3GPP TSG CN Plenary **Tdoc NP-010085**
Meeting #11, Palm Springs, U.S.A
14th - 16th March 2001

Source: **TSG CN WG4**

Title: **CRs to Rel-4 on Work Item LCS**

Agenda item: **8.12**

Document for: **APPROVAL**

Introduction:

This document contains **9** CRs on **Rel-4** Work Item **"LCS"**, that have been agreed by **TSG CN WG4**, and are forwarded to TSG CN Plenary meeting #11 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
24.010	002		N4-010047	Rel-4	Adaptation of SS to PS domain	B	3.1.0
24.030	003		N4-010048	Rel-4	Adaptation of SS to PS domain	B	3.1.0
23.016	020		N4-010113	Rel-4	PS domain support for LCS Release 4	B	3.6.0
29.002	222	1	N4-010198	Rel-4	PS domain support for LCS Release 4	B	4.2.1
23.016	019	1	N4-010200	Rel-4	Extension of call related privacy class for LCS Release 4	B	3.6.0
29.002	231	1	N4-010287	Rel-4	Extension of call related privacy class for LCS Release 4	B	4.2.1
23.008	033	1	N4-010251	Rel-4	Addition of LCS related subscriber data for PS domain	B	3.5.0
29.002	233	1	N4-010334	Rel-4	MS presence notification procedure for LCS	B	4.2.1
29.002	232	1	N4-010375	Rel-4	Maximum numbers of LCS Clients	B	4.2.1

3GPP TSG-CN4 Rel-4 Ad Hoc Meeting **Tdoc N4-010251**
Madrid, SPAIN from 13th to 15th February 2001

CR-Form-v3

CHANGE REQUEST

⌘ **23.008** **CR** **033** ⌘ rev **1** ⌘ Current version: **3.5.0** ⌘

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

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

Title:	⌘	Addition of LCS related subscriber data for PS domain
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	05/02/2001
Category:	⌘	**B**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

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

Reason for change:	⌘	In R4, the location services for CS domain are also applied to PS domain.
Summary of change:	⌘	Addition of LCS related subscriber data for PS domain.
Consequences if not approved:	⌘	

Clauses affected:	⌘	2.4.9, 2.16, 4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	23.016, 29.002
Other comments:	⌘			

How to create CRs using this form:
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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.

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 and SGSN. 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.

*** *Next Change* ***

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 3G TS 23.271~~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 3G TS 23.271~~GSM 03.71~~.

2.16.2 Data stored in GMLC

The GMLC stores data related to LCS clients. Refer to 3G TS 23.271~~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.

*** *Next Change* ***

4 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the HLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Mobile Station ISDN Number (MSISDN).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of the following reference:

- International Mobile Subscriber Identity (IMSI).

See clause 3 for explanation of M, C, T and P in table 1 and table 2.

Table 1: Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
IMSI	2.1.1.1	M	M	P
Network Access Mode	2.1.1.2	M	-	P
International MS ISDN number	2.1.2	M	M	P
multinumbering MSISDNs	2.1.3	C	-	P
Basic MSISDN indicator	2.1.3.1	C	-	P
MSISDN-Alert indicator	2.1.3.2	C	-	P
TMSI	2.1.4	-	C	T
LMSI	2.1.8	C	C	T
Mobile Station Category	2.2.1	M	M	P
LMU Identifier	2.2.2	C	C	P
RAND, SRES and Kc	2.3.1		C	T
RAND, XRES, CK, IK and AUTN	2.3.2	M	C	T
Ciphering Key Sequence Number	2.3.3	-	M	T
MSRN	2.4.1	-	C	T
Location Area Identity	2.4.2	-	M	T
VLR number	2.4.5	M	-	T
MSC number	2.4.6	M	C	T
HLR number	2.4.7	-	C	T
Subscription restriction	2.4.10	C	-	P
RSZI lists	2.4.11.1	C	-	P
Zone Code List	2.4.11.2	-	C	P
MSC area restricted flag	2.4.12	M	-	T
LA not allowed flag	2.4.13	-	M	T
ODB-induced barring data	2.4.15.1	C	-	T
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T
Cell Global ID or Service Area ID	2.4.16	-	C	T
LSA Identity	2.4.17.1	C	C	P
LSA Priority	2.4.17.2	C	C	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	P
LSA Only Access Indicator	2.4.17.3	C	C	P
LSA Active Mode Indicator	2.4.17.4	C	C	P
VPLMN Identifier	2.4.17.5	C	-	P
Provision of bearer service	2.5.1	M	M	P
Provision of teleservice	2.5.2	M	M	P
BC allocation	2.5.3	C		P
IMSI detached flag	2.7.1	-	C	T
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T
Check SS indicator	2.7.4.4	M	-	T
MS purged for non-GPRS flag	2.7.5	M	-	T
MNRR	2.7.7	C	-	T
Subscriber status	2.8.1	C	C	P
Barring of outgoing calls	2.8.2.1	C	C	P
Barring of incoming calls	2.8.2.2	C	-	P
Barring of roaming	2.8.2.3	C	-	P
Barring of premium rate calls	2.8.2.4	C	C	P
Barring of supplementary service management	2.8.2.5	C	C	P
Barring of registration of call forwarding	2.8.2.6	C	-	P
Barring of invocation of call transfer	2.8.2.7	C	C	P
Operator determined barring PLMN-specific data	2.8.3	C	C	P
Notification to CSE flag for ODB	2.8.4	C	-	T
gsmSCF address list for ODB	2.8.5	C	-	P
Handover Number	2.9.1	-	C	T
Messages Waiting Data	2.10.1	C	-	T
Mobile Station Not Reachable Flag	2.10.2	C	M	T
Memory Capacity Exceeded Flag	2.10.3	C	-	T

(continued)

Table 1 (concluded): Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
Trace Reference	2.11.1	C	C	P
Trace Type	2.11.2	C	C	P
Operations Systems Identity	2.11.3	C	C	P
HLR Trace Type	2.11.4	C	-	P
MAP Error On Trace	2.11.5	C	-	T
Trace Activated in VLR	2.11.6	C	C	T
Foreign Subscriber Registered in VLR	2.11.7	-	C	P
VGCS Group Membership List	2.12.1	C	C	P
VBS Group Membership List	2.12.2	C	C	P
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P
Originating CAMEL Subscription Information (O-CSI)	2.14.1.1/3.1	C	C	P
Terminating CAMEL Subscription Information (T-CSI)	2.14.1.2	C	-	P
VMSC Terminating CAMEL Subscription Information (VT-CSI)	2.14.1.2/3.2	C	C	P
Location Information/Subscriber state Information	2.14.1.3	C	-	P
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P
SS invocation notification (SS-CSI)	2.14.1.5/3.2	C	C	P
Translation information flag(TIF-CSI)	2.14.1.6/3.6	C	C	P
Dialled service CAMEL Subscription Information (D-CSI)	2.14.1.10/3.6	C	C	P
USSD General CAMEL service information (UG-CSI)	2.14.2	C	-	P
O-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
SS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
VT-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
SMS-CSI VLR Negotiated CAMEL Capability Handling	2.14.2.1	C		P
M-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
VLR Supported CAMEL Phases	2.14.2.3	C		P
GsmSCF address for CSI	2.14.2.4	C		P
IST Alert Timer	2.15.1	C	C	P
Privacy Exception List	2.16.1.1	C	C	P
GMLC Numbers	2.16.1.2	C	C	P
MO-LR List	2.16.1.3	C	C	P
Age Indicator	2.17.1	C	C	T
CS Allocation/Retention priority	2.18.1	C	C	P

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	M	M	M	M	P
Network Access Mode	2.1.1.2	M	-	C note1	-	P
International MS ISDN number	2.1.2	M	M	M	-	T
multinumbering MSISDNs	2.1.3	C	-	-	-	T
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T .
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T
P-TMSI	2.1.5	-	-	C	-	T
TLLI	2.1.6	-	-	C	-	T
Random TLLI	2.1.7	-	-	C	-	T
IMEI	2.1.9	-	-	C	-	T
RAND/SRES and Kc	2.3.1		-	C	-	T
RAND, XRES, CK, IK, AUTN	2.3.2	M	-	C	-	T
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	T
Current Kc	2.3.6	-	-	M	-	T
P-TMSI Signature	2.3.7	-	-	C	-	T
Routing Area Identity	2.4.3	-	-	M	-	T
VLR Number	2.4.5	M	-	C note2	-	T
SGSN Number	2.4.8.1	M	C note2	-	-	T
GGSN Number	2.4.8.2	M	-	-	-	P
RSZI Lists	2.4.11.1	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	C	-	P
LA not allowed flag	2.4.13	-	-	M	-	T
SGSN area restricted flag	2.4.14	M	-	-	-	T
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	T
LSA Identity	2.4.17.1	C	C	C	-	P
LSA Priority	2.4.17.2	C	C	C	-	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	C		P
LSA Active Mode Support Indicator	2.$.17.2B	C	C	C		P
LSA Only Access Indicator	2.4.17.3	C	C	C	-	P
LSA Active Mode Indicator	2.4.17.4	C	C	C	-	P
VPLMN Identifier	2.4.17.5	C	-	-	-	P
Provision of teleservice	2.5.2	C	-	C	-	P
Transfer of SM option	2.5.4	M	-	-	-	P
MNRG	2.7.2	M	-	M	M	T
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T
MS purged for GPRS flag	2.7.6	M	-	-	-	T
MNRR	2.7.7	C	-	-	-	T
Subscriber Status	2.8.1	C	-	C	-	P
Barring of outgoing calls	2.8.2.1	C	-		-	P
Barring of roaming	2.8.2.3	C	-	C	-	P
ODB PLMN-specific data	2.8.3	C	-	C	-	P
Notification to CSE flag for ODB	2.8.4	C	-	-	-	T
gsmSCF address list for ODB	2.8.5	C	-	-	-	P
Trace Activated in SGSN	2.11.7	C	-	C	-	P
PDP Type	2.13.1	C	-	C	M	P
PDP Address	2.13.2	C	-	C	M	P
NSAPI	2.13.3	-	-	C	C	T
PDP State	2.13.4	-	-	C	-	T
New SGSN Address	2.13.5	-	-	C	-	T
Access Point Name	2.13.6	C	-	C	C	P/T
GGSN Address in Use	2.13.7	-	-	C	-	T
VPLMN Address Allowed	2.13.8	C	-	C	-	P
Dynamic Address	2.13.9	-	-	-	C	T
SGSN Address	2.13.10	-	-	-	M	T
GGSN-list	2.13.11	M	-	-	-	T

(continued)

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C note2	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
PDP Context Identifier	2.13.24	C	-	C	-	T
PDP Context Charging Characteristics	2.13.25	C	-	C	C	P
Short Message Service CAMEL Subscription Information (SMS-CSI)	2.14.4.1/1.8	C	-	C	-	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.4.2/1.9	C	-	C	-	C
SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
SGSN Supported CAMEL Phases	2.14.2.3	C	-	-	-	P
GsmSCF address for CSI	2.14.2.4	C	-	-	-	P
Age Indicator	2.16.1	C	-	C	-	T
Subscribed Charging Characteristics	2.19.1	C	-	C	C	P
Privacy Exception List	2.16.1.1	C	-	C	-	P
GMLC Numbers	2.16.1.2	C	-	C	-	P
MO-LR List	2.16.1.3	C	-	C	-	P

The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.

note1: This parameter is relevant in the SGSN only when the Gs interface is installed.

note2: The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

For special condition of storage see in clause 2.
See clause 3 for explanation of M, C, T and P in table 2.

3GPP TSG-CN4 Meeting #6
Beijing, China, 15-19 Jan.

Tdoc N4-010200

CR-Form-v3

CHANGE REQUEST

⌘ **23.016** **CR** **019** ⌘ rev **1** ⌘ Current version: **3.6.0** ⌘

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

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

Title:	⌘	Extension of call related privacy class for LCS Release 4
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	18/Jan/2001
Category:	⌘	**B**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
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R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change: ⌘ The reflection of the extension of call related privacy class described in LCS Stage2.

Summary of change: ⌘ This CR shows that the reflection of the description to the 23.016 related to the extension of "call related privacy class" agreed in the last SA plenary and described in LCS Stage 2 (23.271).

The agreed description in SA plenary is as follows;
-----23.271 section 10.1.1 Table 10.2 [Call / session Related Class] --- from --------
Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list:

- Location not allowed
- Location allowed without notification (default case)
- Location allowed with notification
- Location with notification and privacy verification; location allowed if no response
- Location with notification and privacy verification; location restricted if no response

External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list:

- International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target MS
- Restriction on the GMLC. Possible values are:
  - Identified GMLCs only
  - Any GMLC in the home country
- Indication of one of the following mutually exclusive options:
  - Location allowed without notification (default case)
  - Location allowed with notification
  - Location with notification and privacy verification; location allowed if no response
  - Location with notification and privacy verification; location restricted if no response

--- to ----------

		According to SA agreement, the additional description to 23.016 is as follows; 1) External Client is used by “call related privacy class” User can establish the privacy class for specific external Clients during the communication.
Consequences if not approved:	⌘	

Clauses affected:	⌘	4.5.4			
Other specs affected:	⌘	X	Other core specifications	⌘	N4-010199(29.002-221r1)
			Test specifications		
			O&M Specifications		
Other comments:	⌘	The requirement of this modification is for Release 4. After this CR is approved, the content will be reflected in the 23.016 version 4.0.0.			

How to create CRs using this form:
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http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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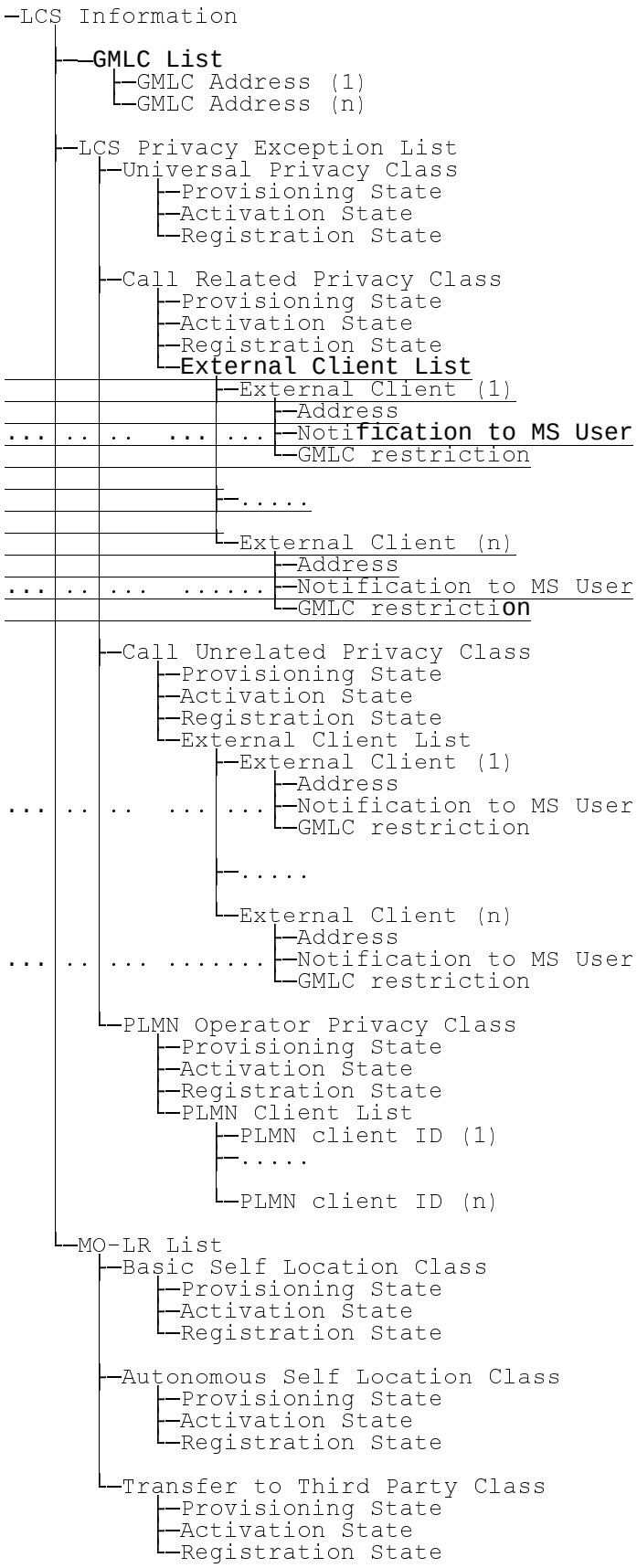
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest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

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

4.5.4 Consistency of Supplementary Service data



NOTE: For detailed information see 3GPP TS~~GSM 0~~23.x71 and 3GPP TS 29.002.

Figure 16: LCS Information

3GPP TSG-CN4 Meeting #6
Beijing, China, 15-19 Jan.

Tdoc N4-010113

CR-Form-v3

CHANGE REQUEST

⌘ **23.016** **CR** **020** ⌘ rev **-** ⌘ Current version: **3.6.0** ⌘

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

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

Title:	⌘	PS domain support for LCS Release 4
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	08/01/2001
Category:	⌘	**B**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

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

Reason for change: ⌘ This CR shows the adaptation of PS domain for LCS Release 4 according to LCS Stage2.

Summary of change: ⌘ According to SA agreement, the additional description to 23.016 is as follows;

1) GSM 03.71 -> 3G TS 23.x71
In this specification, the x is used for the flexible extension.

2) The addition of the “LCS information for PS” to the information sent by HLR
LCS information is used not only CS domain but also PS domain.
P11(LCS information for PS) is newly added.

Consequences if not approved: ⌘

Clauses affected: ⌘ 2, 3.2, 4.3.1, 4.5.4

Other specs affected: ⌘
- ☒ Other core specifications ⌘ N4-010053(29.002-222)
- ☐ Test specifications
- ☐ O&M Specifications

Other comments: ⌘ The requirement of this modification is for Release 4. After this CR is approved, the content will be reflected in the 23.016 version 4.0.0.

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

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

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

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

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.
- For this Release 1999 document, references to 3G documents are for Release 1999 versions (version 3.x.y).

[1] 3GPP TS 21.905: "3G Vocabulary".

[2] 3GPP TS 22.002: "Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[3] 3GPP TS 22.004: "General on supplementary services".

[4] 3GPP TS 23.007: "Restoration procedures".

[5] 3GPP TS 23.008: "Digital cellular telecommunications system (Phase 2+); Organization of subscriber data".

[6] 3GPP TS 23.011: "Technical realization of supplementary services - General Aspects".

[7] 3GPP TS 23.015: "Technical realization of Operator Determined Barring (ODB)".

[8] 3GPP TS 23.060: "General Packet Radio Service (GPRS) - Stage 2".

[9] 3GPP TS 23.067: "Enhanced Multi-Level Precedence and Preemption service (EMLPP) - Stage 2".

[10] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - Phase 3 Stage 2".

[11] 3GPP TS 23.081: "Line identification Supplementary Services - Stage 2".

[12] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[13] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[14] 3GPP TS 23.084: "MultiParty (MPTY) Supplementary Service - Stage 2".

[15] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Service - Stage 2".

[16] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Service - Stage 2".

[17] 3GPP TS 23.088: "Call Barring (CB) Supplementary Service - Stage 2".

[18] 3GPP TS 23.090: "Unstructured Supplementary Service Data (USSD) - Stage 2".

[19] 3GPP TS 23.091: "Explicit Call Transfer (ECT) supplementary service - Stage 2".

[20] 3GPP TS 23.093: "Completion of Calls to Busy Subscriber (CCBS) - Stage 2".

[21] 3GPP TS 23.096: "Calling Name Presentation (CNAP) supplementary service - Stage 2".

[22] 3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2."

[23] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[24] 3GPP TS 29.060: "GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[25] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[26] GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[27] GSM 02.32: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service Description - Stage 1".

[28] GSM 03.35: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Stage 2".

[29] GSM 03.68: "Digital cellular telecommunications system (Phase 2+);Voice Group Call Service (VGCS) - Stage 2".

[30] GSM 03.69: "Digital cellular telecommunications system (Phase 2+);Voice Broadcast Service (VBS) - Stage 2".

[31] 3GPP TS 23.x71~~GSM 03.71~~: "~~Digital cellular telecommunications system (Phase 2+);~~ Location Services (LCS); Functional Description; Stage 2".

[32] 3GPP TS 23.135: "Multicall supplementary service; Stage 2".

Next Change

3.2 Definitions

Subscriber data to be stored in the HLR, VLR and SGSN are defined in 3GPP TS 23.008, 3GPP TS 23.x71~~GSM 03.71~~, 3GPP TS 23.135 and in 3GPP TS 23.06x, 3GPP TS 23.08x and 3GPP TS 23.09x-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 3GPP 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 3GPP TS 23.116);

Charging Information (see 3GPP TS 23.060).

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. 3GPP TS 23.06x, 3GPP TS 23.08x and 3GPP TS 23.09x-series of technical specifications, 3GPP TS 23.015, 3GPP TS 23.x71~~GSM 03.71~~ and 3GPP TS 23.135) and by PLMN defined requirements.

NOTE 1: 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. 3GPP TS 23.06x, 3GPP TS 23.08x and 3GPP TS 23.09x-series of technical specifications, 3GPP TS 23.015, 3GPP TS 23.x71~~GSM 03.71~~ and 3GPP TS 23.135) or by PLMN defined requirements but is not defined as mandatory data.

NOTE 2: 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 3: 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;
  - MC 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.
- Bearer Service Priority Information (Group L):
    - Bearer Service Priority 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.
- Charging Information (Group P10):
    - Subscribed Charging Characteristics.
- Location Services (LCS) information (Group P11);

- GMLC List;
- LCS Privacy Exception List;
- MO-LR List.

Next Change

4.3.1 Order of information sent by the HLR

The order of information is defined by the order in which the transfer syntax is generated by the HLR. This includes a sequence of messages as well as the syntax within a message (first to last message, component, operation, parameter, etc.).

With the above definitions, the following rules shall apply for non-GPRS subscriber data for the order of information within an HLR-VLR dialogue:

- Group A information (subscriber status) shall be sent first;
- Group B information shall be sent after Group A information and before any Group C, E, F, G, H, J, L or X information;
- Group D information shall be sent after Group A information and in any order with respect to Group B, C, E, F, G, H, J, K, L and X information.
- a specific order of Group C, E, F, G, H, J, K, L or X information is not required.

There is no requirement for the sending of subscriber information groups in the same message.

With the above definitions, the following rules shall apply for GPRS subscriber data for the order of information within a dialogue:

- Group P1 information (subscriber status) shall be sent first;
- Group P2 information shall be sent after P1 information and before P4 and P5 information;
- Group P3 information shall be sent after Group P1 information and in any order with respect to Group P2, P4, P5, P6, P7, P8 and P11~~8~~ information;
- a specific order of Group P4, P5, P6, P9~~, and~~ P10 and P11 information is not required.

Next Change

4.5.4 Consistency of Supplementary Service data

In some cases, the protocol used between the HLR and VLR encodes some data that is not EBSG-related SS data with an EBSG qualifier. In this case, the HLR shall ensure that when this data is sent it is always the same for all EBSGs. If this data is modified, the HLR must send the supplementary service data to the VLR for all EBSGs which meet all the following criteria:

- at least one basic service in the EBSG is supported; and
- the supplementary service is applicable to at least one (possibly different) basic service in the EBSG; and
- the subscriber has a subscription to at least one (possibly different) basic service in the EBSG.

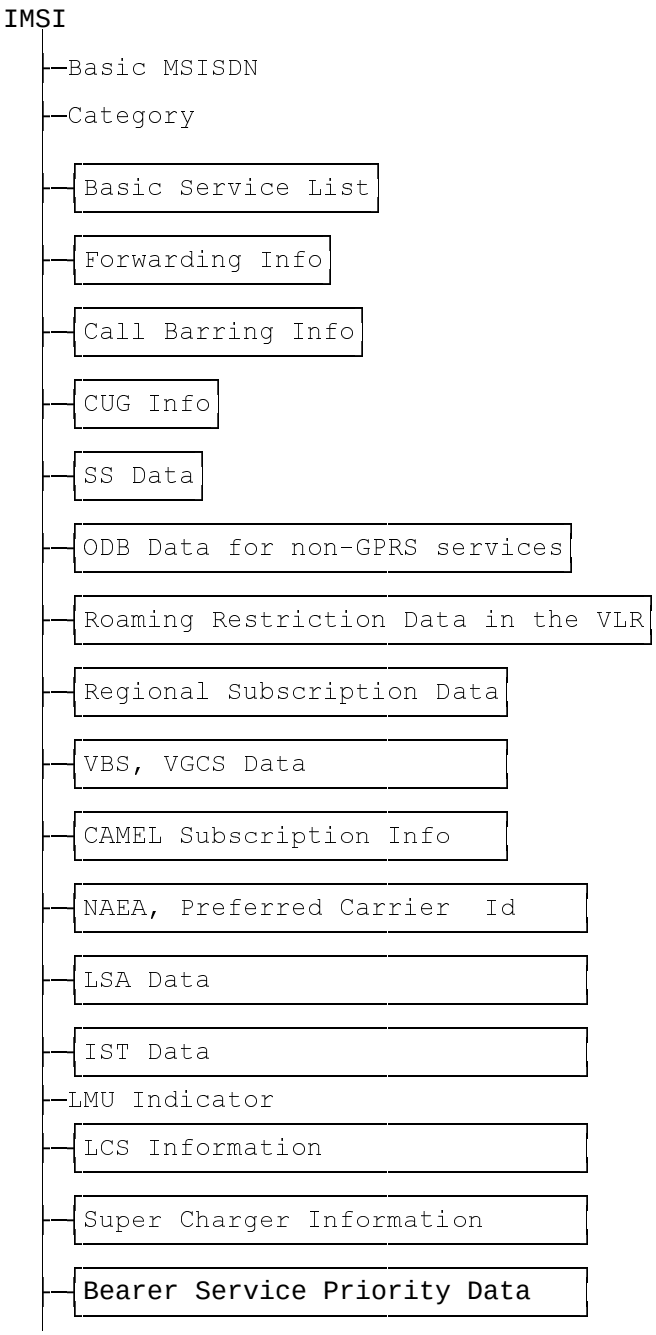


Figure 1: Abstract data structure of non-GPRS Subscriber Data (Data sent to the VLR)

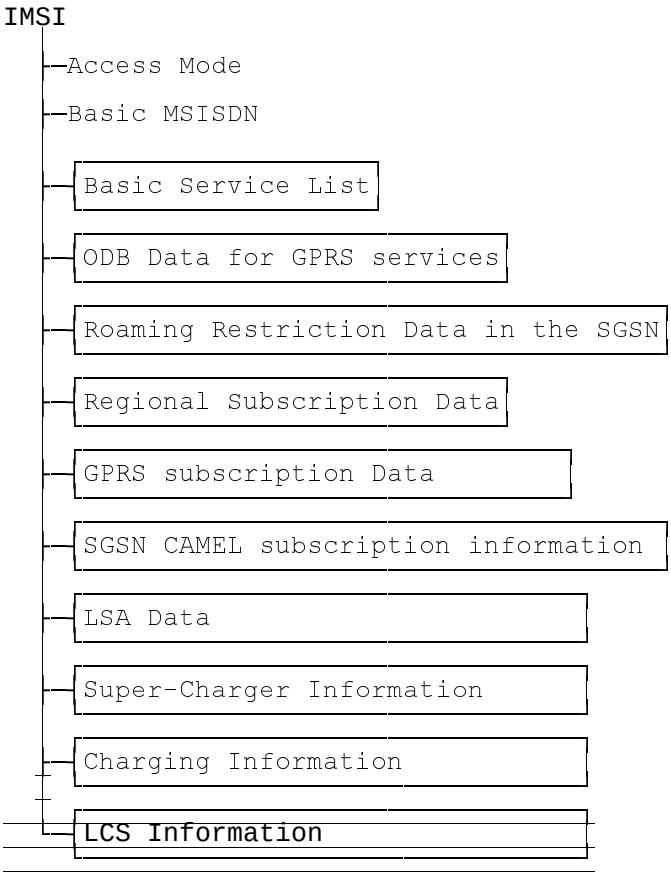


Figure 2: Abstract data structure of GPRS Subscriber Data (Data sent to the SGSN)

3GPP TSG-CN4 Meeting #06 **Tdoc N4-010047**
BEIJING, CHINA 15th 19th January 2001

CR-Form-v3

CHANGE REQUEST

⌘ **24.010** **CR** **002** ⌘ rev **-** ⌘ Current version: **3.1.0** ⌘

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

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

Title:	⌘	Adaptation of SS to PS domain
Source:	⌘	CN4
Work item code:	⌘	LCS ***Date:*** ⌘ 18/Jan/2001
Category:	⌘	**B** ***Release:*** ⌘ REL-4

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

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

Reason for change:	⌘	In CN1#14, it was agreed that Supplementary Service protocol is applied to PS domain to support LCS. It is required to add some descriptions to relevant SS specifications.
Summary of change:	⌘	It is described that call independent supplementary services can be applied to PS domain regarding to specific services. And a “PS-signaling connection” is established between MS and network on PS domain.
Consequences if not approved:	⌘	It would not be clear that LCS operations are applied to both CS and PS domain.

Clauses affected:	⌘	1.1, 2.2.5, 3.1
Other specs affected:	⌘	☒ Other core specifications ⌘ 24.007, 24.030 ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	This CR is against REL-4, so if approved, the version is supposed to be 4.0.0.

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

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

1 Scope

The present document gives the general aspects of the specification of supplementary services at the layer 3 radio interface.

GSM 04.8x and 04.9x-series specify the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

GSM 04.08 and GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and 02.9x-series.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and 03.9x-series.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3 radio interface are defined in GSM 04.07 and GSM 04.08.

1.1 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.

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

[2] GSM 02.04: "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[3] GSM 02.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 1".

[4] GSM 02.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 1".

[5] GSM 02.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".

[6] GSM 02.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 1".

[7] GSM 02.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 1".

[8] GSM 02.86: "Digital cellular telecommunications system (Phase 2+); Advice of charge (AoC) supplementary services - Stage 1".

[9] GSM 02.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 1".

[10] GSM 02.90: "Digital cellular telecommunications system (Phase 2+); Unstructured Supplementary Services Data (USSD) - Stage 1".

[11] GSM 02.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) supplementary service - Stage 1".

[12] GSM 03.11: "Digital cellular telecommunications system (Phase 2+); Technical realization of supplementary services".

[13] GSM 03.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 2".

[14] GSM 03.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 2".

[15] GSM 03.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[16] GSM 03.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 2".

[17] GSM 03.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 2".

[18] GSM 03.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 2".

[19] GSM 03.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 2".

[20] GSM 03.90: "Digital cellular telecommunications system (Phase 2+); Unstructured supplementary services operation - Stage 2".

[21] GSM 03.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) supplementary service - Stage 2".

[22] GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[23] GSM 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Stations system (MS - BSS) interface; Channel structures and access capabilities".

[24] GSM 04.04: "Digital cellular telecommunications system (Phase 2+); Layer 1; General requirements".

[25] GSM 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer; General aspects".

[26] GSM 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[27] ~~GSM 04.07~~3G TS 24.007: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface signalling layer 3; General aspects".

[28] ~~GSM 04.08~~3G TS 24.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile radio interface layer 3 specification".

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

[28] GSM 04.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 3".

[29] GSM 04.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 3".

[30] GSM 04.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[31] GSM 04.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 3".

[32] GSM 04.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 3".

[33] GSM 04.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 3".

[34] GSM 04.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 3".

[35] GSM 04.90: "Digital cellular telecommunications system (Phase 2+); Unstructured supplementary services operation - Stage 3".

[36] GSM 04.91: "Digital cellular telecommunications system (Phase 2+); Explicit Call Transfer (ECT) supplementary service - Stage 3".

[37] GSM 05.01: "Digital cellular telecommunications system (Phase 2+); Physical layer on the radio path; General description".

[38] GSM 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[39] GSM 05.03: "Digital cellular telecommunications system (Phase 2+); Channel coding".

[40] GSM 05.04: "Digital cellular telecommunications system; Modulation".

[41] GSM 05.05: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[42] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[43] GSM 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".

[44] GSM 05.90: "Digital cellular telecommunications system; GSM Electro Magnetic Compatibility (EMC) considerations".

[45] GSM 09.02: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[46] GSM 09.11: "Digital cellular telecommunications system (Phase 2+); Signalling interworking for supplementary services".

[47] CCITT Recommendation Q.774 (White Book): "Specifications of Signalling System No.7; Transaction capabilities procedures".

2.2.5 Call independent supplementary service procedures

2.2.5.1 Introduction

For supplementary service procedures independent of any call, the initiating side must establish a MM-connection between the network and the MS according to the rules given in ~~GSM 04.07~~TS 24.007 and ~~04.08~~24.008. The call independent supplementary service procedures shall apply to both CS and PS domain for some specific services. On PS domain, a PS-signalling connection shall be established between the network and the MS instead of a MM-connection. The MS or the network starts the transaction by transferring a REGISTER message across the radio interface. This transaction is identified by the transaction identifier associated with the REGISTER message, and the Invoke identifier present in the component part of the Facility information element. Following the REGISTER message one or more FACILITY messages may be transmitted, all of them related by the use of the same transaction identifier. If the transaction is no longer used, it shall be released by sending a RELEASE COMPLETE message. This procedure is specified in detail in clause 3, and the text in clause 3 takes precedence over this introduction.

To convey the supplementary service invocation, the Facility information element is used. The Facility information element present either in the REGISTER message or a subsequent message identifies the supplementary service involved and the type of component (i.e. Invoke, Return result, Return error or Reject component).

When the REGISTER or FACILITY message contains a Facility information element and the requested service is available, a FACILITY message containing a Facility information element may be returned. One or more exchanges of FACILITY messages may subsequently occur. To terminate the service interaction and release the transaction identifier value, a RELEASE COMPLETE message is sent as specified for the specific supplementary service procedure. The RELEASE COMPLETE message may also contain the Facility information element.

