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ETSI SMG3 Plenary Meeting #6,

Nice, France

13th – 15th December 1999

Agenda item: **5.4.3**

Source: **TSG_N SS ad hoc**

Title: **CRs Work Item LCS**

Introduction:

This document contains **1** CRs agreed by **TSG_N SS ad hoc** and forwarded to **TSG_N Plenary** meeting #6 for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
NSS-99139	04.80	A060		F		7.1.0	7.2.0	Addition of LCS operations

SMG#30
Brighton, UK, 09-11 Nov 1999

Document ____99____
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

04.80	**CR**	**A060**	Current Version:	7.1.0

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

For submission to:	SMG#30	for approval	□	strategic	□	*(for SMG*
list expected approval meeting # here ↑		for information	X	non-strategic	X	*use only)*

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

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

Source:	T1P1.5	**Date:**	5 Nov 1999

Subject: Addition of LCS operations

Work item: Location Services (LCS)

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

Reason for change:

Clauses affected:

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

Other comments:

4 Supplementary services operation specifications

4.1 General

This clause specifies the abstract syntax for the Supplementary Service protocol using the Abstract Syntax Notation One (ASN.1), defined in CCITT Recommendation X.208 (1998).

The mapping of OPERATION and ERROR to components is defined in clause 3 of the present document.

The encoding rules which are applicable to the defined abstract syntax are the Basic Encoding Rules for Abstract Syntax Notation One, defined in CCITT Recommendation X.209 (1998) with the same exceptions as stated in GSM 09.02. For each Supplementary Service parameter which has to be transferred by a Supplementary Service message, there is a PDU field (an ASN.1 NamedType) whose ASN.1 identifier has the same name as the corresponding parameter, except for the differences required by the ASN.1 notation (blanks between words are removed, the first letter of the first word is lower-case and the first letter of the following words are capitalized (e.g. "bearer service" is mapped to "bearerService"). In addition some words may be abbreviated as follows:

- ms mobile subscriber;
- ss supplementary services;
- cug closed user group.

The ASN.1 data type which follows the keywords ARGUMENT "PARAMETER" or "RESULT" (for OPERATION and ERROR) is always optional from a syntactic point of view. However, except specific mention, it has to be considered as mandatory from a semantic point of view. When in an invoke component, a mandatory element is missing in any component or inner data structure, a reject component is returned with the problem code "Mistyped Parameter". When an optional element is missing in an invoke component or in an inner data structure while it is required by the context, an error component is returned; the associated type of error is "DataMissing".

In case an element is defined as mandatory in the protocol description (GSM 04.80 including imports from GSM 09.02), but is not present according to the service description (stage 1 to stage 3), the ASN.1 protocol description takes precedence over the diagrams in the GSM 04.8x and 04.9x-series of technical specifications.

When possible operations and errors are imported from GSM 09.02 thereby making the MSC transparent to most of the messages sent to or from the MS.

Timer values for operations which require timers are shown as ASN.1 comments.

Ellipsis Notation shall be used in the same way as described in GSM 09.02 and shall be supported on the radio interface by the MS and the network for all operations defined in the present document including those imported from GSM 09.02.

4.2 Operation types

Table 4.1 summarizes the operations defined for supplementary services in the present document and shows which of these operations are call related and call independent. The terms "call related" and "call independent" are defined in GSM 04.10.

