Technical Specification Group Services and System Aspects ***TSGS#15(02)0138***

Meeting #15, Jeju-do, Korea, 5-14 March 2002

Source: **TSG SA WG2**
Title: **CRs on LCS: 03.71 v.7.8.0 and v.8.4.0, 23.171 v.3.6.0, 23.271 v.4.4.0 and 5.1.0**
Agenda Item: **7.2.3**

The following Change Requests (CRs) have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #15.
Note: the source of all these CRs is now S2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

- CR applicable to Release 98, with mirror CRs to Rel99, Rel-4 and Rel-5:

Tdoc #	Title	Spec	CR #	cat	Rel	WI
S2-020625rev1	Removal of NA-ESRK from MT-LR request for North American Emergency call	03.71	A039	F	98	TEI
S2-020626rev1	Removal of NA-ESRK from MT-LR request for North American Emergency call	03.71	A040	A	99	TEI
S2-020627rev1	Removal of NA-ESRK from MT-LR request for North American Emergency call	23.171	024	A	99	TEI
S2-020628rev1	Removal of NA-ESRK from MT-LR request for North American Emergency call	23.271	076	A	4	TEI4
S2-020629rev1	Removal of NA-ESRK from MT-LR request for North American Emergency call	23.271	077	A	5	TEI5

- CR applicable to Release 99, with mirror CRs to Rel-4 and Rel-5:

Tdoc #	Title	Spec	CR #	cat	Rel	WI
S2-020746	Correction of information flows LCS client – GMLC	23.171	023r1	F	99	LCS
S2-020747	Correction of information flows LCS client – GMLC	23.271	073r1	A	4	LCS1
S2-020748	Correction of information flows LCS client – GMLC	23.271	072r2	A	5	LCS1

- CRs applicable to Release 4, with mirror CRs to Rel-5:

Tdoc #	Title	Spec	CR #	cat	Rel	WI
S2-020635	Clarification of OSA support for LCS in TS 23.271	23.271	058r3	F	4	LCS1
S2-020636	Clarification of OSA support for LCS in TS 23.271	23.271	059r3	A	5	LCS1
S2-020314	Essential correction for session related class	23.271	063 R3	F	4	LCS1
S2-020315	Essential correction for session	23.271	064R2	A	5	LCS1

	related class					
S2-020052	Supported LCS capabilities set	23.271	056	F	4	LCS1
S2-020053	Supported LCS capabilities set	23.271	057	A	5	LCS1

- CRs applicable to Release 5 only:

Tdoc #	**Title**	**Spec**	**CR #**	**cat**	**Rel**	**WI**
S2-020311	Combined Periodical/Deferred Mobile Terminating Location Request	23.271	062R2	B	5	LCS1
S2-020218	Requestor and Requestor identity	23.271	061R1	C	5	LCS1
S2-020758	Handling of Privacy Override Indicator	23.271	071r1	F	5	LCS1
S2-020873	Handling of Service Type and codeword.	23.271	069r1	B	5	LCS1

3GPP TSG-SA2 Meeting #22
Phoenix, USA, 14 – 18 January, 2002

Tdoc S2-020052

CR-Form-v3

CHANGE REQUEST

⌘ **23.271** **CR** **056** ⌘ rev **-** ⌘ Current version: **4.4.0** ⌘

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

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

Title:	⌘	Supported LCS capabilities sets
Source:	⌘	Ericsson
Work item code:	⌘	LCS1
Date:	⌘	2002-Jan-05
Category:	⌘	**F**
Release:	⌘	Rel-4

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

Use one of the following releases:

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

Reason for change:	⌘	The current LCS Stage 2 assumes that if a VLR or SGSN supports a certain release of LCS then it supports all previous capability sets. While this might be true for a VLR Rel-4, it might not be always true in future for, e.g, a Rel-5 VLR, since possibly backward incompatible changes could be done at the LCS related MAP operations, and it is certainly not true for an SGSN Rel-4, since there's no support in SGSN for Rel-99 LCS. This fault was highlighted by means of the LS N4-011422 (S2-013524) from CN4 to SA2, whose answer is in Tdoc S2-013530.
Summary of change:	⌘	The VLR/SGSN shall communicate to the HLR all the releases of LCS it supports.
Consequences if not approved:	⌘	The HLR could have wrong indication about the LCS capabilities supported by the VLR/SGSN.

Clauses affected:	⌘	10.5.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request

10.5.1 Interworking with the VLR supporting only pre-Rel'4 LCS

The VLR that supports only pre-Rel'4 LCS cannot handle the extended privacy control for call-related/call-unrelated class of the Rel'4 LCS. That is, the VLR cannot provide the extended call-related/call-unrelated class service to the user who subscribes to the Rel'4 LCS. Therefore HLR/HSS does not send the subscriber data on call-related/call-unrelated class for users who subscribe to the call-related class of Rel'4 LCS to the VLR that supports only pre-Rel'4 LCS. The HLR/HSS is notified whether the VLR supports Rel'4 LCS or not by an indication , which indicates all the ~~highest~~ LCS core network signalling capability~~y~~ies the VLR supports, from the VLR during location update procedure. The following two LCS core network signalling capabilities are identified in the current version of this specification.

- LCS core network signalling capability set 1: R98 and R99 LCS (pre-Rel'4 LCS)
- LCS core network signalling capability set 2: Rel'4 or later LCS

The serving node, which notified the HLR/HSS that it supports LCS core network signalling capability set 2, shall be able to handle the extended LCS Client list and LCS Client List for call-related class from the HLR.

[Note: this interworking scenario can be also applied for PS domain. Generalization of the description in this sub clause to cover both CS and PS domain should be done.][Note2: the concept of LCS capability set is newly introduced in Rel4 so that it doesn't appear in the specifications for R98 and R99 LCS]

3GPP TSG-SA2 Meeting #22
Phoenix, USA, 14 – 18 January, 2002

Tdoc S2-020053

CR-Form-v3

CHANGE REQUEST

⌘ **23.271** **CR** **057** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

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

Title:	⌘	Supported LCS capabilities sets
Source:	⌘	Ericsson
Work item code:	⌘	LCS1
Date:	⌘	2002-Jan-05
Category:	⌘	**A**
Release:	⌘	Rel-5

Use one of the following categories:
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R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	The current LCS Stage 2 assumes that if a VLR or SGSN supports a certain release of LCS then it supports all previous capability sets. While this might be true for a VLR Rel-4, it might not be always true in future for, e.g, a Rel-5 VLR, since possibly backward incompatible changes could be done at the LCS related MAP operations, and it is certainly not true for an SGSN Rel-4, since there's no support in SGSN for Rel-99 LCS. This fault was highlighted by means of the LS N4-011422 (S2-013524) from CN4 to SA2, whose answer is in Tdoc S2-013530.
Summary of change:	⌘	The VLR/SGSN shall communicate to the HLR all the releases of LCS it supports.
Consequences if not approved:	⌘	The HLR could have wrong indication about the LCS capabilities supported by the VLR/SGSN.

Clauses affected:	⌘	10.5.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	This CR is mirrored from the CR 056 on the rel-4 of the TS.

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- LCS core network signalling capability set 1: R98 and R99 LCS (pre-Rel'4 LCS)
- LCS core network signalling capability set 2: Rel'4 or later LCS

The serving node, which notified the HLR/HSS that it supports LCS core network signalling capability set 2, shall be able to handle the extended LCS Client list and LCS Client List for call-related class from the HLR.

[Note: this interworking scenario can be also applied for PS domain. Generalization of the description in this sub clause to cover both CS and PS domain should be done.][Note2: the concept of LCS capability set is newly introduced in Rel4 so that it doesn't appear in the specifications for R98 and R99 LCS]

3GPP TSG-SA2 Meeting #22 *Tdoc S2-020218*
Phoenix, US, 14 – 18 January, 2002

CR-Form-v3

CHANGE REQUEST

⌘ **23.271** **CR** **061** ⌘ rev **1** ⌘ Current version: **5.1.0** ⌘

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

Title:	⌘	Requestor and Requestor Identity
Source:	⌘	LCS drafting
Work item code:	⌘	LCS1
Date:	⌘	2002-Jan-17
Category:	⌘	**B**
Release:	⌘	Rel-5

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

Use one of the following releases:

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

Reason for change:	⌘	In some possible business scenarios, the location requests are originated by users who are connected to the external LCS client and using the external LCS applications. In the current LCS stage 2, the UE user is notified about the external LCS client but is not able to know about the user who originated the location request.
Summary of change:	⌘	It is proposed that the location request issued by the LCS client to GMLC should be enhanced to optionally include also the identity of the originator of the location request, i.e. the Requestor Identity, not only the identity of the LCS client. The Requestor Identity is included in the LCS Location Notification Invoke message together with the LCS Client ID.
Consequences if not approved:	⌘	The UE users are not able to know about the originator of the location requests.

Clauses affected:	⌘	3.1, 6.3.2, 9.1.1, 9.1.2.1, 9.1.6.1, Annex B		
Other specs Affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	29.002, 24.030, 24.080
Other comments:	⌘	This addition is necessary in order to fulfil national regulations		

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

CAMEL: CAMEL is a network functionality, which provides the mechanisms of Intelligent Network to a mobile user

Call Related: any LCS related operation which is associated with an established call in CS domain and a session via an active PDP context in PS domain.

Current Location: after a location attempt has successfully delivered a location estimate and its associated time stamp, the location estimate and time stamp is referred to as the "current location" at that point in time

Deferred location request: location request where the location response (responses) is (are) not required immediately

Global Positioning System: Global Positioning System (GPS) consists of three functional elements: Space Segment (satellites), User Segment (receivers), and Control Segment (maintenance etc.). The GPS receiver calculates its own position based on the received time differences for several satellites

Immediate location request: location request where a single location response only is required immediately

Initial Location: in the context of an originating emergency call the location estimate and the associated time stamp at the commencement of the call set-up is referred to as "initial location"

Last Known Location: current location estimate and its associated time stamp for Target UE stored in the LCS Server is referred to as the "last known location" and until replaced by a later location estimate and a new time stamp is referred to as the "last known location"

LCS (LoCation Services): LCS is a service concept in system (e.g. GSM or UMTS) standardization. LCS specifies all the necessary network elements and entities, their functionalities, interfaces, as well as communication messages, due to implement the positioning functionality in a cellular network. Note that LCS does not specify any location based (value added) services except locating of emergency calls

LCS Client: software and/or hardware entity that interacts with a LCS Server for the purpose of obtaining location information for one or more Mobile Stations. LCS Clients subscribe to LCS in order to obtain location information. LCS Clients may or may not interact with human users. The LCS Client is responsible for formatting and presenting data and managing the user interface (dialogue). The LCS Client may reside in the Mobile Station (UE)

LCS Client Access barring list: optional list of MSISDNs per LCS Client where the LCS Client is not allowed to locate any MSISDN therein

LCS Client Subscription Profile: collection of subscription attributes of LCS related parameters that have been agreed for a contractual period of time between the LCS client and the service provider

LCS Feature: capability of a PLMN to support LCS Client/server interactions for locating Target UEs

LCS Server: software and/or hardware entity offering LCS capabilities. The LCS Server accepts requests, services requests, and sends back responses to the received requests. The LCS server consists of LCS components, which are distributed to one or more PLMN and/or service provider

Local Service: service, which can be exclusively provided in the current serving network by a Value added Service Provider

Local Information: information related to a given location, or general information, which is made available in a given location

Location (Based) Application: location application is an application software processing location information or utilizing it in some way. The location information can be input by a user or detected by network or UE. Navigation is one location application example

Location Based Service (LBS): service provided either by teleoperator or a 3rd party service provider that utilizes the available location information of the terminal. Location Application offers the User Interface for the service. LBS is either a pull or a push type of service (see Location Dependent Services and Location Independent Services). In ETSI/GSM documentation of SoLSA, LBS is called "Location Related Service". ETSI and/or 3GPP -wide terminology harmonization is expected here

Location Dependent Service: service provided either by teleoperator or a 3rd party service provider that is available (pull type) or is activated (push type) when the user arrives to a certain area. It doesn't require any subscription in advance, but the push type activation shall be confirmed by the user. The offered service itself can be any kind of service (e.g. a public Xerox machine or the discount list in a store)

Location Estimate: geographic location of an UE and/or a valid Mobile Equipment (ME), expressed in latitude and longitude data. The Location Estimate shall be represented in a well-defined universal format. Translation from this universal format to another geographic location system may be supported, although the details are considered outside the scope of the primitive services

Location Independent Service: service provided either by teleoperator or a 3rd party service provider that is available and therefore can be activated anywhere in the network coverage. It is activated by the user's request or by other user's activated service, and therefore it requires a subscription in advance (pull type). The offered service itself can be any kind of service (e.g. MMS, SWDL, or LBS!)

Mobile Assisted positioning: any mobile centric positioning method (e.g. IPDL-OTDOA, E-OTD, GPS) in which the UE provides position measurements to the network for computation of a location estimate by the network. The network may provide assistance data to the UE to enable position measurements and/or improve measurement performance

Mobile Based positioning: any mobile centric positioning method (e.g. IPDL-OTDOA, E-OTD, GPS) in which the UE performs both position measurements and computation of a location estimate and where assistance data useful or essential to one or both of these functions is provided to the UE by the network. Position methods where an UE performs measurements and location computation without network assistance data are not considered within this category

Mobile Station: mobile station (MS) consists of Mobile or User Equipment (ME or UE) with a valid SIM or USIM attached. The abbreviation "UE" in this specification refers both to MS and User Equipment, see below.

PLMN Access barring list: optional list of MSISDN per PLMN where any LCS Client is not allowed to locate any MSISDN therein except for certain exceptional cases

Positioning (/location detecting): positioning is a functionality, which detects a geographical location (of e.g. a mobile terminal)

Positioning method (/locating method): principle and/or algorithm which the estimation of geographical location is based on, e.g. AOA, TOA, TDOA. For example, GPS is based on TOA, whilst OTDOA and E-OTD (on GSM) are based on TDOA

Positioning technology (/locating technology): technology or system concept including the specifications of RF interfaces, data types, etc. to process the estimation of a geographical location, e.g. GPS, E-OTD (GSM), and OTDOA (WCDMA)

Predefined area: geographical area, which is not related to cell or radio coverage. The mobile may take special action when it recognises it has entered or left a predefined area

Privacy Class: list of LCS Clients defined within a privacy exception class to which permission may be granted to locate the target UE. The permission shall be granted either on activation by the target UE or permanently for a contractual period of time agreed between the target UE and the service provider

Privacy Exception List: list consisting of various types of privacy classes (i.e. operator related, personal etc.). Certain types of classes may require agreement between the service provider and the target UE

Prohibited area: area where the mobile must not activate its transmitter. The Prohibited area may be a Predefined area described above or related to radio cell(s)

Requestor: the originating entity which has requested the location of the target UE from the LCS client.

Requestor Identity: This identifier is identifying the Requestor and can be e.g. MSISDN or logical name.

Subscription Profile: profile detailing the subscription to various types of privacy classes

Target UE: UE being positioned

User Equipment: term 'User Equipment', or 'UE', should for GSM be interpreted as 'MS', as defined in GSM TS 04.02 [19]. UE in this specification may also refer to a Mobile Equipment or User Equipment used for emergency calls, that do not have valid SIM or USIM

Further UMTS related definitions are given in 3G TS 22.101.

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6.3 Functional description of LCS per network element

6.3.1 Access Network

The Access Network is involved in the handling of various positioning procedures.

The LCS specific functionalities of the radio access network elements are specified in TS 25.305 [1] for UTRAN and TS 43.059 [16] for GERAN.

6.3.2 LCS Clients, ~~and~~ LCS applications and Requestors

There are two classes of LCS Application - Internal applications and External applications. Internal applications represent entities internal to the GSM/UMTS that make use of location information for the (improved) operation of the network. Internal LCS client can be identified by LCS client internal ID. LCS client Internal ID distinguishes the following classes: (LCS client broadcasting location related information, O&M LCS client in the HPLMN, O&M LCS client in the VPLMN, LCS client recording anonymous location information, LCS Client supporting a bearer service, teleservice or supplementary service to the target UE). External applications represent entities (such as Commercial or Emergency services) that make use of location information for operations external to the mobile communications network. External LCS client can be identified by LCS client external ID. The LCS Applications interface to the LCS entities through their Location Client functions (LCF). Location requests from the external LCS clients may be originated by external entities (i.e. Requestor). LCS client should authenticate the Requestor Identity but this is outside the scope of this specification.

The LCS Client, ~~and~~ LCS applications and Requestors are outside the scope of the present document.

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9 General Network Positioning Procedures

The generic network positioning procedure of providing the location information of an UE subscriber can be partitioned into the following procedures.

Location Preparation Procedure

This generic procedure is concerned with verifying the privacy restrictions of the UE subscriber, reserving network resources, communicating with the UE to be located and determining the positioning method to be used for locating the UE subscriber based on the requested QoS and the UE and network capabilities.

Positioning Measurement Establishment Procedure

This procedure is concerned with performing measurements by involving the necessary network and/or UE resources. Depending on the positioning method to be used for locating the UE the internals of this procedure can be positioning method dependent. The procedure is completed with the end of the positioning measurements.

Location Calculation and Release Procedure

This generic procedure is initiated after the measurements are completed and is concerned with calculating the location of the UE and releasing all network and/or UE resources involved in the positioning.

9.1 Mobile Terminating Location Request

9.1.1 MT-LR routing procedure in PS and CS domain

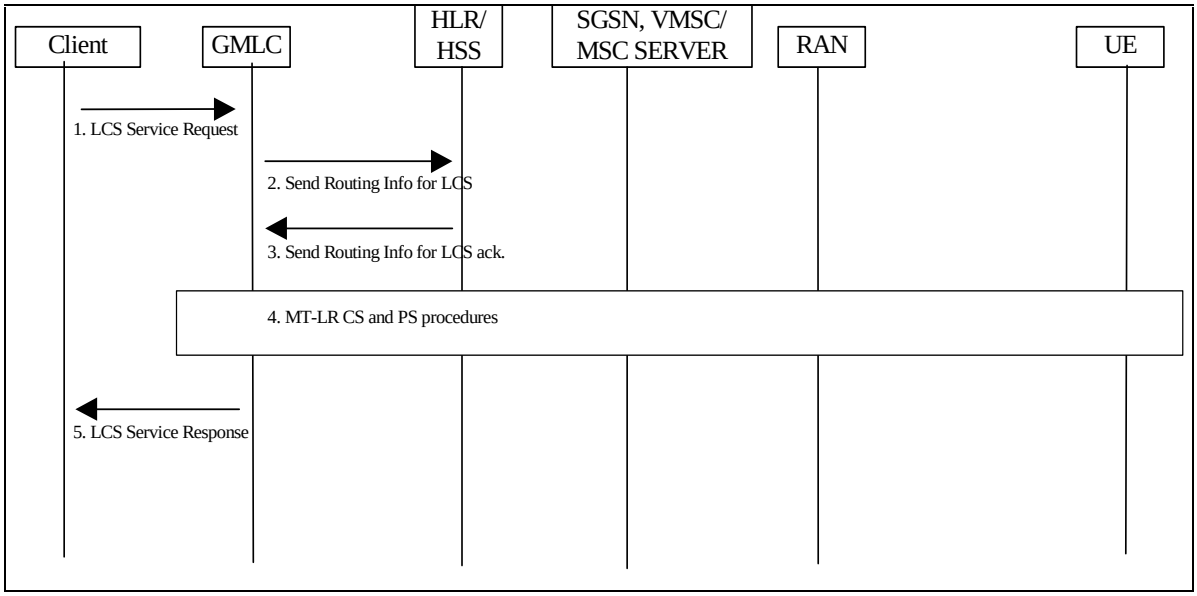

Figure 9.1: General Network Positioning for a MT-LR

1) An external LCS client requests the current location of a target UE from a GMLC. The LCS Client may also request a deferred location request, i.e. based on event. The GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI or PDP address, (NOTE: IP addressing in this context is FFS, one reason is the dynamic IP addressing used in IPv4.) of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client. For a call related or session related location request, the GMLC obtains and authenticates the called party number of the LCS client. If the location request is originated by a Requestor, the Requestor Identity may be added to the LCS service request. LCS client should authenticate the Requestor Identity but this is outside the scope of this specification. If location is required for more than one UE, or if periodic location is requested, the steps following below may be repeated.
   Note: This means that GMLC handles the periodicity of location requests as requested by the LCS client both in CS and PS domain.

2) If the GMLC already knows both the VMSC/MSC server or SGSN location and IMSI for the particular MSISDN or PDP address, (e.g. from a previous location request), this step and step 3 may be skipped. Otherwise, the GMLC sends a SEND_ROUTING_INFO_FOR_LCS message to the home HLR/HSS of the target UE to be located with the IMSI, PDP address or MSISDN of this UE.

Editor´s note: The use of the PDP address for identifying the subscriber is ffs.

3) The HLR/HSS verifies that the calling party SCCP address of the GMLC corresponds to a known GSM/UMTS network element that is authorized to request UE location information. The HLR/HSS then returns one or several of the addresses, the current SGSN and/or VMSC/MSC server and whichever of the IMSI and MSISDN was not provided in step (2) for the particular UE.
   Note: HLR may prioritize between the MSC/VLR or SGSN address sent to GMLC. The prioritisation might be based on information received from SGSN and/or MSC/VLR concerning the MS's capabilities for LCS. Other priority criteria are for further study.

4) In case GMLC receives only the MSC/VLR address, the MT LR proceeds as the CS-MT-LR procedure described in 9.1.2. In case GMLC receives only the SGSN address, the MT LR proceeds as the PS-MT-LR procedure described in 9.1.6. In case the GMLC receives several of the following addresses, SGSN, VMSC and/or MSC Server, it has to decide where to send the location request. If the requested MT-LR is known to be

associated with a CS call, the CS-MT-LR procedure shall be invoked. If the requested MT-LR is associated with a PS session, the PS-MT-LR procedure only shall be invoked. Otherwise, both CS-MT-LR and PS-MT-LR are applicable. If LCS Client indicated deferred location request, GMLC shall indicate this together with applicable event type (ex. MS available) in requested PS/CS-MT-LR, see 9.1.8.

NOTE: The order in which these procedures are invoked and whether one or both procedures are used may depend on subscription information for the LCS client, possible priority information returned by the HSS or information already stored in the GMLC (e.g. obtained from previous location requests).

5) GMLC sends the location service response to the LCS client. If the LCS client requires it, the GMLC may first transform the universal location co-ordinates provided by the SGSN or MSC/MSC server into some local geographic system. The GMLC may record billing for both the LCS client and inter-network revenue charges from the SGSN or MSC/MSC server's network.

The detailed CS-MT-LR and PS-MT-LR procedures in step 4 of figure 9.1 are described in 9.1.2 and 9.1.6.

The detailed procedure for deferred PS/CS-MT-LR is described in 9.1.8.

9.1.2 Circuit Switched Mobile Terminating Location Request (CS-MT-LR)

Figure 9.2 illustrates general network positioning for LCS clients external to the PLMN. In this scenario, it is assumed that the target UE is identified using either an MSISDN or IMSI.

