Technical Specification Group Services and System Aspects   *TSGS#25(04)0528*
Meeting #25, Palm Springs, USA

Source: **TSG SA WG2**
Title: **CRs on 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 #25.

S2 doc #	Title	Spec	CR #	cat	Version in	Rel	WI	S2 meeting	Clauses affected
S2-042825	Corrections to NI-LR using Location Based Routing procedure	23.271	275r2	F	4.11.0	4	LCS	S2 #41	9.1.5A
S2-042826	Corrections to NI-LR using Location Based Routing procedure	23.271	276r2	F	5.11.0	5	LCS1	S2 #41	9.1.5A
S2-042827	Corrections to NI-LR using Location Based Routing procedure	23.271	277r2	A	6.8.0	6	LCS2	S2 #41	9.1.5A
S2-042823	Removal of erroneous sentence to NI-LR using Location Based Routing procedure	23.271	278r1	F	6.8.0	6	LCS2	S2 #41	9.1.5A
S2-042824	Usage of the expression country code in 23.271	23.271	279r1	F	6.8.0	6	LCS	S2 #41	2.1, 3.1, 4.4.2.1, 5.5.1, 5.6.1, 9.1.1, 10.3.1

CR-Form-v7

CHANGE REQUEST

⌘	**23.271**	**CR**	**275**	⌘ **rev**	**2**	⌘	Current version:	**4.11.0**	⌘

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

Title:	⌘	Corrections to NI-LR using Location Based Routing procedure
Source:	⌘	SA2 (Ericsson)

Work item code:	⌘	LCS		**Date:**	⌘	17/8/2004

Category:	⌘	**F**		**Release:**	⌘	Rel-4

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

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

Reason for change:	⌘	A step, in which the GMLC forwards the location information to the Client (PSAP), is missing from the procedure. Another step where the Client requests this location information is also missing.
Summary of change:	⌘	A new step is added, where the Client requests the location information and also another step for the GMLC to send the Location information message to the Client. Because of the addition of those new steps, the rest steps are renumbered.
Consequences if not approved:	⌘	The PSAP won´t be informed for the result of the location.

Clauses affected:	⌘	9.1.5A

		Y	**N**		
Other specs affected:	⌘		**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 <u>http://www.3gpp.org/specs/CR.htm</u>. Below is a brief summary:
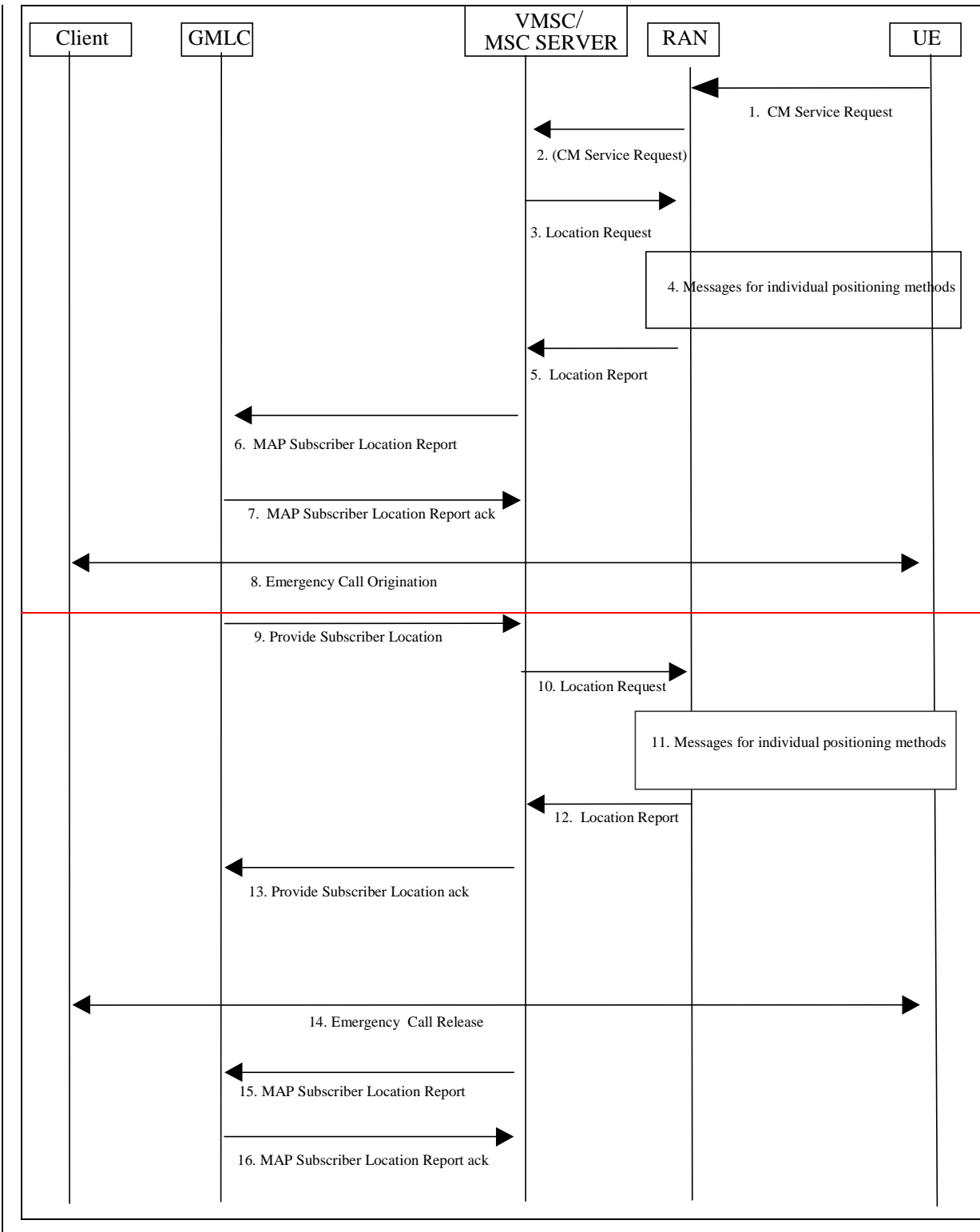
1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
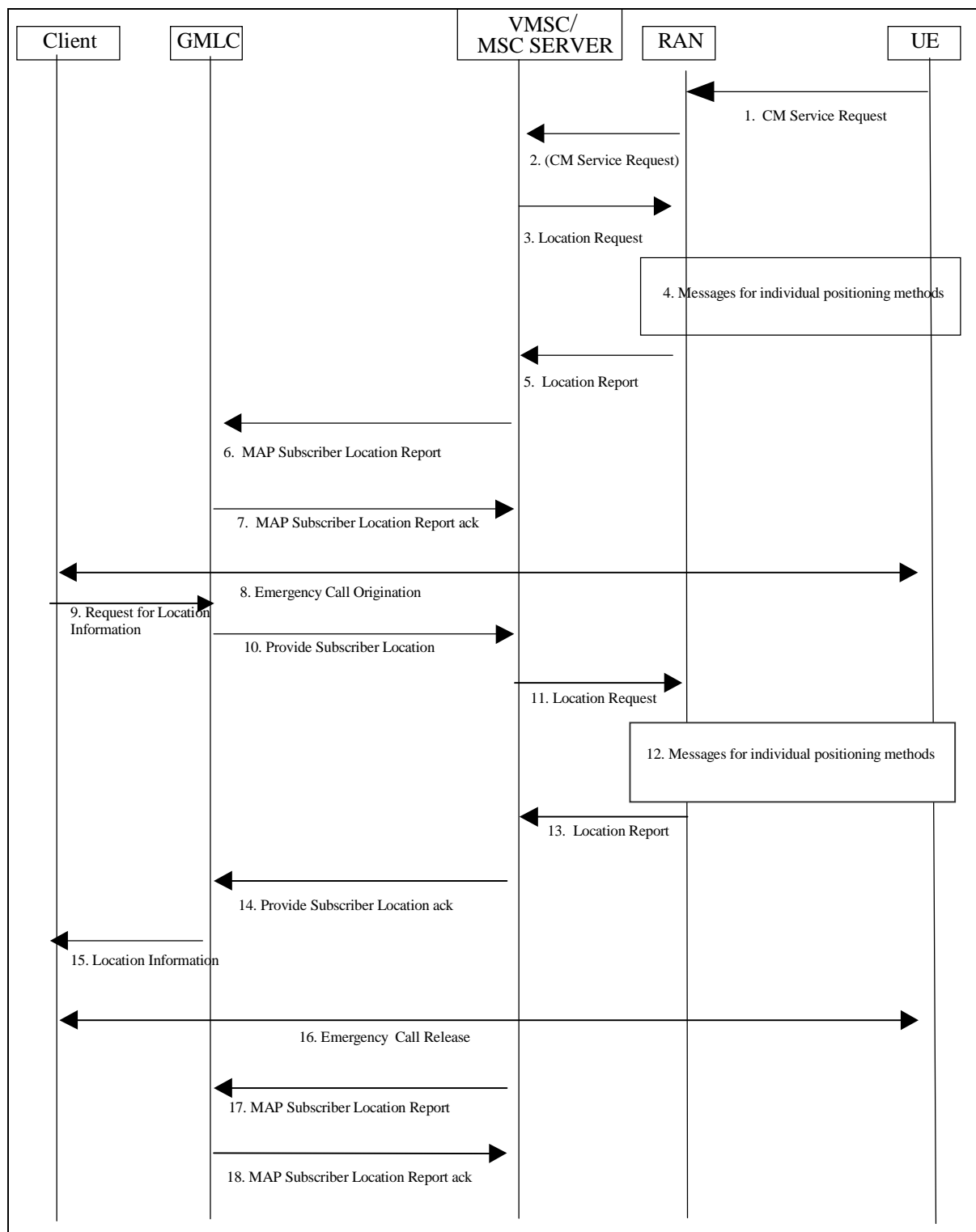
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text.   Delete those parts of the specification which are not relevant to the change request.

