

Source: TSG SA WG2
Title: CRs on 03.71 and 23.271 (LCS Stage 2)
Agenda Item: 7.2.3

The following Change Requests (CRs) have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #24.

S2 doc #	Title	Spec	CR #	cat	Version in	REL	WI	S2 meeting	Clauses affected
S2-041878	Correction of GERAN location request procedure	03.71	047	F	8.8.0	99	LCS2	S2 #40	7.4.1.2, 7.11.1
S2-041874	Clarifications regarding the non-dialable callback number in general and the NI-LR using Location Based Routing procedure, in Rel-5	23.271	274r1	F	5.10.0	5	LCS1	S2 #40	6.4.1, 9.1.3, 9.1.5.3, 9.1.5A.3, 9.1.5A.4, 9.1.5A.6
S2-041264	Enhancement of MO-LR	23.271	271	B	6.7.0	6	LCS2	S2 #39	9.2.1, 9.2.2
S2-041265	Clarification of MLP and RLP usage in 23.271	23.271	260r1	F	6.7.0	6	LCS2	S2 #39	2.1, 3.3, 5.5, 5.6, 6, 6.3.2
S2-041446	Additional explanation on the privacy check procedure in Rel-6, regarding the PLMN Operator service.	23.271	267	F	6.7.0	6	LCS2	S2 #39	Annex C
S2-041496	Clarifications on the NI-LR and CS-MT-LR without HLR Query, for the SIM-less emergency call case.	23.271	269	F	6.7.0	6	LCS2	S2 #39	9.1.3, 9.1.5.3, 9.1.5A.3, 9.1.5A.6
S2-041527	Clarifications regarding the information of V-GMLC address that is send from HLR/HSS to GMLC, during Common MT-LR procedure in CS and PS domain	23.271	268r1	D	6.7.0	6	LCS2	S2 #39	7.3, 9.1.1, 9.1.1A
S2-041634	Clarification to the privacy related action selection flow diagram for Rel-6	23.271	266r2	F	6.7.0	6	LCS2	S2 #39	A.3
S2-041635	Delete the iterant section	23.271	255r3	D	6.7.0	6	LCS2	S2 #39	9.4
S2-041682	Clarifications of section 10 “ Information storage“	23.271	257r5	F	6.7.0	6	LCS2	S2 #39	10
S2-042324	E112 emergency call support	23.271	273r2	F	6.7.0	6	LCS2	S2 #40	9.1.1A, 9.1.3, 9.1.5

CR-Form-v7

CHANGE REQUEST

03.71 CR 047 # rev - # Current version: 8.8.0

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

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

Title:	# Correction of GERAN location request procedure		
Source:	# SA2 (Vodafone)		
Work item code:	# LCS2	Date:	# 19/05/2004
Category:	# F	Release:	# R99
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
	D (editorial modification)	R99	(Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-4	(Release 4)
		Rel-5	(Release 5)
		Rel-6	(Release 6)

Reason for change:	# At RAN#22 changes were made to UTRAN LCS stage 2 for R99 and onwards to correct the interpretation of the LCS functional stage 2 in TS 23.271 and operation of the Location Request procedure. This CR also would mean that UTRAN and GERAN specifications are aligned.
Summary of change:	# Remove the phrases relating to “satisfying the requested LCS QoS” as a deciding factor between successful and unsuccessful operation of the Location Request. Explicitly indicate that the SMLC shall return a location estimate, if available, even if requested accuracy is not satisfied.
Consequences if not approved:	# Misalignment of behaviour between in the RNC and the SMLC. Also any obtained location estimate may be unnecessarily discarded by the SMLC.

Clauses affected:	# 7.4.1.2, 7.11.1								
Other specs affected:	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">#</td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications # <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">#</td> <td style="text-align: center;">X</td> </tr> </table> Test specifications # <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">#</td> <td style="text-align: center;">X</td> </tr> </table> O&M Specifications #	Y	N	#	X	#	X	#	X
Y	N								
#	X								
#	X								
#	X								
Other comments:	# This CR reflects approved changes made to stage 3 in R98 and R99 (GP-041077/8) and also GERAN LCS stage 2 (TS 43.059) R4 and onwards (GP-040681-3).								

How to create CRs using this form:

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

***** FIRST MODIFIED SECTION *****

7.4 State Description for the SMLC

7.4.1 SMLC States

7.4.1.1 NULL State

This is a conceptual rather than actual state in which a certain location request from a particular VMSC or BSC either has not yet been received or has been completed.

7.4.1.2 LOCATION State

This state exists after the SMLC has received a location request from a VMSC or BSC and persists while the SMLC is obtaining position measurements for a particular positioning method until such time as positioning measurements have been received and a location estimate has been computed and returned to the VMSC or BSC.

When sufficient positioning measurement results have been received, the SMLC either evaluates them, if they include an already computed location estimate, or uses them to compute a location estimate. The SMLC then has the option of either reinitiating another positioning attempt, [e.g. if the location estimate did not satisfy the required QoS and the requirement on response time permits another position attempt](#), or returning the location estimate to the VMSC or BSC.

***** NEXT MODIFIED SECTION *****

7.11 Exception Procedures

The procedures in this section apply to all variants of an MT-LR, NI-LR and MO-LR where a BSSMAP-LE Perform Location Request has been sent to an SMLC by a BSC or MSC requesting some location service (e.g. provision of a location estimate for a target MS or transfer of assistance data to a target MS).

7.11.1 Procedures in the SMLC

When a request for a location estimate fails due to failure of a position method itself (e.g. due to inaccurate or insufficient position measurements and related data) and the SMLC is unable to instigate another positioning attempt (e.g. due to a requirement on response time), the SMLC may return a BSSMAP-LE Perform Location response containing a less accurate location estimate (e.g. based on serving cell and timing advance). If a less accurate estimate is not available ~~or will not meet the accuracy requirement~~, the SMLC shall instead return a BSSMAP-LE Perform Location response message containing no location estimate and indicating the cause of failure.

When a request for any other location service (e.g. transfer of assistance data to a target MS) fails for any reason and the SMLC is unable to reattempt the service, the SMLC shall return a BSSMAP-LE Perform Location response message indicating the cause of failure.

When a location service request is interrupted by some other unrecoverable error event inside the SMLC, the SMLC shall immediately terminate the location service attempt and return a BSSMAP Perform Location Response message containing the reason for the location service cancellation. In that case, any dialogue previously opened with an LMU or BSC for the purpose of instigating position measurements for any MS being located may also be aborted by the SMLC.

If the SMLC receives a BSSMAP-LE Perform Location Abort indication for a previous location service request from the VMSC (NSS based SMLC) or BSC (BSS based SMLC), it shall immediately terminate the location service attempt and may abort any dialogues used for the location service attempt that may still exist with any LMUs. Although the SMLC cannot abort any location procedure instigated in the serving BSC (e.g. for TOA), the circumstances of the abort may still ensure cancellation of any such procedure (see section on BSC).

If the SMLC has instigated any location related procedure in the Target MS or its serving BSC and receives a BSSLAP Reject, BSSLAP Abort or BSSLAP Reset indication from the BSC, it shall cancel the location service attempt and may abort any dialogues for this that currently exist with any LMUs. For a BSSLAP Abort, the SMLC shall then either return any location estimate already derived, if this was requested ~~and is sufficient for the requested QoS~~, or return a

BSSMAP-LE Perform Location response indicating failure of the location service and the cause of the failure in the BSSLAP Abort. For a BSSLAP Reject and BSSLAP Reset, the SMLC has the additional option of restarting the location service attempt and using the same or a different position method where a location estimate was requested. A decision to restart the location service shall take into account the cause of the location service failure as conveyed in the BSSLAP Reject or BSSLAP Reset and whether, in the case of successful intra-BSC handover, the new cell for the target MS is still associated with the SMLC. If the SMLC receives a BSSLAP Reject or BSSLAP Reset with a cause indicating intra-BSC handover and with a new cell identity for the target MS that is not associated with the SMLC, the SMLC shall return a BSSMAP-LE Perform Location response containing either a location estimate, if requested, [and](#) available ~~and sufficient for the requested QoS~~, or a failure cause indicating “intra-BSC” handover.

NOTE: This procedure may only be needed for an NSS-based SMLC.

The SMLC may indicate an inability to support location due to overload by rejecting with a cause indicating congestion a BSSMAP-LE Perform Location request received from either an MSC or BSC.

***** END OF CHANGES *****

Shenzhen, China, 19th-23rd April 2004

CR-Form-v7	
CHANGE REQUEST	
# 23.271 CR 255 # rev 3 #	Current version: 6.7.0 #

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:	# Delete the iterant section		
Source:	# SA2 (ZTE)		
Work item code:	# LCS2	Date:	# 5/4/2004
Category:	# D	Release:	# Rel-6
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	# In the 3GPP TS 23271v6.7.0, section 9.4.2 "Procedures in the MSC Server "has already been described in the 9.4.1 "Procedures in the VMSC /MSC server". Also there is no any description about procedures in the UE in the section 9.4.4.
Summary of change:	# The titles of the section 9.4.2 and section 9.4.4 shall be changed to VOID.
Consequences if not approved:	# The section shall be iterant.

Clauses affected:	# 9.4				
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications # 	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Y	N				
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	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Test specifications	X	<input checked="" type="checkbox"/>		
X					
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	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> O&M Specifications	X	<input checked="" type="checkbox"/>		
X					
<input checked="" type="checkbox"/>					
Other comments:	# 				

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

<< First Modified Clause >>

9.4 Exception Procedures

The procedures in this clause apply to all variants of an MT-LR, NI-LR and MO-LR where a Location Request message has been sent to RAN requesting some location service (e.g. provision of a location estimate for a target UE or transfer of assistance data to a target UE).

9.4.1 Procedures in the VMSC /MSC server

After the VMSC /MSC server has requested a location service for a particular UE from RAN, certain events may occur that may temporarily or permanently interfere with the location service attempt. For each such event notified to the VMSC /MSC server, the VMSC /MSC server shall employ one of the following error recovery actions.

Restart the Location Service

This action shall be employed for any event that temporarily impedes a location service attempt and cannot be delayed until the location service attempt is complete. When such an event is notified to the VMSC /MSC server, it shall immediately cancel the location service attempt and the associated signaling dialogue with RAN, if this still exists by sending a "stop reporting" message to RAN. The "stop reporting" message shall contain the reason for the location procedure cancellation in A/Gb mode or the indication about the type of location request to cancel (e.g. direct) in Iu mode.

After aborting the location request dialogue with RAN, the VMSC /MSC server may queue the location service request until the event causing the restart has terminated (if not already terminated). The VMSC /MSC server may optionally wait for an additional time period (e.g. if the queuing delay is minimal) to ensure that any resources allocated in and by RAN have time to be released. The VMSC /MSC server may then send another location service request to RAN associated with the target UE.

Abort the Location Service

This action shall be employed for any event that permanently impedes a location service attempt, such as loss of the dedicated signaling channel to the target UE. When such an event is notified to the VMSC /MSC server, it shall cancel the current location service attempt and the associated signaling dialogue with RAN, if still existing, by sending a "stop reporting" message to RAN. The "stop reporting" message shall contain the reason for the location procedure cancellation in A/Gb mode or the indication about the type of location request to cancel (e.g. direct) in Iu mode. The VMSC /MSC server shall then return an error response to the client or network entity from which the location request was originally received. The VMSC /MSC server shall also release all resources specifically allocated for the location attempt.

The following table indicates the appropriate error recovery procedure for certain events. For events not listed in the table, the VMSC /MSC server need take no action.

Table 9.1: LCS Error Recovery Procedures in the VMSC /MSC server for certain Events

Event	VMSC /MSC server Error Recovery
Release of radio channel to the UE	Abort
Any error response from RAN except for SRNC relocation or inter-MSC handover	Abort
In Iu mode inter RNC hard handover, SRNC relocation and inter-MSC or MSC server handover	Abort on Iu level Restart after process is completed
In A/Gb mode inter-MSC Handover and inter-BSC handover	Restart after handover is completed
InterSystem handover	Restart after handover is completed

If RAN is in an overload condition, it may reject a location request by indicating congestion. The VMSC /MSC server may reduce the frequency of future location service requests until rejection due to overload has ceased.

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9.4.2 ~~Procedures in the MSC Server~~VOID

9.4.3 Procedures in the SGSN

After the SGSN has requested a location service for a particular UE from RAN, certain events may occur that may temporarily or permanently interfere with the location service attempt. For each such event notified to the SGSN, the SGSN shall employ one of the following error recovery actions.

Restart the Location Service

This action shall be employed for any event that temporarily impedes a location service attempt and cannot be delayed until the location service attempt is complete. When such an event is notified to the SGSN, it shall immediately cancel the location service attempt and the associated signaling dialogue with RAN, if this still exists by sending a "stop reporting" (Iu mode) or "location abort" (A/Gb mode) message to RAN. The "stop reporting"/"location abort" message shall contain the reason for the location procedure cancellation.

After aborting the location request dialogue with RAN, the SGSN may queue the location service request until the event causing the restart has terminated (if not already terminated). The SGSN may optionally wait for an additional time period (e.g. if the queuing delay is minimal) to ensure that any resources allocated in and by RAN have time to be released. The SGSN may then send another location service request to RAN associated with the target UE.

Abort the Location Service

This action shall be employed for any event that permanently impedes a location service attempt, such as loss of the radio channel to the target UE. When such an event is notified to the SGSN, it shall cancel the current location service attempt and the associated signaling dialogue with RAN, if still existing, by sending a "stop reporting"/"location abort" message to RAN. The "stop reporting"/"location abort" message shall contain the reason for the location procedure cancellation. The SGSN shall then return an error response to the client or network entity from which the location request was originally received. The SGSN shall also release all resources specifically allocated for the location attempt.

The following table indicates the appropriate error recovery procedure for certain events. For events not listed in the table, the SGSN need take no action.

Table 9.2: LCS Error Recovery Procedures in the SGSN for certain Events

Event	SGSN Error Recovery
Release of radio channel to the UE	Abort
Any error response from RAN causing unavailable signalling connections	Abort
Inter RNC hard handover, Inter SRNC relocation (Iu mode only)	Abort on Iu level Restart after process is completed
Suspend of GPRS services (A/Gb mode only)(During CS connection for class B UE)	Abort
Intra SGSN Routing Area Update (A/Gb mode only)	Restart
Inter SGSN Routing Area Update, inter SGSN relocation	Abort (Note: GMLC may restart)
Standalone P-TMSI Reallocation (A/Gb mode only)	Restart

9.4.3 ~~Procedures in the UE~~VOID

9.4.4 Handover handling

9.4.4.1 VMSC /MSC server procedure for Inter-VMSC /MSC server Handover

When a location estimate is required for a target UE with an established call in a state of inter-VMSC /MSC server handover, the serving location area ID shall be used by the visited MSC /MSC server to identify the correct RAN to serve the location request. All location request related messages shall be sent via MAP/E interface piggy-backed in MAP_FORWARD_ACCESS_SIGNALLING and MAP_PROCESS_ACCESS_SIGNALLING between the visited and serving MSCs /MSC servers.

9.4.4.2 Handling of an ongoing handover while a request for positioning arrives

If during an ongoing handover procedure a request for location information arrives, the request shall be suspended until the handover is completed. On completion of the handover, the location preparation procedure shall continue.

9.4.4.3 Handover handling in Iu mode

In case of hard handovers in Iu mode, e.g. inter RNC hard handover, or Serving RNC relocation, and inter- MSC, MSC Server or SGSN handovers, the ongoing positioning process is aborted on Iu level. In soft handovers where the Serving RNS and Iu are relocated, any ongoing positioning process is also aborted on Iu level. The MSC, MSC Server or SGSN shall restart the Iu aborted location requests with the new Serving RNC. The new SGSN, however, shall not restart the location request after inter SGSN Routing Area Update or inter SGSN relocation. During intra and inter RNC soft and softer handovers the existing RRC connection can normally be used without any need to abort the on-going positioning process on Iu level.

CR-Form-v7

CHANGE REQUEST

⌘ **23.271 CR 257** ⌘ rev **4** ⌘ Current version: **6.7.0** ⌘

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

Title:	⌘ Clarifications of section 10 "Information storage"		
Source:	⌘ SA2 (ZTE)		
Work item code:	⌘ LCS2	Date:	⌘ 5/4/2004
Category:	⌘ F	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
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	D (editorial modification)	R99 (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-4 (Release 4)	
		Rel-5 (Release 5)	
		Rel-6 (Release 6)	

Reason for change:	⌘ In the 3GPP TS 23271v6.7.0, section 9.5.3.2 and section 9.5.3.1, for call/session related or unrelated class, the GMLC restrictions include the value "location request allowed from any GMLC ". But in the Table 10.2, the restrict of GMLC does not contain such value
Summary of change:	⌘ If no value is stored for the restriction on the GMLC in HLR or H-GMLC, there is no restriction on the GMLC. So location request from any GMLC is allowed. This comment is added to the restriction on the GMLC in the Table 10.2, Table 10.3, Table 10.10 and Table 10.11.
Consequences if not approved:	⌘ The specification does not contain the value of no restriction on the GMLC -

Clauses affected:	⌘ 10						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<input checked="" type="checkbox"/>	Test specifications					
	<input checked="" type="checkbox"/>	O&M Specifications					
Other comments:	⌘						

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<< First Modified Clause >>

10 Information storage

This clause describes information storage structures that are mandatory (M), conditional (C) or optional (O) for LCS, and the recovery and restoration procedures needed to maintain service if inconsistencies in databases occur and for lost or invalid database information. Information storage in RAN network elements is specified in UTRAN Stage 2 (TS 25.305 [1]) and GERAN Stage 2 (TS 43.059 [16]) specifications.

10.1 HLR and HSS

The HLR/HSS holds LCS data for both UE subscribers and LMUs. If the privacy profile data for UE subscribers are stored in H-GMLC/PPR, HLR/HSS needs to store the corresponding pseudo-external identities and MO-LR related subscription data shown in Table 10.4 and 10.5. The pseudo-external identities are stored in the privacy exception list shown in Table 10.2. The details of the pseudo-external identity are described in Annex C.

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

The IMSI is the primary key for LCS UE subscription data in the HLR/HSS. This subscription data may be stored in a Multiple Subscriber Profile (MSP), with the HLR/HSS able to hold a number of MSPs per IMSI.

LCS UE subscription data includes a privacy exception list containing the privacy classes for which location of the target UE is permitted. Each privacy class is treated as a distinct supplementary service with its own supplementary service code. The following logical states are applicable to each privacy class (refer to TS 23.011 [22] for an explanation of the notation).

Table 10.1: Logical States for each LCS Privacy Class

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

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

Moreover a list of allowed service types may be stored. The meaning of service types is defined in TS 22.071 [4].

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

LCS Privacy Class	Status	Additional HLR Data when Class is provisioned
Universal Class	-	No additional data
Call/session Related Class	M	<p>Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list:</p> <ul style="list-style-type: none"> • Location not allowed • Location allowed without notification (default case) • Location allowed with notification • Location with notification and privacy verification; location allowed if no response • Location with notification and privacy verification; location restricted if no response
	O	<p>External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list:</p> <ul style="list-style-type: none"> • International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target UE
	C	<ul style="list-style-type: none"> • Restriction on the GMLC. If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE. Possible values are: <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country
	O	<ul style="list-style-type: none"> • Restriction on the GMLC. If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE. Possible values are: <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country
	C	<ul style="list-style-type: none"> • Indication of one of the following mutually exclusive options: <ul style="list-style-type: none"> - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
Call/session Unrelated Class	M	<p>Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list:</p> <ul style="list-style-type: none"> • Location not allowed (default case) • Location allowed with notification • Location with notification and privacy verification; location allowed if no response • Location with notification and privacy verification; location restricted if no response
	O	<p>External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list:</p> <ul style="list-style-type: none"> • International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target UE
	C	<ul style="list-style-type: none"> • Restriction on the GMLC. If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE. Possible values are: <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country
	O	<ul style="list-style-type: none"> • Restriction on the GMLC. If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE. Possible values are: <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country
	C	<ul style="list-style-type: none"> • Indication of one of the following mutually exclusive options: <ul style="list-style-type: none"> - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
PLMN Operator Class	O	<p>LCS client list: a list of one or more generic classes of LCS client that are allowed to locate the particular UE. The following classes are distinguished:</p> <ul style="list-style-type: none"> • LCS client broadcasting location related information

		<ul style="list-style-type: none"> • O&M LCS client in the HPLMN • O&M LCS client in the VPLMN • LCS client recording anonymous location information • LCS Client supporting a bearer service, teleservice or supplementary service to the target UE
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Table 10.3: LCS Service types stored in the HLR/HSS per UE subscriber

Service type indication	Status	Additional HLR data when the indication is stored
Service Types	O	Service types list: a list of one or more service types for which the LCS client is allowed to locate the particular UE. The possible service types are defined in 22.071. The following data may be present for each service type in the list:
	O	- Restriction on the GMLC. <u>If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE.</u> Possible values are:
	C	<ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country - Indication of one of the following mutually exclusive options: <ul style="list-style-type: none"> - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response

In case that UE's privacy profile is stored and is checked in the GMLC (H-GMLC) or in the PPR, pseudo-external identities may be set in the external LCS client list of the HLR privacy exception list shown in Table 10.2. The pseudo-external identity is not the identity of real external LCS client but the identity which is used for notifying SGSN/MSC of the location request class (call/session related or non-call/session related) and the required type of indication for each class. Operator allocates E.164 addresses for the pseudo-external identities.

