCS error cause definitions | A | 5.1.0 | S5-024475 | OAM-CH |
| SP-020736 | 32.215 | 020 | - | Rel-4 | Corrections on LCS error cause definitions | F | 4.3.0 | S5-024472 | OAM-CH |
| SP-020736 | 32.215 | 021 | - | Rel-5 | Corrections on LCS error cause definitions | A | 5.1.0 | S5-024473 | OAM-CH |

| | |
|------------------------|--|
| CR-Form-v7 | |
| CHANGE REQUEST | |
| № 32.205 CR 008 | № rev - № Current version: 4.2.0 № |

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the № symbols.

Proposed change affects: UICC apps № ME Radio Access Network Core Network

| | | | |
|------------------------|---|-----------------|---|
| Title: | № Alignment of LCS charging | | |
| Source: | № SA5 | | |
| Work item code: | № OAM-CH | Date: | № 11/10/2002 |
| Category: | № F | Release: | № Rel-4 |
| | Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 . | | Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) |

| | |
|--------------------------------------|--|
| Reason for change: | № The charging implementation is inconsistent for LCS in Rel-4 due to missing LCS charging discription in CS domain. |
| Summary of change: | № The LCS charging implementation as described in Rel-5 is added into Rel-4 description. |
| Consequences if not approved: | № Missing or inconsistent charging support for Location Service in the operator CS and PO networks in Rel-4. |

| | | | | | | | |
|--|--|---|---|---|---------------------|---------------------------|---------------------------------|
| Clauses affected: | № 2, 3, 4, 5 and 6 | | | | | | |
| Other specs affected: | <table border="1" style="font-size: x-small;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> </tr> </table> | Y | N | X | | Other core specifications | № Rel-5 32.205, Rel-4/5 32.215. |
| | Y | N | | | | | |
| | X | | | | | | |
| <table border="1" style="font-size: x-small;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> </tr> </table> | Y | N | X | | Test specifications | | |
| Y | N | | | | | | |
| X | | | | | | | |
| <table border="1" style="font-size: x-small;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> </tr> </table> | Y | N | X | | O&M Specifications | | |
| Y | N | | | | | | |
| X | | | | | | | |
| Other comments: | № Rel-5 Mirror in 32.205CR009. | | | | | | |

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.003: "Numbering, addressing and identification".
- [3] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".
- [4] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".
- [5] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [6] ITU-T Recommendation X.121: "International numbering plan for public data networks".
- [7] ISO 8824-1 (1994)/ITU-T Recommendation X.680 (1994): "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [8] ITU-T Recommendation X.208: "Specification of Abstract Syntax Notation One (ASN.1)".
- [9] ITU-T Recommendation X.209: "Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1)".
- [10] 3GPP TS 22.024: "Description of Charge Advice Information (CAI)".
- [11] 3GPP TS 22.086: "Advice of Charge (AoC) supplementary services - Stage 1".
- [12] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [13] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) specification".
- [14] ITU-T Recommendation Q.767: "Application of the ISDN user part of CCITT signalling System No.7 for international ISDN interconnections".
- [15] 3GPP TS 23.040: "Technical Realization of Short Message Service (SMS)".
- [16] 3GPP TS 23.003: "Numbering, Addressing and Identification".
- [17] 3GPP TS 23.002: "Network Architecture".
- [18] 3GPP TS 22.115: "Service aspects; Charging and Billing".
- [19] 3GPP TS 22.004: "General on Supplementary Services".
- [20] 3GPP TS 22.003: "Circuit Teleservices Supported by a Public Land Mobile Network (PLMN)".
- [21] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [22] 3GPP TS 32.200: "Telecommunication management; Charging management; Charging Principles".
- [23] 3GPP TS 32.215: "3G Telecom Management; Charging management; Charging data description for the Packet Switched (PS) domain".

- [24] 3GPP TS 32.235: "Telecommunication management; Charging management; Charging data description for application services".
- [25] GSM 12.01: "Network Management (NM); Part 2: Common aspects of GSM/DCS 1800 network management".
- [26] IETF RFC 959 (1985): "File Transfer Protocol"; J. Postel, J. Reynolds, ISI.
- [27] IETF RFC 783 (1981): "TFTP Protocol (revision 2)"; K.R. Sollins MIT.[28] GSM 05.01: "Physical layer on the radio path; General description".
- [29] GSM 08.08: "Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".
- [30] ITU-T Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [31] [3GPP TS 49.031: "Location Services \(LCS\); Base Station System Application Part, LCS Extension \(BSSAP-LE\)".](#)
- [32] [3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification; Formats and coding".](#)

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply. Additional applicable abbreviations can be found in TR 21.905 [1].

| | |
|----------------------------|---|
| AoC | Advice of Charge |
| BCSM | Basic Call State Model |
| CAI | Charge Advice Information |
| CAMEL | Customised Applications for Mobile network Enhanced Logic |
| CDR | Call Detail Record |
| 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 |
| ETSI | European Telecommunications Standard Institute |
| 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 |
| IMEI | International Mobile Equipment Identity |
| IMSI | International Mobile Subscriber Identity |
| ISDN | Integrated Services Digital Network |
| LAC | Location Area Code |
| LR | Location Request |
| 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 |

| | |
|--------------|--|
| <u>NI-LR</u> | <u>Network Induced Location Request</u> |
| O_CSI | Originating CAMEL Subscription Information |
| PLMN | Public Land Mobile Network |
| SAC | Service Area Code |
| SCF | Service Control Function |
| SCI | Subscriber Controlled Input or Send Charging Information |
| SMS | Short Message Service |
| SS7 | Signalling System No. 7 |
| T_CSI | Terminating CAMEL Subscription Information |
| TDP | Trigger Detection Point |
| TMN | Telecommunications Management Network |
| USIM | User Service Identity Module |
| USSD | Unstructured Supplementary Service Data |
| UTRAN | UMTS 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 |

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4.20 Mobile terminated location request (MT-LR)

If enabled, an LCS-MT record shall be produced, within the visited MSC, for each mobile a terminated location request is performed for.

Table 20: LCS-MT record

| <u>Field</u> | <u>2G</u> | <u>3G</u> | <u>Description</u> |
|--------------------------------|----------------------|----------------------|---|
| <u>Record Type</u> | <u>M</u> | <u>M</u> | <u>LCS-MT record.</u> |
| <u>Recording Entity</u> | <u>M</u> | <u>M</u> | <u>The E.164 number of the visited MSC producing the record.</u> |
| <u>LCS Client Type</u> | <u>M</u> | <u>M</u> | <u>The type of the LCS client that invoked the LR.</u> |
| <u>LCS Client Identity</u> | <u>M</u> | <u>M</u> | <u>Further identification of the LCS client .</u> |
| <u>Served IMSI</u> | <u>M</u> | <u>M</u> | <u>The IMSI of the subscriber the LR is invoked for.</u> |
| <u>Served MSISDN</u> | <u>O_M</u> | <u>O_M</u> | <u>The MSISDN of the subscriber the LR is invoked for.</u> |
| <u>Location Type</u> | <u>M</u> | <u>M</u> | <u>The type of the location request.</u> |
| <u>LCS QoS</u> | <u>C</u> | <u>C</u> | <u>QoS of the LR, if available.</u> |
| <u>LCS Priority</u> | <u>C</u> | <u>C</u> | <u>Priority of the LR, if available.</u> |
| <u>MLC Number</u> | <u>M</u> | <u>M</u> | <u>The E.164 address of the requesting GMLC.</u> |
| <u>Event Time Stamp</u> | <u>M</u> | <u>M</u> | <u>The time at which the LR was received by the MSC.</u> |
| <u>MeasureDuration</u> | <u>O_M</u> | <u>O_M</u> | <u>The duration of proceeding the location request .</u> |
| <u>Notification To MS User</u> | <u>C</u> | <u>C</u> | <u>The privacy notification to MS user that was applicable when the LR was invoked, if available.</u> |
| <u>Privacy Override</u> | <u>C</u> | <u>C</u> | <u>This parameter indicates if MS privacy was overridden by the LCS client, if available.</u> |
| <u>Location</u> | <u>O_M</u> | <u>-</u> | <u>The LAC and CI when the LR is received.</u> |
| <u>Location Estimate</u> | <u>O_C</u> | <u>O_C</u> | <u>The location estimate for the subscriber if contained in geographic position and the LR was successful.</u> |
| <u>Positioning Data</u> | <u>C</u> | <u>C</u> | <u>The positioning method used or attempted, if available.</u> |
| <u>LCS Cause</u> | <u>C</u> | <u>C</u> | <u>The result of the LR if any failure or partial success happened as known at the radio interface.</u> |
| <u>Cause for Termination</u> | <u>M</u> | <u>M</u> | <u>The reason for the termination of the location service.</u> |
| <u>Diagnostics</u> | <u>C</u> | <u>C</u> | <u>A more detailed information about the Cause for Termination if any failure or partial success happened.</u> |
| <u>System Type</u> | <u>-</u> | <u>M</u> | <u>This field indicates the use of GERAN or UTRAN at the time of the LCS request. This field is present when either the UTRAN or GERAN air-interface is used on call setup.</u> |
| <u>Record extensions</u> | <u>O_C</u> | <u>O_C</u> | <u>A set of network/ manufacturer specific extensions to the record.</u> |

4.21 Mobile originated location request (MO-LR)

If enabled, an LCS-MO record shall be produced, within the visited MSC, for each mobile an originated location request is performed for.