<< First Modified Clause >>

<< First Modified Clause >>

9.1.5A NI-LR using Location Based Routing ñ 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 UEís 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. 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 8, the emergency services LCS client may request location information.

109)   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.

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.

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

9.1.5A.5   Positioning Measurement Establishment Procedure

121) same as step 4.

9.1.5A.6   Location Calculation and Release Procedure

132)   same as step 5.

143) The VMSC/MSC server returns the location information and its age 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.

15) The GMLC may forward the information received in the previous step to the emergency services LCS client. The client is expected to have requested this information from GMLC before.

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

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

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

CR-Form-v7

CHANGE REQUEST

| ⌘ | **23.271** | **CR** | **276** | ⌘ **rev** | **2** | ⌘ | Current version: | **5.11.0** | ⌘ |

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

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

Title: ⌘	Corrections to NI-LR using Location Based Routing procedure
Source: ⌘	SA2 (Ericsson)
Work item code: ⌘	LCS *Date:* ⌘ 17/8/2004
Category: ⌘ **F**	*Release:* ⌘ Rel-5

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

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

Reason for change: ⌘	A step, in which the GMLC forwards the location information to the Client (PSAP), is missing from the procedure. Another step where the Client requests this location information is also missing.
Summary of change: ⌘	A new step is added, where the Client requests the location information and also another step for the GMLC to send the Location information message to the Client. Because of the addition of those new steps, the rest steps are renumbered.
Consequences if not approved: ⌘	The PSAP wonít be informed for the result of the location.