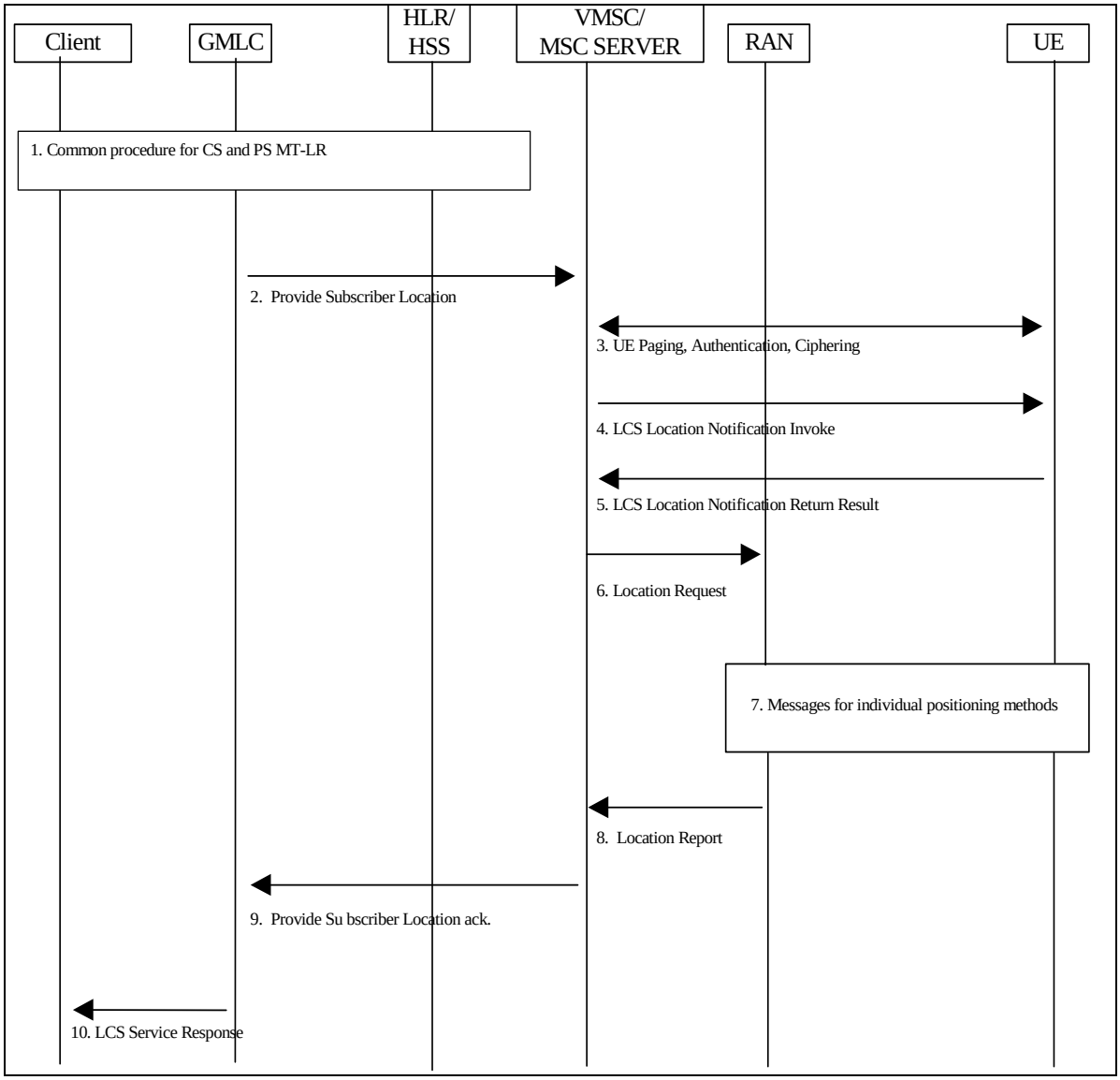

Figure 9.2: Network Positioning for a CS-MT-LR

9.1.2.1 Location Preparation Procedure

1) Common PS and CS MT-LR procedure as described in 9.1.1.

2) The GMLC sends a PROVIDE_ SUBSCRIBER _LOCATION message to the MSC/MSC server indicated by the HLR/HSS. This message carries the type of location information requested (e.g. current location), the UE subscriber's IMSI, LCS QoS information (e.g. accuracy, response time) and an indication of whether the LCS client has the override capability. For a call related location request, the message also carries the LCS client's called party number. For a value added LCS client, the message shall carry the client name, ~~and~~ the external identity of the LCS client and the Requestor Identity (if that is both supported and available). For a PLMN operator LCS client, the message shall carry the internal identity of the LCS client.

3) If the GMLC is located in another PLMN or another country, the VMSC/MSC server first authenticates that a location request is allowed from this PLMN or from this country. If not, an error response is returned. The VMSC/MSC server then verifies LCS barring restrictions in the UE user's subscription profile in the MSC server. In verifying the barring restrictions, barring of the whole location request is assumed if any part of it is barred or any requisite condition is not satisfied. If LCS is to be barred without notifying the target UE and a LCS client accessing a GMLC in the same country does not have the override capability, an error response is returned to the GMLC. Otherwise, if the UE is in idle mode, the Core Network performs paging, authentication and ciphering. The MSC will page a GPRS attached UE either through A/Iu or Gs interface, depending on the presence of the Gs interface (see Note).The UE will inform the network about its LCS capabilities, as described in chapter 6.3.4.. If the UE is instead in dedicated mode, the VMSC/MSC server will already have UE classmark information. In GSM this is supported by controlled early classmark sending.

[Note 1: In GSM, if the target UE has an established circuit call other than speech, the location request may be denied and an error response is then returned to the GMLC. If the location request is allowed for a non-speech circuit call, it shall be up to RAN to decide, on the basis of the applicable position methods and requested QoS, whether positioning is possible. This is FFS]

Note: In some network mode of operation, a GPRS capable UE may not receive the CS paging. In addition, upon receipt of a CS paging, a GPRS capable UE may immediately answer to the Paging Request or delay the answer, as defined in 3GPP TS 22.060 and 23.060. A GPRS UE in class B mode may also suspend its GPRS traffic, sending a GPRS Suspension Request to the network.

4) If the location request comes from a value added LCS client and the UE subscription profile indicates that the UE must either be notified or notified with privacy verification and the UE supports notification of LCS (according to the UE Capability information), an LCS Location Notification Invoke message is sent to the target UE indicating the type of location request (e.g. current location) and the identity of the LCS client, the Requestor Identity (if that is both supported and available) and whether privacy verification is required. [FFS: For a call related location request, the LCS client identity shall be set to the LCS client's called party number if no separate LCS client identity was received from the GMLC.] Optionally, the VMSC/MSC server may after sending the LCS Location Notification Invoke message continue in parallel the location process, i.e. continue to step 6 without waiting for a LCS Location Notification Return Result message in step 5.

NOTE 2: This step is for further study, it should be investigated e.g. which client identities to include in the Privacy Notification message to be shown to the end-user.

5) The target UE notifies the UE user of the location request. If privacy verification was requested, the target UE indicates to the UE user whether the location request will be allowed or not allowed in the absence of a response and waits for the user to grant or withhold permission. The UE then returns an LCS Location Notification Return Result to the VMSC/MSC server indicating, if privacy verification was requested, whether permission is granted or denied. Optionally, the LCS Location Notification Return Result message can be returned some time after step 4, but before step 9. If the UE user does not respond after a predetermined time period, the VMSC/MSC server shall infer a "no response" condition. The VMSC/MSC server shall return an error response to the GMLC if privacy verification was requested and either the UE user denies permission or there is no response with the UE subscription profile indicating barring of the location request in the absence of a response.

6) The MSC/MSC server sends a Location Request message to RAN. This message includes the type of location information requested and requested QoS and, in GSM, the UE's location capabilities.

9.1.2.2 Positioning Measurement Establishment Procedure

7) RAN determines the positioning method and instigates the particular message sequence for this method, as specified in UTRAN Stage 2, TS 25.305 [1] and GERAN Stage 2, TS 43.059 [16].

9.1.2.3 Location Calculation and Release Procedure

8) When a location estimate best satisfying the requested QoS has been obtained, RAN returns it to the MSC/MSC server in a Location Report message. If a location estimate could not be obtained, RAN returns a Location Report message containing a failure cause and no location estimate.

9) The MSC/MSC server returns the location information and its age to the GMLC, if the VMSC/MSC server has not initiated the Privacy Verification process in step 4. If step 4 has been performed for privacy verification, the VMSC/MSC server returns the location information only, if it has received a LCS Location Notification Return Result indicating that permission is granted. If a LCS Location Notification Return Result message indicating that permission is not granted is received, or there is no response, with the UE subscription profile indicating barring of location in the absence of a response, the VMSC/MSC server shall return an error response to the GMLC. If RAN did not return a successful location estimate, but the privacy checks in steps 4 - 5 were successfully executed, the VMSC/MSC server may return the last known location of the target UE if this is known and the LCS client is requesting the current or last known location. The MSC server may then release the Mobility Management connection to the UE, if the UE was previously idle, and the MSC/MSC server may record billing information.

10) The GMLC returns the UE location estimate to the requesting LCS client as described in chapter 9.1.1.

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9.1.6 Packet Switched Mobile Terminating Location Request (PS-MT-LR)

Figure 9.5 illustrates the general network positioning for LCS clients external to the PLMN for packet switched services. In this scenario, it is assumed that the target UE is identified using an MSISDN, PDP address or IMSI.

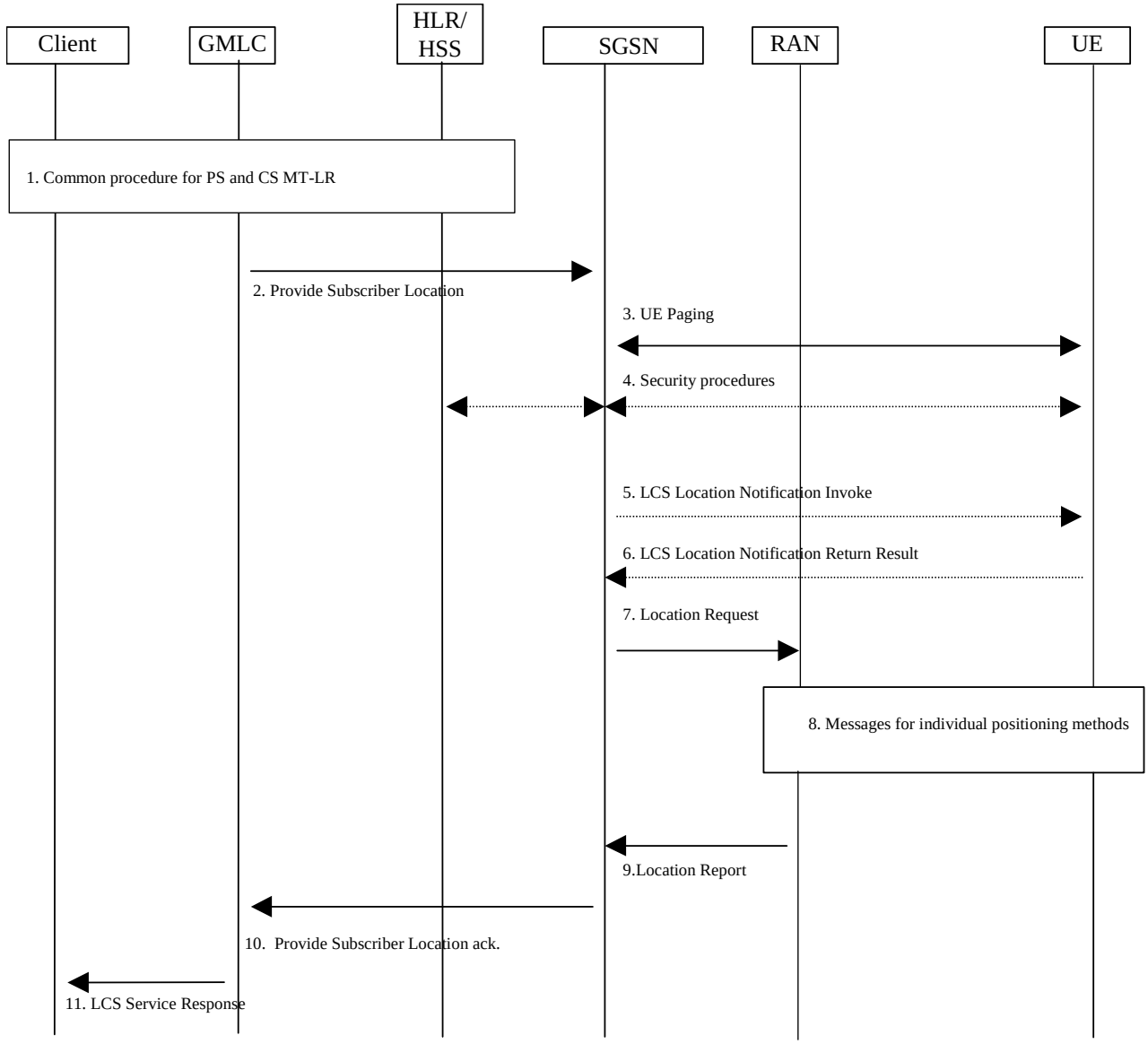

Figure 9.5: General Network Positioning for Packet Switched MT-LR

9.1.6.1 Location Preparation Procedure

1) Common PS and CS MT-LR procedure as described in 9.1.1.

2) GMLC sends a Provide Subscriber Location message to the SGSN indicated by the HLR/HSS. This message carries the type of location information requested (e.g. current location), the UE subscriber's IMSI, LCS QoS information (e.g. accuracy, response time) and an indication of whether the LCS client has the override capability. For a session related location request, the message also carries the APN to which the user has established the session. For a value added LCS client, the message shall carry the client name, ~~and~~ the external identity of the LCS client and the Requestor Identity (if that is both supported and available). For a PLMN operator LCS client, the message shall carry the internal identity of the LCS client.

3) If the GMLC is located in another PLMN or another country, the SGSN first authenticates that a location request is allowed from this PLMN or from this country. If not, an error response is returned. The SGSN then verifies LCS barring restrictions in the UE user's subscription profile in the SGSN. In verifying the barring restrictions, barring of the whole location request is assumed if any part of it is barred or any requisite condition is not satisfied. If LCS is to be barred without notifying the target UE and a LCS client accessing a GMLC in the same country does not have the override capability, an error response is returned to the GMLC.
Otherwise, if the UE is in idle mode, the SGSN performs paging. The paging procedure is defined in TS 23.060[15].

   FFS: The UE may be paged for location services even when in UMTS a signaling connection between mobile station and the network is established and in GSM when in Ready Mode. This makes it possible for the UE to start preparing an anticipated location service coming later by e.g. starting to measure GPS signals.

4) Security functions may be executed. These procedures are defined in TS 23.060 [15].

5) If the location request comes from a value added LCS client and the UE subscription profile indicates that the UE must either be notified or notified with privacy verification and the UE supports notification of LCS, a notification invoke message is sent to the target UE indicating the type of location request (e.g. current location) and the identity of the LCS client and, the Requestor Identity (if that is both supported and available) whether privacy verification is required. Optionally, the SGSN may after sending the LCS Location Notification Invoke message continue in parallel the location process, i.e. continue to step 7 without waiting for a LCS Location Notification Return Result message in step 6.

6) The target UE notifies the UE user of the location request and, if privacy verification was requested, waits for the user to grant or withhold permission. The UE then returns a notification result to the SGSN indicating, if privacy verification was requested, whether permission is granted or denied. Optionally, this message can be returned some time after step 5, but before step 10. If the UE user does not respond after a predetermined time period, the SGSN shall infer a "no response" condition. The SGSN shall return an error response to the GMLC if privacy verification was requested and either the UE user denies permission or there is no response with the UE subscription profile indicating barring of the location request.

7) The SGSN sends a Location Request message to the RAN. This message includes the type of location information requested, the requested QoS and any other location information received in paging response.

9.1.6.2 Positioning Measurement Establishment Procedure

8) If the requested location information and the location accuracy within the QoS can be satisfied based on parameters received from the SGSN and the parameters obtained by the RAN e.g. cell coverage and timing information (i.e. RTT or TA), the RAN may send a Location Report immediately. Otherwise, the RAN determines the positioning method and instigates the particular message sequence for this method in UTRAN Stage 2 TS 25.305 and in GERAN Stage 2 TS 43.059. If the position method returns position measurements, the RAN uses them to compute a location estimate. If there has been a failure to obtain position measurements, the RAN may use the current cell information and, if available, RTT or TA value to derive an approximate location estimate. If an already computed location estimate is returned for an UE based position method, the RAN may verify consistency with the current cell and, if available, RTT or TA. If the location estimate so obtained does not satisfy the requested accuracy and sufficient response time still remains, the RAN may instigate a further location attempt using the same or a different position method. If a vertical location co-ordinate is requested but the RAN can only obtain horizontal co-ordinates, these may be returned.

9.1.6.3 Location Calculation and Release Procedure

9) When location information best satisfying the requested location type and QoS has been obtained, the RAN returns it to the SGSN in a Location Report message. If a location estimate could not be obtained, the RAN returns a Location Report message containing a failure cause and no location estimate.

10) The SGSN returns the location information and its age to the GMLC, if the SGSN has not initiated the Privacy Verification process in step 5. If step 5 has been performed for privacy verification, the SGSN returns the location information only, if it has received a LCS Location Notification Return Result indicating that permission is granted. If a LCS Location Notification Return Result message indicating that permission is not granted is received, or there is no response, with the UE subscription profile indicating barring of location, the SGSN shall return an error response to the GMLC. If the SGSN did not return a successful location estimate, but the privacy checks were successfully executed, the SGSN may return the last known location of the target UE if this is known and the LCS client is requesting the current or last known location. The SGSN may record billing information.

11) The GMLC returns the UE location information to the requesting LCS client. If the LCS client requires it, the GMLC may first transform the universal location co-ordinates provided by the SGSN into some local geographic system. The GMLC may record billing for both the LCS client and inter-network revenue charges from the SGSN's network.

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Annex B (normative):
Presence of LCS client ID Components in MT-LR

The LCS client identity is composed of one or more than one of the following components: LCS client type, external identity, internal identity, call/session related identity, APN, ~~and~~ client name and Requestor Identity. The LCS client type shall always be present and for each LCS client type the presence of the other components are defined as follows:

Component LCS Client type	External identity	Internal identity	Call/session related identity	Client name	Requestor Identity
Emergency	O	N.A.	N.A.	N.A.	N.A.
Value added	M	N.A.	O [Note]	M	O
PLMN operator	N.A.	M	N.A.	N.A.	N.A.
Lawful Intercept	N.A.	N.A.	N.A.	N.A.	N.A.

Note: This component shall be present if the MT-LR is associated to either CS call or PS session. If the MT-LR is associated with the CS call, the number dialled by UE is used. Otherwise if the MT-LR is associated with the PS session, the APN is used.

3GPP TSG-SA-WG2 Meeting #22 ***Tdoc: S2-020311***
Phoenix, US, 14th January – 18th January 2002

CR-Form-v3

CHANGE REQUEST

⌘ **23.271** **CR** **062** ⌘ rev **1** ⌘ 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: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Combined Periodical/Deferred Mobile Terminating Location Request.
Source:	⌘	LCS drafting
Work item code:	⌘	LCS1
Date:	⌘	2002-Jan-08
Category:	⌘	**B**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	It is proposed to introduce the handling of combined periodical/deferred Mobile Terminating Location Request in the LCS stage 2 specification.
Summary of change:	⌘	In case a LCS client requires to have periodical responses and also requires to have responses when a specified event has occurred, the GMLC sends several deferred MT-LRs at the periodical timer expiry, where the timer is handled according to the period received from the LCS client.
Consequences if not approved:	⌘	The handling of the combined periodical/deferred MT-LR would not be specified on stage 2 level.

Clauses affected:	⌘	9.1.8.3, 9.1.8.4
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request

9.1.8 Mobile Terminating Deferred Location Request

Figure 9.6a illustrates the procedures for a Deferred Location Request, where the Location Report is returned based on a event.

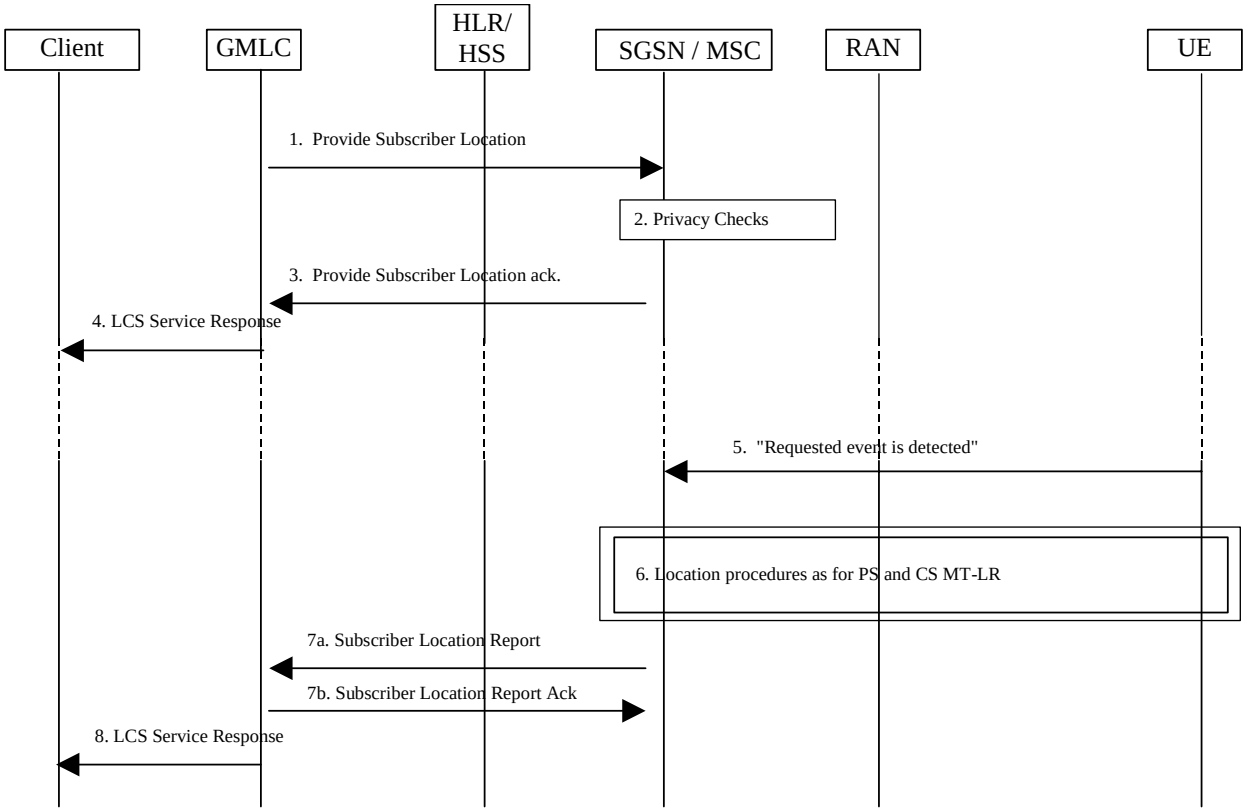

Figure 9.6a: General Network Positioning for a Deferred MT-LR

9.1.8.1 Deferred Location Request Procedure

1) Provide Subscriber Location is received in SGSN/MSC as described in 9.1.2/9.1.6. In addition, the Deferred Location Request includes the event that shall trigger the sending of Location Report.