Table 21: LCS-MO record

| Field | 2G | 3G | Description |
|-----------------------|----------------|----------------|--|
| Record Type | M | M | LCS-MO record. |
| Recording Entity | M | M | The E.164 number of the visited MSC producing the record. |
| LCS Client Type | C | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | C | Further identification of the LCS client, if available. |
| Served IMSI | M | M | The IMSI of the subscriber the LR is invoked for. |
| Served MSISDN | O _M | O _M | The MSISDN of the subscriber the LR is invoked for. |
| MOLR Type | M | M | The type of the LR. |
| LCS QoS | C | C | QoS of the LR, if available. |
| LCS Priority | O _C | O _C | Priority of the LR, if available. |
| MLC Number | C | C | The E.164 address of the involved GMLC, if available. |
| Event Time Stamp | M | M | The time at which the LR was received by the MSC. |
| MeasureDuration | O _M | O _M | The duration of proceeding the location request. |
| Location Estimate | O _C | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | C | The positioning method used or attempted, if available. |
| LCS Cause | C | C | The result of the LR if any failure or partial success happened as known at the radio interface. |
| Cause for Termination | M | M | The reason for the termination of the location service. |
| Diagnostics | C | C | A more detailed information about the Cause for Termination if any failure or partial success happened. |
| System Type | - | M | This field indicates the use of GERAN or UTRAN at the time of the LCS request. This field is present when either the UTRAN or GERAN air-interface is used on call setup. |
| Record extensions | O _C | O _C | A set of network/ manufacturer specific extensions to the record. |

4.22 Network induced location request (NI-LR)

If enabled, an LCS-NI record shall be produced, within the visited MSC, for each network induced location request performed for a MS e.g. in case of emergency call.

Table 22: LCS-NI record

| Field | 2G | 3G | Description |
|-----------------------|----------------|----------------|---|
| Record Type | M | M | LCS-NI record. |
| Recording Entity | M | M | The E.164 number of the visited MSC producing the record. |
| LCS Client Type | C | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | C | Further identification of the LCS client, if available. |
| Served IMSI | C | C | The IMSI of the calling party the LR is executed for if supplied by the UE. |
| Served MSISDN | C | C | The MSISDN of the calling party the LR is executed for if supplied by the UE. |
| Served IMEI | C | C | The IMEI of the calling party the LR is executed for if available. |
| EMS-Digits | O _C | O _C | The emergency service routing digits, if emergency call. |
| EMS-Key | O _C | O _C | The emergency service routing key, if emergency call. |
| LCS QoS | C | C | QoS of the LR, if available. |
| LCS Priority | C | C | Priority of the LR, if available. |
| MLC Number | C | C | The E.164 address of the involved GMLC, if available. |
| Event Time Stamp | M | M | The time at which the LR was received by the MSC. |
| MeasureDuration | O _M | O _M | The duration of proceeding the location request. |
| Location Estimate | O _C | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | C | The positioning method used or attempted, if available. |
| LCS Cause | C | C | The result of the LR if any failure or partial success happened as known at the radio interface. |
| Cause for Termination | M | M | The reason for the termination of the location service. |

| <u>Field</u> | <u>2G</u> | <u>3G</u> | <u>Description</u> |
|--------------------------|----------------------|----------------------|---|
| <u>Diagnostics</u> | <u>C</u> | <u>C</u> | <u>A more detailed information about the Cause for Termination if any failure or partial success happened.</u> |
| <u>System Type</u> | <u>-</u> | <u>M</u> | <u>This field indicates the use of GERAN or UTRAN at the time of the LCS request. This field is present when either the UTRAN or GERAN air-interface is used on call setup.</u> |
| <u>Record extensions</u> | <u>O_C</u> | <u>O_C</u> | <u>A set of network/ manufacturer specific extensions to the record.</u> |

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5.13 Cause for termination

This field contains a generalised reason for the release of the connection [or for the termination of the location service](#) including the following:

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

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

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5.18 Diagnostics

This field includes a more detailed technical reason for the release of the connection and may contain one of the following:

- a MAP error from TS 29.002 [5];
- a Cause from TS 24.008 [4];
- a Cause from TS 29.078 [13];
- ~~—~~ a Cause from ITU-T Recommendation ~~Q.767 [14];~~ [Q.767 \[14\];](#)
- [a LCS diagnostics according TS 29.002 \[5\].](#)

The diagnostics may also be extended to include manufacturer and network specific information.

[5.19 EMS-Digits](#)

[This parameter only applies to location for an emergency services call in North America and gives the North American Emergency Services Routing Digits as defined in TS 29.002 \[5\].](#)

[5.20 EMS-Key](#)

[This parameter only applies to location for an emergency services call in North America and gives the North American Emergency Services Routing Key as defined in TS 29.002 \[5\].](#)

~~5.19~~5.21 Entity number

This field contains the ITU-T Recommendation E.164 [12] number assigned to the entity (MSC, VLR, HLR etc.) that produced the record. For further details concerning the structure of MSC and location register numbers see 3GPP TS 23.003 [2].

~~5.20~~5.22 Equipment id

This field contains a local identifier used to distinguish between equipment of the same equipment type e.g. the number of the conference circuit employed if more than one is available.

~~5.21~~5.23 Equipment type

This field contains the type of common equipment employed e.g. conference circuit for multi-party service.

~~5.22~~5.24 Event time stamps

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

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

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

For both Mobile Originated and Mobile Terminated calls, the Seizure time is the time at which the traffic channel is allocated i.e. the time at which the ASSIGN COMMAND message is sent to the MS.

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

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

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

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

The event records include the following time stamps:

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

- SMS-MT: The transmission of an RP_DATA message to the MS containing an SMS_DELIVER PDU.
- LCS: The time the LR was processed.

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

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

~~5.23~~5.25 Fixed Network User Rate

This field indicates the user data rate applied for the connection in the fixed network. In UMTS, it shall be present for all bearer services as specified in TS 22.002. In GSM, this parameter is part of the HSCSD connection parameters, see clause ~~5.27~~5.29.

~~5.24~~5.26 Free format data

This field contains charging information sent by the gsmSCF in the Furnish Charging Information (FCI) messages as defined in TS 29.078 [13]. The data can be sent either in one FCI message or several FCI messages with append indicator. This data is transferred transparently in the CAMEL clauses of the relevant call records. 'Free format data' sent to the legID=1 is always stored in the top level of the respective record. 'Free format data' sent to the legID >1 is stored in the appropriate CAMEL call leg information field.

If the FCI is received more than once during one continuing incoming/outgoing CAMEL call leg, the append indicator defines whether the FCI information is appended to previous FCI and stored in the relevant record or the information of the last FCI received is stored in the relevant record (the previous FCI information shall be overwritten).

In the event of partial output the currently valid 'Free format data' is stored in the partial record.

~~5.25~~5.27 Free format data append indicator

This field contains an indicator whether free format data is to be appended to free format data stored in previous partial CDR. This field is needed in CDR postprocessing to sort out valid free format data for that call leg from sequence of partial records. Creation of partial records is independent on received FCIs and thus valid free format data may be divided to different partial records.

If field is missing then free format data in this CDR replaces all received free format data in previous CDRs. Append indicator is not needed in the first partial record. In following partial records indicator shall get value true if all FCIs received during that partial record have append indicator. If one or more of the received FCIs for that call leg during the partial record do not have append indicator then this field shall be missing.

~~5.26~~5.28 GsmSCF address

This field identifies the CAMEL server serving the subscriber. Address is defined in HLR as part of CAMEL subscription information.

~~5.27~~5.29 HSCSD parameters / Change of HSCSD parameters

The basic HSCSD parameters are negotiated between the MS and the network at call setup time. They comprise of the following parameters:

- the FNUR (Fixed Network User Rate) (optionally);
- the total AIUR (Air Interface User Rate) requested by the MS (for non-transparent HSCSD connections only);
- a list of the channel codings accepted by the MS;
- the maximum number of traffic channels accepted by the MS (this is noted in the channels requested field);

- the channel coding and the number of traffic channels actually used for the call.

In case the network or user initiated modification procedure takes place during the call, the AIUR requested, the channel coding used and the number of traffic channel requested/used might be recorded in the Change of HSCSD parameters field including the time at which the change occurred and which entity requested the change.

It should be noted that the Change of HSCSD Parameters field is optional and not required if partial records are generated when a Change of HSCSD Parameters takes place.

~~5.28~~[5.30](#) Incoming/ outgoing trunk group

The incoming trunk group describes the trunk on which the call originates as seen from the MSC. For mobile originated calls this will generally be a BSS trunk. Similarly, the outgoing trunk group describes the trunk on which the call leaves the MSC.

For 3G, this parameter may not be available. When available, this parameter shall be supplied in the CDRs.

~~5.29~~[5.31](#) Interrogation result

This field contains the result of the HLR interrogation attempt as defined in the MAP (TS 29.002 [5]).

NOTE: This field is only provided if the attempted interrogation was unsuccessful.

~~5.30~~[5.32](#) IMEI Check Event

This field identifies the type of event that caused the IMEI check to take place:

- Mobile originating call attempt;
- Mobile terminating call attempt;
- Mobile originating SMS;
- Mobile terminating SMS;
- Supplementary service actions performed by the subscriber;
- Location update.

~~5.31~~[5.33](#) IMEI Status

This field contains the result of the IMEI checking procedure:

- Greylisted;
- Blacklisted;
- Non-whitelisted.

