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ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

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Contents

Foreword

This final draft European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Voting phase of the ETSI standards approval procedure.

This final draft ETS describes the function associated with the administration of data related to subscribers, mobile equipments and services within the Digital cellular telecommunications system, specifically from the network management point of view. This ETS corresponds to GSM technical specification, GSM 12.02, version 4.6.0.

The specification from which this ETS has been derived was originally based on GSM Phase 1 documentation, hence the presentation of this ETS is not entirely in accordance with the ETSI/PNE rules.

NOTE: TC-SMG has produced documents which give technical specifications for the implementation of the Digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These specifications may subsequently become I-ETSs (Phase 1), or European Telecommunication Standards (ETSs)(Phase 2), whilst others may become ETSI Technical Reports (ETRs). These ETSI-GSM Technical Specifications are, for editorial reasons, still referred to in this ETS.

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI adoption
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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1 Scope

This final draft European Telecommunication Standard (ETS) gives a description of the function associated with the administration of data related to subscribers, mobile equipments and services, specifically from the network management point of view.

This data, known as the Subscriber Profile, is used for the provision of services for a particular user of a PLMN, or for the user's equipment represented by the International Mobile Subscriber Identity (IMSI) and the International Mobile Equipment Identity (IMEI) respectively. The functions include the administrative procedures for both the subscriber (for example 'provision of service'), and the equipment identified by the IMEI. Also included is the management of subscriber data necessary for network management.

The managed functional entities involved are the Home Location Register (HLR), Visitor Location Register (VLR), Mobile Switching service Centre (MSC), Equipment Identity Register (EIR), Authentication Centre (AUC). The administration of subscriber data in all these entities is part of this ETS; which includes the means for a PLMN Operator to create, update, and delete information concerning a particular subscriber in order to allow (or bar) the use of the network.

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

The following GSM specifications have been taken into account for this ETS:

[1] GSM 01.04 (ETR 100): "Digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".

[2] GSM 02.02 (ETS 300 501): "Digital cellular telecommunication system (Phase 2); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[3] GSM 02.03 (ETS 300 502): "Digital cellular telecommunication system (Phase 2); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[4] GSM 02.04 (ETS 300 503): "Digital cellular telecommunication system (Phase 2); General on supplementary services".

[5] GSM 02.16 (ETS 300 508): "Digital cellular telecommunication system (Phase 2); International Mobile station Equipment Identities (IMEI)".

[6] GSM 02.41 (ETS 300 513): "Digital cellular telecommunication system (Phase 2); Operator determined barring".

[7] GSM 02.81 (ETS 300 514): "Digital cellular telecommunication system (Phase 2); Line identification supplementary services - Stage 1".

[8] GSM 02.82 (ETS 300 515): "Digital cellular telecommunication system (Phase 2); Call Forwarding (CF) supplementary services - Stage 1".

[9] GSM 02.83 (ETS 300 516): "Digital cellular telecommunication system (Phase 2); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 1".

[10] GSM 02.84 (ETS 300 517): "Digital cellular telecommunication system (Phase 2); MultiParty (MPTY) supplementary services - Stage 1".

[11] GSM 02.85 (ETS 300 518): "Digital cellular telecommunication system (Phase 2); Closed User Group (CUG) supplementary services - Stage 1".

[12] GSM 02.86 (ETS 300 519): "Digital cellular telecommunication system (Phase 2); Advice of charge (AoC) supplementary services - Stage 1".

[13] GSM 02.88 (ETS 300 520): "Digital cellular telecommunication system (Phase 2); Call Barring (CB) supplementary services - Stage 1".

[14] GSM 03.03 (ETS 300 523): "Digital cellular telecommunication system (Phase 2); Numbering, addressing and identification".

[15] GSM 03.08 (ETS 300 526): "Digital cellular telecommunication system (Phase 2); Organisation of subscriber data".

[16] GSM 03.12 (ETS 300 530): "Digital cellular telecommunication system (Phase 2); Location registration procedures".

[17] GSM 03.15 (ETS 300 533): "Digital cellular telecommunication system (Phase 2); Technical realization of operator determined barring".

[18] GSM 03.20 (ETS 300 534): "Digital cellular telecommunication system (Phase 2); Security related network functions".

[19] GSM 03.22 (ETS 300 535): "Digital cellular telecommunication system (Phase 2); Functions related to Mobile Station (MS) in idle mode".

