Technical Specification Group Services and System Aspects
Meeting #28, 06 - 08 June 2005,
Quebec, Canada

***TSGS#28(05)0342***

**Source:** **SA WG2**

**Title:** **CRs to TS 23.271: Clarifications on the use of non-dialable callback number (Rel-6, Rel-7), 3 Functional modification CRs Rel-7)**

**Document for:** **Approval**

**Agenda Item:** **7.2.3**

| SA Doc | TS No. | CR No | Rev | Rel | Cat | Subject | Vers Cur | SA2 Doc | WI | Clauses affected |
|---|---|---|---|---|---|---|---|---|---|---|
| SP-050342 | 23.271 | 0303 | 2 | Rel-6 | F | Clarifications on the use of non-dialable callback number | 6.11.0 | S2-051409 | LCS2 | 3.1, 6.4.3, 9.1.1A, 9.1.3, 9.1.5, 9.1.5A |
| SP-050342 | 23.271 | 0304 | 1 | Rel-7 | A | Clarifications on the use of non-dialable callback number | 7.0.0 | S2-051410 | LCS3 | 3.1, 6.4.3, 9.1.1A, 9.1.3, 9.1.5, 9.1.5A |
| SP-050342 | 23.271 | 0306 | 1 | Rel-7 | C | MT-LR without HLR query - appropriate clarifications for EU | 7.0.0 | S2-051335 | LCS3 | 9.1.3 |
| SP-050342 | 23.271 | 0307 | 3 | Rel-7 | C | NI-LR - appropriate clarifications for EU | 7.0.0 | S2-051461 | LCS3 | 3.3, 9.1.5.1, 9.1.5.3 |
| SP-050342 | 23.271 | 0308 | - | Rel-7 | D | Missing definition of the abbreviation for RTT | 7.0.0 | S2-051242 | TEI-7 | 3.3 |

**3GPP TSG-SA2 Meeting #46**
**Athens, Greece, 9th-13th May 2005**

***Tdoc ⌘ S2-051409***
(revised S2-051334)

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **23.271** **CR** **0303** ⌘ **rev** **2** ⌘ Current version: **6.11.0** ⌘

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

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

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Clarifications on the use of non-dialable callback number |
| ***Source:*** | ⌘ | SA WG2 |
| ***Work item code:*** | ⌘ | LCS2 |
| ***Date:*** | ⌘ | 12/5/2005 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | Rel-6 |

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

*Use one of the following releases:*
*Ph2* *(GSM Phase 2)*
*R96* *(Release 1996)*
*R97* *(Release 1997)*
*R98* *(Release 1998)*
*R99* *(Release 1999)*
*Rel-4* *(Release 4)*
*Rel-5* *(Release 5)*
*Rel-6* *(Release 6)*
*Rel-7* *(Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In the specification we often see the term SIM-less emergency call, or SIM-less UE, but there is no formal definition of what is meant. If this term refers to the intuitional "no SIM present" definition, then we miss the case of having a SIM, which is not registered in the VLR for some reason. This CR proposes the clarifications, which are needed regarding the SIM-less emergency call and the missing case of non-registered (U)SIM. |
| ***Summary of change:*** | ⌘ | Two new definitions are given, one for the SIM-less emergency call and another for the non-registered (U)SIM emergency call, which is a case that is missing from the TS. Some editorial changes are also needed, due to those two definitions. |
| ***Consequences if not approved:*** | ⌘ | The missing definition of SIM-less emergency call and the missing case of non-registered (U)SIM may lead the reader to wrong assumptions. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 3.1, 6.4.3, 9.1.1A, 9.1.3, 9.1.5, 9.1.5A. |
| ***Other specs affected:*** | ⌘ | Y / N<br>X Other core specifications<br>X Test specifications<br>X O&M Specifications |
| | ⌘ | |
| ***Other comments:*** | ⌘ | |

# << First Modified Clause >>

## 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.

**Codeword**: access code, which is used by a Requestor or LCS Client in order to gain acceptance of a location request for a Target UE. The codeword is part of the privacy information that may be registered by a Target UE user.

**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) required after a specific event has occurred. The event may or may not occur 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 QoS Class:** The QoS class determines the degree of adherence to the quality of service information as required by the source of a location request.

**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.

**LDR reference number:** the identity which is assigned and maintained by the H-GMLC and circulated between the LCS Client, R-GMLC, H-GMLC, V-GMLC, MSC/SGSN and UE. With the identity of the UE, the LDR reference number can unique identify a Location Deferred Request. Notes: UE is involved only when the event type of the deferred request is "change of area". In addition, in a Periodical Immediate/deferred LCS Service Request, the LDR reference number is exclusive.

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

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

**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.

**Non-dialable call back number:** In case of a SIM-less emergency call, or a non-registered (U)SIM emergency call, a non-dialable callback number shall be used to identify the target UE. The format and structure of the non-dialable callback number is according to national or regional regulations.

**Non-registered (U)SIM emergency call**: The emergency call where the U(SIM) has not been authenticated and have not been registered in the VLR. Examples of such cases could be emergency call from a blocked (U)SIM due to mistyped PIN, or when the UE is in “enter PIN” mode, or the emergency call is performed in another network with no roaming agreement with the home PLMN. Any IMSI retrived from such a (U)SIM cannot be trusted and so cannot be used to identify the calling party.

**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):** method or technical solution, which is used to get an estimate of the target mobile's geographical location. For example positioning methods based on radio cell coverage, GPS or Assisted GPS methods, which are based on the Time-Of-Arrival (TOA) algorithm, and OTDOA or E-OTD methods, which are based on the Time-Difference-Of-Arrival (TDOA) algorithm. The positioning methods are further described in UTRAN Stage 2, TS 25.305 [1] and GERAN Stage 2, TS 43.059 [16].

**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.

**Privacy Profile Register, PPR:** The PPR stores privacy information of the target mobile. The PPR also executes privacy checks and sends the privacy check results to other network elements using the Lpp interface. PPR may be a standalone network entity or the PPR functionality may be integrated in H-GMLC.

**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).

**Pseudo-external identity:** The pseudo-external identity is not the identity of real external LCS client but the identity, which is used for notifying the result of the enhanced privacy check. The pseudo-external identity shall keep the compatibility with pre Rel-6 privacy mechanisms, which does not understand privacy check result made by H-GMLC/PPR. Each operator defines its own the pseudo-external identities.

**Pseudonym:** A fictitious identity, which may be used to conceal the true identity (i.e. MSISDN and IMSI) of a target UE from the requestor and the LCS client.

**Pseudonym mediation device**: functionality that verifies pseudonyms to verinyms.

**Request id:** identity which is used to identify the correspondence of a location request to multiple responses when the Response method is ASYNC. Each receiving GMLC (R-GMLC or V-GMLC or H-GMLC) allocates and maintains the Request id to identify each ASYNC location request, and includes it in the responses to the source entity of the location request (i.e. LCS client or GMLC).

**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.

**Response method:** method how a GMLC, which receives a location request message from another entity (i.e. LCS client or GMLC), responds to the location request. There are two methods, synchronous (SYNC) and asynchronous (ASYNC). When the requesting entity wishes multiple responses (either about one or several target UE's location) to a single location request the procedure is ASYNC and when the requesting entity wishes a single response the procedure is SYNC. The source entity of the location request (i.e. LCS client or GMLC) can choose a preferred method and informs the method to the receiving GMLC. However, the selection of the method used is made by the receiving GMLC and when the ASYNC method is selected the Request id is notified to the source entity. The receiving GMLC can turn a SYNC request into an ASYNC procedure, e.g. in an overload situation, and the source entity (i.e. LCS client or GMLC) should be able to receive multiple responses even though the request was SYNC.

**Service Area Identifier (SAI)**: information, which is used to identify an area consisting of one or more cells belonging to the same Location Area, see ref. [14]. Such an area is called a Service Area and can be used for indicating the location of a UE to the CN. For this specification, only a Service Area that is defined to be applicable to the PS and CS domains shall be used.

**Service coverage**: a list of country codes where an LCS client offers its location services. Country code in this context means E.164 country code for a geographic area [35a].

**Service Type**: attribute of specific location based service provided by the LCS client, as defined in TS 22.071.

**Serving cell identity**: the Cell Global Identification (CGI), see ref [17], of the cell currently used by the target UE, e.g. for an emergency call in A-mode.

**SIM-less emergency call**: The emergency call that is originated from a UE, which does not have a SIM or USIM.

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

**Target area:** geographical area which is used for change of area type deferred location request. The target area is defined by the LCS client and is expressed as geographical area using a shape defined in TS 23.032 [11], as a

geographical area using local coordinate system, as an E.164 country code for a geographic area [35a], as a PLMN identity or as a geopolitical name of the area (e.g. London).

**Target UE:** UE being positioned.

**User Equipment:** term 'User Equipment', or 'UE', as defined in TS 21.905 [3]. 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.

**Verinym**: True identity, i.e. MSISDN or IMSI, of the target UE.

Further UMTS related definitions are given in TS 22.101 [8].

# << Next Modified Clause >>

## 6.4.3 Non-dialable callback numbers

In case of a SIM-less emergency call, or in case of a non-registered (U)SIM emergency call, a non-dialable callback number shall be used to identify the target UE. The format and structure of the non-dialable callback number is according to national or regional regulations. The non-dialable callback number in North America shall, according to J-STD-036 [32], be the digits 911 + the last 7 digits of IMEI expressed in decimal numbers.

Editorial note: The use of non-dialable callback numbers in other parts of the world is for further study. The non-dialable callback number should adopt random numbering, if not otherwise unique.

# << Next Modified Clause >>

## 9.1.1A Common MT-LR procedure in PS and CS domain for Emergency MT-LR

This clause describes how an emergency location request may be handled similarly to a normal location request. This method should be restricted to those countries where there is not a national requirement to provide location for callers who are either roaming or making ~~an emergency call from~~ a SIM-less ~~UE~~emergency call, or making a non-registered (U)SIM emergency call. It is also appropriate to use this method to provide location for lawful intercept services where allowed by national regulation.

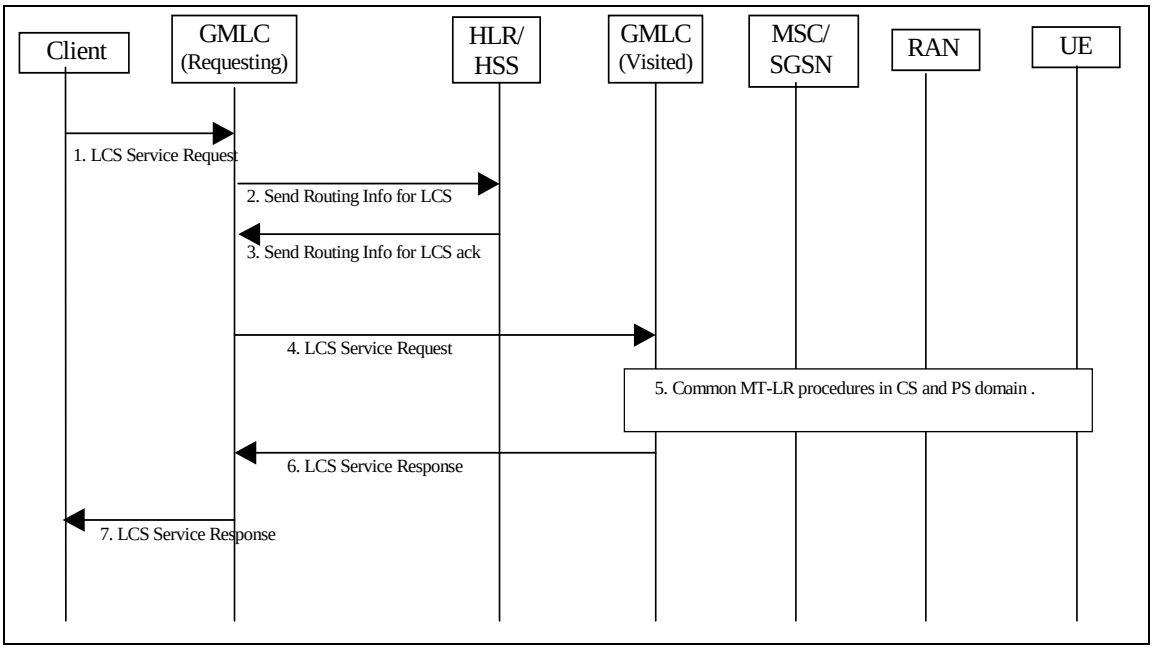


**Figure 9.1A: Network Positioning for an Emergency MT-LR**

1) An external LCS client which has the privacy override capability, (e.g. Emergency service provider), requests the location of a target UE from a GMLC. The R-GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client.

