3GPP TSG CN Plenary Meeting #22 **NP-030514**
10th – 12th December 2003 Maui, USA.

Source: TSG CN WG4

Title: Corrections on Location Service enhancements

Agenda item: 9.19

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.002	679		N4-031108	Rel-6	Modification of description for conditions on inclusion of Positioning Data	F	6.3.0
24.030	014	1	N4-031299	Rel-6	Deferred MT-LR Area Event	B	5.1.0
24.080	031	2	N4-031345	Rel-6	Deferred MT-LR Area Event	B	5.4.0
29.002	702	2	N4-031365	Rel-6	Deferred MT-LR Area Event	B	6.3.0
29.002	680	2	N4-031372	Rel6	Addition of CGI to LCS procedures	F	6.3.0
29.002	696	2	N4-031373	Rel6	Include v-gmlc parameter in RESTORE DATA MAP message	F	6.3.0

3GPP TSG-CN4 Meeting #21 **Tdoc N4-031299**
Bangkok, Thailand, 27 – 31 October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **24.030** **CR** **014** ⌘ **rev** **1** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Deferred MT-LR Area Event
Source:	⌘	CN4
Work item code:	⌘	LCS2
Date:	⌘	27/10/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	SA2 has approved the Deferred MT-LR Area Event concept. This CR, together with the companion CRs, provides the corresponding Stage 3 modifications.
Summary of change:	⌘	Addition of new Area Event Request from network to mobile and Area Event Report from mobile to network and Area Event Cancellation from network to mobile.
Consequences if not approved:	⌘	The functionalities defined at Stage 2 would not be implemented in Stage 3 creating misalignment.

Clauses affected:	⌘	4.2			
Other specs affected:	⌘	Y / N	Other core specifications	⌘	24.080 CR 031, 29.002 CR 702
		X /	Other core specifications		
		/ X	Test specifications		
		/ X	O&M Specifications		
Other comments:	⌘				

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

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

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

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

********** Start of change **********

4.2 Deferred MT-LR Area Event

4.2.1 Area Event Request

The network invokes a Deferred MT-LR Area Event procedure by sending a REGISTER message containing an LCS-Area Event invoke component to the MS.

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 3GPP TS 24.080

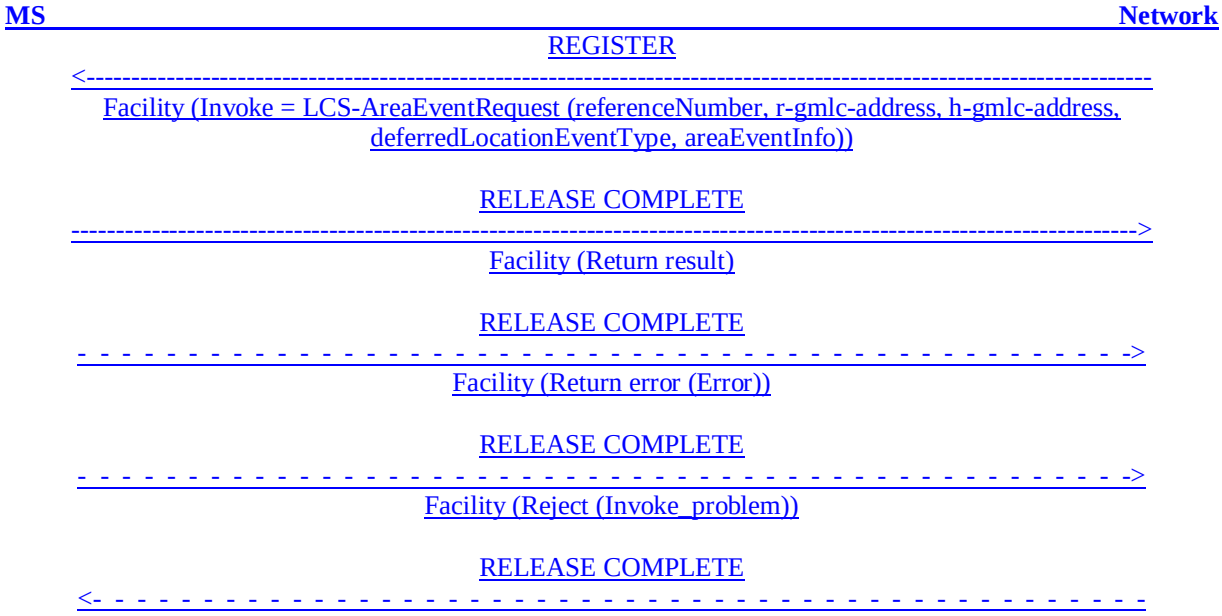

Figure 4.2: Area Event Request

4.2.2 Area Event Report

The MS invokes an Area Event Report by sending a REGISTER message to the network containing an LCS-AreaEventReport invoke component. SS Version Indicator value 1 or above shall be used.

The MS may use the Area Event Report also when cancelling the Area Event Request while monitoring the event.

The receiving network entity shall forward the Area Event Report to the H-GMLC which was included in the invoke component directly or via its associated V-GMLC.

The MS may terminate the dialogue by sending a RELEASE COMPLETE message for a single location request (see figure 4.3). The MS may also initiate another Area Event Report operation by sending a FACILITY message to the network containing an LCS-AreaEventReport invoke component (see figure 4.4). After the Area Event Report operation the MS shall terminate the dialogue by sending a RELEASE COMPLETE message.

If the network cannot successfully process the Area Event Report received from the MS, it shall clear the transaction by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in 3GPP 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, the network has not received either a new Area Event Report 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.

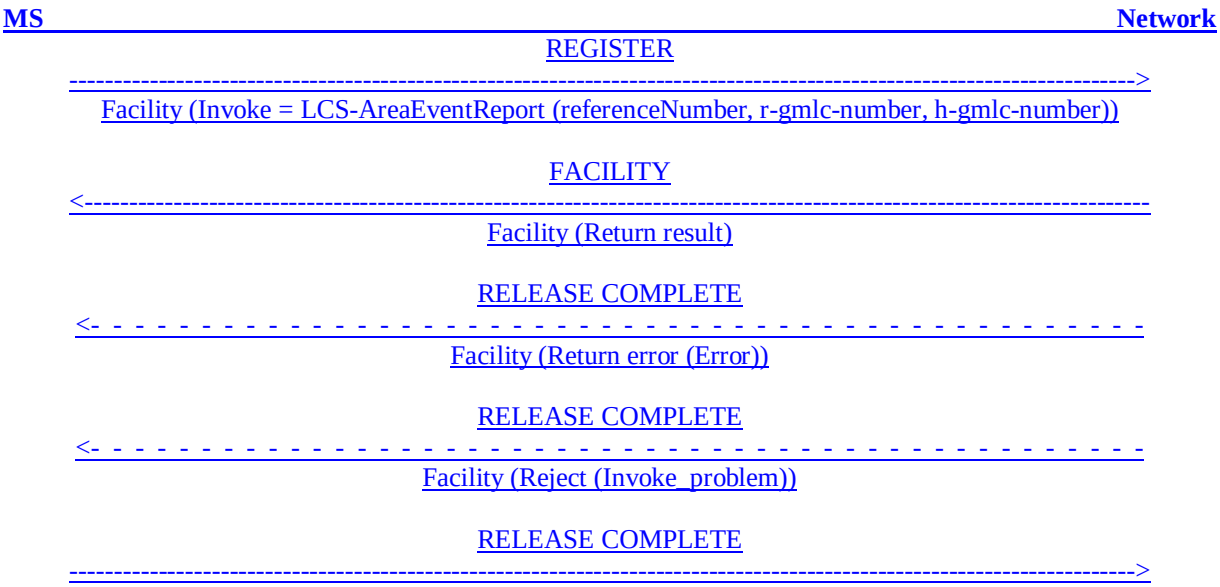

Figure 4.3: Single Area Event Report

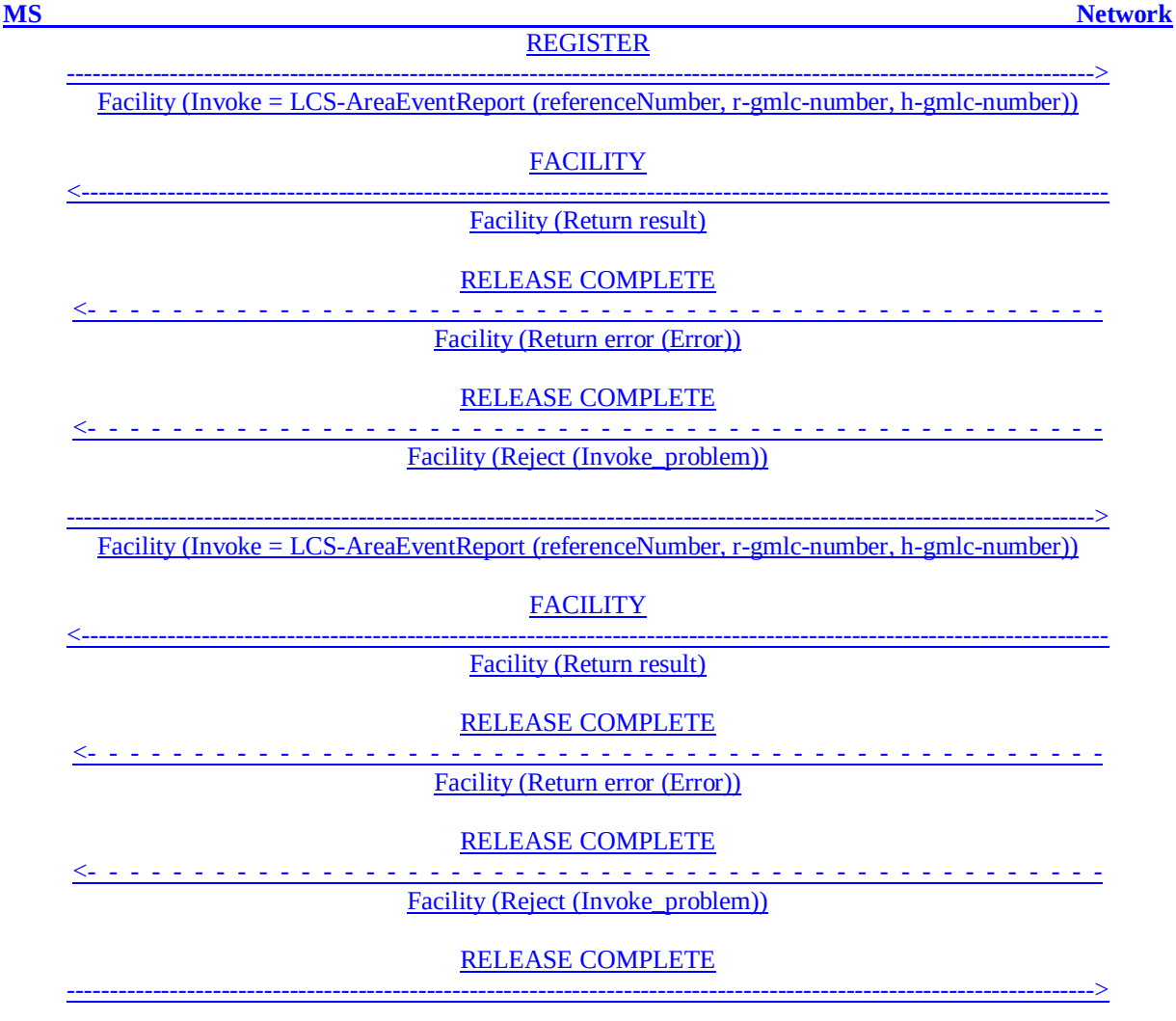

Figure 4.4: Multiple Area Event Reports

4.2.3 Area Event Cancellation

The network invokes a Deferred MT-LR Area Event Cancellation procedure by sending a REGISTER message containing an LCS-Area Event Cancellation invoke component to the MS.

