3GPP TSG_CN **Tdoc NP-000296**
Plenary Meeting #8, Dusseldorf, Germany
21st – 23rd June 2000.

Source: **TSG_N WG4**

Title: **CRs to 3G Work Item "Location Services"**

Agenda item: **6.17.4**

Document for: **APPROVAL**

Introduction:

This document contains **"9"** CRs on **Work Item "Location Services",** that have been agreed by **TSG_N WG4,** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

TDoc	SPEC	CR	REV	PHAS	VERS	SUBJECT	CAT	NEW_VERS
N4-000248	04.30	A002		R98	7.1.0	Correction of MO-LR procedure for LCS	F	7.2.0
N4-000391	09.02	A295	1	R98	7.4.0	Indication of unsupported position method	F	7.5.0
N4-000052	23.007	005		R99	3.2.0	Clarifications on GSM vs. UMTS specific parts	F	3.3.0
N4-000053	23.008	027		R99	3.3.0	Clarifications on GSM vs. UMTS specific parts	F	3.4.0
N4-000054	23.016	014		R99	3.3.0	Clarifications on GSM vs. UMTS specific parts	F	3.4.0
N4-000085	24.030	001	1	R99	3.0.0	Clarifications on GSM vs. UMTS specific parts	F	3.1.0
N4-000249	24.030	002		R99	3.0.0	Correction of MO-LR procedure for LCS	A	3.1.0
N4-000068	29.002	125		R99	3.4.0	Clarification to GMLC List definition	A	3.5.0
N4-000392	29.002	139	1	R99	3.4.0	Indication of unsupported position method	A	3.5.0

3GPP TSG CN WG4
Rotenburg, Germany, 22-26 May 2000

***Document* N4-000248**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

04.30	CR	A002	Current Version:	7.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	X

Source: N4 **Date:** 22 May 2000

Subject: Correction of MO-LR procedure for LCS

Work item: Location Services

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	X
D	Editorial modification			Release 99	
				Release 00	

Reason for change: Clarify MO-LR termination to avoid possible interworking problems between the network and an MS.

Clauses affected: 5.1.1

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

5 Mobile initiated location services operations

5.1 Mobile Originated Location Request (MO-LR)

5.1.1 Normal operation

The MS invokes a MO-LR by sending a REGISTER message to the network containing a LCS-MOLR invoke component.

The receiving network entity shall initiate the handling of location request in the network. The network shall pass the result of the location procedure to the MS by sending a FACILITY message to the MS containing a LCS-MOLR return result component.

The MS may terminate the dialogue by sending a RELEASE COMPLETE message in the case of single location request (see figure 5.1). The MS may also initiate another location request operation by sending a FACILITY message to the network containing a LCS-MOLR invoke component (see figure 5.2). After the last location request operation the MS shall terminate the dialogue by sending a RELEASE COMPLETE message.

If the network is unable to ~~process~~successfully fulfil the request received from the MS (e.g. to provide a location estimate or location assistance information), it shall clear the transaction by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in GSM 04.80.

If the network has returned a result to the MS in a FACILITY message but, after some PLMN administered time period has elapsed, has not received either a new location request operation in a FACILITY message or a RELEASE COMPLETE message from the MS, the network may clear the transaction by sending a RELEASE COMPLETE message.

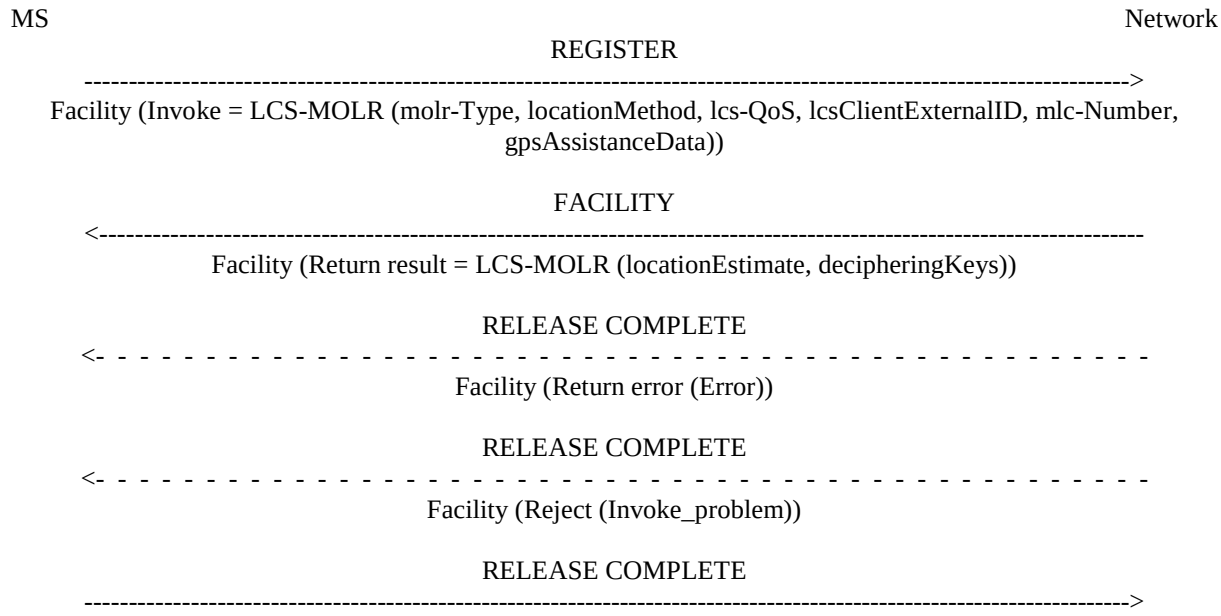

Figure 5.1: Single mobile originated location request

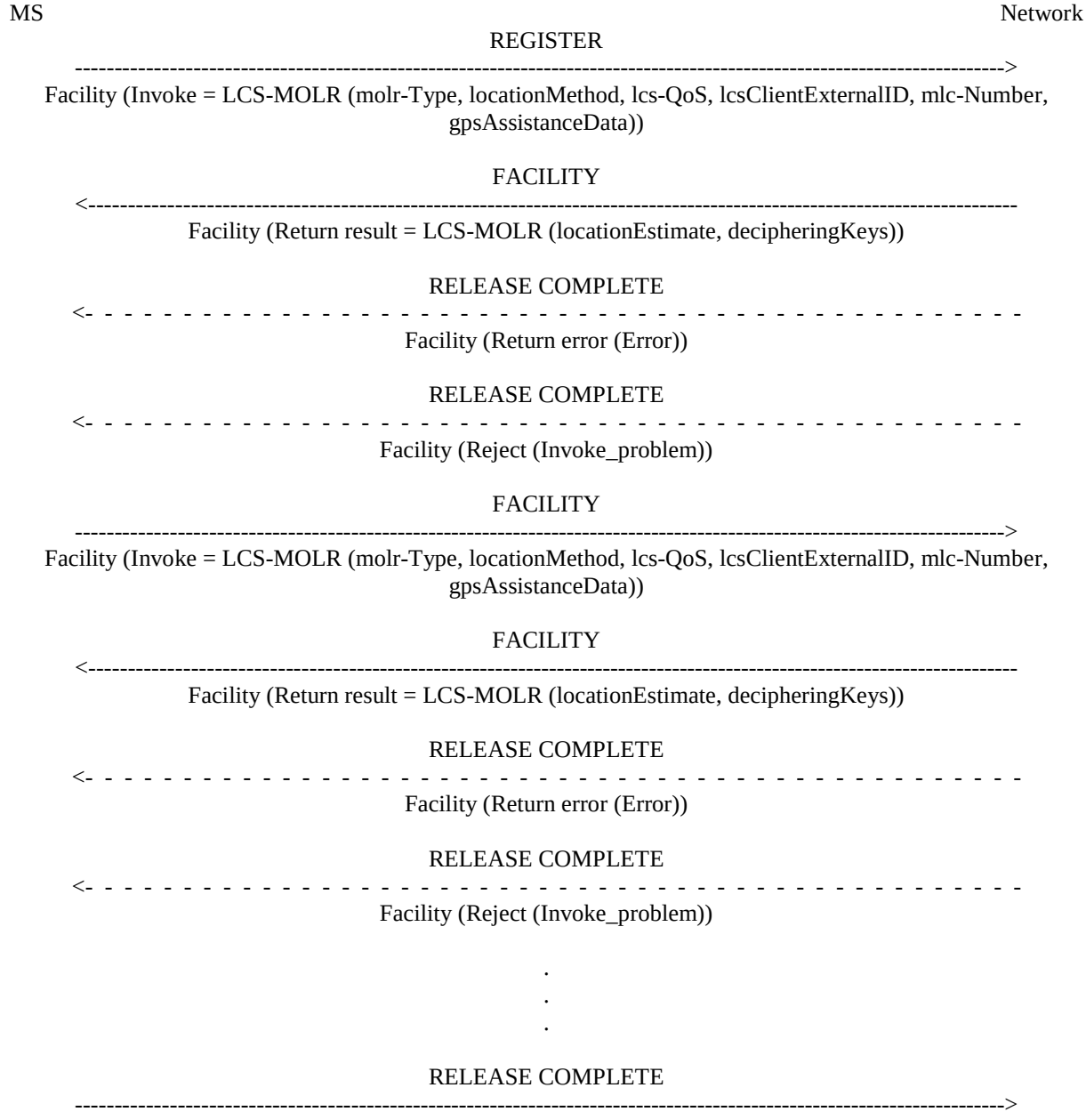

Figure 5.2: Multiple mobile originated location requests

3GPP TSG CN WG4
22 - 26 May 2000
Rotenburg a.d Fulda, Germany,

Document N4-000391
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

09.02	CR	A295r1	Current Version:	7.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#08 *list expected approval meeting # here ↑*	for approval	X	strategic		*(for SMG use only)*
	for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N4 **Date:** 11.5.2000

Subject: Indication of unsupported position method

Work item: LCS

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	X
D	Editorial modification			Release 99	
				Release 00	

Reason for change: MS shall be informed if the requested positioning method in assistance data or in deciphering key request is not supported by the network or by the particular location area

Clauses affected: 7.6.1.4, 17

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	09.31
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

7.6.1.4 User error

This parameter can take values as follows:

NOTE: The values are grouped in order to improve readability; the grouping has no other significance.