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	-	+
NOTE: The ProcessUnstructuredSS-Data operation may be used call related by a GSM Phase 1 MS.		

```
SS-Operations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Operations (0) version3 (3)}

DEFINITIONS ::=

BEGIN

EXPORTS

-- exports operation types

-- operations defined in the present document
ProcessUnstructuredSS-Data, NotifySS, ForwardChargeAdvice, ForwardCUG-Info, BuildMPTY, HoldMPTY,
RetrieveMPTY, SplitMPTY, ExplicitCT, AccessRegisterCCEntry, CallDeflection, UserUserService;

IMPORTS

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

-- 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
FROM SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Datatypes (2) version3 (3)}

-- imports MAP-SS-data types
RegisterCC-EntryRes
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version4 (4)}

-- imports MAP-errors
IllegalSS-Operation, SS-ErrorStatus, SS-NotAvailable,
SS-Incompatibility, SystemFailure, FacilityNotSupported, CallBarred,UnexpectedDataValue,
ShortTermDenial, LongTermDenial, DataMissing, ForwardingViolation, ForwardingFailed,
PositionMethodFailure
FROM MAP-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-Errors (10) version4 (4)}

-- imports SS-Errors
ResourcesNotAvailable, MaxNumberOfMPTY-ParticipantsExceeded,DeflectionToServedSubscriber,
InvalidDeflectedToNumber, SpecialServiceCode, RejectedByUser, RejectedByNetwork
FROM SS-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Errors (1) version3 (3)}
;

-- operation types definition

ProcessUnstructuredSS-Data::=   OPERATION -- Timer T(PUSSD)= 15s to 30s
    ARGUMENT
    ss-UserData     SS-UserData
    RESULT
    ss-UserData     SS-UserData
-- optional
    ERRORS{
    SystemFailure,
    UnexpectedDataValue}

NotifySS ::=    OPERATION
    ARGUMENT
    notifySS-Arg    NotifySS-Arg

ForwardChargeAdvice ::= OPERATION -- Timer T(AoC)= 1s to 40s
    ARGUMENT
    forwardChargeAdviceArg  ForwardChargeAdviceArg
    RESULT

ForwardCUG-Info ::= OPERATION
    ARGUMENT
    forwardCUG-InfoArg  ForwardCUG-InfoArg

BuildMPTY ::=   OPERATION -- Timer T(BuildMPTY)= 5s to 30s
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-NotAvailable,
    SS-Incompatibility,
    SystemFailure,
    ResourcesNotAvailable,
    MaxNumberOfMPTY-ParticipantsExceeded}

HoldMPTY ::=    OPERATION -- Timer T(HoldMPTY)= 5s to 30s
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-Incompatibility,
    FacilityNotSupported,
    SystemFailure}

RetrieveMPTY ::=    OPERATION -- Timer T(RetrieveMPTY)= 5s to 30s
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-Incompatibility,
    FacilityNotSupported,
    SystemFailure}

SplitMPTY ::=   OPERATION -- Timer T(SplitMPTY)= 5s to 30s
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-Incompatibility,
    FacilityNotSupported,
    SystemFailure}

ExplicitCT ::=  OPERATION -- Timer T(ECT)= 5s to 15s
```

```
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-NotAvailable,
    SS-Incompatibility,
    FacilityNotSupported,
    SystemFailure,
    ResourcesNotAvailable,
    CallBarred}

AccessRegisterCCEntry ::= OPERATION -- Timer T(AccRegCCEntry)= 30s
    ARGUMENT
    accessRegisterCCEntryArg    AccessRegisterCCEntryArg
    RESULT
    registerCCEntryRes  RegisterCC-EntryRes
    ERRORS{
    SystemFailure,
    DataMissing,
    UnexpectedDataValue,
    CallBarred,
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-Incompatibility,
    ShortTermDenial,
    LongTermDenial,
    FacilityNotSupported}

-- the timer value is defined by T308, see also in GSM 04.08 for definition of timer T308

CallDeflection ::=  OPERATION -- Timer T(CD)= 30s
    ARGUMENT
    callDeflectionArg   CallDeflectionArg
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-NotAvailable,
    SS-Incompatibility,
    FacilityNotSupported,
    SystemFailure,
    ResourcesNotAvailable,
    ForwardingViolation,
    CallBarred,
    DeflectionToServedSubscriber,
    InvalidDeflectedToNumber,
    SpecialServiceCode,
    ForwardingFailed}

-- the timer value is defined by T305, see also in GSM 04.08 for definition of timer T305
-- extensionContainer shall not be used with this operation

UserUserService ::= OPERATION -- Timer T(UUS3)= 10s
    ARGUMENT
    userUserServiceArg  UserUserServiceArg
    RESULT
    ERRORS{
    IllegalSS-Operation,
    SS-ErrorStatus,
    SS-NotAvailable,
    SS-Incompatibility,
    FacilityNotSupported,
    SystemFailure,
    ResourcesNotAvailable,
    RejectedByNetwork,
    RejectedByUser}

-- 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 GSM 04.87.
-- extensionContainer shall not be used with this operation.


LCS-LocationNotification::= OPERATION  -- Timer T(LCSN)= 10s to 20s
    ARGUMENT
    locationNotificationArg     LocationNotificationArg
    RESULT
    locationNotificationRes     LocationNotificationRes
    ERRORS{
    SystemFailure,
    UnexpectedDataValue}
```

```
LCS-MOLR::= OPERATION -- Timer T(LCSL)= 10s to 30s
    ARGUMENT
    lcs-MOLRArg     LCS-MOLRArg
    RESULT
    lcs-MOLRRes     LCS-MOLRRes
    ERRORS{
    SystemFailure,
    UnexpectedDataValue,
    DataMissing,
    PositionMethodFailure}

END
```

4.2.1 [spare]

4.2.2 Operation types description

For each operation type this subclause provides a brief prose description.

