Source:	TSG CN WG4
Title:	CRs on Rel-4 Location Service Enhancement
Agenda item:	8.8
Document for:	APPROVAL

Introduction:

This document contains 4 CRs on Rel-4 Work Item "LCS1", that have been agreed by TSG CN WG4, and are forwarded to TSG CN Plenary meeting #13 for approval.

Spec	CR	Re	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.010	003		N4-010866	Rel-4	Clarification on the signalling connection for PS domain	F	4.0.0
29.002	291	1	N4-010929	Rel-4	Corrections for Deferred MT-LR	F	4.4.1
29.002	292	2	N4-010937	Rel-4	Clarifications on SupportedLCS-CapabilitySets	F	4.4.1
29.002	295	2	N4-010958	Rel-4	Corrections on the introduction of LCS for PS domain	F	4.4.1

CR-Form-v4

CHANGE REQUEST

⌘ **24.010** CR **003** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

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

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

Title: ⌘	Clarification on the signalling connection for PS domain	
Source: ⌘	CN4	
Work item code: ⌘	LCS1	***Date:*** ⌘ 4/7/2001
Category: ⌘	F	***Release:*** ⌘ REL-4

Use one of the following categories:	*Use one of the following releases:*
F *(correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(Addition of feature),*	*R97 (Release 1997)*
C *(Functional modification of feature)*	*R98 (Release 1998)*
D *(Editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change: ⌘	The term MM-connection is used in various places. It should be clarified that this term is read as PS-signalling connection for PS domain throughout this specification.
Summary of change: ⌘	A sentence carifying above was added.
Consequences if not approved: ⌘	The handling of signalling connection for PS domain is not clear.

Clauses affected: ⌘	2.2.5.1, 3.1

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.

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 3GPP TS 24.007 and 3GPP TS 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. Throughout this specification, the term MM-connection is used to denote a MM-connection for CS domain or PS-signalling connection for PS domain, as appropriate. 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.

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 3GPP 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.

CR-Form-v4

CHANGE REQUEST

⌘	**29.002** CR **291**	⌘ rev **1**	⌘ Current version:	**4.4.1** ⌘

*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:	⌘	Corrections for Deferred MT-LR
Source:	⌘	CN4
Work item code:	⌘ LCS1	***Date:*** ⌘ 3/7/2001
Category:	⌘ **F**	***Release:*** ⌘ REL-4

Use one of the following categories: **F** *(correction)* **A** *(corresponds to a correction in an earlier release)* **B** *(Addition of feature),* **C** *(Functional modification of feature)* **D** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP 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 operation SubscriberLocationReport currentmsc-Number and currentsgsn-Number overlap with lcsLocationInfo in Deferredmt-lrData creating confusion and misinterpretations. The current MSC or SGSN number has to be given in SubscriberLocationReport-Arg only in case of Deferred MT-LR if terminationCause is mt-lrRestart, so networkNode-Number in lcsLocationInfo Deferredmt-lrData is enough to carry this information.
Summary of change:	⌘	currentmsc-Number and currentsgsn-Number are removed from SubscriberLocationReport-Arg. Use of lcsLocationInfo in Deferredmt-lrData clarified
Consequences if not approved:	⌘	Possible malfunctions of the Deferred MT-LR due to inconsistent use of the overlapping parameters.

Clauses affected:	⌘	7.6, 7.6.11.3, 7.6.11.9, 7.6.11.10, 13A.3.2, 13A.3.3, 17.7.13
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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First 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
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 Location Estimate	7.6.11.21	LMSI	7.6.2.16
Additional number	7.6.2.46	Location Information	7.6.2.30
Additional signal info	7.6.9.10	Location update type	7.6.9.6
Additional SM Delivery Outcome	7.6.8.11	Long Forwarded-to Number	7.6.2.22A
		Long FTN Supported	7.6.2.22B
Age Indicator	7.6.3.72	Lower Layer Compatibility	7.6.3.42
		LSA Information	7.6.3.56
		LSA Information Withdraw	7.6.3.58
Alert Reason	7.6.8.8	MC Information	7.6.4.48
Alert Reason Indicator	7.6.8.10	MC Subscription Data	7.6.4.47
Alerting Pattern	7.6.3.44	Mobile Not Reachable Reason	7.6.3.51
All GPRS Data	7.6.3.53	Modification request for CSI	7.6.3.81
All Information Sent	7.6.1.5	Modification request for SS Information	7.6.3.82
AN-apdu	7.6.9.1	More Messages To Send	7.6.8.7
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
B subscriber Number	7.6.2.48	Multicall Bearer Information	7.6.2.52
B subscriber subaddress	7.6.2.49	Multiple Bearer Requested	7.6.2.53
Basic Service Group	7.6.4.40	Multiple Bearer Not Supported	7.6.2.54
Bearer service	7.6.4.38	MWD status	7.6.8.3
Call Barring Data	7.6.3.83	NbrUser	7.6.4.45
Call barring feature	7.6.4.19	Network Access Mode	7.6.3.50
Call barring information	7.6.4.18	Network node number	7.6.2.43
Call Direction	7.6.5.8	Network resources	7.6.10.1
Call Forwarding Data	7.6.3.84	Network signal information	7.6.9.8
Call Info	7.6.9.9	New password	7.6.4.20
Call reference	7.6.5.1	No reply condition timer	7.6.4.7
Call Termination Indicator	7.6.3.67		
Called number	7.6.2.24	North American Equal Access preferred Carrier Id	7.6.2.34
Calling number	7.6.2.25	Number Portability Status	7.6.5.14
CAMEL Subscription Info	7.6.3.78	ODB Data	7.6.3.85
CAMEL Subscription Info Withdraw	7.6.3.38	ODB General Data	7.6.3.9

