RELEASE NOTE

Recommendation GSM 09.02-DCS

Mobile Application Part Specification

Previously distributed version : 3.0.0 (Release 1/90)
New Released version February 92 : 3.0.0 (Release 92, Phase 1)

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1. Reason for changes

No changes since the previously distributed version.

ETSI-GSM

Technical

Specification

GSM 09.02-DCS

Version 3.0.0

European digital cellular telecommunication system (phase 1);

Mobile Application Part Specification

ETSI

PREFATORY NOTE

ETSI has. constituted stable and consistent documents which give specifications for the implementation of the European Cellular Telecommunications System. Historically, these documents have been identified as "GSM recommendations".

Some of these recommendations may subsequently become Interim European Telecommunications Standards (I-ETSs) or European Telecommunications Standards (ETSs), whilst some continue with the status of ETSI-GSM Technical Specifications. These ETSI-GSM Technical Specifications are for editorial reasons still referred to as GSM recommendations in some current GSM documents.

The numbering and version control system is the same for ETSI-GSM Technical Specifications as for "GSM recommendations".

ETSI/TC GSM

Title : **Recommendation GSM 09.02-DCS**
Mobile Application Part Specification

Version : 3.0.0
        (Based on GSM 09.02 version 3.8.0)

Date : January 1991

List of contents:

Language of original : English

Number of pages : 18

Detailed list of pages changed:

In addition to the pages changed, the recto/verso pages are also included to ease inclusion into GSM 09.02 version 3.8.0

1. INTRODUCTION

1.1 Scope

Between the entities of the Public Land Mobile Network there will be a need for an information flow, specific for this system, in order to handle the special behaviour of the roaming Mobile Stations. To transfer this information the Signalling System No 7 specified by CCITT will be applied.

~~This~~ The Recommendation <u>GSM 09.02</u> describes the requirements for the signalling system and the procedures needed at the application level in order to fulfil these signalling needs.

<u>The recommendation GSM 09.02-DCS describes the deviations from the recommendation GSM 09.02 needed for the implementation of DCS 1800. All deviations are marked on the relevant pages as double underlined and/or struck through text with revision bars in the right margins.</u>

<u>GSM 09.02-DCS consists of GSM 09.02 with the pages in this specification replacing those in GSM 09.02.</u>

Where the term "For further study" (or the abbreviations "FS" or "FFS") is used in this recommendation, this means that this is not relevant for ETSI GSM Phase 1 standard.

1.2 Applicability to GSM

The following procedure is not required in GSM PLMNs:

- Deregistration in the HLR (Para 5.2.3.3.3).

1.3 Abbreviations

The following abbreviations are used in this Recommendation:

AE	Application Entity
ASE	Application Service Element
BSS	Base Station System (BS may be used instead)
EIR	Equipment Identity Register
GMSC	Gateway Mobile-Services Switching Centre
GSM	Groupe Spécial Mobile
HLR	Home Location Register
IMEI	International Mobile Station Equipment Identity
IMSI	International Mobile Subscriber Identity
IWMSC	Interworking Mobile-services Switching Centre
LA	Location Area
MAP	Mobile Application Part
MS	Mobile Station
MSC	Mobile-Services Switching Centre
MSISDN	Mobile Station ISDN Number
MSRN	Mobile Station Roaming Number
PLMN	Public Land Mobile Network
SCCP	Signalling Connection Control Part
SS	Supplementary Services
TC	Transaction Capabilities
TCAP	Transaction Capabilities Application Part
TMSI	Temporary Mobile Station Identity
VLR	Visitor Location Register

2. CONFIGURATION OF THE MOBILE NETWORK

2.1 The entities of the mobile system

To provide the mobile service as it is defined, it is necessary to introduce some specific functions. These functional entities can be implemented in different equipments or gathered. In any case, exchanges of data occur between these entities.

2.1.1 The Home Location Register

This functional entity is a data base in charge of the management of mobile stations. A PLMN may contain one or several HLRs: it depends on the number of mobile subscribers, on the capacity of the equipment and on the organization of the network. All subscription data are stored there. The main information stored there concerns the location of the mobile station in order to be able to route the calls to the subscriber. All the management interventions occur on this data base. This data base is used for routinc of calls to mobile stations managed by this HLR. The HLRs have no direct control of MSCs.

Two numbers are attacned to each mobile subscription and are stored in the HLR:

- the International Mobile Station Identity (IMSI)

- the Mobile Station International ISDN number (MSISDN)

The data base contains other information such as:

- routing information (e.g. Mobile Station Roaming Number MSRN)

- basic telecommunication services subscription information

- service restrictions (e.g. roaming limitation)

- supplementary services; the tables contain the parameters attached to these services.

The organization of the subscriber data is detailed in Recommendation GSM 03.08.