2.2.5.2 Handling of protocol errors in call independent SS procedures

Messages containing a Facility information element shall be checked for protocol errors before the contents of the Facility IE is acted on. The checks shall be performed in the following order:

1) The message carrying the Facility IE shall be checked for protocol errors as specified in subclause 3.7. If a protocol error is found then the procedures in subclause 3.7 apply.

2) The contents of the Facility IE shall be checked for protocol errors as specified in subclause 2.2.8. If a protocol error is found then the procedures in subclause 2.2.8 apply.

2.2.5.3 Handling of other errors in call independent SS procedures

If the tests specified in subclause 2.2.5.2 have been passed without the detection of a protocol error, the receiver will attempt to process the contents of the Facility Information Element. If errors occur during this processing (e.g. system failure, or information in the Facility IE is incompatible with the requested operation) then the procedures specified in the individual service specifications apply.

An example of the behaviour that could occur in this case is:

- the MS or network sends a Facility information element containing a return error component in a FACILITY or RELEASE COMPLETE message. If the FACILITY message is used then the MM Connection may continue to be used for further signalling.

2.2.6 Multiple supplementary service invocations

2.2.6.1 Call related supplementary service procedures

Simultaneous requests for different supplementary service procedures (i.e. using more than one operation in the Facility information element) are permitted. Interactions between different operations shall be managed by processing the operations in the order in which they appear in the Facility information element.

2.2.6.2 Call independent supplementary service procedures

Where permitted by the relevant stage 3 specification, multiple operations may be sent on the same transaction.

It is possible for several call independent SS transactions to be used simultaneously. Call independent SS transactions can also exist in parallel with other CM-Layer and MM transactions. The handling of multiple MM connections is defined in GSM 04.07 and 04.08.

For call independent operations a single Facility Information Element shall not contain more than one component.

2.2.7 Recovery procedures

2.2.7.1 Call related supplementary service recovery procedures

There are no additional recovery procedures for call related supplementary service signalling on the radio path. The recovery procedures as specified for the basic service apply.

2.2.7.2 Call independent supplementary service recovery procedures

In case a transaction is not terminated according to the normal procedure as described in technical specifications GSM 04.8x and 04.9x-series, the network side has to ensure that the transaction is terminated e.g. by a supervision timer.

2.2.8 Generic protocol error handling for the component part of supplementary services operations

If (according to the rules specified in GSM 09.02) a supplementary service operation is to be rejected the operation will be denied, and provided the transaction is still in progress, an appropriate reject component will be returned in a Facility Information Element.

The handling of the transaction depends on whether the operation is call related or call independent.

2.2.8.1 Call related component errors

If the call related transaction is still in progress then a reject component shall be sent. Any message which contains a Facility Information Element may be used. In general, the transaction (call) associated with the rejected operation shall not be automatically released by the entity that detects the error. The transaction (call) may be released in some exceptional cases where security related services are involved (e.g. Advice of Charge (Charging)). If this behaviour is required, then it will be specified in the relevant specification for the individual service.

When a reject component for a call related operation is received by a MS or MSC then it may initiate release of the transaction (call) if this is a specified action for the service the SS operation relates to.

Note that this behaviour is intended to allow security related services to release calls if one entity in the system does not support the service. The normal action should be to allow the call to continue.

If the call related transaction has terminated before the operation has been rejected (e.g. the component containing the error was sent in a RELEASE COMPLETE message) then the contents of the component shall be ignored, and no reject component is sent.

2.2.8.2 Call independent component errors

2.2.8.2.1 Single component errors

The reject component shall be sent in a RELEASE COMPLETE message.

If the component containing the error was itself sent in a RELEASE COMPLETE message then the contents of the component shall be ignored, and no reject component is sent.

2.2.8.2.2 Multiple component errors

If a single Facility IE contains more than one component then a RELEASE COMPLETE message with the cause "Facility rejected" and without any component shall be sent.

3 Supplementary service support procedures

3.1 General

This clause describes the supplementary service support procedures at the radio interface. These procedures are provided by the supplementary service support entity defined in ~~GSM 04.07~~TS 24.007. The supplementary service support procedures provide the means to transfer messages for the call independent supplementary service procedures. These procedures are regarded as the user of the supplementary service support.

The call independent supplementary service procedures shall apply to both CS and PS domain for some specific services. On PS domain, a PS-signalling connection shall be established between the network and the MS instead of a MM-connection.

3.2 Supplementary service support establishment

At the beginning of each call independent supplementary service procedure a supplementary service support must be established.

3.2.1 Supplementary service support establishment at the originating side

If the entity that uses the supplementary support procedures wants to send a REGISTER message, the supplementary service support entity shall first request the establishment of an MM-connection. This MM-connection is established according to GSM 04.08 and 04.07. If the network is the initiating side then MM-connection establishment may involve paging the MS.

The supplementary service support entity shall send the REGISTER message as the first CM-message on the MM-connection. The REGISTER message is sent to the corresponding peer entity on the MM-connection and the supplementary service support shall be regarded as being established.

3.2.2 Supplementary service support establishment at the terminating side

At the terminating side a supplementary service support is regarded as being established when an MM-connection is established. According GSM 04.08 this can be ascertained by the receipt of the first message, with a new transaction identifier. For successful establishment of supplementary service support this message shall be a REGISTER message.

If the terminating side wishes to reject the establishment of supplementary services support then it may be immediately initiate supplementary services support release (see subclause 3.4).

3.3 Supplementary service support information transfer phase

Upon the establishment of the supplementary service support both users may exchange FACILITY messages by use of the supplementary service support.

3.4 Supplementary service support release

At the end of each call independent supplementary service procedure the established supplementary service support is released.

The side closing the transaction shall release the transaction by sending the RELEASE COMPLETE message to its corresponding peer entity.

Both supplementary service support entities release the MM-connection locally.

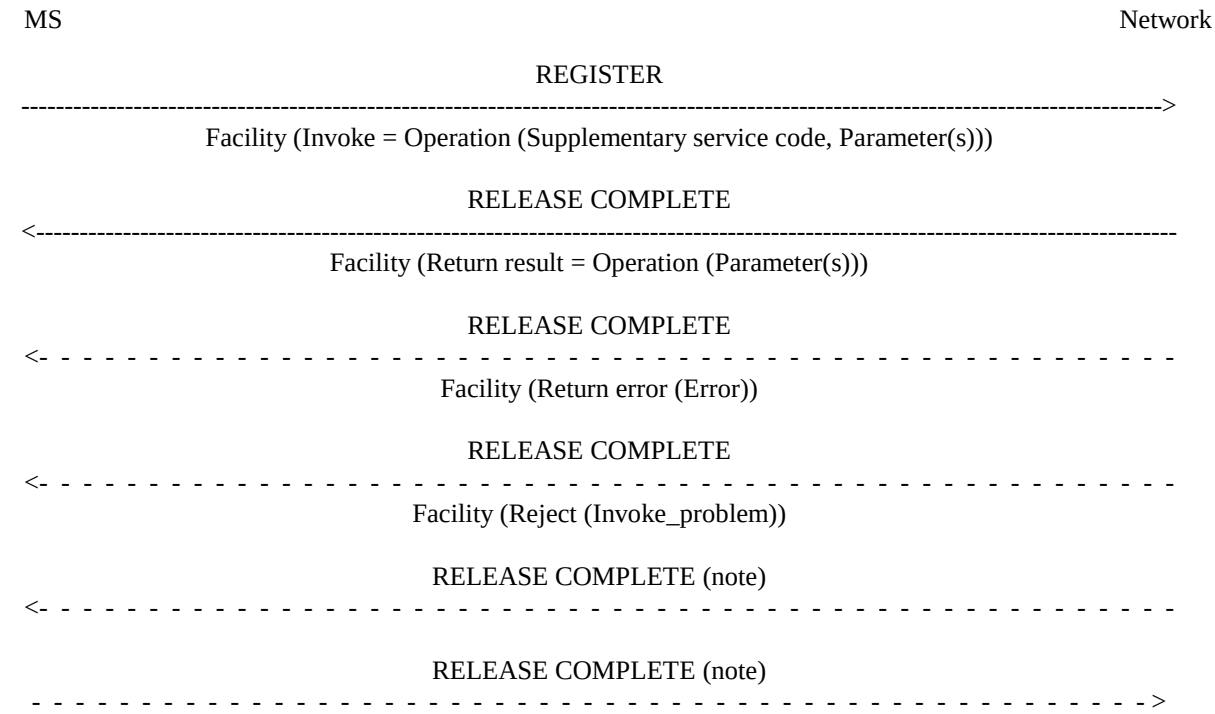
3.5 Recovery procedures

The supplementary service support does not provide recovery procedures, i.e. the operations are transparent to the supplementary service support.

3.6 Message flow (single operation example)

This subclause contains examples of message flows for a single transaction consisting of a single operation. These examples may not show all possibilities.

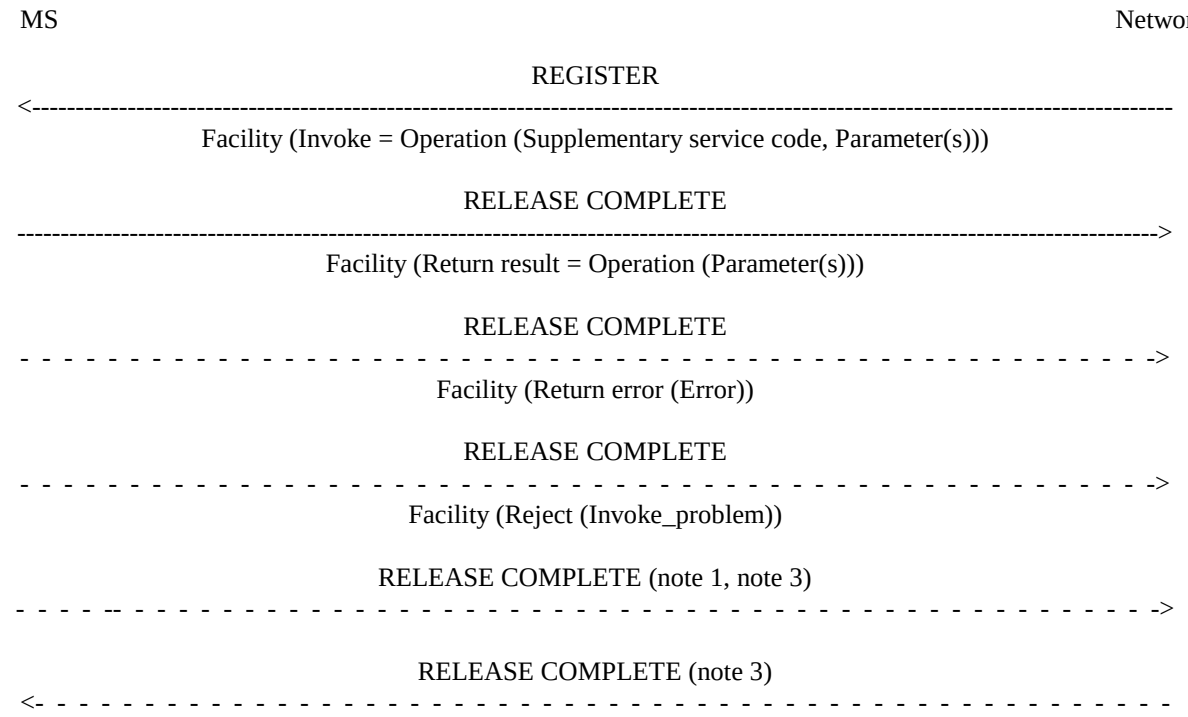
3.6.1 Mobile station initiated supplementary service transaction



NOTE: To prevent transactions being kept open following exceptional cases, either side of the transaction may release it by sending a RELEASE COMPETE message without a Facility IE.

Figure 3.1: Mobile station initiated supplementary service transaction

3.6.2 Network initiated supplementary service transaction



NOTE 1: If the network initiated operation does not require a result, reject or error to be returned then the MS shall release the transaction by sending a RELEASE COMPLETE message without a Facility Information Element.

NOTE 2: For network initiated unstructured SS data alternative procedures for connection release apply; refer to GSM 03.90 and GSM 04.90.

NOTE 3: To prevent transactions being kept open following exceptional cases, either side of the transaction may release it by sending a RELEASE COMPETE message without a Facility IE.

Figure 3.2: Network initiated supplementary service transaction

3.7 Handling of unknown, unforeseen, and erroneous protocol data

3.7.1 General

These procedures only apply to messages where the protocol discriminator is set to indicate call independent SS operations according to the rules in GSM 04.07 and GSM 04.80. Messages that do not meet this criteria are treated according to other GSM technical specifications.

This subclause specifies procedures for handling of unknown, unforeseen and erroneous protocol data by the receiving entity. The procedures are called "error handling procedures", but they also define a compatibility mechanism for future extension of the protocol.

Most error handling procedures are mandatory in the MS, but optional in the network. Detailed error handling procedures may vary from PLMN to PLMN.

In this subclause, the following terminology is used:

- An IE is defined to be syntactically incorrect in a message if it contains at least one value defined as "reserved" in GSM 04.80 or GSM 04.08. However, it is not a syntactical error if a type 4 IE specifies a length indicator greater than that defined. The component part of the Facility information element is handled by a separate mechanism, and errors in the component part are not covered by this subclause.

The following procedures are listed in order of precedence.

Handling of errors in the contents of the Facility IE is described in subclause 2.2.8, and is outside the scope of this subclause.

3.7.2 Message too short

When a message is received that is too short to contain a complete message type information element, that message shall be ignored.

3.7.3 Unknown or unforeseen transaction identifier

The MS shall ignore messages with the transaction identifier value set to "111".

If the transaction identifier value is not "111" the following procedures shall apply to the MS:

a) If a RELEASE COMPLETE message is received specifying a transaction identifier that is not recognised as relating to a call independent SS transaction that is in progress then the message shall be ignored.

b) If a FACILITY message is received specifying a transaction identifier that is not recognised as relating to a call independent SS transaction that is in progress then a RELEASE COMPLETE message shall be sent with cause value #81 "invalid call reference value".

c) If a REGISTER message is received specifying a transaction identifier that is not recognised as relating to a call independent SS transaction that is in progress and with a transaction identifier flag incorrectly set to "1", this message shall be ignored.

The network may follow the same procedures.

3.7.4 Unknown or unforeseen message type

If the MS receives a message type not defined for the protocol discriminator or not implemented by the receiver, then a RELEASE COMPLETE message shall be sent with cause value #97 "message type non-existent or not implemented".

If the MS receives a message type not consistent with the transaction state then a RELEASE COMPLETE message shall be sent with cause value #98 "message not compatible with control state".

The network may follow the same procedures.

3.7.5 Non-semantical mandatory Information Element Error

When on receipt of a message:

- an "imperative message part" error; or
- a "missing mandatory IE" error;

is diagnosed, or when a message containing:

- a syntactically incorrect mandatory IE; or
- an IE unknown in the message, but encoded as "comprehension required" (see GSM 04.08); or
- an out of sequence IE encoded as "comprehension required";

is received, the MS shall proceed as follows:

a) If the message is not RELEASE COMPLETE it shall send a RELEASE COMPLETE message with cause "#96 - Invalid mandatory information".

b) If the message is RELEASE COMPLETE, it shall be treated as a normal RELEASE COMPLETE message.

The network may follow the same procedures.

3.7.6 Unknown and Unforeseen IEs in the non-imperative part

3.7.6.1 IEIs unknown in the message

The MS shall ignore all IEs unknown in the message which are not encoded as "comprehension required".

The network shall take the same approach.

3.7.6.2 Out of sequence IEs

The MS shall ignore all out of sequence IEs in a message which are not encoded as "comprehension required".

The network may take the same approach.

3.7.6.3 Repeated IEs

If an information element with format T, TV or TLV (see GSM 04.07) is repeated in a message in which repetition of the information element is not specified, only the contents of the information element appearing first shall be handled and all subsequent repetitions of the information element shall be ignored. When repetition of information elements is specified, only the contents of specified repeated information elements shall be handled. If the limit on repetition of information elements is exceeded, the contents of information elements appearing first up to the limit of repetitions shall be handled and all subsequent repetitions of the information element shall be ignored.

The network may follow the same procedures.

3.7.7 Non-imperative message part errors

This category includes:

- syntactically incorrect optional IEs;
- conditional IE errors.

Errors in the content of the Facility IE are handled according to subclause 2.2.8.

3.7.7.1 Syntactically incorrect optional IEs (other than Facility)

The MS shall treat all optional IEs that are syntactically incorrect in a message as not present in the message

The network shall take the same approach.

3.7.7.2 Conditional IE errors

When the MS upon receipt of a message diagnoses a "missing conditional IE" error, or an "unexpected conditional IE error", or when it receives a message containing at least one syntactically incorrect conditional IE (other than Facility), it shall send a RELEASE COMPLETE message with cause #100 "conditional IE error".

The network may follow the same procedure.

3GPP TSG-CN4 Meeting #06 **Tdoc N4-010048**
BEIJING, CHINA 15th 19th January 2001

CR-Form-v3

CHANGE REQUEST

⌘ **24.030** **CR** **003** ⌘ rev **-** ⌘ Current version: **3.1.0** ⌘

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

Title:	⌘	Adaptation of SS to PS domain
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	18/Jan/2001
Category:	⌘	**B**
Release:	⌘	REL-4

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

Use one of the following releases:

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

Reason for change:	⌘	In CN1#14, it was agreed that Supplementary Service protocol is applied to PS domain to support LCS. It is required to add some descriptions to relevant SS specifications.
Summary of change:	⌘	It is described that LCS operations can be applied to PS domain.
Consequences if not approved:	⌘	It would not be clear that LCS operations are applied to both CS and PS domain.

Clauses affected:	⌘	1, 2, 3, 4		
Other specs Affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	24.007, 24.010
Other comments:	⌘	This CR is against REL-4, so if approved, the version is supposed to be 4.0.0.		

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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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

1 Scope

The present document gives the stage 3 description of the Location Service (LCS) operations for mobile station. These operations shall apply to both CS and PS domain.

The group of location services operations is divided into two different classes:

- Network initiated location services operations (clause 4);
- Mobile initiated location services operations (clause 5).

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.

[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"~~

[~~3~~2] 3G TS 23.~~1~~271: "Functional stage 2 description of ~~location services in UMTS~~LCS"

[~~4~~3] 3G TS 24.080: "Mobile radio interface layer 3 supplementary services specification; Formats and coding"

3 Definitions and abbreviations

Abbreviations used in the present document are listed in GSM 01.04, ~~GSM 03.71~~ and 3G TS 23.~~1~~271.

The following terms are used in the present document:

- **MS,** Mobile Station. The present document 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.~~1~~2~~71~~ ~~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 3G TS 24.080

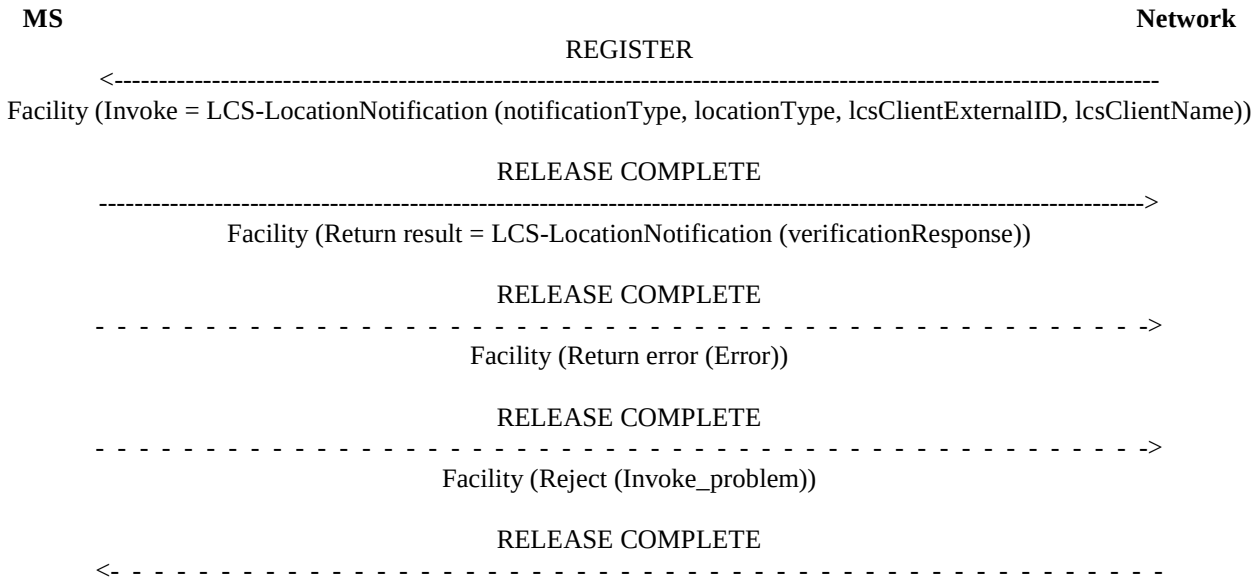

Figure 4.1: Location Notification

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 successfully fulfilthe 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 3G TS 24.080.

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.

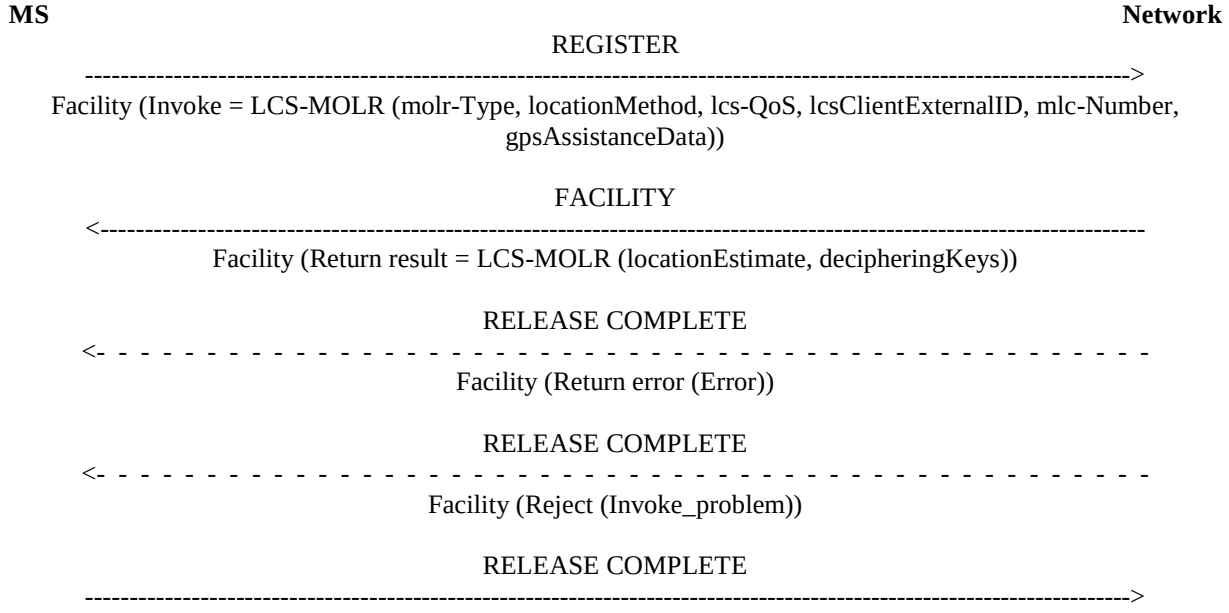

Figure 5.1: Single mobile originated location request

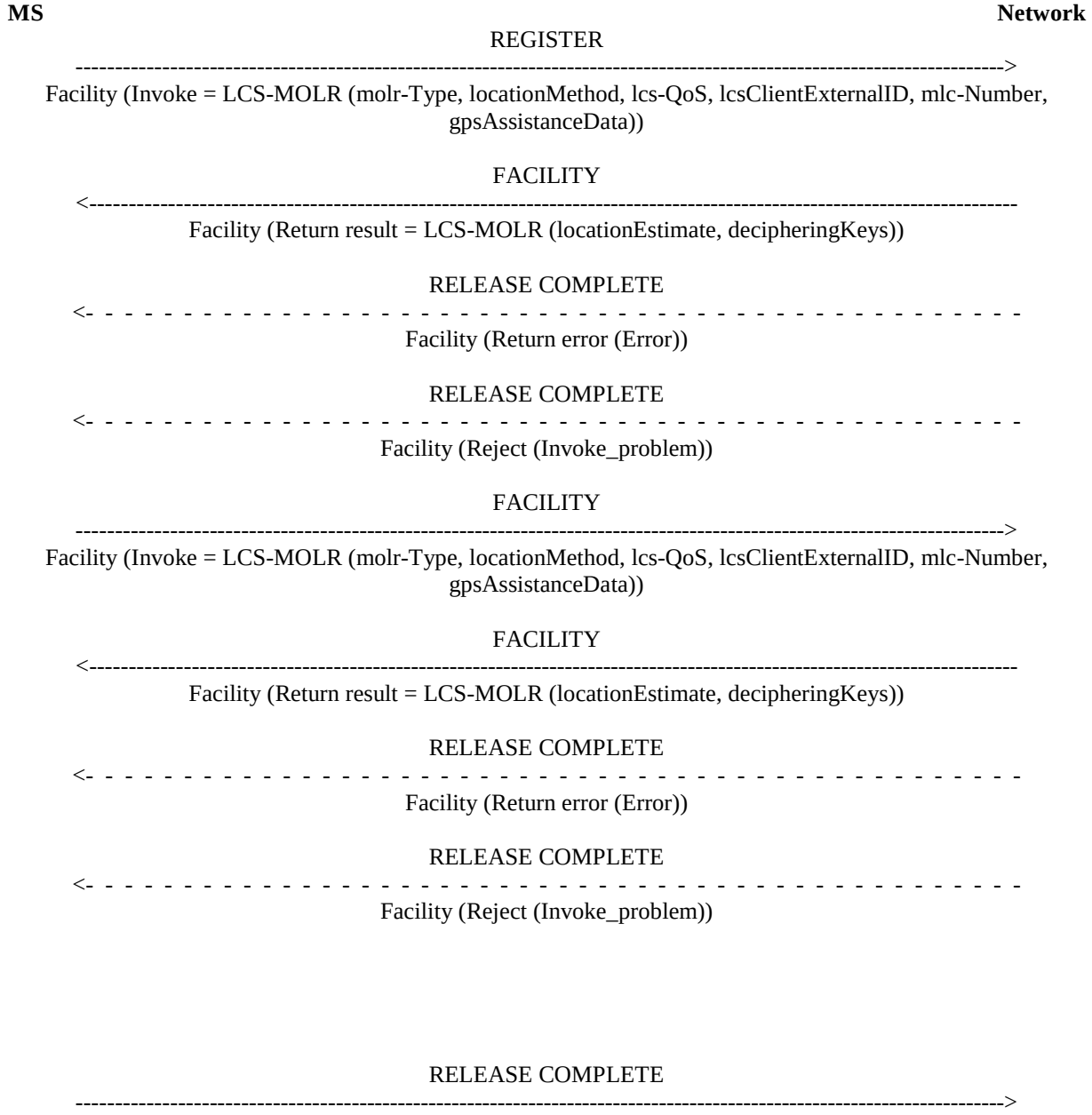

Figure 5.2: Multiple mobile originated location requests

3GPP TSG-CN4 Meeting #6
Beijing, China, 15-19 Jan.

Tdoc N4-010198

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **222** ⌘ rev **1** ⌘ Current version: **4.2.1** ⌘

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

Title:	⌘	PS domain support for LCS Release 4
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	18/Jan/2001
Category:	⌘	**B**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

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

Reason for change: ⌘ The reflection of the PS domain support for LCS Release 4.

Summary of change: ⌘ In the last SA plenary, the LCS Stage2(23.271) was approved and is updated to the version 4.0.0. This CR shows the adaptation of PS domain for LCS Release 4 according to LCS Stage2 to the MAP specification.

The changed point is as follows;

1) GSM 03.71 and 3G TS 23.171 -> 3G TS 23.271

2) Usage of MSC SSN
When the SGSN emulates MSC behaviour for processing message (MAP_SUBSCRIBER_LOCATION_REPORT) towards entities which do not support interworking to SGSNs, it shall use the MSC SSN in the calling party address instead of the SGSN SSN.

3) Parameters [“SS-Data List” , ”LCS Information” , ”SS-Code List”] are set to the ISD message for LCS PS support
In the current specification, those parameters are only used by VLR. In the LCS Release 4, those parameters are used by not only VLR but also SGSN.

4) Parameters [“SS-Code List” , “GMLC List Withdraw”] are set to the DSD message for LCS PS support
In the current specification, those parameters are only used by VLR. In the LCS Release 4, those parameters are used by not only VLR but also SGSN.

5) Usage of “MAP_SRI_for_LCS” , ”MAP_PSR” and ”MAP_SLR”
The MAP_SRI_for_LCS message is used between the GMLC and HLR to retrieve the routing information needed for routing a location service request to the serving SGSN. The MAP_PSR message is used by a GMLC to request

		the location of a target MS from the visited SGSN. The MAP_SLR message is used by a SGSN to provide the location of a target MS to a GMLC when a request for location is either implicitly administered or more at some earlier time. 6) Usage of “SGSN number” in the MAP_SRI_for_LCS and MAP_SLR In the current specification, the “SGSN number” isn’t defined in the MAP_SRI_for_LCS and MAP_SLR messages. The “SGSN number” is added like a SMS procedure.(i.e. Network Node Indicator, GPRS Node Indicator, Additional Number) 7) Addition of APN to LCS Client ID LCSClientDialedByMS and APN are used to specify the LCS Client. APN has already defined as the SMS data types (section 17.7.6), so the APN is exported in this section and the APN is inported in the LCS data types (section 17.7.13).
Consequences if not approved:	⌘	

Clauses affected:	⌘	2, 6.1.2, 7.6.3.61, 7.6.3.65, 7.6.11.16, 8.8.1, 8.8.2, 13A, 17.7.1, 17.7.13, 17.7.6			
Other specs affected:	⌘	X	Other core specifications	⌘	N4-010113(23.016-020)
			Test specifications		
			O&M Specifications		
Other comments:	⌘				

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

2 References

[26a] ~~GSM 03.71: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2".~~3G TS 23.271: "Functional stage2 description of LCS (Release 2000)".

Next Change

6.1.2 Sub-System Number (SSN)

The Application Entities (AEs) defined for MAP consist of several Application Service Elements (ASEs) and are addressed by sub-system numbers (SSNs). The SSNs for MAP are specified in GSM 03.03 [17].

When the SGSN emulates MSC behaviour for processing messages (MAP-MO-FORWARD-SHORT-MESSAGE, MAP_CHECK_IMEI, MAP_SUBSCRIBER_LOCATION_REPORT) towards entities which do not support interworking to SGSNs, it shall use the MSC SSN in the calling party address instead of the SGSN SSN.

Next Change

7.6.3.61 GMLC List

This parameter contains the addresses of all GMLCs in the MS subscriber's HPLMN 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~~ 3G TS 23.271.

Next Change

7.6.3.64 External Client List

This parameter is only applicable to the non-call related privacy class and gives the identities of the external clients that are allowed to locate a target MS for a non-call related MT-LR. Each identity is an international (e.g.E.164) address. For each identified external client, GMLC restrictions may be defined. It may also be indicated if the MS shall be notified of a non-restricted MT-LR from each identified LCS client and, if so, whether notification only or notification with privacy verification shall apply. Usage of this parameter is defined in ~~GSM 03.71~~3G TS 23.271.

7.6.3.65 Internal Client List

This parameter is only applicable to the PLMN operator privacy class and gives the identities of the internal PLMN operator clients that are allowed to locate a target MS for an NI-LR or MT-LR. Usage of this parameter is defined in ~~GSM 03.71~~3G TS 23.271.

7.6.3.65A MO-LR List

This parameter defines the classes of MO-LR for which a subscription exists for a particular MS. For each class, the following information is provided:

- SS-Code (see subclause 7.6.4.1).

7.6.3.65B Privacy Notification to MS User

This parameter is applicable to the non-call related privacy class and call related privacy class. For non-call related privacy class it indicates whether the MS user shall be notified for a non-call related MT-LR from any value added LCS client when the MT-LR is restricted and be enabled to accept or override the restriction. For call related privacy class it indicates whether the MS shall be notified of a call related MT-LR and, if so,

whether notification only or notification with privacy verification shall apply. Usage of this parameter is defined in ~~GSM 03.71~~3G TS 23.271.

7.6.3.65C GMLC List Withdraw

This parameter indicates whether the subscriber's LCS GMLC list shall be deleted from the VLR or SGSN. ~~The parameter does not apply to, and shall be ignored if received by, an SGSN.~~

Next Change

7.6.11.16 Privacy Override

This parameter indicates if MS privacy is overridden by the LCS client when the GMLC and VMSC/SGSN for an MR-LR are in the same country.

Next Change

8.8.1 MAP-INSERT-SUBSCRIBER-DATA service

8.8.1.1 Definition

This service is used by an HLR to update a VLR with certain subscriber data in the following occasions:

- the operator has changed the subscription of one or more supplementary services, basic services or data of a subscriber. Note that in case of withdrawal of a Basic or Supplementary service this primitive shall not be used;
- the operator has applied, changed or removed Operator Determined Barring;
- the subscriber has changed data concerning one or more supplementary services by using a subscriber procedure;
- the HLR provides the VLR with subscriber parameters at location updating of a subscriber or at restoration. In this case, this service is used to indicate explicitly that a supplementary service is not provisioned, if the supplementary service specification requires it. The only supplementary services which have this requirement are the CLIR and COLR services. Network access mode is provided only in restoration. If the Super-Charger functionality is supported the HLR may not need to provide the VLR with subscriber parameters at location updating of a subscriber. See TS 23.116.