4.2.2.1 RegisterSS (MS --> network)

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

4.2.2.7 RegisterPassword (MS --> network)

This operation type 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 type 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 type 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 GSM 04.90).

4.2.2.10 ProcessUnstructuredSS-Request (MS --> network)

This operation type 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 type 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 type 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 type 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 GSM 09.02.

4.2.2.14 ForwardChargeAdvice (network --> MS)

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

4.2.2.15 BuildMPTY (MS --> network)

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

4.2.2.20 ExplicitCT (MS --> Network)

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

4.2.2.22 CallDeflection (MS --> Network)

This operation type 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 type 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 type 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 type 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.

4.3 Error types

4.3.1 Error types 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.

```
SS-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Errors (1) version3 (3)}

DEFINITIONS ::=

BEGIN

IMPORTS

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

-- 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.

-- error types definition
ResourcesNotAvailable ::= ERROR
MaxNumberOfMPTY-ParticipantsExceeded ::= ERROR
InvalidDeflectedToNumber ::= ERROR
SpecialServiceCode ::= ERROR
DeflectionToServedSubscriber ::= ERROR
RejectedByNetwork ::= ERROR
RejectedByUser ::= ERROR

END
```

4.3.2 Error types description

For each error type this subclause provides a brief prose description.

4.3.2.1 UnknownSubscriber

This error is returned by the network when it is requested to perform an operation concerning an unknown subscriber.

4.3.2.2 BearerServiceNotProvisioned

This error is returned by the network when it is requested to perform an operation on a supplementary service and not even a subset of the requested bearer service group has been subscribed to.

4.3.2.3 TeleServiceNotProvisioned

This error is returned by the network when it is requested to perform an operation on a supplementary service and not even a subset of the requested teleservice group has been subscribed to.

4.3.2.4 IllegalSS-Operation

This error is returned by the network when it is requested to perform an illegal operation which is defined as not applicable for the relevant supplementary service(s) (e.g. registration request for a service which must be registered by the administration). For the definition of the allowed operations for the individual supplementary services, see GSM 04.8x and 04.9x-series of technical specifications.

4.3.2.5 SS-ErrorStatus

This error is returned by the network when it is requested to perform an operation which is not compatible with the current status of the relevant supplementary service. The current status may be given as additional information by use of the SS-parameter.

4.3.2.6 SS-NotAvailable

This error is returned by the network when it is requested to perform an operation on a supplementary service which is not available in the current location area.

4.3.2.7 SS-SubscriptionViolation

This error is returned by the network when it is requested to perform an operation on a supplementary service, transgressing the subscription restrictions. The nature of the restriction or the transgressed options may be sent as parameters.

4.3.2.8 SS-Incompatibility

This error is returned by the network when it is requested for a supplementary service operation incompatible with the status of an other supplementary service or with the teleservice or bearer service for which the operation is requested. This error shall only be used if the operation is not compatible for even a subset of the teleservice group or bearer service group specified in the request. The identity and status of the conflicting service may also be indicated. The additional information may contain the SS-code parameter, the Basic Service Group parameter and the SS-status parameter.

4.3.2.9 SystemFailure

This error is returned by the network, when it cannot perform an operation because of a failure in the network.

4.3.2.10 DataMissing

This error is returned by the network when an optional parameter is missing in an invoke component or an inner data structure, while it is required by the context of the request.

4.3.2.11 UnexpectedDataValue

This error is returned by the network when it receives a parameter with an unexpected value, without type violation.

4.3.2.12 PasswordRegistrationFailure

This error is returned when a password registration procedure fails because of abnormal subscriber inputs. A more specific diagnostic may be passed as error parameter and indicates situations such as:

- invalid password format;
- new passwords mismatch.