2.1.2 The Visitor Location Register

A mobile roaming in an MSC area is controlled by the Visitor Location Register in charge of this area. When a mobile appears in a location area it starts a location updating procedure. The MSC in charge of that area notices this registration and transfers to the Visitor Location Register the identity of the location area where the mobile is situated. If this MS is not yet registered, the VLR may allocate a roaming number which will be used to route the calls to this station via the fixed network.

A VLR may be in charge of one or several MSC areas.

The VLR contains also the information needed to handle the calls set up or received by the MSs registered in its data base (for some supplementary services the VLR may have to obtain additional information from the HLR): in its tables the following elements can be found:

- the IMSI

- the Mobile Station International ISDN number

- the Mobile Station Roaming Number, if allocated at location updating.

authentication parameters. If the IMSI response is not received, the new VLR tries to get the IMSI from the MS (5.12, identity management).

When the new VLR has received the IMSI either from the MS or from the previous VLR, the new VLR will send the update location message to the home location register of the MS. This message will contain location information (a combination of mobile station roaming number, MSC number, VLR number, local mobile station identity, depending upon whether call routing information is provided to the HLR at location registration or at incoming call set-up).

If the MS is allowed to roam, the home location register will return the update location acknowledge message (including the HLR number). The information element required by the VLR (category, supplementary services parameters) are provided to the VLR in the operation insert subscriber data of § 5.6.2. The details of this operation are not included in the following description of the location updating procedures.

The visitor location register will send the update location area acknowledge message to the MSC.

If the MS is not allowed to roam, the home location register will mark the MS with a roaming not allowed indicator and return the roaming not allowed message in response to the update location message. The visitor location register will then send the roaming not allowed message to the MSC and delete all MS data. The reason for refusing the location updating is also sent to the MS in the LR-CONFIRM message.

When the roaming not allowed indicator is set and the immediate call forwarding service is not active, the HLR will bar incoming calls to the MS. If the immediate call forwarding service is active, the HLR will forward the call to the required destination. If the MS is making a call when it is in an area into which roaming is not allowed, this will correspond to the case when the MS is not known in the VLR.

5.2.1.2.3 Location register updating Initiated by VLR

If the "HLR confirmed indicator" is set to false, the visitor location register may initiate location register updating if the VLR receives an attach IMSI message, a process access request message or a search acknowledge message.

The VLR may also initiate location register updating if the VLR has to reallocate mobile station roaming numbers (only if mobile station roaming numbers are allocated at location registration).

Other cases where the VLR initiates location register updating may be identified in the future.

> Note: In these cases the call set-up or operation of the supplementary service is suspended until the updating has been completed.

The procedures for updating the home location register are shown in Figure 5.2.5 and are similar to those described in 5.2.1.2.2 for information exchange between the visitor location register and the home location register.
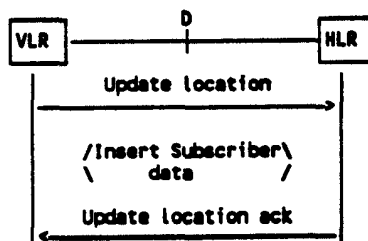

Figure 5.2.5 Updating Initiated by VLR

5.2.1.3 Detailed procedures for location registration

5.2.1.3.1 Procedures in the MSC

Figure 5.2.6 shows the application specific procedures and Figure 5.2.7 shows the ASE/TCAP interface procedures. For this purpose the MSC only requires one TC interface, i.e. towards its associated VLR.

The update location area message is sent in a TC-INVOKE REQUEST primitive. Time-out supervision is requested from TCAP (timer T-lau). Timer T-lau must be large enough to allow the VLR to perform all functions as defined in 5.2.1.3.2. The following responses may be received from TCAP:

- TC-RESULT-L INDICATION primitive containing the update location area acknowledge message. This message indicates a successful outcome of the procedure and the roaming allowed indication is returned to the MS (in the LR-CONFIRM (X) message);

- if the update location area acknowledge message contains parameter errors, a reject request is returned and an updating failure indication is provided to the MS;

- TC-L-CANCEL INDICATION primitive which is seen by the ASE as a timer expired message. The indication provided to the MS is updating failure;

- TC-(U-)REJECT INDICATION primitive which is seen by the ASE as a reject indication message containing the cause for rejection as inserted by the VLR or TCAP. The indication updating failure is sent to the MS. As an option the MSC may initiate an alarm condition since the TC-(U-)REJECT INDICATION normally will indicate a protocol error. The MSC should not restart the operation;

- an associated procedure may fail, the MS may release the radio path or the radio path may be interrupted. In such cases the procedure is terminated by a TC-U-ABORT REQUEST primitive, containing the respective abort cause. Similarly, the MSC may receive a TC-ABORT INDICATION primitive. In this case the updating failure indication is provided to the MS;