.....

i) Location services problem:

- Unauthorized Requesting Network
- Unauthorized LCS Client with detailed reason as follows
- Unauthorzied Privacy Class
- Unauthoized Call Unrelated External Client
- Unauthorized Call Related External Client
- Privacy override not applicable
- Position method failure with detailed reason as follows:
  - Congestion
  - Insufficient resources
  - Insufficient Measurement Data
  - Inconsistent Measurement Data
- Location procedure not completed
- Location procedure not supported by target MS
- QoS not attainable
- Position Method Not Available in Network
- Position Method Not Available in Location Area
- Unknown or unreachable LCS Client

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

17.7.7 Error data types

```
MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version5 (5)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS
   RoamingNotAllowedParam,
   CallBarredParam,
   CUG-RejectParam,
   SS-IncompatibilityCause,
   PW-RegistrationFailureCause,
   SM-DeliveryFailureCause,
   SystemFailureParam,
   DataMissingParam,
```

```
   UnexpectedDataParam,
   FacilityNotSupParam,
   OR-NotAllowedParam,
   UnknownSubscriberParam,
   NumberChangedParam,
   UnidentifiedSubParam,
   IllegalSubscriberParam,
   IllegalEquipmentParam,
   BearerServNotProvParam,
   TeleservNotProvParam,
   TracingBufferFullParam,
   NoRoamingNbParam,
   AbsentSubscriberParam,
   BusySubscriberParam,
   NoSubscriberReplyParam,
   ForwardingViolationParam,
   ForwardingFailedParam,
   ATI-NotAllowedParam,
   SubBusyForMT-SMS-Param,
   MessageWaitListFullParam,
   AbsentSubscriberSM-Param,
   AbsentSubscriberDiagnosticSM,
   ResourceLimitationParam,
   NoGroupCallNbParam,
   IncompatibleTerminalParam,
   ShortTermDenialParam,
   LongTermDenialParam,
   UnauthorizedRequestingNetwork-Param,
   UnauthorizedLCSClient-Param,
   PositionMethodFailure-Param,
   UnknownOrUnreachableLCSClient-Param


;

IMPORTS
   SS-Status
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version5 (5)}

   SignalInfo,
   BasicServiceCode,
   NetworkResource
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version5 (5)}

   SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version5 (5)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version5 (5)}
;

.........
```

```
PositionMethodFailure-Param ::= SEQUENCE {
    positionMethodFailure-Diagnostic    [0] PositionMethodFailure-Diagnostic  OPTIONAL,
    extensionContainer                  [1] ExtensionContainer                OPTIONAL,
    ... }
```

```
PositionMethodFailure-Diagnostic ::= ENUMERATED {
    congestion  (0),
    insufficientResources  (1),
    insufficientMeasurementData  (2),
    inconsistentMeasurementData  (3),
    locationProcedureNotCompleted  (4),
    locationProcedureNotSupportedByTargetMS  (5),
    qoSNotAttainable  (6),
    positionMethodNotAvailableInNetwork  (7),
    positionMethodNotAvailableInLocationArea (8),
    ...}
--  exception handling:
--  any unrecognized value shall be ignored

END
```

3GPP TSG-CN WG4 Meeting #01
Charleston, USA, 27 - 31 March, 2000

Document N4-000052
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.007	CR	005	Current Version:	3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source: N4 **Date:** 20 Mar 2000

Subject: Clarifications on GSM vs. UMTS specific parts

Work item: Location Services

Category: *(only one category shall be marked with an X)*			**Release:**	
F	Correction	X	Phase 2	
A	Corresponds to a correction in an earlier release		Release 96	
B	Addition of feature		Release 97	
C	Functional modification of feature		Release 98	
D	Editorial modification		Release 99	X
			Release 00	

Reason for change: The architecture for Location Services differs between GSM and UMTS. In UMTS there is no SMLC functionality in the Core Network. For this reason some parts of TS 23.007 needs to be specified as GSM only.

Clauses affected:

Other specs affected:			
Other 3G core specifications		→ List of CRs:	23.008, 23.016, 24.030
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

4 Restoration of data in the VLR

The effect on service of failure of a VLR is different from the effect of failure of an HLR. The procedures for restoration of a VLR and an HLR are therefore different.

4.1 Restart of the VLR

When a VLR restarts after a failure, all IMSI records affected by the failure are erased.

There will be no subscriber data or location information stored for an affected mobile station until after the VLR has received either a "Provide Roaming Number" request or an "Update location Area" request for that mobile station.

The VLR causes all affected TMSIs and all affected LMSIs to become invalid. "Invalid" in this context means that the TMSI and LMSI can no longer be regarded as accurate. The term is used to avoid unnecessary constraints on the implementation.

On receipt of either a "Provide Roaming Number" request or an "Update Location Area" request, restoration of subscriber data in the VLR is triggered individually for each IMSI record as described below.

4.2 Restoration Procedures

The objective of the restoration procedure is to handle all traffic for each mobile subscriber correctly. In order to meet this objective, the procedure must make the subscriber data in the VLR consistent with that in the HLR, and make the location information in the HLR and VLR reflect accurately the current location of the MS. For an LMU, the procedure must also make the location information in the SMLC reflect accurately the current serving location of the LMU.

4.2.1 Incoming Call

a) Send Routing Information (GMSC->HLR)

The HLR sends "Provide Roaming Number" to the VLR as for normal operation. The LMSI is updated by the VLR when the VLR requests the transfer of subscriber data from the HLR using the "Restore Data" operation.

b) Provide Roaming Number (HLR->VLR)

- Regardless of whether the VLR has an IMSI record corresponding to the IMSI in the "Provide Roaming Number", it returns an MSRN. If no IMSI record exists, the VLR creates a skeleton IMSI record, sets the indicators "Subscriber Data Confirmed by Radio Contact" and "Confirmed by HLR" to "Not Confirmed" and (if IMSI Attach is used) marks the IMSI as attached. If the VLR serves two or more MSCs, the VLR sets the indicator "Location Information Confirmed in HLR" to "Not Confirmed". Otherwise, if the VLR serves only one MSC, the indicator "Location Information Confirmed in HLR" is set to the initial value "Confirmed".

- If the indicator "Subscriber Data Confirmed by HLR" is "Not Confirmed" the VLR requests authentication data, if required and still not available and subscriber data from the HLR. When the dialogue that covers the subscriber data retrieval procedure is completed successfully, the VLR sets the indicator "Subscriber Data Confirmed by HLR" to "Confirmed". The indicators "Confirmed by Radio Contact" and "Location Information Confirmed in HLR" remain unchanged.

- If the IMSI record for the MS is marked "Subscriber Data Confirmed by HLR" but "Not Confirmed by Radio Contact" the operator may choose an appropriate method to limit the number of "Search for MS" procedures for that MS.

- If subscriber data from the HLR indicates an LMU, the indicator “Location Information Confirmed in SMLC” becomes applicable and is set to “not confirmed”. The means by which this indicator is set to “confirmed” are described under “Incoming LCS Information Request” and “Outgoing LMU Request”.

c) Send Information for I/C Call Setup (MSC->VLR)

- If the VLR has no IMSI record, or if the record is marked "Subscriber Data Not Confirmed by HLR" the VLR returns a "System Failure" error.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Not Confirmed by Radio Contact", the VLR handles the request in the normal way, except that the "Search for MS" procedure is used instead of the "Page MS" procedure.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Confirmed by Radio Contact", the VLR handles the request in the normal way; for this MS, VLR restoration is complete.

- The state of the indicator "Location Information Confirmed in HLR" does not affect the "Send Information for I/C Call Setup" procedure.

d) Process Access Request in Response to Search (MSC->VLR)

- If the MS responds to paging, the MSC sends a positive response to the search request and a "Process Access Request" to the VLR. After successful authentication, if required, the VLR sets the indicator "Confirmed by Radio Contact" to "Confirmed", sets the location area information for the MS, and handles the request in the normal way.