[5.34](#) LCS Cause

[The LCS Cause parameter provides the reason for an unsuccessful location request according TS 49.031 \[31\].](#)

[5.35](#) LCS Client Identity

[This field contains further information on the LCS Client identity:](#)

- [Client External ID](#)

- [Client Dialed by MS ID](#)

- [Client Internal ID](#)

5.36 LCS Client Type

[This field contains the type of the LCS Client as defined in TS 29.002 \[5\]](#)

5.37 LCS Priority

[This parameter gives the priority of the location request as defined in TS 49.031 \[31\]](#)

5.38 LCS QoS

[This information element defines the Quality of Service for a location request as defined in TS 49.031 \[31\]](#)

~~5.32~~5.39 Level of CAMEL service

This field describes briefly the complexity of CAMEL invocation.

- 'Basic' means that CAMEL feature is invoked during the setup phase (e.g.: to modify the destination) of the call only.
- 'Online charging' means that CAMEL supported AoC parameter were sent to the mobile station (the Send Charging Information message, SCI, is received from the gsmSCF).
- The flag 'call duration supervision' is set whenever the call duration supervision is applied in the gsmSSF of the VPLMN (apply charging message is received from the gsmSCF).

~~5.33~~5.40 Location / change of location

The location field contains a combination of the location area code (LAC) and cell identity (CI) of the cell in which the served party is currently located. Any change of location may be recorded in the change of location field including the time at which the change took place.

The change of location field is optional and not required if partial records are generated when the location changes.

The LAC and CI are both 2 octet quantities and coded according to TS 24.008 [4].

5.41 Location Estimate

The Location Estimate field is providing an estimate of a geographic location of a target MS according to 3GPP TS 29.002 [5].

5.42 Location Type

This field contains the type of the location as defined in TS 29.002 [5].

5.43 Measure Duration

This field contains the duration for the section of the location measurement corresponding to the location request and the location report messages.

~~5.34~~5.44 Message reference

This field contains a unique message reference number allocated by the mobile station when transmitting a short message to the service centre. This field corresponds to the TP-Message-Reference element of the SMS_SUBMIT PDU defined in TS 23.040 [15].

5.45 MLC Number

This parameter refers to the ISDN (E.164) number of an MLC.

~~5.35~~5.46 Mobile station classmark / change of classmark

This MS classmark field contains the mobile station classmark employed by the served MS on call set-up as defined in TS 24.008 [4] (see mobile station classmark 2). Any alteration in the classmark during the connection may be recorded in the change of classmark field and will include the time at which the change took place.

It should be noted that the change of classmark field is optional and not required if partial records are created when the classmark is altered.

5.47 MOLR Type

[The MOLR-Type identifier refers to the type of MO-LR that was invoked as defined in 24.080 \[32\]](#)

~~5.36~~5.48 MSC Address

This field contains the ITU-T Recommendation E.164 [12] number assigned to the MSC that produced the record. For further details concerning the structure of MSC numbers see 3GPP TS 23.003 [2].

~~5.37~~5.49 MSC Server 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.

~~5.38~~5.50 Network Call Reference

Whenever CAMEL is applied, this field is used for correlation of call records outputted from the originating MSC (when applicable), the GMSC and the terminating MSC, and a network optional call record from the gsmSCF.

5.51 Notification to MS user

[This field contains the privacy notification to MS user that was applicable when the LR was invoked as defined in TS 29.002 \[5\]](#)

~~5.39~~5.52 Number of DP encountered

This field indicates how often CAMEL armed detection points (TDP and EDP) were encountered and is a measure of signalling between serving network and CAMEL service and complements 'Level of CAMEL service' field. Detection points from all applied CAMEL services for a single call leg and processed in the same gsmSSF shall be counted together.

~~5.40~~5.53 Number of forwarding

This field, if provided via ISUP signalling, contains the number of times a call has been forwarded prior to the interrogation of the HLR and is defined in TS 29.002 [5].

~~5.41~~5.54 Old /new location

These fields contain the location of a mobile subscriber before and after a location update. In case of VLR location update the location information consists of a VMSC number and location area code. In case of HLR location update the field contains the VMSC number and the VLR number.

5.55 Positioning Data

[This information element is providing positioning data associated with a successful or unsuccessful location attempt for a target MS according TS 49.031 \[31\].](#)

5.56 Privacy Override

[This parameter indicates if MS privacy is overridden by the LCS client when the GMLC and VMSC/SGSN for an MT-LR are in the same country as defined in TS 29.002 \[5\]](#)

~~5.42~~5.57 Radio channel requested / radio channel used / change of radio channel

The radio channel requested field contains the type of channel requested by the user. The following values are permitted:

- full rate;
- half rate;
- dual mode half rate preferred;
- dual mode full rate preferred.

The radio channel used field indicates the type of traffic channel actually employed for the connection i.e. either full rate (Bm) or half rate (Lm) as described in GSM 05.01. Any change in the type of channel used may be recorded in the change of radio channel used field including the time at which the change occurred and the speech version used after the change of radio channel.

~~5.43~~5.58 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.

~~5.44~~5.59 Record extensions

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

~~5.45~~5.60 Record type

The field identifies the type of the record e.g. mobile originated, mobile terminated etc.

~~5.46~~5.61 Recording Entity

This field contains the ITU-T E.164 [12] number assigned to the entity (MSC, VLR, HLR etc.) that produced the record. For further details concerning the structure of MSC and location register numbers see 3GPP TS 23.003 [2].

~~5.47~~5.62 Roaming number

The roaming number field of the MOC record contains the mobile station roaming number as defined in TS 23.003 [16] and coded according to TS 29.002 [5].

~~5.48~~5.63 Routing number

The routing number field of the HLR interrogation record contains either a mobile station roaming number or, in case of call forwarding, a forwarded-to number.

~~5.49~~5.64 Sequence number

This field contains a running sequence number employed to link the partial records generated for a particular connection (~~see clause 7.2.4~~).

~~5.50~~5.65 Served IMEI

This fields contains the international mobile equipment identity (IMEI) of the equipment served. The term "served" equipment is used to describe the ME involved in the transaction recorded e.g. the called ME in case of an MTC record.

The structure of the IMEI is defined in TS 23.003 [16].

~~5.51~~5.66 Served IMSI

This fields contains the international mobile subscriber identity (IMSI) of the served party. The term "served" party is used to describe the mobile subscriber involved in the transaction recorded e.g. the calling subscriber in case of an MOC record.

The structure of the IMSI is defined in TS 23.003 [16].

~~5.52~~5.67 Served MSISDN

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

The structure of the MSISDN is defined in TS 23.003 [16].

~~5.53~~5.68 Service centre address

This field contains a ITU-T Recommendation E.164 [12] number identifying a particular service centre e.g. short message service centre (see TS 23.040 [15]).

~~5.54~~5.69 Service key

This field identifies the CAMEL service logic applied. Service key is defined in HLR as part of CAMEL subscription information.

~~5.55~~5.70 Short message service result

This field contains the result of an attempt to deliver a short message either to a service centre or to a mobile subscriber (see TS 29.002 [5]). Note that this field is only provided if the attempted delivery was unsuccessful.

~~5.56~~5.71 Speech version supported / Speech version used

The speech version supported field contains the speech version supported by the MS with the highest priority. The speech version used field contains the speech codec version assigned for that call. The coding is according GSM 08.08 speech version identifier with the extension bit 8 set to 0.

It should be noted that the change of radio channel field is optional and not required if partial records are generated.

~~5.57~~5.72 System type

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.

~~5.58~~5.73 Supplementary service(s)

The supplementary service field in the Supplementary Service record type contains the code of the supplementary service on which the action was performed.

The supplementary services field in the MOC / MTC records contains the codes of the supplementary services invoked as a result of, or during, a connection.

The coding of supplementary service is described in detail in TS 29.002 [5].

~~5.59~~5.74 Supplementary service action

This field contains the type of supplementary service action requested by the subscriber or performed by the network. Possible values include:

- registration;
- erasure;
- activation;
- deactivation;
- interrogation;
- invocation.

For further details see TS 22.004 [19].

~~5.60~~5.75 Supplementary service action result

This field contains the result of an attempted supplementary service action (see TS 29.002 [5]). Note that this field is only provided if the SS-action was at least partially unsuccessful.

~~5.64~~5.76 Supplementary service parameters

This field contains the parameters associated with a supplementary service action requested by the subscriber. For further details of the parameters involved see the GSM 02.8n series of documents.

~~5.62~~5.77 Supplementary service(s)

The supplementary service field in the Supplementary Service record type contains the code of the supplementary service on which the action was performed.

The supplementary services field in the MOC / MTC records contains the codes of the supplementary services invoked as a result of, or during, a connection.

The coding of supplementary service is described in detail in 3GPP TS 29.002 [5].

5.635.78 Transparency indicator

This field indicates whether the basic service was employed in transparent or non-transparent mode. It should also be noted that this field is only relevant for those services which may be operated in both transparent and non-transparent modes.

5.645.79 Update result

This field contains the result of the location update request as defined in the MAP (TS 29.002 [5]). Note that this field is only provided if the attempted update was unsuccessful.