Clauses affected: ⌘	9.1.5A

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

Other comments: ⌘	

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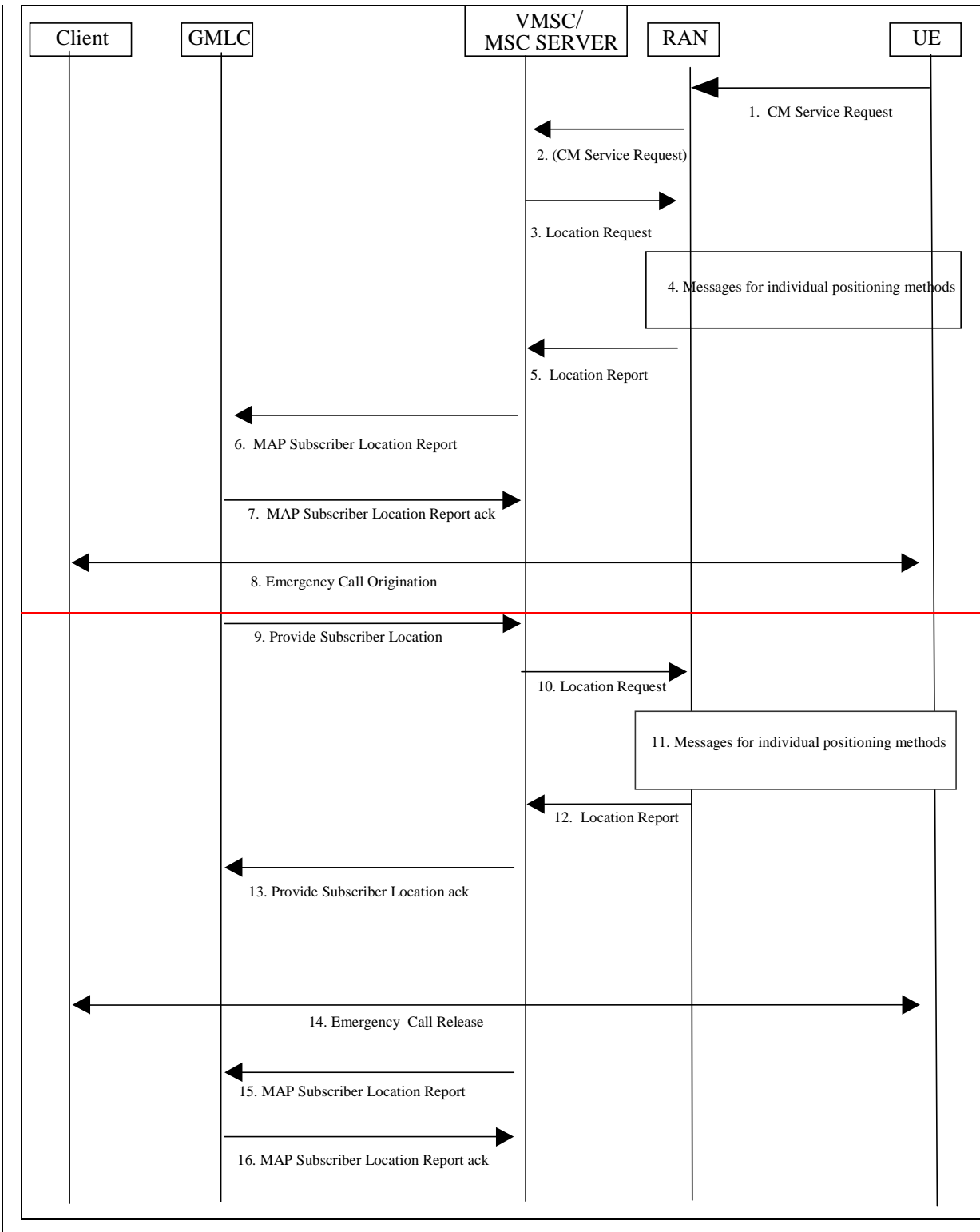
1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
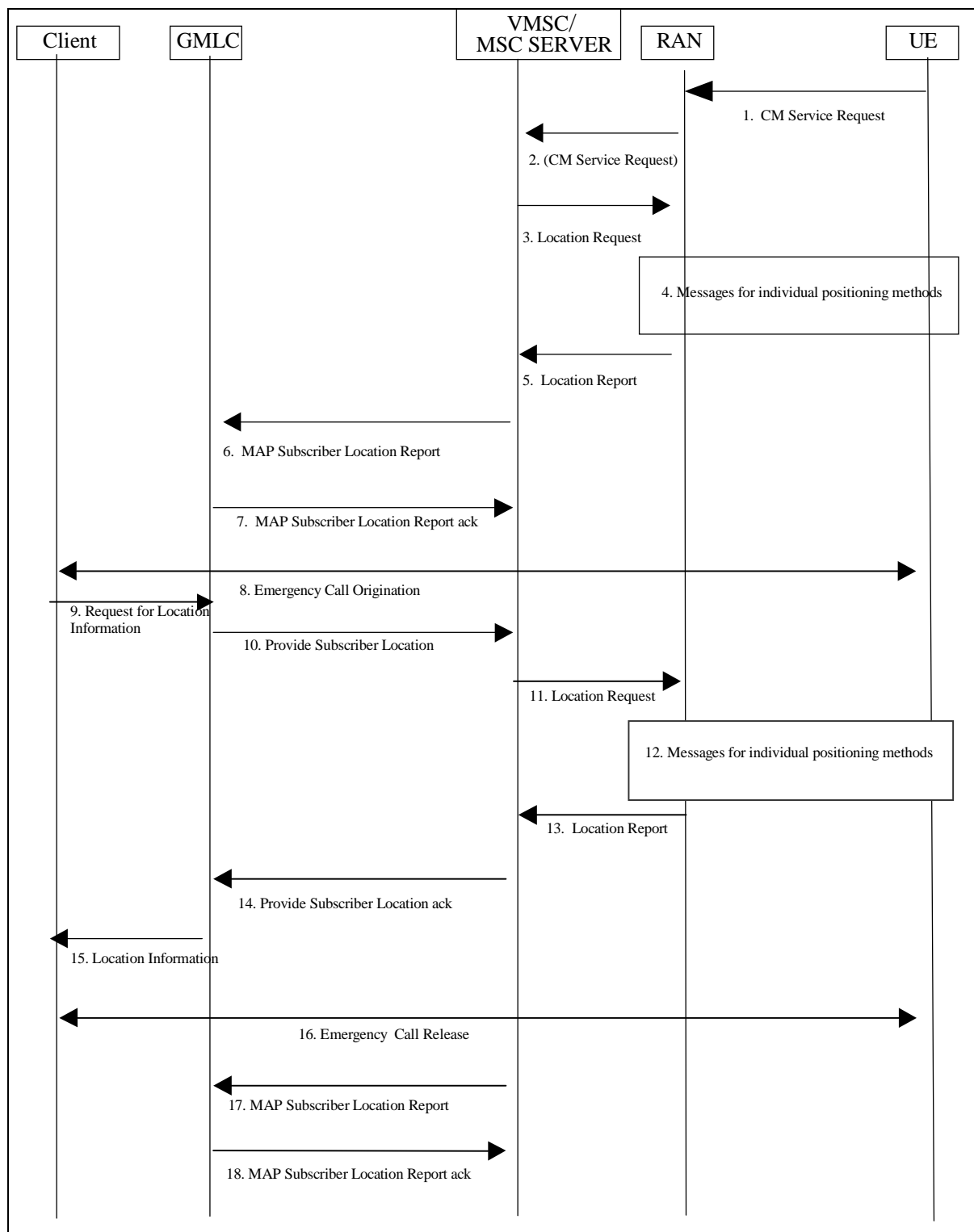
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest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

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

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

Client	GMLC	VMSC/MSC SERVER	RAN	UE

1. CM Service Request

2. (CM Service Request)

3. Location Request

4. Messages for individual positioning methods

5. Location Report

6. MAP Subscriber Location Report

7. MAP Subscriber Location Report ack

8. Emergency Call Origination

9. Provide Subscriber Location

10. Location Request

11. Messages for individual positioning methods

12. Location Report

13. Provide Subscriber Location ack

14. Emergency Call Release

15. MAP Subscriber Location Report

16. MAP Subscriber Location Report ack

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 UEís 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 8, the emergency services LCS client may request location information.