[20] GSM 03.40 (ETS 300 536): "Digital cellular telecommunication system (Phase 2); Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[21] GSM 03.41 (ETS 300 537): "Digital cellular telecommunication system (Phase 2); Technical realization of Short Message Service Cell Broadcast (SMSCB)".

[22] GSM 04.08 (ETS 300 557): "Digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 specification".

[23] GSM 09.02 (ETS 300 599): "Digital cellular telecommunication system (Phase 2); Mobile Application Part (MAP) specification".

[24] GSM 09.07 (ETS 300 604): "Digital cellular telecommunication system (Phase 2); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or the Public Telephone Network (PSTN)".

[25] GSM 12.00 (ETS 300 612-1): "Digital cellular telecommunication system (Phase 2); Objectives and Structure of PLMN Management".

[26] GSM 12.01 (ETS 300 612-2): "Digital cellular telecommunication system (Phase 2); Common Aspects of PLMN Network Management".

[27] GSM 12.03 (ETS 300 614): "Digital cellular telecommunication system (Phase 2); Security Management".

[28] GSM 12.04 (ETS 300 615): "Digital cellular telecommunication system (Phase 2); Performance Data Measurement".

[29] GSM 12.05 (ETS 300 616): "Digital cellular telecommunication system (Phase 2); Subscriber Related Event and Call Data".

[30] GSM 12.06 (ETS 300 617): "Digital cellular telecommunication system (Phase 2); GSM Network configuration management".

[31] GSM 12.07 (ETS 300 612-3): "Digital cellular telecommunication system (Phase 2); Operations and Performance Measurement".

[32] GSM 12.08 (ETS 300 627): "Digital cellular telecommunication system (Phase 2); Subscriber and Equipment Trace".

[33] GSM 12.20 (ETS 300 622): "Digital cellular telecommunication system (Phase 2); Network Management Procedures and Messages".

[34] CCITT M.3010 (White book): "Principles for a Telecommunication Management Network".

[35] CCITT M.3020 (White book): "TMN Interface Specification Methodology".

[36] CCITT M.3100 (White book): "Generic Network Information Model".

[37] CCITT M.3200 (White book): "TMN Management Services".

[38] CCITT M.3400 (White book): "TMN Management Functions".

[39] CCITT M.60 (White book): "Maintenance Terminology and Definitions".

[40] CCITT X.700 (White book): "Management framework for Open Systems Interconnection (OSI) for CCITT applications".

[41] CCITT X.701 (White book): "Information technology - Open Systems Interconnection - Systems Management Overview".

[42] CCITT X.720 (White book): "Information technology - Open Systems Interconnection - Structure of management information: Management Information Model".

[43] CCITT X.721 (White book): "Information technology - Open Systems Interconnection - Structure of management information: Definition of Management Information".

[44] CCITT X.722 (White book): "Information technology - Open Systems Interconnection - Structure of Management Information: Guidelines for the definition of managed objects".

[45] CCITT X.730 (White book): "Information technology - Open Systems Interconnection - Systems Management: Object Management Function".

[46] CCITT X.731 (White book): "Information technology - Open Systems Interconnection - Systems Management: State Management Function".

[47] CCITT X.732 (White book): "Information technology - Open Systems Interconnection - Systems Management: Attributes for representing relationships".

[48] CCITT X.733 (White book): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[49] CCITT X.734 (White book): "Information technology - Open Systems Interconnection - Systems Management: Event report management function".

[50] CCITT X.735 (White book): "Information technology - Open Systems Interconnection - Systems Management: Log control function".

[51] ETR 047: "Network Aspects (NA); Telecommunications Management Network (TMN) Management services".

[52] I-ETS 300 291: "Network Aspects (NA); Functional specification of Customer Administration (CA) on the Operations System/Network Element (OS/NE) interface".

[53] ETSI TCRTR 008: "Network Aspects (NA); Network architecture, operation & maintenance principlesand performance Telecommunications Management Network (TMN) Vocabulary of terms; Vocabulary of Terms for TMN".

2.1 Relationship with other specifications

The references to core specifications mainly concern the GSM 02 and 03 series and the specifications GSM 09.02 and GSM 09.07.

The general objectives of PLMN management are contained in GSM 12.00 and the common aspects are in GSM 12.01.

Since subscriber data management is regarded as a sensitive area, security aspects need to be specifically taken into account according to GSM 12.03.