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

3) The HLR/HSS verifies whether the R-GMLC is authorized to request UE location information. If not, an error response is returned.
Otherwise the HLR/HSS returns one or several of the network addresses of the current SGSN and/or VMSC/MSC server and whichever of the IMSI and MSISDN that was not provided in step 2. The HLR/HSS also returns the address of the V-GMLC associated with the serving nodes, if available.

NOTE: HLR/HSS may prioritise between the MSC/VLR or SGSN address sent to the GMLC. The prioritisation might be based on information received from SGSN and/or MSC/VLR concerning the UE's capabilities for LCS. Other priority criteria are for further study.

4) In the cases when the R-GMLC did not receive the address of the V-GMLC, or when the V-GMLC address is the same as the R-GMLC address, or when both PLMN operators agree not to use the Lr interface, the R-GMLC does not send the location request to the V-GMLC and the step 6 is skipped. In this case, the R-GMLC sends the location service request message directly to the serving node.
If the R-GMLC received the address of the V-GMLC from the HLR/HSS and the V-GMLC address is different from the R-GMLC address, the R-GMLC sends the location request to the V-GMLC. The location request shall contain one or several of the network addresses of the current SGSN and/or MSC/VLR, the IMSI and MSISDN of the target UE and the privacy override indicator. The V-GMLC first authenticates that the location request is allowed from this GMLC, PLMN or from this country. If not, the positioning request is rejected and an error response is returned. Otherwise, it sets the privacy indicator to "not allowed" and includes it with the POI in the Provide Subscriber Location message.

5) In case the 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. In any case the serving node checks for POI applicability.

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

6) The V-GMLC sends the location service response to the R-GMLC. The location service response may contain the information about the positioning method used. The V-GMLC may record charging information.

7) R-GMLC sends the location service response to the LCS client. If the LCS client requires it, the R-GMLC may first transform the universal location co-ordinates provided by the SGSN or MSC/MSC server into some local geographic system. The location service response from the GMLC to the LCS client may contain the information about the positioning method used. After receiving (stage 3) acknowledgement from the LCS client, the R-GMLC may record charging information both for 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 5 of figure 9.1A are described in 9.1.2 and 9.1.6.

# << Next Modified Clause >>

## 9.1.3 CS-MT-LR without HLR Query

Figure 9.3 illustrates current or last known location requests for an emergency services call, where an emergency services client (i.e., a Public Safety Answering Point) identifies the target UE and the serving GMLC using correlation information that were previously provided to it by the VMSC. In North America, this correlation information is provided by either an NA-ESRK, or an MSISDN and NA-ESRD. The signaling used to provide the correlation information to the PSAP is out of scope of this TS, but is presumed to occur on the signaling for the call. This allows the requesting V-GMLC to request location from the VMSC without first querying the home HLR of the target UE. This scenario therefore supports location of emergency callers from roamers or SIM-less ~~mobiles~~emergency calls, or non-registered (U)SIM emergency calls, and requires that the initial location, as well as UE and VMSC identifying information had been pushed to the GMLC as per 9.1.5 (or 9.1.5.A for North America). In North America, additional requirements are found in [32].

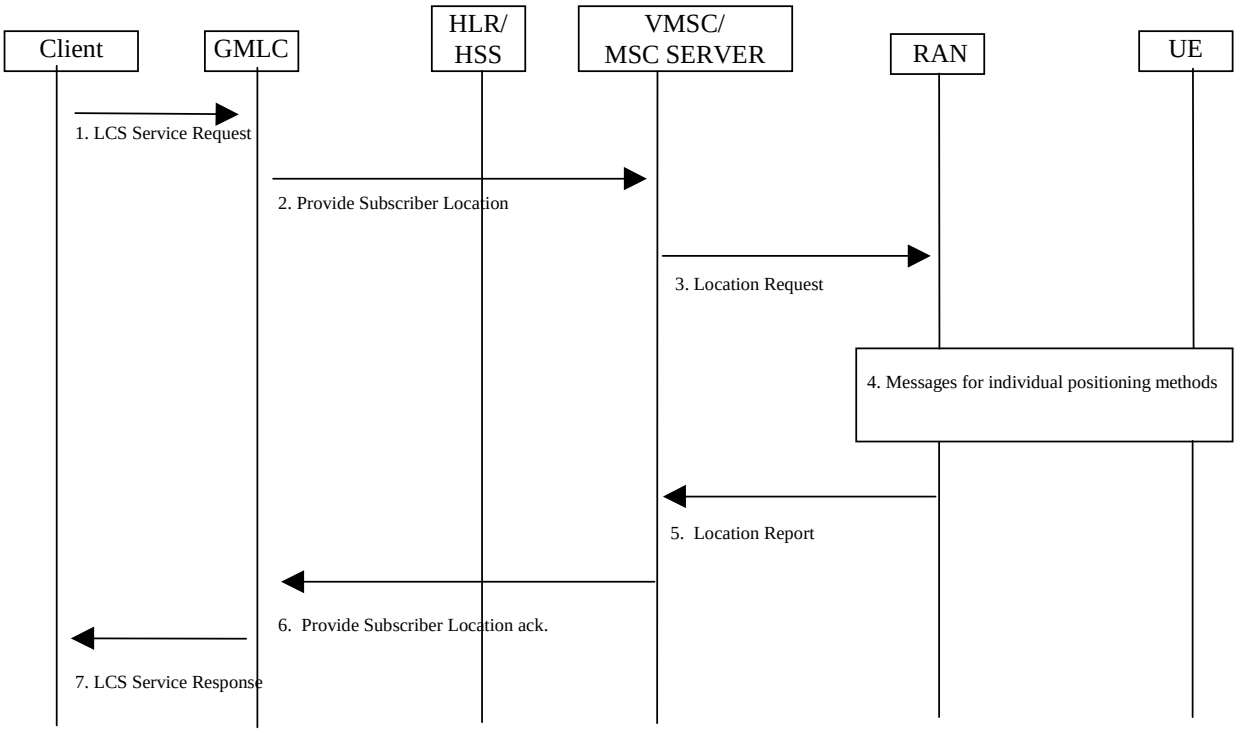


**Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query**

1) Same as step 1 in figure 9.1 but with the LCS client (PSAP) identifying first the target UE and the serving V-GMLC by previously supplied correlation information for the emergency call.

2) The GMLC may determine the VMSC from correlation information received from the PSAP, or from stored information for the target UE (e.g. from a prior location estimate delivery from the VMSC/MSC server). In North America, 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 MSISDN and, if provided, the IMSI and 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 and, if provided, the IMEI. In case of a SIM-less ~~UE is used to make the~~ emergency call, or non-registered (U)SIM emergency call, the IMEI shall be always sent and the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3.

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 step 9 for a normal CS-MT-LR.

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

<< Next Modified Clause >>

## 9.1.5 Network Induced Location Request (NI-LR)

Figure 9.4 illustrates how the initial position for an emergency service call is determined when the subscriber initiates the emergency call.

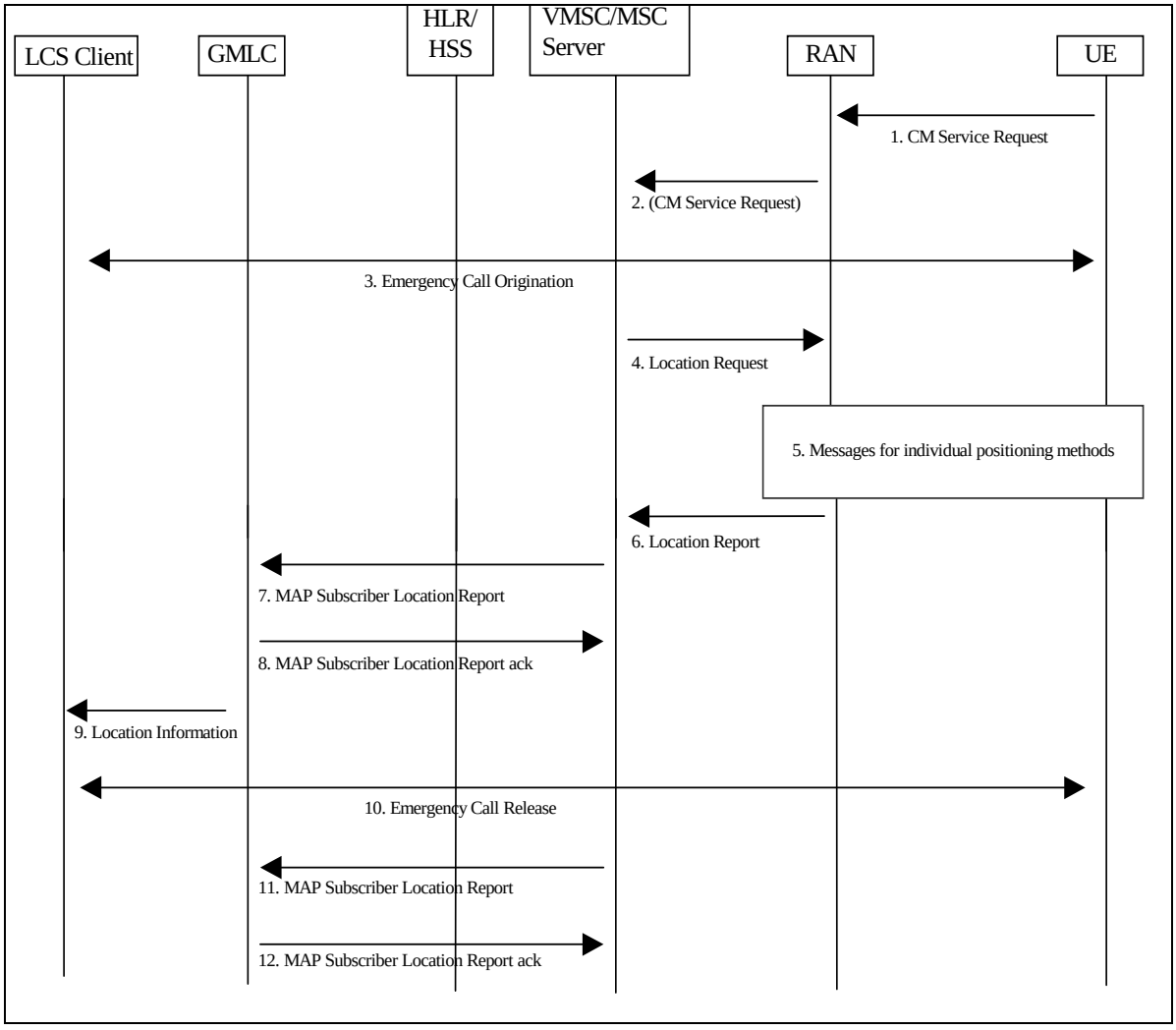


**Figure 9.4: Positioning for a NI-LR Emergency Service Call**

### 9.1.5.1 Location Preparation Procedure

1) An initially idle UE requests radio connection setup indicating a request for an Emergency Service call to the VMSC/MSC server via RAN.