Also this service is used by an HLR to update an SGSN with certain subscriber data in the following occasions:

- if the GPRS subscription has changed;
- if the network access mode is changed;
- the operator has applied, changed or removed Operator Determined Barring;
- the HLR provides the SGSN with subscriber parameters at GPRS location updating of a subscriber. If the Super-Charger functionality is supported the HLR may not need to provide the SGSN with subscriber parameters. See 3G TS 23.116.

It is a confirmed service and consists of the primitives shown in table 8.8/1.

8.8.1.2 Service primitives

Table 8.8/1: MAP-INSERT-SUBSCRIBER-DATA

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	C	C(=)		
MSISDN	C	C(=)		

Parameter name	Request	Indication	Response	Confirm
Category	C	C(=)		
Subscriber Status	C	C(=)		
Bearer service List	C	C(=)	C	C(=)
Teleservice List	C	C(=)	C	C(=)
Forwarding information List	C	C(=)		
Call barring information List	C	C(=)		
CUG information List	C	C(=)		
SS-Data List	C	C(=)		
EMLPP Subscription Data	C	C(=)		
MC-Subscription Data	C	C(=)		
Operator Determined Barring General data	C	C(=)	C	C(=)
Operator Determined Barring HPLMN data	C	C(=)		
Roaming Restriction Due To Unsupported Feature	C	C(=)		
Regional Subscription Data	C	C(=)		
VLR CAMEL Subscription Info	C	C(=)		
Voice Broadcast Data	C	C(=)		
Voice Group Call Data	C	C(=)		
Network access mode	C	C(=)		
GPRS Subscription Data	C	C(=)		
Roaming Restricted In SGSN Due To Unsupported Feature	C	C(=)		
North American Equal Access preferred Carrier Id List	U	C(=)		
SGSN Camel Subscription Info	C	C(=)		
LSA Information	C	C(=)		
IST Alert Timer	C	C(=)		
SS-Code List			C	C(=)
LMU Identifier	C	C(=)		
LCS Information	C	C(=)		
CS Allocation/Retention priority	C	C(=)		
Super-Charger Supported In HLR	C	C(=)		
Regional Subscription Response			C	C(=)
Supported CAMEL Phases			C	C (=)
User error			U	C(=)
Provider error				O

8.8.1.3 Parameter use

All parameters are described in subclause 7.6. The following clarifications are applicable:

SS-Data List

A list of Extensible SS-Data parameters (Extensible SS-Data is defined in subclause 7.6). It is sent for any other supplementary service than Call Forwarding, Call Barring, CUG and eMLPP either at location updating or at restoration or when they are changed. Each SS-Data parameter shall be treated independently of all other parameters in the primitive.

The Extensible SS-Data shall include the SS-Code for an individual supplementary service.

The Extensible SS-Data shall contain an Extensible SS-Status parameter and any subscription options that are applicable to the service defined by the SS-Code.

The SS-Data may include a Basic Service Group List. This shall be interpreted according to the rules in subclause 8.8.1.4.

If the VLR receives an Indication containing any supplementary service codes which it does not support/allocate it returns them to the HLR in the parameter SS-Code List and therefore discards the unsupported service codes received (no error is sent back). This parameter is used by the VLR and SGSN for LCS. Otherwise, t~~T~~his parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

LCS Information

This parameter provides the following LCS related information for an MS subscriber:

- list of GMLCs in the HPLMN;
- privacy exception list;
- MO-LR list.

At restoration and location updating, the HLR shall include the complete LCS data of the subscriber.

When there is a change in LCS subscriber data the HLR shall include at least the new and/or modified LCS data. LCS data that is not modified need not be included.

The VLR/SGSN shall keep any previously stored LCS Information that is not included in an Insert Subscriber Data operation.

If the VLR/SGSN detects that there is overlapping in the LCS information received within a dialogue, it shall send the error Unexpected Data Value.

~~This parameter is used only by the VLR and shall be ignored if received by an SGSN.~~

Super-Charger Supported In HLR

This parameter is used by the HLR to indicate support for the Super-Charger functionality. If this parameter is present it shall include an indication of the age of the subscription data stored in the HLR.

If this parameter is absent then the HLR does not support the Super-Charger functionality.

SS-Code List

The list of SS-Code parameters that are provided to a subscriber but are not supported/allocated by the VLR and SGSN (SS-Code is defined in subclause 7.6). The list can only include individual SS-Codes that were sent in the service request. This parameter is used ~~only~~ by the VLR and SGSN.

Next Change

8.8.2 MAP-DELETE-SUBSCRIBER-DATA service

8.8.2.1 Definition

This service is used by an HLR to remove certain subscriber data from a VLR if the subscription of one or more supplementary services or basic services is withdrawn. Note that this service is not used in case of erasure or deactivation of supplementary services.

Also this service is used by an HLR to remove GPRS subscription data from a SGSN.

It is a confirmed service and consists of the primitives shown in table 8.8/2.

8.8.2.2 Service primitives

Table 8.8/2: MAP-DELETE-SUBSCRIBER-DATA

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
Basic service List	C	C(=)		
SS-Code List	C	C(=)		
Roaming Restriction Due To				
Unsupported Feature	C	C(=)		
Camel Subscription Info Withdraw	C	C(=)		
Specific CSI Withdraw	C	C(=)		
Regional Subscription Data	C	C(=)		
VBS Group Indication	C	C(=)		

VGCS Group Indication	C	C(=)		
GPRS Subscription Data Withdraw	C	C(=)		
Roaming Restricted In SGSN Due To Unsupported Feature	C	C(=)		
LSA Information Withdraw	C	C(=)		
IST Information Withdraw	C	C(=)		
Regional Subscription Response			C	C(=)
GMLC List Withdraw	C	C(=)		
User error			C	C(=)
Provider error				O

8.8.2.3 Parameter use

All parameters are described in subclause 7.6. The following clarifications are applicable:

Basic service List

A list of Extensible Basic service parameters (Extensible Basic service is defined in subclause 7.6). It is used when one, several or all basic services are to be withdrawn from the subscriber. If the VLR or the SGSN receives a value for an Extensible Basic Service which it does not support, it shall ignore that value. This parameter is used by the VLR and by the SGSN.

SS-Code List

A list of SS-Code parameters (SS-Code is defined in subclause 7.6). It is used when several or all supplementary services are to be withdrawn from the subscriber.

There are three possible options:

- deletion of basic service(s);

  The parameter Basic service List is only included.

- deletion of supplementary service(s);

  The parameter SS-Code List is only included.

- deletion of basic and supplementary services;

  Both Basic service List and SS-Code List are included.

This parameter is used by the VLR and SGSN for LCS. Otherwise, t~~T~~his parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Roaming Restriction Due To Unsupported Feature

This parameter is used if Roaming Restriction Due To Unsupported Feature is deleted from the subscriber data. This may occur if unsupported features or services are removed from the subscriber data in the HLR.

If this parameter is sent the VLR shall check if the current Location Area is possibly allowed now. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

CAMEL Subscription Info Withdraw

This parameter is used to indicate that CAMEL Subscription Info shall be deleted from the VLR or from the SGSN. All CAMEL Subscription Info for the subscriber shall be deleted. This parameter is used by the VLR and by the SGSN. This parameter should not be sent in the same message as the Specific CSI Withdraw parameter.

Specific CSI Withdraw

This parameter is used to indicate that one or more specific elements of CAMEL Subscription Info shall be deleted from the VLR or from the SGSN.

The specific elements of CAMEL Subscription Info which may be withdrawn are:

- O-CSI with TDP criteria for O-CSI;

- SS-CSI;
- TIF-CSI;
- D-CSI;
- VT-CSI with TDP criteria for VT-CSI;
- SMS-CSI;
- M-CSI;
- GPRS-CSI.

This parameter is used by the VLR and by the SGSN. It shall not be sent to VLRs that do not support CAMEL phase 3. This parameter should not be sent in the same message as the CAMEL Subscription Info Withdraw parameter.

Regional Subscription Identifier

Contains one single Zone Code (as defined in subclause 7.6) and is used if all Zone Codes shall be deleted from the subscriber data. When all the Zone Codes are deleted, the VLR or the SGSN shall check for its location areas whether they are allowed or not. If the whole MSC area is restricted, VLR will report it to HLR by returning the Regional Subscription Response "MSC Area Restricted". If the whole SGSN area is restricted, SGSN will report it to HLR by returning the Regional Subscription Response "SGSN Area Restricted".

The binary coding of the Zone Code value received in a Delete Subscriber Data request shall not be checked by the VLR or by the SGSN.

Note that support of this parameter is a network operator option and it shall not be sent to networks which do not support Regional Subscription.

If Regional Subscription is not supported by the VLR or by the SGSN, the request for deletion of Zone Codes is refused by sending the Regional Subscription Response "Regional Subscription Not Supported" to the HLR.

If no Zone Codes are stored in the respective subscriber data record, the request for deleting all Zone Code information shall be ignored and no Regional Subscription Response shall be returned. This parameter is used by the VLR and by the SGSN.

VBS Group Indication

Contains an indication (flag) which is used if all Group Ids shall be deleted from the subscriber data for the Voice Broadcast teleservice.

If VBS is not supported in the VLR or no Group Ids are stored for VBS in the respective subscriber record, the request for deletion of all Group Ids shall be ignored. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

VGCS Group Indication

Contains an indication (flag) which is used if all Group Id's shall be deleted from the subscriber data for the Voice Group Call teleservice. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

If VGCS is not supported in the VLR or no Group Ids are stored for VGCS in the respective subscriber record, the request for deletion of all Group Ids shall be ignored.

GPRS Subscription Data Withdraw

This parameter is used to indicate whether all GPRS Subscription Data for the subscriber shall be deleted or if only a subset of the stored GPRS Subscription Data for the subscriber shall be deleted. In the latter case only those PDP contexts whose identifiers are included in the subsequent identifier list will be deleted. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

Roaming Restricted In SGSN Due To Unsupported Feature

This parameter is used if Roaming Restricted In SGSN Due To Unsupported Feature is deleted from the GPRS subscriber data. This may occur if unsupported features or services are removed from the GPRS subscriber data in the HLR.

If this parameter is sent the SGSN shall check if the current Location Area is possibly allowed now. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

LSA Information Withdraw

This parameter is used to indicate whether all LSA Information for the subscriber shall be deleted or if only a subset of the stored LSA Information for the subscriber shall be deleted. In the latter case only the LSA data whose LSA identities are included in the subsequent LSA data list will be deleted. This parameter is used by the VLR and the SGSN.

IST Information Withdraw

This parameter is used to indicate that the IST condition has been removed for the subscriber. See GSM 03.35 for the use of this parameter.

Regional Subscription Response

If included in the Delete Subscriber Data response this parameter indicates one of:

- MSC Area Restricted;
- SGSN Area Restricted;
- Regional Subscription Not Supported.

This parameter is used by the VLR and by the SGSN.

GMLC List Withdraw

This parameter indicates that the subscriber's LCS GMLC List shall be deleted from the VLR or SGSN.

~~This parameter is used only by the VLR and shall be ignored if received by an SGSN.~~

User error

Only one of the following values is applicable:

- Unidentified subscriber;
- Data missing;
- Unexpected data value.

Next Change

13A Location Service Management Services

13A.1 MAP-SEND-ROUTING-INFO-FOR-LCS Service

13A.1.1 Definition

This service is used between the GMLC and the HLR to retrieve the routing information needed for routing a location service request to the servicing VMSC or SGSN. The MAP-SEND-ROUTING-INFO-FOR-LCS is a confirmed service using the primitives from table 13A.1/1.

13A.1.2 Service Primitives

Table 13A.1/1: MAP-SEND-ROUTING-INFO-FOR-LCS

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
MLC Number	M	M(=)		

MSISDN	C	C(=)	C	C(=)
IMSI	C	C(=)	C	C(=)
LMSI			C	C(=)
Network Node~~MSC~~ Number			C	C(=)
GPRS Node Indicator			C	C(=)
Additional Number			C	C(=)
User error			C	C(=)
Provider error				O

13A.1.3 Parameter Use

Invoke id

See definition in subclause 7.6.1.

MLC Number

See definition in subclause 7.6.2.

MSISDN

See definition in subclause 7.6.2. The request shall carry either the IMSI or MSISDN. The response shall carry whichever of these was not included in the request (see ~~GSM 03.71~~3G TS 23.271 for details).

IMSI

See definition in subclause 7.6.2.

LMSI

See definition in subclause 7.6.2. It is an operator option to provide this parameter from the VLR; it is mandatory for the HLR to include the LMSI in a successful response, if the VLR has used the LMSI.

Network Node~~MSC~~ Number

See definition in subclause 7.6.2. This parameter is provided in a successful response.

GPRS Node Indicator

See definition in subclause 7.6.8. The presence of this parameter is mandatory if the SGSN number is sent in the Network Node Number.

Additional Number

See definition in subclause 7.6.2. This parameter is provided in a successful response.

User error

The following errors defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- Unknown subscriber;
- Absent Subscriber;
- Facility Not Supported;
- System failure;
- Unexpected Data Value;
- Data missing;
- Unauthorised requesting network.

Provider error

For definition of provider errors see subclause 7.6.1.

13A.2 MAP-PROVIDE-SUBSCRIBER-LOCATION Service

13A.2.1 Definition

This service is used by a GMLC to request the location of a target MS from the visited MSC or SGSN at any time. This is a confirmed service using the primitives from table 13A.2/1.

13A.2.2 Service Primitives

Table 13A.2/1: Provide_Subscriber_Location

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
Location Type	M	M(=)		
MLC Number	M	M(=)		
LCS Client ID	M	M(=)		
Privacy Override	U	C(=)		
IMSI	C	C(=)		
MSISDN	C	C(=)		
LMSI	C	C(=)		
LCS Priority	C	C(=)		
LCS QoS	C	C(=)		
IMEI	U	C(=)		
Location Estimate			M	M(=)
Age of Location Estimate			C	C(=)
User error			C	C(=)
Provider error				O

13A.2.3 Parameter Definition and Use

All parameters are defined in subclause 7.6. The use of these parameters and the requirements for their presence are specified in ~~GSM 03.71~~3G TS 23.271.

Location Type

This parameter identifies the type of location information requested.

MLC Number

This is the E.164 number of the requesting GMLC.

LCS Client ID

This parameter provides information related to the identity of an LCS client.

Privacy Override

This parameter indicates if MS privacy is overridden by the LCS client when the GMLC and VMSC for an MR-LR are in the same country.

IMSI

The IMSI is provided to identify the target MS. At least one of the IMSI or MSISDN is mandatory.

MSISDN

The MSISDN is provided to identify the target MS. At least one of the IMSI or MSISDN is mandatory.

LMSI

The LMSI shall be provided if previously supplied by the HLR.

LCS Priority

This parameter indicates the priority of the location request.

LCS QoS

This parameter indicates the required quality of service in terms of response time and accuracy.

IMEI

Inclusion of the IMEI is optional.

Location Estimate

This parameter provides the location estimate.

Age of Location Estimate

This parameter indicates how long ago the location estimate was obtained.

User error

This parameter is sent by the responder when the location request has failed or cannot proceed and if present, takes one of the following values defined in subclause 7.6.1.

- System Failure;
- Data Missing;
- Unexpected Data Value;
- Facility Not Supported;
- Unidentified Subscriber;
- Illegal Subscriber;
- Illegal Equipment;
- Absent Subscriber (diagnostic information may also be provided);
- Unauthorised requesting network;
- Unauthorised LCS Client with detailed reason;
- Position method failure with detailed reason.

Provider error

These are defined in subclause 7.6.1.

13A.3 MAP-SUBSCRIBER-LOCATION-REPORT Service

13A.3.1 Definition

This service is used by a VMSC or SGSN to provide the location of a target MS to a GMLC when a request for location is either implicitly administered or made at some earlier time. This is a confirmed service using the primitives from table 13A.3/1.

13A.3.2 Service Primitives

Table 13A.3/1: Subscriber_Location_Report

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
LCS Event	M	M(=)		
LCS Client ID	M	M(=)		
Network Node Number~~MSC Number~~	M	M(=)		
IMSI	C	C(=)		
MSISDN	C	C(=)		

NA-ESRD	C	C(=)		
NA-ESRK	C	C(=)		
IMEI	U	C(=)		
Location Estimate	C	C(=)		
Age of Location Estimate	C	C(=)		
LMSI	U	C(=)		
GPRS Node Indicator	C	C(=)		
User error			C	C(=)
Provider error				O

13A.3.3 Parameter Definition and Use

All parameters are defined in subclause 7.6. The use of these parameters and the requirements for their presence are specified in ~~GSM 03.71~~3G TS 23.271.

LCS Event

This parameter indicates the event that triggered the Subscriber Location Report.

LCS Client ID

This parameter provides information related to the identity of the recipient LCS client.

Network Node~~MSC~~ Number

See definition in subclause 7.6.2. This parameter provideds the address of the visited MSC or SGSN for target MS.

IMSI

The IMSI shall be provided if available to the VMSC or SGSN.

MSISDN

The MSISDN shall be provided if available to the VMSC or SGSN.

NA-ESRD

If the target MS has originated an emergency service call in North America, the NA-ESRD shall be provided by the VMSC if available.

NA-ESRK

If the target MS has originated an emergency service call in North America, the NA-ESRK shall be provided by the VMSC if assigned.

IMEI

Inclusion of the IMEI is optional.

Location Estimate

This parameter provides the location estimate. The absence of this parameter implies that a location estimate was not available or could not be successfully obtained.

Age of Location Estimate

This parameter indicates how long ago the location estimate was obtained.

LMSI

The LMSI may be provided if assigned by the VLR.

GPRS Node Indicator

See definition in subclause 7.6.8. This presence of this parameter is mandatory if the SGSN number is sent in the Network Node Number.

User error

This parameter is sent by the responder when the received message contains an error, cannot be forwarded or stored for an LCS client or cannot be accepted for some other reason and if present, takes one of the following values defined in subclause 7.6.1.

- System Failure;
- Data Missing;
- Unexpected Data Value;
- Resource Limitation;
- Unknown Subscriber;
- Unauthorised requesting network;
- Unknown or unreachable LCS Client.

Provider error

These are defined in subclause 7.6.1.

Next Change

17.7.1 Mobile Service data type

```
MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version7 (7)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

      -- location registration types
      UpdateLocationArg,
      UpdateLocationRes,
      CancelLocationArg,
      CancelLocationRes,
      PurgeMS-Arg,
      PurgeMS-Res,
      SendIdentificationArg,
      SendIdentificationRes,
      UpdateGprsLocationArg,
      UpdateGprsLocationRes,
      IST-SupportIndicator,


      -- handover types
      ForwardAccessSignalling-Arg,
      PrepareHO-Arg,
      PrepareHO-Res,
      PrepareSubsequentHO-Arg,
      PrepareSubsequentHO-Res,
      ProcessAccessSignalling-Arg,
      SendEndSignal-Arg,
      SendEndSignal-Res,


      -- authentication management types
      SendAuthenticationInfoArg,
      SendAuthenticationInfoRes,
      AuthenticationFailureReportArg,
      AuthenticationFailureReportRes,
```

```
        -- security management types
        EquipmentStatus,
        Kc,

        -- subscriber management types
        InsertSubscriberDataArg,
        InsertSubscriberDataRes,
        DeleteSubscriberDataArg,
        DeleteSubscriberDataRes,
        SubscriberData,
        ODB-Data,
        SubscriberStatus,
        ZoneCodeList,
        maxNumOfZoneCodes,
        O-CSI,
        D-CSI,
        O-BcsmCamelTDPCriteriaList,
        T-BCSM-CAMEL-TDP-CriteriaList,
        SS-CSI,
        ServiceKey,
        DefaultCallHandling,
        CamelCapabilityHandling,
        BasicServiceCriteria,
        SupportedCamelPhases,
        maxNumOfCamelTDPData,
        CUG-Index,
        CUG-Interlock,
        InterCUG-Restrictions,
        IntraCUG-Options,
        NotificationToMSUser,
        IST-AlertTimerValue,
        T-CSI,
        T-BcsmTriggerDetectionPoint,
        APN,

        -- fault recovery types
        ResetArg,
        RestoreDataArg,
        RestoreDataRes,

        -- subscriber information enquiry types
        ProvideSubscriberInfoArg,
        ProvideSubscriberInfoRes,
        SubscriberInfo,
        LocationInformation,
        SubscriberState,

        -- any time information enquiry types
        AnyTimeInterrogationArg,
        AnyTimeInterrogationRes,

        -- any time information handling types
        AnyTimeSubscriptionInterrogationArg,
        AnyTimeSubscriptionInterrogationRes,
        AnyTimeModificationArg,
        AnyTimeModificationRes,

        -- subscriber data modification notification types
        NoteSubscriberDataModifiedArg,
        NoteSubscriberDataModifiedRes,

        -- gprs location information retrieval types
        SendRoutingInfoForGprsArg,
        SendRoutingInfoForGprsRes,

        -- failure reporting types
        FailureReportArg,
        FailureReportRes,

        -- gprs notification types
        NoteMsPresentForGprsArg,
        NoteMsPresentForGprsRes,

        -- Mobility Management types
        NoteMM-EventArg,
        NoteMM-EventRes


    ;
```

```
IMPORTS
      maxNumOfSS,
      SS-SubscriptionOption,
      SS-List,
      SS-ForBS-Code,
      Password
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version7 (7)}

      SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version7 (7)}

      Ext-BearerServiceCode
FROM MAP-BS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-BS-Code (20) version7 (7)}

      Ext-TeleserviceCode
FROM MAP-TS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-TS-Code (19) version7 (7)}


      AddressString,
      ISDN-AddressString,
      ISDN-SubaddressString,
      FTN-AddressString,
      AccessNetworkSignalInfo,
      IMSI,
      TMSI,
      HLR-List,
      LMSI,
      Identity,
      GlobalCellId,
      CellGlobalIdOrServiceAreaIdOrLAI,
      Ext-BasicServiceCode,
      NAEA-PreferredCI,
      EMLPP-Info,
      MC-SS-Info,
      SubscriberIdentity,
      AgeOfLocationInformation,
      LCSClientExternalID,
      LCSClientInternalID,
      Ext-SS-Status



FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version7 (7)}

      ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version7 (7)}

      AbsentSubscriberDiagnosticSM
FROM MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version7 (7)}


;

---
```

```
APN ::=  OCTET STRING (SIZE (2..63))
     -- Octets are coded according to TS GSM 03.03
```

```
---
```

Next Change

17.7.13 Location service data type

```
MAP-LCS-DataTypes {
  ccitt identified-organization (4) etsi (0) mobileDomain (0)
  gsm-Network (1) modules (3) map-LCS-DataTypes (25) version7 (7)}

DEFINITIONS
IMPLICIT TAGS
::=
BEGIN

EXPORTS
        RoutingInfoForLCS-Arg,
        RoutingInfoForLCS-Res,
        ProvideSubscriberLocation-Arg,
        ProvideSubscriberLocation-Res,
        SubscriberLocationReport-Arg,
        SubscriberLocationReport-Res,
        LocationType,
        LCSClientName,
        LCS-QoS,
        Horizontal-Accuracy,
        ResponseTime,
        Ext-GeographicalInformation
        ;

IMPORTS
        AddressString,
        ISDN-AddressString,
        IMEI,
        IMSI,
        LMSI,
        SubscriberIdentity,
        AgeOfLocationInformation,
        LCSClientExternalID,
        LCSClientInternalID,
        APN,
        Additional-Number
FROM MAP-CommonDataTypes {
  ccitt identified-organization (4) etsi (0) mobileDomain (0)
  gsm-Network (1) modules (3) map-CommonDataTypes (18) version7 (7)}

        ExtensionContainer
FROM MAP-ExtensionDataTypes {
  ccitt identified-organization (4) etsi (0) mobileDomain (0)
  gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version7 (7)}

        USSD-DataCodingScheme,
    USSD-String
FROM MAP-SS-DataTypes {
  ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
  map-SS-DataTypes (14) version7 (7)}
;
```

```
RoutingInfoForLCS-Arg ::= SEQUENCE {
        mlcNumber                       [0] ISDN-AddressString,
        targetMS                        [1] SubscriberIdentity,
        extensionContainer              [2] ExtensionContainer          OPTIONAL,
        ...}
```

```
RoutingInfoForLCS-Res ::= SEQUENCE {
        targetMS                        [0] SubscriberIdentity,
        lcsLocationInfo                 [1] LCSLocationInfo,
        extensionContainer              [2] ExtensionContainer          OPTIONAL,
        ...}
```

```
LCSLocationInfo ::= SEQUENCE {
        networkNode-msc-Number          ISDN-AddressString,
        -- NetworkNode-number can be either msc-number or sgsn-number
        lmsi                            [0] LMSI                        OPTIONAL,
        extensionContainer              [1] ExtensionContainer          OPTIONAL,
        ...,
        gprsNodeIndicator               [2] NULL                        OPTIONAL,
        -- gprsNodeIndicator is set only if the SGSN number is sent as the Network Node Number
        additional-Number               [3] Additional-Number           OPTIONAL
        }
```

```
ProvideSubscriberLocation-Arg ::= SEQUENCE {
    locationType                    LocationType,
    mlc-Number ISDN-AddressString,
    lcs-ClientID  [0] LCS-ClientID  OPTIONAL,
    privacyOverride                 [1] NULL                    OPTIONAL,
    imsi                            [2] IMSI                    OPTIONAL,
    msisdn                          [3] ISDN-AddressString      OPTIONAL,
    lmsi                            [4] LMSI                    OPTIONAL,
    imei                            [5] IMEI                    OPTIONAL,
    lcs-Priority    [6] LCS-Priority OPTIONAL,
    lcs-QoS                         [7] LCS-QoS                 OPTIONAL,
    extensionContainer              [8] ExtensionContainer      OPTIONAL,
    ...}

    -- one of imsi or msisdn is mandatory
```

```
LocationType ::= SEQUENCE {
    locationEstimateType            [0] LocationEstimateType,
    ... }
```

```
LocationEstimateType ::= ENUMERATED {
    currentLocation                 (0),
    currentOrLastKnownLocation      (1),
    initialLocation                 (2),
    ... }
--  exception handling:
--  a ProvideSubscriberLocation-Arg containing an unrecognized LocationEstimateType
--  shall be rejected by the receiver with a return error cause of unexpected data value
```

```
LCS-ClientID ::= SEQUENCE {
    lcsClientType                   [0] LCSClientType,
    lcsClientExternalID             [1] LCSClientExternalID     OPTIONAL,
    lcsClientDialedByMS             [2] AddressString           OPTIONAL,
    lcsClientInternalID             [3] LCSClientInternalID     OPTIONAL,
    lcsClientName                   [4] LCSClientName           OPTIONAL,
    ...,
    lcsAPN                          [5] APN                     OPTIONAL }
```

```
SubscriberLocationReport-Arg ::= SEQUENCE {
    lcs-Event                       LCS-Event,
    lcs-ClientID  LCS-ClientID,
    lcsLocationInfo                 LCSLocationInfo,
    msisdn                          [0] ISDN-AddressString      OPTIONAL,
    imsi                            [1] IMSI                    OPTIONAL,
    imei                            [2] IMEI                    OPTIONAL,
    na-ESRD                         [3] ISDN-AddressString      OPTIONAL,
    na-ESRK                         [4] ISDN-AddressString      OPTIONAL,
    locationEstimate                [5] Ext-GeographicalInformation OPTIONAL,
    ageOfLocationEstimate           [6] AgeOfLocationInformation OPTIONAL,
    extensionContainer              [7] ExtensionContainer      OPTIONAL,
    ...}

    -- one of msisdn or imsi is mandatory
```

END

Next Change

17.7.6 Short message data types

```
MAP-SM-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SM-DataTypes (16) version7 (7)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN
```

```
EXPORTS
      RoutingInfoForSM-Arg,
      RoutingInfoForSM-Res,
      MO-ForwardSM-Arg,
      MO-ForwardSM-Res,
      MT-ForwardSM-Arg,
      MT-ForwardSM-Res,
      ReportSM-DeliveryStatusArg,
      ReportSM-DeliveryStatusRes,
      AlertServiceCentreArg,
      InformServiceCentreArg,
      ReadyForSM-Arg,
      ReadyForSM-Res,
      SM-DeliveryOutcome,
      AlertReason,
      Additional-Number
;

IMPORTS
      AddressString,
      ISDN-AddressString,
      SignalInfo,
      IMSI,
      LMSI
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version7 (7)}

      AbsentSubscriberDiagnosticSM
FROM MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version7 (7)}

      ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version7 (7)}
;
```

```
RoutingInfoForSM-Arg ::= SEQUENCE {
     msisdn                              [0] ISDN-AddressString,
     sm-RP-PRI                           [1] BOOLEAN,
     serviceCentreAddress                [2] AddressString,
     extensionContainer                  [6] ExtensionContainer          OPTIONAL,
     ... ,
     gprsSupportIndicator                [7]  NULL                       OPTIONAL,
     -- gprsSupportIndicator is set only if the SMS-GMSC supports
     -- receiving of two numbers from the HLR
     sm-RP-MTI                           [8] SM-RP-MTI                   OPTIONAL,
     sm-RP-SMEA                          [9] SM-RP-SMEA                  OPTIONAL }
```

```
SM-RP-MTI ::= INTEGER (0..10)
     -- 0 SMS Deliver
     -- 1 SMS Status Report
     -- other values are reserved for future use and shall be discarded if
     -- received
```

```
SM-RP-SMEA ::= OCTET STRING (SIZE (1..12))
     -- this parameter contains an address field which is encoded
     -- as defined in GSM 03.40. An address field contains 3 elements :
     --       address-length
     --       type-of-address
     --       address-value
```

```
RoutingInfoForSM-Res ::= SEQUENCE {
     imsi                                IMSI,
     locationInfoWithLMSI                [0] LocationInfoWithLMSI,
     extensionContainer                  [4] ExtensionContainer          OPTIONAL,
     ...}
```

```
LocationInfoWithLMSI ::= SEQUENCE {
     networkNode-Number                  [1] ISDN-AddressString,
     lmsi                                LMSI                              OPTIONAL,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...,
     gprsNodeIndicator                   [5]  NULL                         OPTIONAL,
     -- gprsNodeIndicator is set only if the SGSN number is sent as the
     -- Network Node Number
     additional-Number                   [6] Additional-Number             OPTIONAL
     -- NetworkNode-number can be either msc-number or sgsn-number
     }
```

```
Additional-Number ::= CHOICE {
     msc-Number                          [0] ISDN-AddressString,
     sgsn-Number                         [1] ISDN-AddressString}
     -- additional-number can be either msc-number or sgsn-number
     -- if received networkNode-number is msc-number then the
     -- additional number is sgsn-number
     -- if received networkNode-number is sgsn-number then the
     -- additional number is msc-number
```

3GPP TSG-CN4 Rel-4 Ad Hoc Meeting **Tdoc N4-010287**
Madrid, SPAIN from 13th to 15th February 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **231** ⌘ rev **1** ⌘ Current version: **4.2.1** ⌘

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

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

Title:	⌘	Extension of call related privacy class for LCS Release 4
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	13. Feb. 2001
Category:	⌘	**B**
Release:	⌘	REL-4

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

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

Reason for change: ⌘ The reflection of the extension of call related privacy class described in LCS Stage2 (23.271).

Summary of change: ⌘ This CR shows that the reflection of the description to the 29.002 related to the extension of "call related privacy class" agreed in the last SA plenary and described in LCS Stage 2 (23.271).

The agreed description in SA Plenary is as follows;
-----23.271 section 10.1.1 Table 10.2 [Call / session Related Class] --- from --------
Indication of one of the following mutually exclusive options for any LCS client not in the external LCS client list:

- Location not allowed
- Location allowed without notification (default case)
- Location allowed with notification
- Location with notification and privacy verification; location allowed if no response
- Location with notification and privacy verification; location restricted if no response

External LCS client list: a list of zero or more LCS clients, with the following data stored for each LCS client in the list:

- International E.164 address identifying a single LCS client or a single group of LCS clients that are permitted to locate this target MS
- Restriction on the GMLC. Possible values are:
  - Identified GMLCs only
  - Any GMLC in the home country
- Indication of one of the following mutually exclusive options:
  - Location allowed without notification (default case)
  - Location allowed with notification
  - Location with notification and privacy verification; location allowed if no response
  - Location with notification and privacy verification; location restricted if no response

--- next SA agreement ---

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

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

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

--- to ----------

According to SA agreement, the additional description to 29.002 is as follows;

1) External Client is used by "call related privacy class"
   User can establish the privacy class for specific external Clients during the communication.

2) The addition of the "Location request not allowed" to the "Notification to MS User Parameter"
   The establishment of "Location request not allowed" is added.

3) The addition of the "Supported LCS capability sets"
   The parameter "Supported LCS capability sets" indicates the supported LCS capability set in the VLR or SGSN. This parameter is sent by Update Location/ Update GPRS Location message from the VLR/SGSN to HLR. HLR knows the supported LCS capability set at the visited node, and sends the corresponded LCS information to the VLR or SGSN by ISD message.
   LCS capability set 1 indicates LCS Release 98 or Release 99 version.
   LCS capability set 2 indicates LCS Release 4 or later versions.

Consequences if not approved:	⌘	

Clauses affected:	⌘	7.6, 7.6.3.61, 7.6.3.64, 7.6.3.65B, 7.6.11.17, 8.1.2, 8.1.7, 17.7.1			
Other specs affected:	⌘	X	Other core specifications	⌘	N4-010200(23.016-019r1) S2-010053(23.271-011r2)
			Test specifications		
			O&M Specifications		
Other comments:	⌘	N4-010201(29.002-221r2) was approved in the last CN4 Beijing meeting. After CN4 meeting, SA2 meeting was held and SA2 changed the LCS Stage2. The changed description is only about LCS phases.			