- The VLR checks the indicator "Location Information Confirmed in HLR". If it indicates "Not Confirmed" the VLR starts an "Update Location" procedure to the HLR. When this procedure is successfully completed the VLR sets the indicator "Location Information Confirmed in HLR" to "Confirmed".

For this MS, VLR restoration is complete.

4.2.2 Mobile Terminated Short Message

a) Send Routing Information for MT SMS (SMS-GMSC->HLR)

The HLR returns the MSC number as for normal operation.

b) Send Information for MT SMS (MSC->VLR) - MAP version 2

- If the VLR has no IMSI record, or if the record is marked "Subscriber Data Not Confirmed by HLR" the VLR returns an "Unidentified Subscriber" error. This causes the MSC to report a short message delivery failure, with cause "Unidentified Subscriber", to the SMS gateway MSC. The Gateway MSC sends a "Report SM Delivery Status" request, with a cause of "Absent Subscriber", to the HLR. This causes the HLR to set the "Mobile Station Not Reachable Flag" for the MS, as described in Technical Specifications GSM 03.40 and GSM 09.02.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Not Confirmed by Radio Contact", the VLR handles the request in the normal way, except that the "Search for MS" procedure is used instead of the "Page MS" procedure.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Confirmed by Radio Contact", the VLR handles the request in the normal way; for this MS, VLR restoration is complete.

- The state of the indicator "Location Information Confirmed in HLR" does not affect the "Send Information for MT SMS" procedure.

c) Send Information for I/C Call Setup (MSC->VLR) - MAP version 1

- If the VLR has no IMSI record, or if the record is marked "Subscriber Data Not Confirmed by HLR" the VLR returns a "System Failure" error. This causes the MSC to report a short message delivery failure, with cause "System Failure", to the SMS gateway MSC.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Not Confirmed by Radio Contact", the VLR handles the request in the normal way, except that the "Search for MS" procedure is used instead of the "Page MS" procedure.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Confirmed by Radio Contact", the VLR handles the request in the normal way; for this MS, VLR restoration is complete.

- The state of the indicator "Location Information Confirmed in HLR" does not affect the "Send Information for MT SMS" procedure.

d) Process Access Request in Response to Search (MSC->VLR)

- If the MS responds to paging, the MSC sends a positive response to the search request and a "Process Access Request" to the VLR. After successful authentication, if required, the VLR sets the indicator "Confirmed by Radio Contact" to "Confirmed", sets the location area information for the MS, and handles the request in the normal way.

- The VLR checks the indicator "Location Information Confirmed in HLR". If it indicates "Not Confirmed" the VLR starts an "Update Location" procedure to the HLR. When this procedure is successfully completed, the VLR sets the indicator "Location Information Confirmed in HLR" to "Confirmed".

For this MS, VLR restoration is complete.

4.2.3 Mobile Terminating Location Request (MT-LR)

Receipt of an MT-LR for a target MS identified by its IMSI in a serving MSC during VLR restoration is supported by the procedures below.

a) Provide Subscriber Location (GMLC->MSC/VLR)

- If the VLR has no IMSI record, or if the record is marked "Subscriber Data Not Confirmed by HLR" the VLR returns an "Unidentified Subscriber" error. This causes the MSC to report a location failure, with cause "Unidentified Subscriber", to the GMLC.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Not Confirmed by Radio Contact", the VLR handles the request in the normal way, except that the "Search for MS" procedure is used instead of the "Page MS" procedure when paging for the MS.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Confirmed by Radio Contact", the VLR handles the request in the normal way; for this MS, VLR restoration is complete.

- The state of the indicator "Location Information Confirmed in HLR" does not affect the "Provide Subscriber Location" procedure.

b) Process Access Request in Response to Search (MSC->VLR)

- If the MS responds to paging, the MSC sends a positive response to the search request and a "Process Access Request" to the VLR. After successful authentication, if required, the VLR sets the indicator "Confirmed by Radio Contact" to "Confirmed", sets the location area information for the MS, and handles the request in the normal way.

- The VLR checks the indicator "Location Information Confirmed in HLR". If it indicates "Not Confirmed" the VLR starts an "Update Location" procedure to the HLR. When this procedure is successfully completed, the VLR sets the indicator "Location Information Confirmed in HLR" to "Confirmed".

For this MS, VLR restoration is complete.

4.2.4 Incoming LCS Information Request (GSM only)

Receipt of an incoming LCS Information Request from an SMLC directed to a specific LMU is supported by the procedures below.

a) Request associated with an LMU (SMLC->MSC/VLR)

- If the VLR has no IMSI record, or if the record is marked "Subscriber Data Not Confirmed by HLR" or if both the record is marked “Location Information not Confirmed in SMLC” and any LMSI supplied by the SMLC is incorrect, the VLR returns an "Unidentified Subscriber" error.

- If the VLR has an IMSI record for an LMU marked "Subscriber Data Confirmed by HLR" and "Not Confirmed by Radio Contact", the VLR handles the request in the normal way, except that the "Search for MS" procedure is used instead of the "Page MS" procedure when paging for the LMU.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Confirmed by Radio Contact" and “Location Information not Confirmed in SMLC”, then if the VLR serves more than one MSC, the VLR verifies if the Location Area for the LMU belongs to the MSC to which the SMLC sent the LCS Information. Request. If this is not verified, the VLR returns an “Unidentified subscriber” error. Otherwise, the VLR handles the request in the normal way and sets the “Location Information Confirmed in SMLC” indicator to “Confirmed”. For this LMU, data restoration is complete.

- If the VLR has an IMSI record marked "Subscriber Data Confirmed by HLR" and "Confirmed by Radio Contact" and “Location Information Confirmed in SMLC”, the VLR handles the request in the normal way. For this LMU, data restoration is complete.

- The state of the indicator "Location Information Confirmed in HLR" does not affect the incoming LCS Information Request.

b) Process Access Request in Response to Search (MSC->VLR)

- If the LMU responds to paging, the MSC sends a positive response to the search request and a "Process Access Request" to the VLR. After successful authentication, if required, the VLR sets the indicator "Confirmed by Radio Contact" to "Confirmed", sets the indicator “Location Information Confirmed in SMLC” to “Confirmed” (if not already “Confirmed”), sets the location area information for the LMU, and handles the request in the normal way.

- The VLR checks the indicator "Location Information Confirmed in HLR". If it indicates "Not Confirmed" the VLR starts an "Update Location" procedure to the HLR. When this procedure is successfully completed, the VLR sets the indicator "Location Information Confirmed in HLR" to "Confirmed".

For this LMU, VLR restoration is complete.

4.2.5 Outgoing MS request

An outgoing request (MS originated call, mobile originated Short Message or call-independent supplementary service activity) from the MS causes the VLR to check its IMSI record for that MS.

- If the MS is unknown in this VLR (i.e. the VLR has no IMSI record for the MS) or there is an IMSI record marked "Subscriber Data Not Confirmed by HLR" the outgoing request is rejected with error cause "Unidentified Subscriber". This causes the MS to initiate the location registration procedure described below.

- If the VLR has an IMSI record for the MS marked "Subscriber Data Confirmed by HLR" the request is handled in the normal way, and after any necessary authentication and/or IMEI checking the record is marked "Confirmed by Radio Contact".

- The VLR checks the indicator "Location Information Confirmed in HLR". If it indicates "Not Confirmed" the VLR starts an "Update Location" procedure to the HLR. When this procedure is successfully completed the VLR sets the indicator "Location Information Confirmed in HLR" to "Confirmed".

For this MS, VLR restoration is complete.

4.2.6 Outgoing LMU Request (GSM only)

An outgoing request (CM ServiceRequest) for LCS from an LMU causes the VLR to check its IMSI record for that LMU.

- If the LMU is unknown in this VLR (i.e. the VLR has no IMSI record for the LMU) or there is an IMSI record marked "Subscriber Data Not Confirmed by HLR" the outgoing request is rejected with error cause "Unidentified Subscriber". This causes the LMU to initiate the location registration procedure described below.

- If the VLR has an IMSI record for the MS marked "Subscriber Data Confirmed by HLR" and “Location Information not Confirmed in SMLC”, the outgoing request is rejected with the error cause “Not registered in SMLC”. This causes the LMU to initiate the location registration procedure described below.

- If the VLR has an IMSI record for the MS marked "Subscriber Data Confirmed by HLR" and “Location Information Confirmed in SMLC”, the request is handled in the normal way, and after any necessary authentication and/or IMEI checking the record is marked "Confirmed by Radio Contact".

- The VLR checks the indicator "Location Information Confirmed in HLR". If it indicates "Not Confirmed" the VLR starts an "Update Location" procedure to the HLR. When this procedure is successfully completed the VLR sets the indicator "Location Information Confirmed in HLR" to "Confirmed".

For this LMU, VLR restoration is complete.

4.2.7 Location Updating or IMSI Attach

A location registration request (location updating or IMSI attach) from an MS causes the VLR to check its IMSI record for that MS.