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 3GPP TS 24.080

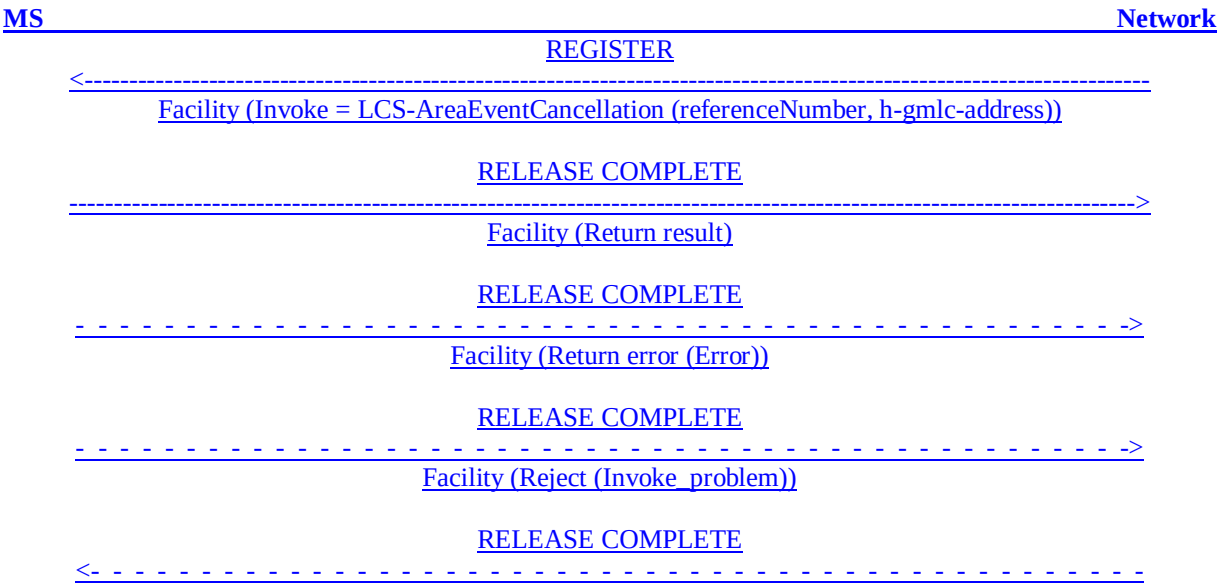

Figure 4.5: Area Event Cancellation

3GPP TSG-CN4 Meeting #21 **Tdoc N4-031345**
Bangkok, Thailand, 27 – 31 October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **24.080** **CR** **031** ⌘ **rev** **2** ⌘ Current version: **5.4.0** ⌘

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

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

Title:	⌘	Deferred MT-LR Area Event
Source:	⌘	CN4
Work item code:	⌘	LCS2
Date:	⌘	31/10/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
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Use one of the following releases:

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R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	SA2 has approved the Deferred MT-LR Area Event concept. This CR, together with the companion CRs, provides the corresponding Stage 3 modifications.
Summary of change:	⌘	Addition of new Area Event Request from network to mobile, Area Event Report from mobile to network and Area Event Cancellation from network to mobile. The ASN.1 module versions have also been updated to version 9 for Rel-6.
Consequences if not approved:	⌘	The functionalities defined at Stage 2 would not be implemented in Stage 3 creating misalignment.

Clauses affected:	⌘	4.2, 4.3.1, 4.4.2, 4.5

Other specs affected:	⌘	Y	N		⌘	
		X		Other core specifications		24.030 CR 014, 29.002 CR 702
			X	Test specifications		
			X	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.

4.2 Operation types

Table 4.1 summarizes the operations defined for supplementary services in this specification and shows which of these operations are call related and call independent. The terms "call related" and "call independent" are defined in TS 24.010.

Table 4.1: Relevance of supplementary service operations

Operation name	Call related SS	Call independent SS
registerSS	-	+
eraseSS	-	+
activateSS	-	+
deactivateSS	-	+
interrogateSS	-	+
registerPassword	-	+
getPassword	-	+
processUnstructuredSS-Data	+	+
forwardCheckSS-Indication	-	+
processUnstructuredSS-Request	-	+
unstructuredSS-Request	-	+
unstructuredSS-Notify	-	+
forwardChargeAdvice	+	-
notifySS	+	-
forwardCUG-Info	+	-
buildMPTY	+	-
holdMPTY	+	-
retrieveMPTY	+	-
splitMPTY	+	-
explicitCT	+	-
accessRegisterCCEntry	+	-
eraseCCEntry	-	+
callDeflection	+	-
userUserService	+	-
lcs-LocationNotification	-	+
lcs-MOLR	-	+
lcs-AreaEventRequest	-	+
lcs-AreaEventReport	-	+
Lcs-AreaEventCancellation	-	+
NOTE: The processUnstructuredSS-Data operation may be used call related by a GSM Phase 1 MS.		

The following ASN.1 module defines operations by allocating them a local value. For the involved operations the same local values as in MAP are allocated.

```
SS-Operations {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Operations (0) version89 (89)}

DEFINITIONS ::=

BEGIN

EXPORTS

-- exports operations

-- operations defined in this specification
processUnstructuredSS-Data, notifySS, forwardChargeAdvice, forwardCUG-Info, buildMPTY, holdMPTY,
retrieveMPTY, splitMPTY, explicitCT, accessRegisterCCEntry, callDeflection, userUserService,
lcs-LocationNotification, lcs-MOLR;

IMPORTS

OPERATION FROM
Remote-Operations-Information-Objects {
    joint-iso-itu-t remote-operations(4)
  informationObjects(5) version1(0)}
```

```
-- The MAP operations:
-- registerSS, eraseSS, activateSS, deactivateSS, interrogateSS, registerPassword,
-- getPassword, processUnstructuredSS-Request, unstructuredSS-Request, unstructuredSS-Notify
-- forwardCheckSS-Indication
-- are imported from MAP-Operations in SS-Protocol module.

-- imports SS-data types
NotifySS-Arg,
ForwardChargeAdviceArg,
ForwardCUG-InfoArg,
SS-UserData,
AccessRegisterCCEntryArg,
CallDeflectionArg,
UserUserServiceArg,
LocationNotificationArg,
LocationNotificationRes,
LCS-MOLRArg,
LCS-MOLRRes,
LCS-AreaEventRequestArg,
LCS-AreaEventReportArg,
LCS-AreaEventCancellationArg

FROM SS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-DataTypes (2) version8 (8)}

-- imports MAP-SS-data types
RegisterCC-EntryRes
FROM MAP-SS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version8 (8)}

-- imports MAP-errors
illegalSS-Operation, ss-ErrorStatus, ss-NotAvailable, ss-SubscriptionViolation,
ss-Incompatibility, systemFailure, facilityNotSupported, callBarred, unexpectedDataValue,
shortTermDenial, longTermDenial, dataMissing, forwardingViolation, forwardingFailed,
positionMethodFailure
FROM MAP-Errors {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-Errors (10) version8 (8)}

-- imports SS-Errors
resourcesNotAvailable, maxNumberOfMPTY-ParticipantsExceeded, deflectionToServedSubscriber,
invalidDeflectedToNumber, specialServiceCode, rejectedByUser, rejectedByNetwork
FROM SS-Errors {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Errors (1) version8 (8)}
;

-- operations definition

processUnstructuredSS-Data  OPERATION ::= { -- Timer T(PUSSD)= 15s to 30s
    ARGUMENT    SS-UserData
    RESULT      SS-UserData
                -- optional
    ERRORS      {
                systemFailure |
                unexpectedDataValue}
    CODE        local:19 }

notifySS    OPERATION ::= {
    ARGUMENT    NotifySS-Arg
    CODE        local:16 }

forwardChargeAdvice     OPERATION ::= { -- Timer T(AoC)= 1s to 40s
    ARGUMENT    ForwardChargeAdviceArg
    RETURN RESULT TRUE
    CODE        local:125 }

forwardCUG-Info     OPERATION ::= {
    ARGUMENT    ForwardCUG-InfoArg
    CODE        local:120 }

buildMPTY   OPERATION ::= { -- Timer T(BuildMPTY)= 5s to 30s
    RETURN RESULT TRUE
    ERRORS  {
            illegalSS-Operation |
            ss-ErrorStatus |
            ss-NotAvailable |
            ss-Incompatibility |
            systemFailure |
```

```
            resourcesNotAvailable |
            maxNumberOfMPTY-ParticipantsExceeded}
    CODE    local:124 }

holdMPTY    OPERATION ::= { -- Timer T(HoldMPTY)= 5s to 30s
    RETURN RESULT TRUE
    ERRORS  {
            illegalSS-Operation |
            ss-ErrorStatus |
            ss-Incompatibility |
            facilityNotSupported |
            systemFailure}
    CODE    local:123 }

retrieveMPTY    OPERATION ::= { -- Timer T(RetrieveMPTY)= 5s to 30s
    RETURN RESULT TRUE
    ERRORS  {
            illegalSS-Operation |
            ss-ErrorStatus |
            ss-Incompatibility |
            facilityNotSupported |
            systemFailure}
    CODE    local:122 }

splitMPTY   OPERATION ::= { -- Timer T(SplitMPTY)= 5s to 30s
    RETURN RESULT TRUE
    ERRORS  {
            illegalSS-Operation |
            ss-ErrorStatus |
            ss-Incompatibility |
            facilityNotSupported |
            systemFailure}
    CODE    local:121 }

explicitCT  OPERATION ::= { -- Timer T(ECT)= 5s to 15s
    RETURN RESULT TRUE
    ERRORS  {
            illegalSS-Operation |
            ss-ErrorStatus |
            ss-NotAvailable |
            ss-Incompatibility |
            facilityNotSupported |
            systemFailure |
            resourcesNotAvailable |
            callBarred}
    CODE    local:126 }

accessRegisterCCEntry    OPERATION ::= { -- Timer T(AccRegCCEntry)= 30s
    ARGUMENT    AccessRegisterCCEntryArg
    RESULT      RegisterCC-EntryRes
    ERRORS      {
                systemFailure |
                dataMissing |
                unexpectedDataValue |
                callBarred |
                illegalSS-Operation |
                ss-ErrorStatus |
                ss-Incompatibility |
                shortTermDenial |
                longTermDenial |
                facilityNotSupported}
    CODE        local:119 }

-- the timer value is defined by T308, see also in TS 24.008 for definition of timer T308

callDeflection  OPERATION ::= { -- Timer T(CD)= 30s
    ARGUMENT    CallDeflectionArg
    RETURN RESULT TRUE
    ERRORS      {
                illegalSS-Operation |
                ss-ErrorStatus |
                ss-NotAvailable |
                ss-Incompatibility |
                facilityNotSupported |
                systemFailure |
                resourcesNotAvailable |
                forwardingViolation |
                callBarred |
                deflectionToServedSubscriber |
                invalidDeflectedToNumber |
                specialServiceCode |
                forwardingFailed}
```

```
    CODE        local:117 }

-- the timer value is defined by T305, see also in TS 24.008 for definition of timer T305
-- extensionContainer shall not be used with this operation

userUserService     OPERATION ::= { -- Timer T(UUS3)= 10s
    ARGUMENT    UserUserServiceArg
    RETURN RESULT TRUE
    ERRORS      {
                illegalSS-Operation |
                ss-ErrorStatus |
                ss-NotAvailable |
                ss-Incompatibility |
                facilityNotSupported |
                systemFailure |
                resourcesNotAvailable |
                rejectedByNetwork |
                rejectedByUser}
    CODE        local:118 }

-- The timer value for UUS3 is 10s; it is applicable only if UUS3 is activated by FACILITY
-- message. If UUS service (UUS1, UUS2 or UUS3) is activated by SETUP message, no timers are
-- needed. In those cases Return Result or Return Error must be received within certain call
-- control messages, see 3GPP TS 24.087.
-- extensionContainer shall not be used with this operation.


lcs-LocationNotification    OPERATION ::= { -- Timer T(LCSN)= 10s to 20s
    ARGUMENT    LocationNotificationArg
    RESULT      LocationNotificationRes
    ERRORS      {
                systemFailure |
                unexpectedDataValue}
    CODE        local:116 }


lcs-MOLR    OPERATION ::= { -- Timer T(LCSL)= 10s to 30s
    ARGUMENT    LCS-MOLRArg
    RESULT      LCS-MOLRRes
    ERRORS      {
                systemFailure |
                unexpectedDataValue |
                dataMissing |
                facilityNotSupported |
                ss-SubscriptionViolation |
                positionMethodFailure}
    CODE        local:115 }


lcs-AreaEventRequest    OPERATION ::= { -- Timer T(LCSN)= 10s to 20s
    ARGUMENT    LCS-AreaEventRequestArg
    RETURN RESULT TRUE
    ERRORS      {
                systemFailure |
                facilityNotSupported |
                unexpectedDataValue}
    CODE        local:xxx }


lcs-AreaEventReport OPERATION ::= { -- Timer T(LCSL)= 10s to 30s
    ARGUMENT    LCS-AreaEventReportArg
    RETURN RESULT TRUE
    ERRORS      {
                systemFailure |
                unexpectedDataValue |
                facilityNotSupported |
    CODE        local:xxx }


lcs-AreaEventCancellation   OPERATION ::= { -- Timer T(LCSN)= 10s to 20s
    ARGUMENT    LCS-AreaEventCancellationArg
    RETURN RESULT TRUE
    ERRORS      {
                systemFailure |
                facilityNotSupported |
                unexpectedDataValue}
    CODE        local:xxx }

END
```