Next Change

7.6.11.3   Deferred MT-LR Data

This parameter is used to report the deferred location event type, the location information and reason why the serving node aborted monitoring the event to the GMLC. The termination cause mt-lrRestart shall be used to trigger the GMLC to restart the location procedure in all the cases where the sending node detects that the location procedure cannot be successfully performed anymore (as for example when. Cancel Location or Send Identification has been received, Implicit Detach has been performed, …). The location information shall be included only if the termination cause is mt-lrRestart. The network node number contained in the location information refers to the node where the MS/UE has moved to and shall be included if available, like in case Send Identification has been received.

Next Change

7.6.11.9   ~~Current MSC Number~~Void

~~This parameter refers to the ISDN number of the MSC currently serving MS. This parameter is set when available in the sending entity and only used for Defferred MT-LR.~~

Next Change

7.6.11.10   ~~Current SGSN Number~~Void

~~This parameter refers to the ISDN number of the SGSN currently serving MS. This parameter is set when available in the sending entity and only used for Defferred MT-LR.~~

Next Change

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	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(=)		
Additional Location Estimate	C	C(=)		
Deferred MT-LR Data	C	C(=)		
~~Current MSC Number~~	~~C~~	~~C(=)~~		
~~Current SGSN Number~~	~~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. 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 Number

See definition in subclause 7.6.2. This parameter provides the address of the ~~visited MSC or SGSN for target MS~~sending node.

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. If the obtained location estimate is not encoded in one of the supported geographical shapes then this parameter shall consist of one octet, which shall be discarded by the receiving node.

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.

Additional Location Estimate

This parameter provides the location estimate when not provided by the Location Estimate parameter..

Deferred MT-LR Data

See definition in subclause 7.6.11.3.

~~Current MSC Number~~

~~See definition in subclause 7.6.11.9.~~

~~Current SGSN Number~~

~~See definition in subclause 7.6.11.10.~~

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

17.7.13 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,
    LocationType,
    LCSClientName,
    LCS-QoS,
    Horizontal-Accuracy,
    ResponseTime,
    Ext-GeographicalInformation,
    SupportedGADShapes,
    Add-GeographicalInformation
;

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)}

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

    Additional-Number
FROM MAP-SM-DataTypes {
    ccitt identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-SM-DataTypes (16) 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-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,
    ... ,
    supportedGADShapes                  [9]  SupportedGADShapes          OPTIONAL}