- If the MS is unknown in this VLR (i.e. the VLR has no IMSI record for the MS) the VLR creates a skeleton IMSI record for the MS and sets the indicators "Confirmed by Radio Contact", "Location Information Confirmed in HLR" and "Subscriber Data Confirmed by HLR" to "Not Confirmed". If authentication is required, the VLR retrieves authentication data. When the radio contact with the Mobile Station is authenticated, the VLR sets the indicator "Confirmed by Radio Contact" to "Confirmed. The VLR then performs an "Update Location" to the HLR. If this is successful, the VLR sets the indicators "Location Information Confirmed in HLR" and "Subscriber Data Confirmed by HLR" to "Confirmed". For this MS, VLR restoration is complete.

- If the VLR has an IMSI record for the MS, after successful authentication, if required, the VLR sets the indicator "Confirmed by Radio Contact" to "Confirmed". If the record is marked "Location Information Not Confirmed in HLR" or "Subscriber Data Not Confirmed by HLR" the VLR performs an "Update Location" to the HLR. If this is successful, the VLR sets the indicators "Location Information Confirmed in HLR" and "Subscriber Data Confirmed by HLR" to "Confirmed". For this MS, VLR restoration is complete.

- If the VLR performs a successful “Update Location” and the IMSI record indicates an LMU with the indicator “Location Information Confirmed in SMLC” set to “Not Confirmed”, the VLR performs an “LCS Registration” to the SMLC associated with either the IMSI or serving cell of the LMU. If this is sucessful, the VLR sets the indicator “Location Information Confirmed in SMLC” to “Confirmed”. For this LMU, VLR restoration is complete.

12 Restoration of Data in an SMLC (GSM only)

12.1 Restart of an SMLC

When an SMLC restarts after a failure, it performs the following actions for those of its associated LMUs whose records have been affected by the fault:

- Reload all administered LMU data from non-volatile back-up
- Mark each LMU as “not registered”
- Reinitialize other temporary data for each LMU to indicate no ongoing measurement or diagnostic activities
- Send an “LCS Reset” message containing no LMU identifier to each VLR where an LMU may be currently served

Any VLR receiving an “LCS Reset” containing no LMU identifier shall reset the indicator “Location Information Confirmed in SMLC” to “Not Confirmed” for each LMU registered with this SMLC. The VLR shall also request the serving MSC for each affected LMU to release any LCS signaling connection to this LMU with the cause “Not registered in SMLC”.

While the “Location Information Confirmed in SMLC” indicator remains “not Confirmed” for any LMU, the VLR shall react to any outgoing request from the LMU as follows

- For an outgoing request for LCS service, the VLR shall return an error response with cause “not registered in SMLC”. This shall cause the LMU to request a location update.
- For a location update request, the VLR shall behave as for a normal MS. Once any location update to the HLR is completed successfully, or if no location update to the HLR is needed, the VLR shall perform an “LCS Registration” to the SMLC. If this is successful, the indicator “Location Information Confirmed in SMLC” shall be set to “Confirmed”.

After an “LCS Registration” has been successfully completed, the SMLC may send an LCS Information Request to the LMU containing an LCS O&M Reset command. On receipt of this, the LMU shall cancel all active LCS measurement and O&M tasks previously ordered by the SMLC.

For this LMU, data restoration in the SMLC is complete.

12.2 Data Restoration for a Specific LMU

An SMLC may restore data for a specific LMU when the data in the SMLC or LMU is considered unreliable (e.g. if there is no communication between the SMLC and LMU for a long time or if messages received by the SMLC are inconsistent with the LMU state kept by the SMLC). To restore data for a specific LMU, the SMLC shall send an “LCS Reset” containing the identity of the LMU to the current serving VLR or to every VLR that may serve the LMU.

Any VLR receiving an “LCS Reset” containing a specific LMU identifier shall reset the indicator “Location Information Confirmed in SMLC” to “Not Confirmed” for this LMU and shall request the serving MSC to release any LCS signaling connection to this LMU with the cause “Not registered in SMLC”. Further actions by the MSC, LMU and SMLC are as described in section 12.1

13 Restoration of Data in an LMU (GSM only)

When an LMU restarts following a failure, it shall reinitialize all data concerning LCS measurement and O&M tasks to indicate that no tasks ordered by an SMLC are active. The LMU shall then perform an “IMSI Attach”. Other actions are for further study.

3GPP TSG-CN WG4 Meeting #01
Charleston, USA, 27 - 31 March 2000

Document N4-000053
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.008	**CR**	**027**	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: N4 **Date:** 20 Mar 2000

Subject: Clarifications on GSM vs. UMTS specific parts

Work item: Location Services

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The architecture for Location Services differs between GSM and UMTS. In UMTS there is no SMLC functionality in the Core Network. For this reason some parts of TS 23.008 needs to be specified as GSM only.

Clauses affected:

Other specs affected:

Other 3G core specifications		→ List of CRs:	23.007, 23.016, 24.030
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

1 Introduction

1.1 Definition

The term subscriber data is used to designate all information associated with a subscription which is required for service provisions, identification, authentication, routing, call handling, GPRS mode transmission, charging, subscriber tracing, operation and maintenance purposes. Some subscriber data are referred to as permanent subscriber data, i.e. they can only be changed by administration means. Other data are temporary subscriber data which may change as a result of normal operation of the system.

Unless shown to be conditional, all data items are considered to be mandatory.

1.2 Storage facilities

This specification considers subscriber data stored in the following types of functional unit:

- Home location register (HLR) which contains all permanent subscriber data and all relevant temporary subscriber data for all mobile subscribers permanently registered in the HLR.
- Visitor location register (VLR) which contains all subscriber data required for call handling and other purposes for mobile subscribers currently located in the area controlled by the VLR.
- Serving GPRS Support Node (SGSN) which contains all subscriber data required for GPRS mode transmission and other purposes for mobile subscribers currently located in the area controlled by the SGSN.
- -Gateway GPRS Support Node (GGSN) which contains all subscriber data required for GPRS mode transmission for mobile subscribers using any service provided by the GGSN.
- Gateway Mobile Location Center (GMLC) which contains all subscriber data required for external clients of the Location Services (LCS).
- In GSM, Serving Mobile Location Center (SMLC) which contains all LMU data required to manage location measurements in LMUs. (Note: a Type A LMU is a network entity that shares many of the attributes of an MS including subscription data in the HLR and identification using an IMSI).

In addition, subscriber data may also be stored in the following functional unit:

- Group Call Register (GCR) which contains all data required for configuration, set-up and handling of voice group and voice broadcast calls. This encompasses subscribers identities (mobile as well as fixed network) who are nominated as dispatchers for one or several groups within the area controlled by the GCR.

NOTE: The data stored in the GCR is not strictly "subscriber data". Description of GCR data is therefore out of scope of this specification and is covered in the corresponding specifications for enhanced Multi Level Precedence and Pre-emption Service (eMLPP), Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS) instead (GSM 03.67, GSM 03.68 and GSM 03.69).

1.3 Subscriber data in functional units other than the HLR, the VLR, the SGSN, the GGSN, the GMLC, the SMLC and the LMU

The individual Subscriber Authentication Key Ki defined in GSM 03.20 is stored in the Authentication Centre AuC; it is also stored in the SIM and therefore available in the MS. Version numbers of algorithms A3 and A8 may also be stored in the AuC.

NOTE: It is for further study whether or not other types of functional units containing mobile subscriber parameters are to be included in this specification. Such units could include encryption key distribution centres, maintenance centres, etc.

2 Definition of subscriber data

2.1 Data related to subscription, identification and numbering

2.1.1 Data defining the subscription profile

2.1.1.1 International Mobile Subscriber Identity (IMSI)

International Mobile Subscriber Identity (IMSI) is defined in GSM 03.03.

IMSI is permanent subscriber data. IMSI is stored in HLR, VLR, SGSN, GGSN and SMLC. For Anonymous Access, IMSI is not used in SGSN nor in GGSN. The IMSI serves as the root of the subscriber data pseudo-tree.

2.1.1.2 Network Access Mode (NAM)

The Network Access Mode defines if the subscriber is registered to get access to the non-GPRS network, to the GPRS network or to both networks. NAM describes the first level of the subscriber data pseudo-tree below the IMSI root. It is permanent subscriber data stored in the HLR and the SGSN with the Gs interface option..

2.1.2 Mobile Station International ISDN Number (MSISDN)

Mobile Station ISDN Number (MSISDN) is defined in GSM 03.03.

The MSISDN is permanent subscriber data and is stored in HLR, VLR and SGSN.

If the multinumbering option applies, the MSISDN stored in the VLR and in the SGSN is the Basic MSISDN, see subclause 2.1.3.1.

2.1.3 MSISDNs for multinumbering option

If the HPLMN allocates different MSISDNs for different Basic Services (see GSM 09.07), these numbers are conditionally stored as permanent data in the HLR.

2.1.3.1 The Basic MSISDN indicator

The Basic MSISDN is defined in GSM 03.12. The Basic MSISDN indicator marks the MSISDN to be used as Basic MSISDN.

It is permanent subscriber data stored conditionally in the HLR.