10~~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.

11~~0~~)   The VMSC/MSC server sends a Location Request message to RAN.   This message includes the type of location information requested, the UEís location capabilities and requested higher accuracy QoS.

9.1.5A.5   Positioning Measurement Establishment Procedure

12~~1~~) same as step 4.

9.1.5A.6   Location Calculation and Release Procedure

13~~2~~)   same as step 5.

14<s>3</s>)   The VMSC/MSC 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.

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

16<s>4</s>)   same as step 10 for normal NI-LR.

17<s>5</s>) same as step 11 for normal NI-LR.

18<s>6</s>) same as step 12 for normal NI-LR.

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CHANGE REQUEST

| ⌘ | **23.271** | **CR** | **277** | ⌘**rev** | **2** | ⌘ | Current version: | **6.8.0** | ⌘ |

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

Title: ⌘	Corrections to NI-LR using Location Based Routing procedure
Source: ⌘	SA2 (Ericsson)

Work item code:⌘	LCS2	*Date:* ⌘	17/8/2004

Category: ⌘ **A**	*Release:* ⌘ Rel-6

Use one of the following categories:
  F (correction)
  A (corresponds to a correction in an earlier release)
  B (addition of feature),
  C (functional modification of feature)
  D (editorial modification)
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Use one of the following releases:
  2   (GSM Phase 2)
  R96 (Release 1996)
  R97 (Release 1997)
  R98 (Release 1998)
  R99 (Release 1999)
  Rel-4 (Release 4)
  Rel-5 (Release 5)
  Rel-6 (Release 6)

Reason for change: ⌘	A step, in which the GMLC forwards the location information to the Client (PSAP), is missing from the procedure. Another step where the Client requests this location information is also missing.
Summary of change:⌘	A new step is added, where the Client requests the location information and also another step for the GMLC to send the Location information message to the Client. Because of the addition of those new steps, the rest steps are renumbered.
Consequences if not approved: ⌘	PSAP wonít be informed for the result of the location.

Clauses affected: ⌘	9.1.5A

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

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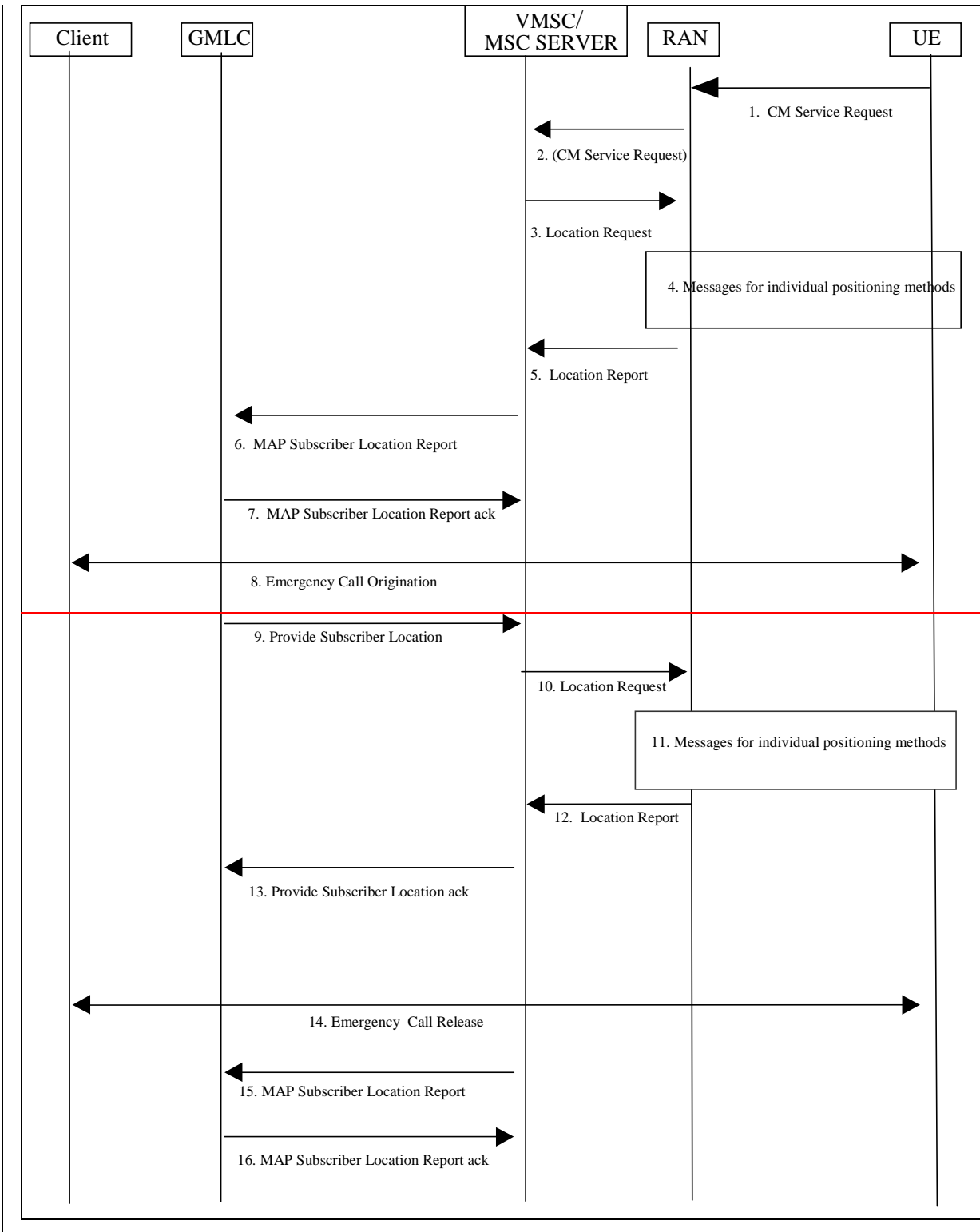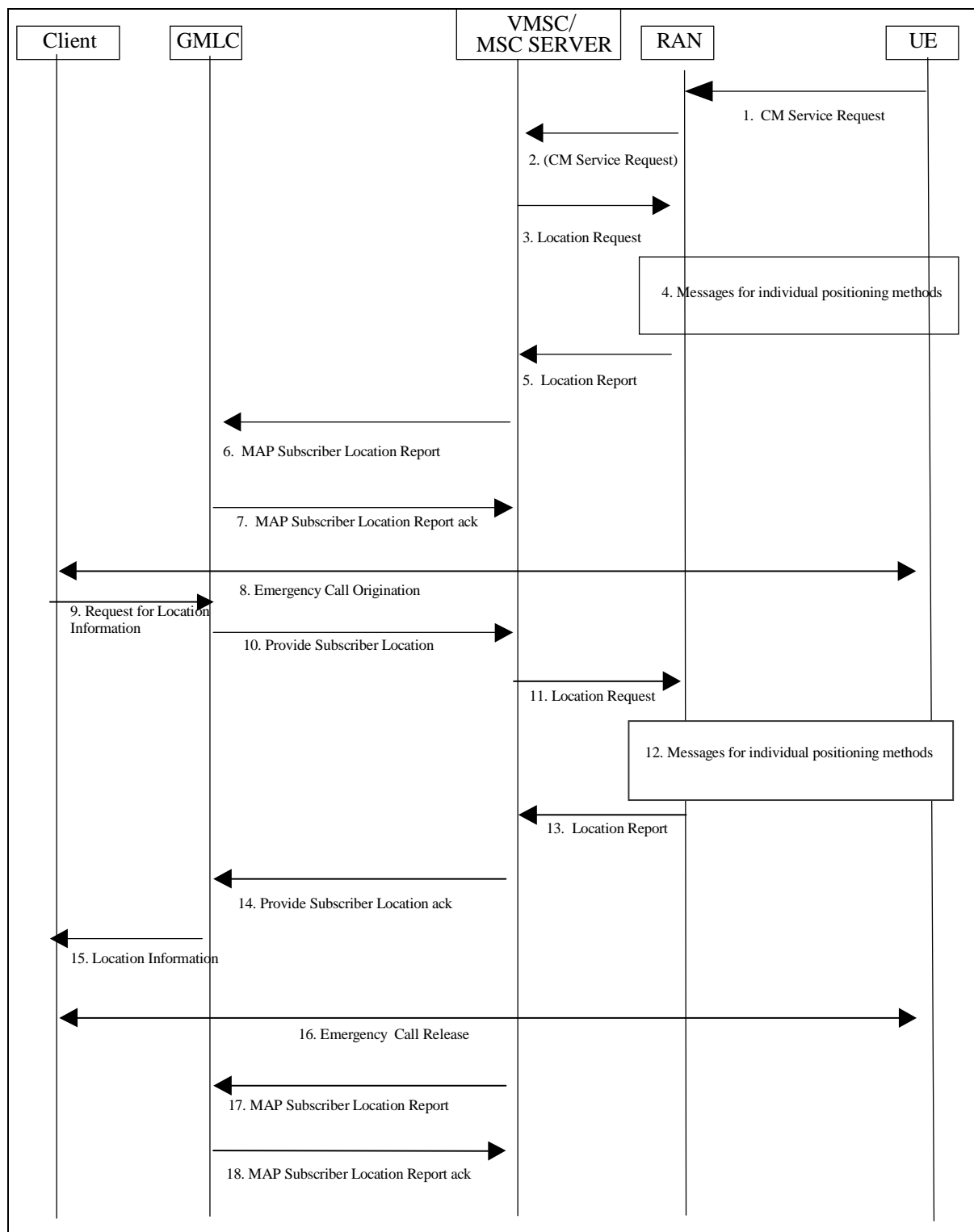
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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text.   Delete those parts of the specification which are not relevant to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