2) If the SGSN/MSC cannot support the deferred location request for the specified event (for temporary or permanent reasons), a Provide Subscriber Location return error shall be returned in step 3 with a suitable cause. The SGSN/MSC verifies that the LCS client is allowed to position the requested UE according to subscription information (no interaction at this stage with the UE). If not, a Provide Subscriber Location return error is returned in step 3.

3) If the SGSN/MSC can support the deferred location request for the specified event and the privacy checks in step 2 are satisfied, a Provide Subscriber Location ack. shall be returned to the GMLC without a location estimate.

4) The GMLC then returns the LCS Service Response to the LCS Client to notify whether the request was successfully accepted or not.

9.1.8.2 Location Report Procedure

5) Immediately following step 3, the SGSN/MSC shall verify if the requested event is already satisfied (e.g. UE available inferred from a current transaction) or can be invoked immediately (e.g. by paging the UE and receiving a page response). If requested event is not existing the SGSN/MSC waits until it has occurred or until some maximum time has expired.

=> In case the SGSN/MSC receives an indication that the UE has moved to another SGSN/MSC while it is waiting for the requested event to happen, a Subscriber Location Report is directly sent to the GMLC with the information that MT-LR must be re-initiated against the new SGSN/MSC. The adress of the new SGSN/MSC is

included in Subscriber Location Report if available. (If new SGSN/MSC adress was included, the GMLC continues at step 1 above, otherwise it continues with an interrogation against HLR as described in 9.1.1.)

6) When the requested event is detected, the SGSN/MSC will proceed with the location request as described in 9.1.2/9.1.6.

If either security or privacy checks fails, a Subscriber Location Report is returned with appropriate error cause indicating termination of the deferred location request.

7) When location information has been obtained from the RAN, the SGSN/MSC returns the Subscriber Location Report. Included in the report is an indication that this is a response to a previously sent deferred location request.

If the location information could not be obtained, or the SGSN/MSC for some other reason decides to not wait any longer for the requested event to occur (ex. timer expires), the Subscriber Location Report will be returned with an appropriate error cause indicating termination of the deferred location request.

8) GMLC then returns the LCS Service Response to the LCS Client as in 9.1.2/9.1.6.

9.1.8.3 Combined Periodical/Deferred Mobile Terminating Location Request

Figure 9.6b illustrates the procedures for a Combined Periodical/Deferred Mobile Terminating Location Request, where the response to the LCS client is returned periodically and based on the event.

Note: In the current specification, it is assumed the LCS client issues the Periodical/Deferred MT-LR with only the location estimate type of “current location”.

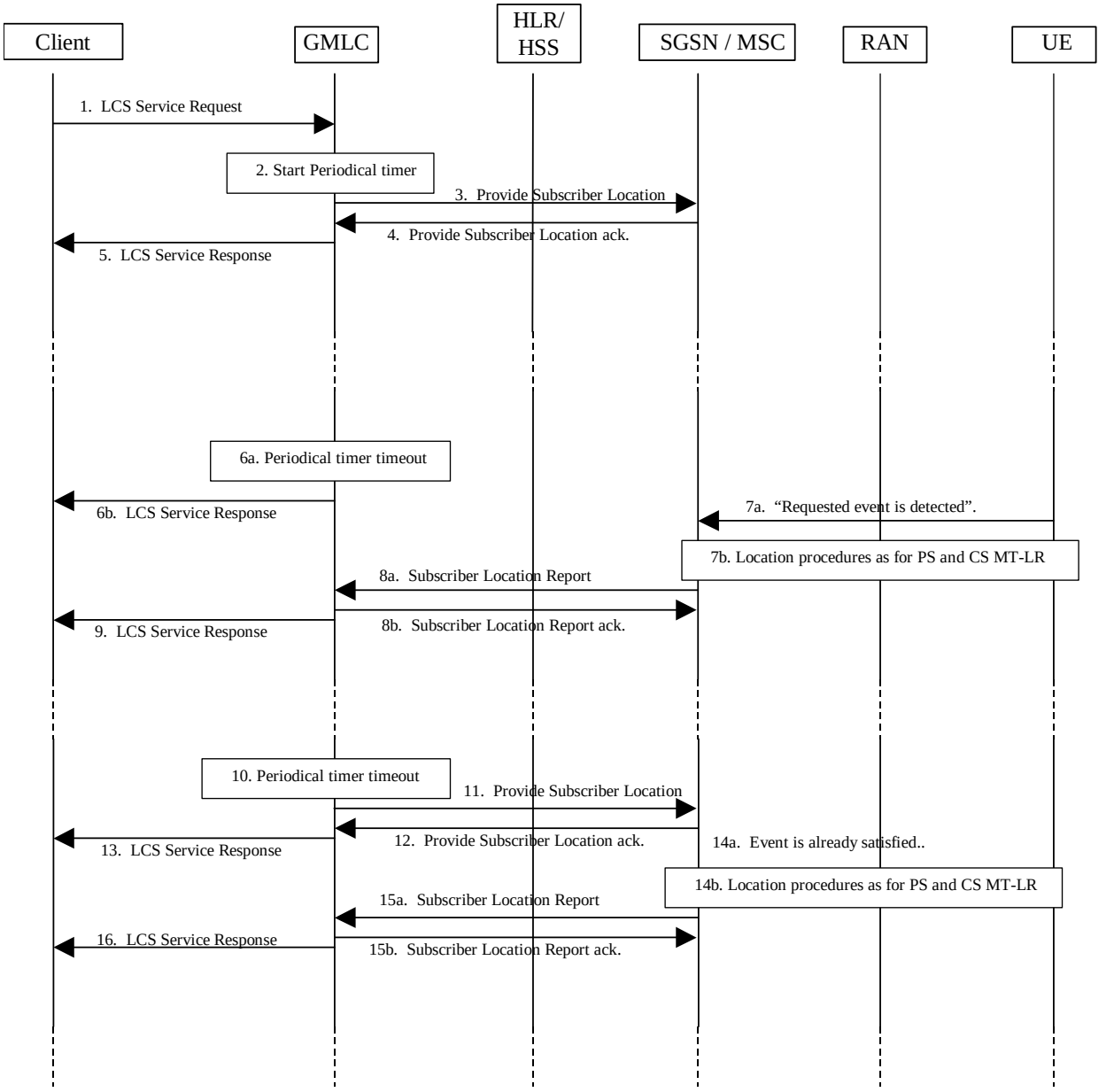

Figure 9.6b: General Network Positioning for a Combined Periodical/Deferred MT-LR

1) When a GMLC receives a LCS Service Request from a LCS client, the GMLC verifies the identity of the LCS client as described in 9.1.1.

2) The GMLC starts the periodical timer, sends a Send Routing Info for LCS to the home HLR/HSS of the target UE and gets SGSN/MSC addresses from the HLR/HSS as described in 9.1.1. If the GMLC already knows both the VMSC/MSC server or SGSN location and IMSI for the particular MSISDN or PDP address, (e.g. from a previous location request), the Send Routing Info is not sent to the HLR/HSS.

3) The GMLC sends a Deferred Location Request to the SGSN/MSC by means of Provide Subscriber Location as described in 9.1.2/9.1.6. In addition, the Deferred Location Request includes the event that shall trigger the sending of Subscriber Location Report.

4) If the SGSN/MSC cannot support the deferred location request for the specified event or the LCS client is not allowed to position the requested UE according to subscription information, a Provide Subscriber Location error is returned to the GMLC. If the SGSN/MSC can support the deferred location request for the specified event and the privacy checks are satisfied, a Provide Subscriber Location ack shall be returned to the GMLC without a location estimate.

5) The GMLC then returns the LCS Service Response to the LCS Client to notify whether the request was successfully accepted or not.

6) When the periodical timer expires, if the GMLC is still waiting for the event, the GMLC shall send a LCS Service Response to the LCS client, indicating that the location is not available at that moment.

7) When the requested event is detected, the SGSN/MSC will proceed with the location request as described in 9.1.2/9.1.6.

8) When location information has been obtained from the RAN, the SGSN/MSC returns the Subscriber Location Report. The report includes an indication that this is a response to a previously sent deferred location request.

If the location information could not be obtained, or the SGSN/MSC for some other reason decides to not wait any longer for the requested event to occur (ex. timer expires), the Subscriber Location Report will be returned with an appropriate error cause indicating termination of the deferred location request.

9) GMLC then returns the LCS Service Response to the LCS Client as in 9.1.2/9.1.6.

10) When the timer expires, if the GMLC is not waiting for the event, the GMLC sends a Send Routing Info for LCS to the home HLR/HSS of the target UE and receives SGSN/MSC addresses from the HLR/HSS as described in 9.1.1. If the GMLC already knows both the VMSC/MSC server or SGSN location and IMSI for the particular MSISDN or PDP address, (e.g. from a previous location request), the Send Routing Info is not sent to the HLR/HSS.

11) Same as step 3.

12) Same as step 4.

13) Same as step 5.

14) If the requested event is already satisfied, the SGSN/MSC will proceed with the location request as described in 9.1.2/9.1.6.

15) Same as step 8.

16) Same as step 9.

9.1.8.4~~3~~ Cancellation of a Deferred Location Request

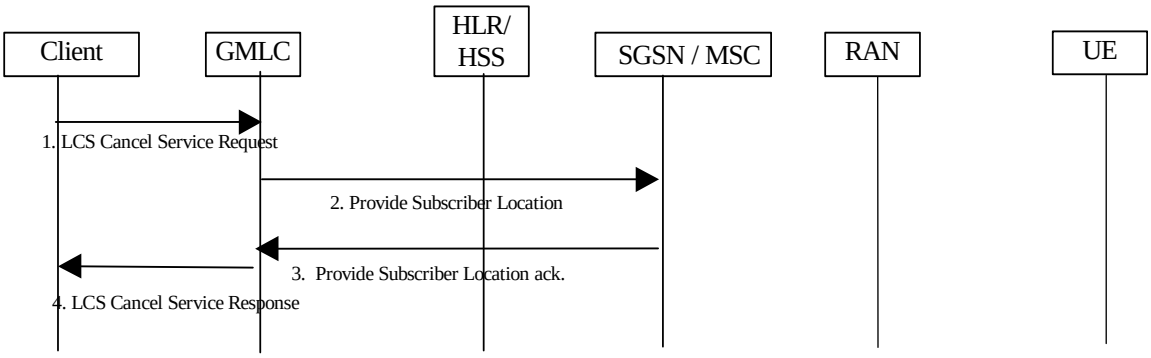

Figure 9.6~~b~~c: Cancellation of a Deferred MT-LR procedure

1) The LCS Client requests the cancellation of a previously requested Deferred Location Request. The cancellation could be initiated by the GMLC itself for some reasons (e.g. implementation dependent timer in the GMLC expired). The event type to cancel must be indicated in the Cancellation procedure.

2) The GMLC will indicate this cancellation request in the Provide Subscriber Location toward the SGSN/MSC.

3) When the SGSN/MSC completes the cancellation procedure, it notifies it to the GMLC in the Provide Subscriber Location Ack (with no location estimate included).

4) The GMLC informs the LCS Client that the cancellation procedure has been successfully completed.

3GPP TSG- SA WG2 (LCS ad hoc) ***Tdoc S2-020314***

CR-Form-v3

With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< first modified section>>

3.3 Abbreviations

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

2G-	Second Generation
3G-	Third Generation
AC	Admission Control
AI	Application Interface (prefix to interface class method)
ANM	Answer Message (ISUP)
APN	Access Point Name
APN-NI	APN Network Identifier

<< next modified section>>

9.1.1 MT-LR routing procedure in PS and CS domain

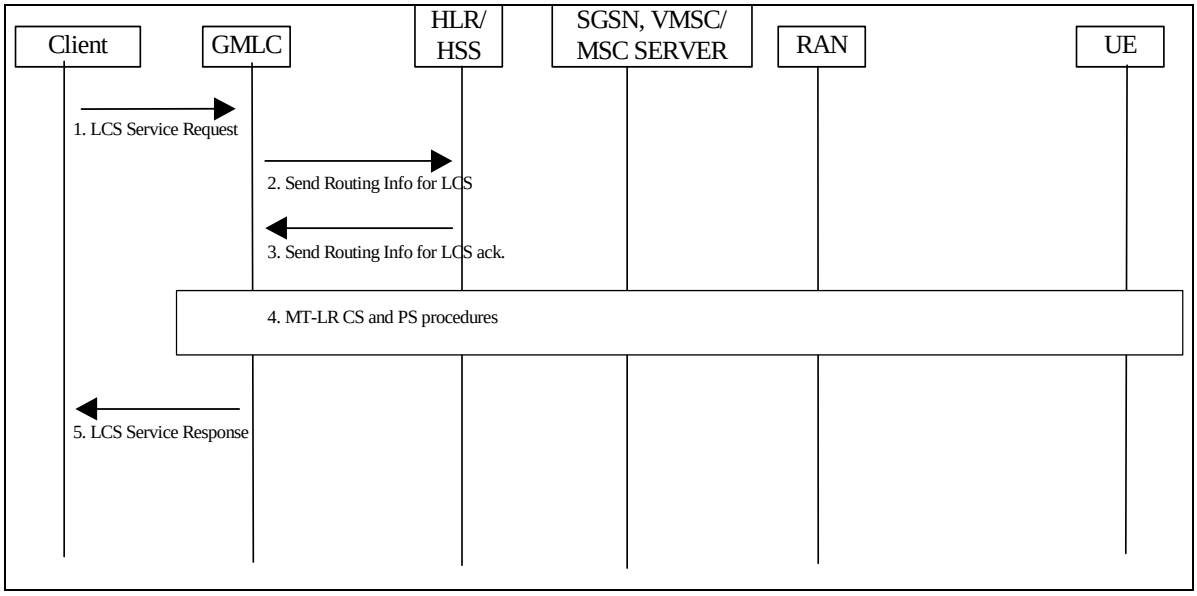

Figure 9.1: General Network Positioning for a MT-LR

1) An external LCS client requests the current location of a target UE from a GMLC. The LCS Client may also request a deferred location request, i.e. based on event. The GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI or PDP address, (NOTE: IP addressing in this context is FFS, one reason is the dynamic IP addressing used in IPv4.) of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client. For a call related ~~or session related~~ location request, the GMLC obtains and authenticates the called party number of the LCS client. For a session related location request, the GMLC obtains and authenticates the APN-NI of the LCS client. If location is required for more than one UE, or if periodic location is requested, the steps following below may be repeated.
   Note: This means that GMLC handles the periodicity of location requests as requested by the LCS client both in CS and PS domain.

<< next modified section>>

9.1.6.1 Location Preparation Procedure

1) Common PS and CS MT-LR procedure as described in 9.1.1.

2) GMLC sends a Provide Subscriber Location message to the SGSN indicated by the HLR/HSS. This message carries the type of location information requested (e.g. current location), the UE subscriber's IMSI, LCS QoS information (e.g. accuracy, response time) and an indication of whether the LCS client has the override capability. For a session related location request, the message also carries the APN-NI to which the user has established the session. For a value added LCS client, the message shall carry the client name and the external identity of the LCS client. For a PLMN operator LCS client, the message shall carry the internal identity of the LCS client.

<< next modified section>>

9.5.3.2 Call/Session related class

When the user of the UE subscribes to the "Call/Session related Class" the CS-MT-LR/PS-MT-LR or NI-LR/PS-NI-LR positioning is allowed in the following cases:

Allow positioning by specific identified value added LCS client or groups of value added LCS Client to which the UE originated a call in CS domain or a value added LCS client with which the UE has a session via an active PDP context in PS domain indicated by a specific APN-NI. For all clients in the call related class, OR For each identified LCS client or group of LCS Clients, one of the following subscription options shall apply:

<< next modified section>>

9.5.3.2.2 Call/session-related class in the PS-domain

If the UE subscribes to the call/session-related class, a PS-MT-LR may be allowed if all of the following conditions are met:

- The UE previously originated a PDP-context towards the network where the external client is located and that this context is still established

- The APN-NI negotiated between the UE and SGSN matches the APN-NI received from the GMLC.

<< next modified section>>

9.5.3.5 Matching of LCS client identities

In evaluating privacy where any address "A" associated with the LCS client (e.g. LCS client ID or GMLC address) needs to be compared with a corresponding address "B" in the target UE's SLPP, a match shall be determined if a match is found for each of the following components of each address:

a) numbering plan;

b) nature of address indicator;

c) corresponding address digits for all digits in "B" (the digits or initial digits in "A" must match all the digits in "B", but "A" may contain additional digits beyond those in "B").

All addresses shall be transferred to the MSC/VLR, MSC server or SGSN in international format, except for the called party number received from the GMLC during a Call-Related CS MT-LR when the LCS client was reached via IN or abbreviated number routing (e.g. toll-free number or emergency call routing). In these cases it is up to the GMLC to use the valid national specific number of the visited country.

In evaluating privacy where an APN-NI associated with the LCS client notified by the GMLC needs to be compared with a corresponding APN that is used to set up the associated PDP context, a match shall be determined if a match is found for each of component of APN-NI. ~~each of following components of each address:~~

~~a) Operator Identifier (the Operator Identifier received from the GMLC is compared with the corresponding information used to set up the associated PDP Context in the SGSN when the associated PS session was established)~~

~~b) Network Identifier~~

<< next modified section>>

10.3 GMLC

The GMLC holds data for a set of external LCS clients that may make call related or non-call related CS-MT-LR/PS-MT-LR requests to this GMLC. The permanent data administered for each LCS client is as follows.

Table10.6: GMLC Permanent Data for a LCS Client

LCS Client data in GMLC	Status	Description
LCS Client Type	M	Identifies the type LCS client from among the following: - Emergency Services - Value Added Services - PLMN Operator Services - Lawful Intercept Services
External identity	O	A list of one or more identifiers used to identify an external LCS client. The identity may be used when making an MT-LR and/or MO-LR. The format of the identity is international E.164 addresses. Each external identity shall be associated with a logical client name.
Authentication data	M	Data employed to authenticate the identity of an LCS client – details are outside the scope of the present document
Call/session related identity	O	A list of one or more international E.164 addresses, which are used to make calls by mobile subscribers, or APN-NIs (see NOTE) to identify the client for a call related MT-LR In case the LCS client was reached via IN or abbreviated number routing (e.g. toll free number or emergency call routing), the E.164 number(s) stored in the GMLC shall be the number(s) that the UE has to dial to reach the LCS Client. In these cases the E.164 number is not to be in international format. The country in which the national specific number(s) is (are) applicable is (are) also stored (or implied) in this case. Each call related identity may be associated with a specific external identity. Each call/session-related identity shall be associated with a logical client name.
Internal identity	O	Identifies the type PLMN operator services and the following classes are distinguished: - LCS client broadcasting location related information - O&M LCS client in the HPLMN - O&M LCS client in the VPLMN - LCS client recording anonymous location information - LCS Client supporting a bearer service, teleservice or supplementary service to the target UE This identity is applicable only to PLMN Operator Services.
Client name	O	An address string which is a logical name associated with LCS client's external identity (i.e., E.164 address).
Override capability	O	Indication of whether the LCS client possesses the override capability (not applicable to a value added and PLMN operator service)
Authorized UE List	O	A list of MSISDNs or groups of MSISDN for which the LCS client may issue a non-call related MT-LR. Separate lists of MSISDNs and groups of MSISDN may be associated with each distinct external or non-call related client identity.
Priority	M	The priority of the LCS client – to be treated as either the default priority when priority is not negotiated between the LCS server and client or the highest allowed priority when priority is negotiated
QoS parameters	M	The default QoS requirements for the LCS client, comprising: - Accuracy - Response time Separate default QoS parameters may be maintained for each distinct LCS client identity (external, non-call related, call related)
Allowed LCS Request Types	M	Indicates which of the following are allowed: - Non-call related CS-MT-LR/PS-MT-LR - Call/session related CS-MT-LR/PS-MT-LR - Specification or negotiation of priority - Specification or negotiation of QoS parameters - Request of current location - Request of current or last known location
Local Co-ordinate System	O	Definition of the co-ordinate system(s) in which a location estimate shall be provided – details are outside the scope of the present document
Access Barring List(s)	O	List(s) of MSISDNs or groups of MSISDN for which a location request is barred

NOTE: The LCS Client is identified with E.164 number or APN. APN is specified in TS 23.003. ~~The APN identity of the LCS Client shall include Operator Identifier as mandatory (i.e. it is globally unique) to show whether the session-related MT_LR is associated with a session towards the VPLMN or HPLMN.~~

<< next modified section>>

Annex B (normative): Presence of LCS client ID Components in MT-LR

The LCS client identity is composed of one or more than one of the following components: LCS client type, external identity, internal identity, call/session related identity, APN-NI, and client name. The LCS client type shall always be present and for each LCS client type the presence of the other components are defined as follows:

Component LCS Client type	External identity	Internal identity	Call/session related identity	Client name
Emergency	O	N.A.	N.A.	N.A.
Value added	M	N.A.	O [Note]	M
PLMN operator	N.A.	M	N.A.	N.A.
Lawful Intercept	N.A.	N.A.	N.A.	N.A.

Note: This component shall be present if the MT-LR is associated to either CS call or PS session. If the MT-LR is associated with the CS call, the number dialled by UE is used. Otherwise if the MT-LR is associated with the PS session, the APN-NI is used.

With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< first modified section>>

3.3 Abbreviations

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

2G-	Second Generation
3G-	Third Generation
AC	Admission Control
AI	Application Interface (prefix to interface class method)
ANM	Answer Message (ISUP)
APN	Access Point Name
APN-NI	APN Network Identifier

<< next modified section>>

9.1.1 MT-LR routing procedure in PS and CS domain

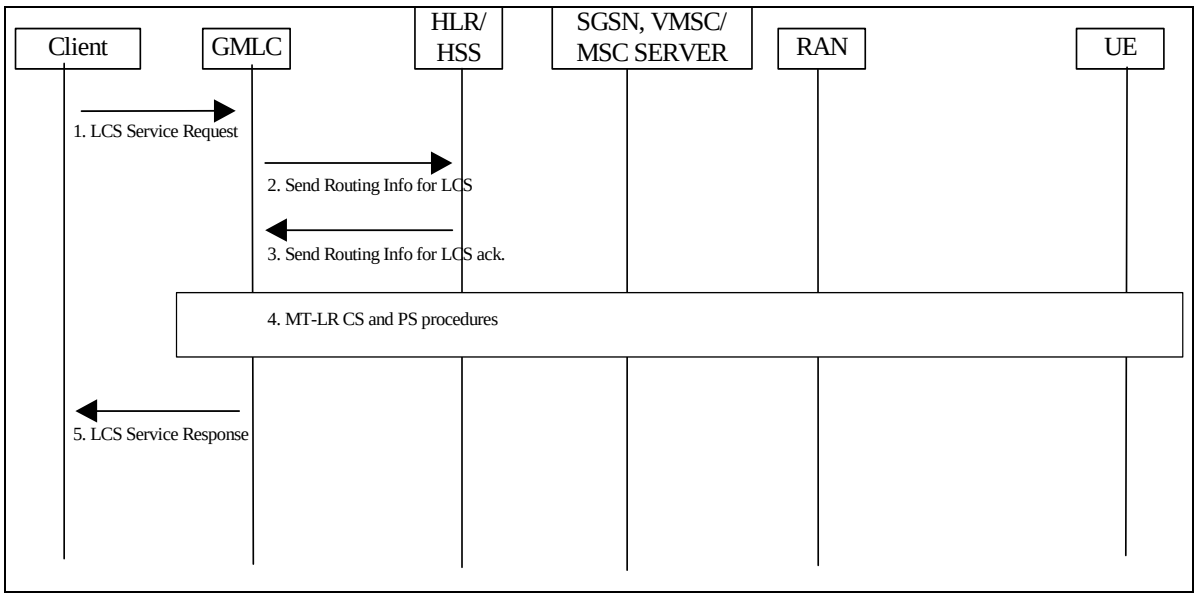

Figure 9.1: General Network Positioning for a MT-LR

1) An external LCS client requests the current location of a target UE from a GMLC. The LCS Client may also request a deferred location request, i.e. based on event. The GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI or PDP address, (NOTE: IP addressing in this context is FFS, one reason is the dynamic IP addressing used in IPv4.) of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client. For a call related ~~or session related~~ location request, the GMLC obtains and authenticates the called party number of the LCS client. For a session related location request, the GMLC obtains and authenticates the APN-NI of the LCS client. If location is required for more than one UE, or if periodic location is requested, the steps following below may be repeated.
   Note: This means that GMLC handles the periodicity of location requests as requested by the LCS client both in CS and PS domain.