2) RAN shall convey the CM service request to the core network. (Before having a CM connection there must be a radio connection.) The UE may identify itself using a TMSI, IMSI or IMEI.

3) The emergency call procedure is applied. The VMSC/MSC server determines based on the serving cell the appropriate emergency services client. The VMSC/MSC server, RAN and UE continue the normal procedure for emergency call origination towards that emergency services client. Depending on local regulatory requirements, the sending of call setup information into the PSTN may be delayed until either the UE's location has been obtained or the location attempt has failed or a PLMN defined timer has expired before location was obtained. If the serving cell serves an area that contains the service domain of multiple emergency services clients, the VMSC/MSC server may delay call setup and invoke location based routing procedures described in section 9.1.5A. Call setup information sent into the PSTN may include the UE location (if already obtained) plus information that will enable the emergency service provider to request UE location at a later time (e.g. NA-ESRD or NA-ESRK in North America).

4) At any time after step 2, the VMSC/MSC server may initiate procedures to obtain the UE's location. These procedures may run in parallel with the emergency call origination. The VMSC/MSC server sends a Location Request message to RAN associated with the UE's current location area (see step 6 for a MT-LR). This message includes the QoS required for an emergency call.

### 9.1.5.2 Positioning Measurement Establishment Procedure

5) 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].

### 9.1.5.3 Location Calculation and Release Procedure

6) When a location estimate best satisfying the requested QoS has been obtained, RAN returns it to the VMSC/MSC server in a Location Report. As a national option, Cell ID positioning accuracy is allowed. RAN shall in its response include an indication whether the obtained location estimate satisfies the requested accuracy or not. The information of the positioning method used may be returned with the location estimate. If a location estimate could not be obtained, the RAN returns a location response containing a failure cause and no location estimate.

7) Depending on local regulatory requirements, the VMSC/MSC server may send a MAP Subscriber Location report to a GMLC associated with the emergency services provider to which the emergency call has been or will be sent. This message shall carry any location estimate returned in step 6 including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, the age of this estimate and may carry the MSISDN, IMSI and IMEI of the calling UE, the information about the positioning method used and the serving cell identity or SAI of the UE. In case of a SIM-less ~~UE is used to make the~~ emergency call, or a non-registered (U)SIM emergency call, the IMEI shall be always sent and the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3. In North America, any NA-ESRD and any NA-ESRK that may have been assigned by the VMSC/MSC server shall be included. The message shall also indicate the event that triggered the location report. If location failed (i.e. an error result was returned by RAN in step 6), an indication of failure rather than a location estimate may be sent to the GMLC: the indication of failure is conveyed by not including a location estimate in the MAP Subscriber Location Report. The MSC/MSC server may record charging information.

8) The GMLC acknowledges receipt of the location information. The GMLC shall store the location information for later retrieval by the emergency services LCS client.

9) The GMLC may optionally forward the information received in step 8 to the emergency services LCS client. The GMLC may also record charging information. The client is expected to obtain the location information by requesting it from the GMLC. The information about the positioning method used may be sent with the location information from the GMLC to the LCS client.

10) At some later time, the emergency services call is released.

11) The MSC/MSC server sends another MAP Subscriber Location Report to the GMLC. This message may include the same parameters as before except that there is no position estimate and an indication of emergency call termination is included.

12) The GMLC acknowledges the MSC/MSC server notification and may then delete all information previously stored for the emergency call per national regulation.

<< Next Modified Clause >>

## 9.1.5A NI-LR using Location Based Routing – applicable to North American Emergency Calls only

Figure 9.4A illustrates positioning for an emergency service call using location based routing.

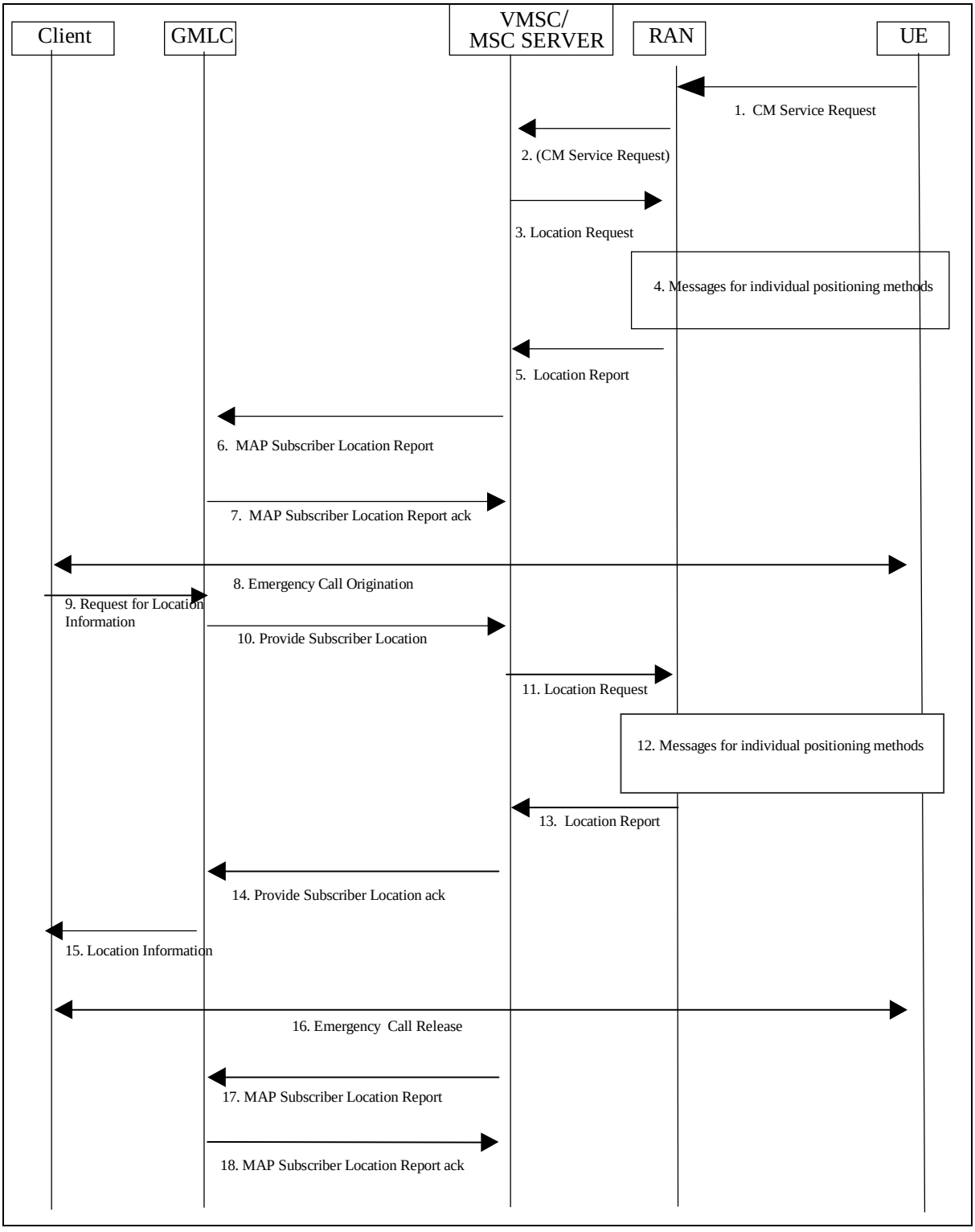


**Figure 9.4A: Positioning for a NI-LR Emergency Service Call using Location Based Routing**

### 9.1.5A.1 Location Preparation Procedure

1) An initially idle UE requests radio connection setup indicating a request for an Emergency Service call to the VMSC/MSC server via RAN.

2) RAN shall convey the CM service request to the core network. (Before having a CM connection there must be a radio connection.) The UE may identify itself using a TMSI, IMSI or IMEI.

3) The VMSC/MSC server determines that the serving cell serves an area that contains portions of multiple emergency services zones. Therefore, the VMSC/MSC server delays call setup and initiates procedures to obtain the UE's location for routing the emergency call to the emergency services LCS client. The VMSC/MSC server sends a Location Request message to RAN associated with the UE's current location area. This message includes the type of location information requested, the UE's location capabilities and a QoS with low delay and low horizontal accuracy.

### 9.1.5A.2 Positioning Measurement Establishment Procedure

4) 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].

### 9.1.5A.3 Location Calculation and Release Procedure

5) When a location estimate best satisfying the requested QoS has been obtained, RAN returns it to the VMSC/MSC server. If a location estimate could not be obtained, the RAN returns a location response containing a failure cause and no location estimate. If a failure is received, the VMSC/MSC server initiates emergency call setup using the normal NI-LR procedures.

6) The VMSC/MSC server sends a MAP Subscriber Location Report to a GMLC associated with the emergency services provider to which the emergency call will be sent. This message shall carry any location estimate returned in step 5, the age of this estimate and may carry the MSISDN, IMSI, IMEI of the calling UE, the information about the positioning method used and the serving cell identity or SAI of the UE. In case of a SIM-less ~~UE is used to make the~~ emergency call, or a non-registered (U)SIM emergency call, the IMEI shall be always sent and the MSISDN shall be populated with a non-dialable callback number as specified in clause 6.4.3. The message shall also indicate the event that triggered the location report. Any NA-ESRD and NA-ESRK that was assigned by the VMSC/MSC server shall be included. The message shall also include an indication that the VMSC/MSC server supports the capability to replace an NA-ESRK or NA-ESRD value with the one assigned by the GMLC. The VMSC/MSC server and GMLC may record charging information.

7) The GMLC translates the location estimate into a zone identity and assigns either a NA-ESRK or a NA-ESRD, which was requested by the VMSC/MSC server. The GMLC shall include either the NA-ESRK value or the NA-ESRD value in the MAP Subscriber Location Report ack and send it to the VMSC/MSC server. The GMLC stores either the assigned NA-ESRD or the assigned NA- ESRK and any NA-ESRD that was sent by the VMSC/MSC server in step 6.

### 9.1.5A.4 Location Preparation Procedure

8) The emergency call procedure is applied. The VMSC/MSC server, RAN and UE continue the normal procedure for emergency call origination towards the appropriate emergency services client. Call setup information sent into the PSTN may include the UE location plus information that will enable the emergency service provider to request UE location at a later time (NA-ESRD or NA-ESRK in North America). The NA-ESRK or NA-ESRD used shall be the one received from the GMLC. If a NA-ESRK or NA-ESRD is not received from the GMLC then the VMSC/MSC server shall employ default routing for the call using a default NA-ESRK, default NA-ESRD or other default number as in 9.1.5.1 step 3.