For subscriber and equipment tracing GSM 12.08 covers the activation and deactivation of the tracing function, and the contents of the trace records are defined in GSM 12.05.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the ETS the following definitions apply.

Customer: A customer can be handled by an administration as an entity for various reasons which are beyond the scope of this specification. A given customer can have more than one subscription and therefore more than one subscriber profile.

- This ETS does not consider any relationships that may exist due to several subscribers belonging to the same customer.

- Following from this it can be stated that the perspective of the specification is intended to be that of the single subscriber.

Managed Element: A Managed Element represents the location where the Q.3 interface and its associated resources are provided.

Subscriber: The term subscriber in this specification signifies a single subscription in connection with a particular subscriber profile, this profile being related 1:1 with one IMSI.

Subscriber Profile: The Subscriber Profile is the representation of a subscriber within the Managed Element. It may be considered to be synonymous with the subscriber. The Subscriber Profile is related to all resources used by the subscriber and contains all services provisioned for the subscriber. It is related 1:1 to one IMSI.

Subscriber data administration: All actions intended to maintain the currency and integrity of subscriber data.

Subscriber data: The data defined in the GSM 02 and 03 series specifications in general, plus the additional data related to operations specified in this ETS.

For further TMN definitions, see CCITT M.60 and ETSI TCRTR 008 Vocabulary of Terms for TMN.

3.2 Abbreviations

For the purposes of the ETS, the following abbreviations apply.

AUC	AUthentication Centre
BCA	Bearer Capability Allocation
BS	Basic Service
BSG	Basic Service Group
EIR	Equipment Identity Register
FFS	for further study
GSM	Global System for Mobile Communications
HLR	Home Location Register
HPLMN	Home Public Land Mobile Network
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
ISDN	Integrated Services Digital Network
LR	Location Register
ME	Mobile Equipment
MS	Mobile Station
MSC	Mobile Switching service Centre
MSISDN	Mobile Station ISDN Number
NEF	Network Element Function
NM	Network Management
OS	Operations System
OSF	Operations System Functions
PLMN	Public Land Mobile Network
SIM	Subscriber Identity Module
SS	Supplementary Service(s)
TMN	Telecommunication Management Network
VPLMN	Visited Public Land Mobile Network
VLR	Visitor Location Register

For further abbreviations, see GSM 01.04

4 TMN Management Services

The purpose of this ETS is to define the functions and data necessary to fulfil the requirements imposed by the following TMN Management Services (Source ETR 047).

- Customer Administration;
- Management of Mobile Equipment;
- Customer Controlled Management Service (FFS).

4.1 Customer Administration

Customer Administration is a management activity performed by the Network Operator. Its purpose is two-fold: firstly, to exchange with the customer all the customer related management data and functions required to operate a telecommunication service; and secondly, to exchange with the network all customer related management data and functions to provide that service. Only the second activity is within the scope of this ETS.

In a wider sense this could include interactions for the purpose of service provision management, configuration administration, fault administration, quality of service administration, traffic measurement administration, etc. Here, however, only customer administration in the more traditional sense of service provision, service configuration and complaints management have been included.

4.2 Management of Mobile Equipment

An International Mobile Station Equipment Identity (IMEI) is a unique number which is allocated to each individual mobile station equipment in the GSM system, and shall be unconditionally implemented by the MS manufacturer (see GSM 02.16).

The implementation of IMEI is required in order to obtain information about the presence of specific mobile station equipment in the network, this information being separate from that which is IMSI related.

The main objective of managing the IMEI is to be able to take measures against the use of stolen equipment, or against equipment that for technical reasons cannot be permitted to be used in the GSM system.

A network operator can make administrative use of the IMEI, in the EIR, in the following manner:

Three registers are defined containing lists of information. The use of such lists is at the operators discretion.

> The "White List" is composed of equipment identities, held either individually or as a series, that have been allocated (i.e. type approved) in the different participating GSM countries.
>
> The "Black List" is composed of all equipment identities, held either individually or as a series, belonging to equipment that need to be barred.
>
> The "Grey List" is composed of equipment identities, held either individually or as a series, that although not barred, are tracked by the network for evaluation, or for other purposes.

Individual IMEIs may be traced using the IMEI Trace via the VLR (for details see GSM 12.08).