How to create CRs using this form:

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

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

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

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

7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in subclause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

Absent Subscriber Diagnostic SM	7.6.8.9	Invoke Id	7.6.1.1
Access connection status	7.6.9.3	ISDN Bearer Capability	7.6.3.41
		IST Alert Timer	7.6.3.66
		IST Information Withdrawn	7.6.3.68
		IST Support Indicator	7.6.3.69
Access signalling information	7.6.9.5	Kc	7.6.7.4
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Linked Id	7.6.1.2
Additional number	7.6.2.46	LMSI	7.6.2.16
Additional signal info	7.6.9.10	Location Information	7.6.2.30
Additional SM Delivery Outcome	7.6.8.11		
Age Indicator	7.6.3.72	Location update type	7.6.9.6
		Long Forwarded-to Number	7.6.2.22A
		Long FTN Supported	7.6.2.22B
Alert Reason	7.6.8.8	Lower Layer Compatibility	7.6.3.42
		LSA Information	7.6.3.56
		LSA Information Withdraw	7.6.3.58
		MC Information	7.6.4.48
		MC Subscription Data	7.6.4.47
Alert Reason Indicator	7.6.8.10	Mobile Not Reachable Reason	7.6.3.51
Alerting Pattern	7.6.3.44	Modification request for CSI	7.6.3.81
All GPRS Data	7.6.3.53	Modification request for SS Information	7.6.3.82
All Information Sent	7.6.1.5	More Messages To Send	7.6.8.7
AN-apdu	7.6.9.1		
APN	7.6.2.42	MS ISDN	7.6.2.17
Authentication set list	7.6.7.1	MSC number	7.6.2.11
B-subscriber Address	7.6.2.36	MSIsdn-Alert	7.6.2.29
		Multicall Bearer Information	7.6.2.52
		Multiple Bearer Requested	7.6.2.53
		Multiple Bearer Not Supported	7.6.2.54
B subscriber Number	7.6.2.48	MWD status	7.6.8.3
		NbrUser	7.6.4.45
B subscriber subaddress	7.6.2.49	Network Access Mode	7.6.3.50
Basic Service Group	7.6.4.40	Network node number	7.6.2.43
Bearer service	7.6.4.38	Network resources	7.6.10.1
		Network signal information	7.6.9.8
Call Barring Data	7.6.3.83	New password	7.6.4.20
Call barring feature	7.6.4.19	No reply condition timer	7.6.4.7
Call barring information	7.6.4.18	North American Equal Access preferred Carrier Id	7.6.2.34
Call Direction	7.6.5.8	Number Portability Status	7.6.5.14
Call Forwarding Data	7.6.3.84	ODB Data	7.6.3.85
Call Info	7.6.9.9	ODB General Data	7.6.3.9
Call reference	7.6.5.1	ODB HPLMN Specific Data	7.6.3.10
Call Termination Indicator	7.6.3.67		
Called number	7.6.2.24	OMC Id	7.6.2.18
Calling number	7.6.2.25	Originally dialled number	7.6.2.26
CAMEL Subscription Info	7.6.3.78	Originating entity number	7.6.2.10
CAMEL Subscription Info Withdraw	7.6.3.38	Override Category	7.6.4.4
Cancellation Type	7.6.3.52	P-TMSI	7.6.2.47
Category	7.6.3.1	PDP-Address	7.6.2.45
CCBS Feature	7.6.5.8	PDP-Context identifier	7.6.3.55
CCBS Request State	7.6.4.49		
Channel Type	7.6.5.9	PDP-Type	7.6.2.44

Chosen Channel	7.6.5.10
Ciphering mode	7.6.7.7
Cksn	7.6.7.5
CLI Restriction	7.6.4.5
CM service type	7.6.9.2
Complete Data List Included	7.6.3.54
CS Allocation Retention priority	7.6.3.87
CUG feature	7.6.3.26
CUG index	7.6.3.25
CUG info	7.6.3.22
CUG interlock	7.6.3.24
CUG Outgoing Access indicator	7.6.3.8
CUG subscription	7.6.3.23
CUG Subscription Flag	7.6.3.37
Current location area Id	7.6.2.6
Current password	7.6.4.21
eMLPP Information	7.6.4.41
Encryption Information	7.6.6.9
Equipment status	7.6.3.2
Extensible Basic Service Group	7.6.3.5
Extensible Bearer service	7.6.3.3
Extensible Call barring feature	7.6.3.21
Extensible Call barring information	7.6.3.20
Extensible Call barring information for CSE	7.6.3.79
Extensible Forwarding feature	7.6.3.16
Extensible Forwarding info	7.6.3.15
Extensible Forwarding information for CSE	7.6.3.80
Extensible Forwarding Options	7.6.3.18
Extensible No reply condition timer	7.6.3.19
Extensible QoS-Subscribed	7.6.3.74
Extensible SS-Data	7.6.3.29
Extensible SS-Info	7.6.3.14
Extensible SS-Status	7.6.3.17
Extensible Teleservice	7.6.3.4
External Signal Information	7.6.9.4
Failure Cause	7.6.7.9
Forwarded-to number	7.6.2.22
Forwarded-to subaddress	7.6.2.23
Forwarding feature	7.6.4.16
Forwarding information	7.6.4.15
Forwarding Options	7.6.4.6
GGSN address	7.6.2.40
GGSN number	7.6.2.41
GMSC CAMEL Subscription Info	7.6.3.34
GPRS enhancements support indicator	7.6.3.73
GPRS Node Indicator	7.6.8.14
GPRS Subscription Data	7.6.3.46
GPRS Subscription Data Withdraw	7.6.3.45
GPRS Support Indicator	7.6.8.15
Group Id	7.6.2.33
GSM bearer capability	7.6.3.6
Guidance information	7.6.4.22
Handover number	7.6.2.21
High Layer Compatibility	7.6.3.43
HLR Id	7.6.2.15
HLR number	7.6.2.13
HO-Number Not Required	7.6.6.7
IMEI	7.6.2.3
IMSI	7.6.2.1
Integrity Protection Information	7.6.6.8

Pre-paging supported	7.6.5.15
Previous location area Id	7.6.2.4
Protocol Id	7.6.9.7
Provider error	7.6.1.3
QoS-Subscribed	7.6.3.47
Radio Resource Information	7.6.6.10
Rand	7.6.7.2
Regional Subscription Data	7.6.3.11
Regional Subscription Response	7.6.3.12
Relocation Number List	7.6.2.19A
Requested Info	7.6.3.31
Requested Subscription Info	7.6.3.86
Roaming number	7.6.2.19
Roaming Restricted In SGSN Due To Unsupported Feature	7.6.3.49
Roaming Restriction Due To Unsupported Feature	7.6.3.13
Current Security Context	7.6.7.8
Selected RAB ID	7.6.2.56
Service centre address	7.6.2.27
Serving Cell Id	7.6.2.37
SGSN address	7.6.2.39
SGSN CAMEL Subscription Info	7.6.3.75
SGSN number	7.6.2.38
SIWF Number	7.6.2.35
SoLSA Support Indicator	7.6.3.57
SM Delivery Outcome	7.6.8.6
SM-RP-DA	7.6.8.1
SM-RP-MTI	7.6.8.16
SM-RP-OA	7.6.8.2
SM-RP-PRI	7.6.8.5
SM-RP-SMEA	7.6.8.17
SM-RP-UI	7.6.8.4
Sres	7.6.7.3
SS-Code	7.6.4.1
SS-Data	7.6.4.3
SS-Event	7.6.4.42
SS-Event-Data	7.6.4.43
SS-Info	7.6.4.24
SS-Status	7.6.4.2
Stored location area Id	7.6.2.5
Subscriber State	7.6.3.30
Subscriber Status	7.6.3.7
Super-Charger Supported in HLR	7.6.3.70
Super-Charger Supported in Serving Network Entity	7.6.3.71
Supported CAMEL Phases in VLR	7.6.3.36
Supported CAMEL Phases in SGSN	7.6.3.36A
Supported LCS Capability Sets	7.6.11.17
Suppress T-CSI	7.6.3.33
Suppression of Announcement	7.6.3.32
Target cell Id	7.6.2.8
Target location area Id	7.6.2.7
Target RNC Id	7.6.2.8A
Target MSC number	7.6.2.12
Teleservice	7.6.4.39
TMSI	7.6.2.2
Trace reference	7.6.10.2
Trace type	7.6.10.3
User error	7.6.1.4
USSD Data Coding Scheme	7.6.4.36
USSD String	7.6.4.37
UU Data	7.6.5.12
UUS CF Interaction	7.6.5.13
VBS Data	7.6.3.40
VGCS Data	7.6.3.39

Inter CUG options	7.6.3.27	VLR CAMEL Subscription Info	7.6.3.35
Intra CUG restrictions	7.6.3.28	VLR number	7.6.2.14
		VPLMN address allowed	7.6.3.48
		Zone Code	7.6.2.28

Next Change

7.6.3.60 LCS Information

This parameter defines the LCS related information for an MS subscriber and contains the following components:

- GMLC List (see subclause 7.6.3.61).
- LCS Privacy Exception List (see subclause 7.6.3.62).
- MO-LR List (see subclause 7.6.3.65A).

7.6.3.61 GMLC List

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

7.6.3.62 LCS Privacy Exception List

This parameter defines the classes of LCS Client that are allowed to locate any target MS. For each class, the following information is provided:

- SS-Code (see subclause 7.6.4.1);
- a list of LCS privacy exception parameters (see subclause 7.6.3.63).

7.6.3.63 LCS Privacy Exception Parameters

This parameter gives the status of each LCS privacy exception class and any additional parameters relevant to this class. The parameter contains the following information:

- provisioned SS-Status (see subclause 7.6.3.17);
- privacy notification to MS user (see subclause 7.6.3.65B);
- external client List (see subclause 7.6.3.64);
- internal client List (see subclause 7.6.3.65).

7.6.3.64 External Client List

This parameter is only applicable to the non-call related privacy class and call related privacy class, and gives the identities of the external clients that are allowed to locate a target MS for a ~~non-call related~~ MT-LR. Each identity is an international (e.g.E.164) address. For each identified external client, GMLC restrictions may be defined. It may also be indicated if the MS shall be notified of a non-restricted MT-LR from each identified LCS client and, if so, whether notification only or notification with privacy verification shall apply. Usage of this parameter is defined in GSM 03.71.

7.6.3.65 Internal Client List

This parameter is only applicable to the PLMN operator privacy class and gives the identities of the internal PLMN operator clients that are allowed to locate a target MS for an NI-LR or MT-LR. Usage of this parameter is defined in GSM 03.71.

7.6.3.65A MO-LR List

This parameter defines the classes of MO-LR for which a subscription exists for a particular MS. For each class, the following information is provided:

- SS-Code (see subclause 7.6.4.1).

7.6.3.65B Privacy Notification to MS User

This parameter is applicable to the non-call related privacy class and call related privacy class. For non-call/call related privacy class it indicates whether the MS user shall be notified for a non-call/call related MT-LR from any value added LCS client when the MT-LR is restricted and be enabled to accept or override the restriction. ~~For call related privacy class it indicates whether the MS shall be notified of a call related MT-LR and, if so, whether notification only or notification with privacy verification shall apply.~~ Usage of this parameter is defined in GSM 03.71.

7.6.3.65C GMLC List Withdraw

This parameter indicates whether the subscriber's LCS GMLC list shall be deleted from the VLR. The parameter does not apply to, and shall be ignored if received by, an SGSN.

Next Change

7.6.11.11 Location Estimate

This parameter gives an estimate of the location of an MS in universal coordinates and the accuracy of the estimate.

7.6.11.12 Location Type

This parameter indicates the type of location estimate required by the LCS client. Possible location estimate types include:

- current location;
- current or last known location;
- initial location for an emergency services call.

7.6.11.13 NA-ESRD

This parameter only applies to location for an emergency services call in North America and gives the North American Emergency Services Routing Digits.

7.6.11.14 NA-ESRK

This parameter only applies to location for an emergency services call in North America and gives the North American Emergency Services Routing Key.

7.6.11.15 Void

7.6.11.16 Privacy Override

This parameter indicates if MS privacy is overridden by the LCS client when the GMLC and VMSC for an MR-LR are in the same country.

7.6.11.17 Supported LCS Capability Sets

This parameter indicates which capability sets of LCS are supported in the VLR or SGSN.

Next Change

8.1.2 MAP_UPDATE_LOCATION service

8.1.2.1 Definition

This service is used by the VLR to update the location information stored in the HLR.

The MAP_UPDATE_LOCATION service is a confirmed service using the service primitives given in table 8.1/2.

8.1.2.2 Service primitives

Table 8.1/2: MAP_UPDATE_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
MSC Address	M	M(=)		
VLR number	M	M(=)		
LMSI	U	C(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
IST Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
Long FTN Supported	C	C(=)		
Supported LCS Capability Sets	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.2.3 Parameter definitions and use

Invoke Id

See definition in subclause 7.6.1.

IMSI

See definition in subclause 7.6.2.

MSC Address

See definition for MSC number in subclause 7.6.2. The MSC address is used for short message delivery only and for each incoming call set-up attempt the MSRN will be requested from the VLR.

VLR number

See definition in subclause 7.6.2.

LMSI

See definition in subclause 7.6.2. It is an operator option to provide the LMSI from the VLR; it is mandatory for the HLR to support the LMSI handling procedures.

Supported CAMEL Phases

This parameter indicates which phases of CAMEL are supported. Must be present if a CAMEL phase different from phase 1 is supported. Otherwise may be absent.

HLR number

See definition in subclause 7.6.2. The presence of this parameter is mandatory in case of successful HLR updating.

SoLSA Support Indicator

This parameter is used by the VLR to indicate to the HLR in the Update Location indication that SoLSA is supported. If this parameter is not included in the Update Location indication and the Subscriber is marked as only allowed to

roam in Subscribed LSAs, then the HLR shall reject the roaming and indicate to the VLR that roaming is not allowed to that Subscriber in the VLR.

This SoLSA Support Indicator shall be stored by the HLR per VLR where there are Subscribers roaming. If a Subscriber is marked as only allowed to roam in Subscribed LSAs while roaming in a VLR and no SoLSA Support indicator is stored for that VLR, the location status of that Subscriber shall be set to Restricted.

IST Support Indicator

This parameter is used to indicate to the HLR that the VMSC supports basic IST functionality, that is, the VMSC is able to terminate the Subscriber Call Activity that originated the IST Alert when it receives the IST alert response indicating that the call(s) shall be terminated. If this parameter is not included in the Update Location indication and the Subscriber is marked as an IST Subscriber, then the HLR may limit the service for the subscriber (by inducing an Operator Determined barring of Roaming, Incoming or Outgoing calls), or allow service assuming the associated risk of not having the basic IST mechanism available.

This parameter can also indicate that the VMSC supports the IST Command service, including the ability to terminate all calls being carried for the identified subscriber by using the IMSI as a key. If this additional capability is not included in the Update Location indication and the HLR supports the IST Command capability, then the HLR may limit the service for the subscriber (by inducing an Operator Determined barring of Roaming, Incoming or Outgoing calls), or allow service assuming the associated risk of not having the IST Command mechanism available.

Long FTN Supported

This parameter indicates that the VLR supports Long Forwarded-to Numbers.

Super-Charger Supported in Serving Network Entity

This parameter is used by the VLR to indicate to the HLR that the VLR supports the Super-Charger functionality and whether subscription data has been retained by the VLR. If subscription data has been retained by the VLR the age indicator shall be included. Otherwise the VLR shall indicate that subscriber data is required.

If this parameter is absent then the VLR does not support the Super-Charger functionality.

Supported LCS Capability Sets

This parameter indicates by its presence that LCS is supported and the capability sets of LCS which are supported.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed;

  This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the VLR number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring". If no qualification is received (HLR with MAP Version 1), "PLMN Not Allowed" is taken as default.
- system failure;
- unexpected data value.

Provider error

For definition of provider errors see subclause 7.6.1.

Next Change

8.1.7 MAP_UPDATE_GPRS_LOCATION service

8.1.7.1 Definition

This service is used by the SGSN to update the location information stored in the HLR.

The MAP_UPDATE_GPRS_LOCATION service is a confirmed service using the service primitives given in table 8.1/7.

8.1.7.2 Service primitives

Table 8.1/7: MAP_UPDATE_GPRS_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
SGSN number	M	M(=)		
SGSN address	M	M(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
GPRS enhancements support indicator	C	C(=)		
Supported LCS Capability Sets	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.7.3 Parameter definitions and use

Invoke Id

See definition in subclause 7.6.1.

IMSI

See definition in subclause 7.6.2.

SGSN number

See definition in subclause 7.6.2.

SGSN address

See definition in subclause 7.6.2.

Supported CAMEL Phases

This parameter indicates which phases of CAMEL are supported. The SGSN can only support CAMEL phase 3 or greater.

SoLSA Support Indicator

This parameter is used by the SGSN to indicate to the HLR in the Update GPRS Location indication that SoLSA is supported. If this parameter is not included in the Update GPRS Location indication and the Subscriber is marked as only allowed to roam in Subscribed LSAs, then the HLR shall reject the roaming and indicate to the SGSN that roaming is not allowed to that Subscriber in the SGSN.

This SoLSA Support Indicator shall be stored by the HLR per SGSN where there are Subscribers roaming. If a Subscriber is marked as only allowed to roam in Subscribed LSAs while roaming in a SGSN and no SoLSA Support indicator is stored for that SGSN, the location status of that Subscriber has to be set to Restricted.

Super-Charger Supported in Serving Network Entity

This parameter is used by the SGSN to indicate to the HLR that the SGSN supports the Super-Charger functionality and whether subscription data has been retained by the SGSN. If subscription data has been retained by the SGSN the age indicator shall be included. Otherwise the SGSN shall indicate that subscriber data is required.

If this parameter is absent then the SGSN does not support the Super-Charger functionality.

GPRS enhancements support indicator

This parameter is used by the SGSN to indicate to the HLR in the Update GPRS Location indication that GPRS enhancements are supported. If this parameter is included in the Update GPRS Location indication the HLR may send the extensible QoS in the PDP contexts to the SGSN.

HLR number

See definition in subclause 7.6.2. The presence of this parameter is mandatory in case of successful HLR updating.

Supported LCS Capability Sets

This parameter indicates by its presence that LCS is supported and the capability sets of LCS which are supported.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed.

  This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the SGSN number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring".

- system failure;
- unexpected data value.

The diagnostic in the Unknown Subscriber may indicate “Imsi Unknown” or “Gprs Subscription Unknown”.

Provider error

For definition of provider errors see subclause 7.6.1.

Next Change

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version7 (7)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

      -- location registration types
      UpdateLocationArg,
      UpdateLocationRes,
      CancelLocationArg,
      CancelLocationRes,
      PurgeMS-Arg,
      PurgeMS-Res,
      SendIdentificationArg,
      SendIdentificationRes,
      UpdateGprsLocationArg,
```

```
      UpdateGprsLocationRes,
      IST-SupportIndicator,
      SupportedLCS-CapabilitySets,

      -- gprs location registration types
      GSN-Address,

      -- handover types
      ForwardAccessSignalling-Arg,
      PrepareHO-Arg,
      PrepareHO-Res,
      PrepareSubsequentHO-Arg,
      PrepareSubsequentHO-Res,
      ProcessAccessSignalling-Arg,
      SendEndSignal-Arg,
      SendEndSignal-Res,


      -- authentication management types
      SendAuthenticationInfoArg,
      SendAuthenticationInfoRes,
      AuthenticationFailureReportArg,
   AuthenticationFailureReportRes,

      -- security management types
      EquipmentStatus,
      Kc,

      -- subscriber management types
      InsertSubscriberDataArg,
      InsertSubscriberDataRes,
      DeleteSubscriberDataArg,
      DeleteSubscriberDataRes,
      SubscriberData,
      ODB-Data,
      SubscriberStatus,
      ZoneCodeList,
      maxNumOfZoneCodes,
      O-CSI,
   D-CSI,
      O-BcsmCamelTDPCriteriaList,
      T-BCSM-CAMEL-TDP-CriteriaList,
      SS-CSI,
      ServiceKey,
      DefaultCallHandling,
      CamelCapabilityHandling,
      BasicServiceCriteria,
      SupportedCamelPhases,
      maxNumOfCamelTDPData,
      CUG-Index,
      CUG-Interlock,
      InterCUG-Restrictions,
      IntraCUG-Options,
      NotificationToMSUser,
   IST-AlertTimerValue,
      T-CSI,
      T-BcsmTriggerDetectionPoint,

      -- fault recovery types
      ResetArg,
      RestoreDataArg,
      RestoreDataRes,

      -- subscriber information enquiry types
      ProvideSubscriberInfoArg,
      ProvideSubscriberInfoRes,
      SubscriberInfo,
      LocationInformation,
      SubscriberState,

      -- any time information enquiry types
      AnyTimeInterrogationArg,
      AnyTimeInterrogationRes,

      -- any time information handling types
      AnyTimeSubscriptionInterrogationArg,
      AnyTimeSubscriptionInterrogationRes,
      AnyTimeModificationArg,
      AnyTimeModificationRes,

      -- subscriber data modification notification types
      NoteSubscriberDataModifiedArg,
```

```
      NoteSubscriberDataModifiedRes,

      -- gprs location information retrieval types
      SendRoutingInfoForGprsArg,
      SendRoutingInfoForGprsRes,

      -- failure reporting types
      FailureReportArg,
      FailureReportRes,

      -- gprs notification types
      NoteMsPresentForGprsArg,
      NoteMsPresentForGprsRes,

      -- Mobility Management types
   NoteMM-EventArg,
      NoteMM-EventRes



;

IMPORTS
      maxNumOfSS,
      SS-SubscriptionOption,
      SS-List,
      SS-ForBS-Code,
      Password
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version7 (7)}

      SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version7 (7)}

      Ext-BearerServiceCode
FROM MAP-BS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-BS-Code (20) version7 (7)}

      Ext-TeleserviceCode
FROM MAP-TS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-TS-Code (19) version7 (7)}


      AddressString,
   ISDN-AddressString,
      ISDN-SubaddressString,
      FTN-AddressString,
      AccessNetworkSignalInfo,
      IMSI,
      TMSI,
      HLR-List,
      LMSI,
      Identity,
      GlobalCellId,
      CellGlobalIdOrServiceAreaIdOrLAI,
      Ext-BasicServiceCode,
      NAEA-PreferredCI,
      EMLPP-Info,
      MC-SS-Info,
      SubscriberIdentity,
      AgeOfLocationInformation,
      LCSClientExternalID,
      LCSClientInternalID,
      Ext-SS-Status



FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version7 (7)}

      ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version7 (7)}

      AbsentSubscriberDiagnosticSM
```

```
FROM MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version7 (7)}

;

-- location registration types

UpdateLocationArg ::= SEQUENCE {
     imsi                              IMSI,

     msc-Number                        [1] ISDN-AddressString,
     vlr-Number                        ISDN-AddressString,
     lmsi                              [10] LMSI OPTIONAL,
     extensionContainer                ExtensionContainer                OPTIONAL,
     ... ,
     vlr-Capability                    [6] VLR-Capability                OPTIONAL }

VLR-Capability ::= SEQUENCE{
     supportedCamelPhases              [0] SupportedCamelPhases          OPTIONAL,
     extensionContainer                ExtensionContainer                OPTIONAL,
     ... ,
     solsaSupportIndicator             [2] NULL                          OPTIONAL,
     istSupportIndicator               [1] IST-SupportIndicator          OPTIONAL,
     superChargerSupportedInServingNetworkEntity   [3] SuperChargerInfo  OPTIONAL,
     longFTN-Supported                 [4]  NULL                         OPTIONAL,
     supportedLCS-CapabilitySets       [5]  SupportedLCS-CapabilitySets  OPTIONAL }

SuperChargerInfo ::= CHOICE {
     sendSubscriberData                [0] NULL,
     subscriberDataStored              [1] AgeIndicator }

AgeIndicator ::= OCTET STRING (SIZE (1..6))
     -- The internal structure of this parameter is implementation specific.


IST-SupportIndicator ::=  ENUMERATED {
     basicISTSupported                 (0),
     istCommandSupported               (1),
     ...}
-- exception handling:
-- reception of values > 1 shall be mapped to ' istCommandSupported '

SupportedLCS-CapabilitySets ::= BIT STRING {
     lcs capability set1 (0),
     lcs capability set2 (1) } (SIZE (2..16))
-- Core network signalling capability set1 indicates LCS Release98 or Release99 version.
-- Core network signalling capability set2 indicates LCS Release4 or later version.
-- A node shall mark in the BIT STRING all LCS capability sets it supports.
-- Other bits than listed above shall be discarded.

UpdateLocationRes ::= SEQUENCE {
     hlr-Number                        ISDN-AddressString,

     extensionContainer                ExtensionContainer                OPTIONAL,
     ... }


-- gprs location registration types

UpdateGprsLocationArg ::= SEQUENCE {
     imsi                              IMSI,
     sgsn-Number                       ISDN-AddressString,
     sgsn-Address                      GSN-Address,
     extensionContainer                ExtensionContainer                OPTIONAL,
     ... ,
     sgsn-Capability                   [0] SGSN-Capability               OPTIONAL }

SGSN-Capability ::= SEQUENCE{
     solsaSupportIndicator             NULL                              OPTIONAL,
     extensionContainer                [1] ExtensionContainer            OPTIONAL,
     ... ,
     superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo  OPTIONAL ,
     gprsEnhancementsSupportIndicator  [3] NULL                          OPTIONAL,
     supportedCamelPhases              [4] SupportedCamelPhases          OPTIONAL,
     supportedLCS-CapabilitySets       [5]  SupportedLCS-CapabilitySets  OPTIONAL }

GSN-Address ::= OCTET STRING (SIZE (5..17))
     -- Octets are coded according to TS GSM 03.03
```

```
UpdateGprsLocationRes ::= SEQUENCE {
     hlr-Number                          ISDN-AddressString,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

-- subscriber management types

```
InsertSubscriberDataArg ::= SEQUENCE {
     imsi                                [0] IMSI                          OPTIONAL,
     COMPONENTS OF                       SubscriberData,
     extensionContainer                  [14] ExtensionContainer           OPTIONAL,
     ... ,
     naea-PreferredCI                    [15] NAEA-PreferredCI             OPTIONAL,
     -- naea-PreferredCI is included at the discretion of the HLR operator.
     gprsSubscriptionData                [16] GPRSSubscriptionData         OPTIONAL,
     roamingRestrictedInSgsnDueToUnsupportedFeature [23]                   NULL
                                                                           OPTIONAL,
     networkAccessMode                   [24] NetworkAccessMode            OPTIONAL,
     lsaInformation                      [25] LSAInformation               OPTIONAL,
     lmu-Indicator                       [21] NULL                         OPTIONAL,
     lcsInformation                      [22] LCSInformation               OPTIONAL,
          istAlertTimer                  [26] IST-AlertTimerValue          OPTIONAL,
          superChargerSupportedInHLR     [27] AgeIndicator                 OPTIONAL,
          mc-SS-Info                     [28] MC-SS-Info                   OPTIONAL,
     cs-AllocationRetentionPriority      [29] CS-AllocationRetentionPriority      OPTIONAL
 }
     -- If the Network Access Mode parameter is sent, it shall be present only in
     -- the first sequence if seqmentation is used
```

```
CS-AllocationRetentionPriority ::= OCTET STRING (SIZE (1))
     -- This data type encodes each priority level defined in TS 23.107 as the binary value
     -- of the priority level.
```

```
IST-AlertTimerValue ::= INTEGER (15..255)
```

```
LCSInformation ::= SEQUENCE {
     gmlc-List [0]                       GMLC-List OPTIONAL,
     lcs-PrivacyExceptionList            [1]  LCS-PrivacyExceptionList     OPTIONAL,
     molr-List                           [2]  MOLR-List                    OPTIONAL,
     ...}
```

```
GMLC-List ::= SEQUENCE SIZE (1..maxNumOfGMLC) OF
                                         ISDN-AddressString
     -- if segmentation is used, the complete GMLC-List shall be sent in one segment
```

```
maxNumOfGMLC  INTEGER ::= 5
```

```
LCS-PrivacyExceptionList ::= SEQUENCE SIZE (1..maxNumOfPrivacyClass) OF
                                         LCS-PrivacyClass
```

```
maxNumOfPrivacyClass  INTEGER ::= 4
```

```
LCS-PrivacyClass ::= SEQUENCE {
     ss-Code                             SS-Code,
     ss-Status                           Ext-SS-Status,
     notificationToMSUser                [0] NotificationToMSUser          OPTIONAL,
     -- notificationToMSUser  is expected only for
     -- SS-code = callunrelated or SS-code = callrelated
     externalClientList                  [1] ExternalClientList            OPTIONAL,
     -- externalClientList is expected only for SS-code = callunrelated or SS-code =
callrelated
     plmnClientList                      [2] PLMNClientList                OPTIONAL,
     -- plmnClientList is expected only for SS-code = plmn operator
     extensionContainer                  [3] ExtensionContainer            OPTIONAL,
     -- if segmentation is used, the complete LCS-PrivacyClass shall be sent in one segment
     ...}
```

```
ExternalClientList ::= SEQUENCE SIZE (0..maxNumOfExternalClient) OF
                                         ExternalClient
```

```
maxNumOfExternalClient  INTEGER ::= 5
```

```
PLMNClientList ::= SEQUENCE SIZE (1..maxNumOfPLMNClient) OF
                                        LCSClientInternalID
```

```
maxNumOfPLMNClient  INTEGER ::= 5
```

```
ExternalClient ::= SEQUENCE {
     clientIdentity                     LCSClientExternalID,
     gmlc-Restriction                   [0] GMLC-Restriction            OPTIONAL,
     notificationToMSUser               [1] NotificationToMSUser        OPTIONAL,
     extensionContainer                 [2] ExtensionContainer          OPTIONAL,
     ... }
```

```
GMLC-Restriction ::= ENUMERATED {
     gmlc-List                          (0),
     home-Country                       (1) ,
     ... }
-- exception handling:
-- At reception of any other value than the ones listed the receiver shall ignore
-- GMLC-Restriction.
```

```
NotificationToMSUser ::= ENUMERATED {
     notifyLocationAllowed              (0),
     notifyAndVerify-LocationAllowedIfNoResponse   (1),
     notifyAndVerify-LocationNotAllowedIfNoResponse(2),
     ...,
     locationNotAllowed (3) }
-- exception handling:
-- At reception of any other value than the ones listed the receiver shall ignore
-- NotificationToMSUser.
```

```
MOLR-List ::= SEQUENCE SIZE (1..maxNumOfMOLR-Class) OF
                                        MOLR-Class
```

```
maxNumOfMOLR-Class  INTEGER ::= 3
```

```
MOLR-Class ::= SEQUENCE {
     ss-Code                            SS-Code,
     ss-Status                          Ext-SS-Status,
     extensionContainer                 [0] ExtensionContainer          OPTIONAL,
     ...}
```

3GPP TSG_CN_WG4, Meeting #07 **Tdoc N4-010375**
Sophia Antipolis, FRANCE, 26th February - 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **232** ⌘ rev **1** ⌘ Current version: **4.2.1** ⌘

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

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

Title:	⌘	Maximum numbers of LCS Clients
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	21th. Feb. 2001
Category:	⌘	**B**
Release:	⌘	REL-4

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

Use one of the following releases:

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

Reason for change:	⌘	To show the additional LCS Clients to MAP specification.
Summary of change:	⌘	The maximum numbers of LCS clients is changed from 5 to 40.
Consequences if not approved:	⌘	

Clauses affected:	⌘	17.7.1
Other specs affected:	⌘	☒ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

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

```
LCS-PrivacyClass ::= SEQUENCE {
     ss-Code                          SS-Code,
     ss-Status                        Ext-SS-Status,
     notificationToMSUser             [0] NotificationToMSUser          OPTIONAL,
     -- notificationToMSUser  is expected only for
     -- SS-code = callunrelated or SS-code = callrelated
     externalClientList               [1] ExternalClientList            OPTIONAL,
     -- externalClientList and ext-externalClientList are~~is~~ expected only for SS-code =
callunrelated.
     plmnClientList                   [2] PLMNClientList                OPTIONAL,
     -- plmnClientList is expected only for SS-code = plmn operator
     extensionContainer               [3] ExtensionContainer            OPTIONAL,
     ~~-- if segmentation is used, the complete LCS-PrivacyClass shall be sent in one segment~~
     ... ,
     ext-externalClientList           [4] Ext-ExternalClientList  OPTIONAL,
     -- Ext-externalClientList is present when the visited node supports LCS Release 4 or
later versions, user specifies more than 5 clients and White Book SCCP is used.
     -- if segmentation is used, the complete LCS-PrivacyClass shall be sent in one segment
}
```

```
ExternalClientList ::= SEQUENCE SIZE (0..maxNumOfExternalClient) OF
                                      ExternalClient
```

```
maxNumOfExternalClient  INTEGER ::= 5
```

```
PLMNClientList ::= SEQUENCE SIZE (1..maxNumOfPLMNClient) OF
                                      LCSClientInternalID
```

```
maxNumOfPLMNClient  INTEGER ::= 5
```

```
Ext-ExternalClientList ::= SEQUENCE SIZE (1..maxNumOfExt-ExternalClient) OF
                                      ExternalClient
```

```
MaxNumOfExt-ExternalClient  INTEGER ::= 35
```

3GPP TSG_CN_WG4, Meeting #07 **Tdoc N4-010334**
Sophia Antipolis, FRANCE, 26th February - 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **233** ⌘ rev **1** ⌘ Current version: **4.2.1** ⌘

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

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

Title:	⌘	MS presence notification procedure for LCS
Source:	⌘	CN4
Work item code:	⌘	LCS
Date:	⌘	21.Feb.2001
Category:	⌘	**B**
Release:	⌘	REL-4

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

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

Reason for change: ⌘ Addition of the MS presence notification procedure, which enables the network to alert the LCS client when the mobile station becomes reachable after the failure of the MT-LR.