4.2.1 Void

4.2.2 Operations description

For each operation this subclause provides a brief prose description.

4.2.2.1 registerSS (MS --> network)

This operation is invoked by an MS to register data related to a supplementary service in the network. When no BasicService parameter is provided, the registration applies to all provisioned and applicable basic services.

4.2.2.2 eraseSS (MS --> network)

This operation is invoked by an MS to erase data related to a supplementary service in the network. When no BasicService parameter is provided, the erasure applies to all provisioned and applicable basic services.

4.2.2.3 activateSS (MS --> network)

This operation is invoked by an MS to request the network for a supplementary service activation. When no BasicService parameter is provided, the activation applies to all provisioned and applicable basic services.

4.2.2.4 deactivateSS (MS --> network)

This operation is invoked by an MS to request the network for a supplementary service deactivation. When no BasicService parameter is provided, the deactivation applies to all provisioned and applicable basic services.

4.2.2.5 interrogateSS (MS --> network)

This operation is invoked by an MS to request the network for a supplementary service interrogation. When no BasicService parameter is provided, the interrogation applies to all provisioned and applicable basic services.

4.2.2.6 notifySS (network --> MS)

This operation is invoked by the network to forward a supplementary service notification towards a mobile subscriber.

4.2.2.7 registerPassword (MS --> network)

This operation is invoked by an MS to register a new password related to the management by the subscriber himself of subscription data in the HLR. The operation "Register password" will be successful if the subscriber can provide the old password, the new password and the new password again as results of 3 subsequent operations "Get password".

4.2.2.8 getPassword (network --> MS)

This operation is invoked by the network to request a password from the mobile subscriber. It may be used to allow the registration of a new password or the management of subscription data by the subscriber himself (e.g. modification of call barring activation status).

4.2.2.9 processUnstructuredSS-Data (MS --> network)

This operation is invoked by an MS to relay unstructured information in order to allow end to end SS operation between the MS and the network following specific rules (e.g. embedding of keypad commands). The operation is used in order to provide backward compatibility (see TS 24.090).

4.2.2.10 processUnstructuredSS-Request (MS --> network)

This operation is invoked by an MS to start an unstructured supplementary service data application in the network.

4.2.2.11 unstructuredSS-Request (network --> MS)

This operation is invoked by the network to request unstructured information from the MS in order to perform an unstructured supplementary service data application.

4.2.2.12 unstructuredSS-Notify (network --> MS)

This operation is invoked by the network to give an unstructured supplementary service notification to the mobile user.

4.2.2.13 forwardCheckSSIndication (network --> MS)

This operation is invoked by the network to indicate to the mobile subscriber that the status of supplementary services may not be correct in the network. The procedures for initiating ForwardCheckSSIndication are specified in TS 29.002.

4.2.2.14 forwardChargeAdvice (network --> MS)

This operation is invoked by the network to forward Advice of Charge information to the mobile subscriber.

4.2.2.15 buildMPTY (MS --> network)

This operation is invoked by an MS to request the network to connect calls in a multi party call.

4.2.2.16 holdMPTY (MS --> network)

This operation is invoked by an MS to put the MS-connection to a multi party call (invoked by that MS) on hold.

4.2.2.17 retrieveMPTY (MS --> network)

This operation is invoked by an MS to request retrieval of a multi party call held by that MS.

4.2.2.18 splitMPTY (MS --> network)

This operation is invoked by an MS to request a private communication with one of the remote parties in a multi party call invoked by that MS.

4.2.2.19 forwardCUG-Info (MS --> network)

This operation is used by an MS to explicitly invoke a CUG call.

4.2.2.20 explicitCT (MS --> Network)

This operation is invoked by an MS to request the network to connect the two calls of the subscriber.

4.2.2.21 accessRegisterCCEntry (MS --> Network)

This operation is invoked by an MS to activate a CCBS request in the network.

4.2.2.22 callDeflection (MS --> Network)

This operation is invoked by an MS to request the network to deflect the incoming call to a specified destination.

4.2.2.23 userUserService (MS --> Network, Network --> MS)

This operation is invoked by an MS to request the network to allow an MS to send/receive information to/from another subscriber in association with a call.

4.2.2.24 lcs-LocationNotification (network --> MS)

This operation is invoked by the network to request a verification from the mobile subscriber for the attempted location request or to notify the subscriber about authorized location request.

4.2.2.25 lcs-MOLR (MS --> Network)

This operation is invoked by an MS to request the network to start location procedure, which is used to provide the MS location estimate, location assistance data or deciphering keys for broadcast assistance data.

4.2.2.26 lcs-AreaEventRequest (network --> MS)

This operation is invoked by the network to request a mobile to start the deferred MT-LR Area Event procedure.

4.2.2.27 lcs-AreaEventReport (MS --> network)

This operation is invoked by an MS to respond that the requested Area Event has occurred.

4.2.2.28 lcs-AreaEventCancellation (network --> MS)

This operation is invoked by the network to request a mobile to cancel the deferred MT-LR Area Event procedure.