- a negative result is received in a TC-U-ERROR INDICATION primitive and the actions taken by the MSC are as follows:

i)   roaming not allowed in the new area. This indication is provided to the MS. If there is no associated parameter or the parameter is PLMN not allowed, then PLMN not allowed is sent to the MS. If the associated parameter has the value national roaming not allowed, then national roaming not allowed for this location area is sent to the MS;

ii)   illegal subscriber is received when authentication was performed in conjunction with the location registration and the MS did not pass the authentication check (see § 5.10 for procedures). The condition is shown to the ASE as an illegal MS message and the corresponding information is provided to the MS. Since this case may correspond to fraudulent access from an MS, an alarm condition may be set in the MSC;

iii) system failure. The updating failure indication is provided to the MS;

iv)   unknown subscriber. This indication is provided to the MS and, as an option, an alarm condition may be set in the MSC;

v)   unknown location area, or unexpected data value. The updating failure
           indication is provided to the MS. An error condition is set in the MSC since
           the receipt of these messages may indicate fault conditions in the MSC.

5.2.1.3.2 Procedures in the VLR

The detailed procedures in the VLR are given in Figures 5.2.8, 5.2.9, 5.2.10 and 5.2.11.

The application specific procedure in the VLR associated with the MSC is shown in Figure 5.2.8.
When an update location area message is received from the MSC, various decision processes take
place:

-          if there are parameter errors in the message, a reject indication or the unexpected data
           value message is returned, as appropriate;

-          if the indicated location area is not known in the VLR, the unknown location area
           message is returned;

-          if the subscribers MCC and MNC indicate that national roaming is applicable, but this is
           not provided in the requested location area, the error roaming not allowed with
           parameter national roaming not allowed is returned;

-          if the MS is already registered in the VLR, (i.e. the IMSI or TMSI used is known by the
           VLR), and either national roaming is not applicable for subscribers of that PLMN1, or it
           can be offered in the requested location area, then updating of the HLR needs only take
           place if the "HLR confirmed indicator" is set to false. Otherwise the update location area
           acknowledge message is returned to the MSC, after initiation of ciphering and TMSI
           reallocation, if required;

-          if the MS is not registered in the VLR, and either national roaming is not applicable for
           subscribers of that PLMN1, or it can be offered in the requested location area, then the
           VLR can only update the HLR if the update location area message contains enough
           routing information, i.e. either the IMSI or a TMSI plus the location area identity (LAI) of
           the previous location area. In the first case the VLR will derive the required routing
           information for accessing the HLR of the MS. In the latter case the LAI will enable the
           VLR to derive the address of the previous VLR (VLR1) and to initiate the send parameters
           operation containing a request for IMSI and authentication parameters. The previous VLR
           will in response provide the IMSI and the authentication parameters of the MS. If the
           IMSI is not obtained (receipt of unidentified subscriber, reject or unexpected data value),
           the new VLR may request the MS to identify itself by using the IMSI. The identification
           procedure will also be used if the MS identifies itself with a TMSI which is not known in
           the VLR and for which the address of the previous VLR cannot be derived. If the
           identification procedure fails for any reason, the system failure message is returned to
           the MSC;

-          authentication may be required during location register updating. If the authentication
           parameters are not already stored in the VLR, they may be obtained either from the
           previous VLR or from the HLR depending on whether the MS identified itself by the TMSI
           or the IMSI. The authentication procedure towards the MSC/MS will take place (state 2
           "Wait for authentication"). This procedure is defined in § 5.10 and is only included here

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1 Note: The decision to offer national roaming (ie. roaming with restrictions on a location area basis) is made in the VLR. A
subscriber for whom national roaming is not applicable (i.e. there is no agreement on national roaming with the subscribers
PLMN) shall anyhow be offered normal GSM roaming (ie. on a whole PLMN basis) in the visited network. In this case normal
location updating takes place and the decision on whether to offer GSM roaming is taken in the subscribers home network, ie.
in the HLR.

to identify which actions need to take place depending on the outcome of the procedure: the illegal MS message is generated if authentication based on IMSI failed or authentication based on TMSI failed and no new attempt based on IMSI is to be performed (Note, for a new attempt based on IMSI, the IMSI is to be obtained from the MS first). The unknown subscriber message is generated if the authentication procedure required an interrogation of the HLR and the HLR reported the unknown subscriber condition. The system failure message is generated if the authentication procedure failed for other reasons (e.g. authentication parameters are not obtained) and the VLR does not support stand alone operation.

The procedure for updating of the HLR is as follows. The VLR first sends the update location message to the HLR. A successful outcome is indicated in the update location acknowledge message. The VLR will then set the "HLR confirmed indicator" to true and send the update location area acknowledge message to the MSC, after initiation of ciphering and TMSI reallocation, if required.