<< First Modified Clause >>

<< First Modified Clause >>

9.1.5A NI-LR using Location Based Routing ñ 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 UEís 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 8, the emergency services LCS client may request location information.

10~~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.

11~~0~~) The VMSC/MSC server sends a Location Request message to RAN. This message includes the type of location information requested, the UEís location capabilities and requested higher accuracy QoS.

9.1.5A.5 Positioning Measurement Establishment Procedure

12~~1~~) same as step 4.

9.1.5A.6 Location Calculation and Release Procedure

13~~2~~) same as step 5.

14~~3~~) 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.

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

16~~4~~) same as step 10 for normal NI-LR.

17~~5~~) same as step 11 for normal NI-LR.

18~~6~~) same as step 12 for normal NI-LR.

Tdoc ⌘ *S2-042823*

(Revised S2-042750)

CR-Form-v7.1

CHANGE REQUEST

| ⌘ | **23.271** CR **278** | ⌘**rev** **1** ⌘ | Current version: | **6.8.0** ⌘ |

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

Title: ⌘	Removal of erroneous sentence to NI-LR using Location Based Routing procedure	
Source: ⌘	SA2 (Ericsson)	
Work item code:⌘	LCS2	***Date:*** ⌘ 05/08/2004
Category: ⌘ **F**		***Release:*** ⌘ Rel-6

Use <u>one</u> of the following categories:
F *(correction)*
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Ph2   *(GSM Phase 2)*
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R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
Rel-4   *(Release 4)*
Rel-5   *(Release 5)*
Rel-6   *(Release 6)*
Rel-7   *(Release 7)*

Reason for change: ⌘	During the last updates of clause 9.1.5A, step 13 was updated by mistake and so the message Provide Subscriber Location Ack is shown to include a non dialable callback number as MSISDN. This is wrong, since this message does not include MSISDN.
Summary of change:⌘	The erroneous sentence is removed from step 13 of clause 9.1.5A.
Consequences if not approved: ⌘	Unnecessary impacts to MAP.

Clauses affected: ⌘	9.1.5A

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

Other comments: ⌘	

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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 >>