9) At any time after step 8, the emergency services LCS client may request location information.

10) At any time after step 6, the GMLC may send a MAP Provide Subscriber Location message to the VMSC/MSC server. This message includes a QoS with higher delay and higher horizontal accuracy required for an emergency call. In case of a SIM-less ~~UE is used to make the~~ emergency call, or a non-registered (U)SIM emergency call, the IMEI shall be included in the message.

If the GMLC is capable of determining whether the initial location satisfies the higher accuracy requirements for an emergency call, then the GMLC may not need to request for a higher accuracy location.

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

### 9.1.5A.5 Positioning Measurement Establishment Procedure

12) same as step 4.

### 9.1.5A.6 Location Calculation and Release Procedure

13) same as step 5.

14) The VMSC/MSC server returns the location information and its age, the information about the positioning method used and the serving cell identity or SAI of the UE to the GMLC. The GMLC shall replace the previously stored low accuracy location information with the higher accuracy information for later retrieval by the emergency services LCS client. The VMSC/MSC server and GMLC may record charging information.

15) The GMLC may forward the information received in the previous step to the emergency services LCS client. The client is expected to have requested this information from GMLC before. The information about the positioning method used may be sent with this location information from the GMLC to the LCS client.

16) same as step 10 for normal NI-LR.

17) same as step 11 for normal NI-LR.

18) same as step 12 for normal NI-LR.

<< End of modifications >>

**3GPP TSG-SA2 Meeting #46**
**Athens, Greece, 9th-13th May 2005**

***Tdoc ⌘ S2-051410***
(Revised S2-051154)

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **23.271** **CR** **0304** ⌘ **rev** **1** ⌘ Current version: **7.0.0** ⌘

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

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

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Clarifications on the use of non-dialable callback number |
| ***Source:*** | ⌘ | SA WG2 |
| ***Work item code:*** | ⌘ | LCS2 |
| ***Date:*** | ⌘ | 12/5/2005 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-7 |

*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:*
*Ph2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | In the specification we often see the term SIM-less emergency call, or SIM-less UE, but there is no formal definition of what is meant. If this term refers to the intuitional "no SIM present" definition, then we miss the case of having a SIM, which is not registered in the VLR for some reason. This CR proposes the clarifications, which are needed regarding the SIM-less emergency call and the missing case of non-registered (U)SIM. |
| ***Summary of change:*** | ⌘ | Two new definitions are given, one for the SIM-less emergency call and another for the non-registered (U)SIM emergency call, which is a case that is missing from the TS. Some editorial changes are also needed, due to those two definitions. |
| ***Consequences if not approved:*** | ⌘ | The missing definition of SIM-less emergency call and the missing case of non-registered (U)SIM may lead the reader to wrong assumptions. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 3.1, 6.4.3, 9.1.1A, 9.1.3, 9.1.5, 9.1.5A. |

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

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

# << First Modified Clause >>

## 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.

**Codeword**: access code, which is used by a Requestor or LCS Client in order to gain acceptance of a location request for a Target UE. The codeword is part of the privacy information that may be registered by a Target UE user.

**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) required after a specific event has occurred. The event may or may not occur 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 QoS Class:** The QoS class determines the degree of adherence to the quality of service information as required by the source of a location request.

**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.

**LDR reference number:** the identity which is assigned and maintained by the H-GMLC and circulated between the LCS Client, R-GMLC, H-GMLC, V-GMLC, MSC/SGSN and UE. With the identity of the UE, the LDR reference number can unique identify a Location Deferred Request. Notes: UE is involved only when the event type of the deferred request is "change of area". In addition, in a Periodical Immediate/deferred LCS Service Request, the LDR reference number is exclusive.

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

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

**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. The location estimate may include the velocity of the UE.

**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.

**Non-dialable call back number:** In case of a SIM-less emergency call, or a non-registered (U)SIM emergency call, a non-dialable callback number shall be used to identify the target UE. The format and structure of the non-dialable callback number is according to national or regional regulations.

**Non-registered (U)SIM emergency call**: The emergency call where the U(SIM) has not been authenticated and have not been registered in the VLR. Examples of such cases could be emergency call from a blocked (U)SIM due to mistyped PIN, or when the UE is in “enter PIN” mode, or the emergency call is performed in another network with no roaming agreement with the home PLMN. Any IMSI retrived from such a (U)SIM cannot be trusted and so cannot be used to identify the calling party.

**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 and optionally, velocity (of e.g. a mobile terminal).

**Positioning method (/locating method):** method or technical solution, which is used to get an estimate of the target mobile's geographical location. For example positioning methods based on radio cell coverage, GPS or Assisted GPS methods, which are based on the Time-Of-Arrival (TOA) algorithm, and OTDOA or E-OTD methods, which are based on the Time-Difference-Of-Arrival (TDOA) algorithm. The positioning methods are further described in UTRAN Stage 2, TS 25.305 [1] and GERAN Stage 2, TS 43.059 [16].

**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.

**Privacy Profile Register, PPR:** The PPR stores privacy information of the target mobile. The PPR also executes privacy checks and sends the privacy check results to other network elements using the Lpp interface. PPR may be a standalone network entity or the PPR functionality may be integrated in H-GMLC.

**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).

**Pseudo-external identity:** The pseudo-external identity is not the identity of real external LCS client but the identity, which is used for notifying the result of the enhanced privacy check. The pseudo-external identity shall keep the compatibility with pre Rel-6 privacy mechanisms, which does not understand privacy check result made by H-GMLC/PPR. Each operator defines its own the pseudo-external identities.

**Pseudonym:** A fictitious identity, which may be used to conceal the true identity (i.e. MSISDN and IMSI) of a target UE from the requestor and the LCS client.

**Pseudonym mediation device**: functionality that verifies pseudonyms to verinyms.

**Request id:** identity which is used to identify the correspondence of a location request to multiple responses when the Response method is ASYNC. Each receiving GMLC (R-GMLC or V-GMLC or H-GMLC) allocates and maintains the Request id to identify each ASYNC location request, and includes it in the responses to the source entity of the location request (i.e. LCS client or GMLC).

**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.

**Response method:** method how a GMLC, which receives a location request message from another entity (i.e. LCS client or GMLC), responds to the location request. There are two methods, synchronous (SYNC) and asynchronous (ASYNC). When the requesting entity wishes multiple responses (either about one or several target UE's location) to a single location request the procedure is ASYNC and when the requesting entity wishes a single response the procedure is SYNC. The source entity of the location request (i.e. LCS client or GMLC) can choose a preferred method and informs the method to the receiving GMLC. However, the selection of the method used is made by the receiving GMLC and when the ASYNC method is selected the Request id is notified to the source entity. The receiving GMLC can turn a SYNC request into an ASYNC procedure, e.g. in an overload situation, and the source entity (i.e. LCS client or GMLC) should be able to receive multiple responses even though the request was SYNC.

**Service Area Identifier (SAI)**: information, which is used to identify an area consisting of one or more cells belonging to the same Location Area, see ref. [14]. Such an area is called a Service Area and can be used for indicating the location of a UE to the CN. For this specification, only a Service Area that is defined to be applicable to the PS and CS domains shall be used.

**Service coverage**: a list of country codes where an LCS client offers its location services. Country code in this context means E.164 country code for a geographic area [35a].

**Service Type**: attribute of specific location based service provided by the LCS client, as defined in TS 22.071.

**Serving cell identity**: the Cell Global Identification (CGI), see ref [17], of the cell currently used by the target UE, e.g. for an emergency call in A-mode.

**SIM-less emergency call**: The emergency call that is originated from a UE, which does not have a SIM or USIM.

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

**Target area:** geographical area which is used for change of area type deferred location request. The target area is defined by the LCS client and is expressed as geographical area using a shape defined in TS 23.032 [11], as a

geographical area using local coordinate system, as an E.164 country code for a geographic area [35a], as a PLMN identity or as a geopolitical name of the area (e.g. London).

**Target UE:** UE being positioned.

**User Equipment:** term 'User Equipment', or 'UE', as defined in TS 21.905 [3]. 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.

**Velocity:** The speed of a UE and the direction in which it is travelling, encoded as defined in TS 23.032 [11]. Velocity may be defined as either 2-D (horizontal) velocity or 3-D (horizontal and vertical) velocity. Both 2-D and 3-D velocity may be reported either with or without uncertainty.

**Verinym**: True identity, i.e. MSISDN or IMSI, of the target UE.

Further UMTS related definitions are given in TS 22.101 [8].

# << Next Modified Clause >>

## 6.4.3 Non-dialable callback numbers

In case of a SIM-less emergency call, or in case of a non-registered (U)SIM emergency call, a non-dialable callback number shall be used to identify the target UE. The format and structure of the non-dialable callback number is according to national or regional regulations. The non-dialable callback number in North America shall, according to J-STD-036 [32], be the digits 911 + the last 7 digits of IMEI expressed in decimal numbers.

Editorial note: The use of non-dialable callback numbers in other parts of the world is for further study. The non-dialable callback number should adopt random numbering, if not otherwise unique.

# << Next Modified Clause >>

## 9.1.1A Common MT-LR procedure in PS and CS domain for Emergency MT-LR

This clause describes how an emergency location request may be handled similarly to a normal location request. This method should be restricted to those countries where there is not a national requirement to provide location for callers who are either roaming or making ~~an emergency call from~~ a SIM-less ~~UE~~emergency call, or making a non-registered (U)SIM emergency call. It is also appropriate to use this method to provide location for lawful intercept services where allowed by national regulation.

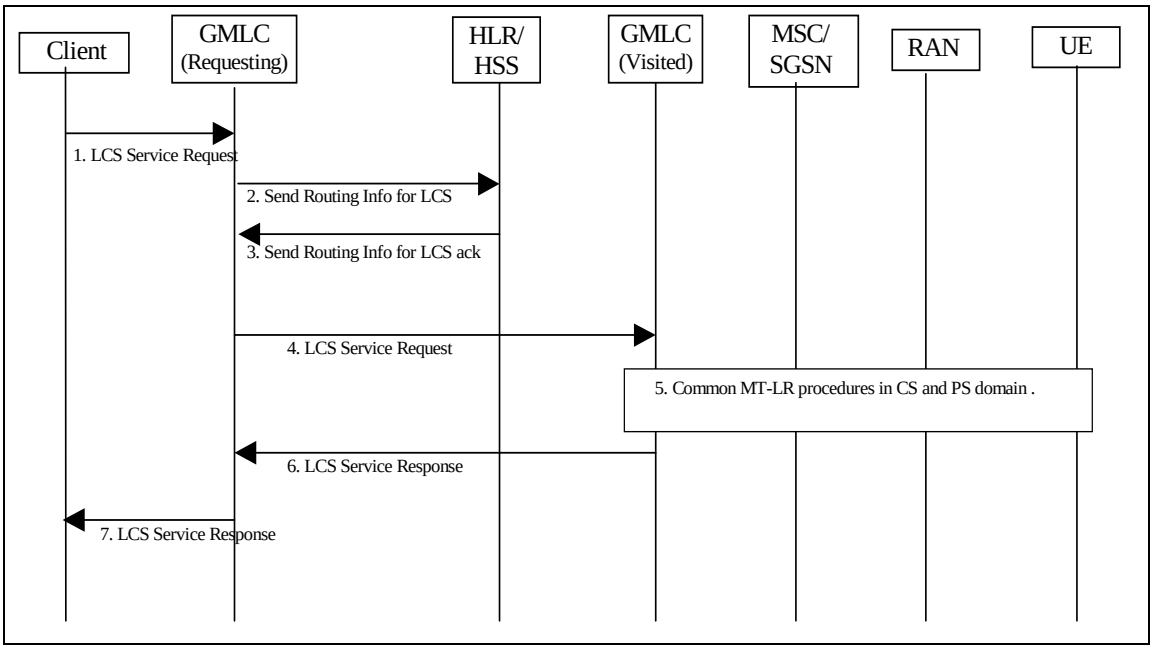


**Figure 9.1A: Network Positioning for an Emergency MT-LR**

1) An external LCS client which has the privacy override capability, (e.g. Emergency service provider), requests the location of a target UE from a GMLC. The R-GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client.