<< next modified section>>

9.5.3.2 Call/Session related class

When the user of the UE subscribes to the "Call/Session related Class" the CS-MT-LR/PS-MT-LR or NI-LR/PS-NI-LR positioning is allowed in the following cases:

Allow positioning by specific identified value added LCS client or groups of value added LCS Client to which the UE originated a call in CS domain or a value added LCS client with which the UE has a session via an active PDP context in PS domain indicated by a specific APN-NI. For all clients in the call related class, OR For each identified LCS client or group of LCS Clients, one of the following subscription options shall apply:

<< next modified section>>

9.1.6.1 Location Preparation Procedure

1) Common PS and CS MT-LR procedure as described in 9.1.1.

2) GMLC sends a Provide Subscriber Location message to the SGSN indicated by the HLR/HSS. This message carries the type of location information requested (e.g. current location), the UE subscriber's IMSI, LCS QoS information (e.g. accuracy, response time) and an indication of whether the LCS client has the override capability. For a session related location request, the message also carries the APN-NI to which the user has established the session. For a value added LCS client, the message shall carry the client name and the external identity of the LCS client. For a PLMN operator LCS client, the message shall carry the internal identity of the LCS client.

<< next modified section>>

9.5.3.2 Call/Session related class

When the user of the UE subscribes to the "Call/Session related Class" the CS-MT-LR/PS-MT-LR or NI-LR/PS-NI-LR positioning is allowed in the following cases:

Allow positioning by specific identified value added LCS client or groups of value added LCS Client to which the UE originated a call in CS domain or a value added LCS client with which the UE has a session via an active PDP context in PS domain indicated by a specific APN-NI. For all clients in the call related class, OR For each identified LCS client or group of LCS Clients, one of the following subscription options shall apply:

<< next modified section>>

9.5.3.2.2 Call/session-related class in the PS-domain

If the UE subscribes to the call/session-related class, a PS-MT-LR may be allowed if all of the following conditions are met:

- The UE previously originated a PDP-context towards the network where the external client is located and that this context is still established
- The APN-NI negotiated between the UE and SGSN matches the APN-NI received from the GMLC.
- The identity of the LCS client or LCS client group supplied by the GMLC matches the identity of any LCS Client or LCS Client group contained in the UE's SLPP and any other GMLC restrictions associated with this LCS Client identity in the SLPP are also met

If these conditions are satisfied, the PS-MT-LR shall be allowed if the UE user subscribes to either location without notification or location with notification. If the UE user subscribes to location with notification and privacy verification, the PS-MT-LR shall be allowed following notification to the UE if the UE user either returns a response indicating that location is allowed or returns no response but subscribes to allowing location in the absence of a response. In all other cases, the PS-MT-LR shall be restricted.

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<< next modified section>>

9.5.3.5 Matching of LCS client identities

In evaluating privacy where any address "A" associated with the LCS client (e.g. LCS client ID or GMLC address) needs to be compared with a corresponding address "B" in the target UE's SLPP, a match shall be determined if a match is found for each of the following components of each address:

a) numbering plan;

b) nature of address indicator;

c) corresponding address digits for all digits in "B" (the digits or initial digits in "A" must match all the digits in "B", but "A" may contain additional digits beyond those in "B").

All addresses shall be transferred to the MSC/VLR, MSC server or SGSN in international format, except for the called party number received from the GMLC during a Call-Related CS MT-LR when the LCS client was reached via IN or abbreviated number routing (e.g. toll-free number or emergency call routing). In these cases it is up to the GMLC to use the valid national specific number of the visited country.

In evaluating privacy where an APN-NI associated with the LCS client notified by the GMLC needs to be compared with a corresponding APN-NI that is used to set up the associated PDP context, a match shall be determined if a match is found for each of component of APN-NI.~~each of following components of each address:~~

~~a) Operator Identifier (the Operator Identifier received from the GMLC is compared with the corresponding information used to set up the associated PDP Context in the SGSN when the associated PS session was established)~~

~~b) Network Identifier~~

<< next modified section>>

10.3 GMLC

The GMLC holds data for a set of external LCS clients that may make call related or non-call related CS-MT-LR/PS-MT-LR requests to this GMLC. The permanent data administered for each LCS client is as follows.

Table10.6: GMLC Permanent Data for a LCS Client

LCS Client data in GMLC	Status	Description
LCS Client Type	M	Identifies the type LCS client from among the following: - Emergency Services - Value Added Services - PLMN Operator Services - Lawful Intercept Services
External identity	O	A list of one or more identifiers used to identify an external LCS client. The identity may be used when making an MT-LR and/or MO-LR. The format of the identity is international E.164 addresses. Each external identity shall be associated with a logical client name.
Authentication data	M	Data employed to authenticate the identity of an LCS client – details are outside the scope of the present document
Call/session related identity	O	A list of one or more international E.164 addresses, which are used to make calls by mobile subscribers, or APN-NIs (see NOTE) to identify the client for a call related MT-LR In case the LCS client was reached via IN or abbreviated number routing (e.g. toll free number or emergency call routing), the E.164 number(s) stored in the GMLC shall be the number(s) that the UE has to dial to reach the LCS Client. In these cases the E.164 number is not to be in international format. The country in which the national specific number(s) is (are) applicable is (are) also stored (or implied) in this case. Each call related identity may be associated with a specific external identity. Each call/session-related identity shall be associated with a logical client name.
Internal identity	O	Identifies the type PLMN operator services and the following classes are distinguished: - LCS client broadcasting location related information - O&M LCS client in the HPLMN - O&M LCS client in the VPLMN - LCS client recording anonymous location information - LCS Client supporting a bearer service, teleservice or supplementary service to the target UE This identity is applicable only to PLMN Operator Services.
Client name	O	An address string which is a logical name associated with LCS client's external identity (i.e., E.164 address).
Override capability	O	Indication of whether the LCS client possesses the override capability (not applicable to a value added and PLMN operator service)
Authorized UE List	O	A list of MSISDNs or groups of MSISDN for which the LCS client may issue a non-call related MT-LR. Separate lists of MSISDNs and groups of MSISDN may be associated with each distinct external or non-call related client identity.
Priority	M	The priority of the LCS client – to be treated as either the default priority when priority is not negotiated between the LCS server and client or the highest allowed priority when priority is negotiated
QoS parameters	M	The default QoS requirements for the LCS client, comprising: - Accuracy - Response time Separate default QoS parameters may be maintained for each distinct LCS client identity (external, non-call related, call related)
Allowed LCS Request Types	M	Indicates which of the following are allowed: - Non-call related CS-MT-LR/PS-MT-LR - Call/session related CS-MT-LR/PS-MT-LR - Specification or negotiation of priority - Specification or negotiation of QoS parameters - Request of current location - Request of current or last known location
Local Co-ordinate System	O	Definition of the co-ordinate system(s) in which a location estimate shall be provided – details are outside the scope of the present document
Access Barring List(s)	O	List(s) of MSISDNs or groups of MSISDN for which a location request is barred

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NOTE: The LCS Client is identified with E.164 number or APN-NI. APN-NI is specified in TS 23.003. ~~The APN identity of the LCS Client shall include Operator Identifier as mandatory (i.e. it is globally unique) to show whether the session-related MT_LR is associated with a session towards the VPLMN or HPLMN.~~

<< next modified section>>

Annex B (normative): Presence of LCS client ID Components in MT-LR

The LCS client identity is composed of one or more than one of the following components: LCS client type, external identity, internal identity, call/session related identity, APN-NI, and client name. The LCS client type shall always be present and for each LCS client type the presence of the other components are defined as follows:

Component LCS Client type	External identity	Internal identity	Call/session related identity	Client name
Emergency	O	N.A.	N.A.	N.A.
Value added	M	N.A.	O [Note]	M
PLMN operator	N.A.	M	N.A.	N.A.
Lawful Intercept	N.A.	N.A.	N.A.	N.A.

Note: This component shall be present if the MT-LR is associated to either CS call or PS session. If the MT-LR is associated with the CS call, the number dialled by UE is used. Otherwise if the MT-LR is associated with the PS session, the APN-NI is used.

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3GPP TSG-SA2 Meeting #23 ***Revised 4.3.2002 Tdoc S2-020625***
Sophia Antipolis, France, 18 – 22 February, 2002

CR-Form-v5

CHANGE REQUEST

⌘ **03.71** **CR** **A039** ⌘ **rev** **1** ⌘ Current version: **7.8.0** ⌘

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

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

Title:	⌘	Removal of NA-ESRK from MT-LR request for North American Emergency call
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	4.3.2002
Category:	⌘	**F**
Release:	⌘	R98

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

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

Reason for change:	⌘	Currently there is a misalignment between 03.71 and 09.02 regarding inclusion of NA-ESRK parameter in MT-LR request for North American Emergency Service call. According to TIA/EIA/J-STD-036 the GMLC does not identify target MS using NA-ESRK in an updated location request. Instead a MAP Provide Subscriber Location request sent to the MSC contains the IMSI or, if not available, the MSISDN. For this reason there is no parameter for NA-ESRK in the MAP Provide Subscriber Location request. This issue was discussed also in CN4#12, see N4-020184.
Summary of change:	⌘	It is proposed that 03.71 is aligned with 09.02 and TIA/EIA/J-STD-036 by removing NA-ESRK from MT-LR request for North American Emergency Service call.
Consequences if not approved:	⌘	3GPP specifications 03.71 and 09.02 are contradictory, and there is room for misinterpretations. It should be noted that the proposed change doesn't have impact on existing implementations because stage 3 doesn't support NA-ESRK parameter.

Clauses affected:	⌘	7.6.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.6.2 MT-LR without HLR Query - applicable to North America Emergency Calls only

Figure 30 illustrates location for a North American Emergency Services call, where an emergency services client identifies the target MS using an IMSI, MSISDN or NA-ESRK plus, possibly IMEI, that were previously provided to it by the VMSC (e.g. see section 7.6.4). The emergency services client also identifies the VMSC to the GMLC by providing an NA-ESRD or NA-ESRK or by referring to information for the target MS already stored in the GMLC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target MS. This is necessary when the home HLR either cannot be identified (e.g. client provides an NA-ESRK but not IMSI or MSISDN) or does not support the LCS query procedure.

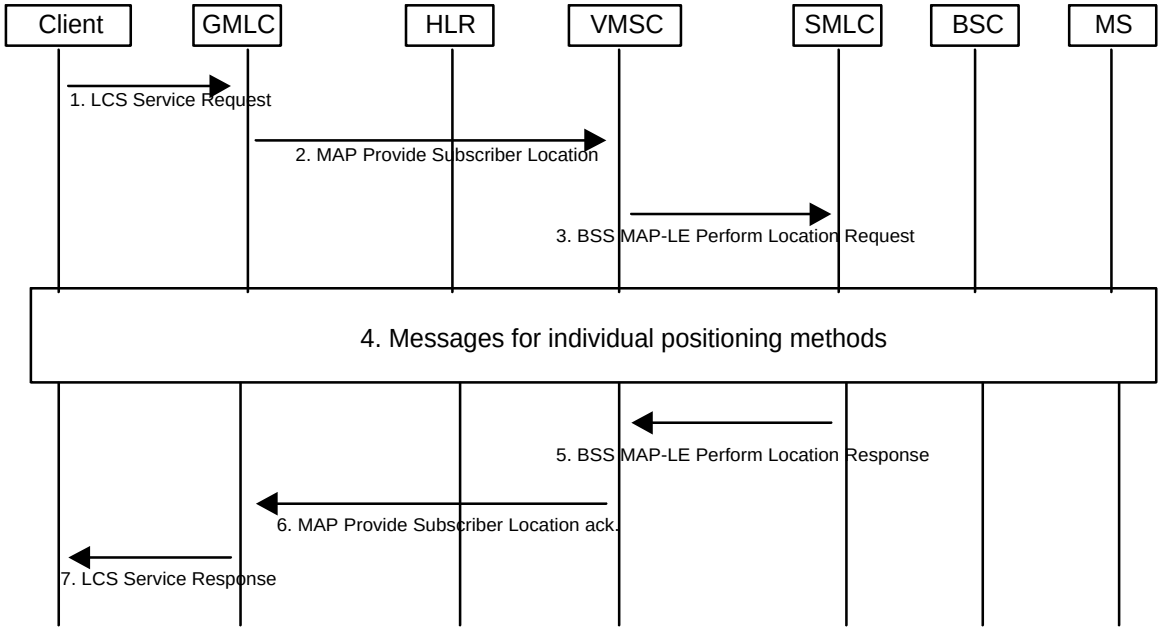

Figure 30: Positioning for a Emergency Services MT-LR without HLR Query

1) Same as step 1 in figure 29 but with the LCS client identifying first the target MS by an IMSI, MSISDN or NA-ESRK and possibly IMEI and, second, the VMSC by an NA-ESRK or NA-ESRD.

2) If the GMLC already has stored information for the target MS (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD – with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the IMSI, if available, or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI for the target MS, as well as the required QoS and an indication of a location request from an emergency services client. The VMSC identifies the target MS using the IMSI~~,~~ or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI.

3) The VMSC verifies that MS privacy is overridden by the emergency services provider and that positioning is not prevented for other reasons (e.g. unreachable MS, inapplicable call type to the MS). The VMSC then sends a BSSMAP-LE Perform Location Request to the SMLC, either directly or via the BSC, as in steps 8-10 for a normal MT-LR.

4) The SMLC performs positioning as in step 11 for a normal MT-LR.

5) The SMLC returns a location estimate to the VMSC either directly or via the BSC as in steps 12-14 for a normal MT-LR.

6) to (7) Same as steps 15 to 16 for a normal MT-LR.

3GPP TSG-SA2 Meeting #23 ***Revised 4.3.2002 Tdoc S2-020626***
Sophia Antipolis, France, 18 – 22 February, 2002

CR-Form-v5

CHANGE REQUEST

⌘ **03.71** **CR** **A040** ⌘ **rev** **1** ⌘ Current version: **8.4.0** ⌘

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

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

Title:	⌘	Removal of NA-ESRK from MT-LR request for North American Emergency call
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	4.3.2002
Category:	⌘	**A**
Release:	⌘	R99

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

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

Reason for change:	⌘	Currently there is a misalignment between 03.71 and 29.002 regarding inclusion of NA-ESRK parameter in MT-LR request for North American Emergency Service call. According to TIA/EIA/J-STD-036 the GMLC does not identify target MS using NA-ESRK in an updated location request. Instead a MAP Provide Subscriber Location request sent to the MSC contains the IMSI or, if not available, the MSISDN. For this reason there is no parameter for NA-ESRK in the MAP Provide Subscriber Location request. This issue was discussed also in CN4#12, see N4-020184.
Summary of change:	⌘	It is proposed that 03.71 is aligned with 29.002 and TIA/EIA/J-STD-036 by removing NA-ESRK from MT-LR request for North American Emergency Service call.
Consequences if not approved:	⌘	3GPP specifications 03.71 and 29.002 are contradictory, and there is room for misinterpretations. It should be noted that the proposed change doesn't have impact on existing implementations because stage 3 doesn't support NA-ESRK parameter.

Clauses affected:	⌘	7.6.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.6.2 MT-LR without HLR Query - applicable to North America Emergency Calls only

Figure 30 illustrates location for a North American Emergency Services call, where an emergency services client identifies the target MS using an IMSI, MSISDN or NA-ESRK plus, possibly IMEI, that were previously provided to it by the VMSC (e.g. see section 7.6.4). The emergency services client also identifies the VMSC to the GMLC by providing an NA-ESRD or NA-ESRK or by referring to information for the target MS already stored in the GMLC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target MS. This is necessary when the home HLR either cannot be identified (e.g. client provides an NA-ESRK but not IMSI or MSISDN) or does not support the LCS query procedure.

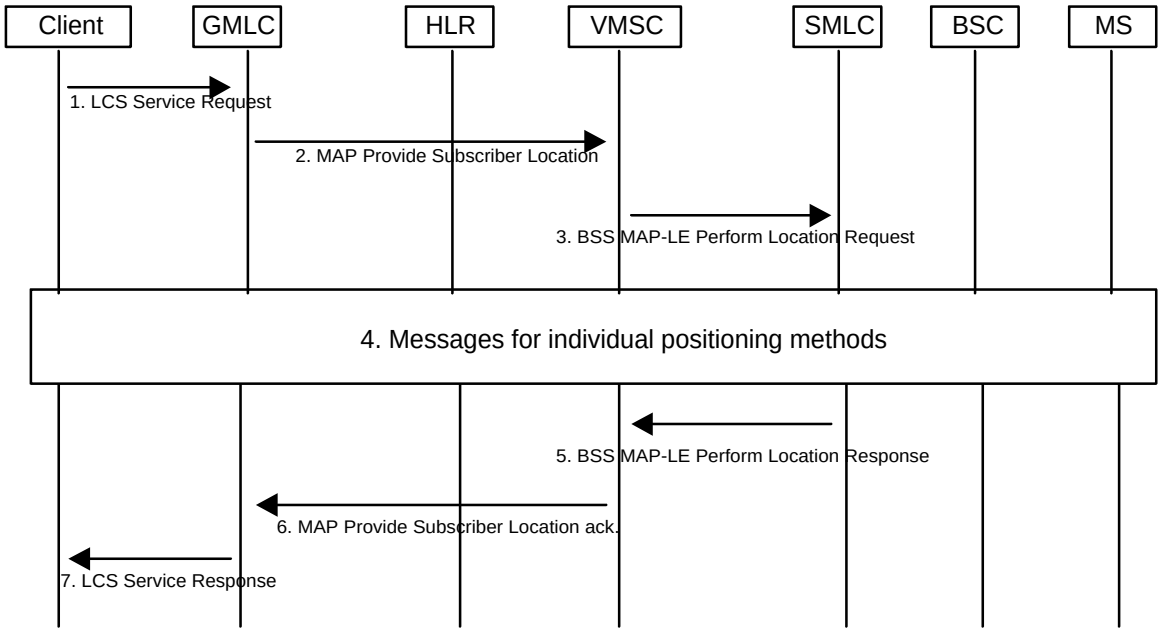

Figure 30: Positioning for a Emergency Services MT-LR without HLR Query

1) Same as step 1 in figure 29 but with the LCS client identifying first the target MS by an IMSI, MSISDN or NA-ESRK and possibly IMEI and, second, the VMSC by an NA-ESRK or NA-ESRD.

2) If the GMLC already has stored information for the target MS (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD – with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the IMSI, if available, or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI for the target MS, as well as the required QoS and an indication of a location request from an emergency services client. The VMSC identifies the target MS using the IMSI~~,~~ or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI.

3) The VMSC verifies that MS privacy is overridden by the emergency services provider and that positioning is not prevented for other reasons (e.g. unreachable MS, inapplicable call type to the MS). The VMSC then sends a BSSMAP-LE Perform Location Request to the SMLC, either directly or via the BSC, as in steps 8-10 for a normal MT-LR.

4) The SMLC performs positioning as in step 11 for a normal MT-LR.

5) The SMLC returns a location estimate to the VMSC either directly or via the BSC as in steps 12-14 for a normal MT-LR.

6) to (7) Same as steps 15 to 16 for a normal MT-LR.

3GPP TSG-SA2 Meeting #23 ***Revised 4.3.2002 Tdoc S2-020627***
Sophia Antipolis, France, 18 – 22 February, 2002

CR-Form-v5

CHANGE REQUEST

⌘ **23.171** **CR** **024** ⌘ **rev** **1** ⌘ Current version: **3.6.0** ⌘

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

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

Title:	⌘	Removal of NA-ESRK from MT-LR request for North American Emergency call
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	4.3.2002
Category:	⌘	**A**
Release:	⌘	R99

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

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

Reason for change:	⌘	Currently there is a misalignment between 23.171 and 29.002 regarding inclusion of NA-ESRK parameter in MT-LR request for North American Emergency Service call. According to TIA/EIA/J-STD-036 the GMLC does not identify target MS using NA-ESRK in an updated location request. Instead a MAP Provide Subscriber Location request sent to the MSC contains the IMSI or, if not available, the MSISDN. For this reason there is no parameter for NA-ESRK in the MAP Provide Subscriber Location request. This issue was discussed also in CN4#12, see N4-020184.
Summary of change:	⌘	It is proposed that 23.171 is aligned with 29.002 and TIA/EIA/J-STD-036 by removing NA-ESRK from MT-LR request for North American Emergency Service call.
Consequences if not approved:	⌘	3GPP specifications 23.171 and 29.002 are contradictory, and there is room for misinterpretations. It should be noted that the proposed change doesn't have impact on existing implementations because stage 3 doesn't support NA-ESRK parameter.

Clauses affected:	⌘	8.7.1a
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.7.1a MT-LR without HLR Query - applicable to North America Emergency Calls only

Figure 8.4a illustrates location for a North American Emergency Services call, where an emergency services client identifies the target UE using an IMSI, MSISDN or NA-ESRK plus, possibly IMEI, that were previously provided to it by the VMSC. The emergency services client also identifies the VMSC to the GMLC by providing an NA-ESRD or NA-ESRK or by referring to information for the target UE already stored in the GMLC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target UE. This is necessary when the home HLR either cannot be identified (e.g. client provides an NA-ESRK but not IMSI or MSISDN) or does not support the LCS query procedure.