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

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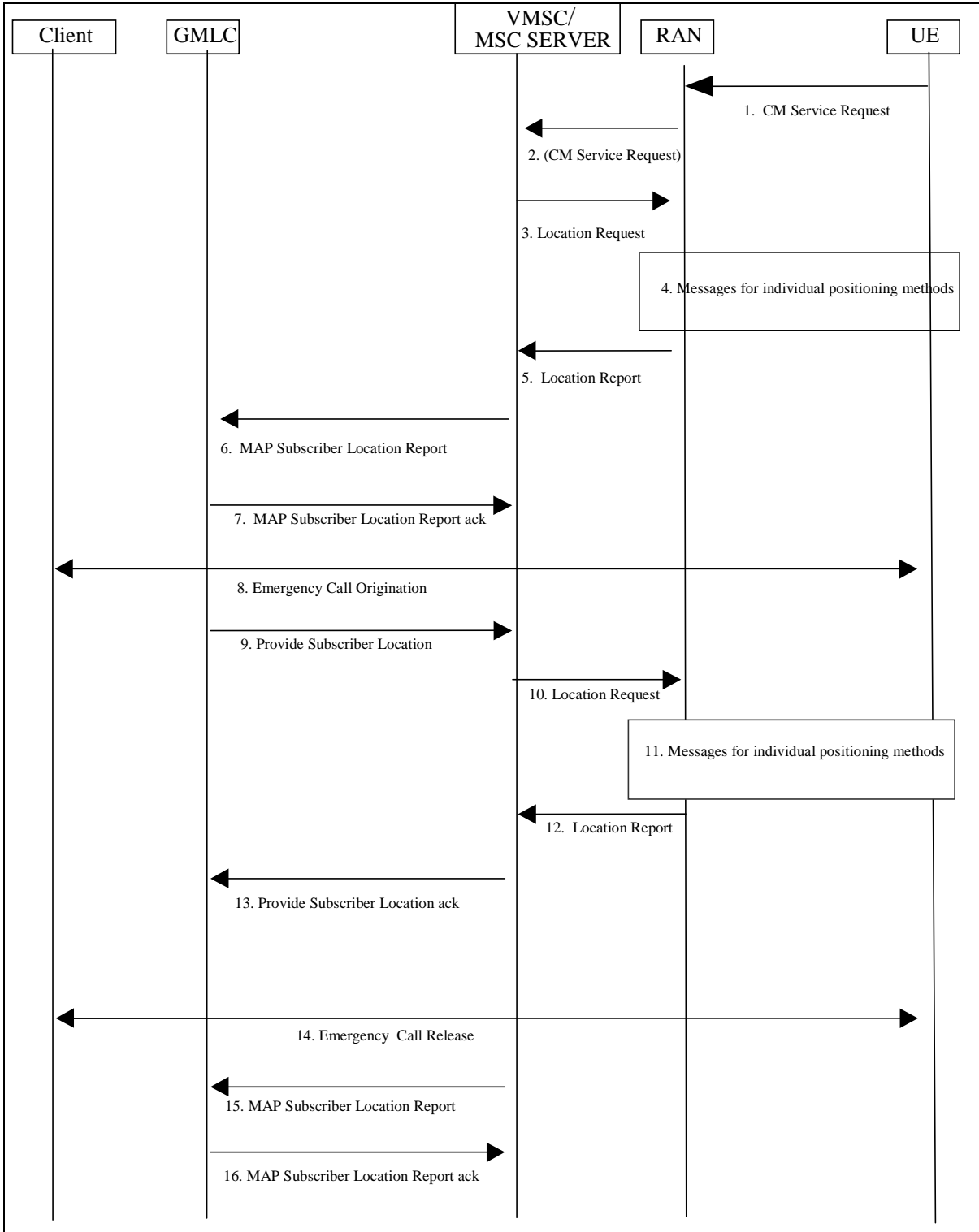

Figure 9.4A: Positioning for a NI-LR Emergency Service Call using Location Based Routing

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 UEís 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 UEís 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.

CR-Form-v7

CHANGE REQUEST

| ⌘ | **23.271** | **CR** | **279** | ⌘**rev** | **1** | ⌘ | Current version: | **6.8.0** | ⌘ |

*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 **X**

Title:	⌘	Usage of the expression country code in 23.271
Source:	⌘	SA2 (Siemens)

Work item code:⌘	LCS			***Date:*** ⌘	11/08/2004

Category:	⌘	**F**	***Release:*** ⌘	Rel-6

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

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

Reason for change:	⌘	The expression ìcountry codeî in the definition of service coverage and target area is unclear. E.g., country code could mean E.164 country code for geographic areas or E.212 mobile country code or possibly something else like defined in the ISO standard for country codes. This contribution proposes to use country code in the sense of E.164 country code for geographic areas as this is the most widely used term in the telecommunication area in the context of geographic country codes (e.g. used as part of MSC and SGSN addresses).
Summary of change:⌘		Clarify that ìcountry codeî in the context of service coverage and target area means E.164 country code for geographic areas. Add the E.164 ITU-T recommendation to the reference list. Make some editorial changes.
Consequences if not approved:	⌘	Unclear definition of the expression ìcountry codeî in 23.271 hinders and delays stage 3 work on MLP and RLP in OMA.

Clauses affected:	⌘	2.1, 3.1, 4.4.2.1, 5.5.1, 5.6.1, 9.1.1, 10.3.1

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

Other comments:	⌘	

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

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

****************** 1st MODIFIED SECTION ******************

2   References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

2.1   Normative references

[1]   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: ìOpen Service Access (OSA); Application Programming Interface (API); Part 1; Overviewî.

[28]   3GPP TS 29.198-2: ìOpen Service Access (OSA); Application Programming Interface (API); Part 2; Common Dataî.

[29]   3GPP TS 29.198-3: ìOpen Service Access (OSA); Application Programming Interface (API); Part 3; Frameworkî.

[30]   3GPP TS 29.198-6: "Open Service Access (OSA); Application Programming Interface (API); Part 6: Mobility".

[31]   OMA Location Working Group   "Mobile Location Protocol Specification", [http://www.openmobilealliance.org]

[32]   ANSI J-STD-036A: ìEnhanced Wireless 9-1-1 Phase 2î

[33]   RFC 2396: ìUniform Resource Identifiersî.

[34]   RFC 3261: ìSIP: Session Initiation Protocolî.

[35]   3GPP TS 23.228:   "IP multimedia subsystem (IMS)"

[35a]   ITU Recommendation E.164: ìThe international public telecommunication numbering planî.

2.2   Informative references

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

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

****************** 2nd MODIFIED SECTION ******************

3   Definitions, symbols and abbreviations

3.1   Definitions

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

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

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

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

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

Deferred location request: location request where the location response (responses) is (are) required after a specific event has occurred. The event may or may not occur immediately

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

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

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

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

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

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

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

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

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

LCS QoS Class: The QoS class determines the degree of adherence to the quality of service information as required by the source of a location request

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

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

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

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

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

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

Location Dependent Service: service provided either by teleoperator or a 3rd party service provider that is available (pull type) or is activated (push type) when the user arrives to a certain area. It doesn't require any subscription in

advance, but the push type activation shall be confirmed by the user. The offered service itself can be any kind of service (e.g. a public Xerox machine or the discount list in a store)

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

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

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

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

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

Non-dialable call back number: In case of a SIM-less emergency call, 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.