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

3) The HLR/HSS verifies whether the R-GMLC is authorized to request UE location information. If not, an error response is returned.
Otherwise the HLR/HSS returns one or several of the network addresses of the current SGSN and/or VMSC/MSC server and whichever of the IMSI and MSISDN that was not provided in step 2. The HLR/HSS also returns the address of the V-GMLC associated with the serving nodes, if available.

NOTE: HLR/HSS may prioritise between the MSC/VLR or SGSN address sent to the GMLC. The prioritisation might be based on information received from SGSN and/or MSC/VLR concerning the UE's capabilities for LCS. Other priority criteria are for further study.

4) In the cases when the R-GMLC did not receive the address of the V-GMLC, or when the V-GMLC address is the same as the R-GMLC address, or when both PLMN operators agree not to use the Lr interface, the R-GMLC does not send the location request to the V-GMLC and the step 6 is skipped. In this case, the R-GMLC sends the location service request message directly to the serving node.
If the R-GMLC received the address of the V-GMLC from the HLR/HSS and the V-GMLC address is different from the R-GMLC address, the R-GMLC sends the location request to the V-GMLC. The location request shall contain one or several of the network addresses of the current SGSN and/or MSC/VLR, the IMSI and MSISDN of the target UE and the privacy override indicator. The V-GMLC first authenticates that the location request is allowed from this GMLC, PLMN or from this country. If not, the positioning request is rejected and an error response is returned. Otherwise, it sets the privacy indicator to "not allowed" and includes it with the POI in the Provide Subscriber Location message.

5) In case the 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. In any case the serving node checks for POI applicability.

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

6) The V-GMLC sends the location service response to the R-GMLC. The location service response may contain the information about the positioning method used. The V-GMLC may record charging information.

7) R-GMLC sends the location service response to the LCS client. If the LCS client requires it, the R-GMLC may first transform the universal location co-ordinates provided by the SGSN or MSC/MSC server into some local geographic system. The location service response from the GMLC to the LCS client may contain the information about the positioning method used. After receiving (stage 3) acknowledgement from the LCS client, the R-GMLC may record charging information both for 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 5 of figure 9.1A are described in 9.1.2 and 9.1.6.

# << Next Modified Clause >>

## 9.1.3 CS-MT-LR without HLR Query

Figure 9.3 illustrates current or last known location requests for an emergency services call, where an emergency services client (i.e., a Public Safety Answering Point) identifies the target UE and the serving GMLC using correlation information that were previously provided to it by the VMSC. In North America, this correlation information is provided by either an NA-ESRK, or an MSISDN and NA-ESRD. The signaling used to provide the correlation information to the PSAP is out of scope of this TS, but is presumed to occur on the signaling for the call. This allows the requesting V-GMLC to request location from the VMSC without first querying the home HLR of the target UE. This scenario therefore supports location of emergency callers from roamers or SIM-less ~~mobiles~~emergency calls, or non-registered (U)SIM emergency calls, and requires that the initial location, as well as UE and VMSC identifying information had been pushed to the GMLC as per 9.1.5 (or 9.1.5.A for North America). In North America, additional requirements are found in [32].

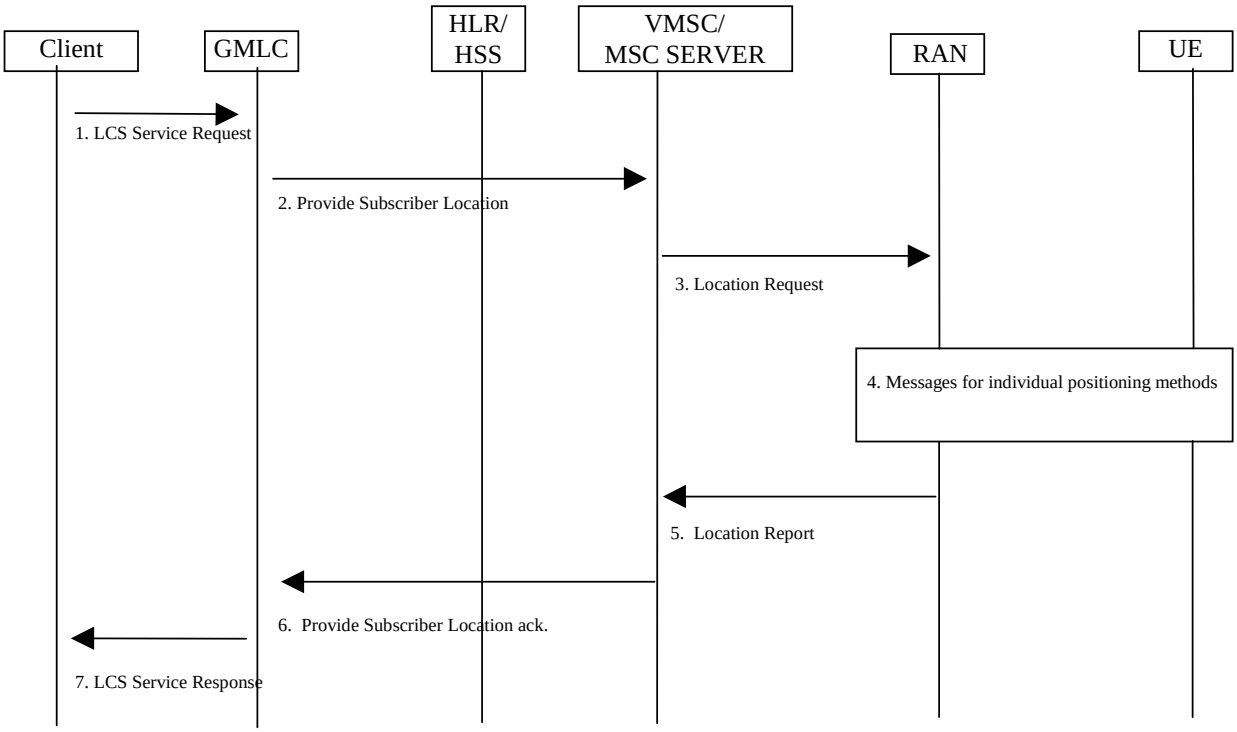


**Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query**

1) Same as step 1 in figure 9.1 but with the LCS client (PSAP) identifying first the target UE and the serving V-GMLC by previously supplied correlation information for the emergency call.

2) The GMLC may determine the VMSC from correlation information received from the PSAP, or from stored information for the target UE (e.g. from a prior location estimate delivery from the VMSC/MSC server). In North America, 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 MSISDN and, if provided, the IMSI and 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 and, if provided, the IMEI. In case of a SIM-less ~~UE is used to make the~~ emergency call, or non-registered (U)SIM emergency call, the IMEI shall be always sent and the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3.

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 step 9 for a normal CS-MT-LR.

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

<< Next Modified Clause >>

## 9.1.5 Network Induced Location Request (NI-LR)

Figure 9.4 illustrates how the initial position for an emergency service call is determined when the subscriber initiates the emergency call.

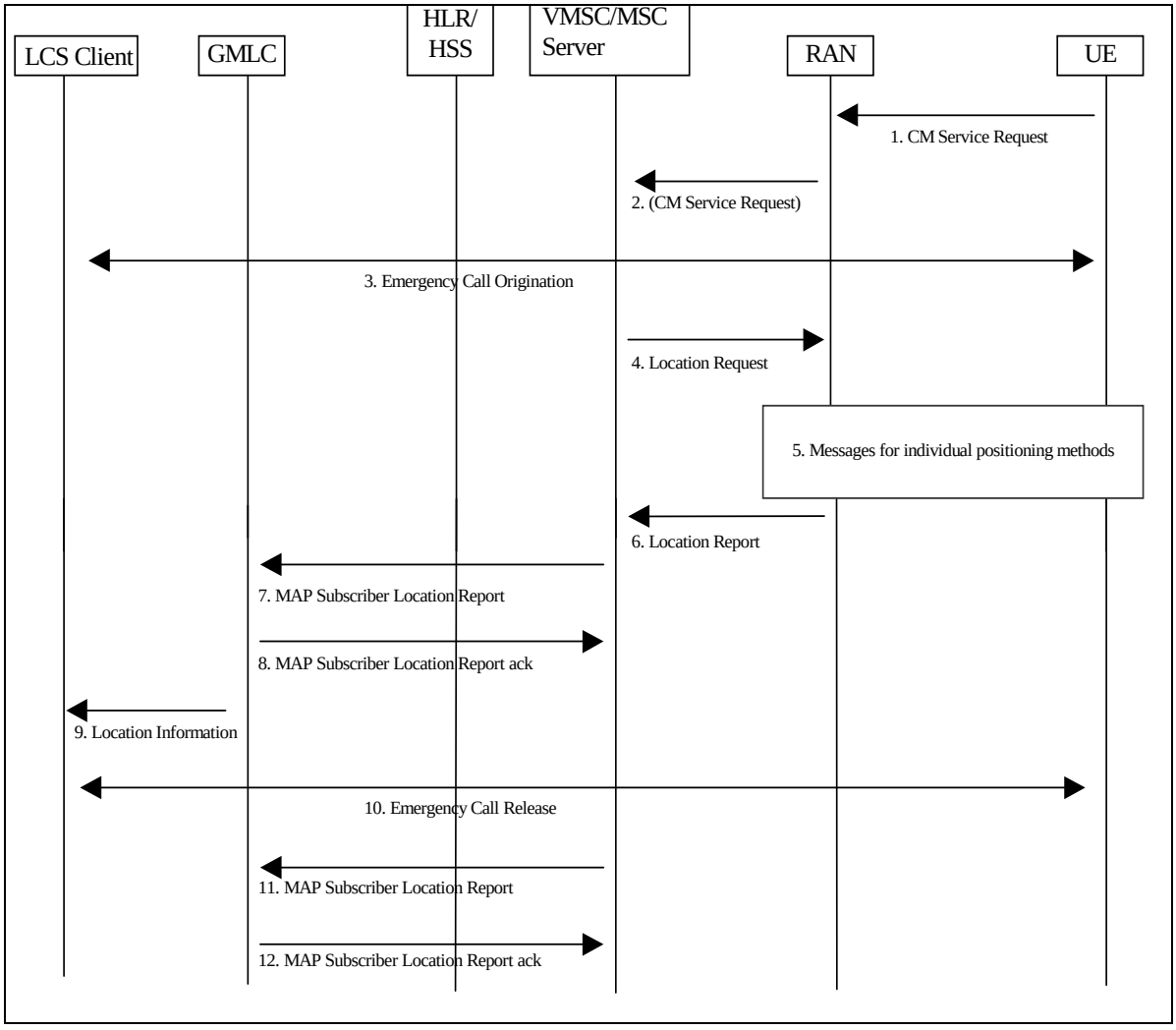


**Figure 9.4: Positioning for a NI-LR Emergency Service Call**

### 9.1.5.1 Location Preparation Procedure

1) An initially idle UE requests radio connection setup indicating a request for an Emergency Service call to the VMSC/MSC server via RAN.