Fourteen pseudo-external identities are needed to be defined. The pseudo-external identities are summarized in the Table C.1. The pseudo-external identities are registered in SLPP of each UE in advance.

LCS UE subscription data may include a mobile originating list containing the LCS mobile originating classes that an UE is permitted to request. Each LCS mobile originating class is treated as a distinct supplementary service with its own supplementary service code. The following logical states are applicable to each mobile originating class (refer to TS 23.011 [22] for an explanation of the notation).

Table 10.4: Logical States for each Mobile Originating LCS Class

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

For each LCS Mobile Originating class, the HLR/HSS shall store the logical state of the class on a per-subscriber (or per subscriber MSP) basis. In this version of LCS, there is no additional permanent data in the HLR. The table below shows the defined mobile originating classes. For the meaning of each LCS mobile originating class, refer to clause 8 and to TS 22.071 [4].

Table 10.5: Data stored in the HLR for the LCS Mobile Originating List for an UE (or UE Subscriber MSP)

LCS Mobile Originating Class	Status	Additional HLR Data when Class is provisioned
Basic Self Location	-	No additional data
Autonomous Self Location	-	No additional data
Transfer to Third Party	-	No additional data

In addition to the privacy exception list, the following other data items may be stored in the UE subscription profile in the HLR to support LCS.

Table 10.6a: Temporary LCS data in the HLR

Other Data in the HLR	Status	Description
GMLC List	O	List of one or more E.164 addresses of the R-GMLCs from which a location request for an MT-LR is allowed, The addresses are only relevant to an LCS client that is restricted (in the UE privacy exception list) to making call/session related or call/session unrelated location requests.

10.2 VLR/SGSN

The VLR/SGSN contains the same LCS permanent data for each registered UE subscriber, as does the HLR/HSS. This data is downloaded to the VLR/SGSN as part of the location update procedure between the VLR/SGSN and HLR/HSS for an UE subscriber.

10.3 GMLC

10.3.1 LCS Data in the GMLC for a LCS Client

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

Table 10.7: GMLC Permanent Data for a LCS Client

LCS Client data in GMLC	Status	Description
LCS Client Type	M	Identifies the type LCS client from among the following: <ul style="list-style-type: none"> - Emergency Services - Value Added Services - PLMN Operator Services - Lawful Intercept Services
External identity	O	A list of one or more identifiers used to identify an external LCS client. The identity may be used when making an MT-LR and/or MO-LR. The format of the identity is international E.164 addresses. Each external identity shall be associated with a logical client name.
Authentication data	M	Data employed to authenticate the identity of an LCS client – details are outside the scope of the present document
Call/session related identity	O	A list of one or more international E.164 addresses, which are used to make calls by mobile subscribers, or APN-NIs (see NOTE) to identify the client for a call related MT-LR In case the LCS client was reached via IN or abbreviated number routing (e.g. toll free number or emergency call routing), the E.164 number(s) stored in the GMLC shall be the number(s) that the UE has to dial to reach the LCS Client. In these cases the E.164 number is not to be in international format. The country in which the national specific number(s) is (are) applicable is (are) also stored (or implied) in this case. Each call related identity may be associated with a specific external identity. Each call/session-related identity shall be associated with a logical client name.
Internal identity	O	Identifies the type PLMN operator services and the following classes are distinguished: <ul style="list-style-type: none"> - LCS client broadcasting location related information - O&M LCS client in the HPLMN - O&M LCS client in the VPLMN - LCS client recording anonymous location information - LCS Client supporting a bearer service, teleservice or supplementary service to the target UE <p>This identity is applicable only to PLMN Operator Services.</p>
Client name	O	An address string which is associated with LCS client's external identity (i.e., E.164 address). See note 2.
Client name type	O	Indication what is the type of the LCS client name. The type of the LCS client name can be one of the following: <ul style="list-style-type: none"> - Logical name - MSISDN - E-mail address[33] - URL[33] - SIP URL[34] - IMS public identity[35]
Override capability	O	Indication of whether the LCS client possesses the override capability (not applicable to a value added and PLMN operator service)
Authorized UE List	O	A list of MSISDNs or groups of MSISDN for which the LCS client may issue a non-call related MT-LR. Separate lists of MSISDNs and groups of MSISDN may be associated with each distinct external or non-call related client identity.

Priority	M	The priority of the LCS client – to be treated as either the default priority when priority is not negotiated between the LCS server and client or the highest allowed priority when priority is negotiated
QoS parameters	M	The default QoS requirements for the LCS client, comprising: <ul style="list-style-type: none"> - Accuracy - Response time - LCS QoS Class <p>Separate default QoS parameters may be maintained for each distinct LCS client identity (external, non-call related, call related)</p>
Service Coverage	O	A list of country codes where the LCS client offers its location services.
Allowed LCS Request Types	M	Indicates which of the following are allowed: <ul style="list-style-type: none"> - Non-call related CS-MT-LR/PS-MT-LR - Call/session related CS-MT-LR/PS-MT-LR - Specification or negotiation of priority - Specification or negotiation of QoS parameters - Specification or negotiation of Service Coverage parameter - Request of current location - Request of current or last known location
Local Co-ordinate System	O	Definition of the co-ordinate system(s) in which a location estimate shall be provided – details are outside the scope of the present document
Access Barring List(s)	O	List(s) of MSISDNs or groups of MSISDN for which a location request is barred
Service Identities	O	List of service identities allowed for the LCS client.
Maximum Target UE Number	O	The maximum number of the Target UEs in one LCS request. For a specific LCS Client, this parameter may have different values for different service identities.

NOTE 1: The LCS Client is identified with E.164 number or APN-NI. APN-NI is specified in TS 23.003.

NOTE 2: The LCS Client name should not contain two equal signs, because those characters are used to separate LCS client name from Requestor ID when ~~GMLC~~GMLC includes them into the same field.

10.3.2 LCS Data in the GMLC/PPR for a UE Subscriber

The GMLC (H-GMLC) or PPR may store LCS UE subscription data. This chapter describes Rel-5 based privacy profile data stored in GMLC/PPR. If the home network operator uses Rel-5 compatible privacy profile data, the profiles shown in this chapter may be stored in GMLC/PPR.

The IMSI or MSISDN is the primary key for LCS UE subscription data in the GMLC/PPR. This subscription data may be stored in a Multiple Subscriber Profile (MSP), with the ~~GMLC/PPR~~ HLR/HSS able to hold a number of MSPs per IMSI.

LCS UE subscription data includes a privacy exception list containing the privacy classes for which location of the target UE is permitted. Each privacy class is treated as a distinct supplementary service with its own supplementary service code. The following logical states are applicable to each privacy class (refer to TS 23.011 [22] for an explanation of the notation).

Table 10.9: Logical States for each LCS Privacy Class

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

For each LCS privacy class, the GMLC/PPR shall store the logical state of the class on a per-subscriber (or per subscriber MSP) basis. In addition, the permanent data indicated in Table 10.10 may be stored on a per subscriber (or

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per subscriber MSP) basis when the logical provisioning state of the associated LCS privacy class is "provisioned". For the meaning of each LCS privacy class, refer to clause 9 and to TS 22.071 [4].
Moreover a list of allowed service types may be stored. The meaning of service types is defined in TS 22.071 [4].

Table 10.10: LCS data stored in the GMLC/PPR privacy exception list for an UE Subscriber (or UE Subscriber MSP)

LCS Privacy Class	Status	Additional GMLC Data when Class is provisioned
Universal Class	-	No additional data
Call/session Related Class	M	Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list: <ul style="list-style-type: none"> - Location not allowed - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response
	O	- Location with notification and privacy verification; location restricted if no response
	C	
	O	External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list: <ul style="list-style-type: none"> - International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target UE
	C	- Restriction on the GMLC. <u>If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE.</u> Possible values are: <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country - Indication of one of the following mutually exclusive options: <ul style="list-style-type: none"> - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
Call/session Unrelated Class	M	Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list: <ul style="list-style-type: none"> - Location not allowed (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
	O	
	C	
	O	External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list: <ul style="list-style-type: none"> - International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target UE
	C	- Restriction on the GMLC. <u>If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed</u>

		<p>to request location information for the UE. Possible values are:</p> <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country - Indication of one of the following mutually exclusive options: <ul style="list-style-type: none"> - Location allowed without notification (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response
PLMN Operator Class	O	<p>LCS client list: a list of one or more generic classes of LCS client that are allowed to locate the particular UE. The following classes are distinguished:</p> <ul style="list-style-type: none"> - LCS client broadcasting location related information - O&M LCS client in the HPLMN - O&M LCS client in the VPLMN - LCS client recording anonymous location information - LCS Client supporting a bearer service, teleservice or supplementary service to the target UE

Table 10.11: LCS Service types stored in the GMLC per UE subscriber

Service type indication	Status	Additional HLR data when the indication is stored
Service Types	O	<p>Indication of one of the following mutually exclusive options for any service type not in the service type list:</p> <ul style="list-style-type: none"> - Location not allowed (default case) - Location allowed with notification - Location with notification and privacy verification; location allowed if no response - Location with notification and privacy verification; location restricted if no response <p>Service types list: a list of one or more service types for which the LCS client is allowed to locate the particular UE. The possible service types are defined in 22.071.</p> <ul style="list-style-type: none"> - Restriction on the GMLC. If no value is stored for this data, there is no restriction on GMLC and any GMLC is allowed to request location information for the UE. Possible values are: <ul style="list-style-type: none"> - Identified GMLCs only - Any GMLC in the home country - Indication of one of the following mutually exclusive options: <ul style="list-style-type: none"> - Location allowed without notification (default case)

		<ul style="list-style-type: none"> - Location allowed with notification - Location with notification and privacy verification; location allowed if no response <p>Location with notification and privacy verification; location restricted if no response</p>
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In case that UE’s privacy profile is stored and is checked in the GMLC (H-GMLC) or in the PPR, the GMLC/PPR shall store the same pseudo-external identity table with HLR, which is shown in Annex C.

GMLC (H-GMLC) or PPR may store codeword handling information and a list of codewords given by the UE subscriber in order not to get the location request rejected.

Table 10.12a: Codeword handling information stored in the GMLC

Other Data in the GMLC	Status	Description
Codeword handling information	O	Indication of one of the following mutually exclusive options for codeword: <ul style="list-style-type: none"> - codeword shall be checked in network. - codeword shall be sent to UE

Table 10.12b: LCS data stored in the GMLC for a UE Subscriber

LCS Privacy profile	Status	Additional GMLC data when profile is provisioned
Codeword	O	A list of codeword.

The GMLC (H-GMLC) or the PPR may store additional privacy information in order protect UE users privacy. The details of the additional privacy check are defined by each network operator and are outside the scope of this specification.

CHANGE REQUEST

⌘ **23.271 CR 260** ⌘ rev **1** ⌘ Current version: **6.7.0** ⌘

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:	⌘ Clarification of MLP and RLP usage in 23.271		
Source:	⌘ SA2 (S Siemens)		
Work item code:	⌘ LCS2	Date:	⌘ 20/04/2004
Category:	⌘ F	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ TS 23.271 currently is unclear with respect to the protocol used at Le interface, whether its MLP or another one.		
Summary of change:	⌘ Delete references to MLP as protocol used at Le interface.		
Consequences if not approved:	⌘ Usage of OMA Location WG protocols MLP and RLP within 3GPP remains unclear.		

Clauses affected:	⌘ 2.1, 3.3, 5.5, 5.6, 6, 6.3.2										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications Test specifications O&M Specifications	⌘
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<input type="checkbox"/>	<input checked="" type="checkbox"/>										
Other comments:	⌘										

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

***** MODIFIED SECTION *****

2.1 Normative references

- [1] 3GPP TS 25.305: "Stage 2 functional specification of UE positioning in UTRAN".
- [2] GSM 01.04 (ETR 350): "Abbreviations and acronyms".
- [3] 3GPP TS 21.905: "UMTS Abbreviations and acronyms".
- [4] 3GPP TS 22.071: "Technical Specification Group Systems Aspects; Location Services (LCS); Stage 1".
- [5] (void)
- [6] 3GPP TS 48.008: "Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".
- [7] 3GPP TS 22.100: "UMTS phase 1 (Release 1999)".
- [8] 3GPP TS 22.101: "Service principles".
- [9] 3GPP TS 22.105: "Services and Service Capabilities".
- [10] 3GPP TS 22.115: "Charging and Billing".
- [11] 3GPP TS 23.032 (GSM 03.32): "Universal Geographical Area Description (GAD)".
- [12] 3GPP TS 22.121: "The Virtual Home Environment".
- [13] 3GPP TS 23.110: "UMTS Access Stratum Services and Functions".
- [14] 3GPP TS 25.413: "UTRAN Iu Interface RANAP signaling".
- [15] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".
- [16] 3GPP TS 43.059: "Functional Stage 2 description of Location Services in GERAN".
- [17] 3GPP TS 23.003: "Numbering, addressing and identification".
- [18] 3GPP TS 29.002: "Mobile Application Part (MAP) Specification".
- [19] GSM 04.02: "GSM Public Land Mobile Network (PLMN) access reference configuration".
- [20] 3GPP TS 23.002: "Network architecture".
- [21] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - stage 2".
- [22] 3GPP TS 23.011: "Technical realization of Supplementary Services".
- [23] 3GPP TS 23.007: "Restoration procedures".
- [24] 3GPP TS 24.008: "Mobile Radio Interface - Layer 3 MM/CC Specification".
- [25] 3GPP TS 25.331 "RRC protocol specification".
- [26] 3GPP TS 23.127 "Virtual Home Environment/Open Service Access".
- [27] 3GPP TS 29.198-1: "Open Service Access (OSA); Application Programming Interface (API); Part 1; Overview".
- [28] 3GPP TS 29.198-2: "Open Service Access (OSA); Application Programming Interface (API); Part 2; Common Data".

- [29] 3GPP TS 29.198-3: "Open Service Access (OSA); Application Programming Interface (API); Part 3; Framework".
- [30] 3GPP TS 29.198-6: "Open Service Access (OSA); Application Programming Interface (API); Part 6: Mobility".
- [31] ~~LIF TS 101~~[OMA Location Working Group](http://www.openmobilealliance.org/tech/LIF/) "Mobile Location Protocol Specification" (~~Location-Interoperability Forum~~), [~~Available at~~<http://www.openmobilealliance.org/>]-<http://www.openmobilealliance.org/tech/LIF/>]
- [32] ANSI J-STD-036A: "Enhanced Wireless 9-1-1 Phase 2"
- [33] RFC 2396: "Uniform Resource Identifiers".
- [34] RFC 3261: "SIP: Session Initiation Protocol".
- [35] 3GPP TS 23.228: "IP multimedia subsystem (IMS)"

***** MODIFIED SECTION *****

3.3 Abbreviations

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

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

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

***** MODIFIED SECTION *****

5.5 Information Flows between Client and Server

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

Any of the information flows here indicated may not be externally realized if the information does not flow over an open interface. ~~On the other hand, if a flow goes over an open interface, it shall abide to a well defined protocol, e.g. LIF TS 101 [31], Location Inter Operability Forum 2001~~

***** MODIFIED SECTION *****

5.6 Information Flows between LCS Servers

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

~~Error! No text of specified style in document. Error! No text of specified style in document. Fehler! Kein Text mit angegebener Formatvorlage im Dokument.~~

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

When the LCS server's associated GMLC uses the Lr interface then this interface shall conform to ~~the protocol as specified in (reference to be added) and~~ the procedures defined in clause 9 of the current specification.

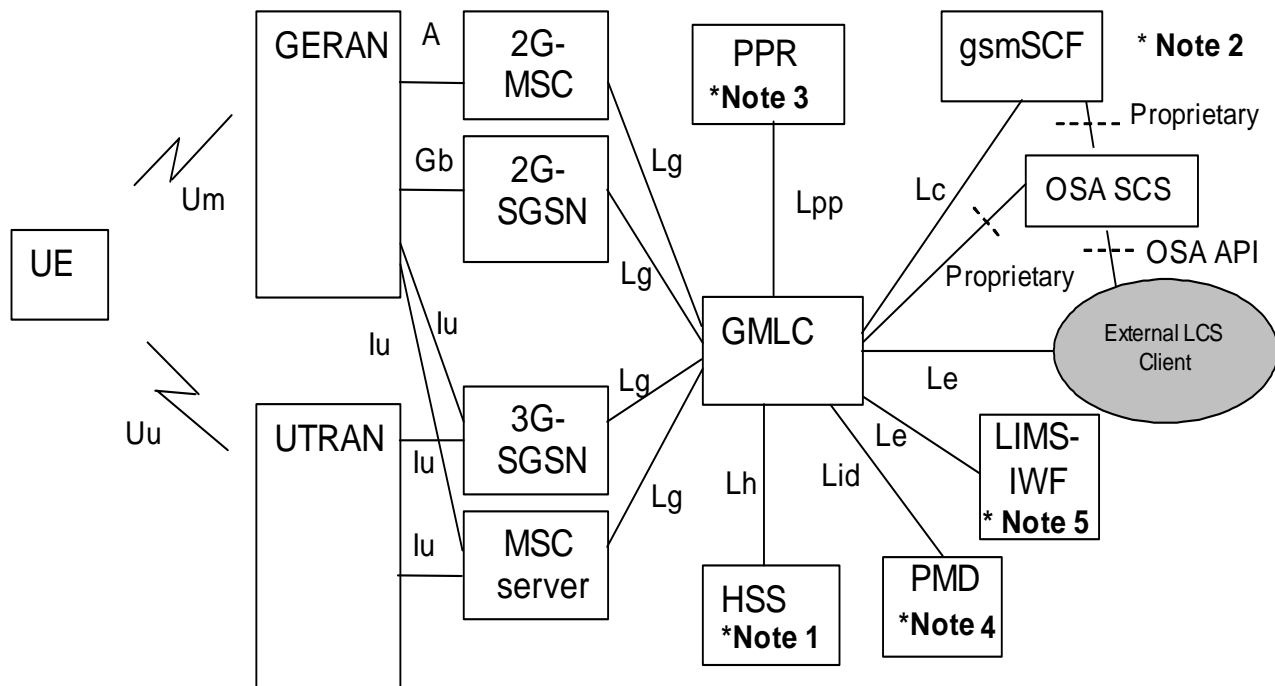
***** MODIFIED SECTION *****

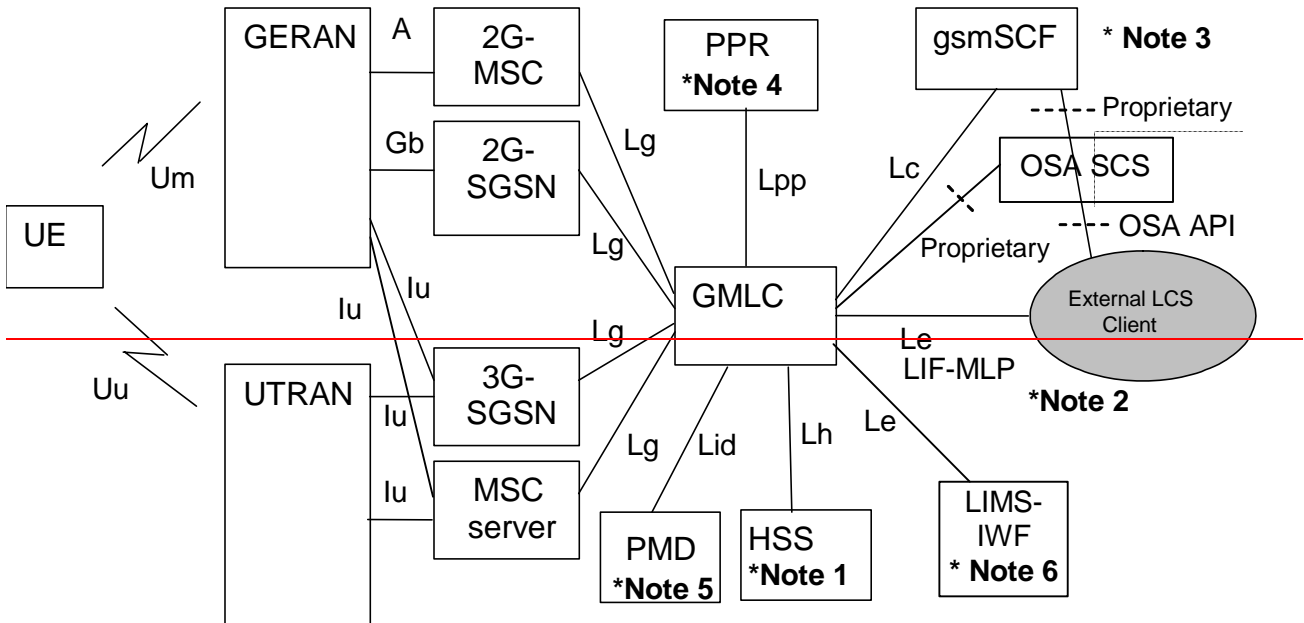
6 LCS Architecture

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

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

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





NOTE 1: HSS includes both 2G-HLR and 3G-HLR functionality. LCS is included in the overall network architecture in TS 23.002 [20].