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

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

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

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

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

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

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

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

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

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

Pseudonym mediation device: functionality that verifies pseudonyms to verinyms

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

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

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

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

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

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

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

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

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

Target area: geographical area which is used for change of area type deferred location request. The target area is defined by the LCS client and is expressed as geographical area using a shape defined in TS 23.032, as a geographical area using local coordinate system, as an E.164 country code for a geographic area [35a], as a PLMN identity or as a geopolitical name of the area (e.g. London).

Target UE: UE being positioned

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

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

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

******************** 3rd MODIFIED SECTION ********************

4.4.2   Deferred Location Request

Request for location contingent on some current or future events where the response from the LCS Server to the LCS Client may occur some time after the request was sent.

4.4.2.1 Types of event

a) UE available: Any event in which the MSC/SGSN has established a contact with the UE. Note, this event is considered to be applicable when the UE is temporarily unavailable due to inaction by the ~~UE~~ user, temporarily loss of radio connectivity or IMSI detach and so on. Note that IMSI detach is only applicable in the case the UE has previously been registered and information is still kept in the node. The UE Available event only requires one response and after th~~e one~~is response, the UE Available event is concluded.

b) Change of Area: An event where the UE enters or leaves a pre-defined geographical area or if the UE is currently within the pre-defined geographical area. The LCS client defines the target area as a geographical area, as an E.164 country code for a geographic area [35a], as a PLMN identity or as a geopolitical name of the area. The LCS server may translate and define the target area as the identities of one or more radio cells, location areas, routing areas, country code or PLMN identity. The target UE must not give the target UE user access to the area definitions and network identities. The change of area event may be reported one time only, or several times. The area event report must not be repeated more often than allowed by the LCS client. The change of area event report shall contain an indication of the event occurrence. The location estimate may be included in the report.

c) Other events are FFS

******************** 4th 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.

5.5.1 Location Service Request

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

- Location Immediate Request (LIR); and

- Location Deferred Request (LDR).

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

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

- Target UE identity (either verinym or pseudonym);

- LCS Client identity;

- Service identity, if needed;

- Response method (SYNC or ASYNC), if needed;

- Codeword, if needed;

- Requestor identity, if needed (and type of Requestor identity if available);

- Number dialled by the target mobile user or APN-NI, if the request is call or session related ;

- Type of Event definition, i.e. UE available or change of area, applicable to deferred location requests only;

- Definitions for change of area type deferred location requests. Following parameters may be defined, if needed;

    a) Indication for event trigger, i.e. UE enters, leaves or is within requested target area;

  b) Indication of either a single event report or multiple event reports;

  c) Minimum interval time between area event reports, if multiple event reports is requested;

  d) Indication of the requested location estimate; i.e. whether the location estimate of the target UE should be contained in the change of area event report;

- Start time, stop time (i.e. specifying the validity time of LCS request), if needed;

- Interval, applicable to periodical requests only;

- Requested Quality of Service information, if needed, i.e. accuracy, response time and LCS QoS Class;

- Requested type of location, i.e. current location or last known location applicable to LIR only (current location is only available for LDR);

- Priority, if needed;

- Service coverage (i.e. E.164 country codes for geographic areas [35a]), if needed;

- Requested maximum age of location, if needed;

- Local coordinate reference system, if needed;

- Target area, i.e. geographical area expressed as one of the following format, if needed.

  a) a shape defined in TS 23.032

  b) local coordinate system

  c) E.164 country code for a geographic area [35a]

  d) PLMN identity

  e) geopolitical name of the area (e.g. London)

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

******************* 5th 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.

Any of the information flows here indicated may not be externally realized if the information does not flow over an open interface.

When the LCS server's associated GMLC uses the Lr interface then this interface shall conform to the procedures defined in clause 9 of the current specification.

5.6.1 Location Service Request

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

- Location Immediate Request (LIR); and

- Location Deferred Request (LDR).

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

- Target UE identity, (either one or both of MSISDN and IMSI, or SIP-URI, or pseudonym);

- LCS Client identity, i.e. LCS client external identity or internal identity;

- LCS Client type, (i.e. Value added, Emergency, PLMN operator or Lawful interception);

- LCS Client name, if needed (and type of LCS client name if available);

- Service type, if needed;

- Response method (SYNC or ASYNC), if needed;

- Codeword, if needed;

- Requestor identity, if needed (and type of Requestor identity if available);

- Number dialled by the target mobile user or APN-NI, if the request is call or session related ;

- Type of Event definition, i.e. UE available or change of area, applicable to deferred location requests only;

- Definitions for change of area type deferred location requests. Following parameters may be defined, if needed;

  a) Indication for event trigger, i.e. UE enters, leaves or is within requested target area;

  b) Indication of either a single event report or multiple event reports;

  c) Minimum interval time between area event reports;

  d) Start time, stop time, i.e. specifying the validity time of LCS area event request

- Requested Quality of Service information, if needed, i.e. accuracy, response time and LCS QoS Class;

- Requested type of location, i.e. ì current locationî , ì current or last known locationî or ì initial locationî applicable to LIR only (current location is only available for LDR);

- Priority, if needed;

- Requested maximum age of location, if needed;

- Privacy override indicator, if needed;

- Service coverage (i.e. E.164 country codes for geographic areas [35a]), if needed;

- Indicator of privacy check related actions, if needed;

- Supported GAD shapes, if needed;

- HPLMN LCS server address, i.e. H-GMLC address, if needed;

- VPLMN LCS server address, i.e. V-GMLC address, if needed;

- Network address of Privacy Profile Register, if needed;

- Network numbers of serving nodes;

- LCS capability sets of serving nodes, if needed.

- Target area, i.e. geographical area expressed as one of the following format, if needed.

  a) a shape defined in TS 23.032

  b) E.164 country code for a geographic area [35a]

  c) PLMN identity

- LDR reference number, if needed.