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

```
LocationType ::= SEQUENCE {
    locationEstimateType                [0] LocationEstimateType,
    ...,
    deferredLocationEventType           [1] DeferredLocationEventType    OPTIONAL }
```

```
LocationEstimateType ::= ENUMERATED {
    currentLocation                     (0),
    currentOrLastKnownLocation          (1),
    initialLocation                     (2),
    ...,
    activateDeferredLocation            (3),
    cancelDeferredLocation              (4) }
--  exception handling:
--  a ProvideSubscriberLocation-Arg containing an unrecognized LocationEstimateType
--  shall be rejected by the receiver with a return error cause of unexpected data value
```

```
DeferredLocationEventType ::= BIT STRING {
    msAvailable                         (0) } (SIZE (1..16))
-- exception handling
-- a ProvideSubscriberLocation-Arg containing other values than listed above in
-- DeferredLocationEventType 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 }
```

```
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 3G TS 23.032. 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 3G TS 23.032.
    -- 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)
```

```
SupportedGADShapes ::= BIT STRING {
    ellipsoidPoint  (0),
    ellipsoidPointWithUncertaintyCircle (1),
    ellipsoidPointWithUncertaintyEllipse (2),
    polygon (3),
    ellipsoidPointWithAltitude (4),
    ellipsoidPointWithAltitudeAndUncertaintyElipsoid (5),
    ellipsoidArc  (6) } (SIZE (7..16))
-- A node shall mark in the BIT STRING all Shapes defined in 3G TS 23.032 it supports.
-- exception handling: bits 7 to 15 shall be ignored if received.
```

```
ProvideSubscriberLocation-Res ::= SEQUENCE {
    locationEstimate                Ext-GeographicalInformation,
    ageOfLocationEstimate           [0] AgeOfLocationInformation       OPTIONAL,
    extensionContainer              [1] ExtensionContainer             OPTIONAL,
    ... ,
    add-LocationEstimate            [2] Add-GeographicalInformation    OPTIONAL,
    deferredmt-lrResponseIndicator  [3] NULL                           OPTIONAL }

--   if deferredmt-lrResponseIndicator is set, locationEstimate is ignored.

-- the add-LocationEstimate parameter shall not be sent to a node that did not indicate the
-- geographic shapes supported in the ProvideSubscriberLocation-Arg
```

```
Ext-GeographicalInformation ::= OCTET STRING (SIZE (1..maxExt-GeographicalInformation))
    -- Refers to geographical Information defined in 3G TS 23.032.
    -- This is composed of 1 or more octets with an internal structure according to
    -- 3G TS 23.032
    -- Octet 1: Type of shape, only the following shapes in 3G TS 23.032 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
    --      (e) Ellipsoid Point
    -- 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
    -- Octets 2 to 7 for case (e) - Ellipsoid Point
    --          Degrees of Latitude                                     3 octets
    --          Degrees of Longitude                                    3 octets


    --
    -- An Ext-GeographicalInformation parameter comprising more than one octet and
    -- containing any other shape or an incorrect number of octets or coding according
    -- to 3G TS 23.032 shall be treated as invalid data by a receiver.
    --
    -- An Ext-GeographicalInformation parameter comprising one octet shall be discarded
    -- by the receiver if an Add-GeographicalInformation parameter is received
    -- in the same message.
    --
    -- An Ext-GeographicalInformation parameter comprising one octet shall be treated as
    -- invalid data by the receiver if an Add-GeographicalInformation parameter is not
    -- received in the same message.
```

```
maxExt-GeographicalInformation  INTEGER ::= 20
    -- the maximum length allows for further shapes in 3G TS 23.032 to be included in later
    -- versions of 3G TS 29.002
```

```
Add-GeographicalInformation ::= OCTET STRING (SIZE (1..maxAdd-GeographicalInformation))
    -- Refers to geographical Information defined in 3G TS 23.032.
    -- This is composed of 1 or more octets with an internal structure according to
    -- 3G TS 23.032
    -- Octet 1: Type of shape, all the shapes defined in 3G TS 23.032 are allowed:
    -- Octets 2 to n (where n is the total number of octets necessary to encode the shape
    -- according to 3G TS 23.032) are used to encode the shape itself in accordance with the
    -- encoding defined in 3G TS 23.032
    --
    -- An Add-GeographicalInformation parameter, whether valid or invalid, received
    -- together with a valid Ext-GeographicalInformation parameter in the same message
    -- shall be discarded.
    --
    -- An Add-GeographicalInformation parameter containing any shape not defined in
    -- 3G TS 23.032 or an incorrect number of octets or coding according to
    -- 3G TS 23.032 shall be treated as invalid data by a receiver if not received
    -- together with a valid Ext-GeographicalInformation parameter in the same message.
```

```
maxAdd-GeographicalInformation  INTEGER ::= 90
    -- the maximum length allows support for all the shapes currently defined in 3G TS 23.032
```

```
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,
    ... ,
    add-LocationEstimate            [8] Add-GeographicalInformation OPTIONAL,
    deferredmt-lrData               [9] Deferredmt-lrData           OPTIONAL,
    currentmsc Number               [10] ISDN AddressString         OPTIONAL,
    currentsgsn Number              [11] ISDN AddressString         OPTIONAL }

    -- one of msisdn or imsi is mandatory
    -- a location estimate that is valid for the locationEstimate parameter should
    -- be transferred in this parameter in preference to the add-LocationEstimate.
    -- the deferredmt-lrData parameter shall be included if and only if the lcs-Event
    -- indicates a deferredmt-lrResponse.
```

```
Deferredmt-lrData ::= SEQUENCE {
    deferredLocationEventType       DeferredLocationEventType,
    terminationCause                [0] TerminationCause            OPTIONAL,
    lcsLocationInfo                 [1] LCSLocationInfo             OPTIONAL,
    ...}
    -- lcsLocationInfo may be included only if a terminationCause is present
    -- indicating mt-lrRestart.
```

```
LCS-Event ::= ENUMERATED {
    emergencyCallOrigination  (0),
    emergencyCallRelease  (1),
    mo-lr  (2),
    ...,
    deferredmt-lrResponse  (3) }
    --   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
```

```
TerminationCause ::= ENUMERATED {
    normal  (0),
    errorundefined  (1),
    internalTimeout  (2),
    congestion  (3),
    mt-lrRestart  (4),
    privacyViolation  (5),
    ... }
-- mt-lrRestart shall be used to trigger the GMLC to restart the location procedure,
-- either because the sending node knows that the terminal has moved under coverage
-- of another MSC or SGSN (e.g. Send Identification received), or because the subscriber
-- has been autonomously deregistered by the serving node (e.g implicit detach).
--
-- exception handling
-- an unrecognized value shall be treated the same as value 1 (errorundefined)
```

```
SubscriberLocationReport-Res ::= SEQUENCE {
    extensionContainer              ExtensionContainer              OPTIONAL,
    ...}
```