5 TMN Management Service Components

5.1 Impact on Service and Business Layer Functions

There are dependencies between managed data both within NEFs and between NEFs. These dependencies may be managed by NEFs or by OSFs depending on implementation. Below are listed examples of such managed data dependencies within the Subscriber Administration Area:

1) With the connection of services for a subscriber, data will be entered in the AUC and in the HLR. The data needs to be entered in the AUC before the corresponding profile for the subscriber is created in the HLR. The managed data dependency here is, that when creating the subscriber profile in the HLR a check could be made in the AUC or OS that the data for the subscriber already exists, returning a failure from the HLR if it does not (see subclause 6.2.1).

2) With the connection or upgrading of services it may be necessary to check whether or not the required services are valid in the specified combination i.e. that the result is permitted at the network element level (e.g. certain combinations of basic and supplementary services may be invalid).

3) When the service for a subscriber is discontinued, it is necessary to delete the subscriber from the HLR first. This could mean a check from the AUC to the HLR to ensure that the data in the HLR has already been deleted, otherwise a failure would be returned from the AUC.

5.2 Manage IMSI and Ki in SIM and AUC

The generation of IMSI and Ki pairs and the production, prepersonalization and personalization of SIM (i.e. the loading of the SIM with the appropriate data) are beyond the scope of this ETS.

However, for prepersonalization of SIM it is necessary to find an available IMSI, to generate a Ki and to connect IMSI and SIM (reference number) for administrative purposes.

This IMSI, Ki pair needs to now be transferred to and stored in the AUC prior to service provision in HLR. The Ki is transferred and stored in an encrypted form.

After removing the service from the subscriber the data needs to also be deleted within the AUC.

TMN Management Functions required:

Create Subscriber in AUC;
Interrogate Subscriber in AUC;
Delete Subscriber in AUC.

5.3 Manage Directory Number

It may be necessary to provide blocks of available MSISDN in the HLR. After removing service from a subscriber, it may be required to connect the MSISDN to an announcement for a certain period of time.

TMN Management Functions required:

Create MSISDN in HLR;
Modify MSISDN in HLR;
Interrogate MSISDN in HLR;
Delete MSISDN in HLR.

5.4 Manage Service Provision

When a customer order is received one or more available directory numbers (MSISDN) will be allocated as required, together with an available IMSI (and a suitable SIM) in a selected HLR. It is assumed that the IMSI and the SIM are already connected, and that the subscriber is already created in the AUC. The customer details (name, address etc.) may be recorded at the Service Layer. If a SIM has been lost by the customer, or the SIM is out of order, then a new IMSI (and SIM) will be connected to the MSISDN. If the

service is to be discontinued the corresponding data in the HLR needs to be deleted. All of these events, or just selected ones, may be recorded or logged for billing or performance measurement purposes.

TMN Management Functions required:

Create Subscriber in HLR;
Modify Subscriber in HLR;
Interrogate Subscriber in HLR;
Delete Subscriber in HLR.

5.5 Manage basic and supplementary services

Depending on user or operator service requirements, data related to basic and supplementary services may be modified, added or removed. Some services can be both customer and operator controlled. All events, or just selected ones, may be recorded or logged for billing or performance measurement purposes.

TMN Management Functions required:

Modify Subscriber in HLR;
Interrogate Subscriber in HLR.

5.6 Managing of regional subscription zones per subscriber In HLR

For regional subscription a list of zones per subscriber needs to be managed in the HLR. The definition of the zones is given in GSM 03.08. The list of zones will be managed independently, and pointed to from within a particular subscriber profile.

NOTE: The configuration data required to support the regional subscription held in the VLR is not a part of this ETS.

TMN Management Functions required:

Create Regional Subscription Zone List in Hlr;
Modify Regional Subscription Zone List in Hlr;
Interrogate Regional Subscription Zone List in Hlr;
Delete Regional Subscription Zone List in Hlr.

5.7 Managing of Bearer Capability Allocation

In multi numbering systems, several subscriber numbers are allocated to a subscriber. The bearer capability allows call compatibility checking on incoming calls to each subscriber number (msisdn) individually. To accomodate this a Bearer Capability Allocation (BCA) consisting of one or more individual bearer capabilities can be allocated to an msisdn for a subscriber.

Create Bearer Capability Allocation;
Modify Bearer Capability Allocation;
Interrogate Bearer Capability Allocation;
Delete Bearer Capability Allocation.