Unsuccessful outcome is indicated in the messages

-       roaming not allowed if the MS is not allowed to roam into the area controlled by the VLR. The VLR will not store any information on that MS and forward the error either without parameter or using the parameter value PLMN not allowed;

-       unknown subscriber if no subscription information on the MS is contained in the HLR. The VLR will then not keep any information on that MS.

The corresponding error messages are sent to the MSC if the MSC initiated the updating.

If the location updating procedure to the HLR fails (receipt of a system failure message, an unexpected data value message, a reject indication, a timer expired indication, or an update location acknowledge message with parameter errors) and the VLR does not support stand alone operation, the system failure message is sent to the MSC. If stand alone operation is supported and "old" MS data are present, the update location area acknowledge message is sent to the MSC, after initiation of ciphering and TMSI reallocation, if required.

The VLR may also return a reject request if there are parameter errors in the message.

Updating of the HLR may also be initiated by other processes in the VLR, e.g. if the mobile station roaming numbers have to be reallocated.

For location updating purposes the VLR must support three MAP interfaces:

-       to the MSC (Figure 5.2.9)

-       to the HLR (Figure 5.2.l0)

-       to the previous VLR (Figure 5.2.ll)

The ASE/TCAP interface procedures are as follows:

At the VLR/MSC interface (Figure 5.2.9) the VLR will receive a TC-INVOKE INDICATION primitive containing the update location area message. Either of the following responses may be received from the application specific procedure of Figure 5.2.8:

-       update location area acknowledge message if the updating was successful and the MS is allowed to roam into the area. The message is sent in the TC-RESULT-L REQUEST primitive;

- reject request if procedure errors are discovered in the update location area message. This is sent in a TC-U-REJECT REQUEST primitive;

- other unsuccessful events are returned in TC-U-ERROR REQUEST primitive:

  i)   roaming not allowed;
  ii)   illegal MS;
  iii)   system failure;
  iv)   unknown subscriber;
  v)   unknown location area;
  vi)   unexpected data value.

At the VLR/HLR interface (Figure 5.2.l0) the VLR initiates the operation update location sent in a TC-INVOKE REQUEST primitive. TCAP is requested to supervise the procedure by timer T-lu. The results of the procedure are as follows:

- the update location acknowledge message is contained in the TC-RESULT-L INDICATION primitive;

- if timer T-lu expires, this is indicated in a TC-L-CANCEL INDICATION primitive;

- if the HLR or TCAP rejects the operation because of procedure errors, the cause is received in a TC-(U)REJECT INDICATION;

- if the updating is unsuccessful, the cause is received in a TC-U-ERROR INDICATION primitive:

  i)   unknown subscriber;
  ii)   roaming not allowed;
  iii)   unexpected data value;
  iv)   system failure.

At the VLR/previous VLR (VLR1) interface (Figure 5.2.11) the VLR initiates the operation send parameters (IMSI). VLR1 is requested to provide the IMSI corresponding to the indicated TMSI, and also authentication parameters for that MS. TCAP is requested to supervise the procedure by the timer T-par. The results of the procedure are as follows:

- the send parameters acknowledge (IMSI response) message is contained in a TC-RESULT-L INDICATION primitive. Two cases may occur:

  i)   only IMSI
  ii)   IMSI + authentication set;

- the TC-L-CANCEL INDICATION primitive is used to indicate expiry of timer T-par;

- the TC-(U-)REJECT INDICATION primitive is used to indicate procedure errors discovered by the previous VLR or TCAP;

- the TC-U-ERROR INDICATION is used to indicate an unsuccessful outcome as follows:

  i)   Unidentified subscriber;
  ii)   unexpected data value.

5.2.1.3.3 Procedures in the HLR

The procedures are shown in Figures 5.2.12 and 5.2.13.

The application specific procedure for location registration in the HLR is shown in Figure 5.2.12 and is as follows:

-   if the MS is unknown in the HLR, the unknown subscriber message is returned;

-   if the MS is not allowed to roam into the area controlled by the VLR, the roaming not allowed message is returned without parameters. The HLR will set a roaming not allowed | indicator which will be used for barring or forwarding of MS terminating calls and initiate the location cancellation procedure of § 5.2.2 towards the previous VLR.

-   if the MS is allowed to roam into the area, the update location acknowledge message is returned to the VLR.

-   if the message contains parameter or data errors, the HLR ignores the message and returns a reject request or the unexpected data value message depending upon the nature of the error.

In case the MS is known and no parameter or data errors occurred it is checked whether the "SS ind" for the MS is set to false due to restoration of the HLR. In that case, the check SS procedure is invoked.

If the MS is allowed to roam into the area, the subscriber parameters are transferred to the VLR by using the insert subscriber data operation of § 5.6.2. In case of successful parameter transfer, a "MS present" indication is set in order to alert service centers that the MS is available for SMS, and the update location acknowledge message is returned to the VLR. Otherwise, a system failure indication is returned.