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

4.3.1 Errors ASN.1 specification

The following ASN.1 module provides an ASN.1 specification of errors. Errors from MAP are imported in the SS-Protocol module in subclause 4.5. The module defines errors by allocating them a local value. For the involved errors the same local values as in MAP are allocated.

```
SS-Errors {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Errors (1) version~~8~~9 (~~8~~9)}

DEFINITIONS ::=

BEGIN

IMPORTS

ERROR FROM
Remote-Operations-Information-Objects {joint-iso-itu-t remote-operations(4)
  informationObjects(5) version1(0)};

-- The MAP errors
-- unknownSubscriber, bearerServiceNotProvisioned, teleserviceNotProvisioned,
-- illegalSS-Operation, ss-ErrorStatus, ss-NotAvailable, ss-SubscriptionViolation,
-- ss-Incompatibility, systemFailure, dataMissing, unexpectedDataValue, facilityNotSupported,
-- pw-RegistrationFailure, negativePW-Check, callBarred, numberOfPW-AttemptsViolation,
-- absentSubscriber, illegalSubscriber, illegalEquipment, ussd-Busy, unknownAlphabet,
-- forwardingViolation, forwardingFailed
-- are imported from MAP-Errors in SS-Protocol module.

-- errors definition
resourcesNotAvailable  ERROR ::= {
    CODE    local:127 }
maxNumberOfMPTY-ParticipantsExceeded  ERROR ::= {
    CODE    local:126 }
invalidDeflectedToNumber  ERROR ::= {
```

```
    CODE    local:125 }
specialServiceCode  ERROR ::= {
    CODE    local:124 }
deflectionToServedSubscriber  ERROR ::= {
    CODE    local:123 }
rejectedByNetwork  ERROR ::= {
    CODE    local:122 }
rejectedByUser  ERROR ::= {
    CODE    local:121 }

END
```

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

4.4.2 ASN.1 data types

This subclause provides an ASN.1 module defining the abstract data types in operations and errors specification. Only data types which are specific for this specification are defined. All other data types are imported from MAP together with the import of operations and errors.

```
SS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-DataTypes (2) version~~8~~9 (~~8~~9)}

DEFINITIONS

IMPLICIT TAGS ::=

BEGIN

-- exports all data types defined in this module

IMPORTS

SS-Code
FROM MAP-SS-Code {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-Code (15) version~~8~~9 (~~8~~9)}

-- imports MAP-SS-DataTypes
SS-Status, USSD-DataCodingScheme, USSD-String, CCBS-Feature
-- USSD-DataCodingScheme, USSD-String were introduced because of CNAP.
FROM MAP-SS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-DataTypes (14) version~~8~~9 (~~8~~9)}

GSN-Address,
CUG-Index,
NotificationToMSUser
FROM MAP-MS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-MS-DataTypes (11) version~~8~~9 (~~8~~9)}

maxSignalInfoLength,
ISDN-AddressString,
ISDN-SubaddressString,
AlertingPattern,
LCSClientExternalID,
AddressString,
LCSServiceTypeID
FROM MAP-CommonDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-CommonDataTypes (18) version~~8~~9 (~~8~~9)}

LocationType,
DeferredLocationEventType,
LCSClientName,
LCS-QoS,
Horizontal-Accuracy,
ResponseTime,
Ext-GeographicalInformation,
SupportedGADShapes,
Add-GeographicalInformation,
LCSRequestorID,
```

```
    LCS-ReferenceNumber,
    LCSCodeword,
    AreaEventInfo
    FROM MAP-LCS-DataTypes {
       itu-t identified-organization (4) etsi (0) mobileDomain (0)
       gsm-Network (1) modules (3) map-LCS-DataTypes (25) version8 (8)}

    ;

    -- data types definition

    SS-UserData ::= IA5String (SIZE (1.. maxSignalInfoLength))

    NotifySS-Arg ::= SEQUENCE{
        ss-Code                     [1]     SS-Code OPTIONAL,
        ss-Status                   [4]     SS-Status OPTIONAL,
        ss-Notification             [5]     SS-Notification OPTIONAL,
        callIsWaiting-Indicator     [14]    NULL OPTIONAL,
        callOnHold-Indicator        [15]    CallOnHold-Indicator OPTIONAL,
        mpty-Indicator              [16]    NULL OPTIONAL,
        cug-Index                   [17]    CUG-Index OPTIONAL,
        clirSuppressionRejected     [18]    NULL OPTIONAL,
        ... ,
        ect-Indicator               [19]    ECT-Indicator OPTIONAL,
        nameIndicator               [20]    NameIndicator OPTIONAL,
        ccbs-Feature                [21]    CCBS-Feature OPTIONAL,
        alertingPattern             [22]    AlertingPattern OPTIONAL,
        multicall-Indicator         [23]    Multicall-Indicator OPTIONAL}

    --  The nameIndicator is defined because of CNAP.

    Multicall-Indicator ::= ENUMERATED {
            nbr-SNexceeded (0),
            nbr-Userexceeded (1)}

    ForwardChargeAdviceArg ::= SEQUENCE{
        ss-Code                     [0]     SS-Code,
        chargingInformation         [1]     ChargingInformation,
        ...}

    SS-Notification ::= OCTET STRING (SIZE (1))

    --    Bit 8 7 6 5 4 00000 (Unused)

    --  Bit 3   Call is forwarded indication to A-subscriber
    --      (calling subscriber)
    --  0   No information content
    --  1   Outgoing call has been forwarded to C

    --  Bit 2   Call is forwarded indication to B-subscriber
    --      (forwarding subscriber)
    --  0   No information content
    --  1   Incoming call has been forwarded to C

    --  Bit 1   Call is forwarded indication to C-subscriber
    --      (forwarded-to subscriber)
    --  0   No information content
    --  1   Incoming call is a forwarded call

    ChargingInformation ::= SEQUENCE{
        e1  [1] E1 OPTIONAL,
        e2  [2] E2 OPTIONAL,
        e3  [3] E3 OPTIONAL,
        e4  [4] E4 OPTIONAL,
        e5  [5] E5 OPTIONAL,
        e6  [6] E6 OPTIONAL,
        e7  [7] E7 OPTIONAL,
        ...}

    E1 ::= INTEGER (0..max10TimesUnitsPerTime)
    max10TimesUnitsPerTime INTEGER ::= 8191

    E2 ::= INTEGER (0..max10TimesTimeInterval)
    max10TimesTimeInterval INTEGER ::= 8191

    E3 ::= INTEGER (0..max100TimesScalingFactor)
    max100TimesScalingFactor INTEGER ::= 8191

    E4 ::= INTEGER (0..max10TimesIncrement)
    max10TimesIncrement INTEGER ::= 8191

    E5 ::= INTEGER (0..max10TimesIncrementPerDataInterval)
```

```
max10TimesIncrementPerDataInterval INTEGER ::= 8191

E6 ::= INTEGER (0..maxNumberOfSegmentsPerDataInterval)
maxNumberOfSegmentsPerDataInterval INTEGER ::= 8191

E7 ::= INTEGER (0..max10TimesInitialTime)
max10TimesInitialTime INTEGER ::= 8191

CallOnHold-Indicator    ::= ENUMERATED {
            callRetrieved (0),
            callOnHold (1)}

ForwardCUG-InfoArg ::= SEQUENCE {
    cug-Index           [0] CUG-Index OPTIONAL,
    suppressPrefCUG     [1] NULL OPTIONAL,
    suppressOA          [2] NULL OPTIONAL,
    ...}

ECT-Indicator   ::= SEQUENCE {
    ect-CallState       [0] ECT-CallState,
    rdn [1] RDN OPTIONAL,
    ...}

ECT-CallState   ::= ENUMERATED {
        alerting (0),
        active (1)}

    NameIndicator ::= SEQUENCE {
        callingName     [0] Name OPTIONAL,
        ...}

    Name ::= CHOICE {
        namePresentationAllowed     [0] NameSet,
        presentationRestricted      [1] NULL,
        nameUnavailable             [2] NULL,
        namePresentationRestricted  [3] NameSet}

    NameSet ::= SEQUENCE {
        dataCodingScheme        [0] USSD-DataCodingScheme,
        lengthInCharacters      [1] INTEGER,
        nameString              [2] USSD-String,
        ...}

-- NameIndicator, Name and NameSet are defined because of CNAP.
-- 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|

RDN ::= CHOICE {
    presentationAllowedAddress              [0] RemotePartyNumber,
    presentationRestricted                  [1] NULL,
    numberNotAvailableDueToInterworking     [2] NULL,
    presentationRestrictedAddress           [3] RemotePartyNumber}

RemotePartyNumber   ::= SEQUENCE {
    partyNumber             [0] ISDN-AddressString,
    partyNumberSubaddress   [1] ISDN-SubaddressString OPTIONAL,
    ...}

AccessRegisterCCEntryArg    ::= SEQUENCE {
    ...}

CallDeflectionArg   ::= SEQUENCE {
    deflectedToNumber       [0] AddressString,
    deflectedToSubaddress   [1] ISDN-SubaddressString OPTIONAL,
    ...}

UserUserServiceArg ::= SEQUENCE {
    uUS-Service     [0] UUS-Service,
    uUS-Required    [1] BOOLEAN,
    ... }

UUS-Service ::= ENUMERATED {
    uUS1 (1),
    uUS2 (2),
    uUS3 (3),
    ... }

-- exception handling:
-- In case of UUS-Service with any other value, indicated as "UUS required",
-- but not understood by the MS, the call will be cleared.
```

```
LocationNotificationArg ::= SEQUENCE {
    notificationType    [0] NotificationToMSUser,
    locationType        [1] LocationType,
    lcsClientExternalID [2] LCSClientExternalID     OPTIONAL,
    lcsClientName       [3] LCSClientName           OPTIONAL,
    ... ,
    lcsRequestorID      [4] LCSRequestorID          OPTIONAL,
    lcsCodeword         [5] LCSCodeword             OPTIONAL,
    lcsServiceTypeID    [6] LCSServiceTypeID        OPTIONAL }
-- exception handling:
-- At reception of an unrecognised notificationType value the receiver shall reject the
-- operation with a return error cause of unexpected data value.
-- At reception of an unrecognised locationType value the receiver shall reject the
-- operation with a return error cause of unexpected data value.


LocationNotificationRes ::= SEQUENCE {
    verificationResponse        [0] VerificationResponse OPTIONAL,
    ...}

VerificationResponse::= ENUMERATED {
    permissionDenied    (0),
    permissionGranted   (1),
    ... }

-- exception handling:
-- an unrecognized value shall be treated the same as value 0 (permissionDenied)

LCS-MOLRArg ::= SEQUENCE {
    molr-Type           [0] MOLR-Type,
    locationMethod      [1] LocationMethod          OPTIONAL,
    lcs-QoS             [2] LCS-QoS                 OPTIONAL,
    lcsClientExternalID [3] LCSClientExternalID     OPTIONAL,
    mlc-Number          [4] ISDN-AddressString      OPTIONAL,
    gpsAssistanceData   [5] GPSAssistanceData       OPTIONAL,
    ...,
    supportedGADShapes  [6] SupportedGADShapes      OPTIONAL}
-- The parameter locationMethod shall be included if and only if the molr-Type is set to value
-- deCipheringKeys or assistanceData.
-- The parameter gpsAssistanceData shall be included if and only if the molr-Type is set to value
-- assistanceData and locationMethod is set to value assistedGPS.

MOLR-Type::= ENUMERATED {
    locationEstimate            (0),
    assistanceData              (1),
    deCipheringKeys             (2),
    ... }
-- exception handling:
-- an unrecognized value shall be rejected by the receiver with a return error cause of
-- unexpected data value.

LocationMethod::= ENUMERATED {
    msBasedEOTD         (0),
    msAssistedEOTD      (1),
    assistedGPS         (2),
    ...,
    msBasedOTDOA        (3)
    }
-- exception handling:
-- When this parameter is received with value msBasedEOTD or msAssistedEOTD and the MS
-- is camped on an UMTS Service Area then the receiver shall reject it
-- with a return error cause of unexpected data value.
-- When this parameter is received with value msBasedOTDOA and the MS
-- is camped on a GSM Cell then the receiver shall reject it with a return error cause of
-- unexpected data value.
-- an unrecognized value shall be rejected by the receiver with a return error cause of
-- unexpected data value.

GPSAssistanceData::= OCTET STRING (SIZE (1..38))
-- Octets 1 to 38 are coded in the same way as the octets 3 to 7+2n of Requested GPS Data IE
-- in 3GPP TS 49.031.

LCS-MOLRRes::= SEQUENCE {
    locationEstimate        [0] Ext-GeographicalInformation     OPTIONAL,
    decipheringKeys         [1] DecipheringKeys                 OPTIONAL,
    ...,
    add-LocationEstimate    [2] Add-GeographicalInformation         OPTIONAL}
-- Parameters locationEstimate or add-LocationEstimate (one but not both)
-- shall be included if and only if the
-- molr-Type in LocationRequestArg was set to value locationEstimate.
-- Parameter add-LocationEstimate shall not be included if the supportedGADShapes
```

```
-- parameter was not received in the LCS-MOLRArg.
-- The locationEstimate and the add-locationEstimate parameters shall not be sent if
-- the supportedGADShapes parameter has been received in LCS-MOLRArg
-- and the shape encoded in locationEstimate or add-LocationEstimate is not marked
-- as supported in supportedGADShapes. In such a case LCS-MOLRArg
-- shall be rejected with error FacilityNotSupported with additional indication
-- shapeOfLocationEstimateNotSupported.
-- Parameter decipheringKeys shall be included if and only if the molr-Type
-- in LocationRequestArg was set to value deCipheringKeys.


DecipheringKeys::= OCTET STRING (SIZE (15))
-- Octets in DecipheringKeys are coded in the same way as the octets 3 to 17 of Deciphering Key IE
-- in 3GPP TS 49.031. I.e. these octets contain Current Deciphering Key, Next Deciphering Key and
-- Ciphering Key Flag.

LCS-AreaEventRequestArg ::= SEQUENCE {
    referenceNumber             [0] LCS-ReferenceNumber,
    h-gmlc-address              [1] GSN-Address,
    r-gmlc-address              [2] GSN-Address             OPTIONAL,
    deferredLocationEventType   [3] DeferredLocationEventType,
    areaEventInfo               [4] AreaEventInfo,
    ... }

-- the msAvailableValue in the DeferredLocationEventType is not applicable for this procedure

LCS-AreaEventReportArg  ::= SEQUENCE {
    referenceNumber             [0] LCS-ReferenceNumber,
    h-gmlc-address              [1] GSN-Address,
    r-gmlc-address              [2] GSN-Address             OPTIONAL,
    ... }

LCS-AreaEventCancellationArg    ::= SEQUENCE {
    referenceNumber             [0] LCS-ReferenceNumber,
    h-gmlc-address              [1] GSN-Address,
    ... }

END
```