5.8 Managing of Customer Care

5.8.1 General

Customer Care includes the dealing with subscriber complaints which are defined in GSM 12.00. Subscriber complaints can be considered as any event received from a customer who experiences dissatisfaction with the service for a reason which is not yet confirmed by the PLMN Operator as a network problem. As such dissatisfaction is subjective, the maintenance area can only convert the original customer complaint event into a fault event when the complaint is confirmed (see GSM 12.00). The topic of administration and tracking of customer and subscriber complaints is outside the scope of this ETS.

There are two cases to be considered:

- home subscriber complaining:
  The implementation of this procedure is mainly PLMN Operator dependent as some specific law may exist within one country concerning privacy. Due to this the implementation is a national matter.

- roaming subscriber complaining:
  With the same constraints as in the above statement, a procedure can be defined by agreement between PLMN Operators. It may range from the testing of mobile stations to providing answers on subscriber complaints about the amount billed. In the latter case, the transfer of information may be handled manually. The VPLMN will more than likely be constrained by the laws of its own country with respect to information it may obtain from, or provide to, a subscriber or PLMN Operator.

For efficient handling of customer and subscriber complaints, the following information is necessary:

- Interrogation and modification of subscriber data in the HLR.

- Interrogation and, in some cases, deletion of subscriber data in the VLR.

- Interrogation of subscriber data in the AUC.

- Identification of the Subscriber.

- Subscriber tracing (Tracing of IMSI - see GSM 12.08).

- Equipment tracing (Tracing of IMEI - see GSM 12.08).

- Billing Data (see GSM 12.05).

- Network actions dealing with faulty MS (see subclause 5.8.2 and GSM 12.10).

- For handling of Emergency Call notifications (see GSM 12.05).

- Also information about the overall network status plus the possibility of the interrogation of certain network information is necessary; but these aspects are outside the scope of this ETS (see GSM 12.06).

5.8.2 Interrogations and modifications of HLR and AUC

Complaints from home subscribers can be handled with these functions. Subscriber data in the HLR and the AUC can be interrogated and the HLR can also be modified with the appropriate procedures (see clause 6).

TMN Management Functions required:

Interrogate Subscriber in AUC;
Modify MSISDN in HLR;
Interrogate MSISDN in HLR;
Modify Subscriber in HLR;
Interrogate Subscriber in HLR.

5.8.3 Interrogations and modifications of VLR

Complaints from home and roaming subscribers can be handled with these functions. Subscriber data in the VLR can be interrogated with the appropriate procedures (see clause 6).

The VLR subscriber data may be updated in three ways:

a) by the HLR;
b) by the subscriber;
c) by the VPLMN to protect itself against roaming subscribers.

NOTE: Changes to subscriber data in the VLR are only possible via the HLR. If a VPLMN operator wants to bar a subscriber or change subscriber related data, then the operator of the HPLMN needs to be contacted directly.

The only means a VPLMN may protect itself without contacting the HPLMN operator are:

1) Deletion of the subscriber in the VLR (however there would be nothing to prevent the subscriber registering again immediately).

2) Blacklisting the IMEI of the subscriber's equipment in the EIR.

TMN Management Functions required:

Interrogate Subscriber in VLR;
Delete Subscriber in VLR.

5.8.4 Identify Subscriber

Complaints from home and roaming subscribers can be handled with this function which allows the interrogation of the IMSI of a given MSISDN from any VLR. The IMSI can then be used for other functions.

TMN Management Functions required:

Identify Request in VLR.

5.9 Managing of the EIR

If a PLMN Operator has decided to use IMEI-Checking, an EIR will be required.

The EIR is a functional entity and will be accessed by the Telecommunication Network (see GSM 09.02) and by the TMN. Its function is to maintain the lists of white, black and grey listed equipment.

Data transfer between PLMN Operators concerning IMEI is subject to bilateral agreement.

Only the administration of the white, black and grey lists is of concern within this ETS.

The interrogation of the EIR from the MSC (covered in GSM 09.02) and the decision of what action is taken according of the outcome of this interrogation is beyond the scope of this ETS i.e. what happens if an equipment is found to be on the white, the grey or the blacklist.

5.9.1 Managing of the White List

The "White List" is composed of equipment identities, held either individually or as a series, that have been allocated (i.e. type approved) in the different participating GSM countries.

TMN Management Functions required:

Create WhiteEquipmentInEir;
Interrogate WhiteEquipmentInEir;
Delete WhiteEquipmentInEir.

5.9.2 Managing of the Black List

The "Black List" is composed of all equipment identities, held either individually or as a series, belonging to equipment that needs to be barred.