9.1.1 Common MT-LR procedure in PS and CS domain
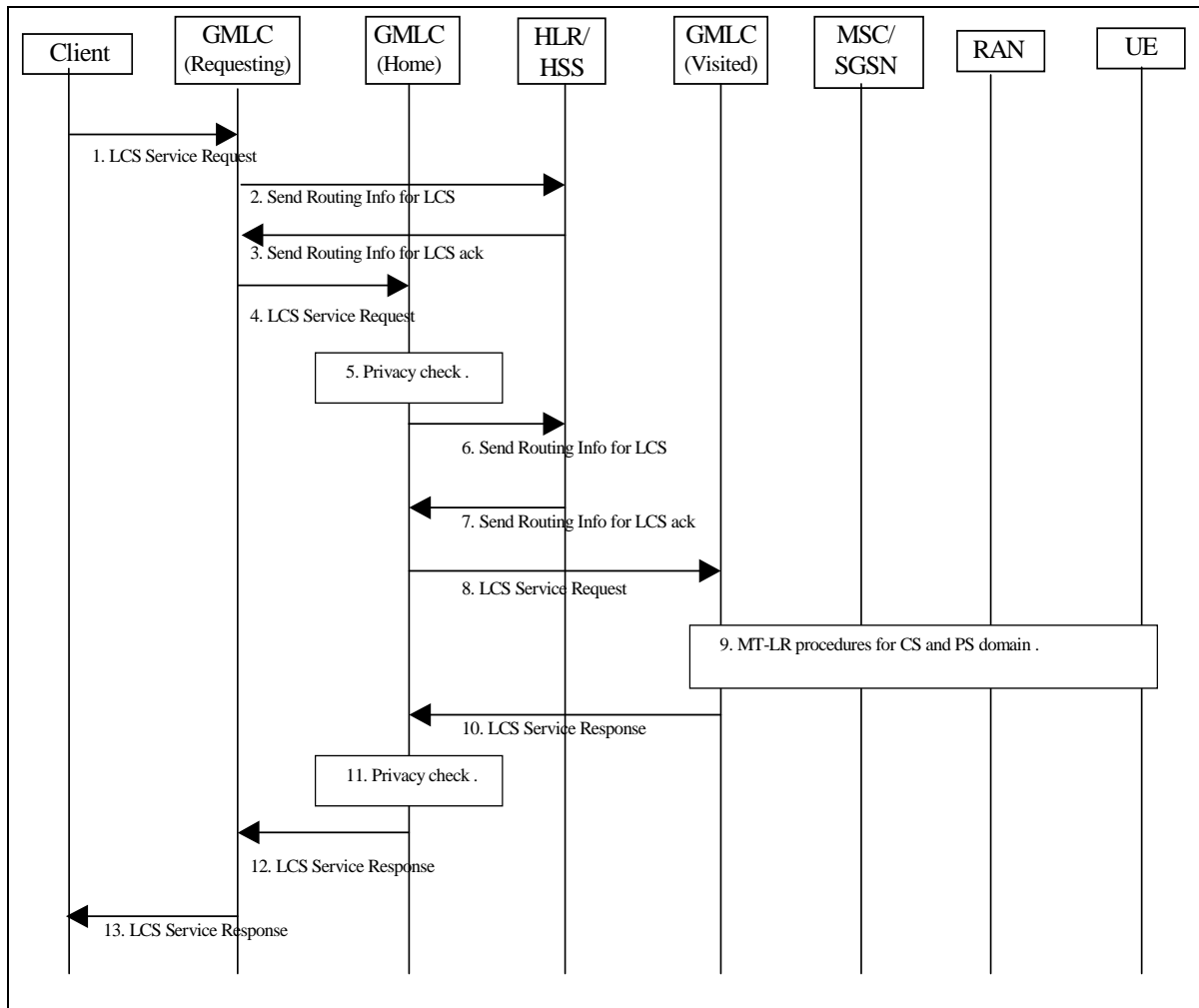
Figure 9.1: General Network Positioning for a MT-LR

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 clientís 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 deduced from the pseudonym, the R-GMLC shall determine the verinym 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 UEís 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 UEís pseudonym, which includes the target UEís Home-GMLC address, or a pseudonym from which the target UEís 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.

Editorís 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, if available.

Note: HLR/HSS may prioritise between the MSC/VLR or SGSN address sent to the GMLC. The prioritisation might be based on information received from SGSN and/or MSC/VLR concerning the UEís 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 userís 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 userís 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 ì current or last known locationî 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 ì Location allowed without notificationî 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, if available.

Note: HLR/HSS may prioritise between the MSC/VLR or SGSN address sent to the GMLC. The prioritisation might be based on information received from SGSN and/or MSC/VLR concerning the UEís 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 in accordance with the requested LCS QoS Class. If the requested LCS QoS class was Assured, V-GMLC sends the result only if the result has been indicated to fulfil the requested accuracy, otherwise V-GMLC sends a LCS service response with a suitable error

cause. If the UE requested LCS QoS class was Best Effort, V-GMLC sends whatever result it received with an appropriate indication if the requested accuracy was not met. 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 and the indication whether the obtained location estimate satisfies the requested accuracy or not. 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 and the indication whether the obtained location estimate satisfies the requested accuracy or not.

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.

******************* 7th MODIFIED SECTION *******************

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.

Table10.7: 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: - 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 an international E.164 addresses [35a]. Each external identity shall be associated with a logical client name.
Authentication data	M	Data employed to authenticate the identity of an LCS client ñ details are outside the scope of the present document
Call/session related identity	O	A list of one or more international E.164 addresses [35a], which are used to make calls by mobile subscribers, or APN-NIs (see NOTE) to identify the client for a call related MT-LR In case the LCS client was reached via IN or abbreviated number routing (e.g. toll free number or emergency call routing), the E.164 number(s) stored in the GMLC shall be the number(s) that the UE has to dial to reach the LCS Client. In these cases the E.164 number is not to be in international format. The country in which the national specific number(s) is (are) applicable is (are) also stored (or implied) in this case. Each call related identity may be associated with a specific external identity. Each call/session-related identity shall be associated with a logical client name.
Internal identity	O	Identifies the type PLMN operator services and the following classes are distinguished: - LCS client broadcasting location related information - O&M LCS client in the HPLMN - O&M LCS client in the VPLMN - LCS client recording anonymous location information - LCS Client supporting a bearer service, teleservice or supplementary service to the target UE This identity is applicable only to PLMN Operator Services.
Client name	O	An address string which is 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: - 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 ñ to be treated as either the default priority when priority is not negotiated between the LCS server and client or the highest allowed priority when priority is negotiated	
QoS parameters	M	The default QoS requirements for the LCS client, comprising: - Accuracy - Response time - LCS QoS Class Separate default QoS parameters may be maintained for each distinct LCS client identity (external, non-call related, call related)	
Service Coverage	O	A list of E.164 country codes for geographic areas [35a] where the LCS client offers its location services.	
Allowed LCS Request Types	M	Indicates which of the following are allowed: - Non-call related CS-MT-LR/PS-MT-LR - Call/session related CS-MT-LR/PS-MT-LR - Specification or negotiation of priority - Specification or negotiation of QoS parameters - 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 ñ 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 includes them into the same field.