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

4.5 Operations and errors implementation

For the actual implementation of supplementary services, operations and errors have to be defined by value. The following ASN.1 module, imports operation from the ASN.1 module described in subclause 4.2 and operations and errors from MAP.

```
SS-Protocol {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Access (2) modules (3) ss-Protocol (3) version~~8~~9 (~~8~~9)}

DEFINITIONS ::=

BEGIN

IMPORTS

OPERATION
FROM Remote-Operations-Information-Objects {
   joint-iso-itu-t remote-operations(4) informationObjects(5) version1(0)}

-- imports operations

-- imports operation from MAP-MobileServiceOperations
forwardCheckSS-Indication
FROM MAP-MobileServiceOperations {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-MobileServiceOperations (5) version~~8~~9 (~~8~~9)}

-- imports operations from MAP-SupplementaryServiceOperations
registerSS, eraseSS, activateSS, deactivateSS, interrogateSS, registerPassword, getPassword,
processUnstructuredSS-Request, unstructuredSS-Request, unstructuredSS-Notify, eraseCC-Entry
FROM MAP-SupplementaryServiceOperations {
```

```
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SupplementaryServiceOperations (8) version8 (8)}

-- imports operations from SS-Operations
processUnstructuredSS-Data, notifySS, forwardChargeAdvice, buildMPTY, holdMPTY, retrieveMPTY,
splitMPTY, explicitCT, forwardCUG-Info, accessRegisterCCEntry, callDeflection, userUserService,
lcs-LocationNotification, lcs-MOLR
FROM SS-Operations {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Operations (0) version8 (8)}

;

Supported-SS-Operations OPERATION ::= {forwardCheckSS-Indication | registerSS | eraseSS |
    activateSS | deactivateSS | interrogateSS | registerPassword | getPassword |
    processUnstructuredSS-Request | unstructuredSS-Request | unstructuredSS-Notify | eraseCC-Entry |
    processUnstructuredSS-Data | notifySS | forwardChargeAdvice | buildMPTY | holdMPTY |
    retrieveMPTY | splitMPTY | explicitCT | forwardCUG-Info | accessRegisterCCEntry |
    callDeflection | userUserService | lcs-LocationNotification | lcs-MOLR | lcs-AreaEventRequest |
    lcs-AreaEventReport | lcs-AreaEventCancellation}


END
```

3GPP TSG CN WG4 Meeting #21 **N4-031108**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **679** ⌘ **rev** **-** ⌘ Current version: **6.3.0** ⌘

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

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

Title:	⌘	Modification of description for conditions on inclusion of Positioning Data
Source:	⌘	CN4
Work item code:	⌘	LCS2
Date:	⌘	10/09/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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

Reason for change:	⌘	Following CN4 #20, CR674 to 29.002 was approved by e-mail. However, during that approval, some minor comments were made relating to aspects of that change that could be handled better or clarified. This CR is intended to address those points. The comments related mostly to the value of the discriminator used in UTRAN. In 25.413 there is a statement that says that the discriminator has a value of 0000 if positioning methods are included in Positioning Data, and that a different value of the discriminator implies that no methods are included. This would seem to imply that the Positioning Data Parameter in MAP could also carry no positioning methods and so the minimum length of the parameter defined in the ASN.1 should be 1 (as opposed to the value that is currently set as 2). However, given that the parameter is only useful to the GMLC if there is at least one positioning method included, it is better to state that for discriminator values not defined in RAN specs (be that GERAN or UTRAN) or where no positioning method information is included by the RAN, the parameter is excluded from MAP messages.
Summary of change:	⌘	The conditions for inclusion of Positioning Data in MAP messages are added
Consequences if not approved:	⌘	Misalignment between RAN and CN specifications. Positioning Data may be included in messages when it contains no information.

Clauses affected:	⌘	7.6.11.11A

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	

	X	O&M Specifications

Other comments: ⌘

How to create CRs using this form:

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

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

13A.2.3 Parameter Definition and Use

…

Positioning Data

This parameter indicates the usage of each positioning method that was attempted to determine the location estimate either successfully or unsuccessfully. If Positioning Data received from the RAN contains no Positioning Methods, Positioning Data is excluded from the MAP message.

****** *Next Changed Section* ******

13A.3.3 Parameter Definition and Use

…

Positioning Data

This parameter indicates the usage of each positioning method that was attempted to determine the location estimate either successfully or unsuccessfully. If Positioning Data received from the RAN contains no Positioning Methods, Positioning Data is excluded from the MAP message.

3GPP TSG CN WG4 Meeting #21 **N4-031372**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **680** ⌘**rev** **2** ⌘ Current version: **6.3.0** ⌘

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

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

Title:	⌘	Addition of CGI to LCS procedures
Source:	⌘	CN4
Work item code:	⌘	LCS2
Date:	⌘	29/09/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The current 3GPP specifications do not allow the option of sending the serving cell id of the originating MS. In North America this information (serving cell id) is required to be passed to the emergency centers (PSAPs) as part of the FCC E911 phase 1 mandate. The cell id is needed because the NA-ESRD (which is used to provide the phase1 information) is not always sent by the MSC to GMLC, and if an NA-ESRK is sent, the GMLC only has the phase2 information and not phase1 information (cell id or ESRD). This is an essential correction.
Summary of change:	⌘	A new optional paramater (Cell ID) is added.
Consequences if not approved:	⌘	Emergency Call Location Information will not be available to phase 1 PSAPs.

Clauses affected:	⌘	7.6.11.22, 13A.2, 13A.3, 17.7.13

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.271 CR 226
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

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

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

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

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

7.6.11.22 ~~7.6.11.22 Void~~Cell Id Or SAI

For GERAN access, t~~T~~his parameter contains the Global Cell Identifier for the cell that the subscriber is currently attached to. For UTRAN access, this parameter contains the Service Area Identifier for the cell that the subscriber is currently attached to.

****** *Next Changed Section* ******

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(=)		
LCS-Reference Number	C	C(=)		
LCS Codeword	C	C(=)		
LCS Service Type Id	C	C(=)		
LCS Privacy Check	C	C(=)		
Location Estimate			M	M(=)
Positioning Data			C	C(=)
Age of Location Estimate			C	C(=)
Additional Location Estimate			C	C(=)
Deferred MT-LR Response Indicator			C	C(=)
Cell Id Or SAI			C	C(=)
User error			C	C(=)
Provider error				O

13A.2.3 Parameter Definition and Use

All parameters are defined in clause 7.6. The use of these parameters and the requirements for their presence are specified in. 3GPP 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 3GPP TS 23.032 [122] are supported.

LCS-Reference Number

This parameter shall be included if a deferred mt-lr procedure is performed.

LCS Codeword

See definition in clause 7.6.11.18. The requirements for its presence are specified in 3GPP TS 23.271 [26a].

LCS Service Type Id

See definition in clause 7.6.11.15. The requirements for its presence are specified in 3GPP TS 23.271 [26a].

LCS Privacy Check

See definition in clause 7.6.11. The requirements for its and its components presence are specified in 3GPP TS 23.271 [26a].

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.

Positioning Data

This parameter indicates the usage of each positioning method that was attempted to determine the location estimate either successfully or unsuccessfully.

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 clause 7.6.11.2.

Cell Id Or SAI

For GERAN access, t~~T~~his parameter indicates Global Cell Identifier of the cell that the served subscriber is currently attached to. For UTRAN access, this parameter contains the Service Area Identifier for the cell that the subscriber is currently attached to. This parameter is included only for North American Emergency Calls as described in 3GPP TS 23.271 [26a].

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 clause 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 clause 7.6.1.