Summary of change: ⌘ Description about LCS routing procedure, LCS alerting procedure and LCS status reporting procedure are added. The detail description is as follows;

Messages ----------
1) MAP-ALERT-LCS message is used to inform the subscriber's status when the HLR detects that a subscriber is active. This message is defined newly.
2) MAP-REPORT-LCS-Status message is used to set the Message Waiting Data into the HLR. This message is defined newly.
3) MAP-INFORM-LCS message is used to inform the status of Message Waiting Data in the HLR and the reason why the subscriber is absent. This message is used parallel with the MAP-SENT-ROUTING-INFO-FOR-LCS message. This message is defined newly.

Parameters----------
1) LCS-Client ID and Notification Supported Indixator are added to the MAP-SEND-ROUTING-INFO-FOR-LCS message so that HLR can know that visited node supports the MS presence notification procedure.
2) LCS-Client ID List is added to the MAP-ALERT-LCS message so that GMLC can know the list of LCS Client ID that MS has been registered.
3) MT-LR Outcome for CS and MT-LR Outcome for PS are added to the MAP-REPORT-LCS-STATUS message so that HLR can know the cause for setting the Message Waiting Data.
4) Absent Subscriber Diagnostic LCS for CS and Absent Subscriber Diagnostic LCS for PS are added to the MAP-REPORT-LCS-STATUS message so that HLR can know the reason why the subscriber is absent.
5) LCS MW Status is added to the MAP-INFORM-LCS message so that HLR can inform the status of Message Waiting to GMLC.

		Error---------- 1) Serving Node Number Mismatch is newly added to the User error of MAP-REPORT-LCS-STATUS message. This error indicates that serving node numbers are not same. 2) Message Waiting List Full is added to the User error of MAP-REPORT-LCS-STATUS message. (Refers to SMS) 3) Feature not supported by serving node is newly added to the User error of REPORT-LCS-STATUS message. This error indicates that serving node don't support the MS presence notification procedure. SDL diagram---------- 1) SDL diagrams for LCS are added in section 24B.
Consequences if not approved:	⌘	

Clauses affected:	⌘	5.1.2, 7.6, 7.6.1.4, 7.6.11.17-23(new), 13A.1, 13A.4-6(new), 16.2.2.4, 17.1.6, 17.2.2.44, 17.2.2.46-47(new), 17.3.2.41-42, 17.3.3, 17.5, 17.6.6, 17.6.8, 17.7.7, 17.7.13, 24B			
Other specs affected:	⌘	**X**	Other core specifications	⌘	23.271-014
			Test specifications		
			O&M Specifications		
Other comments:	⌘				

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

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

5.1.2 Overload control for MAP entities

For all MAP entities, especially the HLR, the following overload control method is applied.

If overload of a MAP entity is detected requests for certain MAP operations (see tables 5.1/1, 5.1/2, 5.1/3 and 5.1/4) may be ignored by the responder. The decision as to which MAP Operations may be ignored is made by the MAP service provider and is based upon the priority of the application context.

Since most of the affected MAP operations are supervised in the originating entity by TC timers (medium) an additional delay effect is achieved for the incoming traffic.

If overload levels are applicable in the Location Registers the MAP operations should be discarded taking into account the priority of their application context (see table 5.1/1 for HLR, table 5.1/2 for MSC/VLR, table 5.1/3 for the SGSN and table 5.1/4 for the SMLC; the lowest priority is discarded first).

The ranking of priorities given in the tables 5.1/1, 5.1/2, 5.1/3 and 5.1/4 is not normative. The tables can only be seen as a proposal that might be changed due to network operator/implementation matters.

If secure transport is used, the encapsulated application context for the requested dialogue determines the priority for discarding the received MAP operation.

Table 5.1/1: Priorities of Application Contexts for HLR as Responder

	Responder = HLR	**Initiating Entity**
Priority high		
	Mobility Management	
	networkLocUp (updateLocation), (restoreData/v2), (sendParameters/v1)	VLR
	gprsLocationUpdate (updateGPRSLocation/v3),	SGSN
	infoRetrieval (sendAuthenticationInfo/v2/v3), (sendParameters/v1)	VLR/SGSN
	istAlerting (istAlert/v3)	MSC msPurging VLR
	(purgeMS/v2/v3)	
	msPurging (purgeMS/v3)	SGSN
	Short Message Service	
	shortMsgGateway (sendRoutingInfoforSM), (reportSM-DeliveryStatus)	GMSC
	mwdMngt (readyForSM/v2/v3), (noteSubscriberPresent/v1)	VLR/SGSN
	Mobile Terminating Traffic	
	locInfoRetrieval (sendRoutingInfo)	GMSC
	anyTimeEnquiry (anyTimeInterrogation)	gsmSCF
	reporting (statusReport)	VLR
	Location Services	
	locationSvcGateway (sendRoutingInfoforLCS/v3)	GMLC
	locationSvcReportStatus (reportLCS-Status/v3)	GMLC
	Subscriber Controlled Inputs (Supplementary Services)	
	networkFunctionalSs (registerSS), (eraseSS), (activateSS), (deactivateSS), (interrogateSS), (registerPassword), (processUnstructuredSS-Data/v1), (beginSubscriberActivity/v1)	VLR
	callCompletion (registerCCEntry), (eraseCCEntry)	VLR
	networkUnstructuredSs (processUnstructuredSS-Request/v2)	VLR
	imsiRetrieval (sendIMSI/v2)	VLR
	gprsLocationInfoRetrieval (sendRoutingInfoForGprs/v3)	GGSN/SGSN
	failureReport (failureReport/v3)	GGSN/SGSN
	authenticationFailureReport (authenticationFailureReport/v3)	VLR/SGSN
Priority low		

NOTE: The application context name is the last component but one of the object identifier.
Operation names are given in brackets for information with "/vn" appended to vn only operations.

Table 5.1/3: Priorities of Application Contexts for SGSN as Responder

Responder = SGSN	Initiating Entity
Priority high	
Mobility and Location Register Management	
locationCancel (cancelLocation v3)	HLR
reset (reset)	HLR
subscriberDataMngt (insertSubscriberData v3), (deleteSubscriberData v3)	HLR
tracing (activateTraceMode), (deactivateTraceMode)	HLR
Short Message Service	
shortMsgMT-Relay (MT-ForwardSM v3) (forwardSM v1/v2)	MSC
Network-Requested PDP context activation	
gprsNotify (noteMsPresentForGprs v3),	HLR
Priority low	

NOTE: The application context name is the last component but one of the object identifier.
Operation names are given in brackets for information with "/vn" appended to vn.

Table 5.1/2: Priorities of Application Contexts for MSC/VLR as Responder

Responder = MSC/VLR	Initiating Entity
Priority high	
Handover	
handoverControl (prepareHandover/v2/v3), (performHandover/v1)	MSC
Group call and Broadcast call	
groupCallControl (prepareGroupCall/v3)	MSC
Mobility and Location Register Management	
locationCancel (cancelLocation)	HLR
reset (reset)	HLR
immediateTermination (istCommand/v3)	HLR
interVlrInfoRetrieval (sendIdentification/v2/v3), (sendParameters/v1)	VLR
subscriberDataMngt (insertSubscriberData), (deleteSubscriberData)	HLR
tracing (activateTraceMode), (deactivateTraceMode)	HLR
Short Message Service	
shortMsgMO-Relay (MO-ForwardSM v3) (forwardSM v1/v2)	MSC/SGSN
shortMsgMT-Relay (MT-ForwardSM v3) (forwardSM v1/v2)	MSC
shortMsgAlert (alertServiceCentre/v2), (alertServiceCentreWithoutResult/v1)	HLR
Mobile Terminating Traffic	
roamingNbEnquiry (provideRoamingNumber)	HLR
callControlTransfer (resumeCallHandling)	MSC
subscriberInfoEnquiry (provideSubscriberInformation)	HLR
reporting (remoteUserFree) (SetReportingState)	HLR
Location Services	
locationSvcEnquiry (provideSubscriberLocation v3)	GMLC
Network-Initiated USSD	
networkUnstructuredSs (unstructuredSS-Request/v2), (unstructuredSS-Notify/v2)	HLR
Priority low	

NOTE: The application context name is the last component but one of the object identifier.
Operation names are given in brackets for information with "/vn" appended to vn only operations.

Next Change

7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in subclause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

Absent Subscriber Diagnostic SM	7.6.8.9	Invoke Id	7.6.1.1
Absent Subscriber Diagnostic LCS for CS	7.6.11.17		
Absent Subscriber Diagnostic LCS for PS	7.6.11.18		
Access connection status	7.6.9.3	ISDN Bearer Capability	7.6.3.41
		IST Alert Timer	7.6.3.66
		IST Information Withdrawn	7.6.3.68
		IST Support Indicator	7.6.3.69
Access signalling information	7.6.9.5	Kc	7.6.7.4
		LCS Client ID list	7.6.11.19
		LCS MW Status	7.6.11.20
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Linked Id	7.6.1.2
Additional number	7.6.2.46	LMSI	7.6.2.16
Additional signal info	7.6.9.10	Location Information	7.6.2.30
Additional SM Delivery Outcome	7.6.8.11		
Age Indicator	7.6.3.72	Location update type	7.6.9.6
		Long Forwarded-to Number	7.6.2.22A
		Long FTN Supported	7.6.2.22B
Alert Reason	7.6.8.8	Lower Layer Compatibility	7.6.3.42
		LSA Information	7.6.3.56
		LSA Information Withdraw	7.6.3.58
		MC Information	7.6.4.48
		MC Subscription Data	7.6.4.47
Alert Reason Indicator	7.6.8.10	Mobile Not Reachable Reason	7.6.3.51
Alerting Pattern	7.6.3.44	Modification request for CSI	7.6.3.81
All GPRS Data	7.6.3.53	Modification request for SS Information	7.6.3.82
All Information Sent	7.6.1.5	More Messages To Send	7.6.8.7
AN-apdu	7.6.9.1		
APN	7.6.2.42	MS ISDN	7.6.2.17
Authentication set list	7.6.7.1	MSC number	7.6.2.11
B-subscriber Address	7.6.2.36	MSIsdn-Alert	7.6.2.29
		MT-LR Outcome for CS	7.6.11.21
		MT-LR Outcome for PS	7.6.11.22
		Multicall Bearer Information	7.6.2.52
		Multiple Bearer Requested	7.6.2.53
		Multiple Bearer Not Supported	7.6.2.54
B subscriber Number	7.6.2.48	MWD status	7.6.8.3
		NbrUser	7.6.4.45
B subscriber subaddress	7.6.2.49	Network Access Mode	7.6.3.50
Basic Service Group	7.6.4.40	Network node number	7.6.2.43
Bearer service	7.6.4.38	Network resources	7.6.10.1
		Network signal information	7.6.9.8
Call Barring Data	7.6.3.83	New password	7.6.4.20
Call barring feature	7.6.4.19	No reply condition timer	7.6.4.7
Call barring information	7.6.4.18	North American Equal Access	7.6.2.34
		Notification supported indicator	7.6.11.23

GPRS enhancements support indicator	7.6.3.73
GPRS Node Indicator	7.6.8.14
GPRS Subscription Data	7.6.3.46
GPRS Subscription Data Withdraw	7.6.3.45
GPRS Support Indicator	7.6.8.15
Group Id	7.6.2.33
GSM bearer capability	7.6.3.6
Guidance information	7.6.4.22
Handover number	7.6.2.21
High Layer Compatibility	7.6.3.43
HLR Id	7.6.2.15
HLR number	7.6.2.13
HO-Number Not Required	7.6.6.7
IMEI	7.6.2.3
IMSI	7.6.2.1
Integrity Protection Information	7.6.6.8
Inter CUG options	7.6.3.27
Intra CUG restrictions	7.6.3.28
Suppression of Announcement	7.6.3.32
Target cell Id	7.6.2.8
Target location area Id	7.6.2.7
Target RNC Id	7.6.2.8A
Target MSC number	7.6.2.12
Teleservice	7.6.4.39
TMSI	7.6.2.2
Trace reference	7.6.10.2
Trace type	7.6.10.3
User error	7.6.1.4
USSD Data Coding Scheme	7.6.4.36
USSD String	7.6.4.37
UU Data	7.6.5.12
UUS CF Interaction	7.6.5.13
VBS Data	7.6.3.40
VGCS Data	7.6.3.39
VLR CAMEL Subscription Info	7.6.3.35
VLR number	7.6.2.14
VPLMN address allowed	7.6.3.48
Zone Code	7.6.2.28

Next Change

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.

a) Generic error:

- system failure, i.e. a task cannot be performed because of a problem in another entity. The type of entity or network resource may be indicated by use of the network resource parameter;
- data missing, i.e. an optional parameter required by the context is missing;
- unexpected data value, i.e. the data type is formally correct but its value or presence is unexpected in the current context;
- resource limitation;
- initiating release, i.e. the receiving entity has started the release procedure;
- facility not supported, i.e. the requested facility is not supported by the PLMN;
- incompatible terminal, i.e. the requested facility is not supported by the terminal.

b) Identification or numbering problem:

- unknown subscriber, i.e. no such subscription exists;
- number changed, i.e. the subscription does not exist for that number any more;
- unknown MSC;
- unidentified subscriber, i.e. if the subscriber is not contained in the database and it has not or cannot be established whether or not a subscription exists;
- unallocated roaming number;
- unknown equipment;
- unknown location area.

c) Subscription problem:

- roaming not allowed, i.e. a location updating attempt is made in an area not covered by the subscription;
- illegal subscriber, i.e. illegality of the access has been established by use of authentication procedure;
- bearer service not provisioned;
- teleservice not provisioned;
- illegal equipment, i.e. the IMEI check procedure has shown that the IMEI is blacklisted or not whitelisted.

d) Handover problem:

- no handover number available, i.e. the VLR cannot allocate a number for handover or cannot allocate the required amount of numbers for relocation;
- subsequent handover failure, i.e. handover to a third MSC failed for some reason;
- target cell outside group call area.

e) Operation and maintenance problem:

- tracing buffer full, i.e. tracing cannot be performed because the tracing capacity is exceeded.

f) Call set-up problem:

- no roaming number available, i.e. a roaming number cannot be allocated because all available numbers are in use;
- absent subscriber, i.e. the subscriber has activated the detach service or the system detects the absence condition. This error may be qualified to indicate whether the subscriber was IMSI detached, in a restricted area or did not respond to paging;
- busy subscriber. This error may be qualified to indicate that the subscriber was busy due to CCBS and that CCBS is possible;
- no subscriber reply;
- forwarding violation, i.e. the call has already been forwarded the maximum number of times that is allowed;
- CUG reject, i.e. the call does not pass a CUG check; additional information may also be given in order to indicate rejection due to e.g. incoming call barred or non-CUG membership;
- call barred. Optionally, additional information may be included for indicating either that the call meets a barring condition set by the subscriber or that the call is barred for operator reasons. In the case of barring of Mobile Terminating Short Message, the additional information may indicate a barring condition due to "Unauthorised Message Originator";
- optimal routeing not allowed, i.e. the entity which sends the error does not support optimal routeing, or the HLR will not accept an optimal routeing interrogation from the GMSC, or the call cannot be optimally routed because it would contravene optimal routeing constraints;
- forwarding failed, i.e. the GMSC interrogated the HLR for forwarding information but the HLR returned an error.

g) Supplementary services problem:

- call barred;
- illegal SS operation;
- SS error status;
- SS not available;
- SS subscription violation;
- SS incompatibility;

- negative password check;
- password registration failure;
- Number of Password Attempts;
- USSD Busy;
- Unknown Alphabet;
- short term denial;
- long term denial.

For definition of these errors see GSM 04.80.

h) Short message problem:

- SM delivery failure with detailed reason as follows:
  - memory capacity exceeded;
  - MS protocol error;
  - MS not equipped;
  - unknown service centre (SC);
  - SC congestion;
  - invalid SME address;
  - subscriber is not an SC subscriber;
  - and possibly detailed diagnostic information, coded as specified in GSM 03.40, under SMS-SUBMIT-REPORT and SMS-DELIVERY-REPORT. If the SM entity that returns the SM Delivery Failure error includes detailed diagnostic information, it shall be forwarded in the MAP_MO_FORWARD_SHORT_MESSAGE and in the MAP_MT_FORWARD_SHORT_MESSAGE response.
- message waiting list full, i.e. no further SC address can be added to the message waiting list.
- Subscriber busy for MT SMS, i.e. the mobile terminated short message transfer cannot be completed because:
  - another mobile terminated short message transfer is going on and the delivery node does not support message buffering; or
  - another mobile terminated short message transfer is going on and it is not possible to buffer the message for later delivery; or
  - the message was buffered but it is not possible to deliver the message before the expiry of the buffering time defined in GSM 03.40;
- Absent Subscriber SM, i.e. the mobile terminated short message transfer cannot be completed because the network cannot contact the subscriber. Diagnostic information regarding the reason for the subscriber's absence may be included with this error.

i) Location services problem:

- Unauthorised Requesting Network
- Unauthorised LCS Client with detailed reasons as follows:
  - Unauthorised Privacy Class
  - Unauthorised Call Unrelated External Client

- Unauthorised Call Related External Client

- Privacy override not applicable

- Position method failure with detailed reasons as follows:

  - Congestion

  - Insufficient resources

  - Insufficient Measurement Data

  - Inconsistent Measurement Data

  - Location procedure not completed

  - QoS not attainable

  - Position Method Not Available in Network

  - Position Method Not Available in Location Area

  - Unknown or unreachable LCS Client.

- message waiting list full, i.e. no further GMLC number and/or LCS Client ID can be added to the message waiting list.

- Serving Node Number Mismatch, i.e. the serving node number stored in the HLR changed after the last interrogation from the GMLC.

- Feature not supported by serving node, i.e. the serving node does not support the MS presence notification procedure.

j) Problem detected by an application using secure transport:

- Secure transport error. This error indicates that the application using secure transport returned an error. The parameter of the error indicates:

  - The protected payload, which carries the result of applying the protection function specified in 3G TS 33.102 to the encoding of the parameter of the original error.

Next Change

7.6.11 Location Service Parameters

7.6.11.1 Age of Location Estimate

This parameter indicates how long ago the location estimate was obtained.

7.6.11.2 Void

7.6.11.3 Void

7.6.11.4 LCS Client ID

This parameter provides information related to the identity of an LCS client.

7.6.11.5 LCS Event

This parameter identifies an event associated with the triggering of a location estimate.

7.6.11.6 LCS MLC Data

This parameter provides the identities of any authorised GMLCs for a target MS. Only these GMLCs are allowed to send a location request for an external client when location requests are restricted to these GMLCs.

7.6.11.7 LCS Priority

This parameter gives the priority of the location request.

7.6.11.8 LCS QoS

This parameter defines the Quality of Service (QoS) for any location request. It is composed of the following elements.

1) Response Time

   Indicates the category of response time – “low delay” or “delay tolerant”.

2) Horizontal Accuracy

   Indicates the required horizontal accuracy of the location estimate.

3) Vertical Coordinate

   Indicates if a vertical coordinate is required (in addition to horizontal coordinates).

4) Vertical Accuracy

   Indicates the required vertical accuracy of the location estimate (inclusion is optional).

7.6.11.9 Void

7.6.11.10 Void

7.6.11.11 Location Estimate

This parameter gives an estimate of the location of an MS in universal coordinates and the accuracy of the estimate.

7.6.11.12 Location Type

This parameter indicates the type of location estimate required by the LCS client. Possible location estimate types include:

- current location;
- current or last known location;
- initial location for an emergency services call.

7.6.11.13 NA-ESRD

This parameter only applies to location for an emergency services call in North America and gives the North American Emergency Services Routing Digits.

7.6.11.14 NA-ESRK

This parameter only applies to location for an emergency services call in North America and gives the North American Emergency Services Routing Key.

7.6.11.15 Void

7.6.11.16 Privacy Override

This parameter indicates if MS privacy is overridden by the LCS client when the GMLC and VMSC for an MR-LR are in the same country.

7.6.11.17 ~~Void~~ Absent Subscriber Diagnostic LCS for CS

This parameter is used to indicate the reason why the subscriber is absent for CS domain.

7.6.11.18 ~~Void~~ Absent Subscriber Diagnostci LCS for PS

This parameter is used to indicate the reason why the subscriber is absent for PS domain.

7.6.11.19 ~~Void~~LCS Client ID list

This parameter indicates the list of the LCS Client IDs.

7.6.11.20 LCS MW status

This parameter indicates whether or not the LCS Client IDs is already contained in the Message Waiting Data file. In addition, it contains the status of the Mobile subscriber Not Reachable Flag (MNRF) and the status of the Mobile station Not Reachable for GPRS flag (MNRG).

7.6.11.21 MT-LR Outcome for CS

This parameter indicates the cause for setting the message waiting data for only CS domain. It can take one of the following values:

- Absent subscriber;
- Successful transfer.

7.6.11.22 MT-LR Outcome for PS

This parameter indicates the cause for setting the message waiting data for only PS domain. It can take one of the following values:

- Absent subscriber;
- Successful transfer.

7.6.11.23 Notification supported indicator

This parameter indicates the support of MS presence notification procedure by the GMLC.

Next Change

13A Location Service Management Services

13A.1 MAP-SEND-ROUTING-INFO-FOR-LCS Service

13A.1.1 Definition

This service is used between the GMLC and the HLR to retrieve the routing information needed for routing a location service request to the servicing VMSC. The MAP-SEND-ROUTING-INFO-FOR-LCS is a confirmed service using the primitives from table 13A.1/1.

13A.1.2 Service Primitives

Table 13A.1/1: MAP-SEND-ROUTING-INFO-FOR-LCS

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
MLC Number	M	M(=)		
MSISDN	C	C(=)	C	C(=)
IMSI	C	C(=)	C	C(=)
LCS Client ID	O	O(=)		
Notification supported indicator	C	C(=)		
LMSI			C	C(=)
MSC Number			C	C(=)
User error			C	C(=)
Provider error				O

13A.1.3 Parameter Use

Invoke id

See definition in subclause 7.6.1.

MLC Number

See definition in subclause 7.6.2.

MSISDN

See definition in subclause 7.6.2. The request shall carry either the IMSI or MSISDN. The response shall carry whichever of these was not included in the request (see GSM 03.71 for details).

IMSI

See definition in subclause 7.6.2.

LCS Client ID

This parameter provides information related to the identity of an LCS client. This parameter shall be present if the GMLC request the MS presence notification procedure (see 3G TS 23.271 for details)

Notification supported indicator

See definition in subclause 7.6.11.23. This parameter is set when the GMLC supports the MS presence notification procedure.

LMSI

See definition in subclause 7.6.2. It is an operator option to provide this parameter from the VLR; it is mandatory for the HLR to include the LMSI in a successful response, if the VLR has used the LMSI.

MSC Number

See definition in subclause 7.6.2. This parameter is provided in a successful response.

User error

The following errors defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- Unknown subscriber;
- Absent Subscriber;
- Facility Not Supported;
- System failure;
- Unexpected Data Value;
- Data missing;
- Unauthorised requesting network

Provider error

For definition of provider errors see subclause 7.6.1.

Next Change

13A.4 MAP-ALERT-LCS service

13A.4.1 Definition

This service is used between the HLR and the GMLC. The HLR initiates this service, if the HLR detects that a subscriber is active.

The MAP-ALERT-LCS service is a confirmed service using the primitives from table 13A.4/1.

13A.4.2 Service primitives

Table 13A.4/1: MAP-ALERT-LCS

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
LCS Client Id list	M	M(=)		
User error			C	C(=)
Provider error				O

13A.4.3 Parameter use

Invoke id

See definition in subclause 7.6.1.

LCS Client ID List

See definition in subclause 7.6.11.19.

User error

The following errors defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- System Failure;
- Unexpected Data Value;
- Data missing.

Provider error

For definition of provider errors see subclause 7.6.1.

13A.5 MAP-REPORT-LCS-STATUS service

13A.5.1 Definition

This service is used between the GMLC and the HLR. The MAP-REPORT-LCS-STATUS service is used to set the Message Waiting Data into the HLR or to inform the HLR of successful Location Request transfer after polling. This service is invoked by the GMLC.

The MAP-REPORT-LCS-STATUS service is a confirmed service using the service primitives given in table 13A.5/1.

13A.5.2 Service primitives

Table 13A.5/1: MAP-REPORT-LCS-STATUS

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
LCS Client ID	C	C(=)		
MSC Number	C	C(=)		
MT-LR Outcome for CS	C	C(=)		
Absent Subscriber Diagnostic LCS for CS	C	C(=)		
SGSN Number	C	C(=)		
MT-LR Outcome for PS	C	C(=)		
Absent Subscriber Diagnostic LCS for PS	C	C(=)		
User error			C	C(=)
Provider error				O

13A.5.3 Parameter use

Invoke id

See definition in subclause 7.6.1.

IMSI

The IMSI shall be provided if available to the VMSC.

LCS Client ID

This parameter provides information related to the identity of an LCS client.

MSC Number

See definition in subclause 7.6.2.

MT-LR Outcome for CS

See definition in subclause 7.6.11.21.

Absent Subscriber Diagnostic LCS for CS

See definition in subclause 7.6.11.17.

SGSN Number

See definition in subclause 7.6.2.

MT-LR Outcome for PS

See definition in subclause 7.6.11.22.

Absent Subscriber Diagnostic LCS for PS

See definition in subclause 7.6.11.18.

User error

The following errors defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- Unknown Subscriber;
- Message Waiting List Full;
- Serving Node Number Mismatch;
- Unexpected Data Value;
- Data missing;
- Feature not supported by serving node.

Provider error

For definition of provider errors see subclause 7.6.1.

13A.6 MAP-INFORM-LCS service

13A.6.1 Definition

This service is used between the HLR and the GMLC to inform the status of Message Waiting in the HLR. The MAP-INFORM-LCS service is a non-confirmed service using the primitives from table 13A.6/1.

13A.6.2 Service primitives

Table 13A.6/1: MAP-INFORM-LCS

Parameter name	Request	Indication
Invoke Id	M	M(=)
LCS MW Status	M	M(=)
Absent Subscriber Diagnostic LCS for CS	C	C(=)
Absent Subscriber Diagnostic LCS for PS	C	C(=)

13A.6.3 Parameter use

Invoke id

See definition in subclause 7.6.1.

LCS MW Status

See definition in subclause 7.6.20.

Absent Subscriber Diagnostic LCS for CS

See definition in subclause 7.6.11.17.

Absent Subscriber Diagnostic LCS for PS

See definition in subclause 7.6.11.18.

Next Change

16.2.1 Directly mapped parameters

The Invoke Id parameter of the MAP request and indication primitive is directly mapped on to the Invoke Id parameter of the component handling primitives.

16.2.2 Use of other parameters of component handling primitives

16.2.2.1 Dialogue Id

The value of this parameter is associated with the MAP PM invocation in an implementation dependent manner.

16.2.2.2 Class

The value of this parameter is set by the MAP PM according to the type of the operation to be invoked.

16.2.2.3 Linked Id

When a service response is mapped to a class 4 operation, the value of this parameter is set by the MAP PM and corresponds to the value assigned by the user to the initial service request (i.e. the value of the invoke ID parameter of the request primitive). Otherwise if such a parameter is included in MAP request/indication primitives it is directly mapped to the linked ID parameter of the associated TC-INVOKE request/indication primitives.

16.2.2.4 Operation

When mapping a request primitive on to a Remote Operations PDU (invoke), the MAP PM shall set the operation code according to the mapping described in table 16.2/1.

When mapping a response primitive on to a Remote Operations service, the MAP PM shall set the operation code of the TC-RESULT-L/NL primitive (if required) to the same value as the one received at invocation time.

Table 16.2/1: Mapping of MAP specific services on to MAP operations

MAP-SERVICE	operation
MAP-ACTIVATE-SS	activateSS
MAP-ACTIVATE-TRACE-MODE	activateTraceMode
MAP-ALERT-LCS	AlertLCS
MAP-ALERT-SERVICE-CENTRE	AlertServiceCentre
MAP-ANY-TIME-INTERROGATION	AnyTimeInterrogaton
MAP_AUTHENTICATION_FAILURE_REPORT	AuthenticationFailureReport
MAP-ANY-TIME-MODIFICATION	AnyTimeModification
MAP-ANY-TIME-SUBSCRIPTION-INTERROGATION	AnyTimeSubscriptionInterrogaton
MAP-CANCEL-LOCATION	CancelLocation
MAP-CHECK-IMEI	CheckIMEI
MAP-DEACTIVATE-SS	DeactivateSS
MAP-DEACTIVATE-TRACE-MODE	DeactivateTraceMode
MAP-DELETE-SUBSCRIBER-DATA	DeleteSubscriberData
MAP-ERASE-CC-ENTRY	EraseCC-Entry
MAP-ERASE-SS	EraseSS
MAP-FAILURE-REPORT	FailureReport
MAP-FORWARD-ACCESS-SIGNALLING	ForwardAccessSignalling
MAP-FORWARD-CHECK-SS-INDICATION	ForwardCheckSsIndication
MAP-FORWARD-GROUP-CALL-SIGNALLING	ForwardGroupCallSignalling
MAP-MT-FORWARD-SHORT-MESSAGE	mt-forwardSM
MAP-MO-FORWARD-SHORT-MESSAGE	mo-forwardSM
MAP-GET-PASSWORD	GetPassword

MAP-INFORM-SERVICE-CENTRE	InformServiceCentre
MAP-INFORM-LCS	InformLCS
MAP-INSERT-SUBSCRIBER-DATA	InsertSubscriberData
MAP-INTERROGATE-SS	InterrogateSs
MAP-IST-ALERT	IstAlert
MAP-IST-COMMAND	IstCommand
MAP-NOTE-MS-PRESENT-FOR-GPRS	NoteMsPresentForGprs
MAP-NOTE-SUBSCRIBER-DATA-MODIFIED	NoteSubscriberDataModified
MAP-PREPARE-GROUP-CALL	PrepareGroupCall
MAP-PREPARE-HANDOVER	PrepareHandover
MAP-PREPARE-SUBSEQUENT-HANDOVER	PrepareSubsequentHandover
MAP-PROCESS-ACCESS-SIGNALLING	ProcessAccessSignalling
MAP-PROCESS-GROUP-CALL-SIGNALLING	ProcessGroupCallSignalling
MAP-PROCESS-UNSTRUCTURED-SS-REQUEST	ProcessUnstructuredSS-Request
MAP-PROVIDE-ROAMING-NUMBER	ProvideRoamingNumber
MAP-PROVIDE-SIWFS-NUMBER	ProvideSIWFSNumber
MAP-PROVIDE-SUBSCRIBER-LOCATION	ProvideSubscriberLocation
MAP-PROVIDE-SUBSCRIBER-INFO	ProvideSubscriberInfo
MAP-PURGE-MS	PurgeMS
MAP-READY-FOR-SM	ReadyForSM
MAP-REGISTER-CC-ENTRY	RegisterCC-Entry
MAP-REGISTER-PASSWORD	RegisterPassword
MAP-REGISTER-SS	RegisterSS
MAP-REMOTE-USER-FREE	RemoteUserFree
MAP-REPORT-LCS-STATUS	ReportLCS-Status
MAP-REPORT-SM-DELIVERY-STATUS	ReportSmDeliveryStatus
MAP-RESET	Reset
MAP-RESTORE-DATA	RestoreData
MAP-SECURE-TRANSPORT-CLASS-1	SecureTransportClass1
MAP-SECURE-TRANSPORT-CLASS-2	SecureTransportClass2
MAP-SECURE-TRANSPORT-CLASS-3	SecureTransportClass3
MAP-SECURE-TRANSPORT-CLASS-4	SecureTransportClass4
MAP-SEND_GROUP-CALL_END_SIGNAL	SendGroupCallEndSignal
MAP-SEND-END-SIGNAL	SendEndSignal
MAP-SEND-AUTHENTICATION-INFO	SendAuthenticationInfo
MAP-SEND-IMSI	SendIMSI
MAP-SEND-IDENTIFICATION	SendIdentification
MAP-SEND-ROUTING-INFO-FOR-SM	SendRoutingInfoForSM
MAP-SEND-ROUTING-INFO-FOR-GPRS	SendRoutingInfoForGprs
MAP-SEND-ROUTING-INFO-FOR-LCS	SendRoutingInfoForLCS
MAP-SEND-ROUTING-INFORMATION	SendRoutingInfo
MAP-SET-REPORTING-STATE	SetReportingState
MAP-SIWFS-SIGNALLING-MODIFY	SIWFSSignallingModify
MAP-STATUS-REPORT	StatusReport
MAP-SUBSCRIBER-LOCATION-REPORT	SubscriberLocationReport
MAP-SUPPLEMENTARY-SERVICE-INVOCATION-NOTIFICATION	ss-Invocation-Notification
MAP-UNSTRUCTURED-SS-NOTIFY	unstructuredSS-Notify
MAP-UNSTRUCTURED-SS-REQUEST	unstructuredSS-Request
MAP-UPDATE-GPRS-LOCATION	UpdateGprsLocation
MAP-UPDATE-LOCATION	UpdateLocation
MAP-NOTE-MM-EVENT	NoteMM-Event

Next Change

17.1.6 Application Contexts

The following informative table lists the latest versions of the Application Contexts used in this specification, with the operations used by them and, where applicable, whether or not the operation description is exactly the same as for previous versions. Information in 17.6 & 17.7 relates only to the ACs in this table.