2) RAN shall convey the CM service request to the core network. (Before having a CM connection there must be a radio connection.) The UE may identify itself using a TMSI, IMSI or IMEI.

3) The emergency call procedure is applied. The VMSC/MSC server determines based on the serving cell the appropriate emergency services client. The VMSC/MSC server, RAN and UE continue the normal procedure for emergency call origination towards that emergency services client. Depending on local regulatory requirements, the sending of call setup information into the PSTN may be delayed until either the UE's location has been obtained or the location attempt has failed or a PLMN defined timer has expired before location was obtained. If the serving cell serves an area that contains the service domain of multiple emergency services clients, the VMSC/MSC server may delay call setup and invoke location based routing procedures described in section 9.1.5A. Call setup information sent into the PSTN may include the UE location (if already obtained) plus information that will enable the emergency service provider to request UE location at a later time (e.g. NA-ESRD or NA-ESRK in North America).

4) At any time after step 2, the VMSC/MSC server may initiate procedures to obtain the UE's location and optionally, velocity. These procedures may run in parallel with the emergency call origination. The VMSC/MSC server sends a Location Request message to RAN associated with the UE's current location area (see step 6 for a MT-LR). This message includes the QoS required for an emergency call.

### 9.1.5.2 Positioning Measurement Establishment Procedure

5) 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].

### 9.1.5.3 Location Calculation and Release Procedure

6) When a location estimate best satisfying the requested QoS has been obtained, RAN returns it to the VMSC/MSC server in a Location Report. As a national option, Cell ID positioning accuracy is allowed. RAN shall in its response include an indication whether the obtained location estimate satisfies the requested accuracy or not. The information of the positioning method used may be returned with the location estimate. If a location estimate could not be obtained, the RAN returns a location response containing a failure cause and no location estimate.

7) Depending on local regulatory requirements, the VMSC/MSC server may send a MAP Subscriber Location report to a GMLC associated with the emergency services provider to which the emergency call has been or will be sent. This message shall carry any location estimate returned in step 6 including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, the age of this estimate and may carry the MSISDN, IMSI and IMEI of the calling UE, the information about the positioning method used and the serving cell identity or SAI of the UE. In case of a SIM-less ~~UE is used to make the~~ emergency call, or a non-registered (U)SIM emergency call, the IMEI shall be always sent and the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3. In North America, any NA-ESRD and any NA-ESRK that may have been assigned by the VMSC/MSC server shall be included. The message shall also indicate the event that triggered the location report. If location failed (i.e. an error result was returned by RAN in step 6), an indication of failure rather than a location estimate may be sent to the GMLC: the indication of failure is conveyed by not including a location estimate in the MAP Subscriber Location Report. The MSC/MSC server may record charging information.

8) The GMLC acknowledges receipt of the location information. The GMLC shall store the location information for later retrieval by the emergency services LCS client.

9) The GMLC may optionally forward the information received in step 8 to the emergency services LCS client. The GMLC may also record charging information. The client is expected to obtain the location information by requesting it from the GMLC. The information about the positioning method used may be sent with the location information from the GMLC to the LCS client.

10) At some later time, the emergency services call is released.

11) The MSC/MSC server sends another MAP Subscriber Location Report to the GMLC. This message may include the same parameters as before except that there is no position estimate and an indication of emergency call termination is included.

12) The GMLC acknowledges the MSC/MSC server notification and may then delete all information previously stored for the emergency call per national regulation


# << Next Modified Clause >>

## 9.1.5A NI-LR using Location Based Routing – applicable to North American Emergency Calls only

Figure 9.4A illustrates positioning for an emergency service call using location based routing.

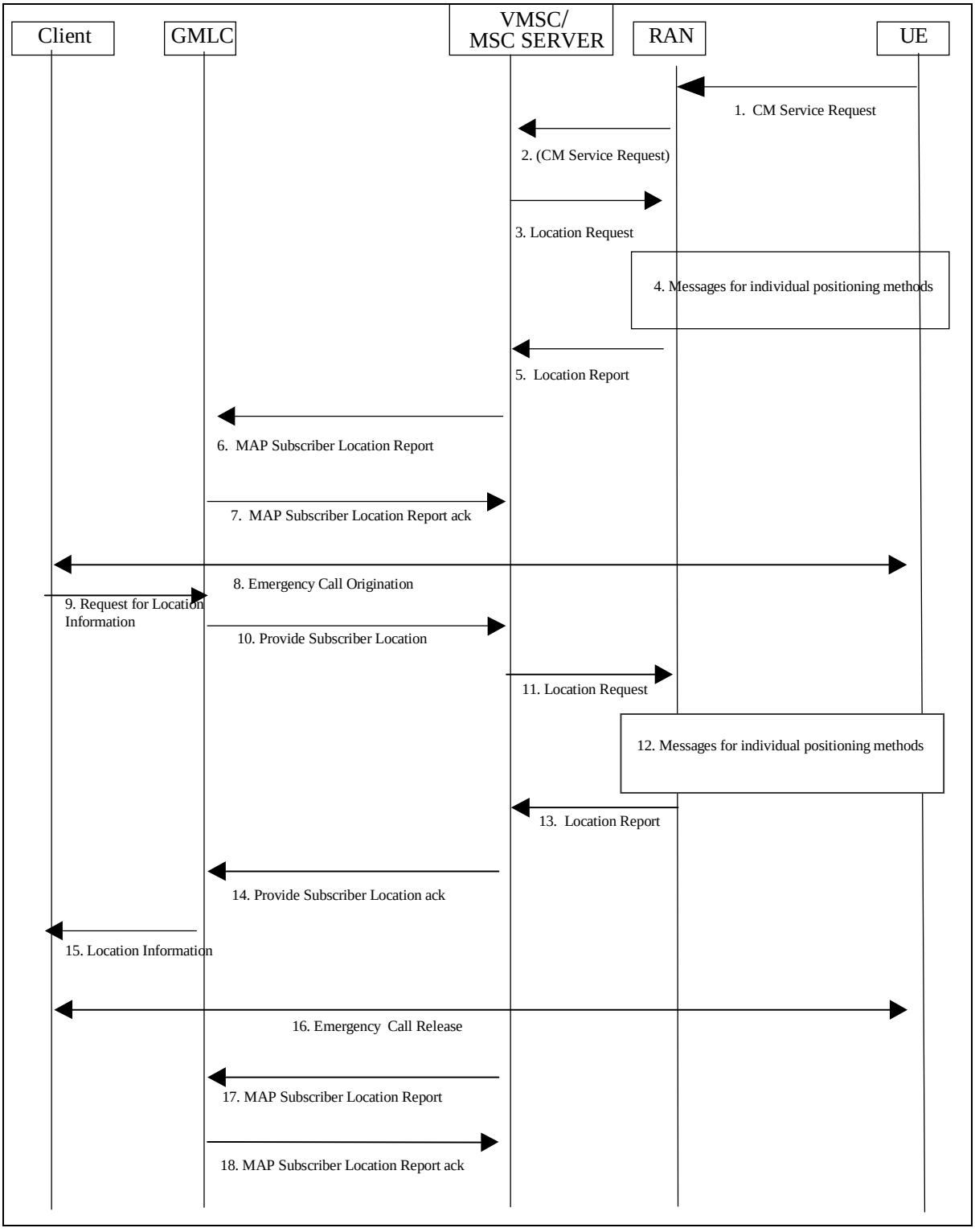


**Figure 9.4A: Positioning for a NI-LR Emergency Service Call using Location Based Routing**

### 9.1.5A.1 Location Preparation Procedure

1) An initially idle UE requests radio connection setup indicating a request for an Emergency Service call to the VMSC/MSC server via RAN.

2) RAN shall convey the CM service request to the core network. (Before having a CM connection there must be a radio connection.) The UE may identify itself using a TMSI, IMSI or IMEI.

3) The VMSC/MSC server determines that the serving cell serves an area that contains portions of multiple emergency services zones. Therefore, the VMSC/MSC server delays call setup and initiates procedures to obtain the UE's location for routing the emergency call to the emergency services LCS client. The VMSC/MSC server sends a Location Request message to RAN associated with the UE's current location area. This message includes the type of location information requested, the UE's location capabilities and a QoS with low delay and low horizontal accuracy.

### 9.1.5A.2 Positioning Measurement Establishment Procedure

4) 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].

### 9.1.5A.3 Location Calculation and Release Procedure

5) When a location estimate best satisfying the requested QoS has been obtained, RAN returns it to the VMSC/MSC server. If a location estimate could not be obtained, the RAN returns a location response containing a failure cause and no location estimate. If a failure is received, the VMSC/MSC server initiates emergency call setup using the normal NI-LR procedures.

6) The VMSC/MSC server sends a MAP Subscriber Location Report to a GMLC associated with the emergency services provider to which the emergency call will be sent. This message shall carry any location estimate returned in step 5, the age of this estimate and may carry the MSISDN, IMSI, IMEI of the calling UE, the information about the positioning method used and the serving cell identity or SAI of the UE. In case of a SIM-less ~~UE is used to make the~~ emergency call, or a non-registered (U)SIM emergency call, the IMEI shall be always sent and the MSISDN shall be populated with a non-dialable callback number as specified in clause 6.4.3. The message shall also indicate the event that triggered the location report. Any NA-ESRD and NA-ESRK that was assigned by the VMSC/MSC server shall be included. The message shall also include an indication that the VMSC/MSC server supports the capability to replace an NA-ESRK or NA-ESRD value with the one assigned by the GMLC. The VMSC/MSC server and GMLC may record charging information.

7) The GMLC translates the location estimate into a zone identity and assigns either a NA-ESRK or a NA-ESRD, which was requested by the VMSC/MSC server. The GMLC shall include either the NA-ESRK value or the NA-ESRD value in the MAP Subscriber Location Report ack and send it to the VMSC/MSC server. The GMLC stores either the assigned NA-ESRD or the assigned NA- ESRK and any NA-ESRD that was sent by the VMSC/MSC server in step 6.

### 9.1.5A.4 Location Preparation Procedure

8) The emergency call procedure is applied. The VMSC/MSC server, RAN and UE continue the normal procedure for emergency call origination towards the appropriate emergency services client. Call setup information sent into the PSTN may include the UE location plus information that will enable the emergency service provider to request UE location at a later time (NA-ESRD or NA-ESRK in North America). The NA-ESRK or NA-ESRD used shall be the one received from the GMLC. If a NA-ESRK or NA-ESRD is not received from the GMLC then the VMSC/MSC server shall employ default routing for the call using a default NA-ESRK, default NA-ESRD or other default number as in 9.1.5.1 step 3.

9) At any time after step 8, the emergency services LCS client may request location information.

10) At any time after step 6, the GMLC may send a MAP Provide Subscriber Location message to the VMSC/MSC server. This message includes a QoS with higher delay and higher horizontal accuracy required for an emergency call. In case of a SIM-less ~~UE is used to make the~~ emergency call, or a non-registered (U)SIM emergency call, the IMEI shall be included in the message.

If the GMLC is capable of determining whether the initial location satisfies the higher accuracy requirements for an emergency call, then the GMLC may not need to request for a higher accuracy location.