****** *Next Changed Section* ******

13A.3MAP-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(=)	C	C(=)
IMEI	U	C(=)		
Location Estimate	C	C(=)		
Positioning Data	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(=)		
LCS-Reference Number	C	C(=)		
NA-ESRK Request	C	C(=)		
Cell Id Or SAI	C	C(=)		
User error			C	C(=)
Provider error				O

13A.3.3 Parameter Definition and Use

All parameters are defined in clause 7.6. The use of these parameters and the requirements for their presence are specified in. 3GPP TS 23.271 [26a].

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 clause 7.6.2. This parameter provides the address of the 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.

If the target MS has originated an emergency service call in North America and NA-ESRK Request is included in Subscriber_Location_Report-Arg, NA-ESRK may also be included in the response to the MSC, see 3GPP TS 23.271 [26a].

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.

Positioning Data

This parameter indicates the usage of each positioning method that was attempted to determine the location estimate either successfully or unsuccessfully.

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 clause 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 clause 7.6.11.3.

LCS-Reference Number

This parameter shall be included if the Subscriber Location Report is the reponse to a deferred MT location request.

NA-ESRK Request

If the target MS has originated an emergency service call in North America, NA-ESRK Request may be included to indicate that the MSC is able to accept NA-ESRK in the Response message, see section 7.6.11.19.

Cell Id Or SAI

For GERAN access, t~~T~~his parameter indicates Global Cell Identifier of the cell that the served subscriber is currently attached to. For UTRAN access, this parameter contains the Service Area Identifier for the cell that the subscriber is currently attached to. This parameter is included only for North American Emergency Calls as described in 3GPP TS 23.271 [26a].

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 clause 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 clause 7.6.1.

******* Next Changed Section *******

17.7.13 Location service data types

```
MAP-LCS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LCS-DataTypes (25) version9 (9)}

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,
   LCSRequestorID,
   LCSCodeword
;

IMPORTS
   AddressString,
   ISDN-AddressString,
   IMEI,
   IMSI,
   LMSI,
   SubscriberIdentity,
   AgeOfLocationInformation,
   LCSClientExternalID,
   LCSClientInternalID,
   LCSServiceTypeID,
   GlobalCellIdOrServiceAreaIdOrLAI
FROM MAP-CommonDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version9 (9)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version9 (9)}

   USSD-DataCodingScheme,
   USSD-String
FROM MAP-SS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-DataTypes (14) version9 (9)}

   APN,
   GSN-Address,
   SupportedLCS-CapabilitySets
FROM MAP-MS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version9 (9)}

   Additional-Number
FROM MAP-SM-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SM-DataTypes (16) version9 (9)}
;
```

```
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,
     ...,
     v-gmlc-Address                    [3]  GSN-Address                OPTIONAL,
     h-gmlc-Address                    [4]  GSN-Address                OPTIONAL,
     ppr-Address                       [5]  GSN-Address                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,
     supportedLCS-CapabilitySets       [4]  SupportedLCS-CapabilitySets  OPTIONAL,
     additional-LCS-CapabilitySets     [5]  SupportedLCS-CapabilitySets  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,
     lcs-ReferenceNumber               [10] LCS-ReferenceNumber        OPTIONAL,
     lcsServiceTypeID                  [11] LCSServiceTypeID           OPTIONAL,
     lcsCodeword                       [12] LCSCodeword                OPTIONAL,
     lcs-PrivacyCheck                  [13] LCS-PrivacyCheck           OPTIONAL }

     -- one of imsi or msisdn is mandatory
     -- If a location estimate type indicates activate deferred location or cancel deferred
     -- location, a lcs-Reference number shall be included.
```

```
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,
     lcsRequestorID                    [6] LCSRequestorID              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,
     ...,
     lcs-FormatIndicator                [3] LCS-FormatIndicator          OPTIONAL }

-- 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
```

```
LCSRequestorID ::= SEQUENCE {
     dataCodingScheme                   [0] USSD-DataCodingScheme,
     requestorIDString                  [1] RequestorIDString,
     ...,
     lcs-FormatIndicator                [2] LCS-FormatIndicator          OPTIONAL }
```

```
RequestorIDString ::= USSD-String (SIZE (1..maxRequestorIDStringLength))
```

```
maxRequestorIDStringLength  INTEGER ::= 63
```

```
LCS-FormatIndicator ::= ENUMERATED {
     logicalName                        (0),
     e-mailAddress                      (1),
     msisdn                             (2),
     url                                (3),
     sipUrl                             (4),
     ... }
```

```
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 3GPP 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 3GPP 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 3GPP TS 23.032 it supports.
-- exception handling: bits 7 to 15 shall be ignored if received.
```

```
LCS-ReferenceNumber::= OCTET STRING (SIZE(1))
```

```
LCSCodeword ::= SEQUENCE {
     dataCodingScheme                    [0] USSD-DataCodingScheme,
     lcsCodewordString                   [1] LCSCodewordString,
     ...}
```

```
LCSCodewordString ::= USSD-String (SIZE (1..maxLCSCodewordStringLength))
```

```
maxLCSCodewordStringLength  INTEGER ::= 20
```

```
LCS-PrivacyCheck ::= SEQUENCE {
     callSessionUnrelated                [0] PrivacyCheckRelatedAction,
     callSessionRelated                  [1] PrivacyCheckRelatedAction     OPTIONAL,
     ...}
```

```
PrivacyCheckRelatedAction ::= ENUMERATED {
     allowedWithoutNotification (0),
     allowedWithNotification (1),
     allowedIfNoResponse (2),
     restrictedIfNoResponse (3),
     notAllowed (4),
     ...}
--   exception handling:
--   a ProvideSubscriberLocation-Arg containing an unrecognized PrivacyCheckRelatedAction
--   shall be rejected by the receiver with a return error cause of unexpected data value
```

```
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,
     positioningData                     [4] PositioningDataInformation    OPTIONAL,
     cellIdOrSai                         [5] GlobalCellIdOrServiceAreaIdOrLAI   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
-- The locationEstimate and the add-locationEstimate parameters shall not be sent if
-- the supportedGADShapes parameter has been received in ProvideSubscriberLocation-Arg
-- and the shape encoded in locationEstimate or add-LocationEstimate is not marked
-- as supported in supportedGADShapes. In such a case ProvideSubscriberLocation
-- shall be rejected with error FacilityNotSupported with additional indication
-- shapeOfLocationEstimateNotSupported
```

```
Ext-GeographicalInformation ::= OCTET STRING (SIZE (1..maxExt-GeographicalInformation))
    -- Refers to geographical Information defined in 3GPP TS 23.032.
    -- This is composed of 1 or more octets with an internal structure according to
    -- 3GPP TS 23.032
    -- Octet 1: Type of shape, only the following shapes in 3GPP 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 3GPP 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 3GPP TS 23.032 to be included in later
    -- versions of 3GPP TS 29.002
```

```
PositioningDataInformation ::= OCTET STRING (SIZE (2..maxPositioningDataInformation))
    -- Refers to the Positioning Data defined in 3GPP TS 49.031 for GERAN or 3GPP TS 25.413
    -- for UTRAN.
    -- This is composed of 2 or more octets with an internal structure according to
    -- 3GPP TS 49.031 for GERAN and 25.413 for UTRAN. Note that the internal structure
    -- of the parameter is identical for GERAN and UTRAN, but the defined code points differ
    -- for GERAN and UTRAN to allow for Radio Technology specific location methods.
```

```
maxPositioningDataInformation INTEGER ::= 10
    --
```

```
Add-GeographicalInformation ::= OCTET STRING (SIZE (1..maxAdd-GeographicalInformation))
    -- Refers to geographical Information defined in 3GPP TS 23.032.
    -- This is composed of 1 or more octets with an internal structure according to
    -- 3GPP TS 23.032
    -- Octet 1: Type of shape, all the shapes defined in 3GPP TS 23.032 are allowed:
    -- Octets 2 to n (where n is the total number of octets necessary to encode the shape
    -- according to 3GPP TS 23.032) are used to encode the shape itself in accordance with
```

```
the
     -- encoding defined in 3GPP 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
     -- 3GPP TS 23.032 or an incorrect number of octets or coding according to
     -- 3GPP 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 ::= 91
     -- the maximum length allows support for all the shapes currently defined in 3GPP 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,
     lcs-ReferenceNumber                [10] LCS-ReferenceNumber          OPTIONAL,
     positioningData                    [11] PositioningDataInformation   OPTIONAL,
     na-ESRK-Request                    [12] NULL                         OPTIONAL,
     cellIdOrSai                        [13] GlobalCellIdOrServiceAreaIdOrLAI  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.
     -- if the lcs-Event indicates a deferredmt-lrResponse then the locationEstimate
     -- and the add-locationEstimate parameters shall not be sent if the
     -- supportedGADShapes parameter had been received in ProvideSubscriberLocation-Arg
     -- and the shape encoded in locationEstimate or add-LocationEstimate was not marked
     -- as supported in supportedGADShapes. In such a case terminationCause
     -- in deferredmt-lrData shall be present with value
     -- shapeOfLocationEstimateNotSupported.
     -- If a lcs event indicates deferred mt-lr response, the lcs-Reference number shall be
     -- included.
```

```
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),
     ...,
     shapeOfLocationEstimateNotSupported (6) }
-- 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 deregistered due to a Cancel Location received from HLR.
--
-- exception handling
-- an unrecognized value shall be treated the same as value 1 (errorundefined)
```

```
SubscriberLocationReport-Res ::= SEQUENCE {
     extensionContainer                  ExtensionContainer               OPTIONAL,
     ...,
     na-ESRK                             [0] ISDN-AddressString           OPTIONAL }
```

```
END
```

3GPP TSG CN WG4 Meeting #21 **N4-031373**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **696** ⌘ **rev** **2** ⌘ Current version: **6.3.0** ⌘

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

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

Title:	⌘	Include v-gmlc parameter in RESTORE DATA MAP message
Source:	⌘	CN4
Work item code:	⌘	LCS2
Date:	⌘	30/10/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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

Reason for change:	⌘	MSC/VLR should be possible to inform HLR about the V-GMLC IP address also in RESTORE DATA message apart from LOCATION UPDATE.
Summary of change:	⌘	The information regarding the V-GMLC address that is transferred from VLR to HLR via the MAP operation UPDATE LOCATION shall be also transferred via the RESTORE DATA operation.
Consequences if not approved:	⌘	HLR will not be updated with the correct data until the next LOCATION UPDATE is received, which may take some time.