4.3.2.13 NegativePasswordCheck

This error is returned to indicate the negative result of a password check because the subscriber has not provided the required password or has provided a password which does not match the valid one.

4.3.2.14 FacilityNotSupported

This error is returned by the network receiving a request about a facility which is not supported in the PLMN.

4.3.2.15 ResourcesNotAvailable

This error is returned by the network to the MS if temporarily there are no resources to support e.g. a multi party call available in the network.

4.3.2.16 MaxNumberOfMPTY-ParticipantsExceeded

This error is returned by the network to the MS if the request must be rejected because the number of subscribers to join a multi party call would exceed the maximum value.

4.3.2.17 CallBarred

This error is returned by the network to the MS when call independent subscriber control procedures are barred by the operator. The parameter "operator barring" shall be included.

4.3.2.18 NumberOfPW-AttemptsViolation

This error is returned by the network to the MS when the maximum number of wrong password attempts is exceeded.

4.3.2.19 AbsentSubscriber

This error is returned when the subscriber has activated the detach service or the system detects the absence condition. This error is not used on the radio interface but only between network entities.

4.3.2.20 IllegalSubscriber

This error is returned when illegality of the access has been established by use of authentication procedure. This error is not used on the radio interface but only between network entities.

4.3.2.21 IllegalEquipment

This error is returned when the IMEI check procedure has shown that the IMEI is blacklisted or not white—listed. This error is not used on the radio interface but only between network entities.

4.3.2.22 USSD-Busy

This error is returned by the MS to the network when the MS is not able to process the unstructured supplementary service data operation due to an on-going MMI input of the user or an already existing call independent supplementary service transaction.

4.3.2.23 UnknownAlphabet

This error is returned by the MS or the network when the alphabet/language used for the unstructured supplementary service data operation is not known by the network or the MS.

4.3.2.24 InvalidDeflectedToNumber

This error is returned if the requested deflected-to number is invalid.

4.3.2.25 SpecialServiceCode

This error is returned if diversion to a special service code was requested.

4.3.2.26 DeflectionToServedSubscriber

This error is returned if a diversion to the served subscriber's number was requested.

4.3.2.27 RejectedByNetwork

This error is returned by the network when the network rejects User-to-User Signalling service request.

4.3.2.28 RejectedByUser

This error is returned by the remote party when the remote party rejects User-to-User Signalling service request.

4.4 Data types and identifiers

4.4.1 General

The data types used in the SS protocol specifications are described in the ASN.1 module provided in subclause 4.4.2, while subclause 4.4.3 provides an overview of the identifiers used in SS ASN.1 specifications.

Since size constraints are subject to modifications named values have been defined in the following module for the upper boundaries of the value ranges associated to several sub-type specifications.

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 the present document are defined. All other data types are imported from MAP together with the import of operations and errors.

```
SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-DataTypes (2) version3 (3)}

DEFINITIONS

IMPLICIT TAGS ::=
BEGIN

-- exports all data types defined in this module

IMPORTS

SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-Code (15) version3 (3)}

-- 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 {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SS-DataTypes (14) version4 (4)}

CUG-Index
FROM MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-MS-DataTypes (11) version3 (3)}

maxSignalInfoLength,
ISDN-AddressString,
ISDN-SubaddressString,
AlertingPattern,
LCSClientExternalID
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-CommonDataTypes (18) version4 (4)}

LocationType,
LCSClientName,
LCS-QoS,
Horizontal-Accuracy,
ResponseTime,
Ext-GeographicalInformation
FROM MAP-LCS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-LCS-DataTypes (25) version5 (5)}

;

-- 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}

--  The nameIndicator is defined because of CNAP.

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] ISDN-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] NotificationType,
    locationType        [1] LocationType,
    lcsClientExternalID [2] LCSClientExternalID     OPTIONAL,
    lcsClientName       [3] LCSClientName           OPTIONAL,
    ...}

NotificationType::= ENUMERATED {
    notification        (0),
    privacyVerification (1),
    ... }
-- an unrecognized value shall be rejected by the receiver 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)

MOLR-Arg    ::= 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,
    ...}
-- 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),
    ... }
```

```
-- exception handling:
-- 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 GSM 09.31.

MOLR-Res::= SEQUENCE {
    locationEstimate        [0] Ext-GeographicalInformation     OPTIONAL,
    decipheringKeys         [1] DecipheringKeys                 OPTIONAL,
    ...}
-- Parameter locationEstimate shall be included if and only if the
-- molr-Type in LocationRequestArg was set to value locationEstimate.
-- 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 GSM 09.31. I.e. these octets contain Current Deciphering Key, Next Deciphering Key and
-- Ciphering Key Flag.


END
```

4.4.3 Identifiers definition

The parameters which are described in the following subclauses correspond to the identifiers used in operation and error types description.