2.1.3.2 The MSISDN-Alert indicator

The MSISDN-Alert is defined in GSM 03.40. The MSISDN-Alert indicator marks the MSISDN to be used as MSISDN-Alert.

It is permanent subscriber data stored conditionally in the HLR.

2.1.4 Temporary mobile subscriber identity (TMSI)

Temporary mobile subscriber identity (TMSI) is defined in GSM 03.03.

The TMSI is temporary subscriber data and is conditionally stored in the VLR.

2.1.5 Packet-Temporary Mobile Subscriber Identity (P-TMSI)

Packet-Temporary Mobile Subscriber Identity (P-TMSI) is defined in GSM 03.03. Its usage is described in GSM 03.60. P-TMSI is accompanied by the P-TMSI Signature, see subclause 2.3.7.

The P-TMSI is temporary subscriber data and is conditionally stored in the SGSN.

2.1.6 Temporary Link Layer Identifier (TLLI)

Temporary Link Layer Identifier (TLLI) is defined in GSM 03.03. It is derived from the P-TMSI by the MS and occurs in the variants Local TLLI and Foreign TLLI. The TLLI is temporary subscriber data and is conditionally stored in the SGSN. For use of TLLI see GSM 03.60.

2.1.7 Random TLLI

Random TLLI is chosen randomly by the MS. It is defined in GSM 03.03. Random TLLI is short living temporary subscriber data and is conditionally stored in the SGSN. For use of Random TLLI see GSM 03.60.

A Random TLLI may be used if no valid P-TMSI is available.

2.1.8 Local Mobile Station Identity (LMSI)

Local Mobile Station Identity (LMSI) is defined in GSM 03.03. The LMSI is temporary subscriber data. The LMSI may be stored in the VLR; if it is received in the HLR it must be stored there.

2.1.9 International Mobile Equipment Identity (IMEI)

International Mobile Equipment Identity (IMEI) is defined in GSM 03.03. The IMEI is temporary subscriber data and is conditionally stored in the SGSN.

2.2 Data related to Mobile Station types

2.2.1 Mobile Station Category

Mobile Station Category has a structure identical to that of "Calling Party's Category" defined in ISUP (CCITT Recommendation Q.763).

The following values of category shall be supported:

- ordinary subscriber.

The category is assigned per IMSI.

Mobile Station Category is permanent subscriber data and is stored in HLR and VLR.

2.2.2 LMU Identifier (GSM only)

The LMU identifier is part of the subscriber data for a Type A LMU, when associated with an NSS based SMLC, and serves to distinguish a Type A LMU from a normal MS.

2.4.9 MLC number

The MLC number occurs as an SMLC number and as a GMLC number.

2.4.9.1 SMLC number (GSM only)

The SMLC number is the E.164 address of an NSS based SMLC.

The SMLC number is permanent data that may be stored in an MSC in association with either a set of IMSIs belonging to LMUs controlled by the SMLC or a set of cell identifiers belonging to the geographic area served by the SMLC.

2.4.9.2 GMLC number

The GMLC number is the E.164 address of the GMLC. One or more GMLC numbers may be stored in the MS subscriber data in the HLR and downloaded to the VLR. These GMLC numbers identify the GMLCs for the particular MS from which a location request for this MS may be confined for particular LCS clients.

2.16 Data related to Location Services

2.16.1 Subscriber Data stored in HLR

2.16.1.1 Privacy Exception List

This data contains the privacy classes for any target MS which identify the LCS clients permitted to locate the MS. For a detailed definition of this data, refer to GSM 03.71.

2.16.1.2 GMLC Numbers

This data contains the GMLC addresses for an MS subscriber. These addresses may be used to verify that a location request from specific LCS clients is authorized for the target MS.

2.16.1.3 MO-LR List

This data contains the classes of MO-LR that are permitted for the MS subscriber. For a detailed definition of this data, refer to GSM 03.71.

2.16.2 Data stored in GMLC

The GMLC stores data related to LCS clients. Refer to GSM 03.71 for a detailed description.

2.16.3 Data stored in SMLC (GSM only)

The SMLC stores data related to associated Type A and Type B LMUs from which location measurements may be received. Refer to GSM 03.71 for a detailed description.

2.16.4 Data stored in LMU (GSM only)

The LMU stores data related to its LCS measurement and O&M capabilities and may store data related to LCS measurements and O&M reports that it is required to provide to its controlling SMLC. The nature and content of this data is not defined in GSM.

2.16.5 Data stored in the MSC (GSM only)

In order to support routing of connectionless LCS messages to an SMLC or a Type B LMU, the MSC may store permanent routing data for an SMLC or a Type B LMU in association with a specific location area identifier or location area identifier plus cell identifier.

2.16.6 Data stored in the BSC (GSM only)

In order to support routing of connectionless LCS messages to an SMLC or a Type B LMU, the BSC may store permanent routing data for an SMLC or a Type B LMU in association with a specific location area identifier or location area identifier plus cell identifier.

3GPP TSG-CN WG2 Meeting #01
Charleston, USA, 27 - 31 March 2000

Document N4-000054
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.016	CR	014	Current Version:	3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: N4 **Date:** 20 Mar 2000

Subject: Clarifications on GSM vs. UMTS specific parts

Work item: Location Services

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The architecture for Location Services differs between GSM and UMTS. In UMTS there is no SMLC functionality in the Core Network. For this reason some parts of TS 23.016 needs to be specified as GSM only.

Clauses affected:

Other specs affected:

Other 3G core specifications		→ List of CRs:	23.007, 23.008, 24.030
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:


help.doc

<---------- double-click here for help and instructions on how to create a CR.

3 Definitions and abbreviations

3.1 Abbreviations

Abbreviations used in this specification are listed in 3G TS 21.905.

3.2 Definitions

Subscriber data to be stored in the HLR, VLR and SGSN are defined in GSM 03.08, GSM 03.71 and in GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications.

Voice Broadcast Service (VBS), Voice Group Call Service (VGCS) and enhanced Multi Level Precedence and Pre-emption Service (eMLPP) Data related to group call area, cell or dispatcher attributes is only stored in the Group Call Register (GCR) which is linked to each MSC/VLR.

The GCR and its stored data is out of scope of this specification.

Subscriber related VBS, VGCS and eMLPP Data only concerns entitlement data for these-services and is seen as shared non-GPRS subscriber data.

GPRS and non-GPRS subscriber data:

The HLR has to download data to the VLR and to the SGSN. In this specification those data sent to the VLR are called non-GPRS subscriber data and those data sent to the SGSN are called GPRS subscriber data.

Whenever the refining identifier non-GPRS or GPRS is missing a common rule is addressed which hold for both kinds of subscriber data.

Subscriber data specific to non-GPRS shall only be sent from the HLR to the VLR. Subscriber data specific to GPRS shall only be sent from the HLR to the SGSN.

Subscriber data common to both non-GPRS and GPRS (regional subscription information) are downloaded from the HLR to both entities.

Shared non-GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and VLR. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared subscriber data includes:

BS: Bearer Service (see GSM 02.02);

TS: Teleservice (see GSM 02.03);

BSG: Basic Service Group (see GSM 02.01, GSM 02.04 and GSM 03.11);

EBSG: Elementary Basic Service Group (see GSM 03.11);

CBSG: Collective Basic Service Group (see GSM 03.11);

LSA Information: Localised Service Area Information (see GSM 03.73);

SC Information: Super-Charger Information (see 3G TS 23.116);

IST Information: Immediate Service Termination Information (see GSM 03.35).

Shared GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and SGSN. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared GPRS subscriber data includes:

TS: Teleservice (see GSM 02.03);

PDP Context (see GSM 03.60);

LSA Information: Localised Service Area Information (see GSM 03.73);

SC Information: Super-Charger Information (see 3G TS 23.116).

Mandatory data:

Data required to form a self-consistent set of subscriber data. The context governs whether a specific parameter is mandatory, e.g. the data set for a specific service may be optional, however if data for this service is present, then parameters within this data set may be mandatory.

Mandatory data is defined by the service description (see e.g. GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15, GSM 03.71) and by PLMN defined requirements.

NOTE: The above definition is seen from a semantic point of view. Semantically, mandatory parameters may be defined as syntactically optional or mandatory by the protocol.

Optional data:

Data which is defined as subscriber data, but which is not required to form a self-consistent set of subscriber data; the context governs whether a specific parameter is optional.

Optional data is data which is defined by the service description (see e.g. GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15, GSM 03.71) or by PLMN defined requirements but is not defined as mandatory data.

NOTE: The above definition is seen from a semantic point of view. Semantically optional parameters are always defined as syntactically optional by the protocol.

Missing data:

Data which is mandatory in a given context but is not received nor is valid data available locally.

Unexpected data:

Data which is received and cannot be further processed. This may be either:

- optional data not required in a given context; or
- optional or mandatory data, required in this context but received with an unexpected value.

Overlapping data:

Two different cases of overlapping within subscriber data are possible:

- two or more parameters are to be stored at the same address in the data structure (see subclause 4.4);
- two or more BSGs within a BSG list include or are identical with one and the same EBSG.