TMN Management Functions required:

Create BlackEquipmentInEir;
Interrogate BlackEquipmentInEir;

Delete BlackEquipmentInEir.

5.9.3 Managing of the Grey List

The "Grey List" is composed of equipment identities, held either individually or as a series, that although not barred, are tracked by the network for evaluation, or for other purposes.

TMN Management Functions required:

Create GreyEquipmentInEir;
Interrogate GreyEquipmentInEir;
Delete GreyEquipmentInEir.

5.9.4 File based management of the EIR

The number of TMN management functions that will be applied to the EIR is estimated to be several thousands per day, and due to this large number an alternative mechanism to manage the EIR beside the transactional (CMISE) mechanism is described in this ETS.

To reduce the signalling overhead, a bulk transfer of management information from OSF to NEF is specified. The management information transferred in the bulk transfer corresponds with that which is passed to the NEF using the transactional mechanism.

The TMN management functions to which the bulk transfer can be applied have previously been defined and are as follows:

Create WhiteEquipmentInEir;
Create GreyEquipmentInEir;
Create BlackEquipmentInEir;

Delete WhiteEquipmentInEir;
Delete GreyEquipmentInEir;
Delete BlackEquipmentInEir.

The OSF will transfer files of management information to the NEF at regular intervals. This bulk transfer is performed using FTAM, that may be controlled using CMISE services for the exchange of information about the data transfer required. This control is exercised through the object class simpleFileTransferControl which is described in GSM 12.00.

The OSF can request the NEF at any time to start executing the management file(s) present in its local filestore. This means that all management operations held in the file(s) are executed.

At any time the OSF may interrogate the NEF about the progress of the management file execution.

The OSF will be informed by the NEF when the execution of a management file is complete.

The OSF may obtain detailed information on the results of the execution of the management file(s) from a log contained in the managed element into which all object creations and object deletions can be logged, if this logging facility is available. The retrieval and the transfer of the information held in this object management log object may be controlled by CMISE services exchanging information on the data transfer required. This control is exercised through the object class simpleFileTransferControl which is described in GSM 12.00.

The OSF will then inform the NEF that the management file(s) can be deleted.

TMN management functions required:

Process EIRManagementFile
Interrogate EIRManagementFileExecution
Remove EIRManagementFile

5.10 List of TMN Management Functions

5.10.1 AUC

Create Subscriber in AUC
Interrogate Subscriber in AUC
Delete Subscriber in AUC
Modify Subscriber in AUC

5.10.2 HLR

Create MSISDN in HLR
Modify MSISDN in HLR
Interrogate MSISDN in HLR
Delete MSISDN in HLR

Create Subscriber in HLR
Modify Subscriber in HLR
Interrogate Subscriber in HLR
Delete Subscriber in HLR

Create Regional Subscription Zone List
Modify Regional Subscription Zone List
Interrogate Regional Subscription Zone List
Delete Regional Subscription Zone List

Create Bearer Capability Allocation
Modify Bearer Capability Allocation
Interrogate Bearer Capability Allocation
Delete Bearer Capability Allocation

5.10.3 VLR

Interrogate Subscriber in VLR
Delete Subscriber in VLR
Identify Request in VLR

5.10.4 EIR

Create WhiteEquipmentInEir
Interrogate WhiteEquipmentInEir
Delete WhiteEquipmentInEir

Create BlackEquipmentInEir
Interrogate BlackEquipmentInEir
Delete BlackEquipmentInEir

Create GreyEquipmentInEir
Interrogate GreyEquipmentInEir
Delete GreyEquipmentInEir

Process EIRManagementFile
Interrogate EIRManagementFileExecution
Remove EIRManagementFile

6 TMN Management Functions

6.1 General

All TMN management functions shall be performed by using the appropriate System Management Functions via a Q3 interface as defined in GSM 12.01.

The appropriate services of the following list of recommendations are used for the creation and deletion of managed objects, the interrogation and updating of attributes, and for invoking of actions and for event reporting:

Object Management Function (X.730);
State Management Function (X.731);
Relationship Management Function (X.732);
Alarm Reporting Function (X.733);
Event Report Management Function (X.734);
Log Control Function (X.735).

For details of the common requirements, see annex A.

For details of the structure of subscriber data, see annex B.