~~NOTE 2: LIF-MLP may be used on the Le interface~~

NOTE 3: As one alternative the LCS client may get location information directly from GMLC, which may contain OSA Mobility SCS with support for the OSA user location interfaces. See TS 23.127 [26] and TS 29.198 [27, 28, 29 and 30].

NOTE 4: The PPR functionality may be integrated in GMLC

NOTE 5: The PMD functionality may be integrated in GMLC or PPR.

NOTE 6: The LIMS-IWF may optionally be located within the GMLC.

***** MODIFIED SECTION *****

6.3.2 LCS Clients, LCS applications and Requestors

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

LCS client may indicate the type of the Requestor identity in the LCS service request. The type of the Requestor identity can be one of the following:

- Logical name
- MSISDN [17]
- E-mail address [33]

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- URL [33]
- SIP URL [34]
- IMS public identity [35]

The LCS Client, LCS applications and Requestors are outside the scope of the present document. ~~However, an external LCS Client may communicate with the LCS Server as specified in [31].~~

Shenzhen, China, 19th-23rd April 2004

CR-Form-v7

CHANGE REQUEST№ **23.271 CR 266** № rev **2** № Current version: **6.7.0** №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:	№ Clarification to the privacy related action selection flow diagram for Rel-6.		
Source:	№ SA2 (Ericsson)		
Work item code:	№ LCS2	Date:	№ 22/4/2004
Category:	№ F	Release:	№ Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)		2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)		R96 (Release 1996)
	B (addition of feature),		R97 (Release 1997)
	C (functional modification of feature)		R98 (Release 1998)
	D (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	№ The flow diagram (figure A.2) in Annex A.3 gives the impression that the indicator for call/session unrelated class is optional. That is not true, since clause 9.5.4 clearly states: "There shall be an indicator for the call/session unrelated. Another indicator for the call/session related is optional and it shall be sent only if call/session related identity, i.e. the number dialled by UE or APN-NI, is sent to the serving node".
Summary of change:	№ Annex A.3 is modified, and a new note is added, in order to be visible that the indicator for call/session unrelated class is not optional.
Consequences if not approved:	№ The serving node may not implement correctly the flow diagram.

Clauses affected:	№ A.3												
Other specs affected:	<table border="1"> <tr> <td>Y</td> <td>N</td> <td></td> </tr> <tr> <td></td> <td>X</td> <td>Other core specifications</td> </tr> <tr> <td></td> <td>X</td> <td>Test specifications</td> </tr> <tr> <td></td> <td>X</td> <td>O&M Specifications</td> </tr> </table>	Y	N			X	Other core specifications		X	Test specifications		X	O&M Specifications
Y	N												
	X	Other core specifications											
	X	Test specifications											
	X	O&M Specifications											
Other comments:	№												

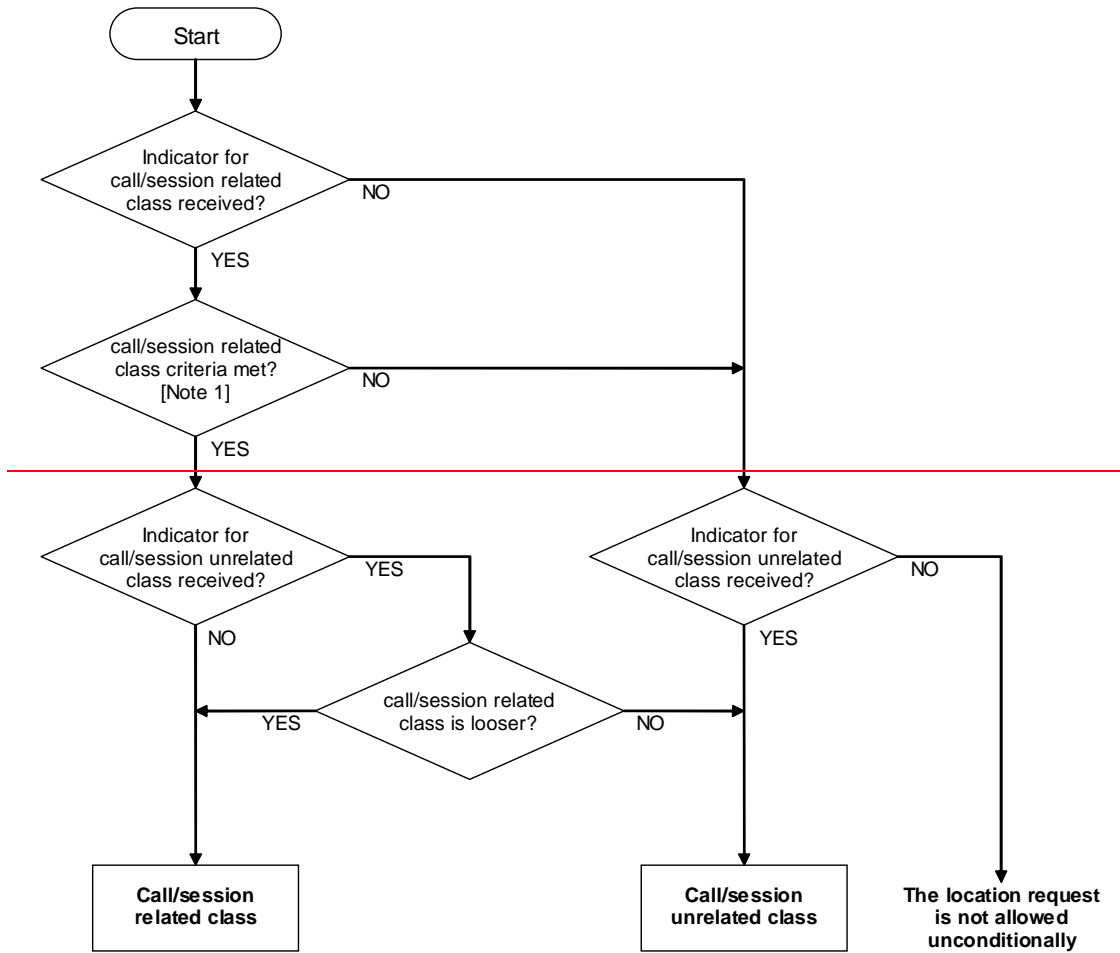
How to create CRs using this form:Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>.
Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☒ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< Modified Clause >>

A.3 Privacy related action selection rule for Rel-6 and later

In Rel-6 and later, the privacy checking function is moved from MSC/SGSN to H-GMLC/PPR of the target UE. H-GMLC/PPR selects one or two indicators of privacy check related action and sends the indicators to serving MSC/SGSN as shown in the clause 9.5.4. If the serving MSC/SGSN receives the indicators from H-GMLC, the serving node selects the privacy related action according to the flow diagram shown in Fig. A-2.



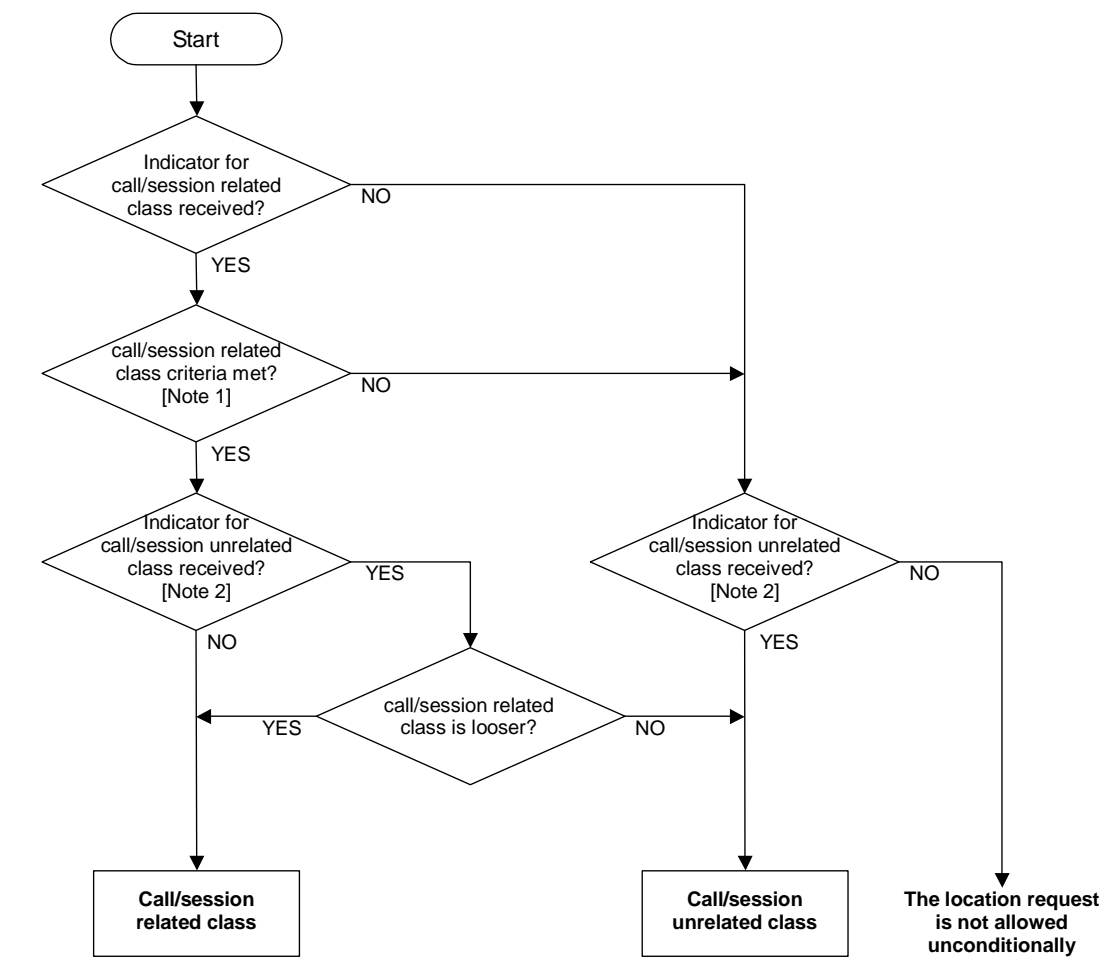


Figure A.2: Privacy related action selection flow diagram of the serving node

Note 1: The UE originated call/session to the requesting LCS client is established and the address associated to the LCS client used by the UE in call/session set up matches with that contained in the location request.

Note 2: A prior change makes this check unnecessary; since the call unrelated indicator is mandatory therefore the result is always "YES".

Shenzhen, China, 19th-23rd April 2004

CR-Form-v7
CHANGE REQUEST
⌘ 23.271 CR 267 ⌘ rev - ⌘ Current version: 6.7.0 ⌘

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:	⌘ Additional explanation on the privacy check procedure in Rel-6, regarding the PLMN Operator service.
Source:	⌘ SA2 (Ericsson)
Work item code:	⌘ LCS2 Date: ⌘ 25/3/2004
Category:	⌘ F Release: ⌘ Rel-6 Use <u>one</u> of the following categories: Use <u>one</u> of the following releases: F (correction) 2 (GSM Phase 2) A (corresponds to a correction in an earlier release) R96 (Release 1996) B (addition of feature), R97 (Release 1997) C (functional modification of feature) R98 (Release 1998) D (editorial modification) R99 (Release 1999) Detailed explanations of the above categories can be found in 3GPP TR 21.900 . Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ In Rel-6, the privacy check function is moved from MSC/SGSN to the H-GMLC/PPR. For that reason, a detailed description was added to the specification with CR 243. This CR describes how GMLC handles the case when the UE subscribes to the PLMN Operator service and the incoming request is of PLMN type. However, in annex C we still need to clarify what happens in the case of PLMN subscription.
Summary of change:	⌘ Annex C is modified, in order to state that the privacy related action indicator for the call/session unrelated class is set to 'allowed without notification', for the case of PLMN subscription. In other words, H-GMLC/PPR sends the pseudo external identity 1 to the serving nodes.
Consequences if not approved:	⌘ The description of the privacy check procedures remains incomplete. This may cause wrong interpretation of the specification and therefore, wrong implementations, for the case that the UE subscribes to the PLMN Operator service.

Clauses affected:	⌘ Annex C				
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications ⌘ [Redacted] Test specifications O&M Specifications	Y	N	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Y	N				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Other comments:	⌘ The proposed correction is complementary to the solution proposed by the				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☹ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< Modified Clause >>

Annex C (Informative): Pseudo external ID

In case that UE’s privacy profile is stored and is checked in the GMLC (H-GMLC) or in the PPR, a pseudo-external identity may be selected as a result of the privacy check in GMLC/PPR.

The pseudo-external identities may be set in the external LCS client list of the HLR privacy exception list shown in Table 10.2. The pseudo-external identity is not the identity of real external LCS client but the identity which is used for notifying SGSN/MSC of the location request class (call/session related or non-related) and the required type of indication for each class. Operator allocates E.164 addresses for the pseudo-external identities. The pseudo-external identities are used for interworking with pre Rel-6 serving nodes.

Fourteen pseudo-external identities shall be defined. The pseudo-external identities are summarized in the Table C.1.

Table C.1: Pseudo-external identities

Pseudo-external identity	Privacy setting for Call/Session related class	Privacy setting for Call/Session unrelated class
Pseudo-external identity 1	N.A.	Location allowed without notification
Pseudo-external identity 2	N.A.	Location allowed with notification
Pseudo-external identity 3	N.A.	Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 4	N.A.	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 5	Location with notification and privacy verification; location restricted if no response	Location not allowed
Pseudo-external identity 6	Location with notification and privacy verification; location allowed if no response	Location not allowed
Pseudo-external identity 7		Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 8	Location allowed with notification	Location not allowed
Pseudo-external identity 9		Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 10		Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 11		Location not allowed
Pseudo-external identity 12	Location allowed without notification	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 13		Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 14		Location allowed with notification

Note: There are five privacy settings shown in Annex A.1 for each class (call/session unrelated class and call/session related class), so there are twenty-five possible combinations of the privacy settings. However, as shown in Annex A.2, even if the call/session related class criteria is met, the privacy setting for call/session unrelated class is selected when the privacy setting for the call/session unrelated class is looser than the privacy setting for the call/session related class. Therefore the twenty-five combinations can be reduced to the above fourteen combinations.

If the UE subscribes to the universal [or PLMN](#) class, H-GMLC/PPR sends the pseudo external identity 1 to the serving nodes.

Usage of the pseudo-external identities are as follows:

- The pseudo-external identities are registered in SLPP of the HLR/HSS.
- The SLPP is sent to the serving nodes, during the Insert Subscriber Data procedures.
- After the privacy check in the H-GMLC/PPR, the H-GMLC/PPR selects an appropriate pseudo-external identity according to the required privacy related actions (i.e. checking the on-going call/session and/or notification/verification procedures) in the serving node.
- H-GMLC sends Provide Subscriber Location message to the serving node, which includes the pseudo-external identity instead of the real external client identity. The real external client identity may be included in the additional information element and is sent to serving node. The pseudo-external identity is sent to the serving node directly from H-GMLC or via V-GMLC.

Table C.2 and C.3 shows how the pseudo-external identities are set in the SLPP in HLR/HSS.

Table C.2: Example of SLPP in HLR/HSS for Call/Session unrelated Class

Pseudo-external identity	Privacy Setting
Pseudo-external identity 1	Location allowed without notification
Pseudo-external identity 2	Location allowed with notification
Pseudo-external identity 3	Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 4	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 5	Location not allowed
Pseudo-external identity 6	Location not allowed
Pseudo-external identity 7	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 8 Indicator 8	Location not allowed
Pseudo-external identity 9	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 10	Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 11	Location not allowed
Pseudo-external identity 12	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 13	Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 14	Location allowed with notification

Table C.3: Example of SLPP in HLR/HSS for Call/Session related Class

Pseudo-external identity	Privacy Setting
--------------------------	-----------------

Pseudo-external identity 5	Location with notification and privacy verification; location restricted if no response
Pseudo-external identity 6	Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 7	Location with notification and privacy verification; location allowed if no response
Pseudo-external identity 8	Location allowed with notification
Pseudo-external identity 9	Location allowed with notification
Pseudo-external identity 10	Location allowed with notification
Pseudo-external identity 11	Location allowed without notification
Pseudo-external identity 12	Location allowed without notification
Pseudo-external identity 13	Location allowed without notification
Pseudo-external identity 14	Location allowed without notification

The selection of pseudo-external identity is based on the result of the privacy check in the H-GMLC/PPR. Table C.4 shows the relation between privacy check result and the pseudo-external identities.

Table C.4: Pseudo-external identity selection at H-GMLC/PPR

Privacy related actions as a result of privacy check	Pseudo-external identity
Location request is allowed without notification, regardless of on-going call/session.	Pseudo-external identity 1
Location request is allowed with notification, regardless of on-going call/session,	Pseudo-external identity 2
Location request is allowed with notification and privacy verification, regardless of on-going call/session. Location request is allowed even if there is no response from UE.	Pseudo-external identity 3
Location request is allowed with notification and privacy verification, regardless of on-going call/session. Location request is restricted if there is no response from UE.	Pseudo-external identity 4
If there is call/session with the client, location request is allowed with notification and privacy verification. Location request is restricted if there is no response from UE. If there is no call/session with the client, location request is restricted.	Pseudo-external identity 5
If there is call/session with the client, location request is allowed with notification and privacy verification. Location request is allowed even if there is no response from UE. If there is no call/session with the client, location request is restricted.	Pseudo-external identity 6
If there is call/session with the client, location request is allowed with notification and privacy verification. Location request is allowed even if there is no response from UE. If there is no call/session with the client, location request is allowed with notification and privacy verification. Location request is restricted if no response.	Pseudo-external identity 7
If there is call/session with the client, location request is allowed with notification. If there is no call/session with the client, location request is	Pseudo-external identity 8

restricted.	
<p>If there is call/session with the client, location request is allowed with notification.</p> <p>If there is no call/session with the client, location request is with notification and privacy verification. Location request is restricted if no response.</p>	Pseudo-external identity 9
<p>If there is call/session with the client, location request is allowed with notification.</p> <p>If there is no call/session with the client, location request is allowed even if there is no response from UE.</p>	Pseudo-external identity 10
<p>If there is call/session with the client, location request is allowed without notification.</p> <p>If there is no call/session with the client, location request is restricted.</p>	Pseudo-external identity 11
<p>If there is call/session with the client, location request is allowed without notification.</p> <p>If there is no call/session with the client, location request is with notification and privacy verification. Location request is restricted if no response.</p>	Pseudo-external identity 12
<p>If there is call/session with the client, location request is allowed without notification.</p> <p>If there is no call/session with the client, location request is allowed even if there is no response from UE.</p>	Pseudo-external identity 13
<p>If there is call/session with the client, location request is allowed without notification.</p> <p>If there is no call/session with the client, location request is allowed with notification.</p>	Pseudo-external identity 14

Shenzhen, China, 19th-23rd April 2004

CR-Form-v7

CHANGE REQUEST№ **23.271 CR 268** № rev **1** № Current version: **6.7.0** №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:	№ Clarifications regarding the information of V-GMLC address that is send from HLR/HSS to GMLC, during Common MT-LR procedure in CS and PS domain.
Source:	№ SA2 (Ericsson)
Work item code:	№ LCS2
Date:	№ 6/4/2004
Category:	№ F
	Use <u>one</u> of the following categories:
	F (correction)
	A (corresponds to a correction in an earlier release)
	B (addition of feature),
	C (functional modification of feature)
	D (editorial modification)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .
Release:	№ Rel-6
	Use <u>one</u> of the following releases:
	2 (GSM Phase 2)
	R96 (Release 1996)
	R97 (Release 1997)
	R98 (Release 1998)
	R99 (Release 1999)
	Rel-4 (Release 4)
	Rel-5 (Release 5)
	Rel-6 (Release 6)

Reason for change:	№ In the Common MT-LR procedure, HLR may return to the GMLC the V-GMLC address, via the Routing Info for LCS message. But according to the specification there is no way to know if this V-GMLC corresponds to MSC or SGSN server. The specification needs modifications in order to clearly state that the returned V-GMLC is the one that is associated with the serving node, which is used for this positioning request.
Summary of change:	№ Clauses 7.3, 9.1.1 and 9.1.1A are modified, in order to state that HLR may return the address of V-GMLC, which is associated with the serving node, which is used for this positioning request. So, depending on information received from SGSN and/or MSC/VLR concerning the UE's capabilities for LCS, HLR shall be able to keep both V-GMLC addresses (available from location update procedure) and send the proper V-GMLC address during MT-LR procedure.
Consequences if not approved:	№ A possible misrouting of the positioning request might occur, if for example GMLC decides to route the positioning request through the SGSN, but the V-GMLC is associated with MSC, or vice versa.