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

### 9.1.5A.5 Positioning Measurement Establishment Procedure

12) same as step 4.

### 9.1.5A.6 Location Calculation and Release Procedure

13) same as step 5.

14) The VMSC/MSC server returns the location information and its age, the information about the positioning method used and the serving cell identity or SAI of the UE to the GMLC. The GMLC shall replace the previously stored low accuracy location information with the higher accuracy information for later retrieval by the emergency services LCS client. The VMSC/MSC server and GMLC may record charging information.

15) The GMLC may forward the information received in the previous step to the emergency services LCS client. The client is expected to have requested this information from GMLC before. The information about the positioning method used may be sent with this location information from the GMLC to the LCS client.

16) same as step 10 for normal NI-LR.

17) same as step 11 for normal NI-LR.

18) same as step 12 for normal NI-LR.

<< End of modifications >>

**3GPP TSG-SA2 Meeting #46**
**Athens, Greece, 9th-13th May 2005**

***Tdoc ⌘ S2-051335***
(Revised S2-051156)

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **23.271** **CR** **0306** ⌘ **rev** **1** ⌘ Current version: **7.0.0** ⌘

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

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

| | | |
|---|---|---|
| ***Title:*** | ⌘ | MT-LR without HLR query - appropriate clarifications for EU |
| ***Source:*** | ⌘ | SA WG2 |
| ***Work item code:*** | ⌘ | LCS3 |
| ***Date:*** | ⌘ | 12/5/2005 |
| ***Category:*** | ⌘ | **C** |
| ***Release:*** | ⌘ | Rel-7 |

*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:*
*Ph2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | According to ETSI Special Report SR 002 180, all networks should transmit their network identification to the emergency control centre in a standardized way. This CR gives clarifications regarding the correlation information that PSAP uses to identify the serving node are needed. That kind of information is already there for the North America 911 calls, but is missing for the EU 112 case. |
| ***Summary of change:*** | ⌘ | The clause that describes the MT-LR without HLR query is modified to include the EU 112 case. The modification is in the text description at the beginning, where is specified that the PSAP gets the MSC number through location number parameter and the MSISDN (dialable or not dialable). |
| ***Consequences if not approved:*** | ⌘ | There will not be a standard way on how the correct serving node is located. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 9.1.3 |

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

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

# << First Modified Clause >>

## 9.1.3 CS-MT-LR without HLR Query

Figure 9.3 illustrates current or last known location requests for an emergency services call, where an emergency services client (i.e., a Public Safety Answering Point) identifies the target UE and the serving GMLC using correlation information- that were previously provided to it by the VMSC. In North America, this correlation information is provided by either an NA-ESRK, or an MSISDN and NA-ESRD.- In E.U., it is provided through the ISUP/BICC IAM message with location number parameter set to MSC number and the calling party number parameter set to MSISDN. The signaling used to provide the correlation information to the PSAP is out of scope of this TS, but is presumed to occur on the signaling for the call. This allows the requesting V-GMLC to request location from the VMSC without first querying the home HLR of the target UE. This scenario therefore supports location of emergency callers from roamers or SIM-less mobiles, and requires that the initial location, as well as UE and VMSC identifying information had been pushed to the GMLC as per 9.1.5 (or 9.1.5.A for North America). In North America, additional requirements are found in [32].

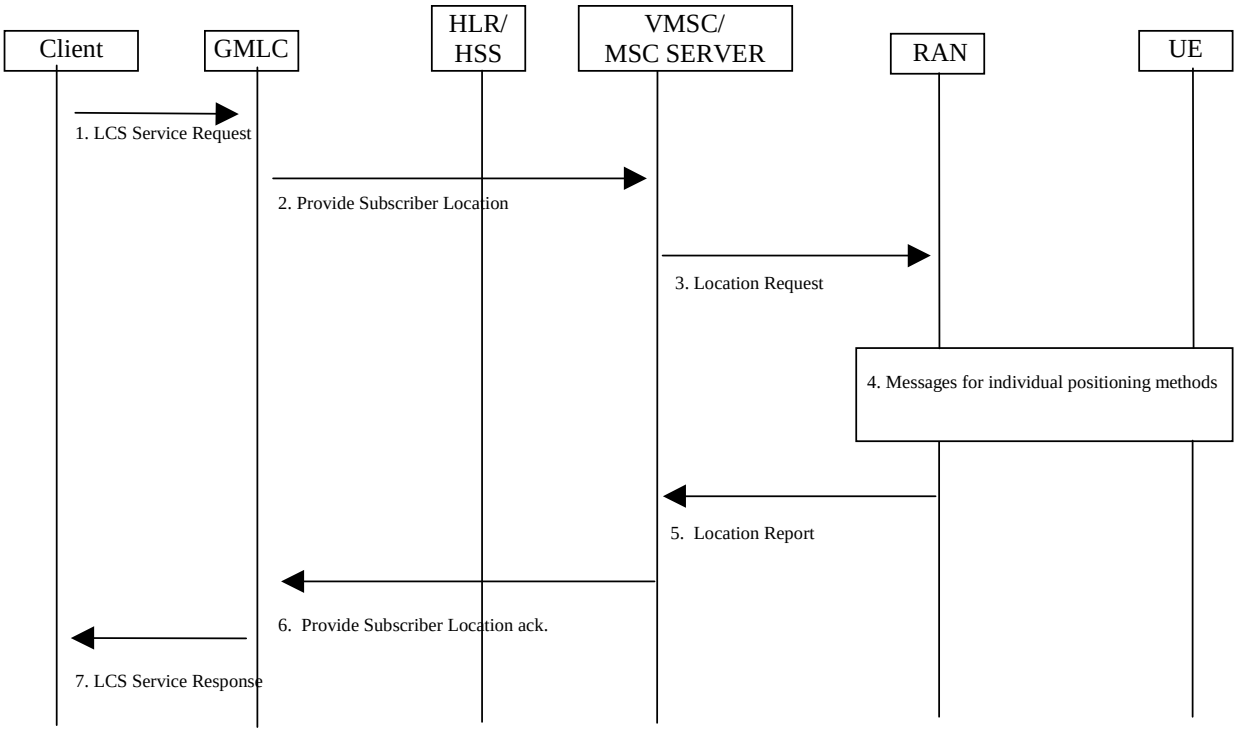


**Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query**

1) Same as step 1 in figure 9.1 but with the LCS client (PSAP) identifying first the target UE and the serving V-GMLC by previously supplied correlation information for the emergency call.

2) The GMLC may determine the VMSC from correlation information received from the PSAP, or from stored information for the target UE (e.g. from a prior location estimate delivery from the VMSC/MSC server). In North America, 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 MSISDN and, if provided, the IMSI and 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 and, if provided, the IMEI. In case a SIM-less UE is used to make the emergency call, the IMEI shall be always sent and the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3.

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 step 9 for a normal CS-MT-LR.

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

**3GPP TSG-SA2 Meeting #46** ***Tdoc ⌘ S2-051461***
**Athens, Greece, 9th-13th May 2005** (rev of S2-051454, rev of S2-051336, rev of S2-051157)

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **23.271** **CR** **0307** ⌘ **rev** **3** ⌘ Current version: **7.0.0** ⌘

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

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

| | | |
|---|---|---|
| ***Title:*** | ⌘ | NI-LR - appropriate clarifications for EU |
| ***Source:*** | ⌘ | SA WG2 |
| ***Work item code:*** | ⌘ | LCS3 |
| ***Date:*** | ⌘ | 12/5/2005 |
| ***Category:*** | ⌘ | **C** |
| ***Release:*** | ⌘ | Rel-7 |

*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:*
*Ph2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | This CR describes how GMLC can route location information associated with an emergency to the same PSAP as a result of a Network Induced Location Request. This mechanism is not clear for the E112 emergency calls. Moreover, clarifications are needed on how the PSAP is informed the identity of the serving node. |
| ***Summary of change:*** | ⌘ | The identity of PSAP, to which an emergency call that triggered the NI-LR, is added to Subscriber Location Report for emergency calls in the E.U. This CR also gives clarifications regarding the correlation information that PSAP uses to identify the serving node. |
| ***Consequences if not approved:*** | ⌘ | There will not be a standard way on how the GMLC could know the identity of the PSAP that is connected. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 3.3, 9.1.5.1, 9.1.5.3 |

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

# << First Modified Clause >>

## 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 |
| 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 |
| DNS | Domain Name System |
| 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 |
| H-GMLC | Home-GMLC |
| H-LIMS-IWF | Home-LIMS-IWF |
| HSS | Home Subscriber Server |
| HLR | Home Location Register |
| HPLMN | Home Public Land Mobile Network |
| IMEI | International Mobile Equipment Identity |
| IMS | IP Multimedia Subsystem |
| 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 |
| LCZTF | Location Client Zone Transformation Function |
| LCS | LoCation Services |
| LDR | Location Deferred Request |
| LIMS-IWF | Location IMS – Interworking Function |
| 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 |
| LSCTF | Location System Co-ordinate Transformation Function |
| LSOF | Location System Operation Function |
| LSPF | Location Subscriber Privacy Function |
| LSTF | Location Subscriber Translation Function |
| MAP | Mobile Application Part |
| ME | Mobile Equipment |
| MExE | Mobile Execution Environment |
| MLC | Mobile Location Center |
| MLP | Mobile Location Protocol |
| MM | Mobility Management |
| MO-LR | Mobile Originated Location Request |
| MS | Mobile Station |
| 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 |
| OMA | Open Mobile Alliance |
| OSA | Open Service Architecture |
| OTDOA | Observed Time Difference Of Arrival |
| PC | Power Control |
| PCF | Power Calculation Function |
| PLMN | Public Land Mobile Network |
| PMD | Pseudonym mediation device functionality |
| POI | Privacy Override Indicator |
| PPR | Privacy Profile Register |
| PRCF | Positioning Radio Co-ordination Function |
| PRRM | Positioning Radio Resource Management |
| PSAP | Public Safety Answering Point |
| 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 |
| R-GMLC | Requesting-GMLC |
| RIS | Radio Interface Synchronization |
| R-LIMS-IWF | Requesting-LIMS-IWF |
| RNC | Radio Network Controller |
| RRM | Radio Resource Management |
| RTD | Real Time Difference |
| SAI | Service Area Identifier |
| SAT | SIM Application Tool-Kit |
| SCCP | Signalling Connection Control Part |
| SCS | Service Capability Server |
| SGSN | Serving GPRS Support Node |
| SI | Service Interface (prefix to interface class method) |
| SIM | Subscriber Identity Module |
| SIP | Session Initiation Protocol |
| SIP-URI | SIP Uniform Resource Identifier |
| SIR | Signal Interference Ratio |
| SLF | Subscription Locator Function |
| 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 |
| TEL-URL | Telephone Uniform Resource Locator |
| 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 |
| U-TDOA | Uplink Time Difference of Arrival |
| UTRAN | Universal Terrestrial Radio Access Network |
| VASP | Value Added Service Provider |
| V-GMLC | Visited -GMLC |
| VHE | Virtual Home Environment |
| WCDMA | Wideband Code Division Multiple Access |

Further related abbreviations are given in TS 21.905 [3].

# << Second Modified Clause >>

## 9.1.5 Network Induced Location Request (NI-LR)

Figure 9.4 illustrates how the initial position for an emergency service call is determined when the subscriber initiates the emergency call.