Clauses affected:	⌘	8.10.3.2, 8.10.3.3, 17.7

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.271 CR S2-033677
			X	Test specifications		
			X	O&M Specifications		

Other comments: ⌘

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

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

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

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

8.10.3 MAP_RESTORE_DATA service

8.10.3.1 Definition

This service is invoked by the VLR on receipt of a MAP_PROVIDE_ROAMING_NUMBER indication for an unknown IMSI, or for a known IMSI with the indicator "Confirmed by HLR" set to "Not confirmed". The service is used to update the LMSI in the HLR, if provided, and to request the HLR to send all data to the VLR that are to be stored in the subscriber's IMSI record.

The MAP_RESTORE_DATA service is a confirmed service using the service primitives defined in table 8.10/3.

8.10.3.2 Service primitives

Table 8.10/3: MAP_RESTORE_DATA

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	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(=)~~
Offered CAMEL 4 CSIs	C	C(=)		
V-GMLC Address	C	C(=)		
HLR number			C	C(=)
MS Not Reachable Flag			C	C(=)
User error			C	C(=)
Provider error				O

8.10.3.3 Parameter definitions and use

Invoke Id

See definition in clause 7.6.1.

IMSI

See definition in clause 7.6.2.

LMSI

See definition in clause 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.

SoLSA Support Indicator

This parameter is used by the VLR to indicate to the HLR in the Restore Data indication that SoLSA is supported. If this parameter is not included in the Restore Data indication then the HLR shall not perform any specific error handling.

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 Restore Data 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 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 Restore Data 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 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 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, 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.

Offered CAMEL 4 CSIs

This parameter indicates the CAMEL phase 4 CSIs offered in the VMSC/VLR (see clause 7.6.3.36D).

HLR number

See definition in clause 7.6.2. The presence of this parameter is mandatory in case of successful outcome of the service.

MS Not Reachable Flag

See definition in clause 7.6.8. This parameter shall be present in case of successful outcome of the service, if the "MS Not Reachable flag" was set in the HLR.

V-GMLC address

See definition in clause 7.6.2.

User error

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

- unknown subscriber;
- system failure;
- unexpected data value;
- data missing.

Provider error

For definition of provider errors see clause 7.6.1.

……

17.7 MAP constants and data types

17.7.1 Mobile Service data types

……..

```
-- fault recovery types
```

```
ResetArg ::= SEQUENCE {
    hlr-Number                      ISDN-AddressString,
    hlr-List                        HLR-List                        OPTIONAL,
    ...}
```

```
RestoreDataArg ::= SEQUENCE {
    imsi                            IMSI,
    lmsi                            LMSI                            OPTIONAL,
    extensionContainer              ExtensionContainer              OPTIONAL,
    ... ,
    vlr-Capability                  [6] VLR-Capability              OPTIONAL,
    v-gmlc-Address                  [x] GSN-Address                 OPTIONAL }
```

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

……..

****** End of Document ******

3GPP TSG CN WG4 Meeting #21 **N4-031365**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **702** ⌘ **rev** **2** ⌘ Current version: **6.3.0** ⌘

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

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

Title:	⌘	Deferred MT-LR Area Event
Source:	⌘	CN4
Work item code:	⌘	LCS2
Date:	⌘	31/10/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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

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

Reason for change:	⌘	SA2 has approved the Deferred MT-LR Area Event consept. This CR, together with the companion CRs, provides the corresponding Stage 3 modifications.
Summary of change:	⌘	Addition of area event specific parameters to Provide Subscriber Location and Subscriber Location Report MAP services.
Consequences if not approved:	⌘	The functionalities defined at Stage2 would not be implemented in Stage3 creating misalignment.

Clauses affected:	⌘	7.6.2, 7.6.11, 13A.2, 13A.3, 17.7.13

	Y	N			
Other specs affected:	X		Other core specifications	⌘	24.030 CR 014, 24.080 CR 031
		X	Test specifications		
		X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:
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Below is a brief summary:

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

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

7.6.2.59 V-GMLC Address

This parameter refers to the IP address of a V-GMLC.

7.6.2.60 ~~V~~R-GMLC Address

This parameter refers to the IP address of a ~~V~~R-GMLC.

7.6.2.61 H-GMLC Address

This parameter refers to the IP address of a H-GMLC.

7.6.2.62 PPR Address

This parameter refers to the IP address of a Privacy Profile Register.

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

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 Deferred MT-LR Response Indicator

This parameter shows that this is a response to a deferred mt-lr request.

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 by the sending node and that it could be successfully performed by another node (as for example when. Cancel Location or Send Identification has been received). 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.

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 Void

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 CS LCS Not Supported by UE

This parameter is used by the VLR to indicate to the HLR that the UE does not support neither UE Based nor UE Assisted positioning metheds for Circuit Switched Location Services. VLR defines the presence of this parameter on the basis of the Classmark 3 information.

7.6.11.10 PS LCS Not Supported by UE

This parameter is used by the SGSN to indicate to the HLR that the UE does not support neither UE Based nor UE Assisted positioning metheds for Packet Switched Location Services. SGSN defines the presence of this parameter on the basis of the UE capability information.

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. The estimate is expressed in terms of the geographical shapes defined by 3GPP TS 23.032. and is composed of the type of shape plus the encoding of the shape itself. Any type of shape defined in 3GPP TS 23.032 can be filled in in the Location Estimate parameter, but only the encoding of the following shapes shall be carried by Location Estimate:

- Ellipsoid point with uncertainty circle
- Ellipsoid point with uncertainty ellipse
- Ellipsoid point with altitude and uncertainty ellipsoid
- Ellipsoid arc
- Ellipsoid point

The encoding for the remaining types of shape, defined in the 3GPP TS 23.032, shall be filled in in the Additional Location Estimate parameter.

7.6.11.11A Positioning Data

This parameter provides positioning data associated with a successful or unsuccessful location attempt for a target MS. For GERAN this parameter contains positioning data as described in 3GPP TS 49.031 [59a]. For UTRAN this parameter contains positioning data as described in 3GPP TS 25.413 [120].

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;
- deferred location event type.

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 LCS Service Type Id

This parameter defines the LCS Service Type of the current positioning request. The possible values are defined in 3GPP TS 22.071 [123]

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-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.

7.6.11.18 LCS Codeword

This parameter contains the codeword associated to current positioning request as described in 3GPP TS 23.271 [26a].

7.6.11.19 Void

7.6.11.20 Supported GAD Shapes

This parameter indicates which of the shapes defined in 3GPP TS 23.032 are supported. If the parameter is not provided then the receiving node shall assume that the sending entity supports the following shapes:

- Ellipsoid point with uncertainty circle
- Ellipsoid point with uncertainty ellipse
- Ellipsoid point with altitude and uncertainty ellipsoid
- Ellipsoid arc
- Ellipsoid point

7.6.11.21 Additional Location Estimate

This parameter gives an estimate of the location of an MS/UE in universal coordinates and the accuracy of the estimate. This parameter allows the location estimate to be expressed in any of the geographical shapes defined in 3GPP TS 23.032

7.6.11.22 Void

7.6.11.23 LCS-Reference Number

This parameter represents a reference between a request and a responce of a deferred mt-lr procedure as deccribed in 3GPP TS 23.271 [26a].

7.6.11.24 LCS Privacy Check

This parameter refers to the requested privacy check related actions (call/session unrelated and/or call/session related) from MSC or SGSN provided by H-GMLC. Possible requested actions are:

- positioning allowed without notifying the UE user;
- positioning allowed with notification to the UE user;
- positioning requires notification and verification by the UE user; positioning is allowed only if granted by the UE user or if there is no response to the notification;
- positioning requires notification and verification by the UE user; positioning is allowed only if granted by the UE user;
- positioning not allowed.

7.6.11.25 Additional LCS Capability Sets

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

7.6.11.xx Area Event Info

This parameter defines the requested deferred MT-LR area event information. The parameter consists of area definition, type of area event, occurrence info and minimum interval time.

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

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(=)		
LCS-Reference Number	C	C(=)		
LCS Codeword	C	C(=)		
LCS Service Type Id	C	C(=)		
LCS Privacy Check	C	C(=)		
Area Event Info	C	C(=)		
H-GMLC Address	C	C(=)		
R-GMLC Address	C	C(=)		
Location Estimate			M	M(=)
Positioning Data			C	C(=)
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 clause 7.6. The use of these parameters and the requirements for their presence are specified in. 3GPP 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 3GPP TS 23.032 [122] are supported.

LCS-Reference Number

This parameter shall be included if a deferred ~~mt~~MT-~~lr~~LR procedure is performed for a UE available event or an area event.

LCS Codeword

See definition in clause 7.6.11.18. The requirements for its presence are specified in 3GPP TS 23.271 [26a].

LCS Service Type Id

See definition in clause 7.6.11.15. The requirements for its presence are specified in 3GPP TS 23.271 [26a].

LCS Privacy Check

See definition in clause 7.6.11. The requirements for its and its components presence are specified in 3GPP TS 23.271 [26a].

Area Event Info

See definition in clause 7.6.11. The parameter shall be included if a deferred MT-LR procedure is performed for an area event.

H-GMLC address

See definition in clause 7.6.2. The parameter shall be included if a deferred MT-LR procedure is performed for an area event.

R-GMLC address

See definition in clause 7.6.2. The parameter shall be included if a deferred MT-LR procedure is performed for an area event and the R-GMLC is not the H-GMLC.

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.

Positioning Data

This parameter indicates the usage of each positioning method that was attempted to determine the location estimate either successfully or unsuccessfully.

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 clause 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 clause 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 clause 7.6.1.

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

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(=)		
Positioning Data	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(=)		

LCS-Reference Number	C	C(=)		
H-GMLC Address	C	C(=)		
R-GMLC Address	C	C(=)		
User error			C	C(=)
Provider error				O

13A.3.3 Parameter Definition and Use

All parameters are defined in clause 7.6. The use of these parameters and the requirements for their presence are specified in. 3GPP TS 23.271 [26a].

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 clause 7.6.2. This parameter provides the address of the 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.

Positioning Data

This parameter indicates the usage of each positioning method that was attempted to determine the location estimate either successfully or unsuccessfully.

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 clause 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 clause 7.6.11.3.

LCS-Reference Number

This parameter shall be included if the Subscriber Location Report is the response to a deferred MT location request.

H-GMLC address

See definition in clause 7.6.2. The parameter shall be included if the Subscriber Location Report is the response to a deferred MT location request for an area event.

R-GMLC address

See definition in clause 7.6.2. The parameter shall be included if the parameter was received from the UE and if the Subscriber Location Report is the response to a deferred MT location request for an area event.

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 clause 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 clause 7.6.1.