Clauses affected:	№ 7.3, 9.1.1, 9.1.1A												
Other specs affected:	<table border="1"> <tr> <td>Y</td> <td>N</td> <td></td> </tr> <tr> <td>X</td> <td></td> <td>Other core specifications</td> </tr> <tr> <td></td> <td>X</td> <td>Test specifications</td> </tr> <tr> <td></td> <td>X</td> <td>O&M Specifications</td> </tr> </table>	Y	N		X		Other core specifications		X	Test specifications		X	O&M Specifications
Y	N												
X		Other core specifications											
	X	Test specifications											
	X	O&M Specifications											
	№ 23.008, 23.016, 29.002												

Other comments: ☹

How to create CRs using this form:

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Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☹ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< First Modified Clause >>

7.3 MAP Interfaces

The following interfaces are based on MAP in LCS.

- Lh interface: interface between GMLC and HSS. This interface is used by the GMLC to request the address of the H-GMLC, and/or the address of the visited MSC or SGSN for a particular target UE whose location has been requested
- Lg interface: interface between GMLC MSC and GMLC - SGSN. This interface is used by the GMLC to convey a location request to the MSC or SGSN currently serving a particular target UE whose location was requested. The interface is used by the MSC or SGSN to return location results to the GMLC.
- Lc interface: interface between GMLC and gsmSCF, CAMEL. This interface is used to get location information for CAMEL based services.

The following MAP services are defined for LCS.

- MAP-SEND-ROUTING-INFO-FOR-LCS Service.

This service is used between the GMLC and the HLR/HSS to retrieve the routing information needed for routing a location service request to the serving VMSC , SGSN. The service may be used in GMLC - HSS interface to retrieve routing information in order to route the location service request to the correct VMSC, SGSN and MSC Server.

In case the service is used between the R-GMLC and the HSS, the H-GMLC address of the target UE to be located is retrieved. The address of the V-GMLC [associated with the serving node](#) and PPR may also be retrieved.

- MAP-PROVIDE-SUBSCRIBER-LOCATION Service.

This service is used by a GMLC to request the location of a target UE from the visited MSC, SGSN or MSC Server at any time.

- MAP-SUBSCRIBER-LOCATION-REPORT Service.

This service is used by a VMSC, SGSN or MSC Server to provide the location of a target UE to a GMLC when a request for location is either implicitly administered or made at some earlier time.

The MAP Subscriber Location Report could also be used to send information about location of the Target UE (for MO-LR) to an external client.

<< Next Modified Clause >>

9.1.1 Common MT-LR procedure in PS and CS domain

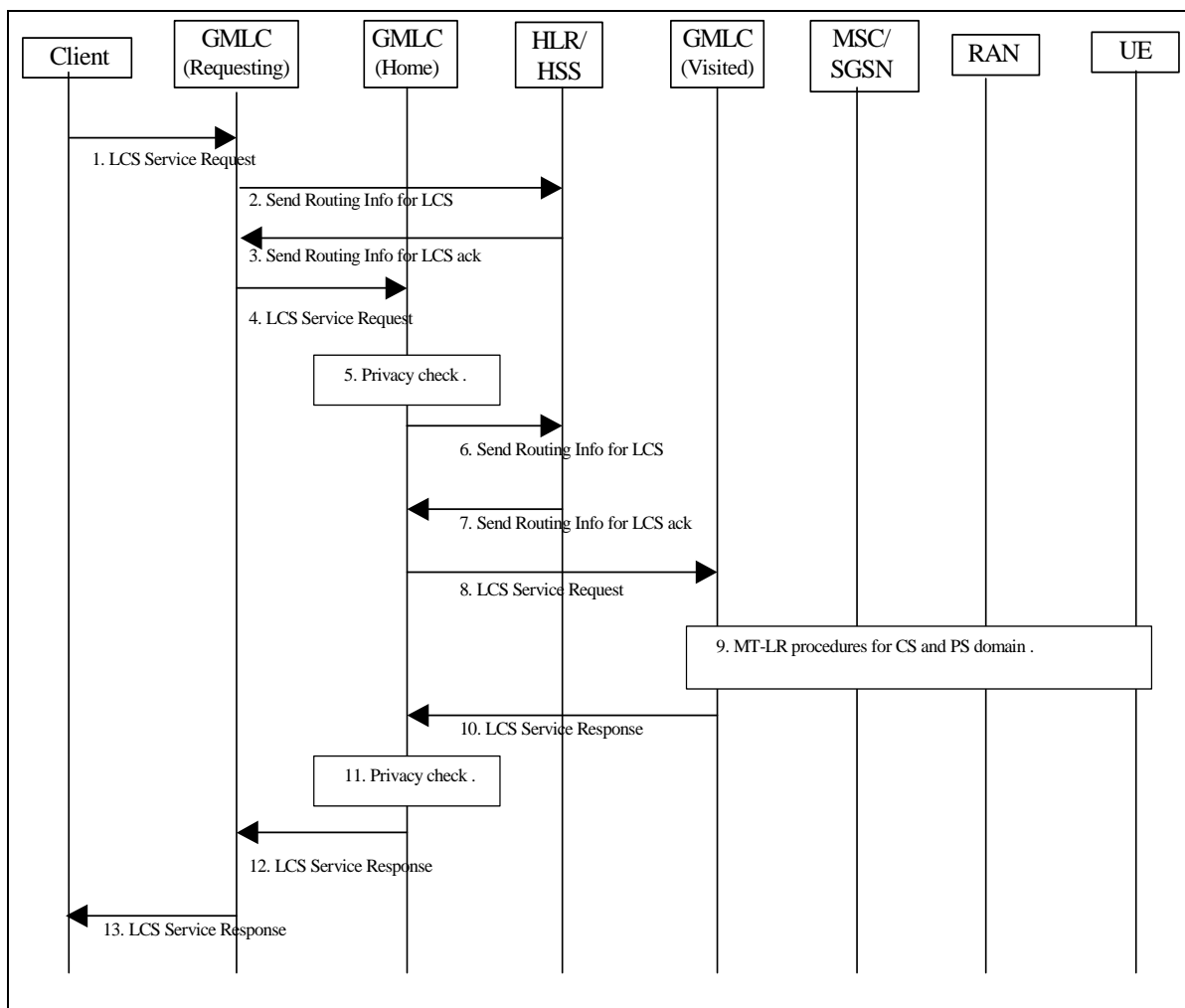


Figure 9.1: General Network Positioning for a MT-LR

- 1) An external LCS client requests the current location of a target UE from a GMLC. The LCS Client may also request a deferred location request, i.e. based on event. The R-GMLC verifies the identity of the LCS client and its subscription to the LCS service requested and derives the MSISDN or IMSI or pseudonym of the target UE to be located and the LCS QoS from either subscription data or data supplied by the LCS client. For a call related location request, the LCS client includes the LCS client's called party number, as dialled by the target mobile user, in the LCS service request. For a session related location request, the LCS client includes the APN-NI of the LCS client, as used by the target UE, in the LCS service request. For a call/session related request the R-GMLC may verify that the called party number or APN-NI is correct for the LCS client in question. The LCS client's dialled number or APN-NI are checked in step 9 for the call/session related class. The LCS request may carry also the Service Identity and the Codeword and the service coverage information. The R-GMLC may verify that the Service Identity received in the LCS request matches one of the service identities allowed for the LCS client. If the service identity does not match one of the service identities for the LCS client, the R-GMLC shall reject the LCS request. Otherwise, the R-GMLC can map the received service identity in a corresponding service type. If the location request is originated by a Requestor, the Requestor Identity may be added to the LCS service request. The LCS client should authenticate the Requestor Identity but this is outside the scope of this specification. The LCS service request may also contain the type of the Requestor identity if the requestor identity was included. If the H-GMLC address is not contained in the pseudonym or cannot be deduced from the pseudonym, the R-GMLC shall determine the veronym for the pseudonym. In this case the R-GMLC may access to its associated

PMD as described in 9.1.1.3.

The R-GMLC verifies whether it stores the privacy profile of the target UE. If the R-GMLC stores the UE's privacy profile, (this means the R-GMLC is the H-GMLC of the target UE), then step 2, 3, 4 and 12 are skipped. If location is required for more than one UE, or if periodic location is requested, the steps following below may be repeated. In case the location is requested for more than one UE, the R-GMLC should verify whether the number of Target UEs in the LCS request is equal or less than the Maximum Target UE Number of the LCS client. If the Maximum Target UE Number is exceeded, the R-GMLC should respond to the client with proper error cause.

- 2) If the R-GMLC already knows, (e.g. from a previous location request or an internal lookup table), or is able to determine, (e.g. it is possible to use a DNS lookup mechanism similar to IETF RFC 2916), the network address of H-GMLC of the target UE, or in case the location service request contains the target UE's pseudonym, which includes the target UE's Home-GMLC address, or a pseudonym from which the target UE's Home-GMLC address can be deduced, then 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 the UE.

The details of the alternative methods of retrieving H-GMLC address other than the sending SEND_ROUTING_INFO_FOR_LCS message to the HLR/HSS, (e.g. internal lookup table, DNS lookup mechanism), are not in the scope of this specification.

Editor's note: The support for number portability with these alternative solutions of retrieving H-GMLC address still needs further study and should be in line with the general solution to support number portability in Rel-6.

- 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, the LCS capabilities of the serving nodes if available, [the V-GMLC address associated with the serving nodes, if available](#) and whichever of the IMSI and MSISDN that was not provided in step 2. The HLR/HSS returns the address of the H-GMLC. The HLR/HSS also returns the address of the PPR ~~and V-GMLC~~, if available.

Note: HLR/HSS may ~~prioritize~~[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) If R-GMLC finds out that it is the H-GMLC, the signalling steps 4 and 12 are skipped.

If the R-GMLC did not receive the H-GMLC address in step 3 and can not retrieve the H-GMLC address in some other way (e.g. DNS lookup), then steps 4, 5, 6, 7, 8, 10, 11 and 12 are skipped and the R-GMLC directly sends the PSL message to the serving node.

Otherwise, the R-GMLC sends the location request to the H-GMLC. If one or several of the network addresses of the current SGSN and/or VMSC/MSC server, the LCS core network signalling capabilities of the serving nodes, IMSI and MSISDN for the target UE and the address of the V-GMLC and the PPR have been retrieved in Step 3, the R-GMLC shall pass the information with the location request to the H-GMLC. The R-GMLC shall also send the service coverage information to the H-GMLC, if the information is available.

- 5) The H-GMLC verifies whether the R-GMLC is authorized to request UE location information. If the R-GMLC is not authorized, an error response is returned.

If the LCS service request contains the pseudonym of the target UE and the H-GMLC cannot resolve the PMD address from the pseudonym, the H-GMLC itself determines the verinym (MSISDN or IMSI) of the target UE. If the H-GMLC can resolve the address of PMD from the pseudonym, the H-GMLC requests the verinym from its associated PMD, see clause 9.1.1.3. In case H-GMLC knows that the PMD functionality is integrated in PPR, it can include the information from the LCS Identity Request in the LCS authorisation request to the PPR, see clause 9.1.1.1. In this case, if H-GMLC is not able to obtain the verinym of the target UE, the H-GMLC shall cancel the location request.

The H-GMLC performs privacy check on the basis of the UE user's privacy profile stored in the H-GMLC and the capabilities of the serving nodes (MSC/VLR and/or SGSN), if available. If the privacy profile of the target UE is stored in a PPR and the H-GMLC received the network address of the PPR from R-GMLC or is able to determine the PPR address (e.g. from a previous location request or an internal lookup table), the H-GMLC shall ask the PPR to perform the privacy check as described in the 9.1.1.1. If the privacy profile is stored in a PPR but the network address of the PPR is not available, the H-GMLC shall send SRI for LCS message to HLR/HSS in step 6 in order to get the PPR address and the privacy check in this step shall be performed after step 7. Also if the key of the UE user's privacy profile (i.e. MSISDN or IMSI) is not available, the privacy check in this step shall be performed after step 7. The H-GMLC/PPR verifies LCS barring restrictions in the UE user's privacy

profile in the H-GMLC/PPR. In verifying the barring restrictions, barring of the whole location request is assumed if any part of it is barred or any requisite condition is not satisfied. If the location service request is to be barred, GMLC shall terminate the request towards the R-GMLC or the LCS client with the appropriate error code. As a result of the privacy check, the H-GMLC/PPR selects one or two indicators of the privacy check related action and/or a pseudo-external identity. (The details of the indicator of the privacy check related action and the pseudo-external identity are described in chapter 9.5.4 and Annex C). If the requested type of location is “current or last known location” and the requested maximum age of location information is available, the H-GMLC verifies whether it stores the previously obtained location estimate of the target UE. If the H-GMLC stores the location estimate and the location estimate satisfies the requested accuracy and the requested maximum age of location, the H-GMLC checks the result of the privacy check. In case the result of the privacy check for call/session unrelated class is “Location allowed without notification” then steps 6, 7, 8, 9 and 10 may be skipped.

- 6) If the H-GMLC does not know IMSI for the particular MSISDN (e.g. from a previous location request), and the VMSC/MSC server address or SGSN address, the H-GMLC shall send 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. Also if the privacy profile is stored in a PPR but the network address of the PPR was not available in the step 5, the H-GMLC shall send the SRI for LCS message to HLR/HSS. Otherwise, this step and step 7 may be skipped.
 - 7) The HLR/HSS then returns one or several of the network addresses of the current SGSN and/or VMSC/MSC server, the LCS core network signalling capabilities of the serving nodes, the V-GMLC address associated with the serving nodes, if available and whichever of the IMSI and MSISDN that was not provided in step (6) for the particular UE. The HLR/HSS may also return the address of the PPR ~~and the V-GMLC~~, if available.
- Note: HLR/HSS may ~~prioritize~~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.
- 8) If step 6 and step 7 were performed, the H-GMLC/PPR may do a new privacy check, or if the privacy profile is stored in a PPR but the network address of the PPR was not available in step 5 and the PPR address is obtained in step 7, the H-GMLC shall ask the PPR to perform the privacy check as described in the 9.1.1.1. Also if the location request is an immediate location request and the service coverage information (i.e. list of country codes) was sent from R-GMLC, the H-GMLC checks the country codes of the serving node addresses. If the H-GMLC finds out the current SGSN and/or VMSC/MSC server locates out of the service coverage, the H-GMLC returns an appropriate error message to the R-GMLC or the LCS client. In the cases when the H-GMLC did not receive the address of the V-GMLC, or when the V-GMLC address is the same as the H-GMLC address, or when both PLMN operators agree not to use the Lr interface, the H-GMLC does not send the location request to the V-GMLC and step 10 is skipped. In this case, the H-GMLC sends the location service request message to the serving node. If the H-GMLC received the address of the V-GMLC from the HLR/HSS and the V-GMLC address is different from the H-GMLC address, the H-GMLC may send 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, and the IMSI and MSISDN of the target UE. The location request may also carry the requested action of the VPLMN as the result of the privacy check in the H-GMLC (i.e. by using the indicator of the privacy check related action as described in chapter 9.5.4 or by using the pseudo-external identity as described in Annex C). The V-GMLC first authenticates that the location request is allowed from this GMLC, PLMN or from this country. If not, an error response is returned.
 - 9) In case the GMLC (H-GMLC, R-GMLC or V-GMLC) receives only the MSC/VLR address, the MT LR proceeds as the CS-MT-LR procedure described in 9.1.2. In case GMLC receives only the SGSN address, the MT LR proceeds as the PS-MT-LR procedure described in 9.1.6. In case the GMLC receives several of the following addresses, SGSN, VMSC and/or MSC Server, it has to decide where to send the location request. If the requested MT-LR is known to be associated with a CS call, the CS-MT-LR procedure shall be invoked. If the requested MT-LR is associated with a PS session, the PS-MT-LR procedure shall be invoked. Otherwise, both CS-MT-LR and PS-MT-LR are applicable. If LCS Client indicated deferred location request, GMLC shall indicate this together with applicable event type (e.g. UE available) in the requested PS/CS-MT-LR, see 9.1.8.

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

- 10) The V-GMLC sends the location service response to the H-GMLC. The location service response may contain the information about the positioning method used. The V-GMLC may record charging information.
- 11) If the privacy check in step 5 indicates that further privacy checks are needed, or on the basis of the privacy profile, the H-GMLC shall perform an additional privacy check or the H-GMLC may ask the PPR to perform the privacy check as described in the 9.1.1.1 in order to decide whether the H-GMLC can forward the location information to the LCS client. If the location request from the R-GMLC or the LCS client contained the pseudonym, the H-GMLC shall use the pseudonym of the target UE in the location response to the R-GMLC or the LCS client. One example when this additional privacy check is needed is when the target UE user has defined different privacy settings for different geographical locations.
- 12) The H-GMLC sends the location service response to the R-GMLC. The H-GMLC may store the location information and its age. The location service response may contain the information about the positioning method used. The H-GMLC may record charging information.
- 13) R-GMLC sends the location service response to the LCS client. If the location request from the LCS client contained the pseudonym and the R-GMLC resolved the verinym from the pseudonym in the step 1, the R-GMLC shall use the pseudonym of the target UE in the location 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 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 location service response from the R-GMLC to the LCS client may contain the information about the positioning method used.

The detailed CS-MT-LR and PS-MT-LR procedures in step 9 of figure 9.1 are described in 9.1.2 and 9.1.6. The detailed procedure for deferred PS/CS-MT-LR is described in 9.1.8.

<< Next Modified Clause >>

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

The network induced location request as described in chapter 9.1.5 may be used in some cases to determine the location of the UE used for an emergency call. This chapter describes the case when the emergency centre initiates an emergency MT-LR.

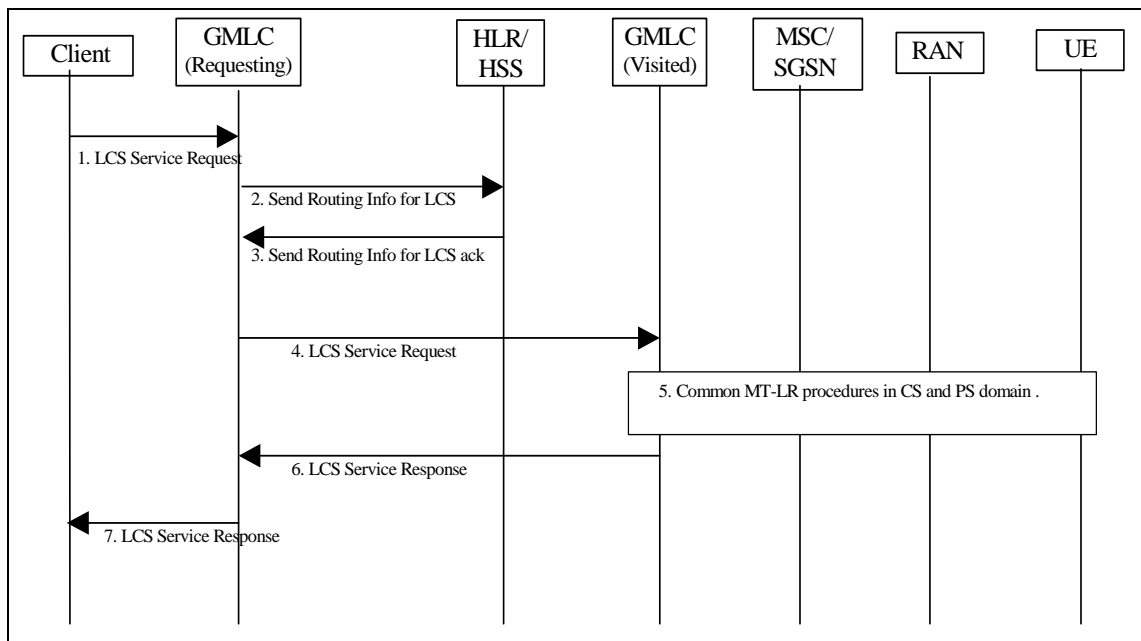


Figure 9.1A: Network Positioning for an Emergency MT-LR

- 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 prioritize 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, an error response is returned.
- 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.