6 Charging Data Record Structure

6.1 ASN.1 definitions for CDR information

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

```
TS32205-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) umts-Operation-
Maintenance (3) ts-32-205 (205) informationModel (0) 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) gsm-Network (1)
modules (3) map-CH-DataTypes (13) version6 (6) }
```

```
AddressString, ISDN-AddressString, BasicServiceCode, IMSI, IMEI, LCSClientExternalID,
LCSClientInternalID
```

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

```
DestinationRoutingAddress
```

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

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

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

```
MOLR-Type
```

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

```
BearerServiceCode
```

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

```
TeleserviceCode
```

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

```
SS-Code
```

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

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

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

```
BasicService
FROM Basic-Service-Elements { ccitt identified-organization (4) etsi (0)
196 basic-service-elements (8) }
--
-- See "Digital Subscriber Signalling System No. one (DSS1) protocol"
-- ETS 300 196
--
```

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

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

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

```
SGSNPDPreRecord, GGSNPDPreRecord, SGSNMMRecord, SGSNSMORRecord, SGSNSMTRecord, SGSNMTLCSRecord,
SGSNMOLCSRecord, SGSNNILCSRecord
FROM TS32215-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-215 (215) informationModel (0) asn1Module (2) version1 (1)}
```

```
MMO1SRecord, MMO4FRqRecord, MMO4FRsRecord, MMO4DRecord, MMO1DRecord, MMO4RRecord, MMO1RRecord,
MMOMDRecord, MMR4FRecord, MMR1NRqRecord, MMR1NRsRecord, MMR1RtRqRecord, MMR1RtRsRecord, MMR1ARecord,
MMR4DRqRecord, MMR4DRsRecord, MMR1RRRecord, MMR4RRqRecord, MMR4RRsRecord, MMRMDRecord, MMFRRecord
FROM TS32235-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-235 (235) informationModel (0) asn1Module (2) version1 (1)}
```

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

```
-----
-- CALL AND EVENT RECORDS
--
-----
```

```
CallEventRecord ::= CHOICE
--
-- Record values 0..160.19 are 3G curcuit switch specific
-- 20..27 are 3G packet switch specific
-- 30..50 are application specific
```

```
{
  moCallRecord [0] MOCallRecord,
  mtCallRecord [1] MTCallRecord,
  roamingRecord [2] RoamingRecord,
  incGatewayRecord [3] IncGatewayRecord,
  outGatewayRecord [4] OutGatewayRecord,
  transitRecord [5] TransitCallRecord,
  moSMSRecord [6] MOSMSRecord,
  mtSMSRecord [7] MTSMSRecord,
  moSMSIWRecord [8] MOSMSIWRecord,
  mtSMSGWRecord [9] MTSMSGWRecord,
  ssActionRecord [10] SSActionRecord,
  hlrIntRecord [11] HLRIntRecord,
  locUpdateHLRRecord [12] LocUpdateHLRRecord,
  locUpdateVLRRecord [13] LocUpdateVLRRecord,
  commonEquipRecord [14] CommonEquipRecord,
  recTypeExtensions [15] ManagementExtensions,
  termCAMELRecord [16] TermCAMELRecord,
  mtLCSRecord [17] MTLCSRecord,
  moLCSRecord [18] MOLCSRecord,
```

```

nilCSRecord          [19] NILCSRecord,

sgsnPDPRecord        [20] SGSNPDPRecord,
ggsnPDPRecord        [21] GGSNPDPRecord,
sgsnMMRecord         [22] SGSNMMRecord,
sgsnSMORecord        [23] SGSNSMORecord,
sgsnSMTRRecord       [24] SGSNSMTRRecord,
sgsnLCRRecord        [25] SGSNLCRRecord,

sgsnLCORRecord       [26] SGSNLCORRecord,
sgsnLCNRecord        [27] SGSNLCNRecord,

mmO1SRecord          [30] MMO1SRecord,
mmO4FRqRecord        [31] MMO4FRqRecord,
mmO4FRsRecord        [32] MMO4FRsRecord,
mmO4DRecord          [33] MMO4DRecord,
mmO1DRecord          [34] MMO1DRecord,
mmO4RRecord          [35] MMO4RRecord,
mmO1RRecord          [36] MMO1RRecord,
mmOMDRecord          [37] MMOMDRecord,
mmR4FRecord          [38] MMR4FRecord,
mmR1NRqRecord        [38] MMR1NRqRecord,
mmR1NRsRecord        [40] MMR1NRsRecord,
mmR1RtRqRecord       [41] MMR1RtRqRecord,
mmR1RtRsRecord       [42] MMR1RtRsRecord,
mmR1AFRecord         [43] MMR1ARecord,
mmR4DRqRecord        [44] MMR4DRqRecord,
mmR4DRsRecord        [45] MMR4DRsRecord,
mmR1RRRecord         [46] MMR1RRRecord,
mmR4RRqRecord        [47] MMR4RRqRecord,
mmR4RRsRecord        [48] MMR4RRsRecord,
mmRMDRecord          [49] MMRMDRecord,
mmFRecord            [50] MMFRecord
}

```

...

```

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

```

```

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

```

```

MOLCSRecord ::= SET
{
  recordType          [0] CallEventRecordType,
  recordingEntity     [1] RecordingEntity,
  lcsClientType       [2] LCSClientType OPTIONAL,
  lcsClientIdentity   [3] LCSClientIdentity OPTIONAL,
  servedIMSI          [4] IMSI,

```

```

    servedMSISDN      [5] MSISDN OPTIONAL,
    molr-Type         [6] MOLR-Type,
    lcsQos            [7] LCSQoSInfo OPTIONAL,
    lcsPriority       [8] LCS-Priority OPTIONAL,
    mlc-Number       [9] ISDN-AddressString OPTIONAL,
    eventTimeStamp   [10] TimeStamp,
    measureDuration  [11] CallDuration OPTIONAL,
    location         [12] LocationAreaAndCell OPTIONAL,
    locationEstimate [13] Ext-GeographicalInformation OPTIONAL,
    positioningData  [14] PositioningData OPTIONAL,
    lcsCause        [15] LCSCause OPTIONAL,
    diagnostics     [16] Diagnostics OPTIONAL,
    systemType      [17] SystemType OPTIONAL,
    recordExtensions [18] ManagementExtensions OPTIONAL,
    causeForTerm    [19] CauseForTerm
}

```

NILCSRecord ::= SET

```

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

```

...

CallEventRecordType ::= INTEGER

```

{
    moCallRecord      (0),
    mtCallRecord      (1),
    roamingRecord     (2),
    incGatewayRecord  (3),
    outGatewayRecord  (4),
    transitCallRecord (5),
    moSMSRecord       (6),
    mtSMSRecord       (7),
    moSMSIWRRecord    (8),
    mtSMSGWRRecord    (9),
    ssActionRecord    (10),
    hlrIntRecord      (11),
    locUpdateHLRRecord (12),
    locUpdateVLRRecord (13),
    commonEquipRecord (14),
    moTraceRecord     (15),
    mtTraceRecord     (16),
    termCAMELRecord   (17),
    --
    -- Record values 18..22 are GPRS specific.
    -- The contents are defined in TS 32.015
    --
    sgsnPDPRecord     (18),
    ggsnPDPRecord     (19),
    sgsnMMRecord      (20),
    sgsnSMORecord     (21),
    sgsnSMTRRecord    (22),

```

-- Record values 23..25 are CS-LCS specific.

```

Record values 23..24 are MMS specific.
-- The contents are defined in TS 32.235this specification
--
mmsORecord (23),
mmsTRecord (24)
mtLCSRecord (23),
moLCSRecord (24),
niLCSRecord (25),
--
-- Record values 26..28 are PS-LCS specific.
-- The contents are defined in TS 32.215
--
sgsnMtLCSRecord (26)
sgsnMoLCSRecord (27),
sgsnNiLCSRecord (28),
--
}

...

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

...

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

...

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

LCSCClientIdentity ::= SEQUENCE
{
  lcsClientExternalID [0] LCSCClientExternalID OPTIONAL,

```

```
| lcsClientDialedByMS [1] AddressString OPTIONAL,  
| lcsClientInternalID [2] LCSCClientInternalID OPTIONAL  
| ]  
  
| LCSQoSInfo ::= OCTET STRING (SIZE(4))  
| --  
| -- See LCS QoS IE, 3GPP TS 49.031  
| --
```

```
...  
END
```

CHANGE REQUEST

32.205 CR 009 # rev **-** # Current version: **5.1.0**

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

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

| | | | |
|------------------------|---|-----------------|---|
| Title: | # Corrections on LCS error cause definitions | | |
| Source: | # SA5 | | |
| Work item code: | # OAM-CH | Date: | # 11/10/2002 |
| Category: | # A | Release: | # Rel-5 |
| | <i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 . | | <i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) |

| | |
|--------------------------------------|---|
| Reason for change: | # The currently existing LCS cause and the belonging diagnostics parameter do not indicate all reasons for service termination. |
| Summary of change: | # The parameter Cause For Termination is included in the LCS CDRs and related to the diagnosis parameter instead of to the LCS Cause parameter. |
| Consequences if not approved: | # Errors in the Billing System occur because not all possible reasons for service interrupt could be indicated in the LCS CDRs. |

| | | | | | | | | | |
|-------------------------------------|-------------------------------------|---|---|---|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--|
| Clauses affected: | # 4.20, 4.21, 4.22, 5.13 and 6 | | | | | | | | |
| Other specs affected: | # | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input type="checkbox"/></td> </tr> </table> | Y | N | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Other core specifications # Test specifications # O&M Specifications # |
| | Y | N | | | | | | | |
| | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | | | | | |
| | | Rel-4 32.205, Rel-4/5 32.215. | | | | | | | |
| Other comments: | # Rel-5 Mirror of 32.205CR008. | | | | | | | | |

4.20 Mobile terminated location request (MT-LR)

If enabled, an LCS-MT record shall be produced, within the visited MSC, for each mobile a terminated location request is performed for.