If the update location message is received from a new VLR, the HLR will initiate the location cancellation procedure of § 5.2.2 towards the previous VLR.

The ASE/TCAP procedure is contained in Figure 5.2.13. The TC-INVOKE INDICATION primitive will contain the update location message. The results are returned as follows:

-   a TC-U-REJECT REQUEST primitive is used to provide the cause if procedure errors are discovered;

-   the update location acknowledge message is returned in the TC-RESULT-L REQUEST-primitive;

-   unsuccessful outcomes are contained in a TC-U-ERROR REQUEST primitive as follows:

    i)   unknown subscriber;
    ii)   roaming not allowed;
    iii)   unexpected data value;
    iv)   system failure.

The insert subscriber data operations will use the transaction opened by the update location operation.

5.2.1.3.4 Procedures in the previous VLR (VLR1)

The application specific procedure is shown in Figure 5.2.14.

On receiving the send parameters (IMSI) message the previous VLR will return:

-   the send parameters acknowledge (IMSI response) message if the TMSI is valid. This message will also contain authentication parameters if requested by the new VLR;

-   the unidentified subscriber message if the TMSI is not allocated in the VLR;

-   a reject request or unexpected data value message is sent if the message contains parameter or data errors.

The interface procedure is contained in Figure 5.2.15. The previous VLR will receive the send parameters (IMSI) message in the TC-INVOKE INDICATION primitive. The results are returned as follows:

-   a TC-U-REJECT REQUEST primitive is used to provide the cause if procedure errors are detected;

-   the send parameters acknowledge (IMSI response) message is returned in the TC-RESULT-L REQUEST primitive. Two cases may occur:

    i)   only IMSI
    ii)   IMSI + authentication set;

-   unsuccessful outcomes are reported in a TC-U-ERROR REQUEST primitive as follows:

    i)   unidentified subscriber;
    ii)   unexpected data value.

Figure 5.2.6 (Sheet 1 of 2)
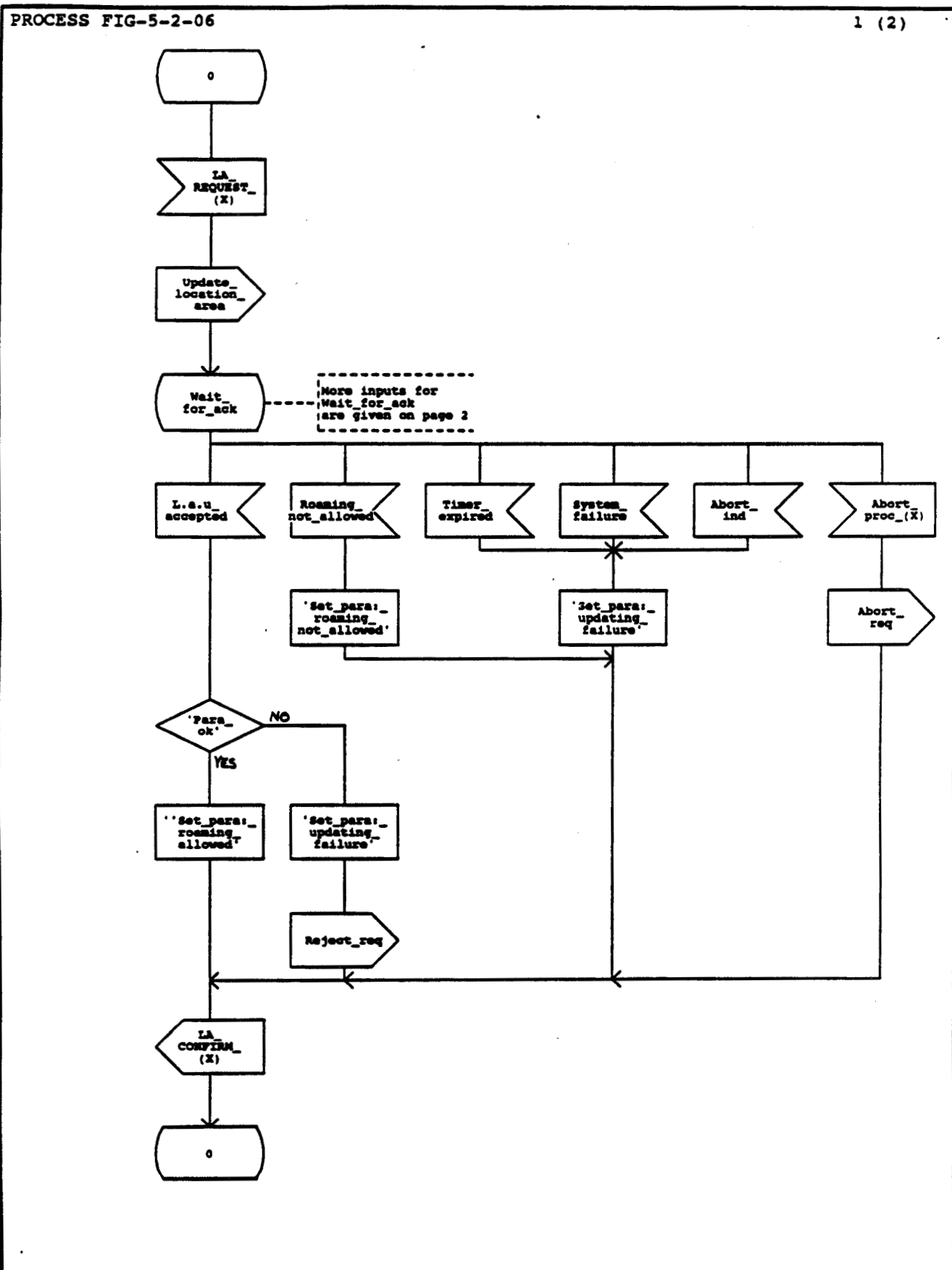Application specific procedures in MSC for location registration