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.

Shenzhen, China, 19th-23rd April 2004

CR-Form-v7

CHANGE REQUEST

⌘ **23.271 CR 269** ⌘ rev - ⌘ Current version: **6.7.0** ⌘

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:	⌘ Clarifications on the NI-LR and CS-MT-LR without HLR Query, for the SIM-less emergency call case.
Source:	⌘ SA2 (Ericsson)
Work item code:	⌘ LCS2 Date: ⌘ 20/4/2004
Category:	⌘ F
	Use <u>one</u> of the following categories:
	F (correction)
	A (corresponds to a correction in an earlier release)
	B (addition of feature),
	C (functional modification of feature)
	D (editorial modification)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .
Release:	⌘ Rel-6
	Use <u>one</u> of the following releases:
	2 (GSM Phase 2)
	R96 (Release 1996)
	R97 (Release 1997)
	R98 (Release 1998)
	R99 (Release 1999)
	Rel-4 (Release 4)
	Rel-5 (Release 5)
	Rel-6 (Release 6)

Reason for change:	⌘ In case of a SIM-less 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. However, this non-dialable callback number does not always uniquely identify the UE. In those cases the IMEI shall be always included in Provide Subscriber Location and MAP Subscriber Location Report messages. Additionally, in the case of NI-LR using Location Based Routing the information regarding the non-dialable callback number is missing. The information of positioning method used is also missing from the Subscriber Location Report that MSC sends to GMLC.
Summary of change:	⌘ Clauses 9.1.3, 9.1.5 and 9.1.5A are modified, in order to state that the IMEI shall be always included in Subscriber Location message, for the case of SIM-less emergency calls. Clause 9.1.5A is also modified, in order to state that in case a SIM-less UE is used to make the emergency call, the MSISDN shall be populated with a non-dialable callback number in MAP Subscriber Location Report message. It is also modified in order to include the information of positioning method used in the Subscriber Location Report message that is sent to GMLC.
Consequences if not approved:	⌘ There will be problems in locating the UE, in case that the subscriber is using SIM-less UE for making emergency calls, because TS 23.271 would be ambiguous.

Clauses affected:	⌘	9.1.3, 9.1.5.3, 9.1.5A.3, 9.1.5A.6										
Other specs affected:	⌘	<table border="1"><tr><td>Y</td><td>N</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr></table>	Y	N		X		X		X	Other core specifications	⌘
		Y	N									
			X									
	X											
	X											
	Test specifications											
	O&M Specifications											
Other comments:	⌘	This CR merges the solutions proposed by S2-041442 and S2-041443.										

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- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< First Modified Clause >>

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

Figure 9.3 illustrates current or last known location requests for a North American Emergency Services call, where an emergency services client (i.e., a Public Safety Answering Point) identifies the target UE and the serving GMLC using either an NA-ESRK, or an MSISDN and NA-ESRD that were previously provided to it by the VMSC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target UE. This scenario presumes that the initial location, as well as UE and VMSC identifying information had been pushed to the GMLC as per [36].

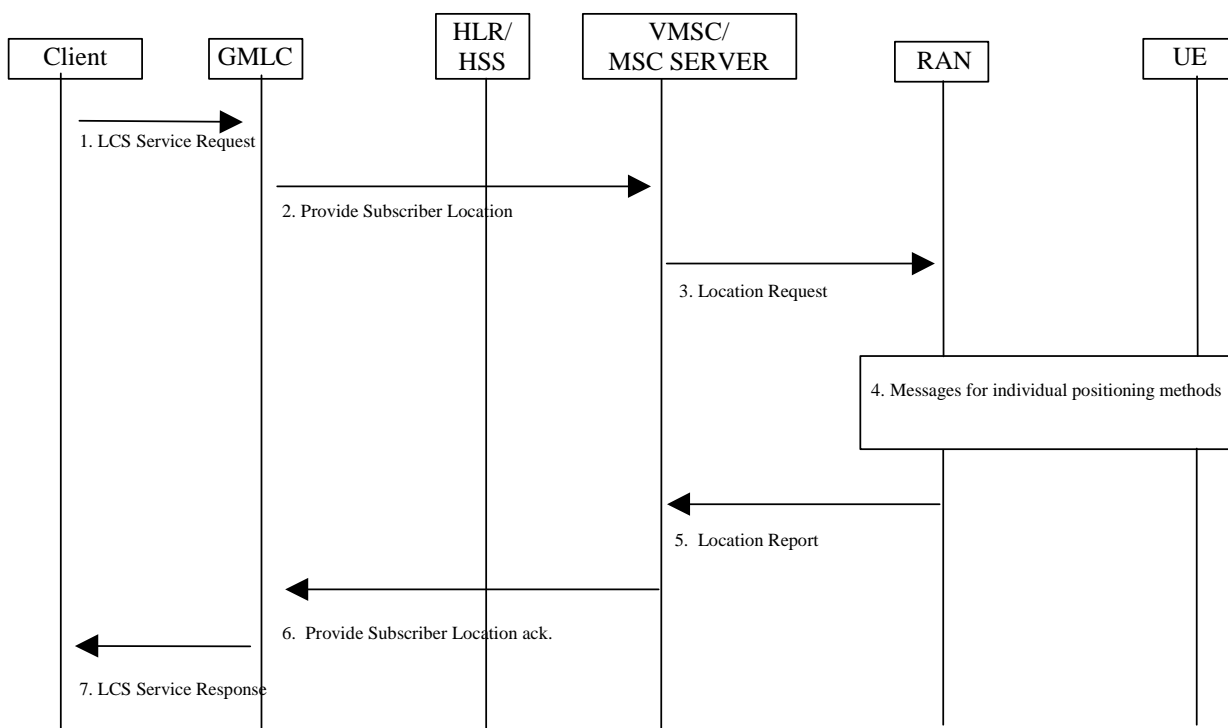


Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query

- 1) Same as step 1 in figure 9.1 but with the LCS client identifying first the target UE and the serving GMLC by either NA-ESRK or both of MSISDN and NA-ESRD.
- 2) If the GMLC already has stored information for the target UE (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD - with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the 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.

<< Next Modified Clause >>

9.1.5 Network Induced Location Request (NI-LR)

Figure 9.4 illustrates positioning for an emergency service call.

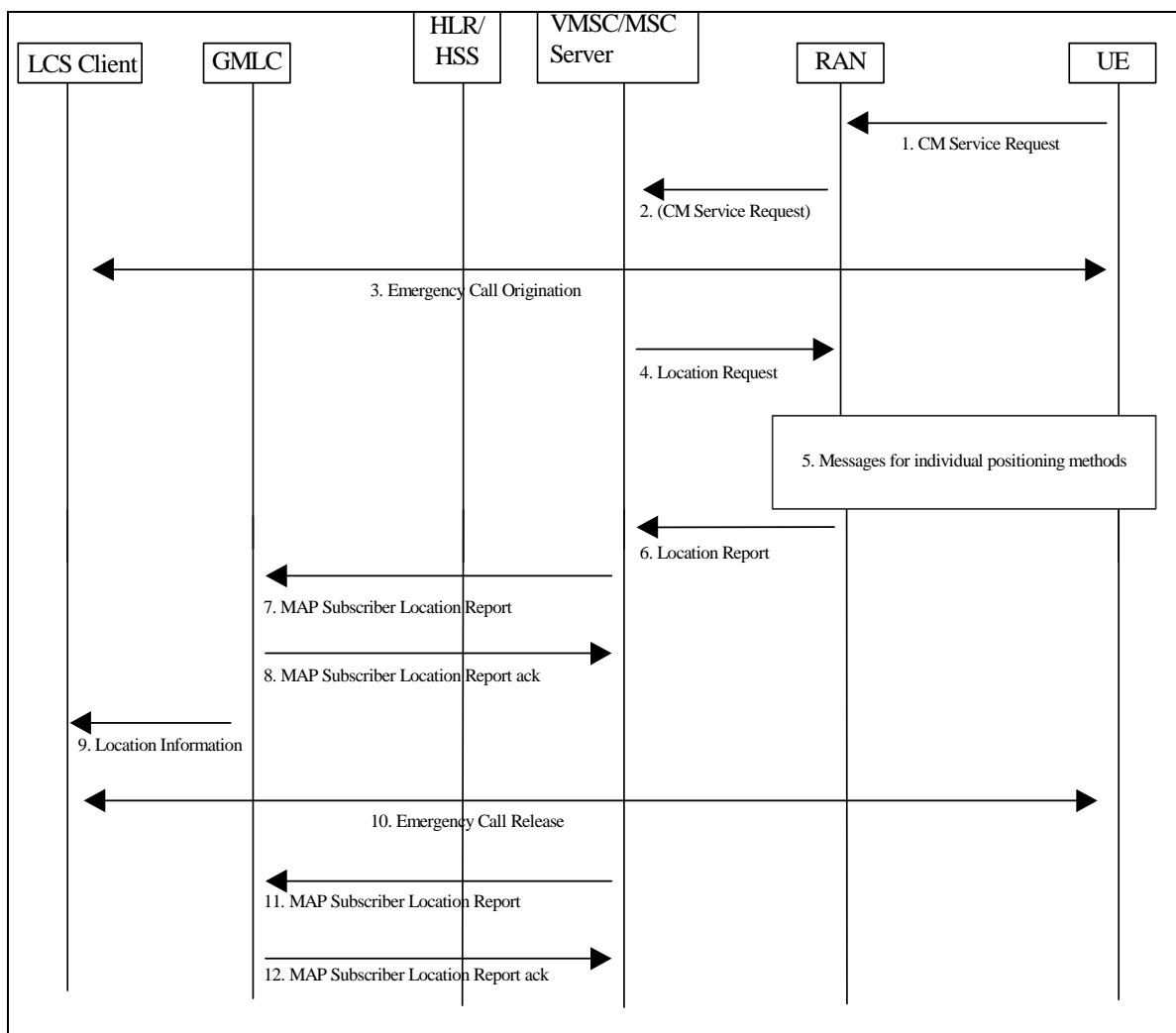


Figure 9.4: Positioning for a NI-LR Emergency Service Call

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. 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. 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. For a North American Emergency Services call, 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. For a North American emergency services call, 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) For a North American Emergency Services call, 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 release all information previously stored for the emergency call.

<< 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.

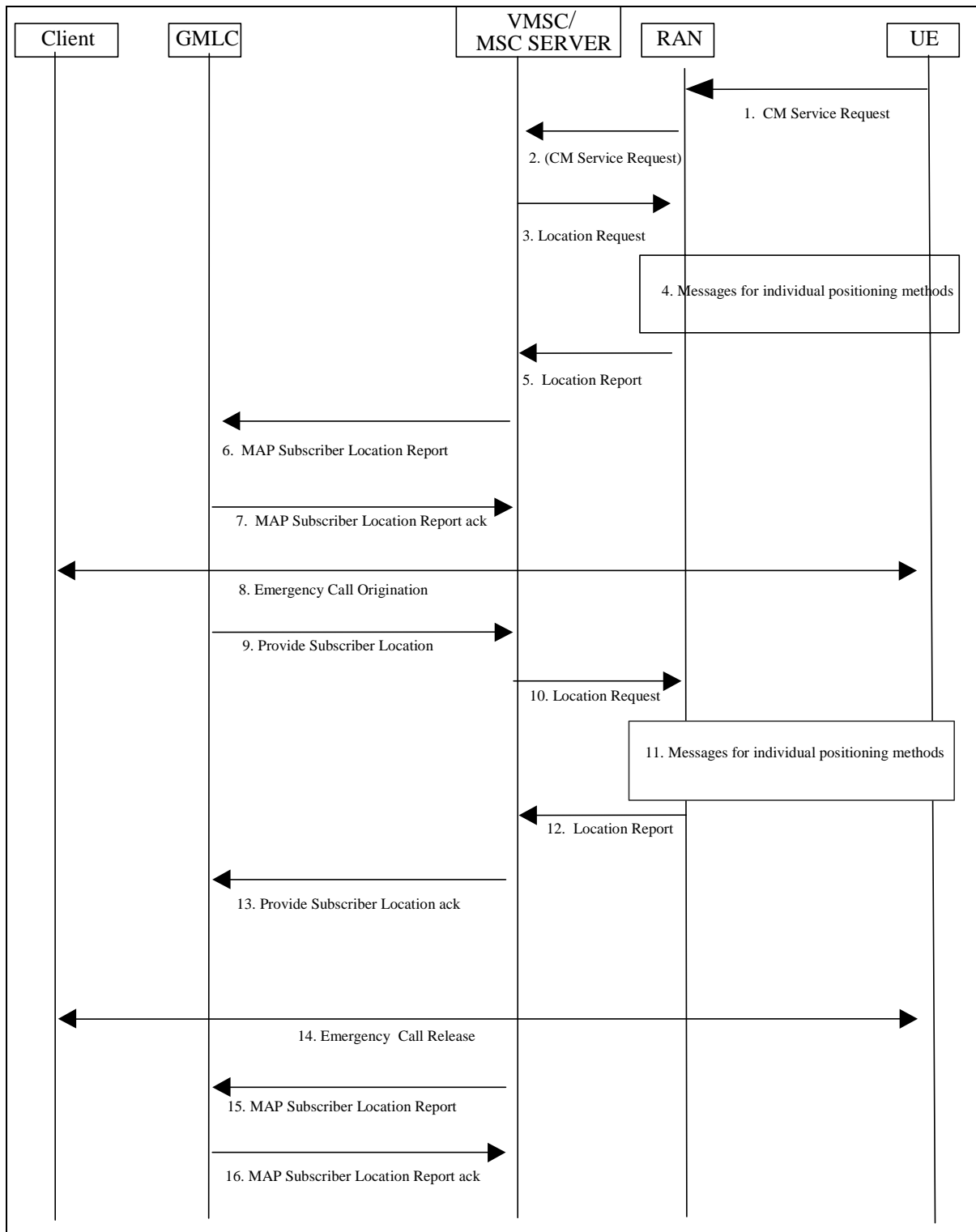


Figure 9.4A: Positioning for a NI-LR Emergency Service Call using Location Based Routing

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 a SIM-less UE is used to make the 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 NA-ESRK 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 a NA-ESRK, which was requested by the VMSC/MSC server. The GMLC shall include the NA-ESRK value in the MAP Subscriber Location Report ack and send it to the VMSC/MSC server. The GMLC stores 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 used shall be the one received from the GMLC. If a NA-ESRK is not received from the GMLC then the VMSC/MSC server shall use the default NA-ESRK for the call as in 9.1.5.1 step 3.
- 9) 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 a SIM-less UE is used to make the 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.

- 10) 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

11) same as step 4.

9.1.5A.6 Location Calculation and Release Procedure

12) same as step 5.

13) 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. [In case a SIM-less UE is used to make the emergency call, the MSISDN may be populated with a non-dialable callback number as specified in clause 6.4.3.](#) 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.

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

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

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

CHANGE REQUEST

23.271 CR 271 # rev # Current version: 6.7.0

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:	# Enhancement of MO-LR		
Source:	# SA2 (Huawei, China Mobile, TCS)		
Work item code:	# LCS2	Date:	# 20/04/2004
Category:	# B	Release:	# REL-6
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction)</p> <p>A (corresponds to a correction in an earlier release)</p> <p>B (addition of feature),</p> <p>C (functional modification of feature)</p> <p>D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>2 (GSM Phase 2)</p> <p>R96 (Release 1996)</p> <p>R97 (Release 1997)</p> <p>R98 (Release 1998)</p> <p>R99 (Release 1999)</p> <p>Rel-4 (Release 4)</p> <p>Rel-5 (Release 5)</p> <p>Rel-6 (Release 6)</p>

Reason for change: # [H14]	<p>This CR is a combine CR from CR#258(S2-041396) and CR#259R1 (S2-041263) which are agreed by SA2 as resolution for issues identified during the SA#37-38-39 meeting. However, there are overlaped changes in the different CR, so it is decided by the SA2 plenary to combine them as one CR to submit to the SA Plenary.</p> <p>Reasons for change from CR#258:</p> <ol style="list-style-type: none"> 1. when the UE requests its own location to be sent to an external LCS client, the corresponding GMLC address may be specified by the UE, or assigned by the VMSC/MSC Server. However, in case the address of the GMLC is specified by the UE, the VMSC/MSC server maybe cannot access that GMLC. Furthermore, in case the GMLC address is assigned by the VMSC/MSC server, the assigned GMLC maybe cannot access the specified external LCS Client. 2. In addition, In the current MO-LR procedure, when the UE only request its own location, or location assistance data or broadcast assistance data message ciphering keys from the network, the request information can not be transferred to the V-GMLC, the MSC/SGSN should be the entity to record the charging information. However, as a value-added service, the most LCS service related information should be stored in the service gateway, i.e. GMLC, rather than the MSC/SGSN, in this case, the GMLC should be the more suitable entity to collect charging information and generate the CDR. In addition, the MSC/SGSN may do not store some service related information so may can not fill all fields of the CDR. Furthermore, comparison with other LCS procedures, GMLC and MSC/SGSN always both be the charging entity. So the V-GMLC should be added as a charging entity in case the location information does not be transferred to the LCS Client, then this charging module should be more extensible to a new MO-LR service. 3. Moreover, in case the UE's location information is transferred to the LCS Client, a pseudonym should be considered to conceal the UE's MSIDSN/IMSI. <p>The above 3 problems can also occur in the current PS-MO-LR procedure.</p>
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Reasons for change from CR#259R1:

4. In the SA2 #37 meeting, we made conclusion to the CR(S2-040154) noted as technically correct, and sent a LS to the CN4 and OMA to query whether the stage 3 work of this new feature can be achievable in 3GPP Release 6 time frame.

The response LS from OMA (S2-040551) indicates the location group is confident that this change can be handled in the stage 3 protocol specification work within the current 3GPP release 6 time frame. On the other hand, the response LS from CN4 (S2-041131) also indicates this feature is achievable in the 3GPP release 6 time frame.

This CR is purpose to add this feature to the stage 2 thus the stage 3 could start the subsequently work.

Summary of change: ⌘ This CR is a combination of CR#258(S2-041396) and CR#259R1 (S2-041263), notice that only section 9.2.1 and 9.2.2 have overlaps with some change to same stentances, but no conflicts.

Following changes are applied to the TS:

1. When the address of the GMLC is specified by the UE and the VMSC/MSC server cannot access it, the VMSC/MSC server shall assign a GMLC, i.e. V-MSC server send the MAP Subscriber Location Report to that V-GMLC. The V-GMLC transfers the MO-LR Location Information to the correct GMLC.

2. When the address of the GMLC i.e. V-GMLC, is assigned by the VMSC/MSC server, and the V-GMLC cannot access the specified LCS Client, the V-GMLC shall determine a GMLC that can access the LCS Client and send the MO-LR Location Information to that GMLC.

3. In any case MAP Subscriber Location Report shall be send to the V-GMLC, carrying at least the MSISDN/IMSI of the UE, the event causing the location estimate (CS-MO-LR/PS-MO-LR) and the location estimate and its age. V-GMLC shall record the charging information for the UE and return the MAP Subscriber Location Report Acknowledgement to the VMSC/MSC server/SGSN.

4. The UE can set a "Pseudonym indicator" to indicate a pseudonym should be assigned by the network and transferred to the LCS Client as the UE's identity. According to the UE's verinym, the GMLC may perform the assignment, or request the H-GMLC/PMD of the UE to assign a pseudonym to the UE.

5. A parameter of Service Identity to indicate the UE requested service is added into the MO-LR invoke message, and the service identity is sent to the LCS Client.

6. The address of the V-GMLC, and a GMLC that can access the LCS Client are added to the MO-LR signalling procedure figures.

Consequences if not approved: ⌘ The current MO-LR procedures do not describe any mechanisms how to handle the case when the VMSC/MSC server cannot access the GMLC specified by the UE and the case when the V-GMLC assigned by the VMSC/MSC server cannot access the specified LCS Client. And charging of the MO-LR procedure shall be handled differently with other LCS procedures. In addition, In case the location information of the UE should be provided to the LCS Client, the UE's MSISDN/IMSI can not be concealed to the LCS Client. the pseudonym functionality can not be fulfilled completely.

When the LCS Client supports more than one MO-LR services, without a service identity, the LCS Client does not know how to handle the obtained location estimate of the UE.