4.4.3.1 chargingInformation

The chargingInformation identifier refers to the necessary information for the Advice of Charge supplementary service (see GSM 02.24).

4.4.3.2 e1

The e1 identifier refers to 10 times the number of LPLMN units per time interval in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.3 e2

The e2 identifier refers to 10 times the length of the time interval in seconds in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.4 e3

The e3 identifier refers to 100 times the scaling factor to convert from LPLMN units to HPLMN units in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.5 e4

The e4 identifier refers to 10 times the LPLMN increment in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.6 e5

The e5 identifier refers to 10 times the number of LPLMN units incremented per data interval in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.7 e6

The e6 identifier refers to the number of segments per data interval in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.8 e7

The e7 identifier refers to 10 times the length of the initial time interval in seconds in connection with the Advice of Charge supplementary service, see GSM 02.24.

4.4.3.9 ss-Code

The ss-Code identifier refers to the code which identify a supplementary service or a group of supplementary services.

4.4.3.10 ss-Notification

The ss-Notification identifier refers to one or several supplementary service notifications which have to be forwarded to a mobile subscriber.

4.4.3.11 ss-Status

The ss-Status identifier refers to the status of a supplementary service.

4.4.3.12 callIsWaiting-Indicator

The callIsWaiting-Indicator identifier refers to the indication given to the mobile station that the call is waiting.

4.4.3.13 callOnhold-Indicator

The callOnHold-Indicator identifier refers to the indication given to the mobile station that the call has been put on hold or has been retrieved.

4.4.3.14 mpty-Indicator

The mpty-Indicator identifier refers to the indication given to the mobile station that the multi party call has been invoked.

4.4.3.15 forwardCUG-InfoArg

The forwardCUG-InfoArg identifier refers to the indication given from the mobile subscriber to the network in connection with explicit invocation of a CUG call.

4.4.3.16 cug-Index

The cug-Index identifier refers to the index of a CUG given in an explicit invocation of a CUG call.

4.4.3.17 suppressPrefCUG

The suppressPrefCUG identifier refers to the mobile subscribers request to the network to prohibit the use of the preferential CUG.

4.4.3.18 suppressOA

The suppressOA identifier refers to the mobile subscribers request to the network to prohibit the use of the subscriber option "OA allowed".

4.4.3.19 clirSuppressionRejected

The clirSuppressionRejected identifier refers to the indication given to the mobile station that the CLIR suppression request has been rejected.

4.4.3.20 ect-Indicator

The ect-Indicator identifier refers to the indication given to the mobile station that the call was transferred.

4.4.3.21 ect-CallState

The ect-CallState identifier refers to the state of the call to the other remote party in which Explicit Call Transfer was invoked.

4.4.3.22 rdn

The Rdn identifier refers to the line identity information of the other remote party.

4.4.3.23 presentationAllowedAddress

The presentationAllowedAddress identifier refers to the line identity of the other remote party that is allowed to be presented.

4.4.3.24 presentationRestricted

The presentationRestricted identifier refers to the restriction of presentation of the line identity of the other remote party.

Also, the identifier refers to the restriction of presentation of the name identity of the calling party to the called party.

4.4.3.25 numberNotAvailableDueToInterworking

The numberNotAvailableDueToInterworking identifier refers to the unavailability of the line identity of the other remote party.

4.4.3.26 presentationRestrictedAddress

The presentationRestrictedAddress identifier refers to the line identity of the other remote party which presentation restriction is overridden.

4.4.3.27 partyNumber

The partyNumber identifier refers to the remote party number.

4.4.3.28 partyNumberSubaddress

The partyNumberSubaddress identifier refers to remote party number subaddress.

4.4.3.29 nameIndicator

The nameIndicator identifier refers to the indication given to the mobile station that the name presentation has been invoked.

4.4.3.30 namePresentationAllowed

The namePresentationAllowed identifier refers to the presentation of the calling party’s name identity to the called party.