END

End of Changes

CR-Form-v4

CHANGE REQUEST

| ⌘ | **29.002** CR **292** | ⌘ | rev | **2** | ⌘ | Current version: | **4.4.1** | ⌘ |

*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: ⌘	Clarifications on SupportedLCS-CapabilitySets	
Source: ⌘	CN4	
Work item code: ⌘	LCS1	***Date:*** ⌘ 3/7/2001
Category: ⌘ F		***Release:*** ⌘ REL-4

Use one of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
Detailed explanations of the above categories can
be found in 3GPP 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 use of parameter SupportedLCS-CapabilitySets is somehow still unclear leading to misinterpretation and interoperability problems
Summary of change: ⌘	Clarifying text added to the description and definition of SupportedLCS-CapabilitySets
Consequences if not approved: ⌘	Possible interoperability problems.

Clauses affected: ⌘	8.1.2.3, 8.1.7.3, 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.

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(=)		
Inform Previous Network Entity	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, if present, ~~by its presence that LCS is supported and~~ the capability sets of LCS which are supported. If the parameter is sent but no capability set is marked as supported then the VLR does not support LCS at all.

If this parameter is absent then the VLR may support at most LCS capability set 1, that is LCS Release98 or Release99 version.

Inform Previous Network Entity

This parameter is used by the VLR to ask the HLR to inform the previous network entity about the update. It is used in case Super-Charger is supported in the network and the serving network entity has not been able to inform itself the previous network entity that MS has moved, that is if it has not sent Send Identification to the previous serving entity.

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.

<u>Provider error</u>

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(=)		
Inform Previous Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.7.3 Parameter definitions and use

<u>Invoke Id</u>

See definition in subclause 7.6.1.

<u>IMSI</u>

See definition in subclause 7.6.2.

<u>SGSN number</u>

See definition in subclause 7.6.2.

<u>SGSN address</u>

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, if present, ~~by its presence that LCS is supported and~~ the capability sets of LCS which are supported. If the parameter is sent but no capability set is marked as supported then the SGSN does not support LCS at all.

The SGSN is not allowed to indicate support for LCS capability set 1.

If this parameter is absent then the SGSN does not support LCS at all.

Inform Previous Network Entity

This parameter is used by the SGSN to ask the HLR to inform the previous network entity about the update. It is used in case Super-Charger is supported in the network and the serving network entity has not been able to inform itself the previous network entity that MS has moved, that is if it has not sent SGSN Context Request to the previous serving entity.

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

17.7.1   Mobile Service data types

<mark>text removed for clarity</mark>

```
SupportedLCS-CapabilitySets ::= BIT STRING {
    lcsCapabilitySet1 (0),
    lcsCapabilitySet2 (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.
-- If no bit is set then the sending node does not support LCS.
-- If the parameter is not sent by an VLR then the VLR may support at most capability set1.
-- If the parameter is not sent by an SGSN then no support for LCS is assumed.
-- An SGSN is not allowed to indicate support of capability set1.
-- Other bits than listed above shall be discarded.
```