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

17.7.13 Location service data types

```
MAP-LCS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LCS-DataTypes (25) version9 (9)}

DEFINITIONS
IMPLICIT TAGS
::=
BEGIN
```

```
EXPORTS
   RoutingInfoForLCS-Arg,
   RoutingInfoForLCS-Res,
   ProvideSubscriberLocation-Arg,
   ProvideSubscriberLocation-Res,
   SubscriberLocationReport-Arg,
   SubscriberLocationReport-Res,
   LocationType,
   DeferredLocationEventType,
   LCSClientName,
   LCS-QoS,
   Horizontal-Accuracy,
   ResponseTime,
   Ext-GeographicalInformation,
   SupportedGADShapes,
   Add-GeographicalInformation,
   LCSRequestorID,
   LCS-ReferenceNumber,
   LCSCodeword,
   AreaEventInfo
;

IMPORTS
   AddressString,
   ISDN-AddressString,
   IMEI,
   IMSI,
   LMSI,
   SubscriberIdentity,
   AgeOfLocationInformation,
   LCSClientExternalID,
   LCSClientInternalID,
   LCSServiceTypeID
FROM MAP-CommonDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version9 (9)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version9 (9)}

   USSD-DataCodingScheme,
   USSD-String
FROM MAP-SS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-DataTypes (14) version9 (9)}

   APN,
   GSN-Address,
   SupportedLCS-CapabilitySets
FROM MAP-MS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version9 (9)}

   Additional-Number
FROM MAP-SM-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SM-DataTypes (16) version9 (9)}
;
```

```
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,
     ...,
     v-gmlc-Address                     [3]  GSN-Address                OPTIONAL,
     h-gmlc-Address                     [4]  GSN-Address                OPTIONAL,
     ppr-Address                        [5]  GSN-Address                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,
     supportedLCS-CapabilitySets        [4]  SupportedLCS-CapabilitySets  OPTIONAL,
     additional-LCS-CapabilitySets      [5]  SupportedLCS-CapabilitySets  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,
     lcs-ReferenceNumber                [10] LCS-ReferenceNumber          OPTIONAL,
     lcsServiceTypeID                   [11] LCSServiceTypeID             OPTIONAL,
     lcsCodeword                        [12] LCSCodeword                  OPTIONAL,
     lcs-PrivacyCheck                   [13] LCS-PrivacyCheck             OPTIONAL,
     areaEventInfo                      [xx] AreaEventInfo                OPTIONAL,
     h-gmlc-Address                     [xx] GSN-Address                  OPTIONAL,
     r-gmlc-Address                     [xx] GSN-Address                  OPTIONAL }

     -- one of imsi or msisdn is mandatory
     -- If a location estimate type indicates activate deferred location or cancel deferred
     -- location, a lcs-Reference number shall be included.
```

```
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),
     enteringIntoArea                   (1),
     leavingFromArea                    (2),
     beingInsideArea                    (3) } (SIZE (1..16))
-- beingInsideArea is always treated as oneTimeEvent regardless of the possible value
-- of occurrenceInfo inside areaEventInfo.
-- 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,
     lcsRequestorID                     [6] LCSRequestorID                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,
     ...,
     lcs-FormatIndicator                [3] LCS-FormatIndicator          OPTIONAL }

-- 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
```

```
LCSRequestorID ::= SEQUENCE {
     dataCodingScheme                   [0] USSD-DataCodingScheme,
     requestorIDString                  [1] RequestorIDString,
     ...,
     lcs-FormatIndicator                [2] LCS-FormatIndicator          OPTIONAL }
```

```
RequestorIDString ::= USSD-String (SIZE (1..maxRequestorIDStringLength))
```

```
maxRequestorIDStringLength  INTEGER ::= 127
```

```
LCS-FormatIndicator ::= ENUMERATED {
     logicalName                        (0),
     e-mailAddress                      (1),
     msisdn                             (2),
     url                                (3),
     sipUrl                             (4),
     ... }
```

```
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 3GPP 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 3GPP 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 3GPP TS 23.032 it supports.
-- exception handling: bits 7 to 15 shall be ignored if received.
```

```
LCS-ReferenceNumber::= OCTET STRING (SIZE(1))
```

```
LCSCodeword ::= SEQUENCE {
     dataCodingScheme                    [0] USSD-DataCodingScheme,
     lcsCodewordString                   [1] LCSCodewordString,
     ...}
```

```
LCSCodewordString ::= USSD-String (SIZE (1..maxLCSCodewordStringLength))
```

```
maxLCSCodewordStringLength  INTEGER ::= 127
```

```
LCS-PrivacyCheck ::= SEQUENCE {
     callSessionUnrelated                [0] PrivacyCheckRelatedAction,
     callSessionRelated                  [1] PrivacyCheckRelatedAction     OPTIONAL,
     ...}
```

```
PrivacyCheckRelatedAction ::= ENUMERATED {
     allowedWithoutNotification (0),
     allowedWithNotification (1),
     allowedIfNoResponse (2),
     restrictedIfNoResponse (3),
     notAllowed (4),
     ...}
--   exception handling:
--   a ProvideSubscriberLocation-Arg containing an unrecognized PrivacyCheckRelatedAction
--   shall be rejected by the receiver with a return error cause of unexpected data value
```

```
AreaEventInfo ::= SEQUENCE {
     areaDefinition                      [0]  AreaDefinition,
     occurrenceInfo                      [1]  OccurrenceInfo               OPTIONAL,
     intervalTime                        [2]  IntervalTime                 OPTIONAL,
     ...}
```

```
AreaDefinition ::= SEQUENCE {
     areaList                            [0]  AreaList,
     ...}
```

```
AreaList ::= SEQUENCE SIZE (1..maxNumOfAreas) OF Area
```

```
maxNumOfAreas  INTEGER ::= 10
```

```
Area ::= SEQUENCE {
     areaType                            [0]  AreaType,
     areaIdentification                  [1]  AreaIdentification,
     ...}
```

```
AreaType ::= ENUMERATED {
     countryCode                         (0),
     plmnId                              (1),
     locationAreaId                      (2),
     routingAreaId                       (3),
     cellGlobalId                        (4),
     ...}
```

```
AreaIdentification ::= OCTET STRING (SIZE (2..7))
     -- The internal structure is defined as follows:
     -- octet 1 bits 4321                  Mobile Country Code 1st digit
     --         bits 8765                  Mobile Country Code 2nd digit
     -- octet 2 bits 4321                  Mobile Country Code 3rd digit
     --         bits 8765                  Mobile Network Code 3rd digit if 3 digit MNC included
     --                                    or filler (1111)
     -- octet 3 bits 4321                  Mobile Network Code 1st digit
     --         bits 8765                  Mobile Network Code 2nd digit
     -- octets 4 and 5                     Location Area Code (LAC)
     -- octet 6                            Routing Area Code (RAC) for Routing Area Id
     -- octets 6 and 7                     Cell Identity (CI) for Cell Global Id
```

```
OccurrenceInfo ::= ENUMERATED {
     oneTimeEvent                         (0),
     multipleTimeEvent                    (1),
     ...}
```

```
IntervalTime ::= INTEGER (1..32767)
     -- minimum interval time between area reports in seconds
```

```
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,
     positioningData                     [4] PositioningDataInformation    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
-- The locationEstimate and the add-locationEstimate parameters shall not be sent if
-- the supportedGADShapes parameter has been received in ProvideSubscriberLocation-Arg
-- and the shape encoded in locationEstimate or add-LocationEstimate is not marked
-- as supported in supportedGADShapes. In such a case ProvideSubscriberLocation
-- shall be rejected with error FacilityNotSupported with additional indication
-- shapeOfLocationEstimateNotSupported
```

```
Ext-GeographicalInformation ::= OCTET STRING (SIZE (1..maxExt-GeographicalInformation))
    -- Refers to geographical Information defined in 3GPP TS 23.032.
    -- This is composed of 1 or more octets with an internal structure according to
    -- 3GPP TS 23.032
    -- Octet 1: Type of shape, only the following shapes in 3GPP 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 3GPP 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 3GPP TS 23.032 to be included in later
    -- versions of 3GPP TS 29.002
```

```
PositioningDataInformation ::= OCTET STRING (SIZE (2..maxPositioningDataInformation))
    -- Refers to the Positioning Data defined in 3GPP TS 49.031 for GERAN or 3GPP TS 25.413
    -- for UTRAN.
    -- This is composed of 2 or more octets with an internal structure according to
    -- 3GPP TS 49.031 for GERAN and 25.413 for UTRAN. Note that the internal structure
    -- of the parameter is identical for GERAN and UTRAN, but the defined code points differ
    -- for GERAN and UTRAN to allow for Radio Technology specific location methods.
```

```
maxPositioningDataInformation INTEGER ::= 10
    --
```

```
Add-GeographicalInformation ::= OCTET STRING (SIZE (1..maxAdd-GeographicalInformation))
    -- Refers to geographical Information defined in 3GPP TS 23.032.
    -- This is composed of 1 or more octets with an internal structure according to
    -- 3GPP TS 23.032
    -- Octet 1: Type of shape, all the shapes defined in 3GPP TS 23.032 are allowed:
    -- Octets 2 to n (where n is the total number of octets necessary to encode the shape
    -- according to 3GPP TS 23.032) are used to encode the shape itself in accordance with
```

```
the
     -- encoding defined in 3GPP 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
     -- 3GPP TS 23.032 or an incorrect number of octets or coding according to
     -- 3GPP 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 ::= 91
     -- the maximum length allows support for all the shapes currently defined in 3GPP 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,
     lcs-ReferenceNumber                [10] LCS-ReferenceNumber          OPTIONAL,
     positioningData                    [11] PositioningDataInformation   OPTIONAL,
     h-gmlc-Address                     [xx] GSN-Address                  OPTIONAL,
     r-gmlc-Address                     [xx] GSN-Address                  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.
     -- if the lcs-Event indicates a deferredmt-lrResponse then the locationEstimate
     -- and the add-locationEstimate parameters shall not be sent if the
     -- supportedGADShapes parameter had been received in ProvideSubscriberLocation-Arg
     -- and the shape encoded in locationEstimate or add-LocationEstimate was not marked
     -- as supported in supportedGADShapes. In such a case terminationCause
     -- in deferredmt-lrData shall be present with value
     -- shapeOfLocationEstimateNotSupported.
     -- If a lcs event indicates deferred mt-lr response, the lcs-Reference number shall be
     -- included.
```

```
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),
     ...,
     shapeOfLocationEstimateNotSupported (6) }
-- 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 deregistered due to a Cancel Location received from HLR.
--
-- exception handling
-- an unrecognized value shall be treated the same as value 1 (errorundefined)
```

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

```
END
```