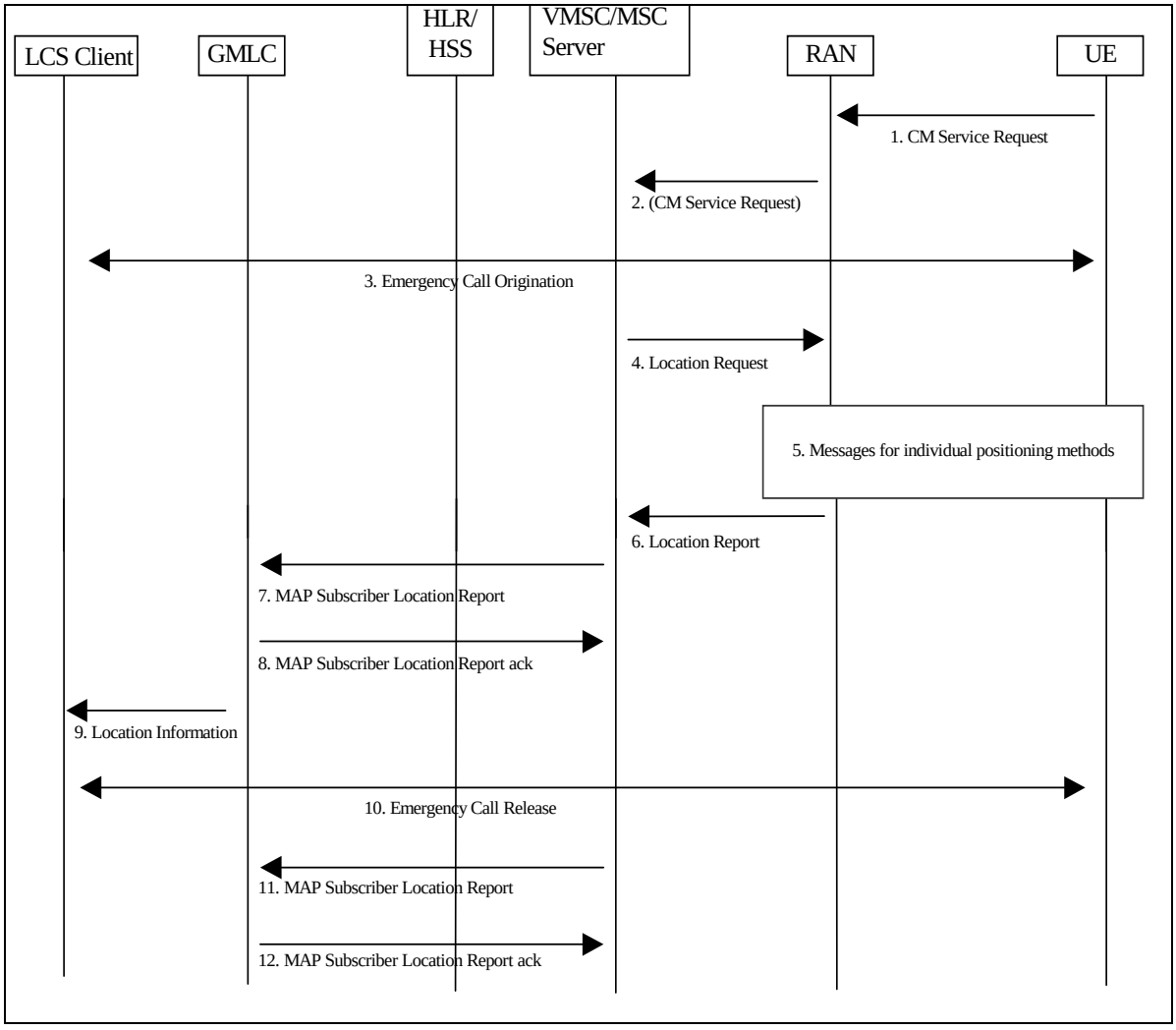


**Figure 9.4: Positioning for a NI-LR Emergency Service Call**

### 9.1.5.1 Location Preparation Procedure

1) An initially idle UE requests radio connection setup indicating a request for an Emergency Service call to the VMSC/MSC server via RAN.

2) RAN shall convey the CM service request to the core network. (Before having a CM connection there must be a radio connection.) The UE may identify itself using a TMSI, IMSI or IMEI.

3) The emergency call procedure is applied. The VMSC/MSC server determines based on the serving cell the appropriate emergency services client. The VMSC/MSC server, RAN and UE continue the normal procedure for emergency call origination towards that emergency services client. Depending on local regulatory requirements, the sending of call setup information into the PSTN may be delayed until either the UE's location has been obtained or the location attempt has failed or a PLMN defined timer has expired before location was obtained. If the serving cell serves an area that contains the service domain of multiple emergency services clients, the VMSC/MSC server may delay call setup and invoke location based routing procedures described in section 9.1.5A. Call setup information sent into the PSTN may include the UE location (if already obtained) plus information that will enable the emergency service provider to request UE location at a later time (e.g. NA-ESRD or NA-ESRK in North America, or the ISUP/BICC IAM message with location number parameter set to MSC number and the calling party parameter set to MSISDN, in E.U.).

4) At any time after step 2, the VMSC/MSC server may initiate procedures to obtain the UE's location. These procedures may run in parallel with the emergency call origination. The VMSC/MSC server sends a Location Request message to RAN associated with the UE's current location area (see step 6 for a MT-LR). This message includes the QoS required for an emergency call.

### 9.1.5.2 Positioning Measurement Establishment Procedure

5) 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].

### 9.1.5.3 Location Calculation and Release Procedure

6) When a location estimate best satisfying the requested QoS has been obtained, RAN returns it to the VMSC/MSC server in a Location Report. As a national option, Cell ID positioning accuracy is allowed. RAN shall in its response include an indication whether the obtained location estimate satisfies the requested accuracy or not. The information of the positioning method used may be returned with the location estimate. If a location estimate could not be obtained, the RAN returns a location response containing a failure cause and no location estimate.

7) Depending on local regulatory requirements, the VMSC/MSC server may send a MAP Subscriber Location report to a GMLC associated with the emergency services provider to which the emergency call has been or will be sent. This message shall carry any location estimate returned in step 6 including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, the age of this estimate and may carry the MSISDN, IMSI and IMEI of the calling UE, the information about the positioning method used and the serving cell identity or SAI of the UE. In case a SIM-less UE is used to make the emergency call, the IMEI shall be always sent and the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3. In North America, any NA-ESRD and any NA-ESRK that may have been assigned by the VMSC/MSC server shall be included. In the E.U., the VMSC/MSC Server shall provide the identity of the PSAP to which the emergency call was connected. The message shall also indicate the event that triggered the location report. If location failed (i.e. an error result was returned by RAN in step 6), an indication of failure rather than a location estimate may be sent to the GMLC: the indication of failure is conveyed by not including a location estimate in the MAP Subscriber Location Report. The MSC/MSC server may record charging information.

8) The GMLC acknowledges receipt of the location information. The GMLC shall store the location information for later retrieval by the emergency services LCS client.

9) The GMLC may optionally forward the information received in step 8 to the emergency services LCS client. The GMLC may also record charging information. The client is expected to obtain the location information by requesting it from the GMLC. The information about the positioning method used may be sent with the location information from the GMLC to the LCS client.

10) At some later time, the emergency services call is released.

11) The MSC/MSC server sends another MAP Subscriber Location Report to the GMLC. This message may include the same parameters as before except that there is no position estimate and an indication of emergency call termination is included.

12) The GMLC acknowledges the MSC/MSC server notification and may then delete all information previously stored for the emergency call per national regulation.

**3GPP TSG-SA2 Meeting #46**
**Athens, Greece, 9 – 13 May 2005**

***Tdoc ⌘S2-051242***

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **23.271** **CR** **0308** ⌘ **rev** **-** ⌘ Current version: **7.0.0** ⌘

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

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

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Missing definition of the abbreviation for RTT |
| ***Source:*** | ⌘ | SA WG2 |
| ***Work item code:*** | ⌘ | TEI7 |
| ***Date:*** | ⌘ | 03/05/2005 |
| ***Category:*** | ⌘ | **D** |
| ***Release:*** | ⌘ | Rel-7 |

*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:*
*Ph2 (GSM Phase 2)*
*R96 (Release 1996)*
*R97 (Release 1997)*
*R98 (Release 1998)*
*R99 (Release 1999)*
*Rel-4 (Release 4)*
*Rel-5 (Release 5)*
*Rel-6 (Release 6)*
*Rel-7 (Release 7)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The definition is missing for RTT. It should represent Round Trip Time. |
| ***Summary of change:*** | ⌘ | The expansion of RTT is added |
| ***Consequences if not approved:*** | ⌘ | Possible cause for misunderstanding |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 3.3 |

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

***Other comments:*** ⌘

## 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 |
| 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 |
| DNS | Domain Name System |
| 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 |
| H-GMLC | Home-GMLC |
| H-LIMS-IWF | Home-LIMS-IWF |
| HSS | Home Subscriber Server |
| HLR | Home Location Register |
| HPLMN | Home Public Land Mobile Network |
| IMEI | International Mobile Equipment Identity |
| IMS | IP Multimedia Subsystem |
| 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 |
| LCZTF | Location Client Zone Transformation Function |
| LCS | LoCation Services |
| LDR | Location Deferred Request |
| LIMS-IWF | Location IMS – Interworking Function |
| 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 |
| LSCTF | Location System Co-ordinate Transformation Function |
| LSOF | Location System Operation Function |
| LSPF | Location Subscriber Privacy Function |
| LSTF | Location Subscriber Translation Function |
| MAP | Mobile Application Part |
| ME | Mobile Equipment |
| MExE | Mobile Execution Environment |
| MLC | Mobile Location Center |
| MLP | Mobile Location Protocol |
| MM | Mobility Management |
| MO-LR | Mobile Originated Location Request |
| MS | Mobile Station |
| 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 |
| OMA | Open Mobile Alliance |
| OSA | Open Service Architecture |
| OTDOA | Observed Time Difference Of Arrival |
| PC | Power Control |
| PCF | Power Calculation Function |
| PLMN | Public Land Mobile Network |
| PMD | Pseudonym mediation device functionality |
| POI | Privacy Override Indicator |
| PPR | Privacy Profile Register |
| 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 |
| R-GMLC | Requesting-GMLC |
| RIS | Radio Interface Synchronization |
| R-LIMS-IWF | Requesting-LIMS-IWF |
| RNC | Radio Network Controller |
| RRM | Radio Resource Management |
| RTD | Real Time Difference |
| RTT | Round Trip Time |
| SAI | Service Area Identifier |
| SAT | SIM Application Tool-Kit |
| SCCP | Signalling Connection Control Part |
| SCS | Service Capability Server |
| SGSN | Serving GPRS Support Node |
| SI | Service Interface (prefix to interface class method) |
| SIM | Subscriber Identity Module |
| SIP | Session Initiation Protocol |
| SIP-URI | SIP Uniform Resource Identifier |
| SIR | Signal Interference Ratio |
| SLF | Subscription Locator Function |
| 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 |
| TEL-URL | Telephone Uniform Resource Locator |
| 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 |
| U-TDOA | Uplink Time Difference of Arrival |
| UTRAN | Universal Terrestrial Radio Access Network |
| VASP | Value Added Service Provider |
| V-GMLC | Visited -GMLC |
| VHE | Virtual Home Environment |
| WCDMA | Wideband Code Division Multiple Access |

Further related abbreviations are given in TS 21.905 [3].