Figure 5.2.8 (Sheet 1 of 5)
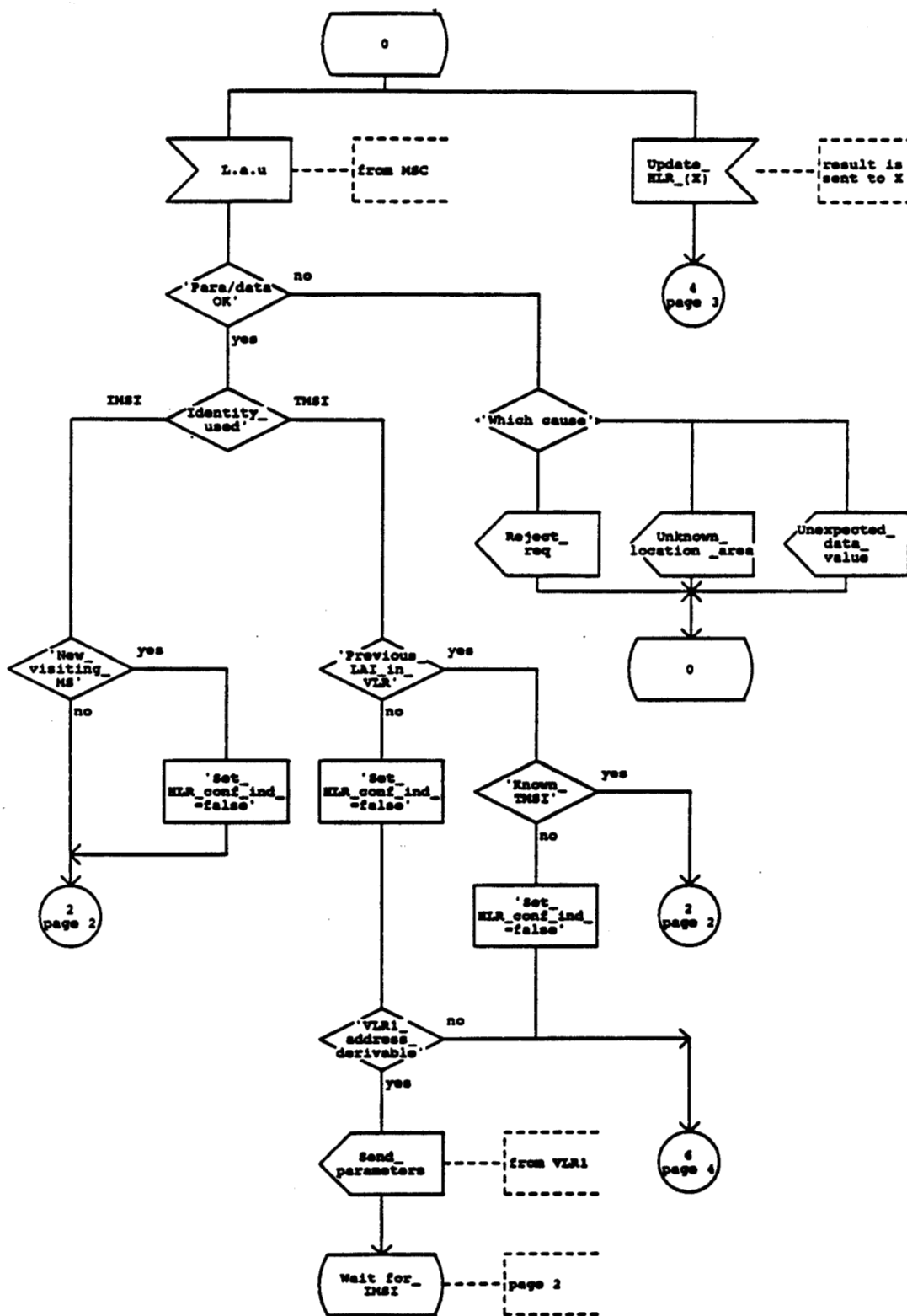