Table 20: LCS-MT record

| Field | 2G | 3G | Description |
|---------------------------------------|---------------------|---------------------|--|
| Record Type | M | M | LCS-MT record. |
| Recording Entity | M | M | The E.164 number of the visited MSC producing the record. |
| LCS Client Type | M | M | The type of the LCS client that invoked the LR. |
| LCS Client Identity | M | M | Further identification of the LCS client . |
| Served IMSI | M | M | The IMSI of the subscriber the LR is invoked for. |
| Served MSISDN | O _M | O _M | The MSISDN of the subscriber the LR is invoked for. |
| Location Type | M | M | The type of the location request. |
| LCS QoS | C | C | QoS of the LR, if available. |
| LCS Priority | C | C | Priority of the LR, if available. |
| MLC Number | M | M | The E.164 address of the requesting GMLC. |
| Event Time Stamp | M | M | The time at which the LR was received by the MSC. |
| MeasureDuration | O _M | O _M | The duration of proceeding the location request . |
| Notification To MS User | C | C | The privacy notification to MS user that was applicable when the LR was invoked, if available. |
| Privacy Override | C | C | This parameter indicates if MS privacy was overridden by the LCS client, if available. |
| Location | O _M | - | The LAC and CI when the LR is received. |
| Location Estimate | O _C | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | C | The positioning method used or attempted, if available. |
| LCS Cause | O _C E | O _C E | The result of the LR if any failure or partial success happened as known at the radio interface. |
| Cause for Termination | M | M | The reason for the termination of the location service. |
| Diagnostics | C | C | A more detailed information about the LCS cause Cause for Termination if any failure or partial success happened. |
| System Type | - | M | This field indicates the use of GERAN or UTRAN at the time of the LCS request. This field is present when either the UTRAN or GERAN air-interface is used on call setup. |
| Record extensions | O _C | O _C | A set of network/ manufacturer specific extensions to the record. |

4.21 Mobile originated location request (MO-LR)

If enabled, an LCS-MO record shall be produced, within the visited MSC, for each mobile an originated location request is performed for.

Table 21: LCS-MO record

| Field | 2G | 3G | Description |
|---------------------|----------------|----------------|---|
| Record Type | M | M | LCS-MO record. |
| Recording Entity | M | M | The E.164 number of the visited MSC producing the record. |
| LCS Client Type | C | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | C | Further identification of the LCS client, if available. |
| Served IMSI | M | M | The IMSI of the subscriber the LR is invoked for. |
| Served MSISDN | O _M | O _M | The MSISDN of the subscriber the LR is invoked for. |
| MOLR Type | M | M | The type of the LR. |
| LCS QoS | C | C | QoS of the LR, if available. |
| LCS Priority | O _C | O _C | Priority of the LR, if available. |
| MLC Number | C | C | The E.164 address of the involved GMLC, if available. |
| Event Time Stamp | M | M | The time at which the LR was received by the MSC. |
| MeasureDuration | O _M | O _M | The duration of proceeding the location request . |
| Location Estimate | O _C | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | C | The positioning method used or attempted, if available. |

| Field | 2G | 3G | Description |
|---------------------------------------|----------------|----------------|--|
| LCS Cause | C | C | The result of the LR if any failure or partial success happened as known at the radio interface . |
| Cause for Termination | M | M | The reason for the termination of the location service . |
| Diagnostics | C | C | A more detailed information about the Cause for Termination LCS cause if any failure or partial success happened. |
| System Type | - | M | This field indicates the use of GERAN or UTRAN at the time of the LCS request. This field is present when either the UTRAN or GERAN air-interface is used on call setup. |
| Record extensions | O _C | O _C | A set of network/ manufacturer specific extensions to the record. |

4.22 Network induced location request (NI-LR)

If enabled, an LCS-NI record shall be produced, within the visited MSC, for each network induced location request performed for a MS e.g. in case of emergency call.

Table 22: LCS-NI record

| Field | 2G | 3G | Description |
|---------------------------------------|----------------|----------------|--|
| Record Type | M | M | LCS-NI record. |
| Recording Entity | M | M | The E.164 number of the visited MSC producing the record. |
| LCS Client Type | C | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | C | Further identification of the LCS client, if available. |
| Served IMSI | C | C | The IMSI of the calling party the LR is executed for if supplied by the UE. |
| Served MSISDN | C | C | The MSISDN of the calling party the LR is executed for if supplied by the UE. |
| Served IMEI | C | C | The IMEI of the calling party the LR is executed for if available. |
| EMS-Digits | O _C | O _C | The emergency service routing digits, if emergency call. |
| EMS-Key | O _C | O _C | The emergency service routing key, if emergency call. |
| LCS QoS | C | C | QoS of the LR, if available. |
| LCS Priority | C | C | Priority of the LR, if available. |
| MLC Number | C | C | The E.164 address of the involved GMLC, if available. |
| Event Time Stamp | M | M | The time at which the LR was received by the MSC. |
| MeasureDuration | O _M | O _M | The duration of proceeding the location request . |
| Location Estimate | O _C | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | C | The positioning method used or attempted, if available. |
| LCS Cause | C | C | The result of the LR if any failure or partial success happened as known at the radio interface . |
| Cause for Termination | M | M | The reason for the termination of the location service . |
| Diagnostics | C | C | A more detailed information about the Cause for Termination LCS cause if any failure or partial success happened. |
| System Type | - | M | This field indicates the use of GERAN or UTRAN at the time of the LCS request. This field is present when either the UTRAN or GERAN air-interface is used on call setup. |
| Record extensions | O _C | O _C | A set of network/ manufacturer specific extensions to the record. |

...

5.13 Cause for termination

This field contains a generalised reason for the release of the connection [or for the termination of the location service](#) including the following:

- normal release;
- CAMEL initiated call release;
- partial record generation;
- partial record call re-establishment;

- unsuccessful call attempt;
- ~~abnormal termination during the stable phase;~~
- unauthorized network originating a location service request;
- unauthorized client requesting a location service;
- position method failure at a location service execution;
- unknown or unreachable LCS client at a location service request.

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

...

6 Charging Data Record Structure

6.1 ASN.1 definitions for CDR information

...

```
-----
--
-- LOCATION SERVICE TICKETS
--
-----
```

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

```
MOLCSRecord ::= SET
{
  recordType           [0] CallEventRecordType,
  recordingEntity      [1] RecordingEntity,
  lcsClientType        [2] LCSClientType OPTIONAL,
  lcsClientIdentity    [3] LCSClientIdentity OPTIONAL,
  servedIMSI           [4] IMSI,
  servedMSISDN         [5] MSISDN OPTIONAL,
  molr-Type            [6] MOLR-Type,
  lcsQos               [7] LCSQoSInfo OPTIONAL,
  lcsPriority           [8] LCS-Priority OPTIONAL,
  mlc-Number           [9] ISDN-AddressString OPTIONAL,
  eventTimeStamp       [10] TimeStamp,
  measureDuration      [11] CallDuration OPTIONAL,
  location             [12] LocationAreaAndCell OPTIONAL,
  locationEstimate     [13] Ext-GeographicalInformation OPTIONAL,
  positioningData      [14] PositioningData OPTIONAL,
```

```

    lcsCause          [15] LCSCause OPTIONAL,
    diagnostics       [16] Diagnostics OPTIONAL,
    systemType        [17] SystemType OPTIONAL,
    recordExtensions  [18] ManagementExtensions OPTIONAL,
    causeForTerm      [19] CauseForTerm
}

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

...

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

...

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

```

```
| unauthorizedLCSCClientCause [6] UnauthorizedLCSCClient-Diagnostic  
| -- see TS 29.002  
| }
```

CHANGE REQUEST

32.215 CR 020 # rev **-** # Current version: **4.3.0**

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

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

| | | | |
|------------------------|---|-----------------|---|
| Title: | # Corrections on LCS error cause definitions | | |
| Source: | # SA5 | | |
| Work item code: | # OAM-CH | Date: | # 11/10/2002 |
| Category: | # F | Release: | # Rel-4 |
| | <i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 . | | <i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) |

| | |
|--------------------------------------|---|
| Reason for change: | # The currently existing LCS cause and the belonging diagnostics parameter do not indicate all reasons for service termination. |
| Summary of change: | # The parameter Cause For Record Closing is included in the LCS CDRs and related to the diagnostic parameter instead of to the LCS Cause parameter. |
| Consequences if not approved: | # Errors in the Billing System occur because not all possible reasons for service interrupt could be indicated in the LCS CDRs. |

| | | | | | | | | |
|-------------------------------------|-------------------------------------|--|---------------------------------|---|-------------------------------------|--------------------------|---------------------------|---|
| Clauses affected: | # 4.7, 4.8, 4.9, 5.4 and 6 | | | | | | | |
| Other specs affected: | # | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Y</td> <td style="padding: 2px 5px;">N</td> </tr> <tr> <td style="padding: 2px 5px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px 5px;"><input type="checkbox"/></td> </tr> </table> | Y | N | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Other core specifications | # |
| | Y | N | | | | | | |
| | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | | | |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Test specifications | # | | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | O&M Specifications | # Rel-4/5 32.205, Rel-5 32.215, | | | | | |
| Other comments: | # Rel-5 Mirror in 32.215CR021. | | | | | | | |

4.7 Mobile terminated location request (LCS-MT-CDR)

If enabled, an SGSN Mobile terminated LCS record shall be produced for each mobile a terminated location request is performed via the SGSN. The fields in the record are specified in table 6. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in clause 5.