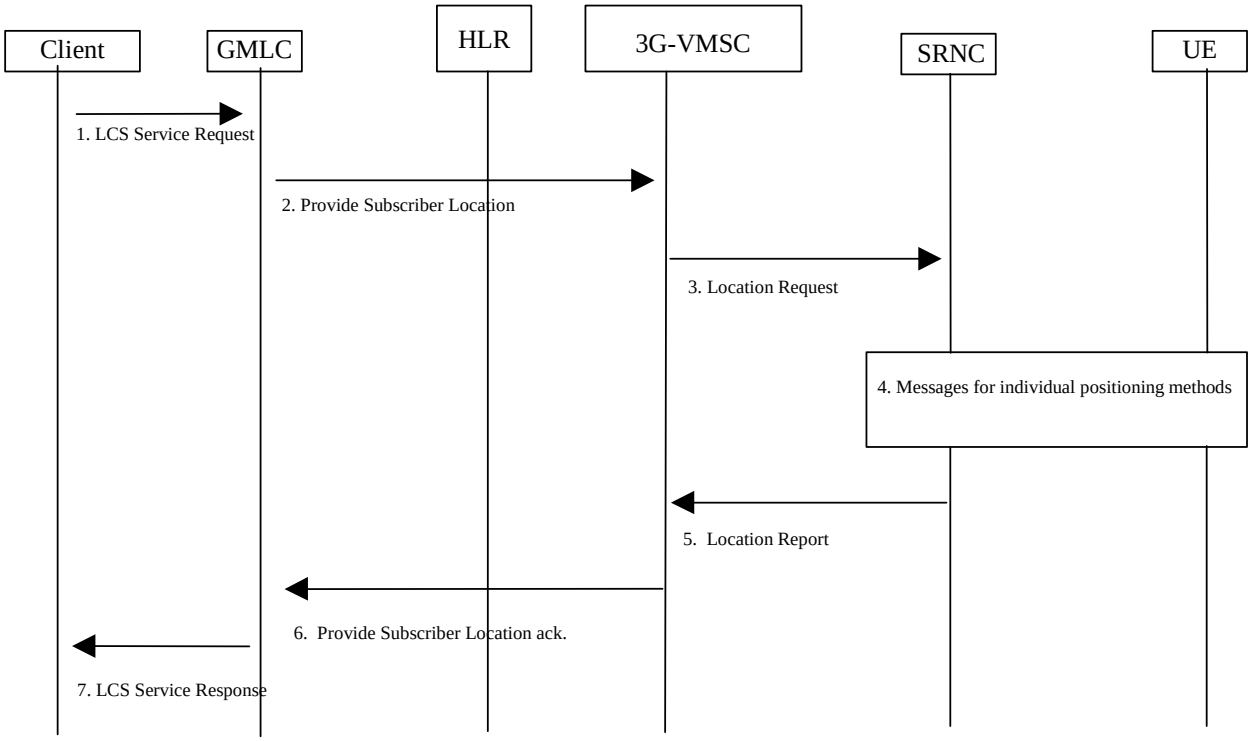

Figure 8.4a: Positioning for a Emergency Services MT-LR without HLR Query

1) Same as step 1 in figure 8.4 but with the LCS client identifying first the target UE by an IMSI, MSISDN or NA-ESRK and possibly IMEI and, second, the VMSC by an NA-ESRK or NA-ESRD.

2) If the GMLC already has stored information for the target UE (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD – with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the IMSI, if available, or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI for the target UE, as well as the required QoS and an indication of a location request from an emergency services client. The VMSC identifies the target UE using the IMSI~~,~~ or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI.

3) The MSC verifies that UE privacy is overridden by the emergency services provider and that positioning is not prevented for other reasons (e.g. unreachable UE, inapplicable call type to the UE). The VMSC then sends a Location Request to the RAN, as for a normal MT-LR.

4) RAN performs positioning as for a normal MT-LR.

5) RAN returns a location estimate to the VMSC as for a normal MT-LR.

6) Same as steps 1-5 for a normal MT-LR.

7) Same as steps 1-6 for a normal MT-LR.

3GPP TSG-SA2 Meeting #23 ***Revised 4.3.2002 Tdoc S2-020628***
Sophia Antipolis, France, 18 – 22 February, 2002

CR-Form-v5

CHANGE REQUEST

⌘ **23.271** **CR** **076** ⌘ **rev** **1** ⌘ Current version: **4.4.0** ⌘

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

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

Title:	⌘	Removal of NA-ESRK from MT-LR request for North American Emergency call
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	4.3.2002
Category:	⌘	**A**
Release:	⌘	Rel-4

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

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

Reason for change:	⌘	Currently there is a misalignment between 23.271 and 29.002 regarding inclusion of NA-ESRK parameter in MT-LR request for North American Emergency Service call. According to TIA/EIA/J-STD-036 the GMLC does not identify target MS using NA-ESRK in an updated location request. Instead a MAP Provide Subscriber Location request sent to the MSC contains the IMSI or, if not available, the MSISDN. For this reason there is no parameter for NA-ESRK in the MAP Provide Subscriber Location request. This issue was discussed also in CN4#12, see N4-020184.
Summary of change:	⌘	It is proposed that 23.271 is aligned with 29.002 and TIA/EIA/J-STD-036 by removing NA-ESRK from MT-LR request for North American Emergency Service call.
Consequences if not approved:	⌘	3GPP specifications 23.271 and 29.002 are contradictory, and there is room for misinterpretations. It should be noted that the proposed change doesn't have impact on existing implementations because stage 3 doesn't support NA-ESRK parameter.

Clauses affected:	⌘	9.1.3
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
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Below is a brief summary:

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.1.3 CS-MT-LR without HLR Query - applicable to North America Emergency Calls only

Figure 9.3 illustrates location for a North American Emergency Services call, where an emergency services client identifies the target UE using an IMSI, MSISDN or NA-ESRK plus, possibly IMEI, that were previously provided to it by the VMSC. The emergency services client also identifies the VMSC to the GMLC by providing an NA-ESRD or NA-ESRK or by referring to information for the target UE already stored in the GMLC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target UE. This is necessary when the home HLR either cannot be identified (e.g. client provides an NA-ESRK but not IMSI or MSISDN) or does not support the LCS query procedure.

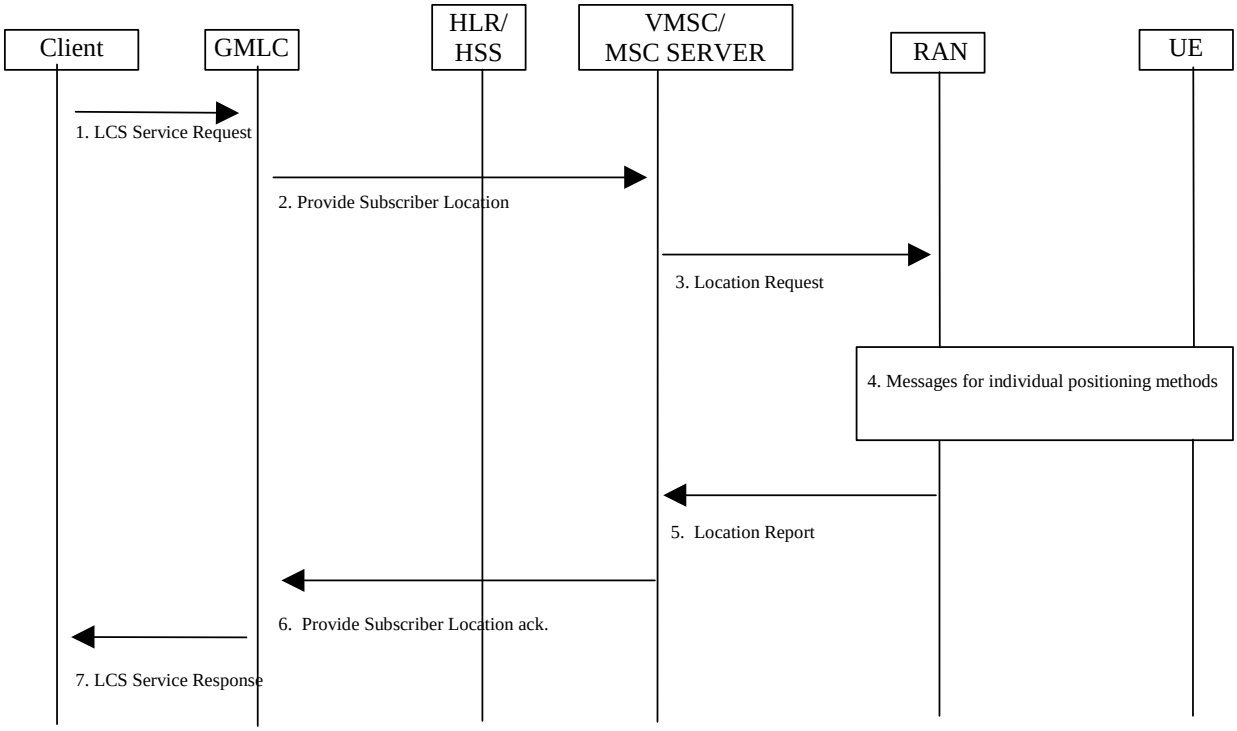

Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query

1) Same as step 1 in figure 9.1 but with the LCS client identifying first the target UE by an IMSI, MSISDN or NA-ESRK and possibly IMEI and, second, the VMSC by an NA-ESRK or NA-ESRD.

2) If the GMLC already has stored information for the target UE (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD - with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the IMSI, if available, or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI for the target UE, as well as the required QoS and an indication of a location request from an emergency services client. The VMSC identifies the target UE using the IMSI~~,~~ or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI.

3) The MSC verifies that UE privacy is overridden by the emergency services provider and that positioning is not prevented for other reasons (e.g. unreachable UE, inapplicable call type to the UE). The VMSC then sends a Location Request to the RAN, as for a normal MT-LR.

4) RAN performs positioning as for a normal CS-MT-LR.

5) RAN returns a location estimate to the VMSC as for a normal CS-MT-LR.

6) Same as steps 9 for a normal CS-MT-LR.

7) Same as steps 10 for a normal CS-MT-LR.

3GPP TSG-SA2 Meeting #23 ***Revised 4.3.2002 Tdoc S2-020629***
Sophia Antipolis, France, 18 – 22 February, 2002

CR-Form-v5

CHANGE REQUEST

⌘ **23.271** **CR** **077** ⌘ **rev** **1** ⌘ 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: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Removal of NA-ESRK from MT-LR request for North American Emergency call
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	4.3.2002
Category:	⌘	**A**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	Currently there is a misalignment between 23.271 and 29.002 regarding inclusion of NA-ESRK parameter in MT-LR request for North American Emergency Service call. According to TIA/EIA/J-STD-036 the GMLC does not identify target MS using NA-ESRK in an updated location request. Instead a MAP Provide Subscriber Location request sent to the MSC contains the IMSI or, if not available, the MSISDN. For this reason there is no parameter for NA-ESRK in the MAP Provide Subscriber Location request. This issue was discussed also in CN4#12, see N4-020184.
Summary of change:	⌘	It is proposed that 23.271 is aligned with 29.002 and TIA/EIA/J-STD-036 by removing NA-ESRK from MT-LR request for North American Emergency Service call.
Consequences if not approved:	⌘	3GPP specifications 23.271 and 29.002 are contradictory, and there is room for misinterpretations. It should be noted that the proposed change doesn't have impact on existing implementations because stage 3 doesn't support NA-ESRK parameter.

Clauses affected:	⌘	9.1.3
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.1.3 CS-MT-LR without HLR Query - applicable to North America Emergency Calls only

Figure 9.3 illustrates location for a North American Emergency Services call, where an emergency services client identifies the target UE using an IMSI, MSISDN or NA-ESRK plus, possibly IMEI, that were previously provided to it by the VMSC. The emergency services client also identifies the VMSC to the GMLC by providing an NA-ESRD or NA-ESRK or by referring to information for the target UE already stored in the GMLC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target UE. This is necessary when the home HLR either cannot be identified (e.g. client provides an NA-ESRK but not IMSI or MSISDN) or does not support the LCS query procedure.

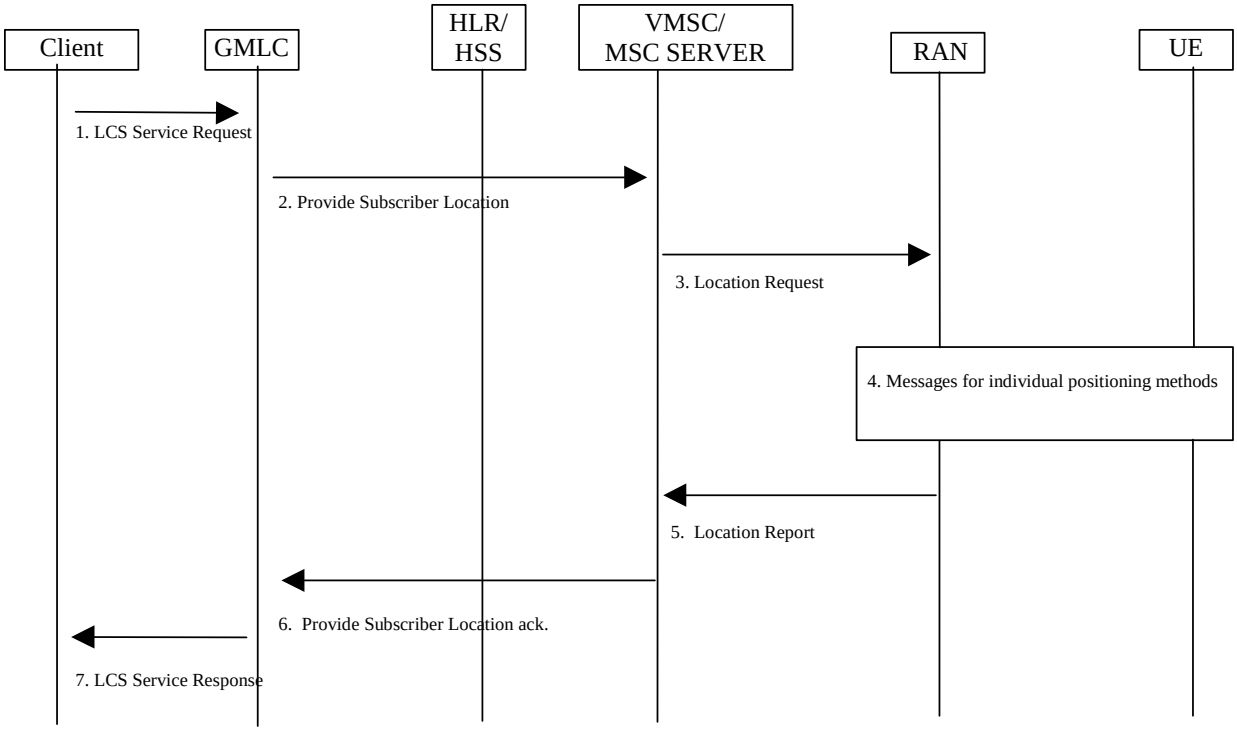

Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query

1) Same as step 1 in figure 9.1 but with the LCS client identifying first the target UE by an IMSI, MSISDN or NA-ESRK and possibly IMEI and, second, the VMSC by an NA-ESRK or NA-ESRD.

2) If the GMLC already has stored information for the target UE (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD - with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the IMSI, if available, or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI for the target UE, as well as the required QoS and an indication of a location request from an emergency services client. The VMSC identifies the target UE using the IMSI~~,~~ or MSISDN ~~or NA-ESRK~~ and, if provided, the IMEI.

3) The MSC verifies that UE privacy is overridden by the emergency services provider and that positioning is not prevented for other reasons (e.g. unreachable UE, inapplicable call type to the UE). The VMSC then sends a Location Request to the RAN, as for a normal MT-LR.

4) RAN performs positioning as for a normal CS-MT-LR.

5) RAN returns a location estimate to the VMSC as for a normal CS-MT-LR.

6) Same as steps 9 for a normal CS-MT-LR.

7) Same as steps 10 for a normal CS-MT-LR.

3GPP TSG-SA WG 2 Meeting #23
Sophia Antipolis, France 18-22 February 2002

Tdoc S2-020635
(revised Tdoc S2-020303)

CR-Form-v5

CHANGE REQUEST

⌘ **23.271** **CR** **058** ⌘ **rev** ~~**2**~~ **3** ⌘ Current version: **4.5.0** ⌘

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

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

Title: ⌘	Clarification of OSA support for LCS in TS 23.271	
Source: ⌘	Nokia, TeleCommunication Systems and Lucent Technologies	
Work item code: ⌘	LCS	***Date:*** ⌘ ~~9 January~~13 February 2002
Category: ⌘	**F**	***Release:*** ⌘ REL-4

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

Use one of the following releases:

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

Reason for change: ⌘	The reference to OSA is unclear in the current specification.
Summary of change: ⌘	The role of OSA is clarified in the architecture figure. Also references to OSA specifications and a term SCS are added. The architecture figure 6.1 is further clarified by reflecting the case where the LCS client directly obtain location information from the GMLC, which may contain OSA mobility SCS.
Consequences if not approved: ⌘	Unclarities persist.

Clauses affected: ⌘	2.1, 3.3, 6		
Other specs affected: ⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments: ⌘			

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

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.*

2.1 Normative references

[1] 3G TS 25.305: "Stage 2 functional specification of UE positioning in UTRAN".

[2] GSM 01.04 (ETR 350): "Abbreviations and acronyms".

[3] 3G TS 21.905: "UMTS Abbreviations and acronyms".

[4] 3G TS 22.071: "Technical Specification Group Systems Aspects; Location Services (LCS); Stage 1".

[5] (void)

[6] 3G TS 48.008: "Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[7] 3G TS 22.100: "UMTS phase 1 (Release 1999)".

[8] 3G TS 22.101: "Service principles".

[9] 3G TS 22.105: "Services and Service Capabilities".

[10] 3G TS 22.115: "Charging and Billing".

[11] 3G TS 23.032 (GSM 03.32): "Universal Geographical Area Description (GAD)".

[12] 3G TS 22.121: "The Virtual Home Environment".

[13] 3G TS 23.110: "UMTS Access Stratum Services and Functions".

[14] 3G TS 25.413: "UTRAN Iu Interface RANAP signaling".

[15] 3G TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[16] 3G TS 43.059: "Functional Stage 2 description of Location Services in GERAN".

[17] 3G TS 23.003: "Numbering, addressing and identification".

[18] 3G TS 29.002: "Mobile Application Part (MAP) Specification".

[19] GSM 04.02: "GSM Public Land Mobile Network (PLMN) access reference configuration".

[20] 3G TS 23.002: "Network architecture".

[21] 3G TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - stage 2".

[22] 3G TS 23.011: "Technical realization of Supplementary Services".

[23] 3G TS 23.007: "Restoration procedures".

[24] 3G TS 24.008: "Mobile Radio Interface - Layer 3 MM/CC Specification".

[24a] 3G TS 25.331 "RRC protocol specification".

[24b] 3G TS 23.127: "Virtual Home Environment".

[24c] 3G TS 29.198-1: “Open Service Access (OSA); Application Programming Interface (API); Part 1; Overview”.

[24d] 3G TS 29.198-2: “Open Service Access (OSA); Application Programming Interface (API); Part 2; Common Data”.

[24e] 3G TS 29.198-3: “Open Service Access (OSA); Application Programming Interface (API); Part 3; Framework”.

[24fe] 3G TS 29.198-6: "Open Service Access (OSA); Application Programming Interface (API); Part 6: Mobility".

2.2 Informative references

[25] Third generation (3G) mobile communication system; Technical study report on the location services and technologies, ARIB ST9 December 1998.

[26] The North American Interest Group of the GSM MoU ASSOCIATION: Location Based Services, Service Requirements Document of the Services Working Group.

3.3 Abbreviations

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

2G-	Second Generation
3G-	Third Generation
AC	Admission Control
AI	Application Interface (prefix to interface class method)
ANM	Answer Message (ISUP)
APN	Access Point Name
ARIB	Association of Radio Industries and Business
ATD	Absolute Time Difference
BCCH	Broadcast Control Channel
BER	Bit Error Rate
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CAMEL	Customised Application For Mobile Network Enhanced Logic
CAP	CAMEL Application Part
CM	Connection Management
CN	Core Network
CSE	Camel Service Environment
DL	Downlink
DRNC	Drift RNC
E-OTD	Enhanced Observed Time Difference
FER	Frame Error Rate
GERAN	GSM EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GMLC	Gateway MLC
GPRS	General Packet Radio Service
GPS	Global Positioning System
HE	Home Environment
HSS	Home Subscriber Server
HLR	Home Location Register
HPLMN	Home Public Land Mobile Network
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPDL	Idle Period Downlink
LA	Location Application
LAF	Location Application Function
LBS	Location Based Services
LCAF	Location Client Authorization Function
LCCF	Location Client Control Function
LCCTF	Location Client Co-ordinate Transformation Function
LCF	Location Client Function
LCS	LoCation Services
LDR	Location Deferred Request
LIR	Location Immediate Request,
LMU	Location Measurement Unit
LSAF	Location Subscriber Authorization Function
LSBcF	Location System Broadcast Function
LSBF	Location System Billing Function
LSCF	Location System Control Function
LSOF	Location System Operation Function
LSPF	Location Subscriber Privacy Function
MAP	Mobile Application Part
ME	Mobile Equipment
MExE	Mobile Execution Environment
MLC	Mobile Location Center

MM	Mobility Management
MO-LR	Mobile Originated Location Request
MS	Mobile Station
MSC	Mobile Services switching Center
MSC	Mobile services Switching Centre
MSISDN	Mobile Station Integrated Services Data Network
MT-LR	Mobile Terminated Location Request
NA-ESRD	North American Emergency Service Routing Digits
NA-ESRK	North American Emergency Service Routing Key
NI-LR	Network Induced Location Request
OSA	Open Service Architecture
OTDOA	Observed Time Difference Of Arrival
PC	Power Control
PCF	Power Calculation Function
PLMN	Public Land Mobile Network
POI	Privacy Override Indicator
PRCF	Positioning Radio Co-ordination Function
PRRM	Positioning Radio Resource Management
PSE	Personal Service Environment
PSMF	Positioning Signal Measurement Function
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RA	Routing Area
RACH	Random Access Channel
RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RIS	Radio Interface Synchronization
RNC	Radio Network Controller
RRM	Radio Resource Management
RTD	Real Time Difference
SAT	SIM Application Tool-Kit
SCCP	Signalling Connection Control Part
SCS	Service Capability Server
SGSN	Serving GPRS Support Node, SGSN in this specification normally refers to 3G-SGSN only, SGSN in GSM is noted 2G-SGSN
SI	Service Interface (prefix to interface class method)
SIM	Subscriber Identity Module
SIR	Signal Interference Ratio
SLPP	Subscriber LCS Privacy Profile
SMLC	Serving Mobile Location Center
SMS	Short Message Service
SP	Service Point
SRNC	Serving RNC
SS7	Signaling System No 7
TA	Timing Advance
TMSI	Temporary Mobile Subscriber Identity
TOA	Time Of Arrival
UDT	SCCP Unitdata message
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
USIM	Universal Subscriber Identity Module
UTRAN	Universal Terrestrial Radio Access Network
VASP	Value Added Service Provider
VHE	Virtual Home Environment
WCDMA	Wideband Code Division Multiple Access

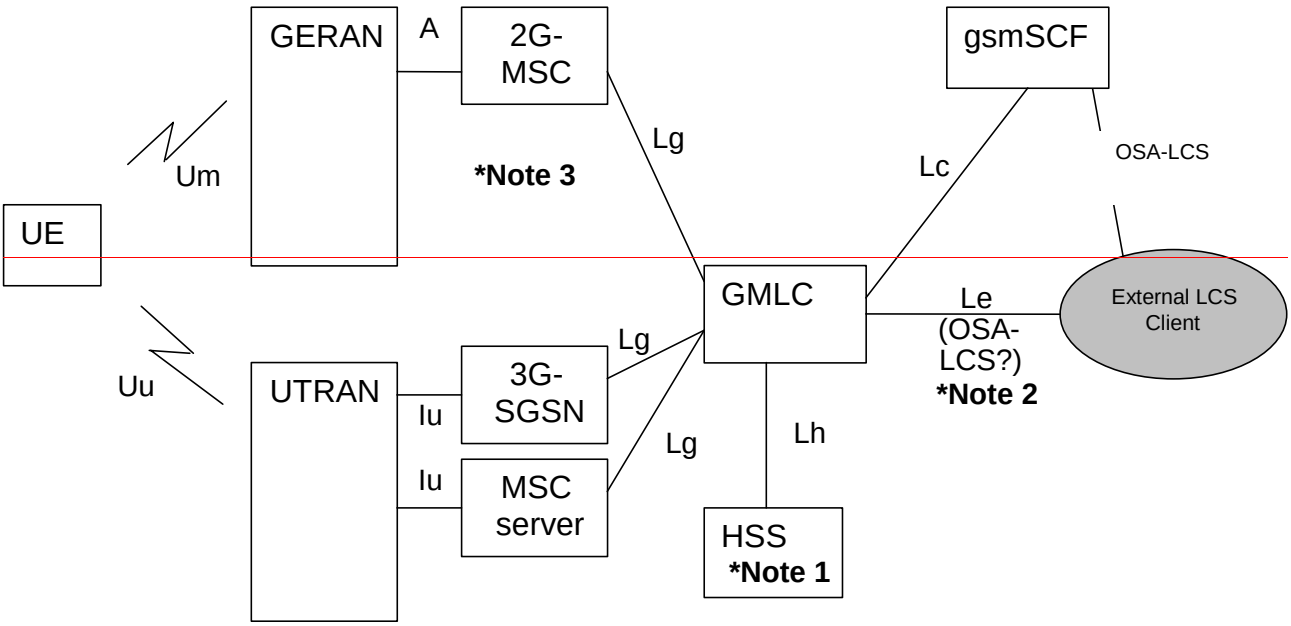
Further GSM related abbreviations are given in GSM 01.04. Further UMTS related abbreviations are given in 3G TS 21.905 [3].