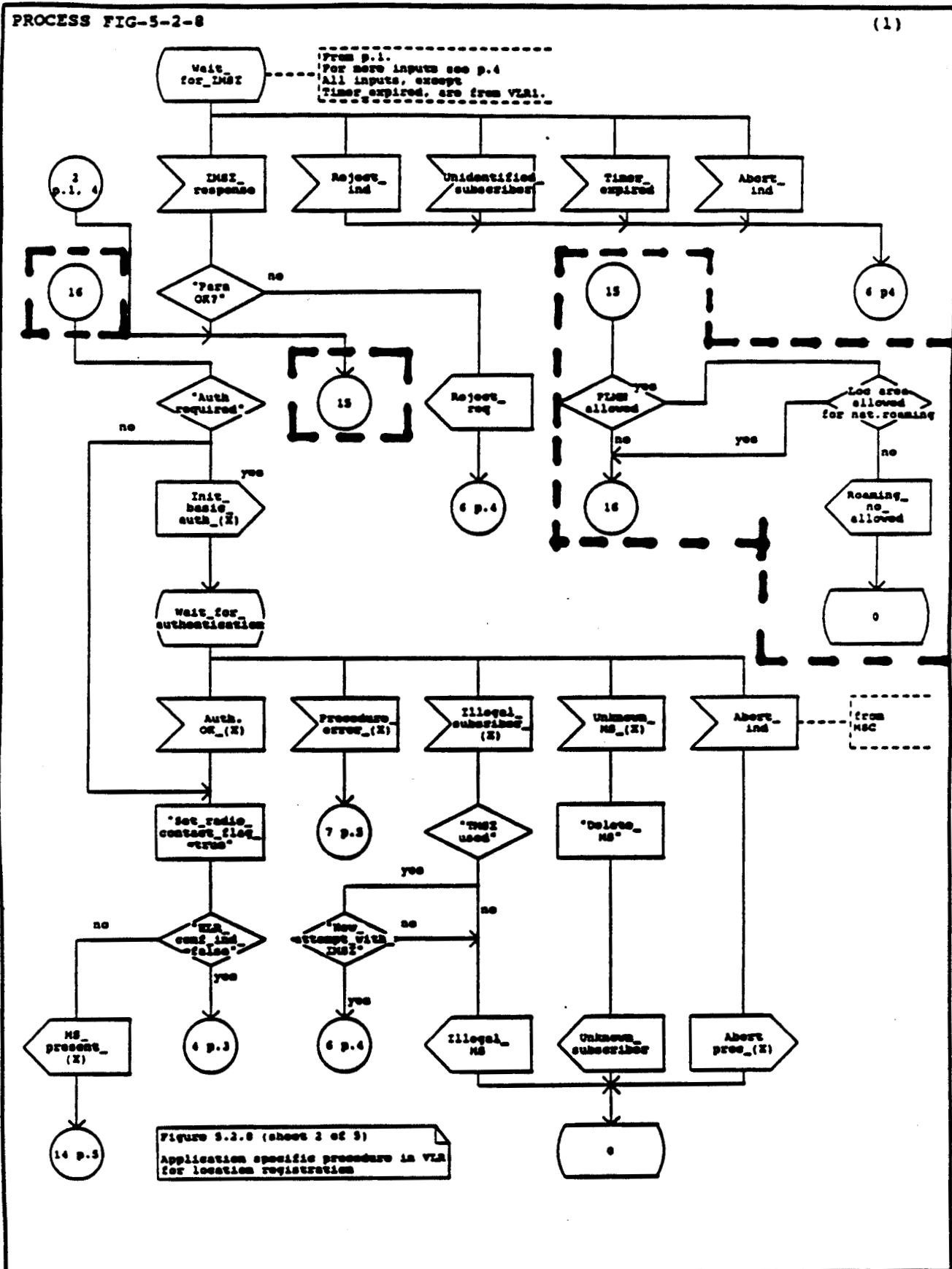Application specific procedures in VLR for location registration