Clauses affected: ⌘ 9.2.1, 9.2.2

Other specs ⌘

Y	N
X	

 Other core specifications ⌘ TS 32.271, 32.250, 32.251, 24.080,

Affected:

X	
X	

Test specifications
O&M Specifications

24.030, 29.002

Other comments: ☞ This modification may affect the RLP.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

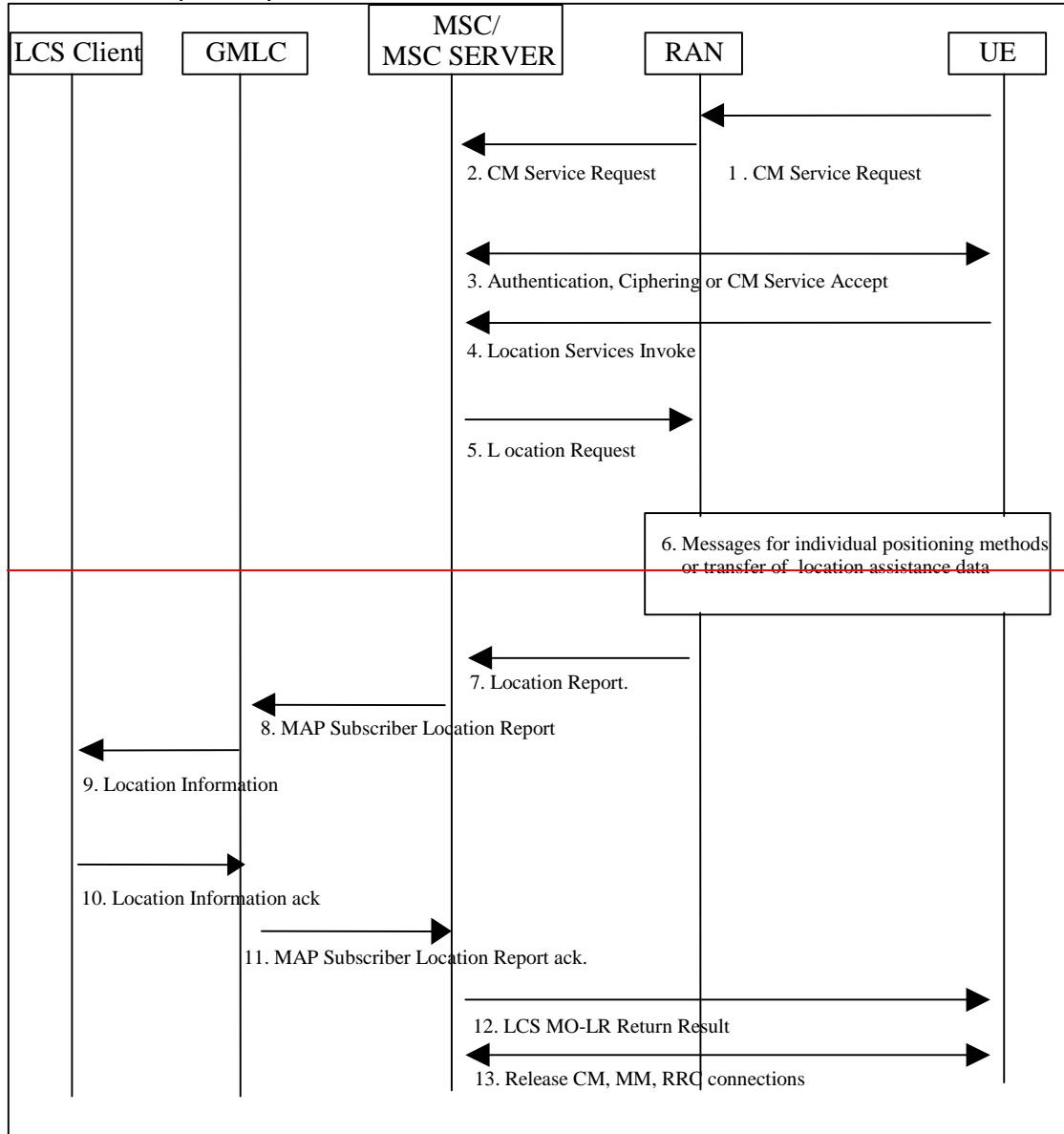
- 1) Fill out the above form. The symbols above marked ☞ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

<< First changed clause >>

9.2 Mobile Originating Location Request

9.2.1 Mobile Originating Location Request, Circuit Switched (CS-MO-LR)

The following procedure shown in figure 9.7 allows an UE to request either its own location, location assistance data or broadcast assistance data message ciphering keys from the network. Location assistance data may be used subsequently by the UE to compute its own location throughout an extended interval using a mobile based position method. The ciphering key enables the UE to decipher other location assistance data broadcast periodically by the network. The MO-LR after location update request may be used to request ciphering keys or GPS assistance data using the follow-on procedure described in TS 24.008 [24]. The procedure may also be used to enable an UE to request that its own location be sent to an external LCS client.



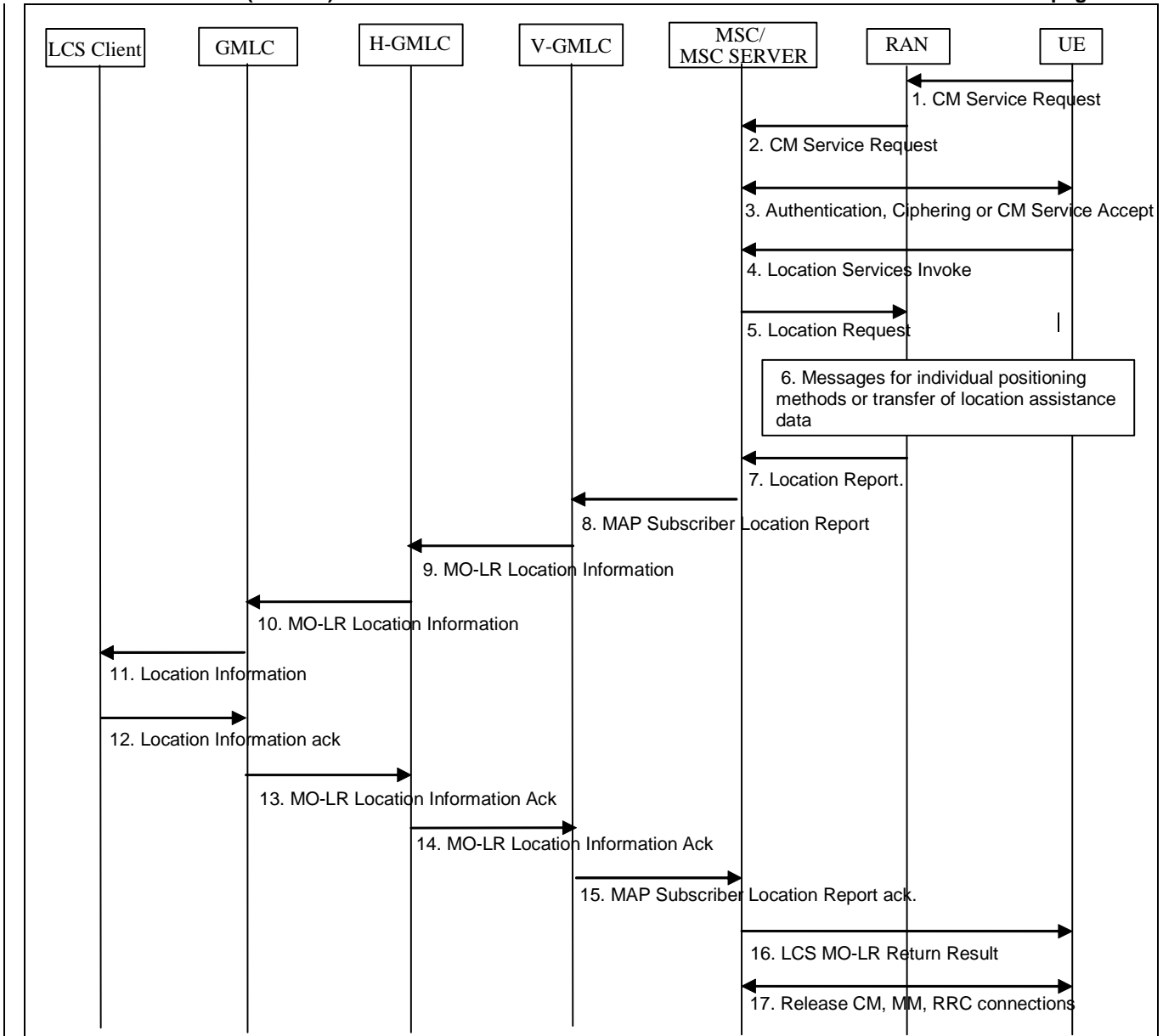


Figure 9.7: General Network Positioning for CS-MO-LR

9.2.1.1 Location Preparation Procedure

- 1) If the UE is in idle mode, the UE requests a radio connection setup and sends a CM service request indicating a request for a call independent supplementary services to the VMSC/MSC server via RAN.
- 2) RAN shall convey the CM service request to the core network. If the UE is in dedicated mode, the UE sends a CM Service Request on the already established radio connection.
- 3) The VMSC/MSC server instigates authentication and ciphering if the UE was in idle mode or returns a Direct Transfer CM Service Accept if the UE was in dedicated mode. The UE will inform the network about its LCS capabilities, as described in chapter 6.3.4.

- 4) The UE sends a LCS CS-MO-LR Location Services invoke to the VMSC/MSC server. Different types of location services can be requested: location of the UE, location of the UE to be sent to an external LCS client, location assistance data or broadcast assistance data message ciphering keys. If the UE is requesting its own location or that its own location be sent to an external LCS client, this message carries LCS requested QoS information (e.g. accuracy, response time, LCS QoS Class), the requested maximum age of location and the requested type of location (e.g. "current location", "current or last known location"). If the UE is requesting that its location be sent to an external LCS client, the message shall include the identity of the LCS client and may include the address of the GMLC through which the LCS client should be accessed. In addition, a Service Identity indicates which MO-LR service of the LCS Client is requested by the UE may be included. The message also may include a pseudonym indicator to indicate a pseudonym should be assigned by the network and transferred to the LCS Client as the UE's identity. If a GMLC address is not included, the VMSC/MSC server may assign a GMLC address stored in the VMSC/MSC server. If a GMLC address is not available for this case, the VMSC/MSC server shall reject the location request. If the UE is instead requesting location assistance data or ciphering keys, the message specifies the type of assistance data or deciphering keys and the positioning method for which the assistance data or ciphering applies. For an LCS CS-MO-LR Location Services invoke, the VMSC/MSC server shall assign a GMLC address, i.e. V-GMLC address, which is stored in the VMSC/MSC server. If a V-GMLC address is not available, the VMSC/MSC server may reject the location request. The VMSC/MSC server verifies in the UE's subscription profile that the UE has permission to request its own location, request that its location be sent to an external LCS client or request location assistance data or deciphering keys (whichever applies). If the UE is requesting positioning and has an established call, the VMSC/MSC server may reject the request for certain non-speech call types.
- 5) In case the requested type of location is "current or last known location" and the requested maximum age of location information is sent from UE, the VMSC/MSC server verifies whether it stores the previously obtained location estimate of the target UE. If the VMSC/MSC server stores the location estimate and the location estimate satisfies the requested maximum age of location, this step and steps 6 and 7 may be skipped. Otherwise the VMSC/MSC server sends a Location Request message to RAN associated with the Target UE. The message indicates whether a location estimate or location assistance data is requested and, in GSM, includes the UE's location capabilities. If the UE's location is requested, the message also includes the requested QoS. If location assistance data is requested, the message carries the requested types of location assistance data.

9.2.1.2 Positioning Measurement Establishment Procedure

- 6) If the UE is requesting its own location, 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]. If the UE is instead requesting location assistance data, RAN transfers this data to the UE as described in subsequent clauses in TS 25.305 [1] and TS 43.059 [16] UE.

9.2.1.3 Location Calculation and Release Procedure

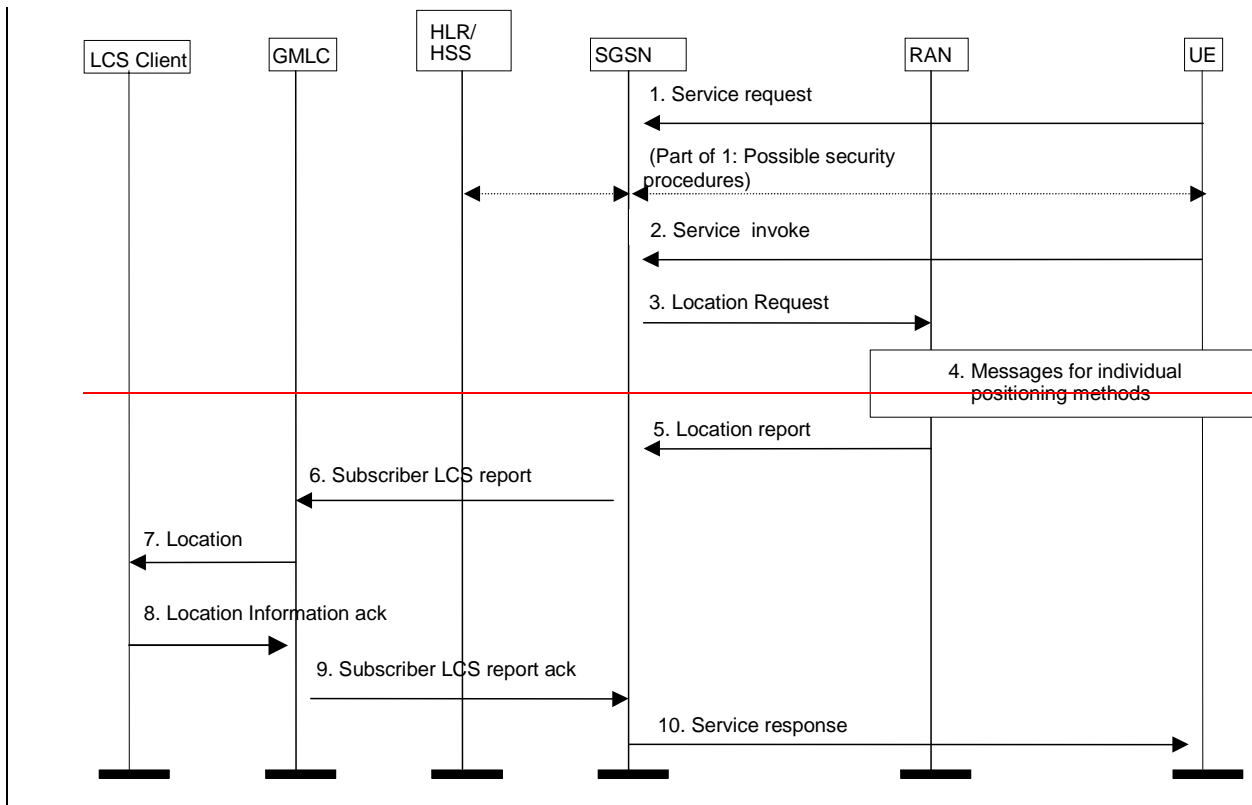
- 7) When a location estimate best satisfying the requested QoS has been obtained or when the requested location assistance data has been transferred to the UE, RAN returns a Location Report to the VMSC/MSC server with an indication whether the obtained location estimate satisfies the requested accuracy or not. This message carries the location estimate or ciphering keys if this was obtained. If a location estimate or deciphering keys were not successfully obtained or if the requested location assistance data could not be transferred successfully to the UE, a failure cause is included in the Location Report.
- 8) If the ~~UE requested transfer of its location to an external LCS client and a~~ location estimate was successfully obtained, the VMSC/MSC server shall send a MAP Subscriber Location Report to the V-GMLC assigned in the step 4, obtained in step 4 carrying the MSISDN/IMSI of the UE, ~~the identity of the LCS client,~~ the event causing the location estimate (CS-MO-LR) and the location estimate, its age, obtained accuracy indication and the LCS QoS Class requested by the target UE. In addition, the MAP Subscriber Location Report may include the pseudonym indicator, the identity of the LCS Client, the GMLC address and the Service Identity specified by the UE, if available. Otherwise, this step and steps 9-11 are skipped.
- 9) Upon receipt of the MAP Subscriber Location Report, the V-GMLC shall determine whether the UE requests transfer of its location to an external LCS Client. If the identity of the LCS Client is not available, this step and steps 10 to 14 are skipped. Otherwise, the V-GMLC shall send the MO-LR Location Information to the H-GMLC (the V-GMLC may query the HLR/HSS of the UE to obtain the address of the H-GMLC), carrying the MSISDN/IMSI of the UE, the event causing the location estimate (CS-MO-LR), the location estimate and its age and the identity of the LCS Client. The pseudonym indicator and/or the GMLC address specified by the UE may also be included if available.

- 10) If the pseudonym indicator is included in the MO-LR Location Information, the H-GMLC assigns or asks the PMD to assign a pseudonym to the UE. If the identity of the LCS Client and the GMLC address access to the LCS Client are available, the H-GMLC shall send the MO-LR Location Information to the specified GMLC. If the identity of the LCS Client is available but the GMLC address access to the LCS Client is not available, the H-GMLC determines whether the specified LCS Client is accessible. If yes, the H-GMLC shall send the Location Information to the LCS Client, then the H-GMLC itself act as the specified GMLC, this step and step 13 are skipped. If not, according to the LCS Client identity, the H-GMLC shall determine a GMLC that can access the LCS Client, and send the MO-LR Location Information to the GMLC, carrying the MSISDN or the pseudonym of the UE, the identity of the LCS client, the event causing the location estimate (CS-MO-LR), location estimate and its age.
- ~~9~~11) If the identified LCS Client is not accessible, this step and step ~~10~~-12 are skipped. Otherwise the GMLC transfers the location information to the LCS client, carrying the MSISDN/IMSI or the pseudonym of the UE, the event causing the location estimate (CS-MO-LR), the Service Identity, if it available, and the location estimate and its age, in accordance with the LCS QoS Class requested by the target UE. If the UE requested LCS QoS class was Assured, GMLC sends the result to the LCS client only if the result has been indicated to fulfil the requested accuracy. If the UE requested LCS QoS class was Best Effort, GMLC sends whatever result it received to the LCS client with an appropriate indication if the requested accuracy was not met.
- ~~10~~12) If the LCS Client ~~doesn't~~does not support MO-LR (for temporary or permanent reasons) or ~~can't~~can not handle the location estimate of the UE, e.g. the LCS Client does not know the Service Identity, or the UE does not register to the LCS Client, the LCS Client doesn't have the no corresponding data of the UE, the LCS Client shall return the Location Information ack message to the GMLC or the H-GMLC (in case the LCS Client received Location Information is sent from H-GMLC) with a suitable error cause. Otherwise, the LCS Client handles the location estimate according to the Service Identity, sends the GMLC or the H-GMLC the Location Information ack message signalling that the location estimate of the UE has been handled successfully.
- ~~11~~13) If the identified LCS Client is not accessible, the GMLC sends MO-LR Location Information Acknowledgement ~~MAP Subscriber Location Report ack~~ to the H-GMLC MSC/MSC server with an appropriate error cause. Otherwise, the GMLC shall send MO-LR Location Information Acknowledgement ~~MAP Subscriber Location Report ack~~ to the H-GMLC MSC/MSC SERVER. The message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step ~~10~~12. The GMLC may record charging information both for the LCS Client and inter-operator revenue charges.
- 14) In case the H-GMLC receives the MO-LR Location Information Acknowledgement from the GMLC, it shall forward the MO-LR Location Information Acknowledgement from the GMLC to the V-GMLC, and record charging information both for the UE and inter-working revenue charges.
- In case the H-GMLC receives the Location Information Acknowledgement from the LCS Client, it shall send MO-LR Location Information Acknowledgement to the V-GMLC. The message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step 12. The H-GMLC shall record charging information both for the UE and inter-working revenue charges.
- 15) In case the V-GMLC receives the MO-LR Location Information Acknowledgement from the H-GMLC, the V-GMLC shall record charging information both for the UE and inter-working revenue charges and send the MAP Subscriber Location Report Acknowledgement to the VMSC/MSC server, carrying the information specifies whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not success, the corresponding error cause obtained in step 14.
- In case the V-GMLC receives the MAP Subscriber Location Report from the VMSC/MSC server and it is not required to send to any LCS Client, the V-GMLC shall record charging information for the UE and response the MAP Subscriber Location Report Acknowledgement to the VMSC/MSC server.
- ~~12~~16) The VMSC/MSC server returns a CS-MO-LR Return Result to the UE carrying any location estimate requested by the UE including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, ciphering keys or an indicator whether a location estimate was successfully transferred to the identified LCS client. If the location estimate was successfully transferred to the identified LCS Client, the CS-MO-LR Return Result message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step ~~11~~15.
- ~~13~~17) The VMSC/MSC server may release the CM, MM and radio connections to the UE, if the UE was previously idle, and the VMSC/MSC server may record charging information.

<< Second changed clause >>

9.2.2 Mobile Originating Location Request, Packet Switched (PS-MO-LR)

The following procedure shown in figure 9.8 allows an UE to request either its own location; location assistance data or broadcast assistance data message ciphering keys from the network. Location assistance data may be used subsequently by the UE to compute its own location throughout an extended interval using a mobile based position method. A ciphering key enables the UE to decipher other location assistance data broadcast periodically by the network. The PS-MO-LR may be used to request ciphering keys or GPS assistance data. The procedure may also be used to enable an UE to request that its own location be sent to an external LCS client.