4.4.3.31 nameUnavailable

The nameUnavailable identifier refers to the unavailability of the calling party’s name identity to be offered to the called party.

4.4.3.32 namePresentationRestricted

The namePresentationRestricted identifier refers to the calling party’s name identity to be offered to the called party with which presentation restriction is overridden.

4.4.3.33 deflectedToNumber

The DeflectedToNumber identifier refers to a party an incoming shall be deflected to.

4.4.3.34 deflectedToSubaddress

The DeflectedToSubaddress identifier refers to a subaddress an incoming call shall be deflected to.

4.4.3.35 uUS-Service

The uUS-Service identifier refers to the UUS service (service 1, service 2 or service 3) to be requested.

4.4.3.36 uUS-Required

The uUS-Required identifier refers to the option ("UUS required" or "UUS not required") given when requesting the UUS service.

4.4.3.37 LocationNotificationArg

The LocationNotificationArg identifier refers to the location notification request which is sent to the MS by the network.

4.4.3.38 NotificationType

The NotificationType identifier refers to the type of location notification (notification or privacy verification).

4.4.3.39 LocationNotificationRes

The LocationNotificationRes identifier refers to the location notification response which is sent to the network by the MS.

4.4.3.40 VerificationResponse

The VerificationResponse identifier refers to the privacy verification response given by the MS user.

4.4.3.41 MOLR-Arg

The MOLR-Arg identifier refers to the MO-LR request parameters which are sent to the network by the MS.

4.4.3.42 MOLR-Type

The MOLR-Type identifier refers to the type of MO-LR.

4.4.3.43 LocationMethod

The LocationMethod identifier refers to the location method, for which assistance data is requested by the MS.

4.4.3.44 GPSAssistanceData

The GPSAssistanceData identifier refers to the indication, which GPS assistance data is requested by the MS.

4.4.3.45 MOLR-Res

The MOLR-Res identifier refers to the MO-LR response parameters which are sent to the MS by the network.

4.4.3.46 DecipheringKeys

The DecipheringKeys identifier refers to the set of deciphering keys, that contains Current Deciphering Key, Next Deciphering Key and Ciphering Key Flag.