Figure 5.2.8 (Sheet 2 of 5)
Application specific procedures in VLR for location registration

UnidentifiedSubscriber ::= ERROR

UnallocatedRoamingNumber ::= ERROR

UnknownEquipment ::= ERROR

RoamingNotAllowed ::= ERROR
PARAMETER
        cause ENUMERATED {
                PLMNNotAllowed (0),
                NationalRoamingNotAllowed (1)} -- optional
        -- The parameter is optional for VLR use, not allowed for HLR use.
        -- In case the parameter is not present, PLMNNotAllowed shall be assumed.

IllegalMS ::= ERROR

BearerServiceNotProvisioned ::= ERROR

TeleServiceNotProvisioned ::= ERROR

InsufficientBearerCapabilities ::= ERROR

CallBarred ::= ERROR
PARAMETER
        cause ENUMERATED {
                barringServiceActive (0),
                operatorBarring (1)} -- optional

--
ForwardingViolation ::= ERROR

--
CUG-Reject ::= ERROR
PARAMETER
        cause ENUMERATED {
                incomingCallBarred(0),
                nonCUGmember (1)} -- optional

--
IllegalSS-Operation ::= ERROR

--
SS-ErrorStatus ::= ERROR
PARAMETER
        ss-Status   SS-Status -- optional

--
SS-NotAvailable ::= ERROR

SS-SubscriptionViolation ::= ERROR
PARAMETER
                ss-SubscriptionOption SS-SubscriptionOption -- optional

Figure 6.3/1 (Sheet 2 of 4)

ASN.1 Specification of MAP errors types

```
--
SS-Incompatibility ::= ERROR
PARAMETER                           SEQUENCE{
            ss-Code                 [1] IMPLICIT SS-Code OPTIONAL,
            basicService            BasicServiceCode OPTIONAL,
            ss-Status               [4] IMPLICIT SS-Status OPTIONAL} -- optional


--
FacilityNotSupported ::= ERROR


--
InvalidTargetBaseStation ::= ERROR

NoRadioResourceAvailable ::= ERROR

NoHandoverNumberAvailable ::= ERROR


SubsequentHandoverFailure ::= ERROR


AbsentSubscriber ::= ERROR
PARAMETER
            mwd-Set                 BOOLEAN -- optional

BusySubscriber ::= ERROR

NoSubscriberReply ::= ERROR

RadioCongestion ::= ERROR

ImpossibleCallCompletion ::= ERROR
PARAMETER
            activeSupplServices     SS-CodeList -- optional

SM-DeliveryFailure ::= ERROR
PARAMETER
            cause ENUMERATED {memoryCapacityExceeded (0),
                        msProtocolError (1),
                        msNotEquiped (2),
                        unknownServiceCentre (3),
                        scCongestion (4),
                        invalidSmeAddress (5),
                        msNotScSubscriber (6)}


MessageWaitingListFull ::= ERROR
```

Figure 6.3/1 (Sheet 3 of 4)

ASN.1 Specification of MAP errors types

--

SystemFailure ::= ERROR
PARAMETER   NetworkResource — optional

DataMissing ::= ERROR

UnexpectedDataValue ::= ERROR

PasswordRegistrationFailure ::= ERROR
PARAMETER
          diagnostic ENUMERATED{undetermined (0),
                      invalidFormat (1),
                      newPasswordsMismatch (2)}

NegativePasswordCheck ::= ERROR

NoRoamingNumberAvailable ::= ERROR

TracingBufferFull ::= ERROR

END — End of error types definitions

Figure 6.3/1 (Sheet 4 of 4)

ASN.1 Specification of MAP errors types

6.3.2 Errors types description

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

6.3.2.1 Identification and numbering

6.3.2.1.1 UnknownSubscriber

This error is returned by a location register, when it is requested to perform an operation concerning an unknown subscriber (ie, the IMSI or the directory number is not allocated to a subscriber).

6.3.2.1.2 UnknownBaseStation

This error is returned by an MSC when it is requested to perform an operation concerning an unknown base station.

6.3.2.1.3 UnknownMSC

This error is returned by an MSC when it is requested to perform an operation concerning an unknown MSC.

6.3.2.1.4 UnknownLocArea

This error is returned by a network entity when its is requested to perform an operation related to an unknown location area.

6.3.2.1.5 UnidentifiedSubscriber

This error is returned by a VLR, in response to an operation related to a subscriber not registered in its data base (ie, the IMSI is not known).

6.3.2.1.6 UnallocatedRoamingNumber

This error is returned by a VLR when it receives a request concerning a roaming number that is not allocated.

6.3.2.1.7 UnknownEquipment

This error is returned by an EIR when it is requested for the status of a non registered equipment.

6.3.2.2 Subscription

6.3.2.2.1 RoamingNotAllowed

This error is returned by a location register when it is requested to update the location of a subscriber, roaming out of the area covered by its subscription. Between VLR and MSC a parameter can be sent which indicates that the requested location area is a forbidden location area for national roaming.

6.3.2.2.2 IllegalMS

This error is returned by a VLR when the procedure cannot be achieved because the mobile subscriber has not been authenticated.

6.3.2.2.3 BearerServiceNotProvisioned

This error is returned by a location register when it is requested for call set-up information related to a non provisioned bearer service.