AC Name	AC Version	Operations Used	Comments
LocationCancellationContext	v3	CancelLocation	
EquipmentMngtContext	v2	CheckIMEI	
ImsiRetrievalContext	v2	SendIMSI	
InfoRetrievalContext	v3	SendAuthenticationInfo	
InterVlrInfoRetrievalContext	v3	SendIdentification	
HandoverControlContext	v3	PrepareHandover forwardAccessSignalling sendEndSignal processAccessSignalling prepareSubsequentHandover	The syntax of this operation has been extended in comparison with release 98 version
MwdMngtContext	v3	ReadyForSM	
MsPurgingContext	v3	PurgeMS	
ShortMsgAlertContext	v2	AlertServiceCentre	
ResetContext	v2	Reset	
NetworkUnstructuredSsContext	v2	ProcessUnstructuredSS-Request unstructuredSS-Request unstructuredSS-Notify	
TracingContext	v3	ActivateTraceMode deactivateTraceMode	
NetworkFunctionalSsContext	v2	RegisterSS eraseSS activateSS deactivateSS registerPassword interrogateSS getPassword	
ShortMsgMO-RelayContext	v3	Mo-forwardSM	
ShortMsgMT-RelayContext	v3	Mt-forwardSM	
ShortMsgGatewayContext	v3	SendRoutingInfoForSM reportSM-DeliveryStatus InformServiceCentre	The syntax of this operation has been extended in comparison with release 96 version
NetworkLocUpContext	v3	UpdateLocation ForwardCheckSs-Indication restoreData insertSubscriberData activateTraceMode	The syntax is the same in v1 & v2
GprsLocationUpdateContext	v3	UpdateGprsLocation InsertSubscriberData ActivateTraceMode	
SubscriberDataMngtContext	v3	InsertSubscriberData DeleteSubscriberData	
RoamingNumberEnquiryContext	v3	ProvideRoamingNumber	
LocationInfoRetrievalContext	v3	SendRoutingInfo	
GprsNotifyContext	v3	NoteMsPresentForGprs	
GprsLocationInfoRetrievalContext	v3	SendRoutingInfoForGprs	
FailureReportContext	v3	FailureReport	
CallControlTransferContext	v4	ResumeCallHandling	
SubscriberInfoEnquiryContext	v3	ProvideSubscriberInfo	
AnyTimeEnquiryContext	v3	AnyTimeInterrogation	
AnyTimeInfoHandlingContext	v3	AnyTimeSubscriptionInterrogation AnyTimeModification	
ss-InvocationNotificationContext	v3	Ss-InvocationNotification	
SIWFSAllocationContext	v3	ProvideSIWFSNumber SIWFSSignallingModify	
GroupCallControlContext	v3	PrepareGroupCall ProcessGroupCallSignalling ForwardGroupCallSignalling SendGroupCallEndSignal	
ReportingContext	v3	SetReportingState StatusReport RemoteUserFree	
CallCompletionContext	v3	RegisterCC-Entry	

AC Name	AC Version	Operations Used	Comments
		eraseCC-Entry	
IstAlertingContext	v3	IstAlert	
ImmediateTerminationContext	v3	IstCommand	
LocationSvcEnquiryContext	v3	ProvideSubscriberLocation SubscriberLocationReport	
LocationSvcGatewayContext	~~V~~v3	SendRoutingInfoForLCS InformLCS	
LocationSvcAlertContext	v3	AlertLCS	
LocationSvcReportStatusContext	v3	ReportLCS-Status	
mm-EventReportingContext	V3	noteMM-Event	
SubscriberDataModificationNotificationContext	v3	NoteSubscriberDataModified	
AuthenticationFailureReportContext	v3	AuthenticationFailureReport	
SecureTransportHandlingContext	v3	SecureTransportClass1 secureTransportClass2 secureTransportClass3 secureTransportClass4	

NOTE (*): The syntax of the operations is not the same as in previous versions unless explicitly stated

Next Change

17.2.2.44 Location service gateway services

This operation package includes the operations required for location service gateway procedures between GMLC and HLR.

```
LocationSvcGatewayPackage-v3 ::= OPERATION-PACKAGE
     -- Supplier is HLR if Consumer is GMLC
     CONSUMER INVOKES {
          sendRoutingInfoForLCS}
     SUPPLIER INVOKES {
          informLCS}
```

This package is v3 only.

17.2.2.45 Location service enquiry

This operation package includes the operations required for the location service enquiry procedures between GMLC and MSC.

```
LocationSvcEnquiryPackage-v3 ::= OPERATION-PACKAGE
     -- Supplier is MSC if Consumer is GMLC
     CONSUMER INVOKES {
          provideSubscriberLocation}
     SUPPLIER INVOKES {
          subscriberLocationReport}
```

This package is v3 only.

17.2.2.46 Location servece client alerting

This operation package includes the operations required for alerting between HLR and GMLC.

```
LocationSvcAlertPackage-v3 ::= OPERATION-PACKAGE
     -- Supplier is GMLC if Consumer is HLR
     CONSUMER INVOKES {
          alertLCS}
```

This package is v3 only.

17.2.2.47 Location service status reporting

This operation package includes the operations required for reporting procedures between GMLC and HLR.

```
LocationSvcReportStatusPackage-v3 ::= OPERATION-PACKAGE
     -- Supplier is HLR if Consumer is GMLC
     CONSUMER INVOKES {
          reportLCS-Status}
```

This package is v3 only.

Next Change

17.3.2.39 Location Service Gateway

This application context is used for location service gateway procedures.

```
locationSvcGatewayContext-v3 APPLICATION-CONTEXT
     -- Responder is HLR if Initiator is GMLC
     INITIATOR CONSUMER OF {
          locationSvcGatewayPackage-v3}
::= {map-ac locationSvcGateway(37) version3(3)}
```

17.3.2.40 Location Service Enquiry

This application context is used for location service enquiry procedures.

```
locationSvcEnquiryContext-v3 APPLICATION-CONTEXT
     -- Responder is MSC if Initiator is GMLC
     INITIATOR CONSUMER OF {
          locationSvcEnquiryPackage-v3}
::= {map-ac locationScvEnquiry(38) version3 (3)}
```

17.3.2.41 Location servece client alerting

This application context is used for LCS client alerting procedures.

```
locationSvcAlertContext-v3 APPLICATION-CONTEXT
     -- Responder is GMLC if Initiator is HLR
     INITIATOR CONSUMER OF {
          locationSvcAlertPackage-v3}
::= {map-ac locationSvcAlert(xx) version3(3)}
```

17.3.2.42 Location service status reporting

This application context is used for LCS status reportging procedures.

```
locationSvcReportStatusContext-v3 APPLICATION-CONTEXT
     -- Responder is HLR if Initiator is GMLC
     INITIATOR CONSUMER OF {
          locationSvcReportStatusPackage-v3}
::= {map-ac locationSvcReportStatus(xx) version3(3)}
```

Next Change

17.3.3 ASN.1 Module for application-context-names

The following ASN.1 module summarises the application-context-name assigned to MAP application-contexts.

```
MAP-ApplicationContexts {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ApplicationContexts (2) version7 (7)}

DEFINITIONS

::=

BEGIN


-- EXPORTS everything


IMPORTS
   gsm-NetworkId,
   ac-Id
FROM MobileDomainDefinitions {
   ccitt (0) identified-organization (4) etsi (0) mobileDomain (0)
   mobileDomainDefinitions (0) version1 (1)}
;

-- application-context-names

map-ac  OBJECT IDENTIFIER ::= {gsm-NetworkId ac-Id}

networkLocUpContext-v3  OBJECT IDENTIFIER ::=
     {map-ac networkLocUp(1) version3(3)}

locationCancellationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationCancel(2) version3(3)}

roamingNumberEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac roamingNbEnquiry(3) version3(3)}

authenticationFailureReportContext-v3  OBJECT IDENTIFIER ::=
     {map-ac authenticationFailureReport(39) version3(3)}

locationInfoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locInfoRetrieval(5) version3(3)}

resetContext-v2  OBJECT IDENTIFIER ::=
     {map-ac reset(10) version2(2)}

handoverControlContext-v3  OBJECT IDENTIFIER ::=
     {map-ac handoverControl(11) version3(3)}

equipmentMngtContext-v2  OBJECT IDENTIFIER ::=
     {map-ac equipmentMngt(13) version2(2)}

infoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac infoRetrieval(14) version3(3)}

interVlrInfoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac interVlrInfoRetrieval(15) version3(3)}

subscriberDataMngtContext-v3  OBJECT IDENTIFIER ::=
     {map-ac subscriberDataMngt(16) version3(3)}

tracingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac tracing(17) version3(3)}

networkFunctionalSsContext-v2  OBJECT IDENTIFIER ::=
     {map-ac networkFunctionalSs(18) version2(2)}

networkUnstructuredSsContext-v2  OBJECT IDENTIFIER ::=
     {map-ac networkUnstructuredSs(19) version2(2)}

shortMsgGatewayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac shortMsgGateway(20) version3(3)}

shortMsgMO-RelayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac shortMsgMO-Relay(21) version3(3)}
```

```
shortMsgAlertContext-v2  OBJECT IDENTIFIER ::=
     {map-ac shortMsgAlert(23) version2(2)}

mwdMngtContext-v3  OBJECT IDENTIFIER ::=
     {map-ac mwdMngt(24) version3(3)}

shortMsgMT-RelayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac shortMsgMT-Relay(25) version3(3)}

imsiRetrievalContext-v2  OBJECT IDENTIFIER ::=
     {map-ac imsiRetrieval(26) version2(2)}

msPurgingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac msPurging(27) version3(3)}

subscriberInfoEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac subscriberInfoEnquiry(28) version3(3)}

anyTimeInfoEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac anyTimeInfoEnquiry(29) version3(3)}

callControlTransferContext-v4  OBJECT IDENTIFIER ::=
     {map-ac callControlTransfer(6) version4(4)}

ss-InvocationNotificationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac ss-InvocationNotification(36) version3(3)}

sIWFSAllocationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac sIWFSAllocation(12) version3(3)}

groupCallControlContext-v3  OBJECT IDENTIFIER ::=
     {map-ac groupCallControl(31) version3(3)}

gprsLocationUpdateContext-v3  OBJECT IDENTIFIER ::=
     {map-ac gprsLocationUpdate(32) version3(3)}

gprsLocationInfoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac gprsLocationInfoRetrieval(33) version3(3)}

failureReportContext-v3  OBJECT IDENTIFIER ::=
     {map-ac failureReport(34) version3(3)}

gprsNotifyContext-v3  OBJECT IDENTIFIER ::=
     {map-ac gprsNotify(35) version3(3)}

reportingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac reporting(7) version3(3)}

callCompletionContext-v3  OBJECT IDENTIFIER ::=
     {map-ac callCompletion(8) version3(3)}

istAlertingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac istAlerting(4) version3(3)}

serviceTerminationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac immediateTermination(9) version3(3)}

locationSvcGatewayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationSvcGateway(37) version3(3)}

locationSvcEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationSvcEnquiry(38) version3(3)}

locationSvcAlertContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationSvcAlert(xx) version3(3)}

locationSvcReportStatusContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationSvcReportStatus(xx) version3(3)}

mm-EventReportingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac mm-EventReporting(42) version3(3)}

anyTimeInfoHandlingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac anyTimeInfoHandling(43) version3(3)}
```

```
subscriberDataModificationNotificationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac subscriberDataModificationNotification(22) version3(3)}
```

```
secureTransportHandlingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac secureTransportHandling(40) version3(3)}
```

```
-- The following Object Identifiers are reserved for application-
-- contexts existing in previous versions of the protocol
```

-- AC Name & Version	Object Identifier	
--		
-- networkLocUpContext-v1	map-ac networkLocUp (1)	version1 (1)
-- networkLocUpContext-v2	map-ac networkLocUp (1)	version2 (2)
-- locationCancellationContext-v1	map-ac locationCancellation (2)	version1 (1)
-- locationCancellationContext-v2	map-ac locationCancellation (2)	version2 (2)
-- roamingNumberEnquiryContext-v1	map-ac roamingNumberEnquiry (3)	version1 (1)
-- roamingNumberEnquiryContext-v2	map-ac roamingNumberEnquiry (3)	version2 (2)
-- locationInfoRetrievalContext-v1	map-ac locationInfoRetrieval (5)	version1 (1)
-- locationInfoRetrievalContext-v2	map-ac locationInfoRetrieval (5)	version2 (2)
-- resetContext-v1	map-ac reset (10)	version1 (1)
-- handoverControlContext-v1	map-ac handoverControl (11)	version1 (1)
-- handoverControlContext-v2	map-ac handoverControl (11)	version2 (2)
-- equipmentMngtContext-v1	map-ac equipmentMngt (13)	version1 (1)
-- infoRetrievalContext-v1	map-ac infoRetrieval (14)	version1 (1)
-- infoRetrievalContext-v2	map-ac infoRetrieval (14)	version2 (2)
-- interVlrInfoRetrievalContext-v2	map-ac interVlrInfoRetrieval (15)	version2 (2)
-- subscriberDataMngtContext-v1	map-ac subscriberDataMngt (16)	version1 (1)
-- subscriberDataMngtContext-v2	map-ac subscriberDataMngt (16)	version2 (2)
-- tracingContext-v1	map-ac tracing (17)	version1 (1)
-- tracingContext-v2	map-ac tracing (17)	version2 (2)
-- networkFunctionalSsContext-v1	*map-ac networkFunctionalSs (18)*	*version1 (1)*
-- shortMsgGatewayContext-v1	map-ac shortMsgGateway (20)	version1 (1)
-- shortMsgGatewayContext-v2	map-ac shortMsgGateway (20)	version2 (2)
-- shortMsgRelayContext-v1	map-ac shortMsgRelay (21)	version1 (1)
-- shortMsgAlertContext-v1	map-ac shortMsgAlert (23)	version1 (1)
-- mwdMngtContext-v1	*map-ac mwdMngt (24)*	*version1 (1)*
-- mwdMngtContext-v2	map-ac mwdMngt (24)	version2 (2)
-- shortMsgMT-RelayContext-v2	map-ac shortMsgMT-Relay (25)	version2 (2)
-- msPurgingContext-v2	map-ac msPurging (27)	version2 (2)
-- callControlTransferContext-v3	map-ac callControlTransferContext (6)	version3 (3)

```
END
```

Next Change

17.5 MAP operation and error codes

```
MAP-Protocol {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-Protocol (4) version7 (7)}

DEFINITIONS

::=

BEGIN

IMPORTS
   UpdateLocation,
   CancelLocation,
   PurgeMS,
   SendIdentification,
   UpdateGprsLocation,
   PrepareHandover,
   SendEndSignal,
   ProcessAccessSignalling,
   ForwardAccessSignalling,
   PrepareSubsequentHandover,
   SendAuthenticationInfo,
   AuthenticationFailureReport,
   CheckIMEI,
   InsertSubscriberData,
   DeleteSubscriberData,
   Reset,
```

```
   ForwardCheckSS-Indication,
   RestoreData,
   ProvideSubscriberInfo,
   AnyTimeInterrogation,
   AnyTimeSubscriptionInterrogation,
   AnyTimeModification,
   SendRoutingInfoForGprs,
   FailureReport,
   NoteMsPresentForGprs,
   NoteMM-Event,
   NoteSubscriberDataModified


FROM MAP-MobileServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MobileServiceOperations (5)
   version7 (7)}

   ActivateTraceMode,
   DeactivateTraceMode,
   SendIMSI
FROM MAP-OperationAndMaintenanceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-OperationAndMaintenanceOperations (6)
   version7 (7)}

   SendRoutingInfo,
   ProvideRoamingNumber,
   ResumeCallHandling,
   ProvideSIWFSNumber,
   SIWFSSignallingModify,
   SetReportingState,
   StatusReport,
   RemoteUserFree,
   IST-Alert,
   IST-Command
FROM MAP-CallHandlingOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CallHandlingOperations (7)
   version7 (7)}

   RegisterSS,
   EraseSS,
   ActivateSS,
   DeactivateSS,
   InterrogateSS,
   ProcessUnstructuredSS-Request,
   UnstructuredSS-Request,
   UnstructuredSS-Notify,
   RegisterPassword,
   GetPassword,
   SS-InvocationNotification,
   RegisterCC-Entry,
   EraseCC-Entry
FROM MAP-SupplementaryServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SupplementaryServiceOperations (8)
   version7 (7)}

   SendRoutingInfoForSM,
   MO-ForwardSM,
   MT-ForwardSM,
   ReportSM-DeliveryStatus,
   AlertServiceCentre,
   InformServiceCentre,
   ReadyForSM
FROM MAP-ShortMessageServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ShortMessageServiceOperations (9)
   version7 (7)}

   PrepareGroupCall,
   ProcessGroupCallSignalling,
   ForwardGroupCallSignalling,
   SendGroupCallEndSignal
FROM MAP-Group-Call-Operations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-Group-Call-Operations (22)
   version7 (7)}
```

```
   ProvideSubscriberLocation,
   SendRoutingInfoForLCS,
   SubscriberLocationReport,
   AlertLCS,
   ReportLCS-Status,
   InformLCS
FROM MAP-LocationServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LocationServiceOperations (24)
   version7 (7)}

SecureTransportClass1,
SecureTransportClass2,
SecureTransportClass3,
SecureTransportClass4

FROM MAP-SecureTransportOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SecureTransportOperations (26)
   version7 (7)}

   SystemFailure,
   DataMissing,
   UnexpectedDataValue,
   FacilityNotSupported,
   UnknownSubscriber,
   NumberChanged,
   UnknownMSC,
   UnidentifiedSubscriber,
   UnknownEquipment,
   RoamingNotAllowed,
   IllegalSubscriber,
   IllegalEquipment,
   BearerServiceNotProvisioned,
   TeleserviceNotProvisioned,
   NoHandoverNumberAvailable,
   SubsequentHandoverFailure,
   TracingBufferFull,
   OR-NotAllowed,
   NoRoamingNumberAvailable,
   AbsentSubscriber,
   BusySubscriber,
   NoSubscriberReply,
   CallBarred,
   ForwardingViolation,
   ForwardingFailed,
   CUG-Reject,
   ATI-NotAllowed,
   IllegalSS-Operation,
   SS-ErrorStatus,
   SS-NotAvailable,
   SS-SubscriptionViolation,
   SS-Incompatibility,
   UnknownAlphabet,
   USSD-Busy,
   PW-RegistrationFailure,
   NegativePW-Check,
   NumberOfPW-AttemptsViolation,
   SubscriberBusyForMT-SMS,
   SM-DeliveryFailure,
   MessageWaitingListFull,
   AbsentSubscriberSM,
   ResourceLimitation,
   NoGroupCallNumberAvailable,
   ShortTermDenial,
   LongTermDenial,
   IncompatibleTerminal,
   UnauthorizedRequestingNetwork,
   UnauthorizedLCSClient,
   PositionMethodFailure,
   UnknownOrUnreachableLCSClient,
   ATSI-NotAllowed,
   ATM-NotAllowed,
   InformationNotAvailable,
   MM-EventNotSupported,
   TargetCellOutsideGroupCallArea,
   SecureTransportError,
   ServingNodeNumberMismatch,
```

```
   FeatureNotSupportedByServingNode


FROM MAP-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-Errors (10) version7 (7)}
;

---

-- Location service operation codes

provideSubscriberLocation  ProvideSubscriberLocation ::= localValue 83
sendRoutingInfoForLCS  SendRoutingInfoForLCS ::= localValue 85
subscriberLocationReport  SubscriberLocationReport ::= localValue 86
alertLCS  AlertLCS ::= localValue xx
reportLCS-Status  ReportLCS-Status ::= localValue xx
informLCS  InformLCS ::= localValue xx


---

-- location service error codes

unauthorizedRequestingNetwork  UnauthorizedRequestingNetwork::= localValue 52
unauthorizedLCSClient  UnauthorizedLCSClient ::= localValue 53
positionMethodFailure  PositionMethodFailure ::= localValue 54
unknownOrUnreachableLCSClient  UnknownOrUnreachableLCSClient ::= localValue 58
servingNodeNumberMismatch  ServingNodeNumberMismatch ::= localValue xx
featureNotSupportedByServingNode FeatureNotSupportedByServingNode ::= localValue xx
```

Next Change

17.6.6 Errors

```
MAP-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-Errors (10) version7 (7)}

DEFINITIONS

::=

BEGIN

EXPORTS

   -- generic errors
   SystemFailure,
   DataMissing,
   UnexpectedDataValue,
   FacilityNotSupported,
   IncompatibleTerminal,
   ResourceLimitation,

   -- identification and numbering errors
   UnknownSubscriber,
   NumberChanged,
   UnknownMSC,
   UnidentifiedSubscriber,
   UnknownEquipment,

   -- subscription errors
   RoamingNotAllowed,
   IllegalSubscriber,
   IllegalEquipment,
   BearerServiceNotProvisioned,
   TeleserviceNotProvisioned,

   -- handover errors
   NoHandoverNumberAvailable,
   SubsequentHandoverFailure,
   TargetCellOutsideGroupCallArea,
```

```
   -- operation and maintenance errors
   TracingBufferFull,

   -- call handling errors
   OR-NotAllowed,
   NoRoamingNumberAvailable,
   BusySubscriber,
   NoSubscriberReply,
   AbsentSubscriber,
   CallBarred,
   ForwardingViolation,
   ForwardingFailed,
   CUG-Reject,

   -- any time interrogation errors
   ATI-NotAllowed,

   -- any time information handling errors
   ATSI-NotAllowed,
   ATM-NotAllowed,
   InformationNotAvailable,

   -- supplementary service errors
   IllegalSS-Operation,
   SS-ErrorStatus,
   SS-NotAvailable,
   SS-SubscriptionViolation,
   SS-Incompatibility,
   UnknownAlphabet,
   USSD-Busy,
   PW-RegistrationFailure,
   NegativePW-Check,
   NumberOfPW-AttemptsViolation,
   ShortTermDenial,
   LongTermDenial,

   -- short message service errors
   SubscriberBusyForMT-SMS,
   SM-DeliveryFailure,
   MessageWaitingListFull,
   AbsentSubscriberSM,

   -- Group Call errors
   NoGroupCallNumberAvailable,

   -- location service errors
   UnauthorizedRequestingNetwork,
   UnauthorizedLCSClient,
   PositionMethodFailure,
   UnknownOrUnreachableLCSClient,
   ServingNodeNumberMismatch,
   FeatureNotSupportedByServingNode,

   -- Mobility Management errors
   MM-EventNotSupported,

   -- Secure transport errors
   SecureTransportError


;

IMPORTS
   ERROR
FROM TCAPMessages {
   ccitt recommendation q 773 modules (2) messages (1) version2 (2)}

   SS-Status
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version7 (7)}

   SS-IncompatibilityCause,
   PW-RegistrationFailureCause,
   SM-DeliveryFailureCause,
   SystemFailureParam,
   DataMissingParam,
   UnexpectedDataParam,
```

```
   FacilityNotSupParam,
   UnknownSubscriberParam,
   NumberChangedParam,
   UnidentifiedSubParam,
   RoamingNotAllowedParam,
   IllegalSubscriberParam,
   IllegalEquipmentParam,
   BearerServNotProvParam,
   TeleservNotProvParam,
   TracingBufferFullParam,
   NoRoamingNbParam,
   OR-NotAllowedParam,
   AbsentSubscriberParam,
   BusySubscriberParam,
   NoSubscriberReplyParam,
   CallBarredParam,
   ForwardingViolationParam,
   ForwardingFailedParam,
   CUG-RejectParam,
   ATI-NotAllowedParam,
   SubBusyForMT-SMS-Param,
   MessageWaitListFullParam,
   AbsentSubscriberSM-Param,
   ResourceLimitationParam,
   NoGroupCallNbParam,
   IncompatibleTerminalParam,
   ShortTermDenialParam,
   LongTermDenialParam,
   UnauthorizedRequestingNetwork-Param,
   UnauthorizedLCSClient-Param,
   PositionMethodFailure-Param,
   UnknownOrUnreachableLCSClient-Param,
   MM-EventNotSupported-Param,
   ATSI-NotAllowedParam,
   ATM-NotAllowedParam,
   IllegalSS-OperationParam,
   SS-NotAvailableParam,
   SS-SubscriptionViolationParam,
   InformationNotAvailableParam,
   TargetCellOutsideGCA-Param,
   SecureTransportErrorParam,
   ServingNodeNumberMismatchParam,
   FeatureNotSupportedByServingNodeParam,



FROM MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version7 (7)}
;


---

-- location service errors

UnauthorizedRequestingNetwork ::= ERROR
     PARAMETER
          unauthorizedRequestingNetwork-Param  UnauthorizedRequestingNetwork-Param
          -- optional

UnauthorizedLCSClient ::= ERROR
     PARAMETER
          unauthorizedLCSClient-Param     UnauthorizedLCSClient-Param
          -- optional

PositionMethodFailure ::= ERROR
     PARAMETER
          positionMethodFailure-Param     PositionMethodFailure-Param
          -- optional

UnknownOrUnreachableLCSClient ::= ERROR
     PARAMETER
          unknownOrUnreachableLCSClient-Param   UnknownOrUnreachableLCSClient-Param
          -- optional
```

```
MM-EventNotSupported ::= ERROR
    PARAMETER
        mm-EventNotSupported-Param      MM-EventNotSupported-Param
        -- optional
```

```
ServingNodeNumberMismatch ::= ERROR
    PARAMETER
        servingNodeNumberMismatchParam  ServingNodeNumberMismatchParam
        -- optional
```

```
FeatureNotSupportedByServingNode::= ERROR
    PARAMETER
        featureNotSupportedByServingNodeParam    FeatureNotSupportedByServingNodeParam
        -- optional
```

Next Change

17.6.8 Location service operations

```
MAP-LocationServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LocationServiceOperations (24)
   version7 (7)}

DEFINITIONS

::=

BEGIN

EXPORTS
   ProvideSubscriberLocation,
   SendRoutingInfoForLCS,
   SubscriberLocationReport,
   AlertLCS,
   ReportLCS-Status,
   InformLCS
;

IMPORTS
   OPERATION
FROM TCAPMessages {
   ccitt recommendation q 773 modules (2) messages (1) version2 (2)}

   SystemFailure,
   DataMissing,
   UnexpectedDataValue,
   FacilityNotSupported,
   UnknownSubscriber,
   AbsentSubscriber,
   UnauthorizedRequestingNetwork,
   UnauthorizedLCSClient,
   PositionMethodFailure,
   ResourceLimitation,
   UnknownOrUnreachableLCSClient,
   UnidentifiedSubscriber,
   IllegalEquipment,
   IllegalSubscriber,
   MessageWaitingLostFull,
   ServingNodeNumberMismatch,
   FeatureNotSupportedByServingNode
FROM MAP-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-Errors (10) version7 (7)}

   RoutingInfoForLCS-Arg,
   RoutingInfoForLCS-Res,
   ProvideSubscriberLocation-Arg,
   ProvideSubscriberLocation-Res,
   SubscriberLocationReport-Arg,
   SubscriberLocationReport-Res,
   AlertLCS-Arg,
```

```
   AlertLCS-Res,
   ReportLCS-Status-Arg,
   ReportLCS-Status-Res,
   InformLCS-Arg
FROM MAP-LCS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LCS-DataTypes (25) version7 (7)}
;
```

```
SendRoutingInfoForLCS ::= OPERATION                                    --Timer m
     ARGUMENT
          routingInfoForLCS-Arg          RoutingInfoForLCS-Arg
     RESULT
          routingInfoForLCS-Res          RoutingInfoForLCS-Res
     ERRORS {
          SystemFailure,
          DataMissing,
          UnexpectedDataValue,
          FacilityNotSupported,
          UnknownSubscriber,
          AbsentSubscriber,
          UnauthorizedRequestingNetwork }
```

```
ProvideSubscriberLocation ::= OPERATION                                 --Timer ml
     ARGUMENT
          provideSubscriberLocation-Arg   ProvideSubscriberLocation-Arg
     RESULT
          provideSubscriberLocation-Res   ProvideSubscriberLocation-Res
     ERRORS {
          SystemFailure,
          DataMissing,
          UnexpectedDataValue,
          FacilityNotSupported,
          UnidentifiedSubscriber,
          IllegalSubscriber,
          IllegalEquipment,
          AbsentSubscriber,
          UnauthorizedRequestingNetwork,
          UnauthorizedLCSClient,
          PositionMethodFailure }
```

```
SubscriberLocationReport ::= OPERATION                                 --Timer m
     ARGUMENT
          subscriberLocationReport-Arg    SubscriberLocationReport-Arg
     RESULT
          subscriberLocationReport-Res    SubscriberLocationReport-Res
     ERRORS {
          SystemFailure,
          DataMissing,
          ResourceLimitation,
          UnexpectedDataValue,
          UnknownSubscriber,
          UnauthorizedRequestingNetwork,
          UnknownOrUnreachableLCSClient}
```

```
AlertLCS ::= OPERATION                                                 --Timer s
     ARGUMENT
          alertLCS-Arg                    AlertLCS-Arg
     RESULT
          alertLCS-Res                    AlertLCS-Res
     ERRORS {
          SystemFailure,
          DataMissing,
          UnexpectedDataValue}
```

```
ReportLCS-Status ::= OPERATION                          --Timer s
    ARGUMENT
        reportLCS-Status-Arg            ReportLCS-Status-Arg
    RESULT
        reportLCS-Status-Res            ReportLCS-Status-Res
        -- optional
    ERRORS {
        DataMissing,
        ServingNodeNumberMismatch,
        UnexpectedDataValue,
        UnknownSubscriber,
        MessageWaitingListFull,
        FeatureNotSupportedByServingNode}

InformLCS ::= OPERATION                                                 --Timer s
    ARGUMENT
        informLCS                       InformLCS-Arg

END
```

Next Change

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) version7 (7)}

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,
   MM-EventNotSupported-Param,
   SecureTransportErrorParam,
   ATSI-NotAllowedParam,
   ATM-NotAllowedParam,
   IllegalSS-OperationParam,
   SS-NotAvailableParam,
   SS-SubscriptionViolationParam,
   InformationNotAvailableParam,
   TargetCellOutsideGCA-Param,
   ServingNodeNumberMismatchParam,
   FeatureNotSupportedByServingNodeParam


;

IMPORTS
   SS-Status
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version7 (7)}

   SignalInfo,
   BasicServiceCode,
   NetworkResource
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version7 (7)}

   SecurityHeader,
   ProtectedPayload
FROM MAP-ST-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ST-DataTypes (27) version7 (7)}


   SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version7 (7)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version7 (7)}
;
```

```
RoamingNotAllowedParam ::= SEQUENCE {
     roamingNotAllowedCause              RoamingNotAllowedCause,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
RoamingNotAllowedCause ::= ENUMERATED {
     plmnRoamingNotAllowed  (0),
     operatorDeterminedBarring  (3)}
```

```
CallBarredParam ::= CHOICE {
     callBarringCause                    CallBarringCause,
     -- call BarringCause must not be used in version 3
     extensibleCallBarredParam           ExtensibleCallBarredParam
     -- extensibleCallBarredParam must not be used in version <3
     }
```

```
CallBarringCause ::= ENUMERATED {
     barringServiceActive  (0),
     operatorBarring  (1)}
```

```
ExtensibleCallBarredParam ::= SEQUENCE {
     callBarringCause                    CallBarringCause                  OPTIONAL,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ... ,
     unauthorisedMessageOriginator       [1] NULL                          OPTIONAL }
```

```
CUG-RejectParam ::= SEQUENCE {
     cug-RejectCause                    CUG-RejectCause                 OPTIONAL,
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
CUG-RejectCause ::= ENUMERATED {
     incomingCallsBarredWithinCUG  (0),
     subscriberNotMemberOfCUG  (1),
     requestedBasicServiceViolatesCUG-Constraints  (5),
     calledPartySS-InteractionViolation  (7)}
```

```
SS-IncompatibilityCause ::= SEQUENCE {
     ss-Code                            [1] SS-Code                     OPTIONAL,
     basicService                       BasicServiceCode                OPTIONAL,
     ss-Status                          [4] SS-Status                   OPTIONAL,
     ...}
```

```
PW-RegistrationFailureCause ::= ENUMERATED {
     undetermined  (0),
     invalidFormat  (1),
     newPasswordsMismatch  (2)}
```

```
SM-EnumeratedDeliveryFailureCause ::= ENUMERATED {
     memoryCapacityExceeded  (0),
     equipmentProtocolError  (1),
     equipmentNotSM-Equipped  (2),
     unknownServiceCentre  (3),
     sc-Congestion  (4),
     invalidSME-Address  (5),
     subscriberNotSC-Subscriber  (6)}
```

```
SM-DeliveryFailureCause ::= SEQUENCE {
     sm-EnumeratedDeliveryFailureCause  SM-EnumeratedDeliveryFailureCause,
     diagnosticInfo                     SignalInfo                      OPTIONAL,
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
AbsentSubscriberSM-Param ::= SEQUENCE {
     absentSubscriberDiagnosticSM       AbsentSubscriberDiagnosticSM    OPTIONAL,
     -- AbsentSubscriberDiagnosticSM can be either for non-GPRS
     -- or for GPRS
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...,
     additionalAbsentSubscriberDiagnosticSM   [0]  AbsentSubscriberDiagnosticSM OPTIONAL }
     -- if received, additionalAbsentSubscriberDiagnosticSM
     -- is for GPRS and absentSubscriberDiagnosticSM is
     -- for non-GPRS
```

```
AbsentSubscriberDiagnosticSM ::= INTEGER (0..255)
     -- AbsentSubscriberDiagnosticSM values are defined in ETS 300 536 (GSM 03.40)
```

```
SystemFailureParam ::= CHOICE {
     networkResource                    NetworkResource,
     -- networkResource must not be used in version 3
     extensibleSystemFailureParam       ExtensibleSystemFailureParam
     -- extensibleSystemFailureParam must not be used in version <3
     }
```

```
ExtensibleSystemFailureParam ::= SEQUENCE {
     networkResource                    NetworkResource                 OPTIONAL,
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
DataMissingParam ::= SEQUENCE {
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
UnexpectedDataParam ::= SEQUENCE {
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
FacilityNotSupParam ::= SEQUENCE {
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
OR-NotAllowedParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
UnknownSubscriberParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...,
     unknownSubscriberDiagnostic         UnknownSubscriberDiagnostic         OPTIONAL}
```