The following **groups of non-GPRS subscriber information** are defined:

- Subscriber information (Group A):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - category;
  - subscriber status,
  - LMU identifier (GSM only)
- Basic service information (Group B):

- Bearer Service list;
- Teleservice list.

NOTE: VBS and VGCS entitlement data are subsumed under Teleservices

- Supplementary Service (SS) information (Group C):
  - forwarding information;
  - call barring information;
  - Closed User Group (CUG) information;
  - eMLPP data;
  - SS Data;
- Operator Determined Barring (ODB) information (Group D):
  - ODB Data for non-GPRS services;
- Roaming restriction information (Group E):
  - roaming restriction due to unsupported feature;
- Regional subscription information (Group F):
  - regional subscription data.
- VBS/VGCS subscription information (Group G):
  - VBS subscription data;
  - VGCS subscription data.
- CAMEL subscription information (Group H):
  - Originating CAMEL Subscription Information (O-CSI);
  - Dialled Service CAMEL Subscription Information (D-CSI);
  - VMSC Terminating CAMEL Subscription Information (VT-CSI);
  - Supplementary Service Invocation Notification CAMEL Subscription Information (SS-CSI);
  - Translation Information Flag CAMEL Subscription Information (TIF-CSI);
  - SMS CAMEL Subscription Information (SMS-CSI);
  - Mobility Management Event Notification CAMEL Subscription Information (M-CSI).
- LSA Information (Group I):
  - LSA data.
- Super-Charger (SC) Information (Group K):
  - Age Indicator
- Location Services (LCS) information (Group X)
  - GMLC List
  - LCS Privacy Exception List
  - MO-LR List
- IST Information (Group J):
  - IST data.

The following **groups of GPRS subscriber information** are defined:

- Subscriber information (Group P1):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - subscriber status;
- Basic service information (Group P2):
  - Teleservice list.
- Operator Determined Barring (ODB) information (Group P3):
  - ODB Data for GPRS services;
- Roaming restriction information (Group P4):
  - roaming restriction in SGSN due to unsupported feature;
- Regional subscription information (Group P5):
  - regional subscription data.
- GPRS subscription information (Group P6):
  - GPRS subscription data.
- SGSN CAMEL subscription information (Group P7):
  - GPRS CAMEL subscription information;
  - SMS CAMEL subscription information.
- LSA Information (Group P8):
  - LSA data.
- Super-Charger (SC) Information (Group P9):
  - Age Indicator.

3GPP TSG-CN WG4 Meeting #01
Charleston, USA, 27 - 31 March 2000

Document N2-000085
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.030	CR	001r1	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network	X

Source: N4 **Date:** 20 Mar 2000

Subject: Clarifications on GSM vs. UMTS specific parts

Work item: Location Services

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Mobile station based positioning methods are not supported in UMTS LCS for release 99. For this reason mobile originated location request (MO-LR) for assistance data and deciphering keys should not be applicable for UMTS, because these procedures are related to mobile station based positioning methods (e.g. E-OTD and GPS in GSM).

Clauses affected:

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments: GSM TS 04.30 has not yet been transferred to 3GPP specification 24.030, but this is now needed as TSG-SA#7 agreed to include support of UMTS LCS for CS domain in release 99.


help.doc

<--------- double-click here for help and instructions on how to create a CR.

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms"

[2] GSM 03.71: “Digital cellular telecommunications system (Phase 2+); Location Services (LCS); (Functional description) - Stage 2”

[2a] 3G TS 23.171: “Functional stage 2 description of location services in UMTS”

[3] ~~GSM 04.80~~3G TS 24.080: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification; Formats and coding"

3 Definitions and ~~A~~abbreviations

Abbreviations used in the present document are listed in GSM 01.04, ~~and~~ GSM 03.71 and TS 23.171.

The following terms are used in this Technical Specification:

- **MS,** Mobile Station. This specification makes no distinction between MS and UE.

4 Network initiated location services operations

4.1 Location Notification

4.1.1 Normal operation

The network invokes a location notification procedure by sending a REGISTER message containing a LCS-LocationNotification invoke component to the MS. This may be sent either to request verification for MT-LR or to notify about already authorized MT-LR.

In case of privacy verification the MS shall respond to the request by sending a RELEASE COMPLETE message containing the mobile subscriber's response in a return result component (figure 4.1).

If the timer expires in the network before any response from the MS (e.g. due to no response from the user), the network shall interprete this by applying the default treatment defined in GSM 03.71 for GSM and TS 23.171 for UMTS (i.e. dissallow location if barred by subscription and allow location if allowed by subscription).

In the case of location notification no response is required from the MS, the MS shall terminate the dialoque by sending a RELEASE COMPLETE message containing a LocationNotification return result.

If the MS is unable to process the request received from the network, it shall return an error indication by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in TS 24.080~~GSM 04.80~~.

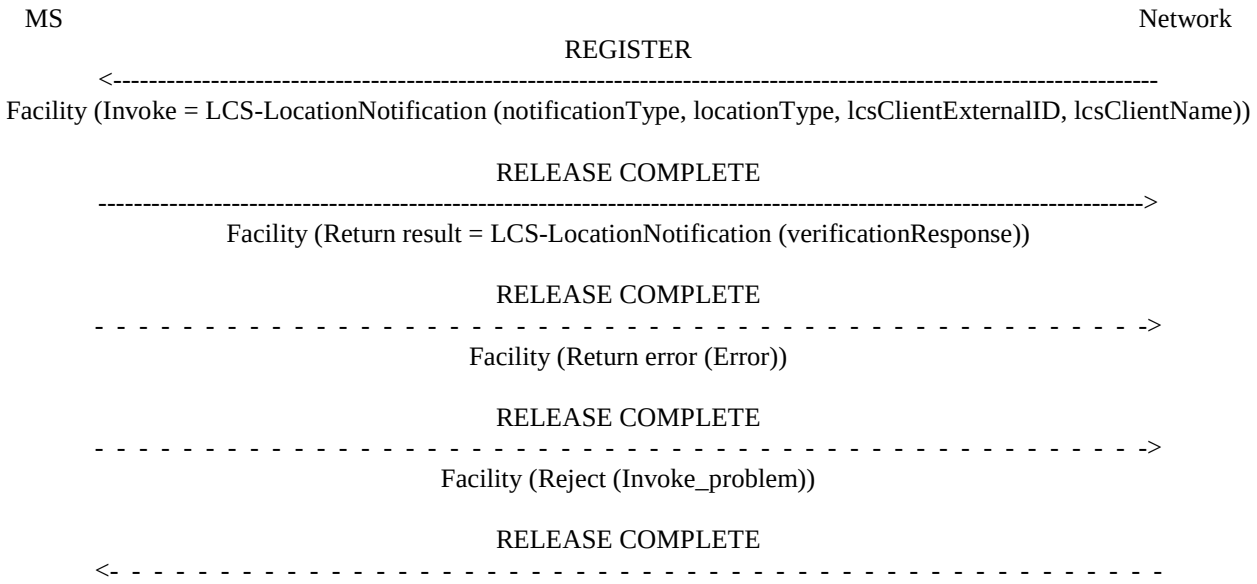

Figure 4.1: Location Notification

5 Mobile initiated location services operations

5.1 Mobile Originated Location Request (MO-LR)

5.1.1 Normal operation

The MS invokes a MO-LR by sending a REGISTER message to the network containing a LCS-MOLR invoke component. In UMTS, the gpsAssistanceData and deCipheringKeys shall not be used as values of molr-Type parameter.

The receiving network entity shall initiate the handling of location request in the network. The network shall pass the result of the location procedure to the MS by sending a FACILITY message to the MS containing a LCS-MOLR return result component.

The MS may terminate the dialogue by sending a RELEASE COMPLETE message in the case of single location request (see figure 5.1). The MS may also initiate another location request operation by sending a FACILITY message to the network containing a LCS-MOLR invoke component (see figure 5.2). After the last location request operation the MS shall terminate the dialogue by sending a RELEASE COMPLETE message.

If the network is unable to process the request received from the MS, it shall clear the transaction by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in TS 24.080~~GSM 04.80~~.