Table 6: SGSN Mobile terminated LCS record (SGSN-LCS-MT)

| Field | Category | Description |
|--|-----------------------------|--|
| Record Type | M | SGSN Mobile Terminated LCS. |
| Recording Entity | M | The E.164 number of the SGSN. |
| LCS Client Type | M | The type of the LCS client that invoked the LR. |
| LCS Client Identity | M | Further identification of the LCS client. |
| Served IMSI | M | The IMSI of the subscriber. |
| Served MSISDN | O _M | The primary MSISDN of the subscriber. |
| SGSN Address | O _M | The IP address of the current SGSN. |
| Location Type | M | The type of the estimated location. |
| LCS QoS | C | QoS of the LR, if available. |
| LCS Priority | C | Priority of the LR, if available |
| MLC Number | M | The E.164 address of the requesting GMLC |
| Event Time stamp | M | The time at which the Perform_Location_Request is sent by the SGSN. |
| Measurement Duration | O _M | The duration of proceeding the location request. |
| Notification To MS User | C | The privacy notification to MS user that was applicable when the LR was invoked, if available. |
| Privacy Override | C | This parameter indicates the override MS privacy by the LCS client, if available. |
| Location | O _M | The LAC and CI when the LR is received. |
| Routing Area Code | O _M | The Routing Area Code to which the LCS terminated. |
| Location Estimate | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | The positioning method used or attempted, if available. |
| LCS Cause | O _C C | The result of the LR if any failure or partial success happened as known at radio interface . |
| Cause for Record Closing | M | The reason for closure of the record from this SGSN. |
| Diagnostics | C | A more detailed information about the Cause for Record Closing LCS cause if any failure or partial success happened. |
| Node ID | O _M | Name of the recording entity. |
| Local Record Sequence Number | O _M | Consecutive record number created by this node. The number is allocated sequentially including all CDR types. |
| Charging Characteristics | M | The Charging Characteristics used by the SGSN. (always use the subscribed CC) |
| Charging Characteristics Selection Mode | O _M | Holds information about how Charging Characteristics were selected. (only subscribed/home default/visited default) |
| System Type | O _C | Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. |
| Record Extensions | O _C | A set of network operator/manufacture specific extensions to the record. Conditioned upon the existence of an extension. |

4.8 Mobile originated location request (LCS-MO-CDR)

If enabled, an SGSN Mobile originated LCS record shall be produced for each mobile a originated location request is performed via the SGSN. The fields in the record are specified in table 7. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in clause 5.

Table 7: SGSN Mobile originated LCS record (SGSN-LCS-MO)

| Field | Category | Description |
|--|----------------|--|
| Record Type | M | SGSN Mobile Originated LCS. |
| Recording Entity | M | The E.164 number of the SGSN. |
| LCS Client Type | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | Further identification of the LCS client, if available. |
| Served IMSI | M | The IMSI of the subscriber. |
| Served MSISDN | O _M | The primary MSISDN of the subscriber. |
| SGSN Address | O _M | The IP address of the current SGSN. |
| Location Method | M | The type of the location request. |
| LCS QoS | C | QoS of the LR, if available. |
| LCS Priority | O _c | Priority of the LR, if available |
| MLC Number | C | The E.164 address of the involved GMLC, if applicable. |
| Event Time stamp | M | The time at which the Perform_Location_Request is sent by the SGSN. |
| Measurement Duration | O _M | The duration of proceeding the location request. |
| Location | O _M | The LAC and CI when the LR is received. |
| Routing Area Code | O _M | The Routing Area Code from which the LCS originated. |
| Location Estimate | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | The positioning method used or attempted, if available. |
| LCS Cause | C | The result of the LR if any failure or partial success happened as known at radio interface . |
| Cause for Record Closing | M | The reason for closure of the record from this SGSN. |
| Diagnostics | C | A more detailed information about the Cause for Record Closing LCS cause if any failure or partial success happened. |
| Node ID | O _M | Name of the recording entity. |
| Local Record Sequence Number | O _M | Consecutive record number created by this node. The number is allocated sequentially including all CDR types. |
| Charging Characteristics | M | The Charging Characteristics flag set used by the SGSN. |
| Charging Characteristics Selection Mode | O _M | Holds information about how Charging Characteristics were selected. |
| System Type | O _C | Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. |
| Record Extensions | O _C | A set of network operator/manufacturer specific extensions to the record. Conditioned upon the existence of an extension. |

4.9 Network induced location request (LCS-NI-CDR)

If enabled, an SGSN Network induced LCS record shall be produced for each mobile a network induced location request is performed via the SGSN. The fields in the record are specified in table 8. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in clause 5.

Table 8: SGSN Network induced LCS record (SGSN-LCS-NI)

| Field | Category | Description |
|--|----------------|--|
| Record Type | M | SGSN Network Induced LCS. |
| Recording Entity | M | The E.164 number of the SGSN. |
| LCS Client Type | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | Further identification of the LCS client, if available. |
| Served IMSI | C | The IMSI of the subscriber if supplied. |
| Served MSISDN | C | The primary MSISDN of the subscriber if supplied. |
| SGSN Address | O _M | The IP address of the current SGSN. |
| Served IMEI | O _C | The IMEI of the ME, if available. |
| LCS QoS | C | QoS of the LR, if available. |
| LCS Priority | C | Priority of the LR, if available |
| MLC Number | C | The E.164 address of the involved GMLC, if applicable. |
| Event Time stamp | M | The time at which the Perform_Location_Request is sent by the SGSN. |
| Measurement Duration | O _M | The duration of proceeding the location request. |
| Location | O _M | The LAC and CI when the LR is received. |
| Routing Area Code | O _M | The Routing Area Code from which the LCS originated. |
| Location Estimate | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | The positioning method used or attempted, if available. |
| LCS Cause | C | The result of the LR if any failure or partial success happened as known at radio interface . |
| Cause for Record Closing | M | The reason for closure of the record from this SGSN. |
| Diagnostics | C | A more detailed information about the Cause for Record Closing LCS cause if any failure or partial success happened. |
| Node ID | O _M | Name of the recording entity. |
| Local Record Sequence Number | O _M | Consecutive record number created by this node. The number is allocated sequentially including all CDR types. |
| Charging Characteristics | M | The Charging Characteristics flag set used by the SGSN. |
| Charging Characteristics Selection Mode | O _M | Holds information about how Charging Characteristics were selected. |
| System Type | O _C | Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. |
| Record Extensions | O _C | A set of network operator/manufacturer specific extensions to the record. Conditioned upon the existence of an extension. |

...

5.4 Cause for Record Closing

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

- normal release: PDP context release (end of context or SGSN change) or GPRS detach;
- partial record generation: data volume limit, time (duration) limit, maximum number of changes in charging conditions or intra SGSN intersystem change (change of radio interface from GSM to UMTS or vice versa);
- abnormal termination (PDP or MM context);
- [unauthorized network originating a location service request](#);
- [unauthorized client requesting a location service](#);
- [position method failure at a location service execution](#);
- [unknown or unreachable LCS client at a location service request](#);
- management intervention (request due to O&M reasons).

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

...

6 Charging Data Record Structure

6.1 ASN.1 definitions for CDR information

...

```

SGSNMMLCSRecord ::= SET
{
    recordType          [0] CallEventRecordType,
    recordingEntity     [1] RecordingEntity,
    lcsClientType       [2] LCSClientType,
    lcsClientIdentity   [3] LCSClientIdentity,
    servedIMSI         [4] IMSI,
    servedMSISDN        [5] MSISDN OPTIONAL,
    sgsnAddress         [6] GSNAddress OPTIONAL,
    locationType        [7] LocationType,
    lcsQos              [8] LCSQoSInfo OPTIONAL,
    lcsPriority          [9] LCS-Priority OPTIONAL,
    mlcNumber           [10] ISDN-AddressString,
    eventTimeStamp      [11] TimeStamp,
    measurementDuration [12] CallDuration OPTIONAL,
    notificationToMSUser [13] NotificationToMSUser OPTIONAL,
    privacyOverride     [14] NULL OPTIONAL,
    location            [15] LocationAreaAndCell OPTIONAL,
    routingArea         [16] RoutingAreaCode OPTIONAL,
    locationEstimate    [17] Ext-GeographicalInformation OPTIONAL,
    positioningData     [18] PositioningData OPTIONAL,
    lcsCause            [19] LCSCause OPTIONAL,
    diagnostics         [20] Diagnostics OPTIONAL,
    nodeID              [21] NodeID OPTIONAL,
    localSequenceNumber [22] LocalSequenceNumber OPTIONAL,
    chargingCharacteristics [23] ChargingCharacteristics,
    chChSelectionMode  [24] ChChSelectionMode OPTIONAL,
    systemType          [25] SystemType OPTIONAL,
    recordExtensions    [26] ManagementExtensions OPTIONAL,
    causeForRecClosing [27] CauseForRecClosing
}

SGSNMOLCSRecord ::= SET
{
    recordType          [0] CallEventRecordType,
    recordingEntity     [1] RecordingEntity,
    lcsClientType       [2] LCSClientType OPTIONAL,
    lcsClientIdentity   [3] LCSClientIdentity OPTIONAL,
    servedIMSI         [4] IMSI,
    servedMSISDN        [5] MSISDN OPTIONAL,
    sgsnAddress         [6] GSNAddress OPTIONAL,
    locationMethod      [7] LocationMethod,
    lcsQos              [8] LCSQoSInfo OPTIONAL,
    lcsPriority          [9] LCS-Priority OPTIONAL,
    mlcNumber           [10] ISDN-AddressString OPTIONAL,
    eventTimeStamp      [11] TimeStamp,
    measurementDuration [12] CallDuration OPTIONAL,
    location            [13] LocationAreaAndCell OPTIONAL,
    routingArea         [14] RoutingAreaCode OPTIONAL,
    locationEstimate    [15] Ext-GeographicalInformation OPTIONAL,
    positioningData     [16] PositioningData OPTIONAL,
    lcsCause            [17] LCSCause OPTIONAL,
    diagnostics         [18] Diagnostics OPTIONAL,
    nodeID              [19] NodeID OPTIONAL,
    localSequenceNumber [20] LocalSequenceNumber OPTIONAL,
    chargingCharacteristics [21] ChargingCharacteristics,
    chChSelectionMode  [22] ChChSelectionMode OPTIONAL,
    systemType          [23] SystemType OPTIONAL,
    recordExtensions    [24] ManagementExtensions OPTIONAL,
    causeForRecClosing [25] CauseForRecClosing
}

SGSNNILCSRecord ::= SET
{
    recordType          [0] CallEventRecordType,
    recordingEntity     [1] RecordingEntity,