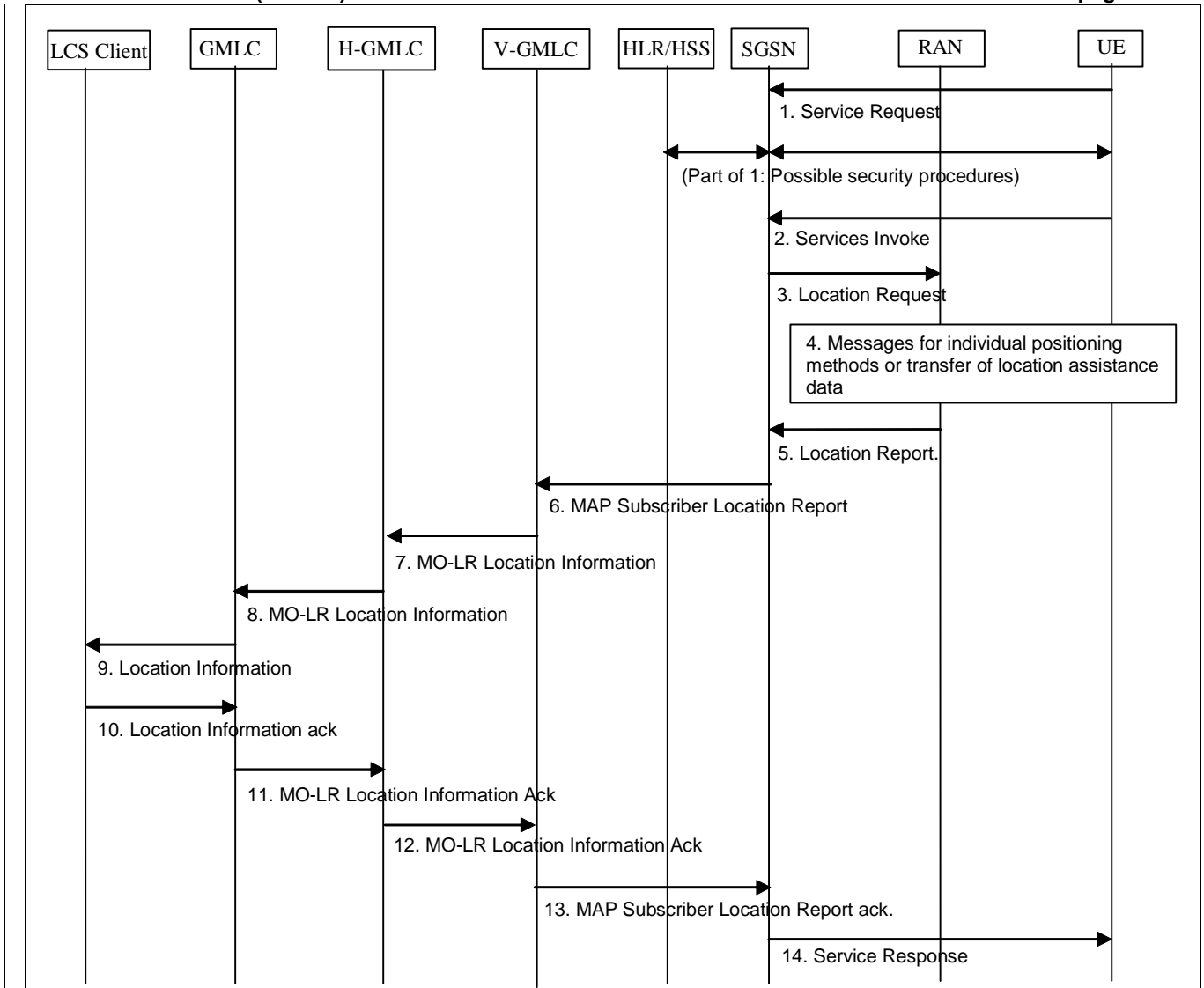


Figure 9.8: General Network Positioning for packet switched MO-LR

9.2.2.1 Location Preparation Procedure

- 1) In UMTS, if the UE is in idle mode, the UE requests a PS signaling connection and sends a Service request indicating signaling to the SGSN via the RAN. If the UE already has PS signaling connection, the UE does not need to send Service request. Security functions may be executed. These procedures are described in TS 23.060 [15]. In GSM this signaling step is not needed.
- 2) The UE sends a LCS PS-MO-LR Location Services invoke message to the SGSN. Different types of location services can be requested: location of the UE, location of the UE to be sent to an external LCS client, location assistance data or broadcast assistance data message ciphering keys. If the UE is requesting its own location or that its own location be sent to an external LCS client, this message carries LCS requested QoS information (e.g. accuracy, response time, LCS QoS Class), the requested maximum age of location and the requested type of location (e.g. "current location", "current or last known location"). If the UE is requesting that its location be sent to an external LCS client, the message shall include the identity of the LCS client and may include the address of the GMLC through which the LCS client should be accessed. [In addition, a Service Identity indicates which MO-LR service of the LCS Client is requested by the UE may be included. The message also may include a pseudonym indicator to indicate a pseudonym should be assigned by the network and transferred to the LCS Client as the UE's identity. If a GMLC address is not included, the SGSN may assign a GMLC address stored in the SGSN. If a GMLC address is not available for this case, the SGSN shall reject the location request.](#) If the UE is instead requesting location assistance data or ciphering keys, the message specifies the type of assistance data or deciphering keys and the positioning method for which the assistance data or ciphering applies. [For an LCS PS-MO-LR Location Services invoke, the SGSN shall assign a GMLC address, i.e. V-GMLC address, which is stored in the SGSN. If a V-GMLC address is not available, the SGSN may reject the location request.](#) The SGSN verifies the subscription profile of the UE and decides if the requested service is allowed or not.

- 3) In case the requested type of location is “current or last known location” and the requested maximum age of location information is sent from UE, the SGSN verifies whether it stores the previously obtained location estimate of the target UE. If the SGSN stores the location estimate and the location estimate satisfies the requested maximum age of location, this step and steps 4 and 5 may be skipped. Otherwise the SGSN sends a Location Request message to the RAN associated with the Target UE's location. The message indicates whether a location estimate or location assistance data is requested. If the UE's location is requested, the message also includes the requested QoS. If location assistance data is requested, the message carries the requested types of location assistance data. The message carries also location parameters received in the Service Invoke message.

9.2.2.2 Positioning Measurement Establishment Procedure

- 4) If the UE is requesting its own location, the actions described in UTRAN Stage 2, TS 25.305 [1] or GERAN stage 2 TS 43.059 [16] are performed. If the UE is instead requesting location assistance data, the RAN transfers this data to the UE as described in subsequent clauses. The RAN determines the exact location assistance data to transfer according to the type of data specified by the UE, the UE location capabilities and the current cell.

9.2.2.3 Location Calculation and Release Procedure

- 5) When a location estimate best satisfying the requested QoS has been obtained or when the requested location assistance data has been transferred to the UE, the RAN returns a Location Report to the SGSN with an indication whether the obtained location estimate satisfies the requested accuracy or not. This message carries the location estimate or ciphering keys if this was obtained. If a location estimate or deciphering keys were not successfully obtained or if the requested location assistance data could not be transferred successfully to the UE, a failure cause is included in the Location Report.
- 6) If the ~~UE requested transfer of its location to an external LCS client and a~~ location estimate was successfully obtained, the SGSN shall send a MAP Subscriber Location Report to the V-GMLC assigned in the step 2, obtained in step 2 carrying the MSISDN/IMSI of the UE, ~~the identity of the LCS client,~~ the event causing the location estimate (PS-MO-LR-PS) and the location estimate, its age, obtained accuracy indication and the LCS QoS Class requested by the target UE. In addition, the MAP Subscriber Location Report may include the pseudonym indicator, the identity of the LCS Client, the GMLC address and the Service Identity specified by the UE, if available. Otherwise, this step and steps 7-9 are skipped.
- 7) Upon receipt of the MAP Subscriber Location Report, the V-GMLC shall determine whether the UE requests transfer of its location to an external LCS Client. If the identity of the LCS Client is not available, this step and steps 8 to 12 are skipped. Otherwise, the V-GMLC shall send the MO-LR Location Information to the H-GMLC (the V-GMLC may query the HLR/HSS of the UE to obtain the address of the H-GMLC), carrying the MSISDN/IMSI of the UE, the event causing the location estimate (PS-MO-LR), the location estimate and its age, and the identity of the LCS Client. The pseudonym indicator and/or the GMLC address specified by the UE may also be included if available.
- 8) If the pseudonym indicator is included in the MO-LR Location Information, the H-GMLC assigns or asks the PMD to assign a pseudonym to the UE. If the identity of the LCS Client and the GMLC address access to the LCS Client are available, the H-GMLC shall send the MO-LR Location Information to the specified GMLC. If the identity of the LCS Client is available but the GMLC address access to the LCS Client is not available, the H-GMLC determines whether the specified LCS Client is accessible. If yes, the H-GMLC shall send the Location Information to the LCS Client, then the H-GMLC itself act as the specified GMLC, this step and step 11 are skipped. If not, according to the LCS Client identity, the H-GMLC shall determine a GMLC that can access the LCS Client, and send the MO-LR Location Information to the GMLC, carrying the MSISDN or the pseudonym of the UE, the identity of the LCS client, the event causing the location estimate (PS-MO-LR), location estimate and its age.
- 79) If the identified LCS Client is not accessible, this step and step ~~8-10~~ are skipped. Otherwise the GMLC transfers the location information to the LCS client, carrying the MSISDN/IMSI or the pseudonym of the UE, the event causing the location estimate (PS-MO-LR), the Service Identity, if it available, and the location estimate and its age, in accordance with the LCS QoS Class requested by the target UE. If the UE requested LCS QoS class was Assured, GMLC sends the result to the LCS client only if the result has been indicated to fulfil the requested accuracy. If the UE requested LCS QoS class was Best Effort, GMLC sends whatever result it received to the LCS client with an appropriate indication if the requested accuracy was not met.
- 810) If the LCS Client ~~doesn't~~ does not support MO-LR (for temporary or permanent reasons) or ~~can't~~ can not handle the location estimate of the UE, e.g. the LCS Client does not know the Service Identity, or the UE does not register to the LCS Client, the LCS Client ~~doesn't~~ does not have ~~the-no~~ corresponding data of the UE, the LCS Client shall return the Location Information ack message to the GMLC or the H-GMLC (in case the LCS Client

received Location Information is sent from H-GMLC with a suitable error cause. Otherwise, the LCS Client handles the location estimate according to the Service Identity, sends the GMLC or the H-GMLC the Location Information ack message signalling that the location estimate of the UE has been handled successfully.

911) If the identified LCS Client is not accessible, the GMLC sends MO-LR Location Information Acknowledgement ~~MAP Subscriber Location Report ack~~ to the H-GMLC ~~SGSN~~ with an appropriate error cause. Otherwise, the GMLC shall send MO-LR Location Information Acknowledgement ~~MAP Subscriber Location Report ack~~ to the H-GMLC ~~SGSN~~. The message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step 810. The GMLC may record charging information both for the LCS Client and inter-operator revenue charges.

12) In case the H-GMLC receives the MO-LR Location Information Acknowledgement from the GMLC, it shall forward the MO-LR Location Information Acknowledgement from the GMLC to the V-GMLC, and record charging information both for the UE and inter-working revenue charges.

In case the H-GMLC receives the Location Information Acknowledgement from the LCS Client, it shall send MO-LR Location Information Acknowledgement to the V-GMLC. The message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step 10. The H-GMLC shall record charging information both for the UE and inter-working revenue charges.

13) In case the V-GMLC receives the MO-LR Location Information Acknowledgement from the H-GMLC, the V-GMLC shall record charging information both for the UE and inter-working revenue charges and send the MAP Subscriber Location Report Acknowledgement to the SGSN, carrying the information specifies whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not success, the corresponding error cause obtained in step 12.

In case the V-GMLC receives the MAP Subscriber Location Report from the SGSN and it is not required to send to any LCS Client, the V-GMLC shall record charging information for the UE and response the MAP Subscriber Location Report Acknowledgement to the SGSN.

14) The SGSN returns a Service Response message to the UE carrying any location estimate requested by the UE including the indication received from RAN whether the obtained location estimate satisfies the requested accuracy or not, ciphering keys or an indicator whether a location estimate was successfully transferred to the identified LCS client. If the location estimate was successfully transferred to the identified LCS Client, the Service Response ~~CS-MO-LR Return Result~~ message shall specify whether the location estimate of the UE has been handled successfully by the identified LCS Client, and if not, the corresponding error cause obtained in step 913. The SGSN may record charging information.

<< End of changed clause >>

CR-Form-v7

CHANGE REQUEST

№ **23.271 CR** **273** № rev **1** № Current version: **6.7.0** №

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:	№ E112 emergency call support		
Source:	№ SA2 (Lucent Technologies)		
Work item code:	№ LCS2	Date:	№ 11 May 2004
Category:	№ F	Release:	№ Rel-6
	<i>Use one of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	№ E112 legislation mandates providing authorities with the location of the caller. This CR provides the changes necessary to support that requirement.
Summary of change:	№ The primary change is to remove language limiting emergency calls to North American specific requirements. An additional change provides for a simplified procedure in case the caller has a GPS-capable handset.
Consequences if not approved:	№ There will not be a specification for how emergency call location is handled in the EU.

Clauses affected:	№ 9.1.1A, 9.1.3, 9.1.5										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications Test specifications O&M Specifications	№
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Other comments:	№										

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- 1) Fill out the above form. The symbols above marked № contain pop-up help information about the field that they are closest to.
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- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** First Changed Section ***

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

The network induced location request as described in chapter 9.1.5 may be used in some cases to determine the location of the UE used for an emergency call. This chapter describes the case when the emergency centre initiates an 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. It is also appropriate to use this method to provide location for lawful intercept services where allowed by national regulation.

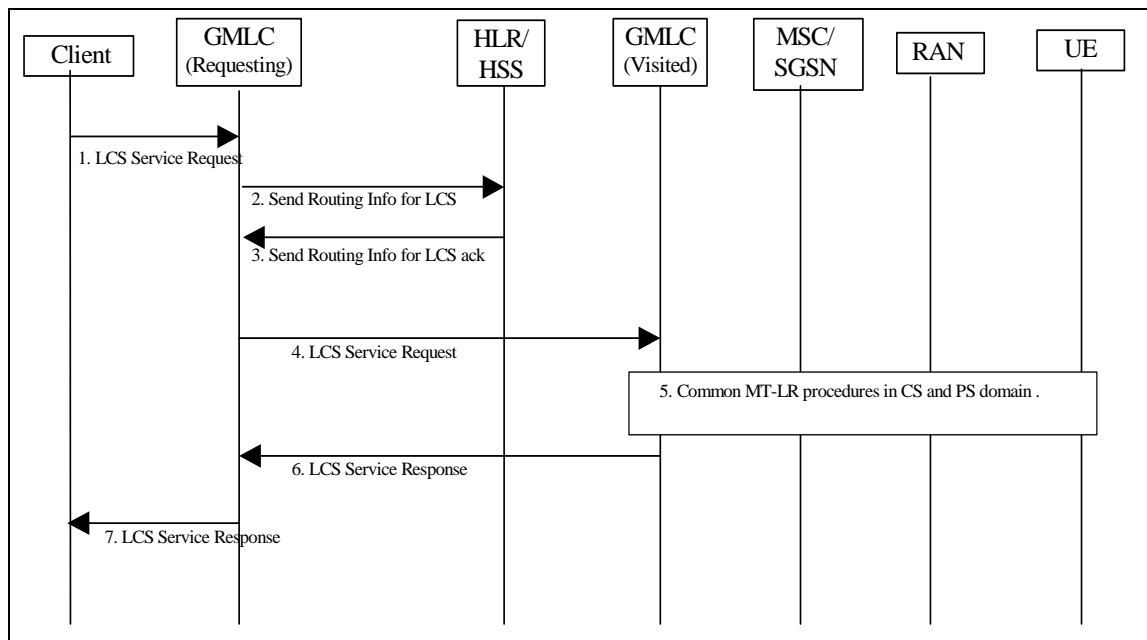


Figure 9.1A: Network Positioning for an Emergency MT-LR

- 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, if available.

Note: HLR/HSS may prioritize 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, an error response is returned.

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.

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 Changed Section ***

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

Figure 9.3 illustrates current or last known location requests for an [North American eEmergency sServices](#) call, where an emergency services client (i.e., a Public Safety Answering Point) identifies the target UE and the serving GMLC using [correlation information either an NA-ESRK, or an MSISDN and NA-ESRD](#) 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, and presumes 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 \[326\]](#).

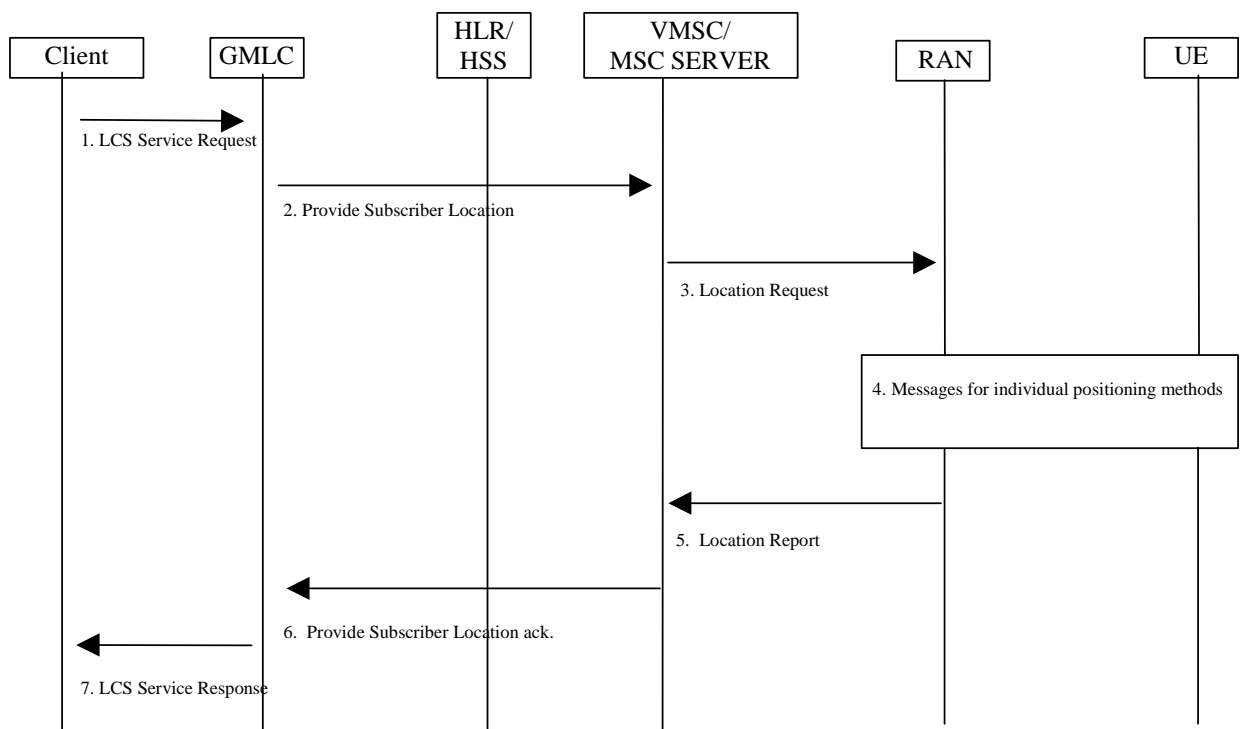


Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query

- 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 ~~either NA-ESRK or both of MSISDN and NA-ESRD~~ [previously supplied correlation information for the emergency call](#).
- 2) ~~If~~ the GMLC ~~already has stored information for the target UE (e.g. from a prior location estimate delivery to the LCS client)~~, the GMLC may determine the VMSC from [correlation this information received from the PSAP, or from stored information for the target UE \(e.g. from a prior location estimate delivery from the VMSC/MSC server\)](#). ~~Otherwise, 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 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 changed section ***