6 LCS Architecture

Figure 6.1 shows the general arrangement of the Location Service feature in GSM and UMTS. This illustrates, generally, the relation of LCS Clients and servers in the core network with the GERAN and UTRAN Access Networks. The LCS entities within the Access Network communicate with the Core Network (CN) across the A, Iu interfaces. Communication among the Access Network LCS entities makes use of the messaging and signaling capabilities of the Access Network.

As part of their service or operation, the LCS Clients may request the location information of UE. There may be more than one LCS client. These may be associated with the GSM/UMTS networks or the Access Networks operated as part of a UE application or accessed by the UE through its access to an application (e.g. through the Internet).

The clients make their requests to a LCS Server. There may be more than one LCS Server. The client must be authenticated and the resources of the network must be co-ordinated including the UE and the calculation functions, to estimate the location of the UE and result returned to the client. As part of this process, information from other systems (other Access Networks) can be used. As part of the location information returned to the client, an estimate of the accuracy of the estimate and the time-of-day the measurement was made may be provided.


GERAN
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*Note 3
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OSA-LCS
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GMLC
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(OSA-LCS?)
*Note 2
External LCS Client
Uu
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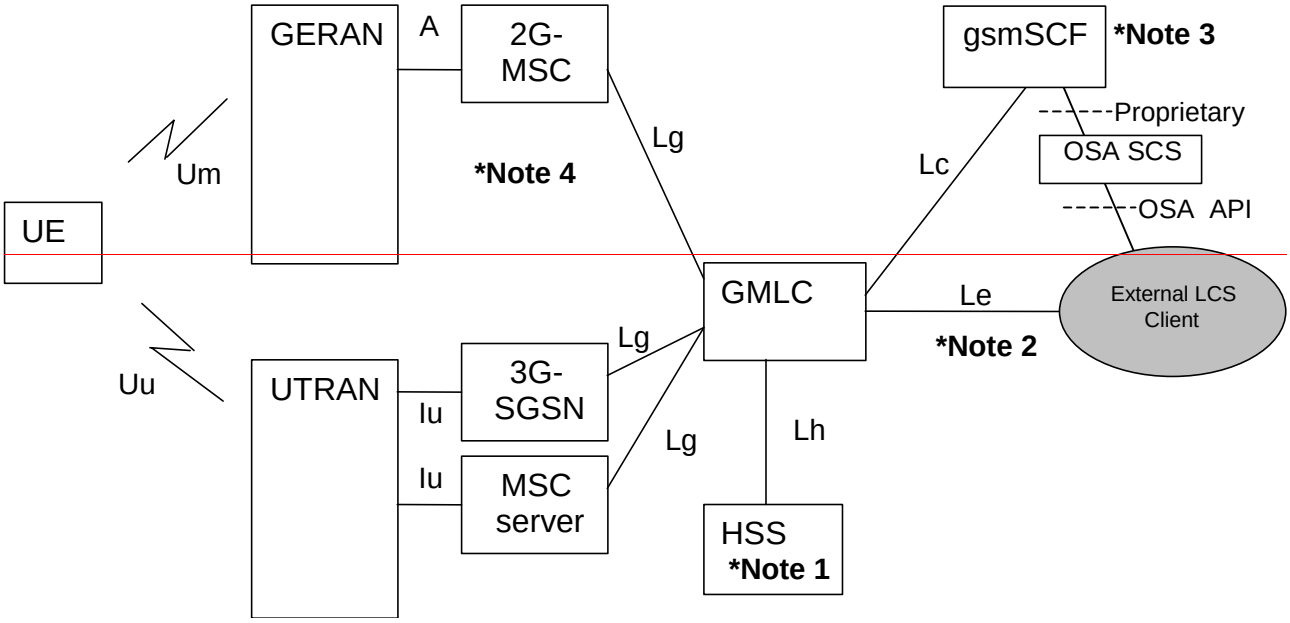
Iu
3G-SGSN
Lg
Lg
Lh
Iu
MSC server
HSS
*Note 1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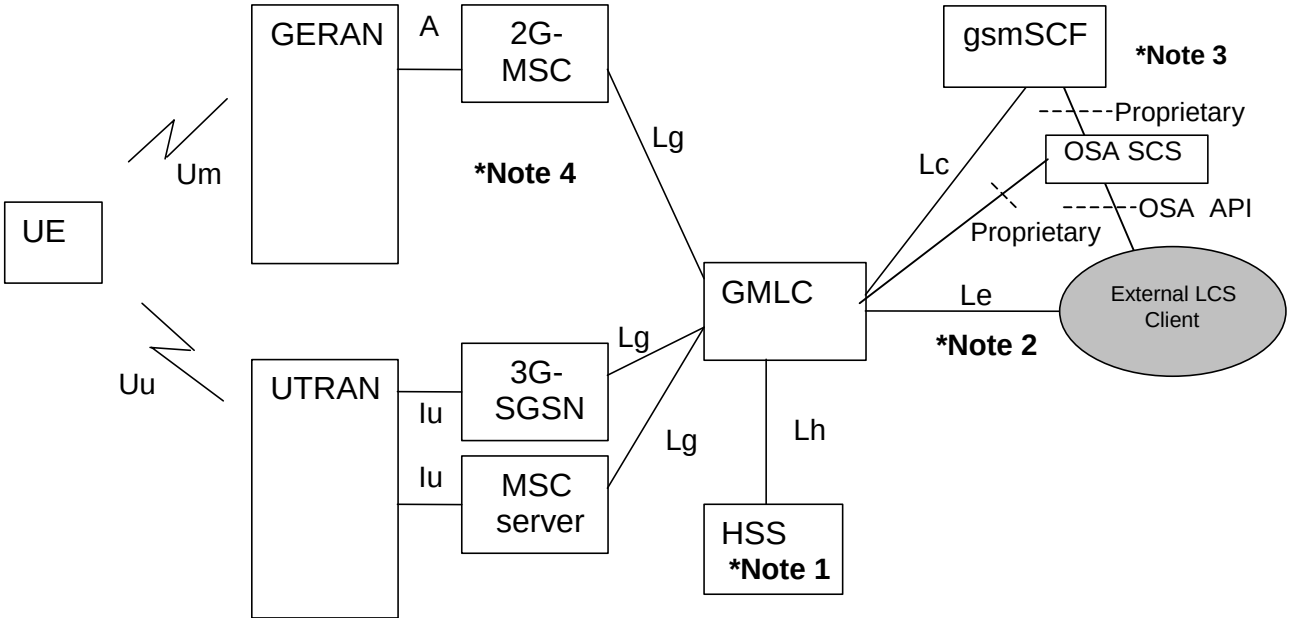
MSC server
HSS
*Note 1



NOTE 1: HSS includes both 2G-HLR and 3G-HLR functionality. LCS should be included in the overall network architecture in TS 23.002 [20].
NOTE 2: The Le interface is FFS.
NOTE 3: As one alternative the LCS client may get location information directly from GMLC, which may contain OSA Mobility SCS with support for the OSA user location interfaces. See TS 23.127 [24b] and TS 29.198-6 [24c, 24d, 24e and 24fc]. S1 agreed that LCS shall support OSA-API.
NOTE 43: In GSM (Rel-4), positioning is only supported on the A interface

Figure 6.1: General arrangement of LCS

3GPP TSG-SA WG 2 Meeting #23
Sophia Antipolis, France, 18-22 February 2002

Tdoc S2-020636
(revised Tdoc S2-020304)

CR-Form-v5

CHANGE REQUEST

⌘	23.271	CR	059	⌘ rev	3 ~~2~~	⌘	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: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Clarification of OSA support for LCS in TS 23.271
Source:	⌘	Nokia, TeleCommunication Systems and Lucent Technologies
Work item code:	⌘	LCS
Date:	⌘	13 February~~9~~ ~~January~~ 2002
Category:	⌘	**A**
Release:	⌘	REL-5

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

Use one of the following releases:

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

Reason for change:	⌘	The reference to OSA is unclear in the current specification.
Summary of change:	⌘	The role of OSA is clarified in the architecture figure. Also references to OSA specifications and a term SCS are added. The architecture figure 6.1 is further clarified by reflecting the case where the LCS client directly obtain location information from the GMLC, which may contain OSA mobility SCS.
Consequences if not approved:	⌘	Unclarities persist.

Clauses affected:	⌘	2.1, 3.3, 6		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	This CR is a mirror CR of CR058 for TS 23.271, Rel-4		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

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.*

2.1 Normative references

[1] 3G TS 25.305: "Stage 2 functional specification of UE positioning in UTRAN".

[2] GSM 01.04 (ETR 350): "Abbreviations and acronyms".

[3] 3G TS 21.905: "UMTS Abbreviations and acronyms".

[4] 3G TS 22.071: "Technical Specification Group Systems Aspects; Location Services (LCS); Stage 1".

[5] (void)

[6] 3G TS 48.008: "Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[7] 3G TS 22.100: "UMTS phase 1 (Release 1999)".

[8] 3G TS 22.101: "Service principles".

[9] 3G TS 22.105: "Services and Service Capabilities".

[10] 3G TS 22.115: "Charging and Billing".

[11] 3G TS 23.032 (GSM 03.32): "Universal Geographical Area Description (GAD)".

[12] 3G TS 22.121: "The Virtual Home Environment".

[13] 3G TS 23.110: "UMTS Access Stratum Services and Functions".

[14] 3G TS 25.413: "UTRAN Iu Interface RANAP signaling".

[15] 3G TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[16] 3G TS 43.059: "Functional Stage 2 description of Location Services in GERAN".

[17] 3G TS 23.003: "Numbering, addressing and identification".

[18] 3G TS 29.002: "Mobile Application Part (MAP) Specification".

[19] GSM 04.02: "GSM Public Land Mobile Network (PLMN) access reference configuration".

[20] 3G TS 23.002: "Network architecture".

[21] 3G TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - stage 2".

[22] 3G TS 23.011: "Technical realization of Supplementary Services".

[23] 3G TS 23.007: "Restoration procedures".

[24] 3G TS 24.008: "Mobile Radio Interface - Layer 3 MM/CC Specification".

[24a] 3G TS 25.331 "RRC protocol specification".

[24b] 3G TS 23.127 "Virtual Home Environment/Open Service Access".

[24c] 3G TS 29.198-1: “Open Service Access (OSA); Application Programming Interface (API); Part 1; Overview”.

[24d] 3G TS 29.198-2: “Open Service Access (OSA); Application Programming Interface (API); Part 2; Common Data”.

[24e] 3G TS 29.198-3: “Open Service Access (OSA); Application Programming Interface (API); Part 3; Framework”.

[24fe] 3G TS 29.198-6: "Open Service Access (OSA); Application Programming Interface (API); Part 6: Mobility".

2.2 Informative references

[25] Third generation (3G) mobile communication system; Technical study report on the location services and technologies, ARIB ST9 December 1998.

[26] The North American Interest Group of the GSM MoU ASSOCIATION: Location Based Services, Service Requirements Document of the Services Working Group.

3.3 Abbreviations

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

2G-	Second Generation
3G-	Third Generation
AC	Admission Control
AI	Application Interface (prefix to interface class method)
ANM	Answer Message (ISUP)
APN	Access Point Name
ARIB	Association of Radio Industries and Business
ATD	Absolute Time Difference
BCCH	Broadcast Control Channel
BER	Bit Error Rate
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CAMEL	Customised Application For Mobile Network Enhanced Logic
CAP	CAMEL Application Part
CM	Connection Management
CN	Core Network
CSE	Camel Service Environment
DL	Downlink
DRNC	Drift RNC
E-OTD	Enhanced Observed Time Difference
FER	Frame Error Rate
GERAN	GSM EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GMLC	Gateway MLC
GPRS	General Packet Radio Service
GPS	Global Positioning System
HE	Home Environment
HSS	Home Subscriber Server
HLR	Home Location Register
HPLMN	Home Public Land Mobile Network
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPDL	Idle Period Downlink
LA	Location Application
LAF	Location Application Function
LBS	Location Based Services
LCAF	Location Client Authorization Function
LCCF	Location Client Control Function
LCCTF	Location Client Co-ordinate Transformation Function
LCF	Location Client Function
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NA-ESRK	North American Emergency Service Routing Key
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PSMF	Positioning Signal Measurement Function
PSTN	Public Switched Telephone Network
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RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RIS	Radio Interface Synchronization
RNC	Radio Network Controller
RRM	Radio Resource Management
RTD	Real Time Difference
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SGSN	Serving GPRS Support Node
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SLPP	Subscriber LCS Privacy Profile
SMLC	Serving Mobile Location Center
SMS	Short Message Service
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SRNC	Serving RNC
SS7	Signaling System No 7
TA	Timing Advance
TMSI	Temporary Mobile Subscriber Identity
TOA	Time Of Arrival
UDT	SCCP Unitdata message
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
USIM	Universal Subscriber Identity Module
UTRAN	Universal Terrestrial Radio Access Network
VASP	Value Added Service Provider
VHE	Virtual Home Environment
WCDMA	Wideband Code Division Multiple Access

Further GSM related abbreviations are given in GSM 01.04. Further UMTS related abbreviations are given in 3G TS 21.905 [3].

6 LCS Architecture

Figure 6.1 shows the general arrangement of the Location Service feature in GSM and UMTS. This illustrates, generally, the relation of LCS Clients and servers in the core network with the GERAN and UTRAN Access Networks. The LCS entities within the Access Network communicate with the Core Network (CN) across the A, Gb and Iu interfaces. Communication among the Access Network LCS entities makes use of the messaging and signaling capabilities of the Access Network.

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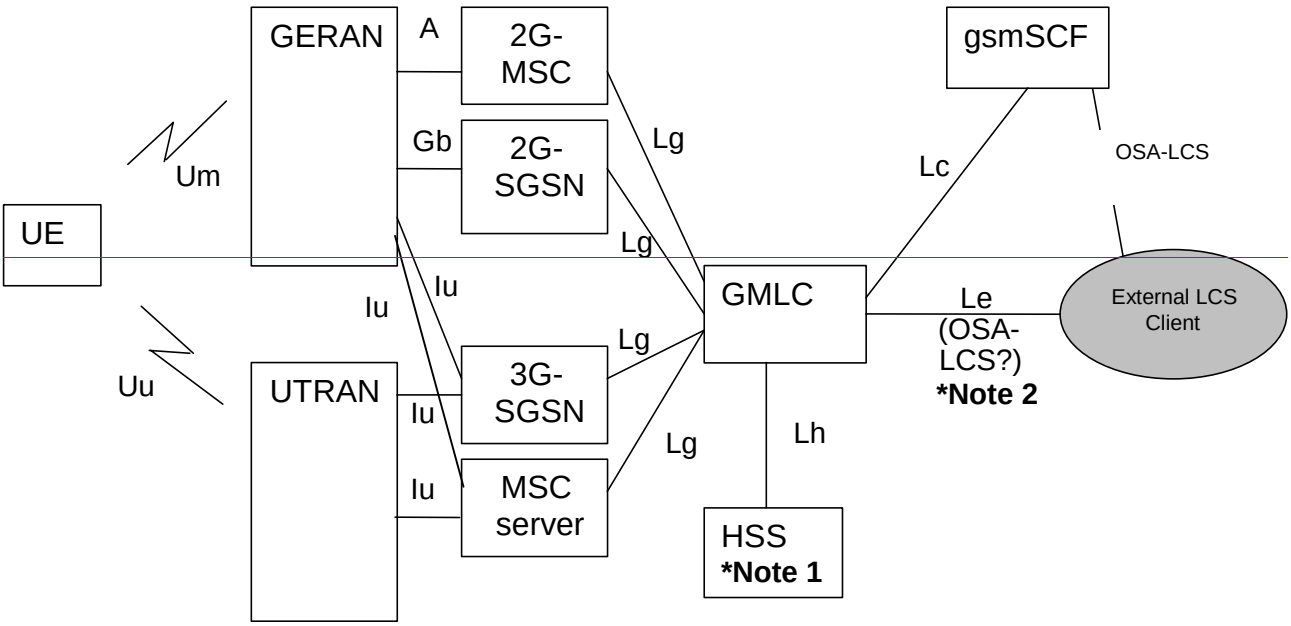
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*Note 1
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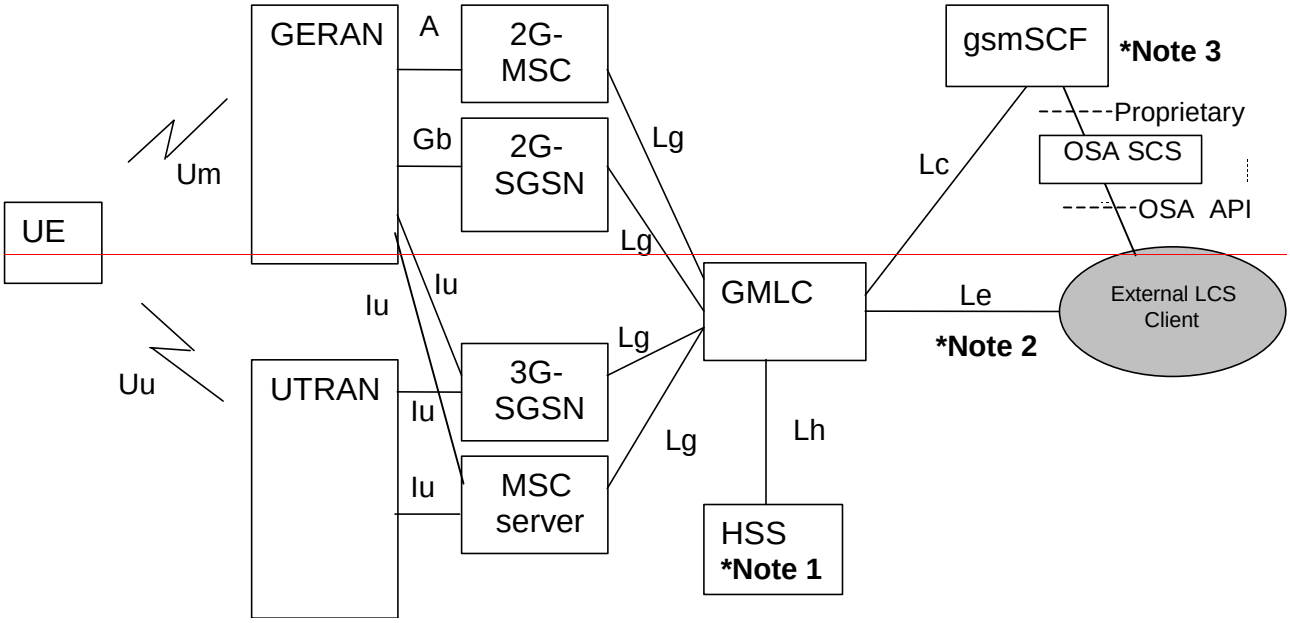
(OSA-LCS?)
*Note 2
External LCS Client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*Note 1
gsmSCF
*Note 3
Proprietary
OSA SCS
OSA API
Lc
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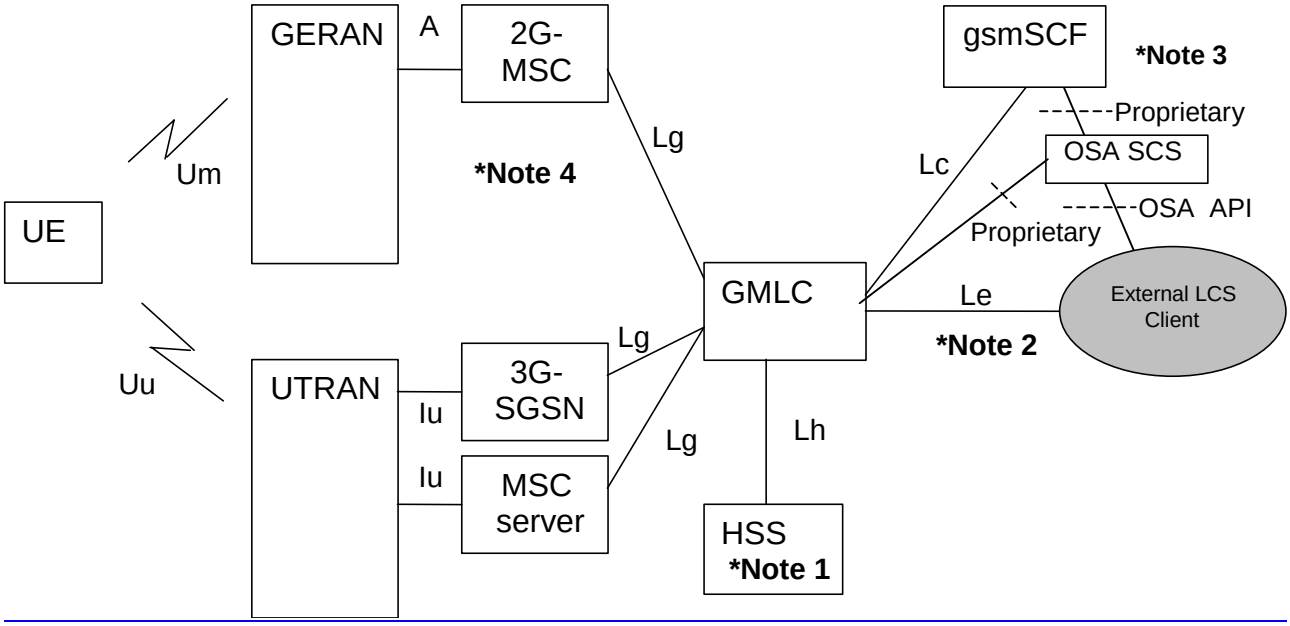
*Note 2
External LCS Client



NOTE 1: HSS includes both 2G-HLR and 3G-HLR functionality. LCS is included in the overall network architecture in TS 23.002 [20].
NOTE 2: The Le interface is FFS.
NOTE 3: As one alternative the LCS client may get location information directly from GMLC, which may contain OSA Mobility SCS with support for the OSA user location interfaces. See TS 23.127 [24b] and TS 29.198-6 [24c, 24d, 24e and 24fc]. ~~S1 agreed that LCS shall support OSA-API.~~

Figure 6.1: General arrangement of LCS

3GPP TSG- SA2#23 (LCS ad hoc)
Sophia-Antipolis, France, 18.-22.2.2002

Tdoc S2-020746
(Revised S2-020622)

CR-Form-v3

CHANGE REQUEST

⌘ **23.171** **CR** **023** ⌘ rev **1** ⌘ Current version: **3.6.0** ⌘

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

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

Title:	⌘	Correction of information flows LCS client – GMLC
Source:	⌘	LCS session
Work item code:	⌘	LCS ***Date:*** ⌘ 20 February, 2002
Category:	⌘	**F** ***Release:*** ⌘ **R99**

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

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

Reason for change:	⌘	The information exchange between the LCS client and GMLC shall be correctly specified on stage 2 level.
Summary of change:	⌘	Correction of the list of information exchange between the LCS client and GMLC
Consequences if not approved:	⌘	The current information list is incorrect and rather incomplete

Clauses affected:	⌘	5.5
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** First changed section ***

5.5 Information Flows between Client and Server

Other types of national specific information flows may be supported in addition to the information flow specified here.