```

```

lcsClientType          [2] LCSCClientType OPTIONAL,
lcsClientIdentity     [3] LCSCClientIdentity OPTIONAL,
servedIMSI            [4] IMSI OPTIONAL,
servedMSISDN          [5] MSISDN OPTIONAL,
sgsnAddress            [6] GSNAddress OPTIONAL,
servedIMEI            [7] IMEI OPTIONAL,
lcsQos                [8] LCSQoSInfo OPTIONAL,
lcsPriority            [9] LCS-Priority OPTIONAL,
mlcNumber             [10] ISDN-AddressString OPTIONAL,
eventTimeStamp         [11] TimeStamp,
measurementDuration   [12] CallDuration OPTIONAL,
location              [13] LocationAreaAndCell OPTIONAL,
routingArea           [14] RoutingAreaCode OPTIONAL,
locationEstimate      [15] Ext-GeographicalInformation OPTIONAL,
positioningData       [16] PositioningData OPTIONAL,
lcsCause              [17] LCSCause OPTIONAL,
diagnostics           [18] Diagnostics OPTIONAL,
nodeID                [19] NodeID OPTIONAL,
localSequenceNumber   [20] LocalSequenceNumber OPTIONAL,
chargingCharacteristics [21] ChargingCharacteristics,
chChSelectionMode    [22] ChChSelectionMode OPTIONAL,
systemType            [23] SystemType OPTIONAL,
recordExtensions      [24] ManagementExtensions OPTIONAL,
causeForRecClosing    [25] CauseForRecClosing
}

```

...

```
CauseForRecClosing ::= INTEGER
```

```

{
  --
  -- In GGSN the value SGSNChange should be used for partial record
  -- generation due to SGSN Address List Overflow
  --
  -- cause codes 0 to 15 are defined in TS 32.205 as 'CauseForTerm' (cause for termination)
  -- LCS related causes belong to the MAP error causes acc. TS 29.002
  --
  normalRelease          _____ (0),
  abnormalRelease       _____ (4),
  cAMELInitCallRelease  _____ (5),
  volumeLimit           _____ (16),
  timeLimit             _____ (17),
  sGSNChange            _____ (18),
  maxChangeCond         _____ (19),
  managementIntervention _____ (20),
  intraSGSNIntersystemChange _____ (21),
  unauthorizedRequestingNetwork _____ (52),
  unauthorizedLCSCClient          _____ (53),
  positionMethodFailure          _____ (54),
  unknownOrUnreachableLCSCClient _____ (58)
}

```

...

```
END
```

CHANGE REQUEST

32.215 CR 021 # rev - # Current version: 5.1.0

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

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

| | | | |
|------------------------|---|-----------------|---|
| Title: | # Corrections on LCS error cause definitions | | |
| Source: | # SA5 | | |
| Work item code: | # OAM-CH | Date: | # 11/10/2002 |
| Category: | # A | Release: | # Rel-5 |
| | <i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 . | | <i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) |

| | |
|--------------------------------------|---|
| Reason for change: | # The currently existing LCS cause and the belonging diagnostics parameter do not indicate all reasons for service termination. |
| Summary of change: | # The parameter Cause For Record Closing is included in the LCS CDRs and related to the diagnostic parameter instead of to the LCS Cause parameter. |
| Consequences if not approved: | # Errors in the Billing System occur because not all possible reasons for service interrupt could be indicated in the LCS CDRs. |

| | | | | | | | | | | | | |
|-------------------------------------|-------------------------------------|--|---------------------------------|---|--------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|---------------------------|---|
| Clauses affected: | # 4.7, 4.8, 4.9, 5.4 and 6 | | | | | | | | | | | |
| Other specs affected: | # | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Y</td> <td style="padding: 2px 5px;">N</td> </tr> <tr> <td style="padding: 2px 5px;"><input type="checkbox"/></td> <td style="padding: 2px 5px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px 5px;"><input type="checkbox"/></td> <td style="padding: 2px 5px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px 5px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px 5px;"><input type="checkbox"/></td> </tr> </table> | Y | N | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Other core specifications | # |
| | Y | N | | | | | | | | | | |
| | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | |
| | | Test specifications | | | | | | | | | | |
| | | O&M Specifications | # Rel-4/5 32.205, Rel-4 32.215, | | | | | | | | | |
| Other comments: | # Rel-5 Mirror of 32.215CR020. | | | | | | | | | | | |

4.7 Mobile terminated location request (LCS-MT-CDR)

If enabled, an SGSN Mobile terminated LCS record shall be produced for each mobile a terminated location request is performed via the SGSN. The fields in the record are specified in Table 6. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in Clause 5.

Table 6: SGSN Mobile terminated LCS record (SGSN-LCS-MT)

| Field | Category | Description |
|--|------------------|--|
| Record Type | M | SGSN Mobile Terminated LCS. |
| Recording Entity | M | The E.164 number of the SGSN. |
| LCS Client Type | M | The type of the LCS client that invoked the LR. |
| LCS Client Identity | M | Further identification of the LCS client. |
| Served IMSI | M | The IMSI of the subscriber. |
| Served MSISDN | O _M | The primary MSISDN of the subscriber. |
| SGSN Address | O _M | The IP address of the current SGSN. |
| Location Type | M | The type of the estimated location. |
| LCS QoS | C | QoS of the LR, if available. |
| LCS Priority | C | Priority of the LR, if available |
| MLC Number | M | The E.164 address of the requesting GMLC |
| Event Time stamp | M | The time at which the Perform_Location_Request is sent by the SGSN. |
| Measurement Duration | O _M | The duration of proceeding the location request. |
| Notification To MS User | C | The privacy notification to MS user that was applicable when the LR was invoked, if available. |
| Privacy Override | C | This parameter indicates the override MS privacy by the LCS client, if available. |
| Location | O _M | The LAC and CI when the LR is received. |
| Routing Area Code | O _M | The Routing Area Code to which the LCS terminated. |
| Location Estimate | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | The positioning method used or attempted, if available. |
| LCS Cause | O _C E | The result of the LR if any failure or partial success happened as known at radio interface . |
| Cause for Record Closing | M | The reason for closure of the record from this SGSN. |
| Diagnostics | C | A more detailed information about the Cause for Record Closing LCS cause if any failure or partial success happened. |
| Node ID | O _M | Name of the recording entity. |
| Local Record Sequence Number | O _M | Consecutive record number created by this node. The number is allocated sequentially including all CDR types. |
| Charging Characteristics | M | The Charging Characteristics used by the SGSN. (always use the subscribed CC) |
| Charging Characteristics Selection Mode | O _M | Holds information about how Charging Characteristics were selected. (only subscribed/home default/visited default) |
| System Type | O _C | Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. |
| Record Extensions | O _C | A set of network operator/manufacture specific extensions to the record. Conditioned upon the existence of an extension. |

4.8 Mobile originated location request (LCS-MO-CDR)

If enabled, an SGSN Mobile originated LCS record shall be produced for each mobile a originated location request is performed via the SGSN. The fields in the record are specified in Table 7. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in Clause 5.

Table 7: SGSN Mobile originated LCS record (SGSN-LCS-MO)

| Field | Category | Description |
|------------------|----------|---|
| Record Type | M | SGSN Mobile Originated LCS. |
| Recording Entity | M | The E.164 number of the SGSN. |
| LCS Client Type | C | The type of the LCS client that invoked the LR, if available. |

| Field | Category | Description |
|--|------------------|--|
| LCS Client Identity | C | Further identification of the LCS client, if available. |
| Served IMSI | M | The IMSI of the subscriber. |
| Served MSISDN | O _M | The primary MSISDN of the subscriber. |
| SGSN Address | O _M | The IP address of the current SGSN. |
| Location Method | M | The type of the location request. |
| LCS QoS | C | QoS of the LR, if available. |
| LCS Priority | O _e | Priority of the LR, if available |
| MLC Number | C | The E.164 address of the involved GMLC, if applicable. |
| Event Time stamp | M | The time at which the Perform_Location_Request is sent by the SGSN. |
| Measurement Duration | O _M | The duration of proceeding the location request. |
| Location | O _M | The LAC and CI when the LR is received. |
| Routing Area Code | O _M | The Routing Area Code from which the LCS originated. |
| Location Estimate | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | The positioning method used or attempted, if available. |
| LCS Cause | O _C Ⓞ | The result of the LR if any failure or partial success happened as known at radio interface . |
| Cause for Record Closing | M | The reason for closure of the record from this SGSN . |
| Diagnostics | C | A more detailed information about the Cause for Record Closing LCS cause if any failure or partial success happened. |
| Node ID | O _M | Name of the recording entity. |
| Local Record Sequence Number | O _M | Consecutive record number created by this node. The number is allocated sequentially including all CDR types. |
| Charging Characteristics | M | The Charging Characteristics flag set used by the SGSN. |
| Charging Characteristics Selection Mode | O _M | Holds information about how Charging Characteristics were selected. |
| System Type | O _C | Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. |
| Record Extensions | O _C | A set of network operator/manufacturer specific extensions to the record. Conditioned upon the existence of an extension. |

4.9 Network induced location request (LCS-NI-CDR)

If enabled, an SGSN Network induced LCS record shall be produced for each mobile a network induced location request is performed via the SGSN. The fields in the record are specified in Table 8. The table provides a brief description of each field. A more elaborate definition of the fields, sorted by the field name in alphabetical order, is provided in Clause 5.