<mark>text removed for clarity</mark>

End of Changes

CR-Form-v4

CHANGE REQUEST

⌘	**29.002**	CR	**295**	⌘ rev	**2**	⌘	Current version:	**4.4.1**	⌘

*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 **X**

Title: ⌘	Corrections on the introduction of LCS for PS domain	
Source: ⌘	CN4	
Work item code: ⌘	LCS1	***Date:*** ⌘ 4/7/2001
Category: ⌘	**F**	***Release:*** ⌘ REL-4

Use *one* of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
Detailed explanations of the above categories can
be found in 3GPP 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: ⌘	CR 29.002-222 (N4-010198) on the introduction of LCS for PS domain was approved in CN4 meeting held in Beijing. However there still remain some ambiguities and editorial mistakes. This CR proposes to clarify and correct them.
Summary of change: ⌘	1. LCS MLC Data parameter defined in 7.6.11.6 was removed since any other section does not refer to this and this is the same information as the GMLC-list defined in 7.6.3.61. 2. The change of subscriber data on the supplementary services can be a trigger of the Insert Subscriber Data service for PS domain as well as CS domain. (Section 8.8.1.1) 3. It was clarified in 8.8.1.3 that <u>If the SGSN receives an SS-Data List containing any SS-codes (either LCS related or not) which it does not support/allocate then it discards them.</u>~~the SGSN also notify the HLR of the supplementary service codes those it does not support/allocate by SS-Code List in MAP Insert Subscriber Data response.~~ 4. It was clarified in 13A.1.3, 13A.3.3 that the GPRS Node Indicator is used Only if the SGSN number is sent in the Network Node Number. 5. Pricacy Override parameter in MAP Provicde Subscriber Location request is also used in PS domain. (Section 13A.2.3) 6. LMSI parameter in MAP Provide Subscriber Location request is not used in PS domain. (Section 13A.2.3) 7. Some other editorial corrections.
Consequences if not approved: ⌘	The presence conditions for some parameters are not clear. This may lead to interoperability problems.

Clauses affected: ⌘	2, 7.6.11.6, 7.6.11.16, 8.8.1.1, 8.8.1.3, 13A.1.3, 13A.2.3, 13A.3.3

Other specs affected:	⌘ ☐	Other core specifications	⌘
	☐	Test specifications	

		O&M Specifications		

Other comments: ⌘

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://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

[26a]   3G TS 23.271: "Functional stage2 description of LCS (Release ~~42~~000)".

7.6.11.6   Void~~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.~~

7.6.11.16   Privacy Override

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

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 subscriber has changed data concerning one or more supplementary services by using a subscriber procedure;

- 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(=)		
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:

<u>SS-Data List</u>

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).

<u>This parameter is used by the SGSN only for LCS. If the SGSN receives an Indication containing any supplementary service codes (either LCS related or not) which it does not support/allocate then it discards them.</u>

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

…

<u>SS-Code List</u>

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 by <u>only</u> the VLR ~~and SGSN~~.

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 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 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 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 only 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(=)		
Supported GAD Shapes	C	C(=)		
Location Estimate			M	M(=)
Age of Location Estimate			C	C(=)
Additional Location Estimate			C	C(=)
Deferred MT-LR Response Indicator			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. 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 or SGSN for an MT-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. This parameter is only used in the case of the MT-LR for CS domain.

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.

Supported GAD Shapes

This parameter indicates which of the shapes defined in 3G TS 23.032 are supported.

Location Estimate

This parameter provides the location estimate if this is encoded in one of the supported geographical shapes. Otherwise this parameter shall consist of one octet, which shall be discarded by the receiving node.

Age of Location Estimate

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

Additional Location Estimate

This parameter provides the location estimate when not provided by the Location Estimate parameter. It may be sent only if the parameter Supported GAD Shapes has been received in the Provide Subscriber Location indication and the shape to be included is supported by the GMLC.

Deferred MT-LR Response Indicator

See definition in subclause 7.6.11.2.

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	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(=)		
Additional Location Estimate	C	C(=)		
Deferred MT-LR Data	C	C(=)		
Current MSC Number	C	C(=)		
Current SGSN Number	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. 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 Number

See definition in subclause 7.6.2. This parameter provides 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. If the obtained location estimate is not encoded in one of the supported geographical shapes then this parameter shall consist of one octet, which shall be discarded by the receiving node.

 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 only if the SGSN number is sent in the Network Node Number.

Additional Location Estimate

This parameter provides the location estimate when not provided by the Location Estimate parameter..

Deferred MT-LR Data

See definition in subclause 7.6.11.3.

Current MSC Number

See definition in subclause 7.6.11.9.

Current SGSN Number

See definition in subclause 7.6.11.10.

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.