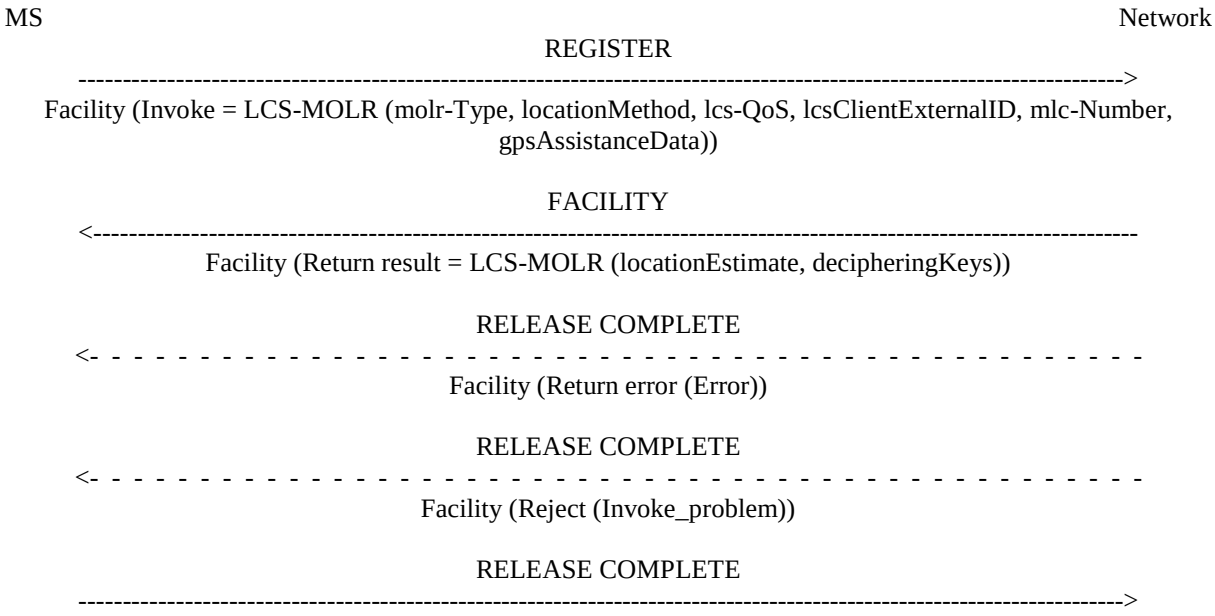

Figure 5.1: Single mobile originated location request

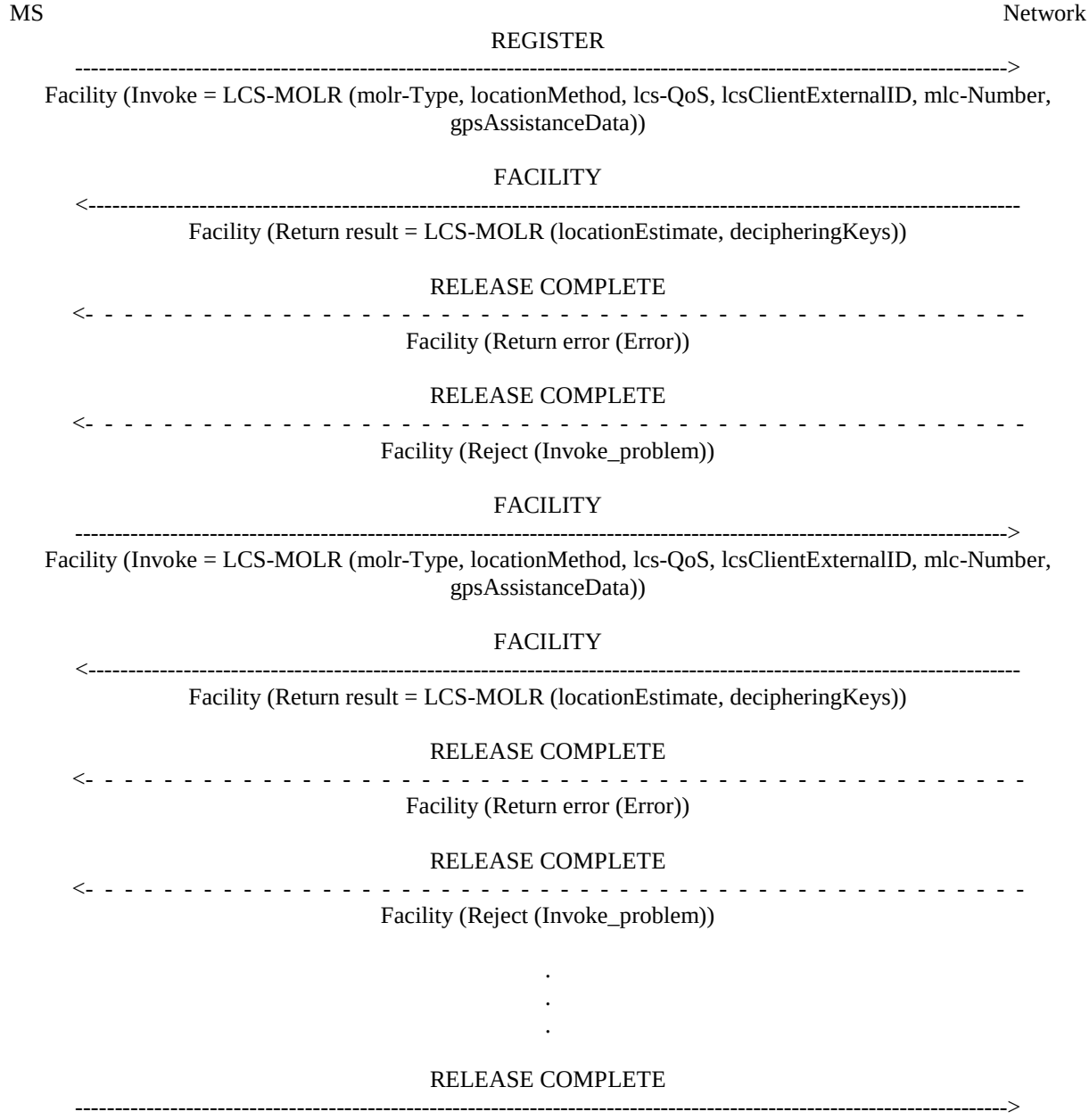

Figure 5.2: Multiple mobile originated location requests

3GPP TSG CN WG4
Rotenburg, Germany, 22-26 May 2000

***Document* N4-000249**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.030	CR	A002	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	X

Source: N4 **Date:** 22 May 2000

Subject: Correction of MO-LR procedure for LCS

Work item: Location Services

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release	A		Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Mirror CR to CR A002 for 04.30.

Clauses affected: 5.1.1

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

5 Mobile initiated location services operations

5.1 Mobile Originated Location Request (MO-LR)

5.1.1 Normal operation

The MS invokes a MO-LR by sending a REGISTER message to the network containing a LCS-MOLR invoke component.

The receiving network entity shall initiate the handling of location request in the network. The network shall pass the result of the location procedure to the MS by sending a FACILITY message to the MS containing a LCS-MOLR return result component.

The MS may terminate the dialogue by sending a RELEASE COMPLETE message in the case of single location request (see figure 5.1). The MS may also initiate another location request operation by sending a FACILITY message to the network containing a LCS-MOLR invoke component (see figure 5.2). After the last location request operation the MS shall terminate the dialogue by sending a RELEASE COMPLETE message.

If the network is unable to successfully fulfil the request received from the MS (e.g. to provide a location estimate or location assistance information), it shall clear the transaction by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in GSM 04.80.

If the network has returned a result to the MS in a FACILITY message but, after some PLMN administered time period has elapsed, has not received either a new location request operation in a FACILITY message or a RELEASE COMPLETE message from the MS, the network may clear the transaction by sending a RELEASE COMPLETE message.