Any of the information flows here indicated may not be externally realized if the information does not flow over an open interface. On the other hand, if a flow goes over an open interface, it shall abide to a well-defined protocol, which will be further specified in other relevant specifications.

5.5.1 Location Service Request

Via the Location Service Request, the LCS client communicates with the LCS server to request for the location information of one or more than one UE within a specified quality of service. There exist two types of location service requests:

- Location Immediate Request (LIR); and
- Location Deferred Request (LDR).

The attributes for the information exchange between the LCS Client and the LCS Server have not been standardized for GSM. This information exchange may be standardized in later releases.

The following generic attributes are identified for Location Service Request information flow:

- Target UE identity;
- LCS Client identity;
- Number dialled by the target mobile user if the request is call relatedIndication whether the request is call/ session related or not;
- Requested Quality of Service information, if needed;

Push address

- Type of location, i.e. current location or last known location
- Priority, if needed
- Local coordinate reference system, if needed;

Some of the information may be stored in GMLC and the LCS client does not need to include such information in the location service request.

5.5.2 Location Service Response

The LCS server (GMLC) sends tThe Location Service Response is sent to the LCS client either as anthe result of the Location Service Request by the LCS Server:

- Immediate Response; or aand
- Deferred Response, .Thesee deferred responses can be either single or periodic.

The following generic attributes are identified for the Location Service Response information flow:

- Location indication of UE in geographical coordinates or local coordinate system;
- Location of UE as an ellipsoid with axes and direction of all axis;

In addition the information attributes of the location service request may be used also in the location service response.

3GPP TSG- SA2#23 (LCS ad hoc)
Sophia-Antipolis, France, 18.-22.2.2002

Tdoc S2-020747
(Tdoc S2-020621)

CR-Form-v3

CHANGE REQUEST

⌘ **23.271** **CR** **073** ⌘ rev **1** ⌘ Current version: **4.4.0** ⌘

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

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

Title:	⌘	Correction of information flows LCS client – GMLC
Source:	⌘	LCS session
Work item code:	⌘	LCS1 ***Date:*** ⌘ 20 February, 2002
Category:	⌘	**F** ***Release:*** ⌘ **REL-4**

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

Use one of the following releases:
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R99 (Release 1999)
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Reason for change:	⌘	The information exchange between the LCS client and GMLC shall be correctly specified on stage 2 level.
Summary of change:	⌘	Correction of the list of information exchange between the LCS client and GMLC
Consequences if not approved:	⌘	The current information list is incorrect and rather incomplete

Clauses affected:	⌘	5.5
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** First changed section ***

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Other types of national specific information flows may be supported in addition to the information flow specified here.

Any of the information flows here indicated may not be externally realized if the information does not flow over an open interface. On the other hand, if a flow goes over an open interface, it shall abide to a well-defined protocol, which will be further specified in other relevant specifications.

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- Location Immediate Request (LIR); and
- Location Deferred Request (LDR).

The attributes for the information exchange between the LCS Client and the LCS Server have not been standardized for GSM. This information exchange may be standardized in later releases.

The following generic attributes are identified for the Location Service Request information flow:

- Ttarget UE identity;
- LCS Client identity;
- Number dialled by the target mobile user or APN-NI, if the request is call or session related ~~Indication whether the request is call/ session related or notstate (idle, dedicated);~~
- Eevent (applicable to LDR requests only);
- Timing information ~~Start time, stop time and interval (~~applicable for~~to~~ periodical ~~(LDR)~~ requests only~~)~~;
- Rrequested Quality of Service information, if needed;

~~Push address~~

- Type of location, i.e. current location or last known location;
- Priority, if needed;
- Llocal coordinate reference system, if needed;

~~- geographical area, [should be checked with the meaning of "Geographical area" in GSM 03.71 [5]].~~

Some of the information may be stored in GMLC and the LCS client does not need to include such information in the location service request.

5.5.2 Location Service Response

The LCS server (GMLC) sends t~~T~~he Location Service Response ~~is sent~~ to the LCS client either as an~~the result of the Location Service Request by the LCS Server~~:

- Immediate Response; or a~~and~~
- Deferred Response~~,~~. t~~T~~hese deferred responses can be either single or periodic.

The following generic attributes are identified for the Location Service Response information flow:

- Llocation indication of UE in geographical coordinates or local coordinate system;

- ~~Llocation of UE as an ellipsoid with axes and direction of all axis;~~
- ~~estimated achieved QoS;~~
- ~~indication when UE enters or leaves the Geographical area.~~

In addition the~~Some~~ information attributes of ~~may be common and repeated for~~ the location service request may be used also in the~~and~~ location service response~~, such as Target UE, LCS identity, State, Event, Local co-ordinate system, geographical area~~.

3GPP TSG- SA2#23 (LCS ad hoc) ***Tdoc S2-020748***
Sophia-Antipolis, France, 18.-22.2.2002 (revised from S2-020655, S2-020620)

CR-Form-v3

CHANGE REQUEST

⌘ **23.271** **CR** **072** ⌘ rev **2** ⌘ 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: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of information flows LCS client – GMLC
Source:	⌘	LCS session
Work item code:	⌘	LCS1 ***Date:*** ⌘ 20 February, 2002
Category:	⌘	**F** ***Release:*** ⌘ **REL-5**

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

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

Reason for change:	⌘	The information exchange between the LCS client and GMLC shall be correctly specified on stage 2 level.
Summary of change:	⌘	Correction of the list of information exchange between the LCS client and GMLC
Consequences if not approved:	⌘	The current information list is incorrect and rather incomplete

Clauses affected:	⌘	5.5
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	This CR includes the LIF related changes agreed in S2#22 in CR065.

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< First modified section>>

5.5 Information Flows between Client and Server

Other types of national specific information flows may be supported in addition to the information flow specified here.

Any of the information flows here indicated may not be externally realized if the information does not flow over an open interface. On the other hand, if a flow goes over an open interface, it shall abide to a well-defined protocol, e.g. LIF TS 101 [xx1], Location Inter-Operability Forum 2001.

5.5.1 Location Service Request

Via the Location Service Request, the LCS client communicates with the LCS server to request for the location information of one or more than one UE within a specified quality of service. There exist two types of location service requests:

- Location Immediate Request (LIR); and
- Location Deferred Request (LDR).

The attributes for the information exchange between the LCS Client and the LCS Server have been standardized by~~-~~ LIF based on requirements set by TS 22.071 and TS 23.271.

The following attributes are identified for Location Service Request information flow:

- T~~t~~arget UE identity;
- LCS Client identity;
- Service identity, if needed;
- Codeword, if needed;
- Requestor identity, if needed;
- Number dialled by the target mobile user or APN-NI, if the request is call or session related ~~Indication whether the request is call/ session related or notstate (idle, dedicated)~~;
- E~~e~~vent, ~~(~~applicable to deferred~~LDR~~ location requests only~~)~~;
- Start time, stop time and interval, ~~(~~applicable to periodical and deferred ~~(LDR)~~ requests only~~)~~;
- R~~r~~equested Quality of Service information, if needed;

~~Push address~~

- Type of location, i.e. current location or last known location;
- Priority, if needed
- L~~l~~ocal coordinate reference system, if needed;
- geographical area, if needed~~, [should be checked with the meaning of "Geographical area" in GSM 03.71 [5]]~~.

Some of the information may be stored in GMLC and the LCS client does not need to include such information in the location service request.

5.5.2 Location Service Response

The LCS server (GMLC) sends t~~T~~he Location Service Response ~~is sent~~ to the LCS client either as an~~the result of the Location Service Request by the LCS Server~~:

- Immediate Response; or a ~~and~~
- Deferred Response, ~~T~~these~~e~~ deferred responses can be either single or periodic.

The following attributes are identified for the Location Service Response information flow:

- L~~l~~ocation indication of UE in geographical coordinates expressed as a shape as defined in TS 23.032 or local coordinate system;
- ~~Llocation of UE expressed as a shape as defined in TS 23.032;~~
- ~~estimated achieved QoS;~~
- I~~i~~ndication when UE enters or leaves the Geographical area, if needed;~~.~~
- Acknowledgement for a deferred location request, if needed.

In addition the~~Some~~ information attributes of ~~may be common and repeated for~~ the location service request may be used also in the~~and~~ location service response. ~~, such as Target UE, LCS Client identity, State, Event, Local co-ordinate system, geographical area.~~

3GPP TSG-SA2 Meeting #23
Sophia Antipolis, France, 18th–22nd February 2002

Tdoc S2-020758
(Revised S2-020576)

CR-Form-v5

CHANGE REQUEST

⌘ **23.271** **CR** **071** ⌘ **rev** **1** ⌘ 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: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Handling of Privacy Override Indicator
Source:	⌘	Ericsson
Work item code:	⌘	LCS1
Date:	⌘	2002-02-06
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	The handling of Privacy Override Indicator has been changed for rel-5 in LCS stage 1 specification 3GPP TS 22.071. As highlighted by SA2 in LS S2-012222 and agreed by SA1 in LS S1-011286, there is a potential regulatory reason to accept usage of privacy override indicator in case the target subscriber and LCS client are in different countries. This may give the possibility to allow use of privacy override indicator based on bi-lateral agreements between operators. This modification was approved in TSG SA#14, by means of Tdoc SP-010673 and included in TS 22.071 v.5.0.0.
Summary of change:	⌘	Possibility to allow use of privacy override indicator based on bi-lateral agreements between operators.
Consequences if not approved:	⌘	Misalignment between LCS stage 1 and stage 2 specifications.

Clauses affected:	⌘	9.5.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.5.1 Privacy Override Indicator (POI)

The POI is used to determine whether the privacy settings of the subscriber to be positioned shall be overridden by the request for location services. The POI is applicable only to Emergency service and Lawful intercept service. The assignment of a POI value with an "override" or "not override" value in the LCS client profile is done during the LCS client provisioning. The type of LCS client requesting location information (i.e. emergency, law-enforcement etc.) shall determine the value of the POI assigned to the LCS client profile.

There are two distinct cases regarding the handling of the privacy override indicator.

Procedure A: If the subscriber to be positioned is in the same country as the GMLC or if the subscriber to be positioned is in a different country than the GMLC and an appropriate bilateral agreement exists between operators, then the POI shall override the subscriber's privacy options, as allowed by regulatory requirements.

Procedure B: Otherwise the POI shall not override the subscriber's privacy options.

3GPP TSG-SA2 Meeting #23
Sophia Antipolis, France, 18th–22nd February 2002

Tdoc S2-020873
(Revised S2-020574)

CR-Form-v5

CHANGE REQUEST

⌘ **23.271** **CR** **069** ⌘ **rev** **1** ⌘ 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: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Handling of Service Type and Codeword
Source:	⌘	LCS session
Work item code:	⌘	LCS1
Date:	⌘	2002-02-12
Category:	⌘	**B**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	Introduction of Service Type and Codeword checking for Enhanced User Privacy. This CR gives the functional requirements contained in TR 23.871 v. 1.1.0 needed to support EUP mechanisms, according to Ericsson contribution Tdoc S2-020573.
Summary of change:	⌘	The impacts on existing functional requirements to support Service Type and Codeword are added to LCS stage 2 specification.
Consequences if not approved:	⌘	Service type and Codeword not supported.

Clauses affected:	⌘	9.1.1, 9.1.2, 9.1.6, 9.5.3, 9.5.3.5, 9.5.3.6, 10.1.1, 10.5.1		
Other specs Affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	29.002
Other comments:	⌘	The requestor identity handling is out of the scope of this CR, because the related CR has already been agreed in SA2.		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

9.1 Mobile Terminating Location Request

9.1.1 MT-LR routing procedure in PS and CS domain

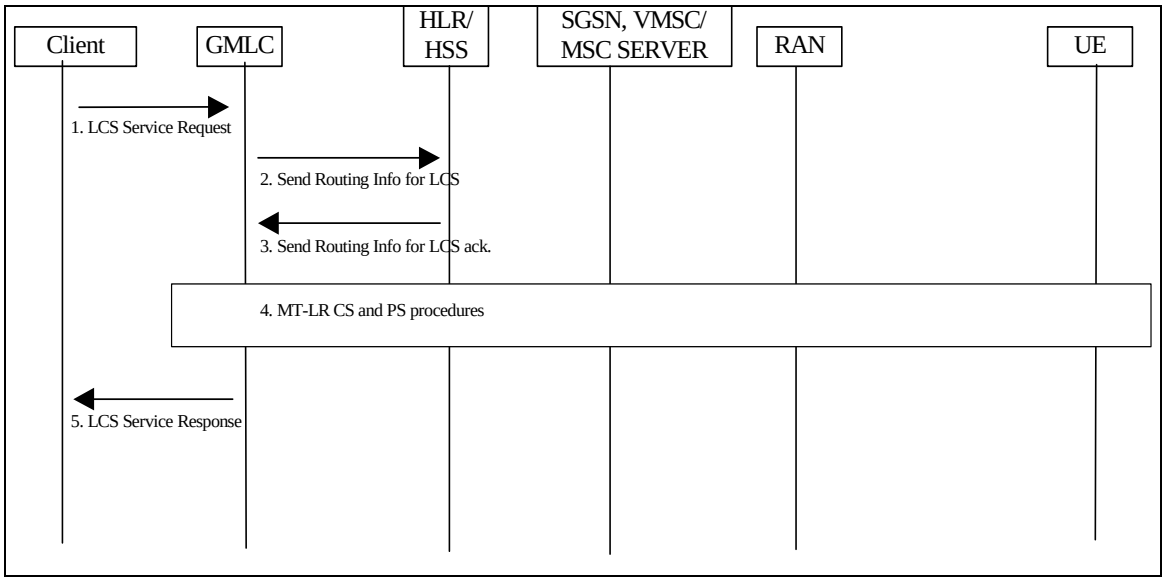

Figure 9.1: General Network Positioning for a MT-LR

1) An external LCS client requests the current location of a target UE from a GMLC. The LCS Client may also request a deferred location request, i.e. based on event. The GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI or PDP address, (NOTE: IP addressing in this context is FFS, one reason is the dynamic IP addressing used in IPv4.) of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client. For a call related or session related location request, the GMLC obtains and authenticates the called party number of the LCS client.

The LCS request may carry also the Service Identity and the Codeword.

The GMLC may verify that the Service Identity received in the LCS request matches one of the service identities allowed for the LCS client. If the service identity does not match one of the service identities for the LCS client, the GMLC shall reject the LCS request. Otherwise, the GMLC can map the received service identity in a corresponding service type.

If the codeword functionality is supported, the GMLC shall reject the LCS service request in case the LCS client type is “value added” and the codeword was not received.

If location is required for more than one UE, or if periodic location is requested, the steps following below may be repeated.
Note: This means that GMLC handles the periodicity of location requests as requested by the LCS client both in CS and PS domain.

2) If the GMLC already knows both the VMSC/MSC server or SGSN location and IMSI for the particular MSISDN or PDP address, (e.g. from a previous location request), and the codeword functionality is not supported, this step and step 3 may be skipped. Otherwise, the GMLC sends a SEND_ROUTING_INFO_FOR_LCS message to the home HLR/HSS of the target UE to be located

with the IMSI, PDP address or MSISDN of this UE. When the GMLC supports the codeword functionality, steps 2 and 3 shall not be skipped.

The SEND_ROUTING_INFO_FOR_LCS message may carry also the Codeword received by the LCS client in the LCS Service request. For a LCS client type different from "value added" an indication may be sent to the HLR, in order to inform the HLR that the codeword is not applicable.

Editor´s note: The use of the PDP address for identifying the subscriber is ffs.

3) The HLR/HSS verifies that the calling party SCCP address of the GMLC corresponds to a known GSM/UMTS network element that is authorized to request UE location information. The HLR/HSS then returns one or several of the addresses, the current SGSN and/or VMSC/MSC server and whichever of the IMSI and MSISDN was not provided in step (2) for the particular UE.
Note: HLR may prioritize between the MSC/VLR or SGSN address sent to GMLC. The prioritisation might be based on information received from SGSN and/or MSC/VLR concerning the MS's capabilities for LCS. Other priority criteria are for further study.

The HLR may check if the codeword received in SEND_ROUTING_INFO_FOR_LCS message matches one of the codewords stored for the target subscriber. If it doesn't match, then the HLR shall return an error message to the GMLC. If no codeword is stored in the HLR for the target subscriber, the request shall not be rejected by the HLR and shall send to the GMLC the related indication in SEND_ROUTING_INFO_FOR_LCS_ack message. If the HLR receives the indication from the GMLC that the codeword is not applicable, the codeword check is not performed in the HLR.

Moreover, if the HLR supports the Enhanced User Privacy, the HLR shall check if the VMSC and/or the SGSN under which the target subscriber is located supports the enhanced user privacy mechanisms (Service type and Requestor), by checking the supported LCS capabilities set. Only the address of a serving node that supports the enhanced user privacy mechanism will be returned to GMLC. If none of the VMSC or SGSN supports the Enhanced User Privacy, then the HLR shall send an error indication to the GMLC.

NOTE: This handling allows the HPLMN to have the control about the fact that the VPLMN supports the EUP mechanisms, in order to fully protect the user privacy.

4) In case GMLC receives only the MSC/VLR address, the MT LR proceeds as the CS-MT-LR procedure described in 9.1.2. In case GMLC receives only the SGSN address, the MT LR proceeds as the PS-MT-LR procedure described in 9.1.6. In case the GMLC receives several of the following addresses, SGSN, VMSC and/or MSC Server, it has to decide where to send the location request. If the requested MT-LR is known to be associated with a CS call, the CS-MT-LR procedure shall be invoked. If the requested MT-LR is associated with a PS session, the PS-MT-LR procedure only shall be invoked. Otherwise, both CS-MT-LR and PS-MT-LR are applicable. If LCS Client indicated deferred location request, GMLC shall indicate this together with applicable event type (ex. MS available) in requested PS/CS-MT-LR, see 9.1.8.

NOTE: The order in which these procedures are invoked and whether one or both procedures are used may depend on subscription information for the LCS client, possible priority information returned by the HSS or information already stored in the GMLC (e.g. obtained from previous location requests).

5) GMLC sends the location service response to the LCS client. If the LCS client requires it, the GMLC may first transform the universal location co-ordinates provided by the SGSN or MSC/MSC server into some local geographic system. The GMLC may record billing for both the LCS client and inter-network revenue charges from the SGSN or MSC/MSC server's network.

The detailed CS-MT-LR and PS-MT-LR procedures in step 4 of figure 9.1 are described in 9.1.2 and 9.1.6.

The detailed procedure for deferred PS/CS-MT-LR is described in 9.1.8.

*** NEXT MODIFIED SECTION ***

9.1.2 Circuit Switched Mobile Terminating Location Request (CS-MT-LR)

Figure 9.2 illustrates general network positioning for LCS clients external to the PLMN. In this scenario, it is assumed that the target UE is identified using either an MSISDN or IMSI.

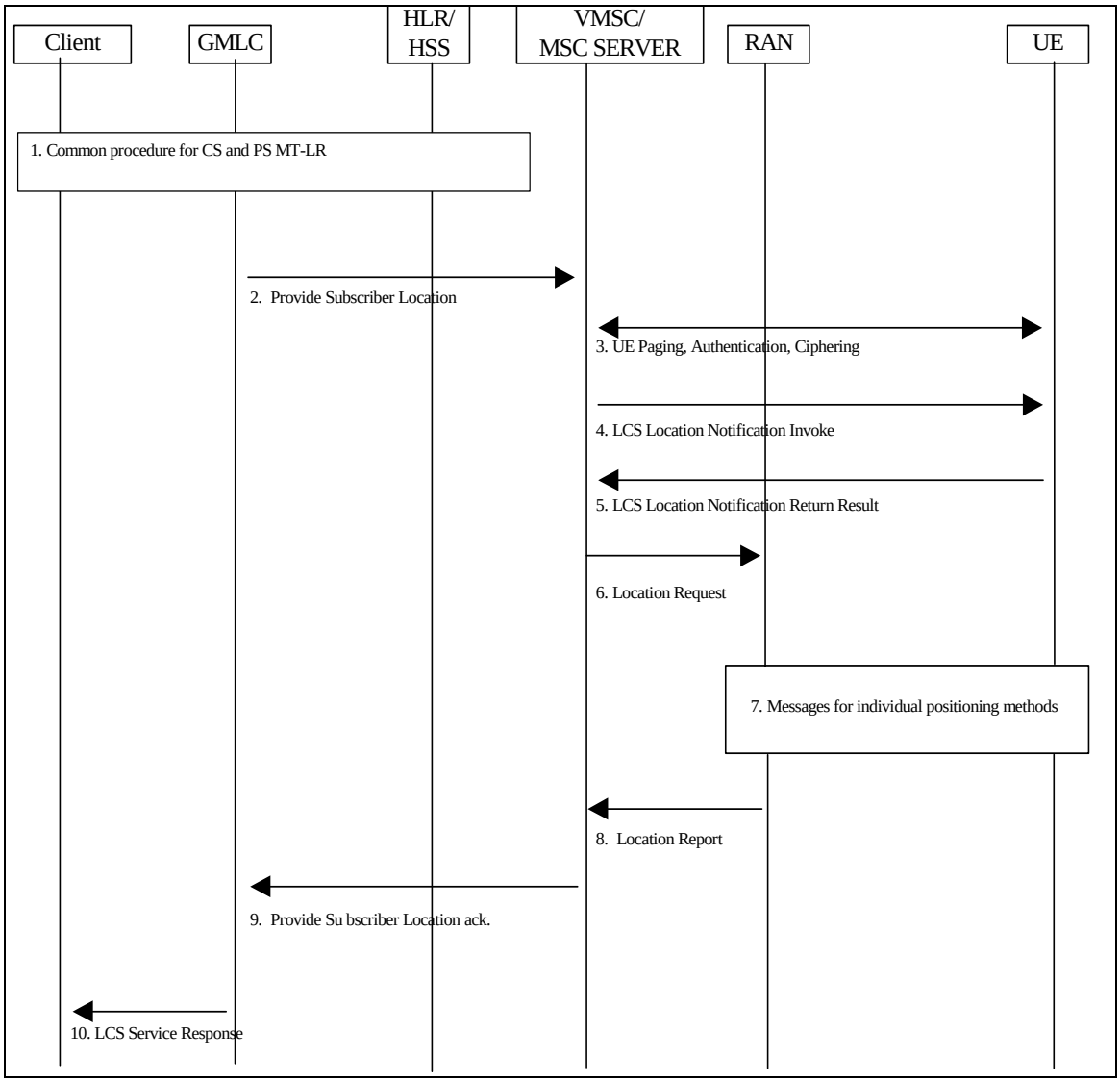

Figure 9.2: Network Positioning for a CS-MT-LR

9.1.2.1 Location Preparation Procedure

1) Common PS and CS MT-LR procedure as described in 9.1.1.