```
UnknownSubscriberDiagnostic ::= ENUMERATED {
     imsiUnknown  (0),
     gprsSubscriptionUnknown  (1),
     ...,
     npdbMismatch  (2)}
     -- if unknown values are received in
     -- unknownSubscriberDiagnostic they shall be discarded
```

```
NumberChangedParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
UnidentifiedSubParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
IllegalSubscriberParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
IllegalEquipmentParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
BearerServNotProvParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
TeleservNotProvParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
TracingBufferFullParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
NoRoamingNbParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...}
```

```
AbsentSubscriberParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...,
     absentSubscriberReason              [0] AbsentSubscriberReason          OPTIONAL}
```

```
AbsentSubscriberReason ::= ENUMERATED {
     imsiDetach (0),
     restrictedArea (1),
     noPageResponse (2),
     ... ,
     purgedMS (3)}
-- exception handling: at reception of other values than the ones listed the
-- AbsentSubscriberReason shall be ignored.
-- The AbsentSubscriberReason: purgedMS is defined for the Super-Charger feature
-- (see TS 23.116). If this value is received in a Provide Roaming Number response
-- it shall be mapped to the AbsentSubscriberReason: imsiDetach in the Send Routeing
-- Information response
-- If this reason is received from PS domain, it is understood as corresponding reason
-- in PS domain.
```

```
BusySubscriberParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ...,
     ccbs-Possible                       [0] NULL                            OPTIONAL,
     ccbs-Busy                           [1] NULL                            OPTIONAL}
```

```
NoSubscriberReplyParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ForwardingViolationParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ForwardingFailedParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ATI-NotAllowedParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ATSI-NotAllowedParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ATM-NotAllowedParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
IllegalSS-OperationParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
SS-NotAvailableParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
SS-SubscriptionViolationParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
InformationNotAvailableParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
SubBusyForMT-SMS-Param ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ... ,
     gprsConnectionSuspended             NULL                              OPTIONAL }
     -- If GprsConnectionSuspended is not understood it shall
     -- be discarded
```

```
MessageWaitListFullParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ResourceLimitationParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
NoGroupCallNbParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
IncompatibleTerminalParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
ShortTermDenialParam ::= SEQUENCE {
     ...}
```

```
LongTermDenialParam ::= SEQUENCE {
     ...}
```

```
UnauthorizedRequestingNetwork-Param ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

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

```
UnauthorizedLCSClient-Diagnostic ::= ENUMERATED {
     noAdditionalInformation (0),
     clientNotInMSPrivacyExceptionList (1),
     callToClientNotSetup (2),
     privacyOverrideNotApplicable (3),
     disallowedByLocalRegulatoryRequirements (4),
     ... }
--   exception handling:
--   any unrecognized value shall be ignored
```

```
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
```

```
UnknownOrUnreachableLCSClient-Param ::= SEQUENCE {
     extensionContainer                   ExtensionContainer                 OPTIONAL,
     ...}
```

```
MM-EventNotSupported-Param ::= SEQUENCE {
     extensionContainer                   ExtensionContainer                 OPTIONAL,
     ...}
```

```
TargetCellOutsideGCA-Param ::= SEQUENCE {
     extensionContainer                   ExtensionContainer                 OPTIONAL,
     ...}
```

```
SecureTransportErrorParam ::= SEQUENCE {
     securityHeader                       SecurityHeader,
     protectedPayload                     ProtectedPayload                   OPTIONAL
     }
     -- The protectedPayload carries the result of applying the security function
     -- defined in 3G TS 33.102 to the encoding of the securely transported error
     -- parameter
```

```
ServingNodeNumberMismatchParam ::= SEQUENCE {
     extensionContainer                   ExtensionContainer                 OPTIONAL,
     ...}
```

```
FeatureNotSupportedByServingNodeParam ::= SEQUENCE {
     extensionContainer                   ExtensionContainer                 OPTIONAL,
     ...}
```

```
END
```

Next Change

17.7.13 Location service data types

```
MAP-LCS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LCS-DataTypes (25) version7 (7)}
```

```
DEFINITIONS
IMPLICIT TAGS
::=
BEGIN

EXPORTS
   RoutingInfoForLCS-Arg,
   RoutingInfoForLCS-Res,
   ProvideSubscriberLocation-Arg,
   ProvideSubscriberLocation-Res,
   SubscriberLocationReport-Arg,
   SubscriberLocationReport-Res,
   AlertLCS-Arg.
   AlertLCS-Res,
   ReportLCS-Status-Arg,
   ReportLCS-Status-Res,
   InformLCS-Arg,
   LocationType,
   LCSClientName,
   LCS-QoS,
   Horizontal-Accuracy,
   ResponseTime,
   Ext-GeographicalInformation,
   AbsentSubscriberDiagnosticForCS,
   AbsentSubscriberDiagnosticForPS,
   MT-LR-OutcomeForCS,
   MT-LR-OutcomeForPS
;

IMPORTS
   AddressString,
   ISDN-AddressString,
   IMEI,
   IMSI,
   LMSI,
   SubscriberIdentity,
   AgeOfLocationInformation,
   LCSClientExternalID,
   LCSClientInternalID
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version7 (7)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version7 (7)}

   USSD-DataCodingScheme,
   USSD-String
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-DataTypes (14) version7 (7)}
;
```

```
RoutingInfoForLCS-Arg ::= SEQUENCE {
     mlcNumber                          [0] ISDN-AddressString,
     targetMS                           [1] SubscriberIdentity,
     extensionContainer                 [2] ExtensionContainer          OPTIONAL,
     ...,
     lcs-ClientID                       [3] LCS-ClientID                OPTIONAL,
     notificationSupportedIndicator     [4] NULL                        OPTIONAL }
```

```
RoutingInfoForLCS-Res ::= SEQUENCE {
     targetMS                           [0] SubscriberIdentity,
     lcsLocationInfo                    [1] LCSLocationInfo,
     extensionContainer                 [2] ExtensionContainer          OPTIONAL,
     ...}
```

```
LCSLocationInfo ::= SEQUENCE {
     msc-Number                         ISDN-AddressString,
     lmsi                               [0] LMSI                        OPTIONAL,
     extensionContainer                 [1] ExtensionContainer          OPTIONAL,
     ...}
```

```
ProvideSubscriberLocation-Arg ::= SEQUENCE {
     locationType                        LocationType,
     mlc-Number                          ISDN-AddressString,
     lcs-ClientID                        [0] LCS-ClientID                    OPTIONAL,
     privacyOverride                     [1] NULL                            OPTIONAL,
     imsi                                [2] IMSI                            OPTIONAL,
     msisdn                              [3] ISDN-AddressString              OPTIONAL,
     lmsi                                [4] LMSI                            OPTIONAL,
     imei                                [5] IMEI                            OPTIONAL,
     lcs-Priority                        [6] LCS-Priority                    OPTIONAL,
     lcs-QoS                             [7] LCS-QoS                         OPTIONAL,
     extensionContainer                  [8] ExtensionContainer              OPTIONAL,
     ...}

     -- one of imsi or msisdn is mandatory
```

```
LocationType ::= SEQUENCE {
     locationEstimateType                [0] LocationEstimateType,
     ... }
```

```
LocationEstimateType ::= ENUMERATED {
     currentLocation                     (0),
     currentOrLastKnownLocation          (1),
     initialLocation                     (2),
     ... }
--   exception handling:
--   a ProvideSubscriberLocation-Arg containing an unrecognized LocationEstimateType
--   shall be rejected by the receiver with a return error cause of unexpected data value
```

```
LCS-ClientID ::= SEQUENCE {
     lcsClientType                       [0] LCSClientType,
     lcsClientExternalID                 [1] LCSClientExternalID             OPTIONAL,
     lcsClientDialedByMS                 [2] AddressString                   OPTIONAL,
     lcsClientInternalID                 [3] LCSClientInternalID             OPTIONAL,
     lcsClientName                       [4] LCSClientName                   OPTIONAL,
     ... }
```

```
LCSClientType ::= ENUMERATED {
     emergencyServices                   (0),
     valueAddedServices                  (1),
     plmnOperatorServices                (2),
     lawfulInterceptServices             (3),
     ... }
     --   exception handling:
     --   unrecognized values may be ignored if the LCS client uses the privacy override
     --   otherwise, an unrecognized value shall be treated as unexpected data by a receiver
     --   a return error shall then be returned if received in a MAP invoke
```

```
LCSClientName ::= SEQUENCE {
     dataCodingScheme                    [0] USSD-DataCodingScheme,
     nameString                          [2] NameString,
     ...}

-- The USSD-DataCodingScheme shall indicate use of the default alphabet through the
-- following encoding
--   bit  7 6 5 4 3 2 1 0
--        0 0 0 0 1 1 1 1
```

```
NameString ::= USSD-String (SIZE (1..maxNameStringLength))
```

```
maxNameStringLength  INTEGER ::= 63
```

```
LCS-Priority ::= OCTET STRING (SIZE (1))
     -- 0 = highest priority
     -- 1 = normal priority
     -- all other values treated as 1
```

```
LCS-QoS ::= SEQUENCE {
     horizontal-accuracy                 [0] Horizontal-Accuracy             OPTIONAL,
     verticalCoordinateRequest           [1] NULL                            OPTIONAL,
     vertical-accuracy                   [2] Vertical-Accuracy               OPTIONAL,
     responseTime                        [3] ResponseTime                    OPTIONAL,
     extensionContainer                  [4] ExtensionContainer              OPTIONAL,
     ...}
```

```
Horizontal-Accuracy ::= OCTET STRING (SIZE (1))
     -- bit 8 = 0
     -- bits 7-1 = 7 bit Uncertainty Code defined in GSM 03.32. The horizontal location
     -- error should be less than the error indicated by the uncertainty code with 67%
     -- confidence.
```

```
Vertical-Accuracy ::= OCTET STRING (SIZE (1))
     -- bit 8 = 0
     -- bits 7-1 = 7 bit Vertical Uncertainty Code defined in GSM 03.32. The vertical location
     -- error should be less than the error indicated by the uncertainty code with 67%
     -- confidence.
```

```
ResponseTime ::= SEQUENCE {
     responseTimeCategory                ResponseTimeCategory,
     ...}
--   note: an expandable SEQUENCE simplifies later addition of a numeric response time.
```

```
ResponseTimeCategory ::= ENUMERATED {
     lowdelay  (0),
     delaytolerant  (1),
     ... }
--   exception handling:
--   an unrecognized value shall be treated the same as value 1 (delaytolerant)
```

```
ProvideSubscriberLocation-Res ::= SEQUENCE {
     locationEstimate                    Ext-GeographicalInformation,
     ageOfLocationEstimate               [0] AgeOfLocationInformation      OPTIONAL,
     extensionContainer                  [1] ExtensionContainer            OPTIONAL,
     ...}
```

```
Ext-GeographicalInformation ::= OCTET STRING (SIZE (1..maxExt-GeographicalInformation))
     -- Refers to geographical Information defined in GSM 03.32.
     -- This is composed of 1 or more octets with an internal structure according to GSM 03.32
     -- Octet 1: Type of shape, only the following shapes in GSM 03.32 are allowed:
     --       (a) Ellipsoid point with uncertainty circle
     --       (b) Ellipsoid point with uncertainty ellipse
     --       (c) Ellipsoid point with altitude and uncertainty ellipsoid
     --       (d) Ellipsoid Arc
     -- Any other value in octet 1 shall be treated as invalid
     -- Octets 2 to 8 for case (a) – Ellipsoid point with uncertainty circle
     --       Degrees of Latitude                                        3 octets
     --       Degrees of Longitude                                       3 octets
     --       Uncertainty code                                           1 octet
     -- Octets 2 to 11 for case (b) – Ellipsoid point with uncertainty ellipse:
     --       Degrees of Latitude                                        3 octets
     --       Degrees of Longitude                                       3 octets
     --       Uncertainty semi-major axis                                1 octet
     --       Uncertainty semi-minor axis                                1 octet
     --       Angle of major axis                                        1 octet
     --       Confidence                                                 1 octet
     -- Octets 2 to 14 for case (c) – Ellipsoid point with altitude and uncertainty ellipsoid
     --       Degrees of Latitude                                        3 octets
     --       Degrees of Longitude                                       3 octets
     --       Altitude                                                   2 octets
     --       Uncertainty semi-major axis                                1 octet
     --       Uncertainty semi-minor axis                                1 octet
     --       Angle of major axis                                        1 octet
     --       Uncertainty altitude                                       1 octet
     --       Confidence                                                 1 octet
     -- Octets 2 to 13 for case (d) – Ellipsoid Arc
     --       Degrees of Latitude                                        3 octets
     --       Degrees of Longitude                                       3 octets
     --       Inner radius                                               2 octets
     --       Uncertainty radius                                         1 octet
     --       Offset angle                                               1 octet
     --       Included angle                                             1 octet
     --       Confidence                                                 1 octet

     --
     -- An Ext-GeographicalInformation parameter containing any other shape or an
     -- incorrect number of octets or coding according to GSM 03.32 shall be
     -- treated as invalid data by a receiver
```

```
maxExt-GeographicalInformation  INTEGER ::= 20
     -- the maximum length allows for further shapes in GSM 03.32 to be included in later
     -- versions of GSM 09.02
```

```
SubscriberLocationReport-Arg ::= SEQUENCE {
    lcs-Event                       LCS-Event,
    lcs-ClientID                    LCS-ClientID,
    lcsLocationInfo                 LCSLocationInfo,
    msisdn                          [0] ISDN-AddressString            OPTIONAL,
    imsi                            [1] IMSI                          OPTIONAL,
    imei                            [2] IMEI                          OPTIONAL,
    na-ESRD                         [3] ISDN-AddressString            OPTIONAL,
    na-ESRK                         [4] ISDN-AddressString            OPTIONAL,
    locationEstimate                [5] Ext-GeographicalInformation   OPTIONAL,
    ageOfLocationEstimate           [6] AgeOfLocationInformation      OPTIONAL,
    extensionContainer              [7] ExtensionContainer            OPTIONAL,
    ...}

    -- one of msisdn or imsi is mandatory
```

```
LCS-Event ::= ENUMERATED {
    emergencyCallOrigination  (0),
    emergencyCallRelease  (1),
    mo-lr  (2),
    ... }
    --   exception handling:
    --   a SubscriberLocationReport-Arg containing an unrecognized LCS-Event
    --   shall be rejected by a receiver with a return error cause of unexpected data value
```

```
SubscriberLocationReport-Res ::= SEQUENCE {
    extensionContainer              ExtensionContainer                OPTIONAL,
    ...}
```

```
AlertLCS-Arg ::= SEQUENCE {
    lcs-ClietnIDList                [1] LCS-ClientIDList,
    extensionContainer              [2] ExtensionContainer            OPTIONAL,
    ...}
```

```
LCS-ClientIDList  ::= SEQUENCE SIZE (1..maxNumOfLCS-ClientID) OF
                                    LCS-ClientID
```

```
maxNumOfLCS-ClientID INTEGER ::= 10
```

```
AlertLCS-Res ::= SEQUENCE {
    extensionContainer              ExtensionContainer                OPTIONAL,
    ...}
```

```
ReportLCS-Status-Arg ::= SEQUENCE {
    lcs-ClientID                    [1] LCS-ClientID,
    imsi                            [2] IMSI,
    msc-Number                      [3] ISDN-AddressString            OPTIONAL,
    mt-lr-OutcomeForCS              [4] MT-LR-Outcome                 OPTIONAL,
    absentSubscriberDiagnosticLCS-ForCS  [5] AbsentSubscriberDiagnosticLCS  OPTIONAL,
    sgsn-Number                     [6] ISDN-AddressString            OPTIONAL,
    absentSubscriberDiagnosticLCS-ForPS  [7]  AbsentSubscriberDiagnosticLCS OPTIONAL,
    mt-lr-OutcomeForPS              [8]  MT-LR-Outcome                OPTIONAL,
    extensionContainer              [9] ExtensionContainer            OPTIONAL,
    ... }
```

```
MT-LR-Outcome ::= ENUMERATED {
    absentSubscriber  (0),
    successfulTransfer  (1)}
```

```
ReportLCS-Status-Res ::= SEQUENCE {
    extensionContainer              ExtensionContainer                OPTIONAL,
    ...}
```

```
InformLCS-Arg ::= SEQUENCE {
    lcs-mw-Status                   [1] LCS-MW-Status,
    absentSubscriberDiagnosticLCS-ForCS  [2] AbsentSubscriberDiagnosticLCS  OPTIONAL,
    absentSubscriberDiagnosticLCS-ForPS  [3] AbsentSubscriberDiagnosticLCS OPTIONAL,
    extensionContainer              [4] ExtensionContainer            OPTIONAL,
    ...}
```

```
LCS-MW-Status ::= BIT STRING {
    lcsClientID-NotIncluded (0),
    mnrf-Set (1),
    mnrg-Set (2)} (SIZE (3..16))
    -- exception handling:
    -- bits 3 to 15 shall be ignored if recerived and not understood
```

```
AbsentSubscriberDiagnosticLCS ::= INTEGER (0..255)
     -- value 0  = no paging response via the MSC;
     -- value 1  = IMSI detached;
     -- value 2  = roaming restriction;
     -- value 4  = MS purged for non GPRS;
     -- value 5  = no paging response via the SGSN;
     -- value 6  = GPRS detached;
     -- value 8  = MS purged for GPRS;
     -- Other values than listed above shall be discarded.

END
```

24B Location Service process description

24B.1 Routeing information retrieval procedure

24B.1.1 General

The message flows for successful retrieval of routeing information related to location services are shown in figure 24B.1/1.

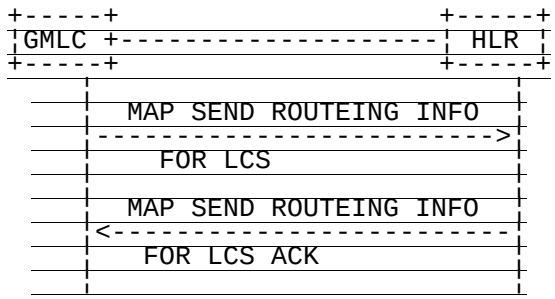

Figure 24B.1/1: Message flow for retrieval of routeing information

The following MAP services are used to retrieve requested information:

MAP_SEND_ROUTING_INFO_FOR_LCS see subclause 13A.1.

MAP_INFORM_LCS see subclause 13A.6.

24B.1.2 Process in the GMLC

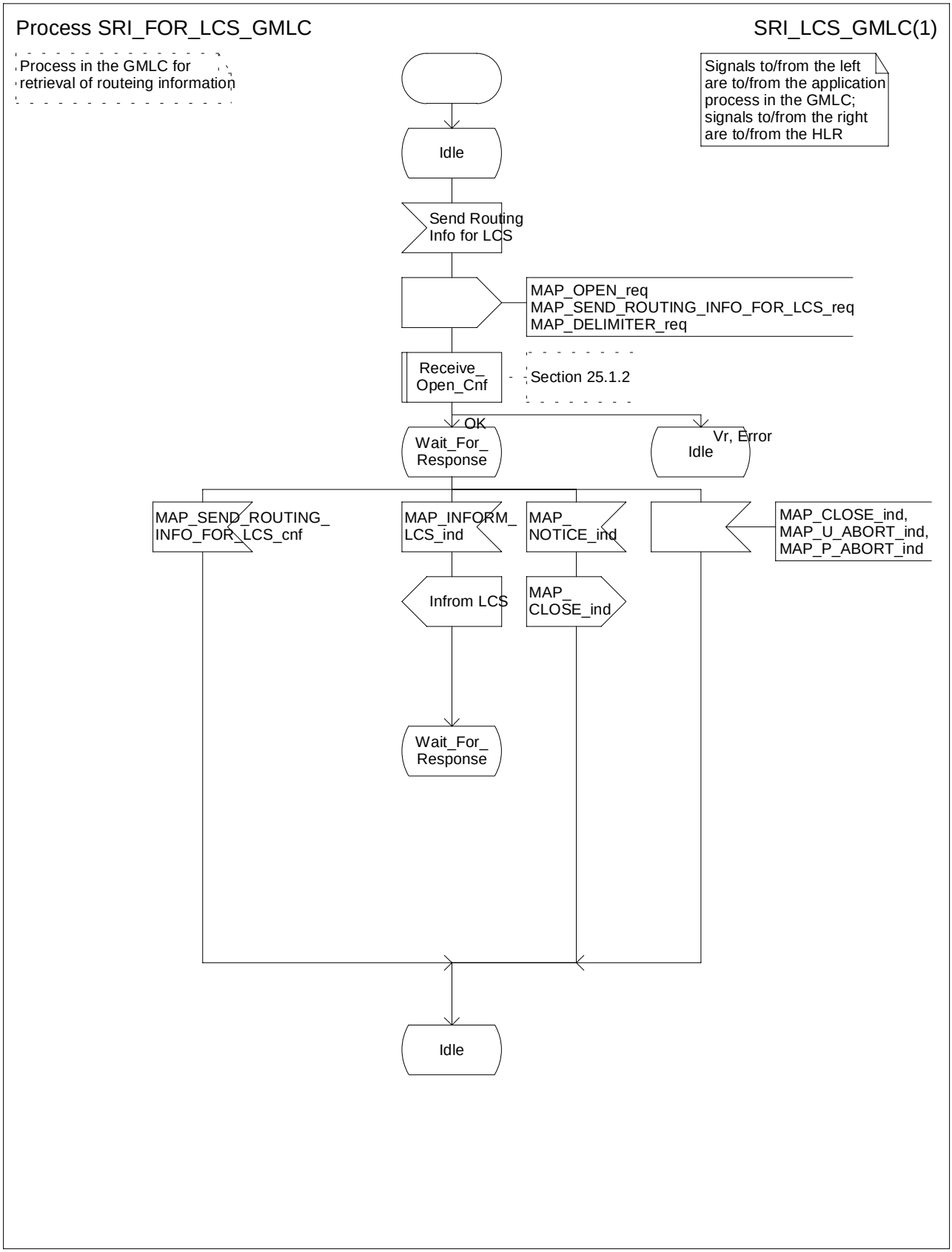

Figure 24B.1/2: Process SRI_FOR_LCS_GMLC

24B.1.3 Process in the HLR

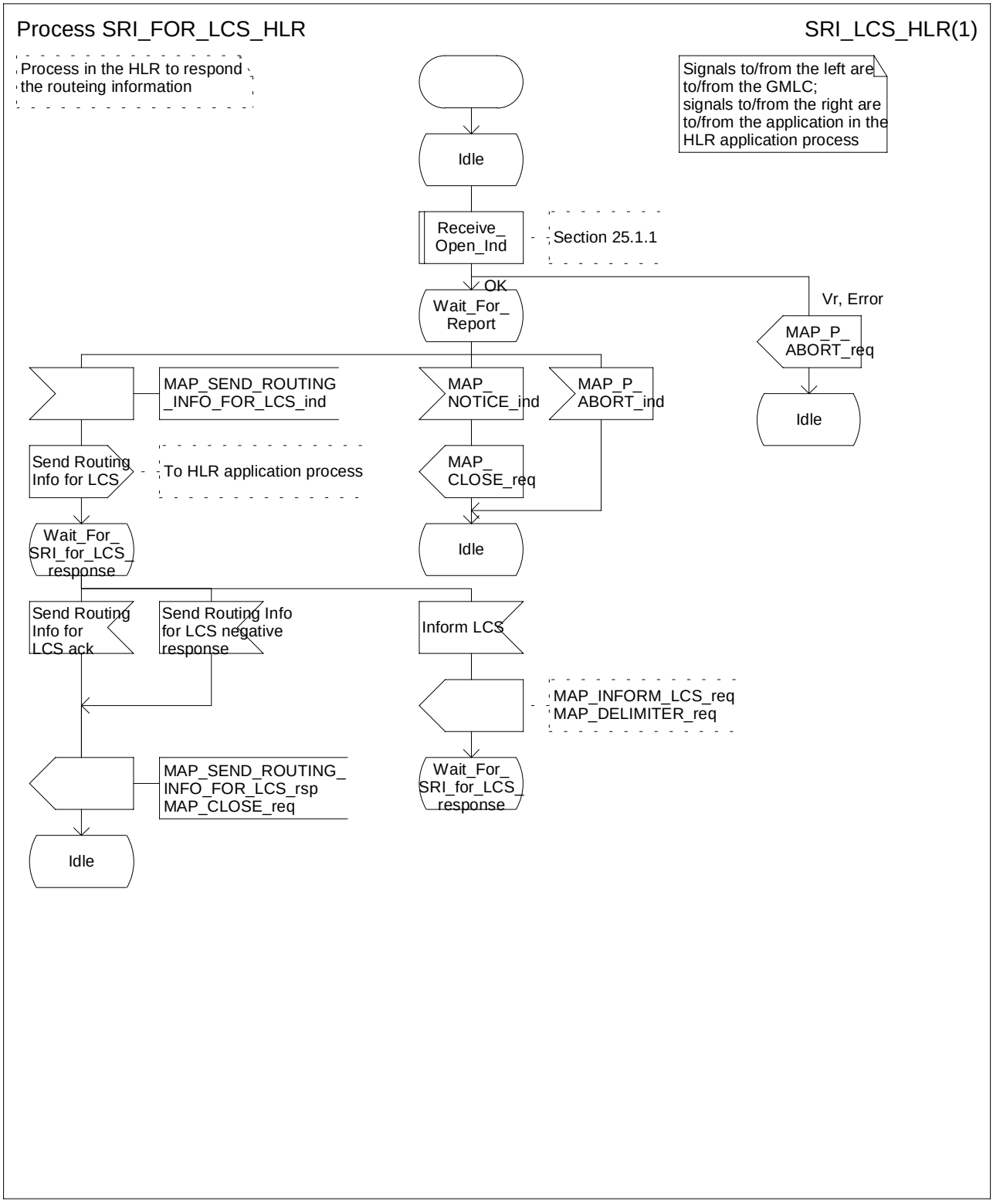

Figure 24B.1/3: Process SRI_FOR_LCS_HLR

24B.2 Provide Subscriber Location procedure

24B.2.1 General

The message flows for successful request of the location information of a target MS related to location services are shown in figure 24B.1/1.

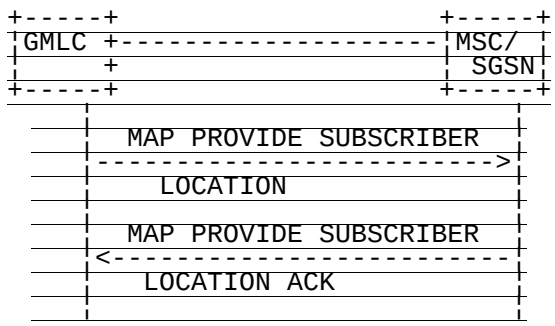

Figure 24B.2/1: Message flow for request of the location information

The following MAP services are used to retrieve requested information:

MAP_PROVIDE_SUBSCRIBER_LOCATION see subclause 13A.2.

24B.2.2 Process in the GMLC

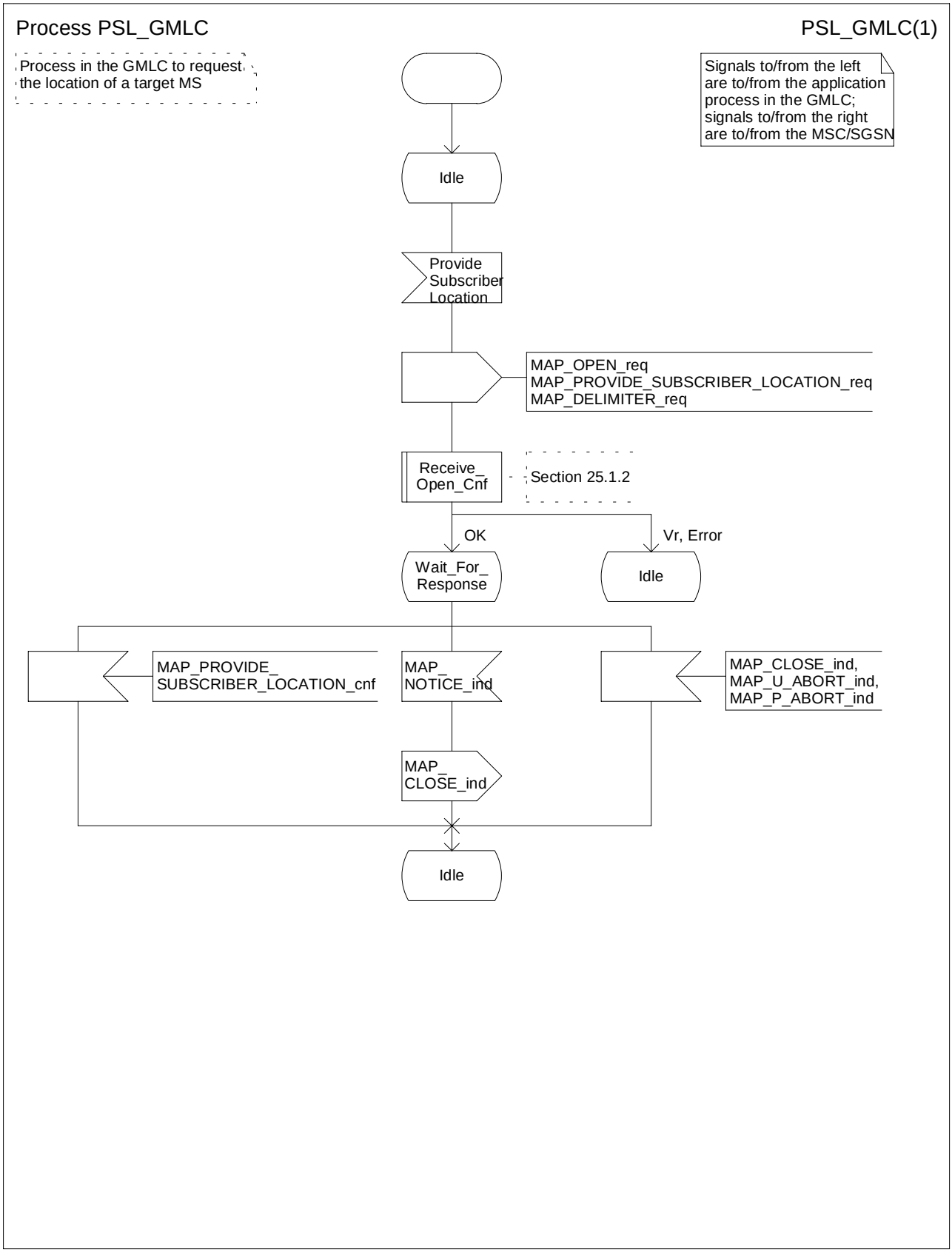

Figure 24B.2/2: Process PSL_GMLC

24B.2.3 Process in the MSC

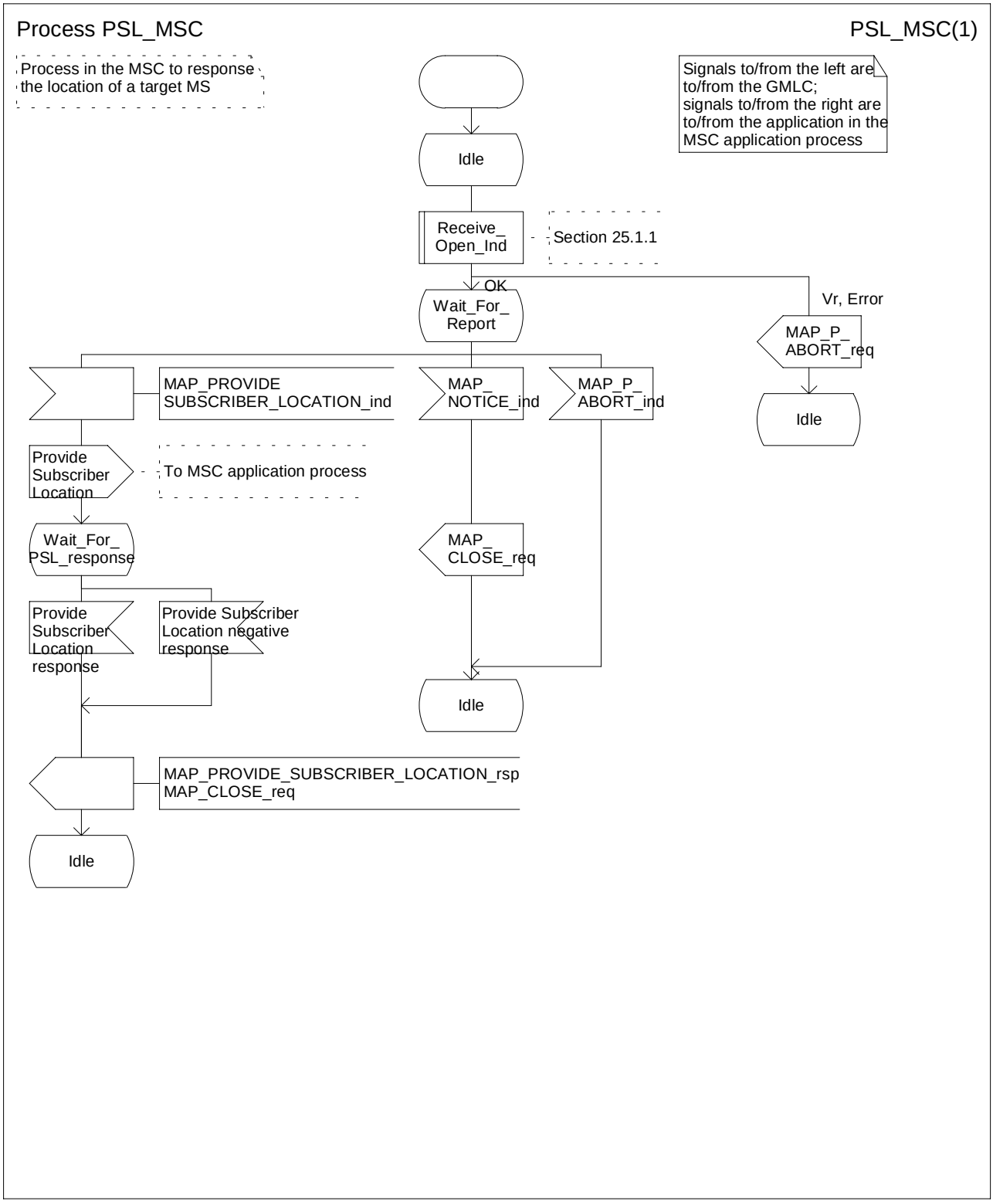

Figure 24B.2/3: Process PSL_MSC

24B.2.4 Process in the SGSN

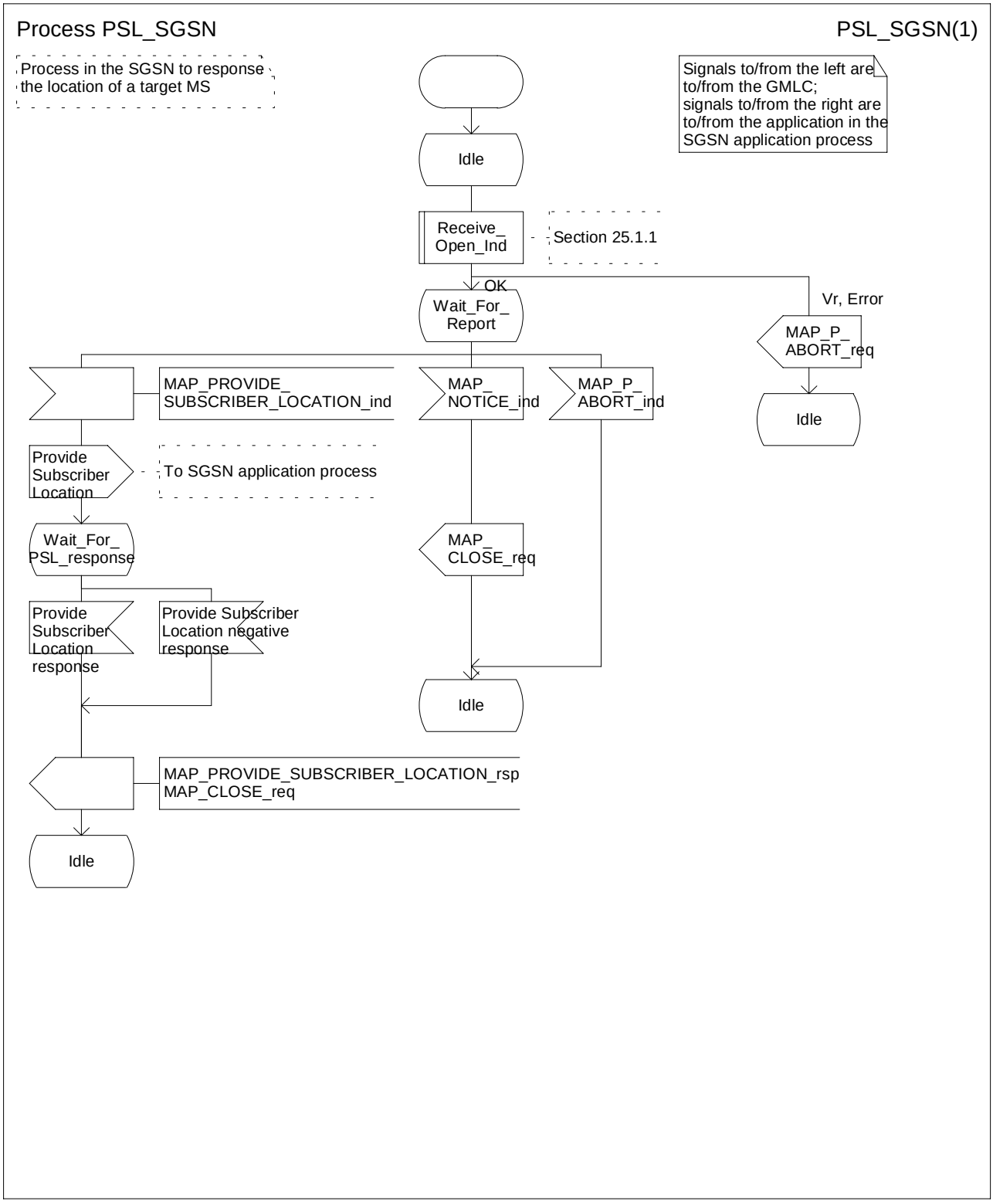

Figure 24B.2/4: Process PSL_SGSN

24B.3 Subscriber Location Report procedure

24B.3.1 General

The message flows for successful report of the location information of a target MS related to location services are shown in figure 24B.3/1.