9.1.5 Network Induced Location Request (NI-LR)

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

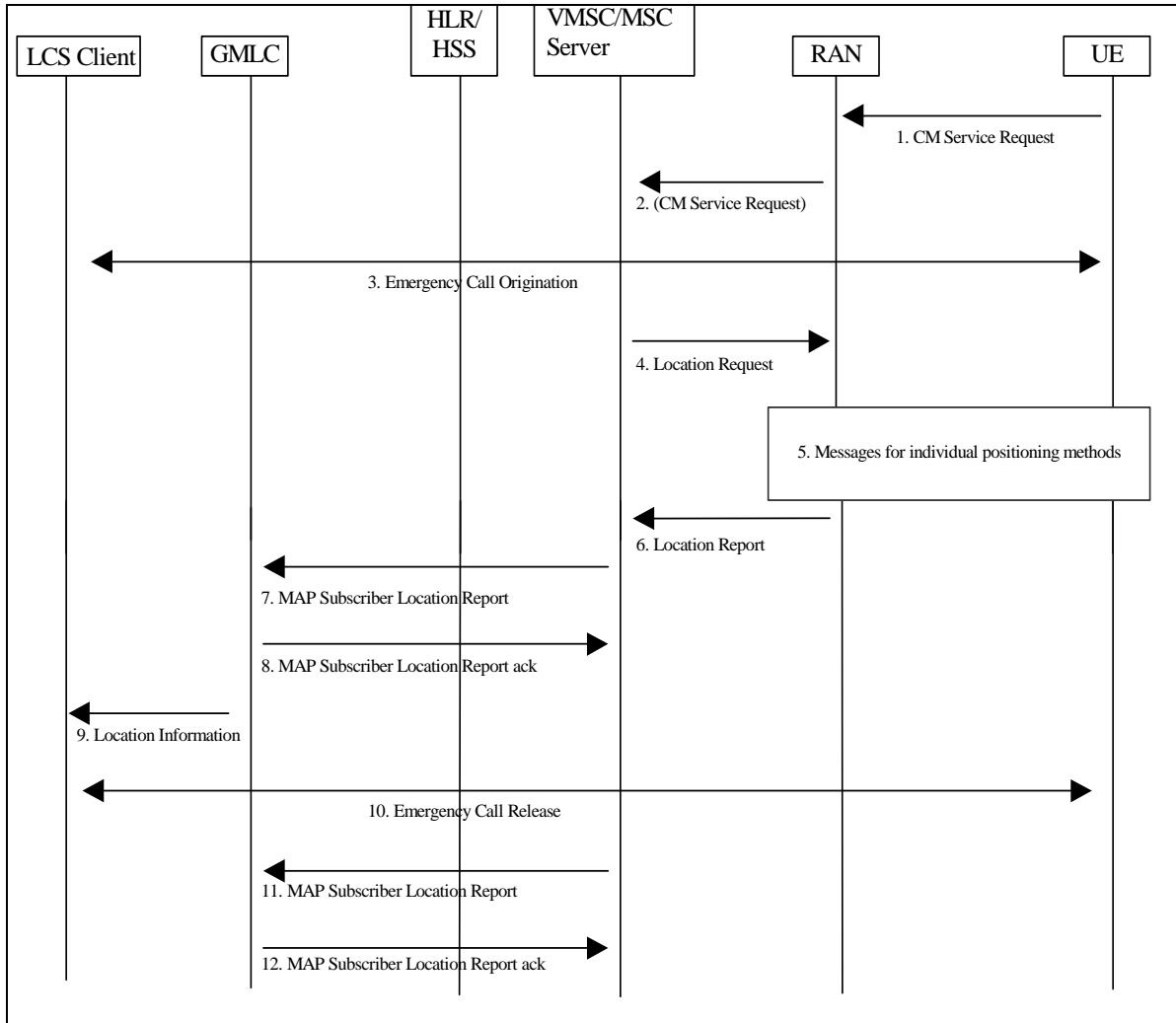


Figure 9.4: Positioning for a NI-LR Emergency Service Call

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.](#) 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, the age of this estimate and may carry the MSISDN, IMSI and IMEI of the calling UE, and the information about the positioning method used. In case a SIM-less UE is used to make the emergency call, 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.
- 8) The GMLC acknowledges receipt of the location information. ~~For a North American Emergency Services call, †~~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. ~~For a North American emergency services call †~~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) ~~For a North American Emergency Services call, †~~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 ~~release-delete~~ all information previously stored for the emergency call [per national regulation](#).

Sophia Antipolis, France, 17th-21st May 2004

CR-Form-v7

CHANGE REQUEST№ **23.271 CR 274** № rev **1** № Current version: **5.10.0** №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:	№ Clarifications regarding the non-dialable callback number in general and the NI-LR using Location Based Routing procedure, in Rel-5.
Source:	№ SA2 (Ericsson)
Work item code:	№ LCS1
Date:	№ 19/5/2004
Category:	№ F
	Use <u>one</u> of the following categories:
	F (correction)
	A (corresponds to a correction in an earlier release)
	B (addition of feature),
	C (functional modification of feature)
	D (editorial modification)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .
Release:	№ Rel-5
	Use <u>one</u> of the following releases:
	2 (GSM Phase 2)
	R96 (Release 1996)
	R97 (Release 1997)
	R98 (Release 1998)
	R99 (Release 1999)
	Rel-4 (Release 4)
	Rel-5 (Release 5)
	Rel-6 (Release 6)

Reason for change:	№ TS 23.271 is incomplete when describing the non-dialable callback number that is used for making SIM-less emergency calls. A sub clause is needed in order to make the non-dialable callback number applicable for other than North American emergency calls, as well. Moreover, in Network Induced Location Request, in case of a SIM-less 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. However, in the case of NI-LR using Location Based Routing this information is missing. The information of positioning method used is also missing from the Subscriber Location Report that MSC sends to GMLC.
Summary of change:	№ A new sub clause is added to clarify the "non dialable callback numbers, as in Rel-6. Clause 9.1.5A is also modified, in order to state that in case a SIM-less UE is used to make the emergency call, the MSISDN may be populated with a non-dialable callback number in MAP Subscriber Location Report message. It is also modified in order to include the information of positioning method used in the Subscriber Location Report message that is sent to GMLC.
Consequences if not approved:	№ There will be problems in locating the UE, in case that the subscriber is using SIM-less UE for making emergency calls.

Clauses affected: № 6.4.1, 9.1.3, 9.1.5.3, 9.1.5A.3, [9.1.5A.4](#), 9.1.5A.6

Other specs affected:	⌘	<table border="1"><tr><td>Y</td><td>N</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr></table>	Y	N		X		X		X	Other core specifications	⌘	
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	X												
		Test specifications											
		O&M Specifications											
Other comments:	⌘												

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

<< New Clause >>

6.4 Addressing the target UE for LCS purposes

6.4.1 Verinym for the target UE

It shall be possible to address and indicate the target UE using MSISDN. It may be possible in certain cases to address the target UE using IP address when a static or dynamic IP address (IPv4 or IPv6) has been allocated for the UE.

In the mobile terminated location request procedures in the PS domain (as well as in the CS domain), the target UE is always identified using MSISDN.

NOTE: It is recognized that IP-addressing of the target UE is only possible when there is an active PDP context established between the target UE and the external LCS client. Using the established PDP context, the LCS client can request the target UE, as identified with the IP address it currently uses, to initiate a Mobile originated location request. The actual signaling exchange between the LCS Client/server and the target UE or the user of the target UE is outside the scope of this specification. The resulting MO-LR is performed as specified in this document.

6.4.2 VOID

6.4.3 Non-dialable callback numbers

In case of a SIM-less emergency call, a non-dialable callback number may 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 be, according to J-STD-036 [32], ~~be~~ the digits 911 + the last 7 digits of IMEI expressed in decimal numbers.

~~Editor's note: The use of non-dialable callback numbers in other parts of the world is for further study.~~

<< First Modified Clause >>

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

Figure 9.3 illustrates current or last known location requests for a North American Emergency Services call, where an emergency services client (i.e., a Public Safety Answering Point) identifies the target UE and the serving GMLC using either an NA-ESRK, or an MSISDN and NA-ESRD that were previously provided to it by the VMSC. This allows the GMLC to request location from the VMSC without first querying the home HLR of the target UE. This scenario presumes that the initial location, as well as UE and VMSC identifying information had been pushed to the GMLC as per [32].

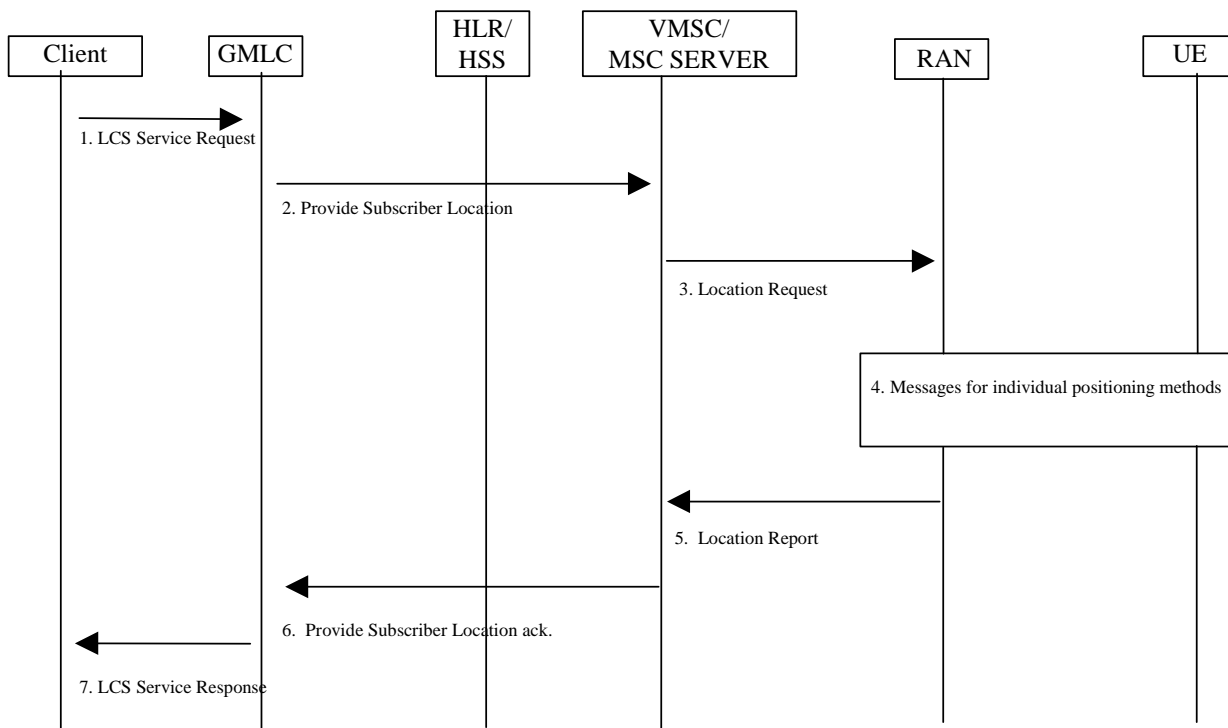


Figure 9.3: Positioning for a Emergency Services MT-LR without HLR Query

- 1) Same as step 1 in figure 9.1 but with the LCS client identifying first the target UE and the serving GMLC by an - NA-ESRK or MSISDN and NA-ESRD.
- 2) If the GMLC already has stored information for the target UE (e.g. from a prior location estimate delivery to the LCS client), the GMLC may determine the VMSC from this information. Otherwise, the GMLC determines the VMSC using the NA-ESRK or NA-ESRD - with use of the NA-ESRK taking priority over that of the NA-ESRD. The MAP_PROVIDE_SUBSCRIBER_LOCATION message sent to the VMSC carries the 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 the case of a SIM-less UE making the emergency call, the MSISDN will have been populated with a non-dialable callback number-, as specified in clause 6.4.3 consisting of the digits: 911, and the last seven digits of the IMEI provided in the emergency call.
- 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 positioning for an emergency service call.

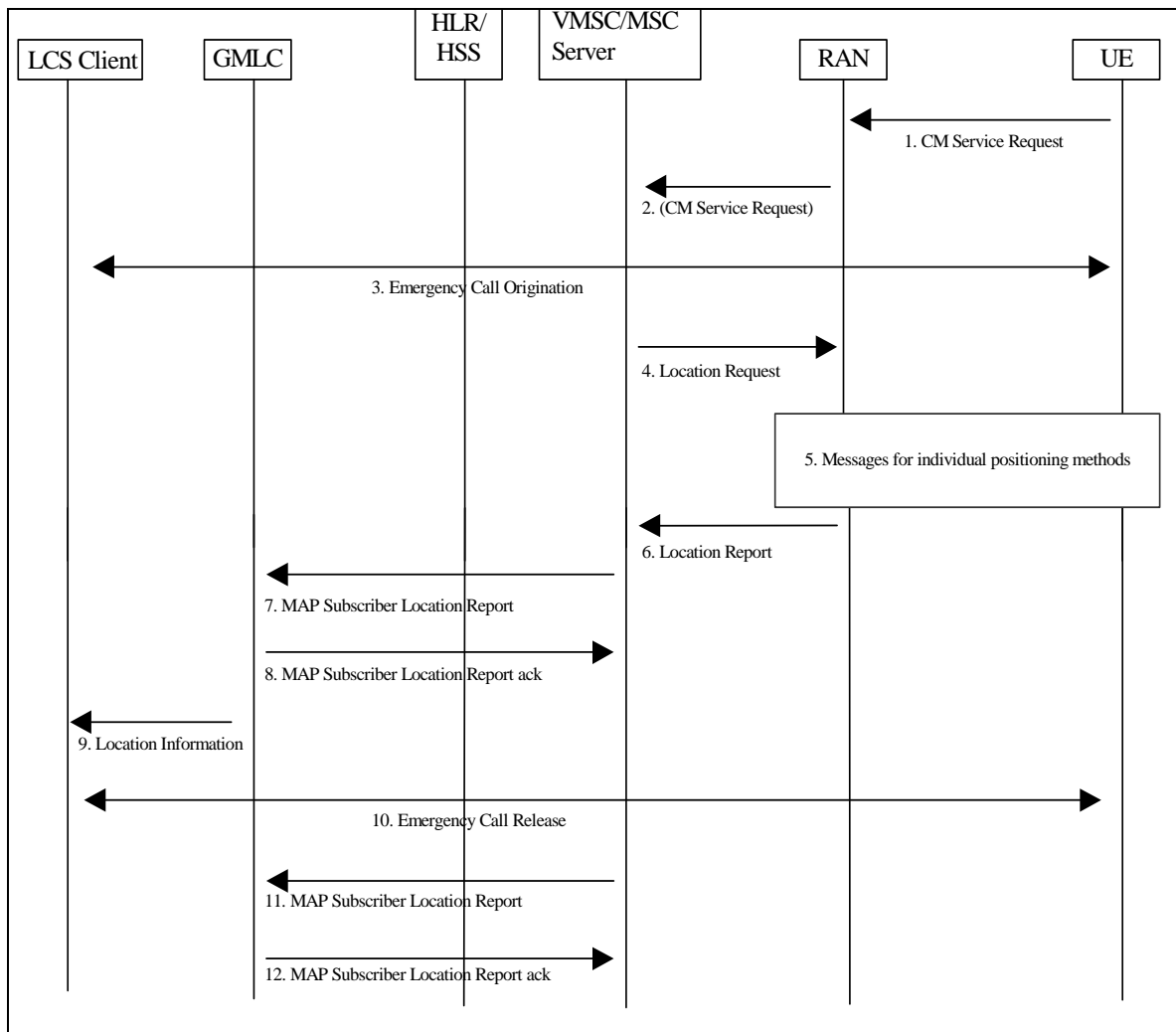


Figure 9.4: Positioning for a NI-LR Emergency Service Call

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 either 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. 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, the age of this estimate and may carry the MSISDN, IMSI and IMEI of the calling UE, and the information about the positioning method used. In the case of a SIM-less UE making the emergency call, the MSISDN shall may be populated with a non-dialable callback number depending on national or regional regulations, 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.
- 8) The GMLC acknowledges receipt of the location information. For a North American Emergency Services call, 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. For a North American emergency services call 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) For a North American Emergency Services call, 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 release all information previously stored for the emergency call.

Editorial Note: The procedure for Network Induced Location Request (NI-LR and PS-NI-LR) for a Target UE in dedicated mode should be defined in UTRAN system stage 2 [1] and GERAN Stage 2 specifications [16].

<< 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.

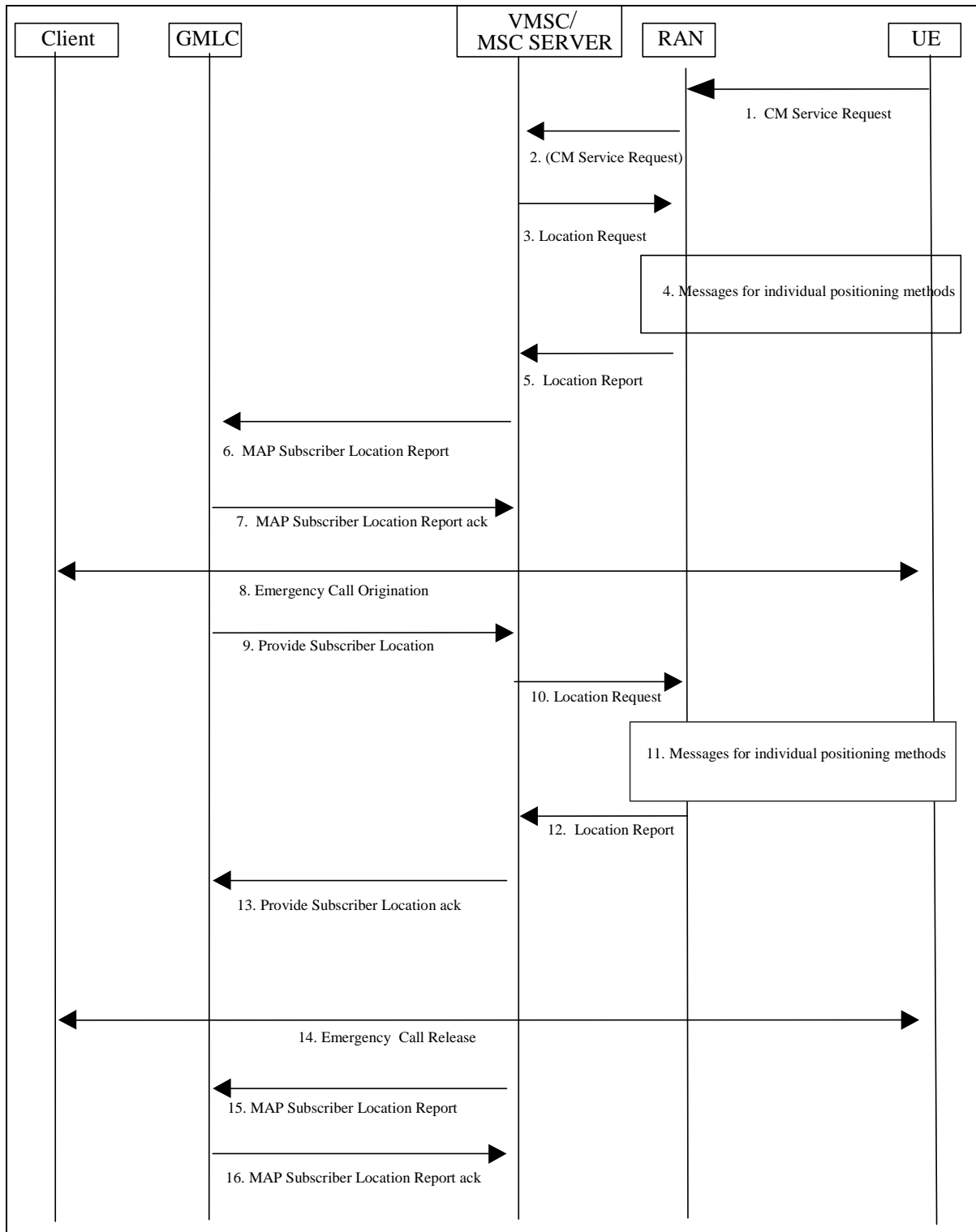


Figure 9.4A: Positioning for a NI-LR Emergency Service Call using Location Based Routing

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 client 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 and IMEI of the calling UE [and the information about the positioning method used. In the case of a SIM-less UE making the emergency call, the MSISDN may 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 a request for an NA-ESRK value based on the UE position.
- 7) The GMLC translates the location estimate into a zone identity and assigns a NA-ESRK, which was requested by the VMSC/MSC server. The GMLC shall include the NA-ESRK value in the MAP Subscriber Location Report ack and send it to the VMSC/MSC server. The GMLC stores 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 used shall be the one received from the GMLC. If a NA-ESRK is not received from the GMLC then the VMSC/MSC server shall use the default NA-ESRK for the call as in 9.1.5.1 step 3.
- 9) 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 the case of a SIM-less UE making the emergency call, the MSISDN may be populated with a non-dialable callback number, as specified in clause 6.4.3.](#)

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.

- 10) 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

11) same as step 4.

9.1.5A.6 Location Calculation and Release Procedure

12) same as step 5.

13) The VMSC/MSR server returns the location information and its age [and the information about the positioning method used](#) 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.

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

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

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