2) The GMLC sends a PROVIDE_ SUBSCRIBER _LOCATION message to the MSC/MSC server indicated by the HLR/HSS. This message carries the type of location information requested (e.g. current location), the UE subscriber's IMSI, LCS QoS information (e.g. accuracy, response time) and an indication of whether the LCS client has the override capability. For a call related location request, the message also carries the LCS client's called party number. For a value added LCS client, the message shall carry the client name and the external identity of the LCS client. Moreover the message may also carry the Service Type**.** If the HLR indicated that no codeword was stored for the UE user, the message may carry also the codeword received from the LCS client, to be displayed to the UE. For a PLMN operator LCS client, the message shall carry the internal identity of the LCS client.

3) If the GMLC is located in another PLMN or another country, the VMSC/MSC server first authenticates that a location request is allowed from this PLMN or from this country. If not, an error response is returned. The VMSC/MSC server then verifies LCS barring restrictions in the UE user's subscription profile in the MSC server. In verifying the barring restrictions, barring of the whole location request is assumed if any part of it is barred or any requisite condition is not satisfied. If LCS is to be barred without notifying the target UE and a LCS client accessing a GMLC in the same country does not have the override capability, an error response is returned to the GMLC. Otherwise, if the UE is in idle mode, the Core Network performs paging, authentication and ciphering. The MSC will page a GPRS attached UE either through A/Iu or Gs interface, depending on the presence of the Gs interface (see Note).The UE will inform the network about its LCS capabilities, as described in chapter 6.3.4.. If the UE is instead in dedicated mode, the VMSC/MSC server will already have UE classmark information. In GSM this is supported by controlled early classmark sending.

[Note 1: In GSM, if the target UE has an established circuit call other than speech, the location request may be denied and an error response is then returned to the GMLC. If the location request is allowed for a non-speech circuit call, it shall be up to RAN to decide, on the basis of the applicable position methods and requested QoS, whether positioning is possible. This is FFS]

Note: In some network mode of operation, a GPRS capable UE may not receive the CS paging. In addition, upon receipt of a CS paging, a GPRS capable UE may immediately answer to the Paging Request or delay the answer, as defined in 3GPP TS 22.060 and 23.060. A GPRS UE in class B mode may also suspend its GPRS traffic, sending a GPRS Suspension Request to the network.

4)If the location request comes from a value added LCS client and the UE subscription profile indicates that the UE must either be notified or notified with privacy verification and the UE supports notification of LCS (according to the UE Capability information), an LCS Location Notification Invoke message is sent to the target UE indicating the type of location request (e.g. current location) and the identity of the LCS client and whether privacy verification is required. Moreover, the message may carry also the service type and the codeword.

[FFS: For a call related location request, the LCS client identity shall be set to the LCS client's called party number if no separate LCS client identity was received from the GMLC.] Optionally, the VMSC/MSC server may after sending the LCS Location Notification Invoke message continue in parallel the location process, i.e. continue to step 6 without waiting for a LCS Location Notification Return Result message in step 5.

NOTE 2: This step is for further study, it should be investigated e.g. which client identities to include in the Privacy Notification message to be shown to the end-user.

5) The target UE notifies the UE user of the location request. If privacy verification was requested, the target UE indicates to the UE user whether the location request will be allowed or not allowed in the

absence of a response and waits for the user to grant or withhold permission. The UE then returns an LCS Location Notification Return Result to the VMSC/MSC server indicating, if privacy verification was requested, whether permission is granted or denied. Optionally, the LCS Location Notification Return Result message can be returned some time after step 4, but before step 9. If the UE user does not respond after a predetermined time period, the VMSC/MSC server shall infer a "no response" condition. The VMSC/MSC server shall return an error response to the GMLC if privacy verification was requested and either the UE user denies permission or there is no response with the UE subscription profile indicating barring of the location request in the absence of a response.

6) The MSC/MSC server sends a Location Request message to RAN. This message includes the type of location information requested and requested QoS and, in GSM, the UE's location capabilities.

*** NEXT MODIFIED SECTION ***

9.1.6 Packet Switched Mobile Terminating Location Request (PS-MT-LR)

Figure 9.5 illustrates the general network positioning for LCS clients external to the PLMN for packet switched services. In this scenario, it is assumed that the target UE is identified using an MSISDN, PDP address or IMSI.

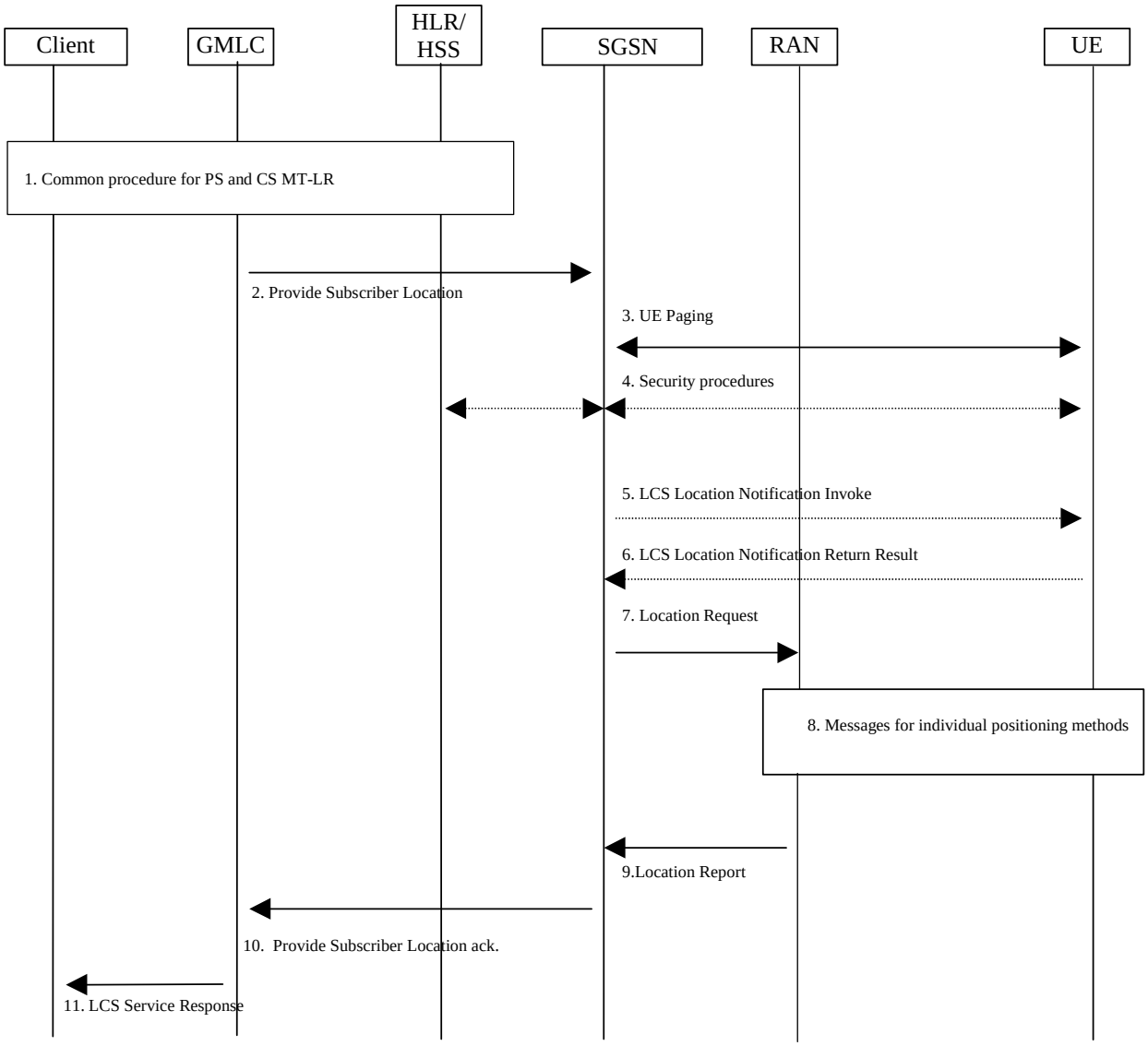

Figure 9.5: General Network Positioning for Packet Switched MT-LR

9.1.6.1 Location Preparation Procedure

1) Common PS and CS MT-LR procedure as described in 9.1.1.

2) GMLC sends a Provide Subscriber Location message to the SGSN indicated by the HLR/HSS. This message carries the type of location information requested (e.g. current location), the UE subscriber's IMSI, LCS QoS information (e.g. accuracy, response time) and an indication of whether the LCS client has the override capability. For a session related location request, the message also

carries the APN to which the user has established the session. For a value added LCS client, the message shall carry the client name and the external identity of the LCS client, and optionally the message may carry the Service Type. If the HLR indicated that no codeword was stored for the UE user, the message may carry also the codeword received from the LCS client, to be displayed to the UE. . For a PLMN operator LCS client, the message shall carry the internal identity of the LCS client.

3) If the GMLC is located in another PLMN or another country, the SGSN first authenticates that a location request is allowed from this PLMN or from this country. If not, an error response is returned. The SGSN then verifies LCS barring restrictions in the UE user's subscription profile in the SGSN. In verifying the barring restrictions, barring of the whole location request is assumed if any part of it is barred or any requisite condition is not satisfied. If LCS is to be barred without notifying the target UE and a LCS client accessing a GMLC in the same country does not have the override capability, an error response is returned to the GMLC.
Otherwise, if the UE is in idle mode, the SGSN performs paging. The paging procedure is defined in TS 23.060[15].

> FFS: The UE may be paged for location services even when in UMTS a signaling connection between mobile station and the network is established and in GSM when in Ready Mode. This makes it possible for the UE to start preparing an anticipated location service coming later by e.g. starting to measure GPS signals.

4) Security functions may be executed. These procedures are defined in TS 23.060 [15].

5)If the location request comes from a value added LCS client and the UE subscription profile indicates that the UE must either be notified or notified with privacy verification and the UE supports notification of LCS, a notification invoke message is sent to the target UE indicating the type of location request (e.g. current location) and the identity of the LCS client and whether privacy verification is required. Moreover, the message may carry also the service type and the codeword.

Optionally, the SGSN may after sending the LCS Location Notification Invoke message continue in parallel the location process, i.e. continue to step 7 without waiting for a LCS Location Notification Return Result message in step 6.

6) The target UE notifies the UE user of the location request and, if privacy verification was requested, waits for the user to grant or withhold permission. The UE then returns a notification result to the SGSN indicating, if privacy verification was requested, whether permission is granted or denied. Optionally, this message can be returned some time after step 5, but before step 10. If the UE user does not respond after a predetermined time period, the SGSN shall infer a "no response" condition. The SGSN shall return an error response to the GMLC if privacy verification was requested and either the UE user denies permission or there is no response with the UE subscription profile indicating barring of the location request.

7) The SGSN sends a Location Request message to the RAN. This message includes the type of location information requested, the requested QoS and any other location information received in paging response.

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9.5.3 UE Privacy Options

The UE privacy options in the SLPP apply to an CS-MT-LR/PS-MT-LR or NI-LR/PS-NI-LR and either indicate that no CS-MT-LR/PS-MT-LR or NI-LR/PS-NI-LR is allowed for the UE (except as may be overridden by the POI or local regulatory requirements) or define the particular classes of LCS client for which an CS-MT-LR/PS-MT-LR or NI-LR/PS-NI-LR for location are allowed, with the following classes being possible:

[Editor's note: An e-mail comment pointed out that there are different cases still to be covered in the description of the classes: 1. the LCS Client identity is included in SLPP or 2. the LCS Client identity is NOT included in SLPP. Also some GMLC restriction conditions need to be mentioned.]

a) Universal Class - allow positioning by all LCS clients;

b) Call/Session related Class

c) Call/Session-unrelated Class

d) PLMN operator Class

Moreover the SLPP may contain the service types allowed by the subscriber.
All UE privacy options of above four classes are commonly used for both CS and PS domain.
Note: If a privacy option setting in a domain is updated, the same modification will be applied to the other domain

*** NEXT MODIFIED SECTION ***

NEW 9.5.3.5 Service type checking

If the SLPP contains service types, an CS-MT-LR/PS-MT-LR may be allowed by the MSC/MSC server or SGSN if the service type supplied by the GMLC matches the identity of any service type contained in the UE's SLPP and any other GMLC restrictions associated with this service type in the SLPP are also met. If the service type is correctly matched in this way and any GMLC restrictions are satisfied, the CS-MT-LR/PS-MT-LR shall be allowed if the UE user subscribes to either location without notification or location with notification. If the UE user subscribes to location with notification and privacy verification, the CS-MT-LR/PS-MT-LR shall be allowed following notification to the UE if the UE user either returns a response indicating that location is allowed or returns no response but subscribes to location in the absence of a response. In all other cases, the CS-MT-LR/PS-MT-LR shall be restricted.

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9.5.3.~~5~~7 Matching of LCS client identities

In evaluating privacy where any address "A" associated with the LCS client (e.g. LCS client ID or GMLC address) needs to be compared with a corresponding address "B" in the target UE's SLPP, a match shall be determined if a match is found for each of the following components of each address:

a) numbering plan;

b) nature of address indicator;

c) corresponding address digits for all digits in "B" (the digits or initial digits in "A" must match all the digits in "B", but "A" may contain additional digits beyond those in "B").

All addresses shall be transferred to the MSC/VLR, MSC server or SGSN in international format, except for the called party number received from the GMLC during a Call-Related CS MT-LR when the LCS client was reached via IN or abbreviated number routing (e.g. toll-free number or emergency call routing). In these cases it is up to the GMLC to use the valid national specific number of the visited country.
In evaluating privacy where an APN associated with the LCS client notified by the GMLC needs to be compared with a corresponding APN that is used to set up the associated PDP context, a match shall be determined if a match is found for each of following components of each address:

a) Operator Identifier (the Operator Identifier received from the GMLC is compared with the corresponding information used to set up the associated PDP Context in the SGSN when the associated PS session was established)

b) Network Identifier

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10.1.1 LCS Data in the HLR/HSS for an UE Subscriber

The IMSI is the primary key for LCS UE subscription data in the HLR/HSS. This subscription data may be stored in a Multiple Subscriber Profile (MSP), with the HLR/HSS able to hold a number of MSPs per IMSI.
The HLR may store a list of codewords given by the UE subscriber, to be provided by the LCS client in order not to get the location request rejected.
LCS UE subscription data includes a privacy exception list containing the privacy classes for which location of the target UE is permitted. Each privacy class is treated as a distinct supplementary service with its own supplementary service code. The following logical states are applicable to each privacy class (refer to TS 23.011 [22] for an explanation of the notation).

Table 10.1: Logical States for each LCS Privacy Class

Provisioning State	Registration State	Activation State	HLR Induction State
(Not Provisioned,	Not Applicable,	Not Active,	Not Induced)
(Provisioned,	Not Applicable,	Active and Operative,	Not Induced)

For each LCS privacy class, the HLR/HSS shall store the logical state of the class on a per-subscriber (or per subscriber MSP) basis. In addition, the permanent data indicated below shall be stored on a per subscriber (or per subscriber MSP) basis when the logical provisioning state of the associated LCS privacy class is "provisioned". For the meaning of each LCS privacy class, refer to clause 9 and to TS 22.071 [4].
Moreover a list of allowed service types may be stored. The meaning of service types is defined in TS 22.071 [4].

Table 10.2: LCS data stored in the HLR privacy exception list for an UE Subscriber (or UE Subscriber MSP)

LCS Privacy Class	Status	Additional HLR Data when Class is provisioned
Universal Class	-	No additional data
Call/session Related Class	M	Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list: • Location not allowed • Location allowed without notification (default case) • Location allowed with notification • Location with notification and privacy verification; location allowed if no response • Location with notification and privacy verification; location restricted if no response
	O	External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list:
	C	• International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target UE
	O	• Restriction on the GMLC. Possible values are: - Identified GMLCs only - Any GMLC in the home country
	C	• Indication of one of the following mutually exclusive options: - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
Call/session Unrelated Class	M	Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list: • Location not allowed (default case) • Location allowed with notification • Location with notification and privacy verification; location allowed if no response • Location with notification and privacy verification; location restricted if no response
	O	External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list:
	C	• International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target UE
	O	• Restriction on the GMLC. Possible values are: - Identified GMLCs only - Any GMLC in the home country
	C	• Indication of one of the following mutually exclusive options: - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
PLMN Operator Class	O	LCS client list: a list of one or more generic classes of LCS client that are allowed to locate the particular UE. The following classes are

		distinguished: • LCS client broadcasting location related information • O&M LCS client in the HPLMN • O&M LCS client in the VPLMN • LCS client recording anonymous location information • LCS Client supporting a bearer service, teleservice or supplementary service to the target UE

Table 10.3: LCS Service types stored in the HLR/HSS per UE subscriber

Service type indication	Status	Additional HLR data when the indication is stored
Service Types	O	Indication of one of the following mutually exclusive options for any service type not in the service type list: • Location not allowed (default case) • Location allowed with notification • Location with notification and privacy verification; location allowed if no response • Location with notification and privacy verification; location restricted if no response Service types list: a list of one or more service types for which the LCS client is allowed to locate the particular UE. The possible service types are defined in 22.071. • Restriction on the GMLC. Possible values are: - Identified GMLCs only - Any GMLC in the home country • Indication of one of the following mutually exclusive options: - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response Location with notification and privacy verification; location restricted if no response

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10.3 GMLC

The GMLC holds data for a set of external LCS clients that may make call related or non-call related CS-MT-LR/PS-MT-LR requests to this GMLC. The permanent data administered for each LCS client is as follows.

Table10.6: GMLC Permanent Data for a LCS Client

LCS Client data in GMLC	Status	Description
LCS Client Type	M	Identifies the type LCS client from among the following: - Emergency Services - Value Added Services - PLMN Operator Services - Lawful Intercept Services
External identity	O	A list of one or more identifiers used to identify an external LCS client. The identity may be used when making an MT-LR and/or MO-LR. The format of the identity is international E.164 addresses. Each external identity shall be associated with a logical client name.
Authentication data	M	Data employed to authenticate the identity of an LCS client – details are outside the scope of the present document
Call/session related identity	O	A list of one or more international E.164 addresses, which are used to make calls by mobile subscribers, or APNs (see NOTE) to identify the client for a call related MT-LR In case the LCS client was reached via IN or abbreviated number routing (e.g. toll free number or emergency call routing), the E.164 number(s) stored in the GMLC shall be the number(s) that the UE has to dial to reach the LCS Client. In these cases the E.164 number is not to be in international format. The country in which the national specific number(s) is (are) applicable is (are) also stored (or implied) in this case. Each call related identity may be associated with a specific external identity. Each call/session-related identity shall be associated with a logical client name.
Internal identity	O	Identifies the type PLMN operator services and the following classes are distinguished: - LCS client broadcasting location related information - O&M LCS client in the HPLMN - O&M LCS client in the VPLMN - LCS client recording anonymous location information - LCS Client supporting a bearer service, teleservice or supplementary service to the target UE This identity is applicable only to PLMN Operator Services.
Client name	O	An address string which is a logical name associated with LCS client's external identity (i.e., E.164 address).
Override capability	O	Indication of whether the LCS client possesses the override capability (not applicable to a value added and PLMN operator service)
Authorized UE List	O	A list of MSISDNs or groups of MSISDN for which the LCS client may issue a non-call related MT-LR. Separate lists of MSISDNs and groups of MSISDN may be associated with each distinct external or non-call related client identity.
Priority	M	The priority of the LCS client – to be treated as either the default priority when priority is not negotiated between the LCS server and client or the highest allowed priority when priority is negotiated
QoS parameters	M	The default QoS requirements for the LCS client, comprising: - Accuracy - Response time Separate default QoS parameters may be maintained for each distinct LCS client identity (external, non-call related, call related)
Allowed LCS Request Types	M	Indicates which of the following are allowed: - Non-call related CS-MT-LR/PS-MT-LR - Call/session related CS-MT-LR/PS-MT-LR - Specification or negotiation of priority - Specification or negotiation of QoS parameters - Request of current location - Request of current or last known location
Local Co-ordinate System	O	Definition of the co-ordinate system(s) in which a location estimate shall be provided – details are outside the scope of the present document
Access Barring List(s)	O	List(s) of MSISDNs or groups of MSISDN for which a location request is

		barred
Service Identities	O	List of service identities allowed for the LCS client.

NOTE: The LCS Client is identified with E.164 number or APN. APN is specified in TS 23.003. The APN identity of the LCS Client shall include Operator Identifier as mandatory (i.e. it is globally unique) to show whether the session-related MT_LR is associated with a session towards the VPLMN or HPLMN.

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10.5.1 Interworking with the VLR supporting only pre-Rel'4 LCS

The VLR that supports only pre-Rel'4 LCS cannot handle the extended privacy control for call-related/call-unrelated class of the Rel'4 LCS. That is, the VLR cannot provide the extended call-related/call-unrelated class service to the user who subscribes to the Rel'4 LCS. Therefore HLR/HSS does not send the subscriber data on call-related/call-unrelated class for users who subscribe to the call-related class of Rel'4 LCS to the VLR that supports only pre-Rel'4 LCS. The HLR/HSS is notified whether the VLR supports Rel'4 LCS or not by an indication , which indicates the highest LCS core network signalling capability the VLRsupports, from the VLR during location update procedure. The following ~~two~~ LCS core network signalling capabilities are identified in the current version of this specification.

- LCS core network signalling capability set 1: R98 and R99 LCS (pre-Rel'4 LCS)
- LCS core network signalling capability set 2: Rel'4 or later LCS (no Enhanced User Privacy support)
- LCS core network signaling capability set 3: Rel'5 or later LCS (with Enhanced User Privacy support)

The serving node, which notified the HLR/HSS that it supports LCS core network signalling capability set 2, shall be able to handle the extended LCS Client list and LCS Client List for call-related class from the HLR. A Rel'5 serving node without support for Enhanced User Privacy shall also indicate LCS core network signaling capability set 2.
The serving node, which notified the HLR/HSS that it supports LCS core network signaling capability set 3 shall be able to handle the Enhanced User Privacy mechanisms, as foreseen for rel-5. If the HLR/HSS is notified that the LCS capability set 3 is not supported, it may decide to not send the LCS subscriber data to the VLR, in order to protect user privacy.

[Note: this interworking scenario can be also applied for PS domain. Generalization of the description in this sub clause to cover both CS and PS domain should be done.][Note2: the concept of LCS capability set is newly introduced in Rel4 so that it doesn't appear in the specifications for R98 and R99 LCS]