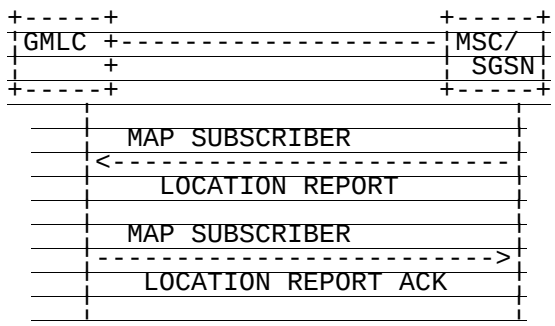

Figure 24B.3/1: Message flow for report of the location information

The following MAP services are used to retrieve requested information:

MAP_SUBSCRIBER_LOCATION_REPORT see subclause 13A.3.

24B.3.2 Process in the GMLC

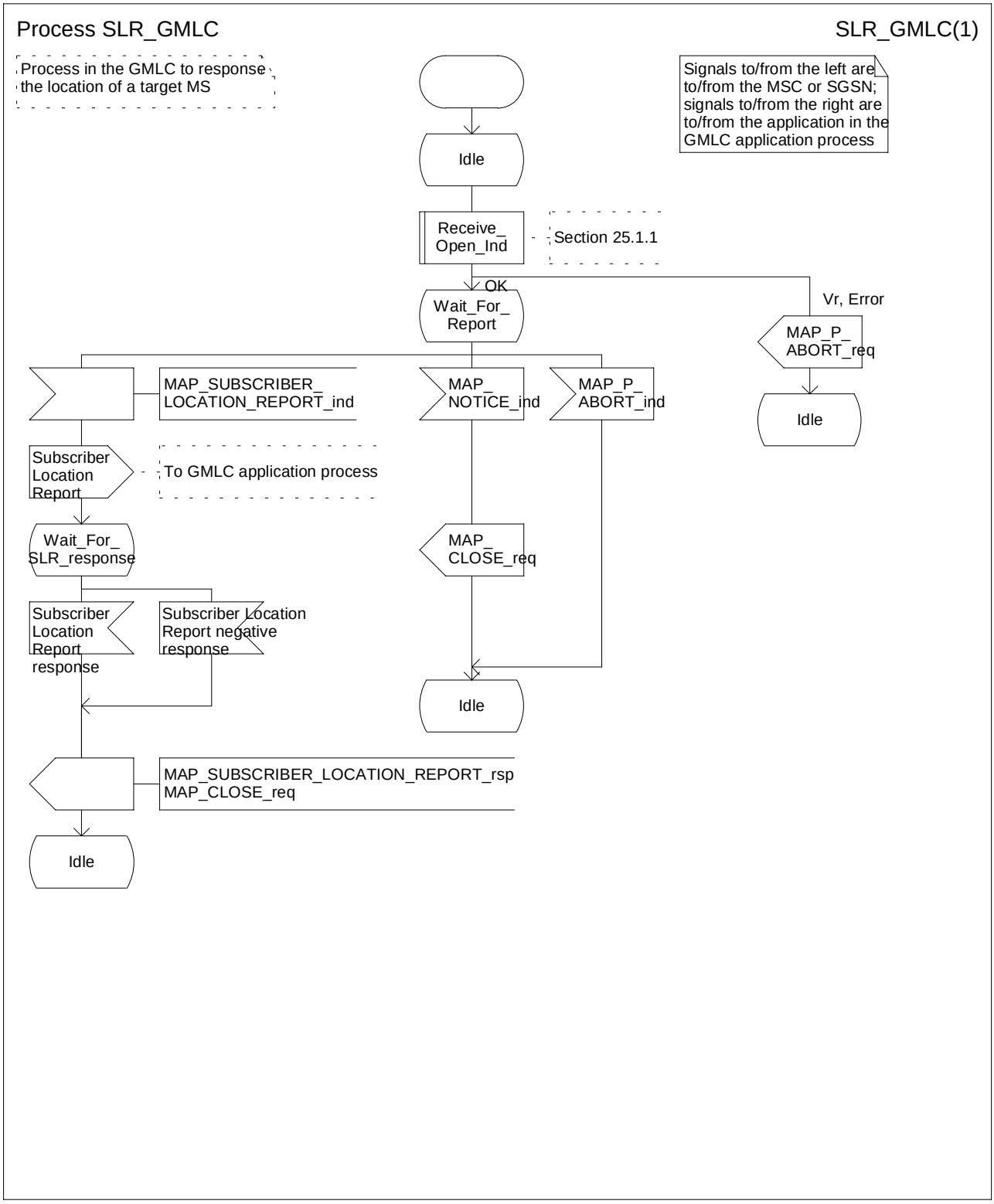

Figure 24A.3/2 Process SLR_GMLC

24B.3.3 Process in the MSC

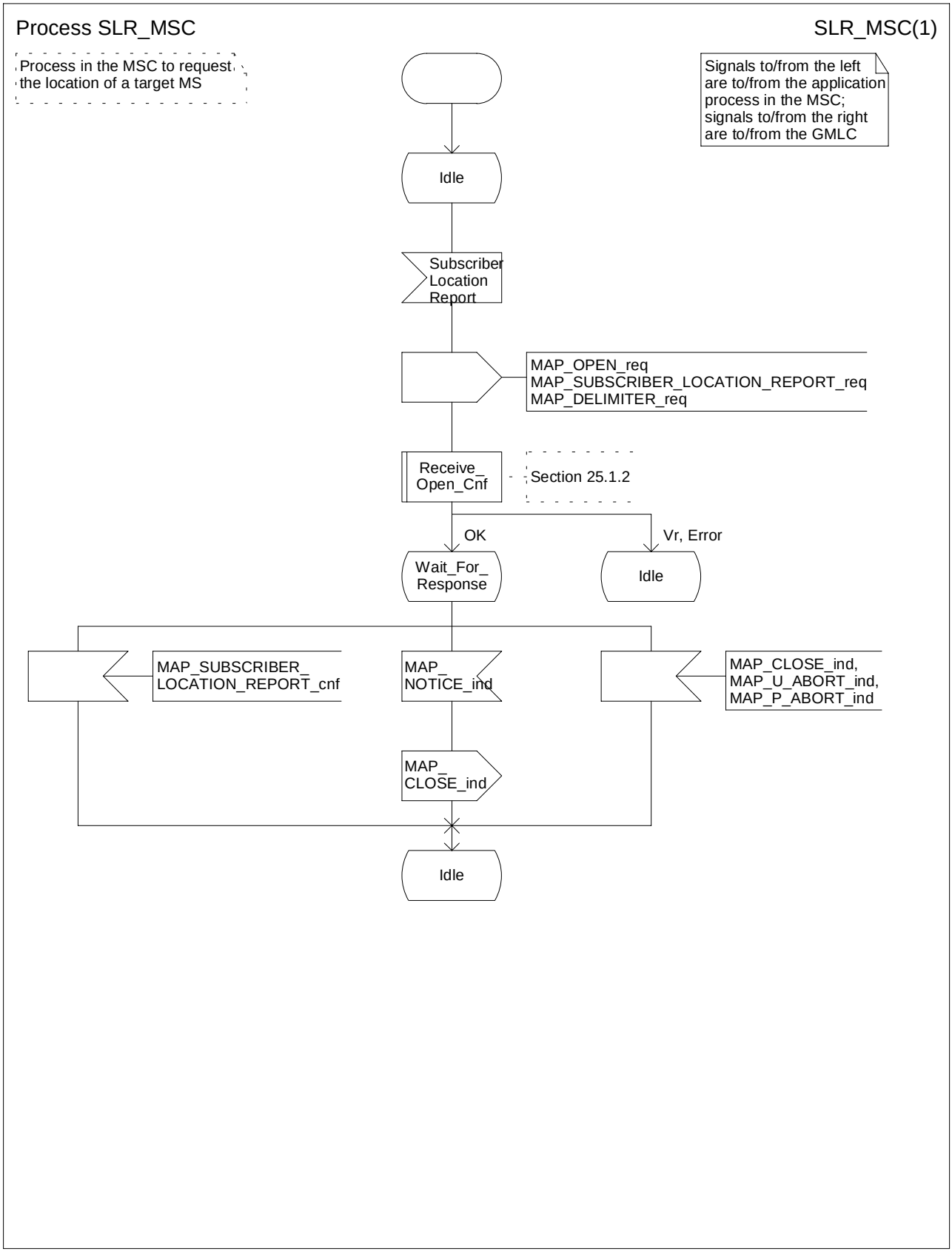

Figure 24B.3/3 Process SLR_MSC

24B.3.4 Process in the SGSN

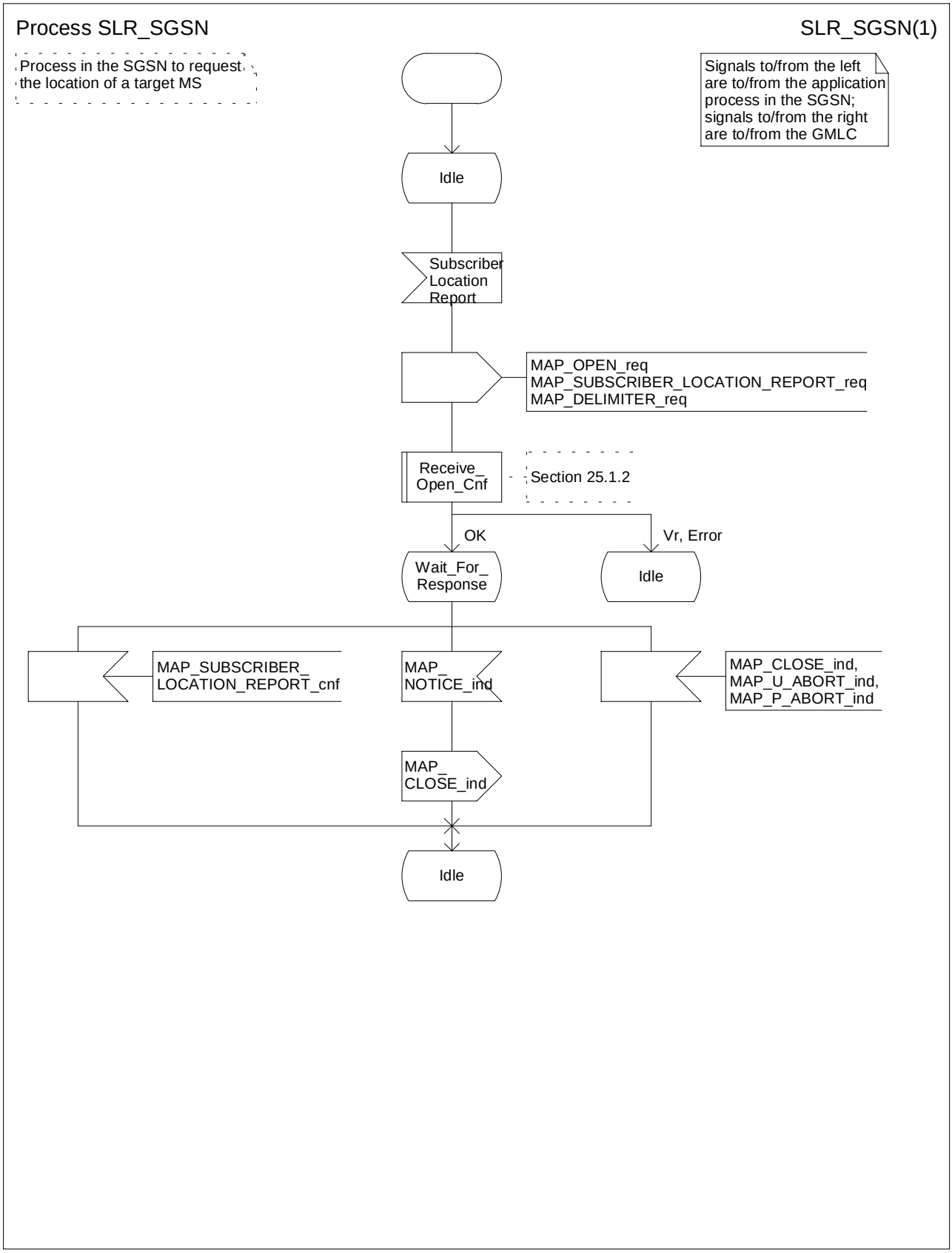

Figure 24B.3/4 Process SLR_SGSN

24B.4 LCS Client Alerting procedure

24B.4.1 General

The message flows for LCS Client Alerting procedure are shown in figure 24B.4/1.

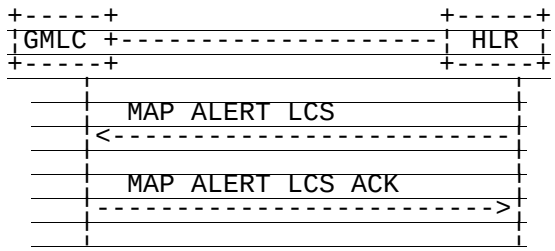

Figure 24B.4/1: Message flow for LCS Client Alerting

The following MAP services are used to retrieve requested information:

MAP_ALERT_LCS see subclause 13A.4.

24A.4.2 Processes in the GMLC

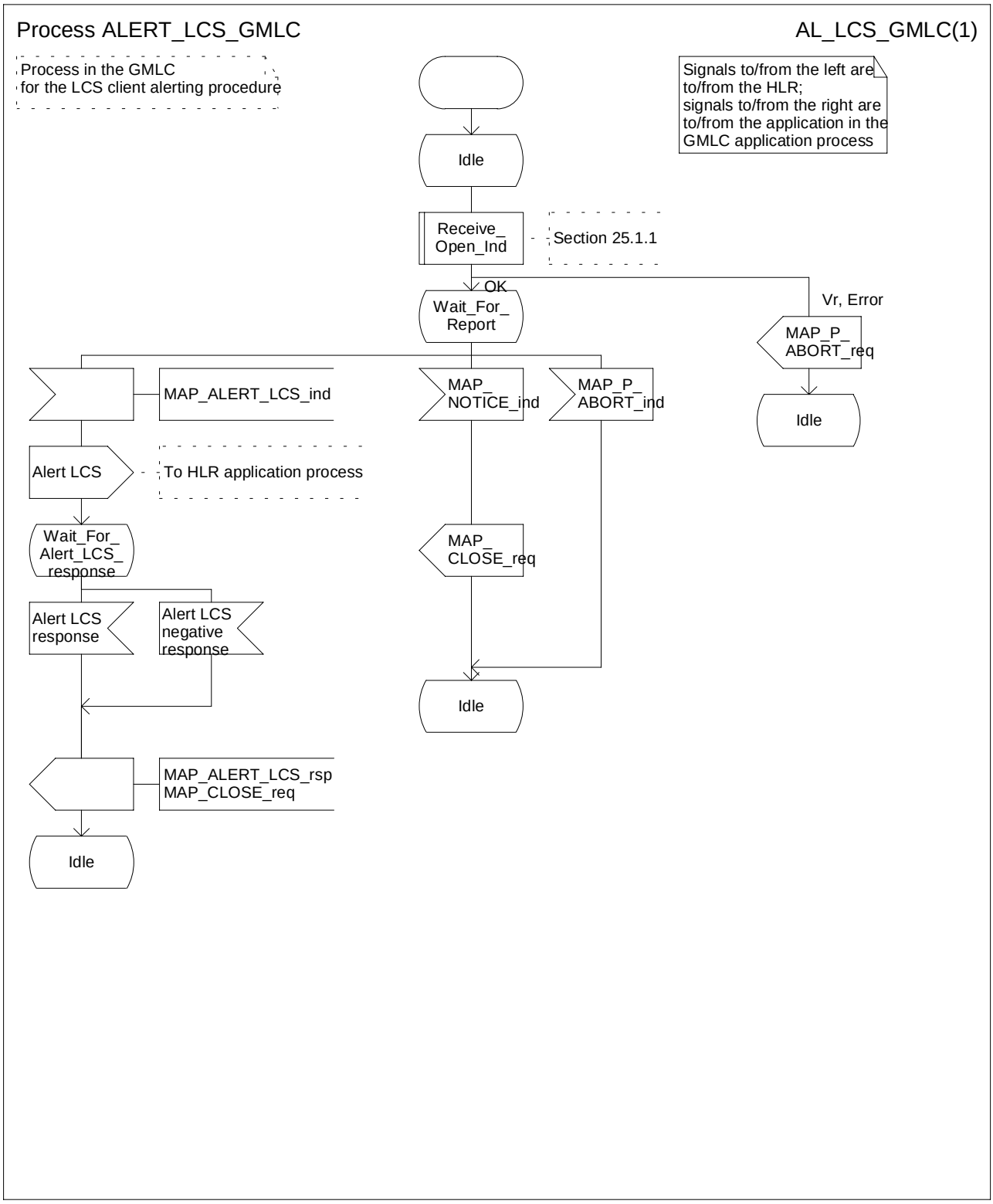

Figure 24B.4/2 Process ALERT_LCS_GMLC

24A.4.3 Processes in the HLR

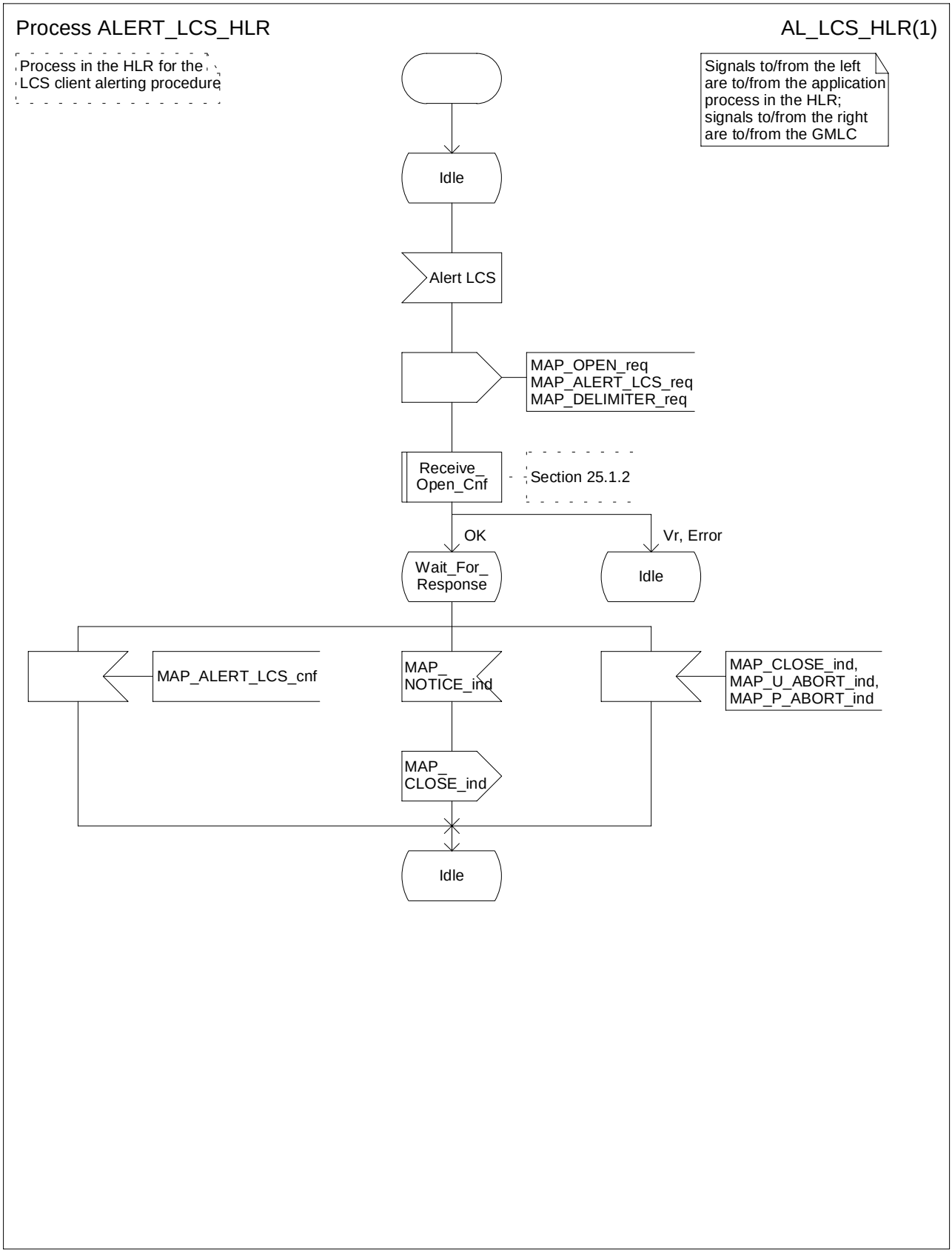

Figure 24B.4/3 Process ALERT_LCS_HLR

24B.5 LCS Status Reporting procedure

24B.5.1 General

The message flows for LCS Status Reporting procedure are shown in figure 24B.5/1.

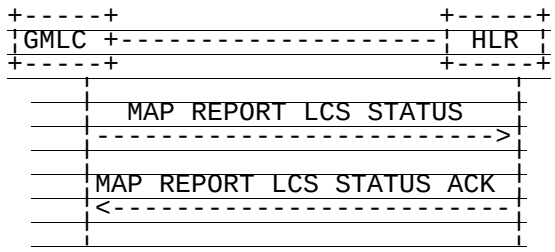

Figure 24B.5/1: Message flow for LCS Status Reporting

The following MAP services are used to retrieve requested information:

MAP_REPORT_LCS_STATUS see subclause 13A.5.

24B.5.2 Processes in the GMLC

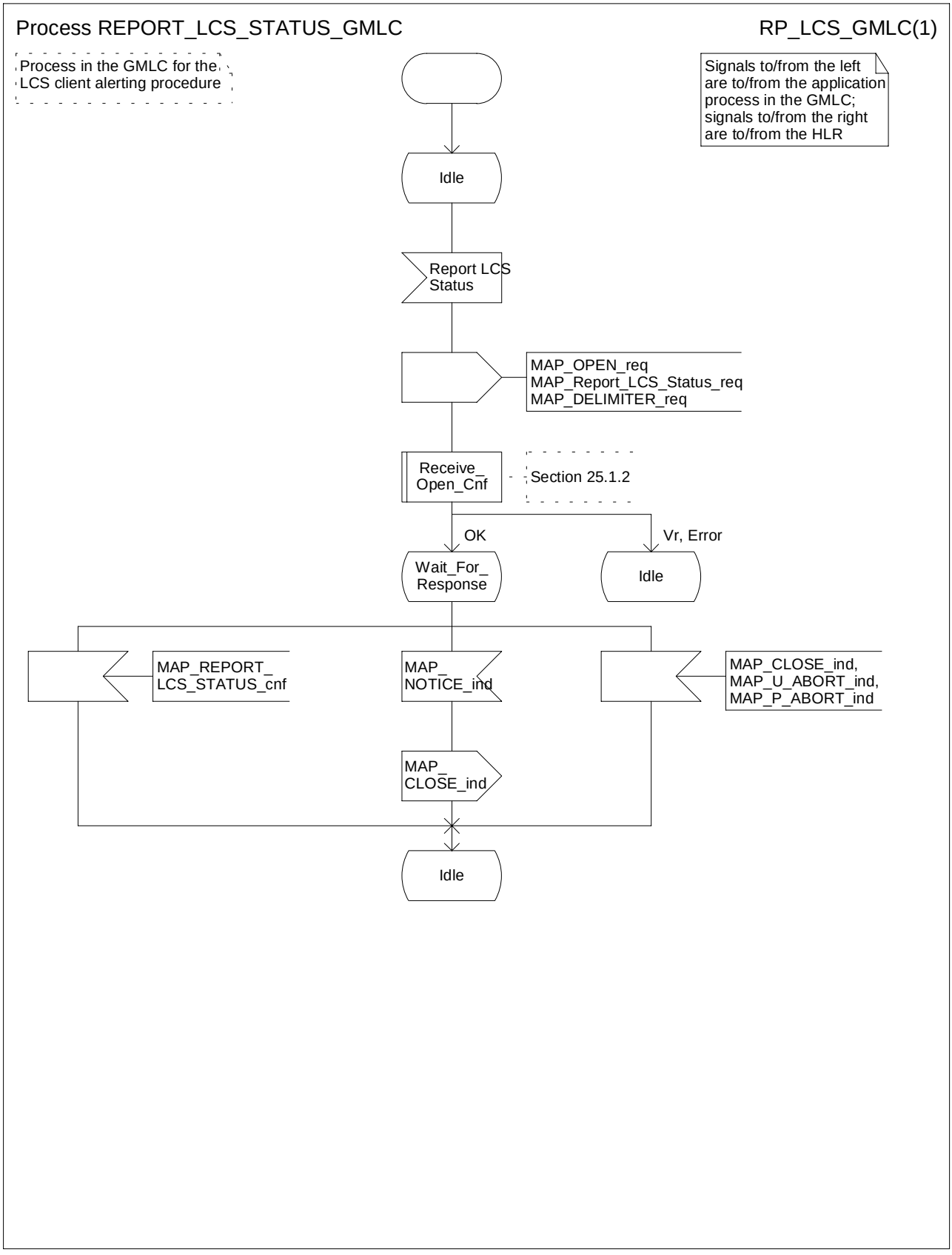

Figure 24B.5/2 Process Report_Status_LCS_GMLC

24B.5.3 Processes in the HLR

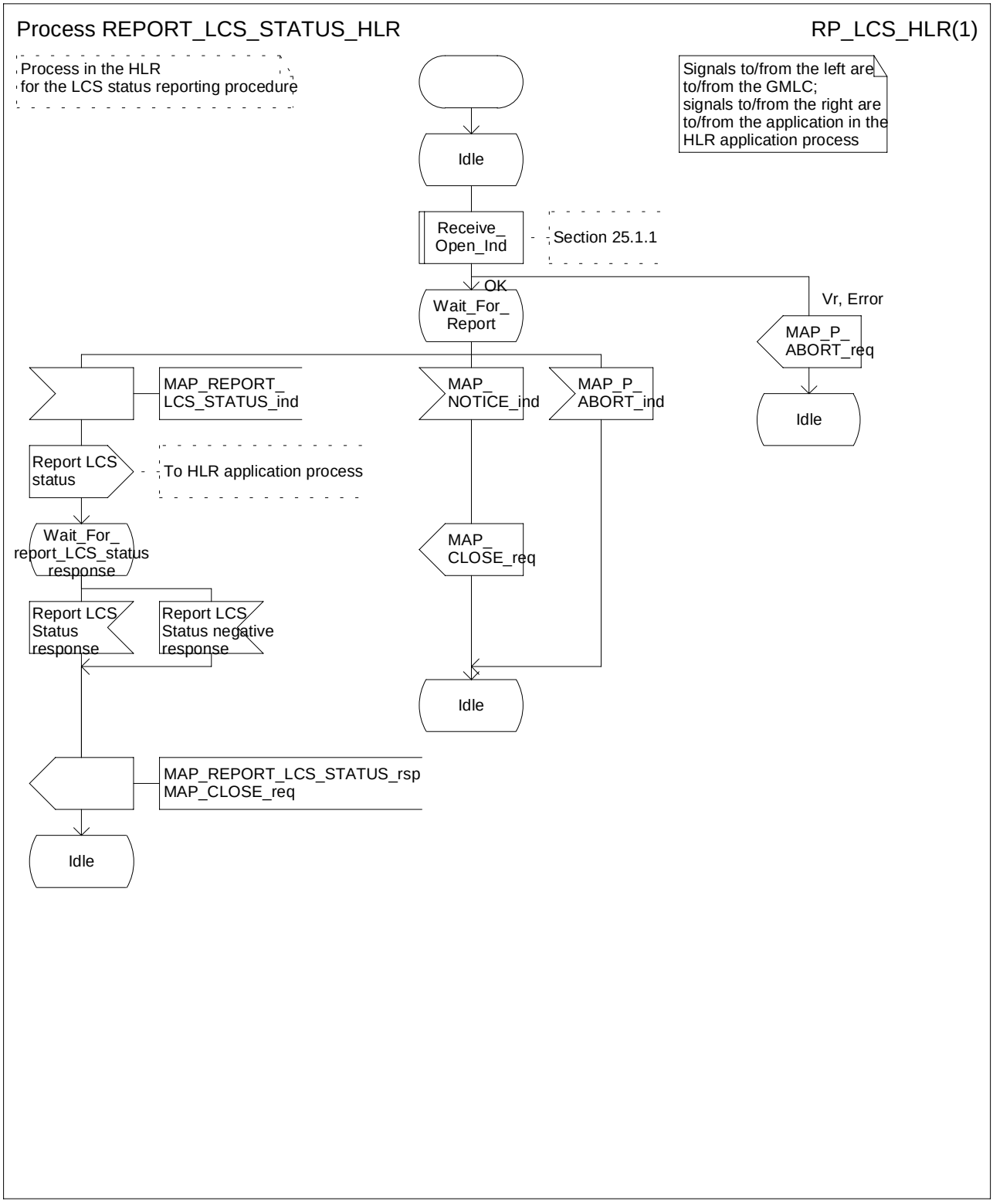

Figure 24B.5/3 Process Report_LCS_Status_HLR