Table 8: SGSN Network induced LCS record (SGSN-LCS-NI)

| Field | Category | Description |
|----------------------|----------------|---|
| Record Type | M | SGSN Network Induced LCS. |
| Recording Entity | M | The E.164 number of the SGSN. |
| LCS Client Type | C | The type of the LCS client that invoked the LR, if available. |
| LCS Client Identity | C | Further identification of the LCS client, if available. |
| Served IMSI | C | The IMSI of the subscriber if supplied. |
| Served MSISDN | C | The primary MSISDN of the subscriber if supplied. |
| SGSN Address | O _M | The IP address of the current SGSN. |
| Served IMEI | O _C | The IMEI of the ME, if available. |
| LCS QoS | C | QoS of the LR, if available. |
| LCS Priority | C | Priority of the LR, if available |
| MLC Number | C | The E.164 address of the involved GMLC, if applicable. |
| Event Time stamp | M | The time at which the Perform_Location_Request is sent by the SGSN. |
| Measurement Duration | O _M | The duration of proceeding the location request. |
| Location | O _M | The LAC and CI when the LR is received. |
| Routing Area Code | O _M | The Routing Area Code from which the LCS originated. |
| Location Estimate | O _C | The location estimate for the subscriber if contained in geographic position and the LR was successful. |
| Positioning Data | C | The positioning method used or attempted, if available. |

| Field | Category | Description |
|--|------------------|--|
| LCS Cause | O _C E | The result of the LR if any failure or partial success happened as known at radio interface . |
| Cause for Record Closing | M | The reason for closure of the record from this SGSN. |
| Diagnostics | C | A more detailed information about the Cause for Record Closing LCS cause if any failure or partial success happened. |
| Node ID | O _M | Name of the recording entity. |
| Local Record Sequence Number | O _M | Consecutive record number created by this node. The number is allocated sequentially including all CDR types. |
| Charging Characteristics | M | The Charging Characteristics flag set used by the SGSN. |
| Charging Characteristics Selection Mode | O _M | Holds information about how Charging Characteristics were selected. |
| System Type | O _C | Indicates the type of air interface used, e.g. UTRAN. This field is present when either the UTRAN or GERAN air-interface is used. It is omitted when the service is provided by a GSM air interface. |
| Record Extensions | O _C | A set of network operator/manufacture specific extensions to the record. Conditioned upon the existence of an extension. |

...

5.4 Cause for Record Closing

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

- normal release: PDP context release (end of context or SGSN change) or GPRS detach;
- partial record generation: data volume limit, time (duration) limit, maximum number of changes in charging conditions or intra SGSN intersystem change (change of radio interface from GSM to UMTS or vice versa);
- abnormal termination (PDP or MM context);
- [unauthorized network originating a location service request](#);
- [unauthorized client requesting a location service](#);
- [position method failure at a location service execution](#);
- [unknown or unreachable LCS client at a location service request](#);
- management intervention (request due to O&M reasons).

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

...

6 Charging Data Record Structure

6.1 ASN.1 definitions for CDR information

...

```

SGSNMMLCSRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    recordingEntity      [1] RecordingEntity,
    lcsClientType        [2] LCSClientType,
    lcsClientIdentity    [3] LCSClientIdentity,
    servedIMSI          [4] IMSI,
    servedMSISDN        [5] MSISDN OPTIONAL,
    sgsnAddress          [6] GSNAddress OPTIONAL,
    locationType         [7] LocationType,
    lcsQos               [8] LCSQoSInfo OPTIONAL,
    lcsPriority          [9] LCS-Priority OPTIONAL,
}
    
```

```

mlcNumber          [10] ISDN-AddressString,
eventTimeStamp      [11] TimeStamp,
measurementDuration [12] CallDuration OPTIONAL,
notificationToMSUser [13] NotificationToMSUser OPTIONAL,
privacyOverride     [14] NULL OPTIONAL,
location            [15] LocationAreaAndCell OPTIONAL,
routingArea         [16] RoutingAreaCode OPTIONAL,
locationEstimate    [17] Ext-GeographicalInformation OPTIONAL,
positioningData     [18] PositioningData OPTIONAL,
lcsCause            [19] LCSCause OPTIONAL,
diagnostics         [20] Diagnostics OPTIONAL,
nodeID              [21] NodeID OPTIONAL,
localSequenceNumber [22] LocalSequenceNumber OPTIONAL,
chargingCharacteristics [23] ChargingCharacteristics,
chChSelectionMode  [24] ChChSelectionMode OPTIONAL,
systemType          [25] SystemType OPTIONAL,
recordExtensions    [26] ManagementExtensions OPTIONAL,
causeForRecClosing [27] CauseForRecClosing
}

SGSNMOLCSRecord ::= SET
{
  recordType          [0] CallEventRecordType,
  recordingEntity     [1] RecordingEntity,
  lcsClientType       [2] LCSClientType OPTIONAL,
  lcsClientIdentity   [3] LCSClientIdentity OPTIONAL,
  servedIMSI         [4] IMSI,
  servedMSISDN        [5] MSISDN OPTIONAL,
  sgsnAddress         [6] GSNAddress OPTIONAL,
  locationMethod      [7] LocationMethod,
  lcsQos              [8] LCSQoSInfo OPTIONAL,
  lcsPriority          [9] LCS-Priority OPTIONAL,
  mlcNumber           [10] ISDN-AddressString OPTIONAL,
  eventTimeStamp      [11] TimeStamp,
  measurementDuration [12] CallDuration OPTIONAL,
  location            [13] LocationAreaAndCell OPTIONAL,
  routingArea         [14] RoutingAreaCode OPTIONAL,
  locationEstimate    [15] Ext-GeographicalInformation OPTIONAL,
  positioningData     [16] PositioningData OPTIONAL,
  lcsCause            [17] LCSCause OPTIONAL,
  diagnostics         [18] Diagnostics OPTIONAL,
  nodeID              [19] NodeID OPTIONAL,
  localSequenceNumber [20] LocalSequenceNumber OPTIONAL,
  chargingCharacteristics [21] ChargingCharacteristics,
  chChSelectionMode  [22] ChChSelectionMode OPTIONAL,
  systemType          [23] SystemType OPTIONAL,
  recordExtensions    [24] ManagementExtensions OPTIONAL,
  causeForRecClosing [25] CauseForRecClosing
}

SGSNNILCSRecord ::= SET
{
  recordType          [0] CallEventRecordType,
  recordingEntity     [1] RecordingEntity,
  lcsClientType       [2] LCSClientType OPTIONAL,
  lcsClientIdentity   [3] LCSClientIdentity OPTIONAL,
  servedIMSI         [4] IMSI OPTIONAL,
  servedMSISDN        [5] MSISDN OPTIONAL,
  sgsnAddress         [6] GSNAddress OPTIONAL,
  servedIMEI          [7] IMEI OPTIONAL,
  lcsQos              [8] LCSQoSInfo OPTIONAL,
  lcsPriority          [9] LCS-Priority OPTIONAL,
  mlcNumber           [10] ISDN-AddressString OPTIONAL,
  eventTimeStamp      [11] TimeStamp,
  measurementDuration [12] CallDuration OPTIONAL,
  location            [13] LocationAreaAndCell OPTIONAL,
  routingArea         [14] RoutingAreaCode OPTIONAL,
  locationEstimate    [15] Ext-GeographicalInformation OPTIONAL,
  positioningData     [16] PositioningData OPTIONAL,
  lcsCause            [17] LCSCause OPTIONAL,
  diagnostics         [18] Diagnostics OPTIONAL,
  nodeID              [19] NodeID OPTIONAL,
  localSequenceNumber [20] LocalSequenceNumber OPTIONAL,
  chargingCharacteristics [21] ChargingCharacteristics,
  chChSelectionMode  [22] ChChSelectionMode OPTIONAL,
  systemType          [23] SystemType OPTIONAL,
}

```



```
| recordExtensions      [24] ManagementExtensions OPTIONAL,  
| causeForRecClosing  [25] CauseForRecClosing  
|  
| }  
|  
| ...  
|  
| CauseForRecClosing ::= INTEGER  
| {  
|   --  
|   -- In GGSN the value SGSNChange should be used for partial record  
|   -- generation due to SGSN Address List Overflow  
|   --  
|   -- cause codes 0 to 15 are defined in TS 32.205 as 'CauseForTerm' (cause for termination)  
|   -- LCS related causes belong to the MAP error causes acc. TS 29.002  
|   --  
|   normalRelease          _____ (0),  
|   abnormalRelease        _____ (4),  
|   cAMELInitCallRelease   _____ (5),  
|   volumeLimit            _____ (16),  
|   timeLimit              _____ (17),  
|   SGSNChange             _____ (18),  
|   maxChangeCond          _____ (19),  
|   managementIntervention _____ (20),  
|   intraSGSNIntersystemChange _____ (21),  
|   unauthorizedRequestingNetwork _____ (52),  
|   unauthorizedLCSCClient          _____ (53),  
|   positionMethodFailure          _____ (54),  
|   unknownOrUnreachableLCSCClient _____ (58)  
| }  
|  
| ...  
|  
| END
```