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 types from the ASN.1 module described in subclause 4.2 and operation and error types from MAP. It defines operations by allocating operations and errors a local value. For the involved operations and errors the same local values as in MAP are allocated.

```
SS-Protocol {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Access (2) modules (3) ss-Protocol (3) version3 (3)}

DEFINITIONS ::=

BEGIN

IMPORTS

-- imports operation types

-- imports operation type from MAP-MobileServiceOperations
ForwardCheckSS-Indication
FROM MAP-MobileServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-MobileServiceOperations (5) version3 (3)}

-- imports operation types from MAP-SupplementaryServiceOperations
RegisterSS, EraseSS, ActivateSS, DeactivateSS, InterrogateSS, RegisterPassword, GetPassword,
ProcessUnstructuredSS-Request, UnstructuredSS-Request, UnstructuredSS-Notify, EraseCC-Entry
FROM MAP-SupplementaryServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-SupplementaryServiceOperations (8) version4 (4)}

-- imports operation types from SS-Operations
ProcessUnstructuredSS-Data, NotifySS, ForwardChargeAdvice, BuildMPTY, HoldMPTY, RetrieveMPTY,
SplitMPTY, ExplicitCT, ForwardCUG-Info, AccessRegisterCCEntry, CallDeflection, UserUserService
FROM SS-Operations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Operations (0) version3 (3)}

-- imports error types

-- imports error types from MAP-Errors
UnknownSubscriber, BearerServiceNotProvisioned, TeleserviceNotProvisioned,
IllegalSS-Operation, SS-ErrorStatus, SS-NotAvailable, SS-SubscriptionViolation,
SS-Incompatibility, SystemFailure, DataMissing, UnexpectedDataValue, PW-RegistrationFailure,
NegativePW-Check, FacilityNotSupported, CallBarred, NumberOfPW-AttemptsViolation,
AbsentSubscriber, IllegalSubscriber, IllegalEquipment, USSD-Busy, UnknownAlphabet,
ShortTermDenial, LongTermDenial, ForwardingViolation, ForwardingFailed

FROM MAP-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3)
   map-Errors (10) version4 (4)}

-- imports error types from SS-Errors
ResourcesNotAvailable, MaxNumberOfMPTY-ParticipantsExceeded,
InvalidDeflectedToNumber, SpecialServiceCode, DeflectionToServedSubscriber,
RejectedByNetwork, RejectedByUser
```

```
FROM SS-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Access (2) modules (3)
   ss-Errors (1) version3 (3)}
;

-- allocation of local values to operations

registerSS  RegisterSS ::= localValue 10
eraseSS     EraseSS ::= localValue 11
activateSS  ActivateSS ::= localValue 12
deactivateSS    DeactivateSS ::= localValue 13
interrogateSS   InterrogateSS ::= localValue 14
notifySS    NotifySS ::= localValue 16
registerPassword    RegisterPassword ::= localValue 17
getPassword     GetPassword ::= localValue 18
processUnstructuredSS-Data  ProcessUnstructuredSS-Data ::= localValue 19
forwardCheckSS-Indication   ForwardCheckSS-Indication ::= localValue 38
processUnstructuredSS-Request   ProcessUnstructuredSS-Request ::= localValue 59
unstructuredSS-Request  UnstructuredSS-Request ::= localValue 60
unstructuredSS-Notify   UnstructuredSS-Notify ::= localValue 61
eraseCCEntry    EraseCC-Entry ::= localValue 77
callDeflection  CallDeflection ::= localValue 117
userUserService UserUserService ::= localValue 118
accessRegisterCCEntry   AccessRegisterCCEntry ::= localValue 119
forwardCUG-Info ForwardCUG-Info ::= localValue 120
splitMPTY   SplitMPTY ::= localValue 121
retrieveMPTY    RetrieveMPTY ::= localValue 122
holdMPTY    HoldMPTY ::= localValue 123
buildMPTY   BuildMPTY ::= localValue 124
forwardChargeAdvice ForwardChargeAdvice ::= localValue 125
explicitCT  ExplicitCT ::= localValue 126
lcs-LocationNotification    LCS-LocationNotification::= localValue ???
lcs-MOLR    LCS-MOLR::= localValue ???

[Editor's note: the local values for will be allocated by SMG3 WPA\CN1]

-- allocation of local values to errors

unknownSubscriber   UnknownSubscriber ::= localValue 1
illegalSubscriber   IllegalSubscriber ::= localValue 9
bearerServiceNotProvisioned BearerServiceNotProvisioned ::= localValue 10
teleserviceNotProvisioned   TeleserviceNotProvisioned ::= localValue 11
illegalEquipment    IllegalEquipment ::= localValue 12
callBarred  CallBarred ::= localValue 13
illegalSS-Operation IllegalSS-Operation ::= localValue 16
ss-ErrorStatus  SS-ErrorStatus ::= localValue 17
ss-NotAvailable SS-NotAvailable ::= localValue 18
ss-SubscriptionViolation    SS-SubscriptionViolation ::= localValue 19
ss-Incompatibility  SS-Incompatibility ::= localValue 20
facilityNotSupported    FacilityNotSupported ::= localValue 21
absentSubscriber    AbsentSubscriber ::= localValue 27
shortTermDenial ShortTermDenial ::= localValue 29
longTermDenial  LongTermDenial ::= localValue 30
systemFailure   SystemFailure ::= localValue 34
dataMissing DataMissing ::= localValue 35
unexpectedDataValue UnexpectedDataValue ::= localValue 36
pw-RegistrationFailure  PW-RegistrationFailure ::= localValue 37
negativePW-Check    NegativePW-Check ::= localValue 38
numberOfPW-AttemptsViolation    NumberOfPW-AttemptsViolation ::= localValue 43
unknownAlphabet UnknownAlphabet ::= localValue 71
ussd-Busy   USSD-Busy ::= localValue 72
rejectedByUser  RejectedByUser ::= localValue 121
rejectedByNetwork   RejectedByNetwork ::= localValue 122
deflectionToServedSubscriber    DeflectionToServedSubscriber ::= localValue 123
specialServiceCode  SpecialServiceCode ::= localValue 124
invalidDeflectedToNumber    InvalidDeflectedToNumber ::= localValue 125
maxNumberOfMPTY-ParticipantsExceeded    MaxNumberOfMPTY-ParticipantsExceeded ::= localValue 126
resourcesNotAvailable   ResourcesNotAvailable ::= localValue 127

END
```