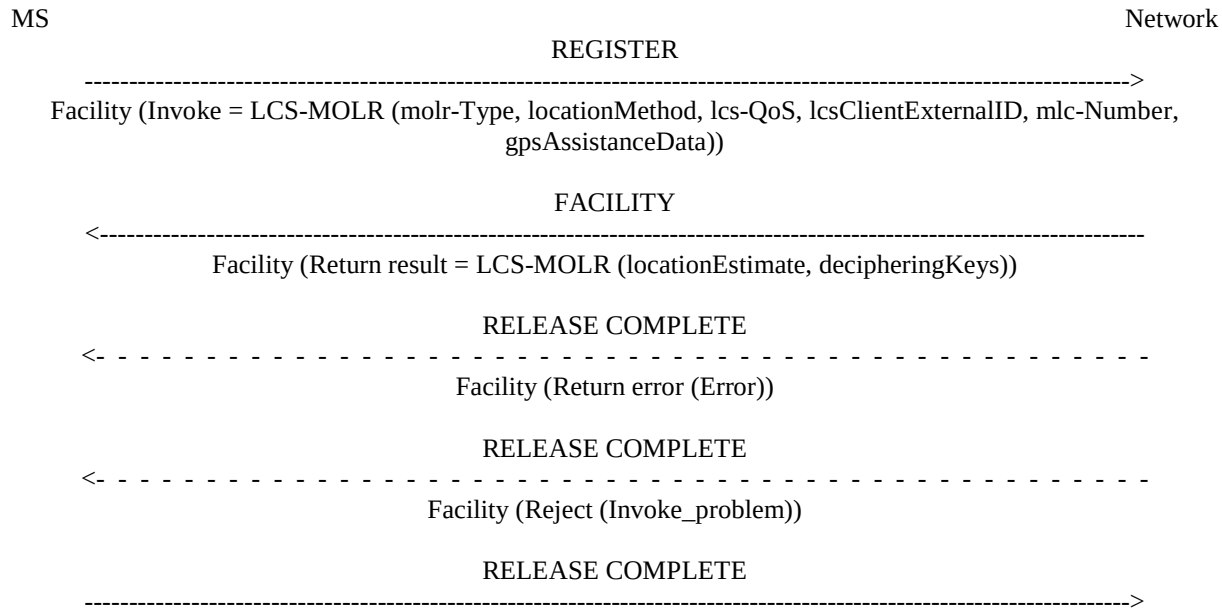

Figure 5.1: Single mobile originated location request

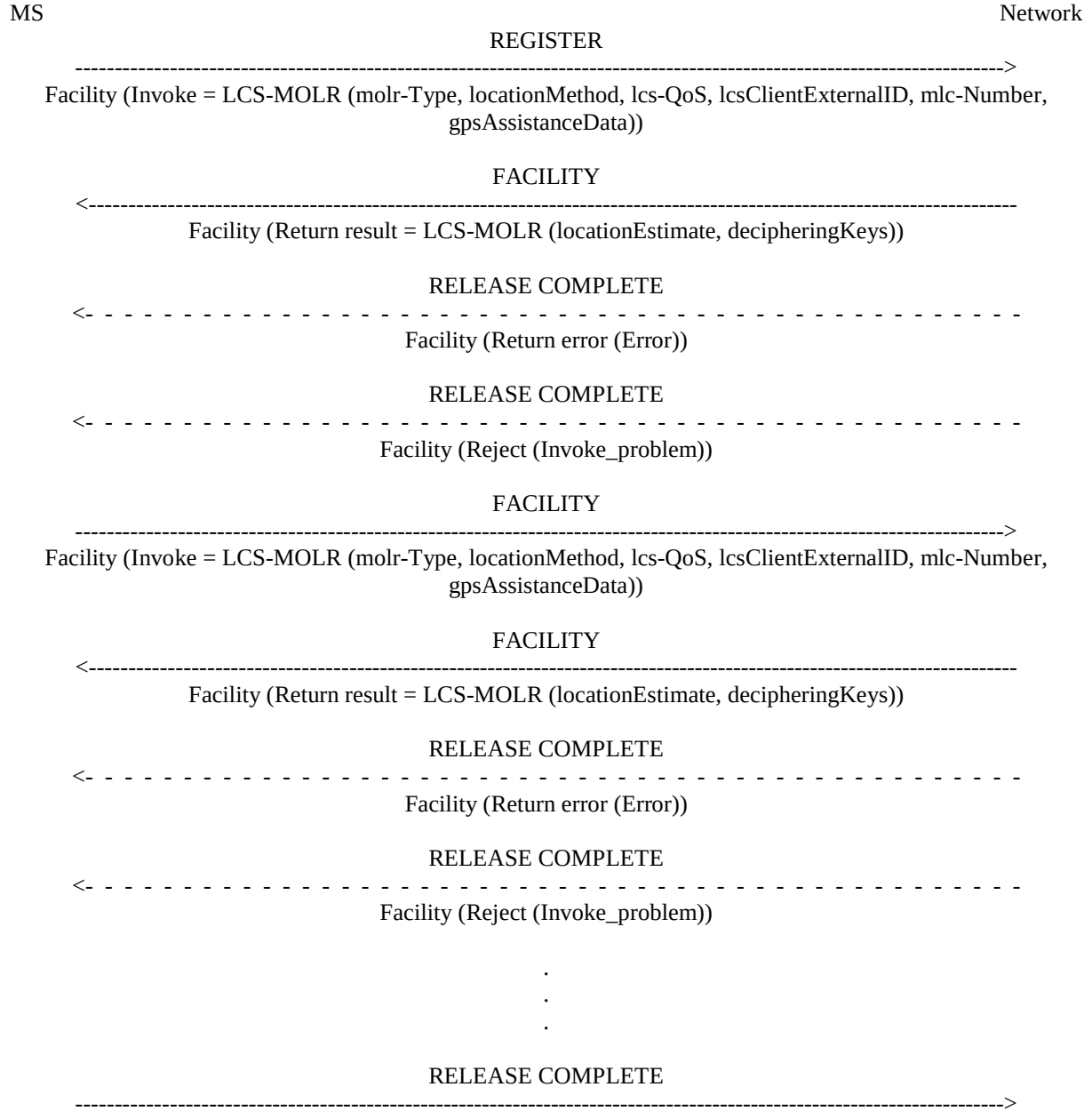

Figure 5.2: Multiple mobile originated location requests

3GPP TSG-CN WG4 Meeting #01
Charleston, USA, 27 - 31 March, 2000

Document N4-000068
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

29.002	CR	125	Current Version:	3.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source: N4 **Date:** 27 Mar 2000

Subject: Clarification to GMLC List definition

Work item: Location Services (LCS)

Category: *(only one category shall be marked with an X)*

Correction		**Release:**	Phase 2	
Corresponds to a correction in an earlier release	X		Release 96	
Addition of feature			Release 97	
Functional modification of feature			Release 98	
Editorial modification			Release 99	X
			Release 00	

Reason for change: In chapter 7.6.3.61 GMLC List is defined to cover GMLCs only in subscriber's HPLMN. In other parts of the specification it has been generalized as in release 98 (see CR A273r1 to GSM TS 09.02). This CR aligns chapter 7.6.3.61 with release 98.

Clauses affected: 7.6.3.61

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other GSM core specifications	X	→ List of CRs:	A273r1 to GSM TS 09.02 (rel98)
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

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

7.6.3 Subscriber management parameters

7.6.3.61 GMLC List

This parameter contains the addresses of all GMLCs that are permitted to issue a non-call related MT-LR location request for this MS. Usage of this parameter is defined in GSM 03.71.

3GPP TSG CN WG4
22 - 26 May 2000
Rotenburg a.d Fulda, Germany,

Document N4-000392
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

29.002	CR	139r1	Current Version:	3.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	CN#08	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: N4 **Date:** 11.5.2000

Subject: Indication of unsupported position method

Work item: LCS

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release	X		Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: MS shall be informed if the requested positioning method in assistance data or in deciphering key request is not supported by the network or by the particular location area

Clauses affected: 7.6.1.4, 17

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	29.031
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

7.6.1.4 User error

This parameter can take values as follows:

NOTE: The values are grouped in order to improve readability; the grouping has no other significance.

.....

i) Location services problem:

- Unauthorized Requesting Network
- Unauthorized LCS Client with detailed reason as follows
- Unauthorzied Privacy Class
- Unauthoized Call Unrelated External Client
- Unauthorized Call Related External Client
- Privacy override not applicable
- Position method failure with detailed reason as follows:
  - Congestion
  - Insufficient resources
  - Insufficient Measurement Data
  - Inconsistent Measurement Data
- Location procedure not completed
- Location procedure not supported by target MS
- QoS not attainable
- Position Method Not Available in Network
- Position Method Not Available in Location Area
- Unknown or unreachable LCS Client

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

17.7.7 Error data types

```
MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version5 (5)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS
   RoamingNotAllowedParam,
   CallBarredParam,
   CUG-RejectParam,
   SS-IncompatibilityCause,
   PW-RegistrationFailureCause,
   SM-DeliveryFailureCause,
   SystemFailureParam,
   DataMissingParam,
```

```
   UnexpectedDataParam,
   FacilityNotSupParam,
   OR-NotAllowedParam,
   UnknownSubscriberParam,
   NumberChangedParam,
   UnidentifiedSubParam,
   IllegalSubscriberParam,
   IllegalEquipmentParam,
   BearerServNotProvParam,
   TeleservNotProvParam,
   TracingBufferFullParam,
   NoRoamingNbParam,
   AbsentSubscriberParam,
   BusySubscriberParam,
   NoSubscriberReplyParam,
   ForwardingViolationParam,
   ForwardingFailedParam,
   ATI-NotAllowedParam,
   SubBusyForMT-SMS-Param,
   MessageWaitListFullParam,
   AbsentSubscriberSM-Param,
   AbsentSubscriberDiagnosticSM,
   ResourceLimitationParam,
   NoGroupCallNbParam,
   IncompatibleTerminalParam,
   ShortTermDenialParam,
   LongTermDenialParam,
   UnauthorizedRequestingNetwork-Param,
   UnauthorizedLCSClient-Param,
   PositionMethodFailure-Param,
   UnknownOrUnreachableLCSClient-Param


;

IMPORTS
   SS-Status
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version5 (5)}

   SignalInfo,
   BasicServiceCode,
   NetworkResource
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version5 (5)}

   SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version5 (5)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version5 (5)}
;

.........
```

```
PositionMethodFailure-Param ::= SEQUENCE {
    positionMethodFailure-Diagnostic    [0] PositionMethodFailure-Diagnostic  OPTIONAL,
    extensionContainer                  [1] ExtensionContainer                OPTIONAL,
    ... }
```

```
PositionMethodFailure-Diagnostic ::= ENUMERATED {
    congestion  (0),
    insufficientResources  (1),
    insufficientMeasurementData  (2),
    inconsistentMeasurementData  (3),
    locationProcedureNotCompleted  (4),
    locationProcedureNotSupportedByTargetMS  (5),
    qoSNotAttainable  (6),
    positionMethodNotAvailableInNetwork  (7),
    positionMethodNotAvailableInLocationArea (8),
    ... }
--  exception handling:
--  any unrecognized value shall be ignored

END
```