6.2 Functions Required in the AUC

6.2.1 Create Subscriber in AUC

An appropriate IMSI-Ki pair for a subscriber needs to be transferred to the AUC and stored there prior to service provision for the subscriber in the HLR. The Ki is transferred and stored encrypted. The information related to the subscriber in AUC is stored in the object subscriberInAuc.

System management functions required:

Create subscriberInAuc

Notifications required (optional):

objectCreation
(May be used with Log Control Function)

6.2.2 Interrogate Subscriber in AUC

This function may be necessary to query if a certain subscriber is installed within an AUC. It is not possible to interrogate the value of a Ki.

System management functions required:

Get Attribute

6.2.3 Delete Subscriber in AUC

After removing the service from the subscriber in HLR the data shall also be deleted within the AUC.

System management functions required:

Delete subscriberInAuc (IMSI)

Notifications required (optional):

objectDeletion
(May be used with Log Control Function)

6.2.4 Modify Subscriber in AUC

This function is necessary to change writeable attributes of the subscriberinAUC object (e.g. Administrative State)

System management functions required;

Replace Attribute Value

6.3 Manage Directory Number in HLR

6.3.1 Create MSISDN in HLR

It is necessary to provide blocks of available directory numbers (MSISDN) in an HLR which can subsequently be connected to a subscriber in the same HLR (i.e. IMSI). If these MSISDN are not connected immediately to an IMSI, then either they need to be related to a (default) announcement, or their administrative states are set to **locked**. This ensures that calls routed to these MSISDN are treated in a consistent manner. An IMSI can only be connected to MSISDN which currently exist. The information related to the MSISDN is stored in the object *msisdnInHlr*.

System management functions required:

Create msisdnInHlr

Notifications required (optional):

objectCreation
(May be used with Log Control Function)

6.3.2 Modify MSISDN in HLR

The MSISDN (msisdnInHlr object) may be modified in the following circumstances:

a) Establishing a group relationship with an IMSI.
The MSISDN is associated with an IMSI via the *subscriberInHlr* object. At the same time it is associated either for multi-numbering with one basic service, or for single numbering in which case several basic Services (*basicServiceInHlr* objects) can be included. For multi-numbering a pointer to the bearer capability allocation (BCA) is stored for each MSISDN. The BCA consists of one or more bearer capabilities and is stored as an instance of the object *bcaSetInHlr*. For both multi- and single numbering the corresponding associations (one or more) to the *msisdnInHlr* objects are established within the *basicServiceInHlr* objects.

b) Modifying the relationship to an IMSI or to a BS.
If the MSISDN is associated with a different IMSI or with a different BS within an IMSI, then the appropriate attributes are changed. This change may trigger a MAP operation (see below).

c) Modifying the BCA.
If the BCA of a BS is changed (in the case of multi-numbering) then either the pointer to the *bcaSetInHlr* object in the *msisdnInHlr* object can be changed to a new pointer, or a new BCA set can be set up i.e. a new instance of the object *bcaSetInHlr* is set up and the pointer in the *msisdnInHlr* object updated to point to this instance.

d) Removing the relationship to an IMSI.
If the MSISDN is disconnected from a certain IMSI (i.e. the IMSI is removed from service or the IMSI is connected to a different MSISDN) then the attribute related to the IMSI is set to a null value. The attribute related to the announcement is set accordingly; or, alternatively, the *msisdnInHlr* object is set to administrative state **locked**. The associations to the basic services are also removed.

System management functions required:

Replace Attribute
Add Attribute Value

Notifications required (optional):

attributeValueChange
(May be used with Log Control Function)

6.3.3 Interrogate MSISDN in HLR

To query the data and associations of an MSISDN it is necessary to provide an interrogation function.

System management functions required:

Get Attribute

6.3.4 Delete MSISDN in HLR

To remove an MSISDN completely from an HLR. This is only possible if the MSISDN is not associated with an IMSI, and if the administrative state is locked.

System management functions required:

Delete msisdnInHlr

Notifications required (optional):

objectDeletion
(May be used with Log Control Function)

6.4 Manage Subscriber in HLR

6.4.1 Create Subscriber in HLR

To provide service to a customer the subscriber data related to an IMSI (subscriberInHlr object) needs to be created within an HLR, and this data shall then be associated with one or more MSISDN. The data should only be entered in the HLR if there is a corresponding entry in the AUC.

Whether this is enforced within the HLR function or within the OSF is operator and implementation dependent because there is no MAP interface defined between HLR and AUC.

When a subscription is offered to a customer the network needs to know a certain amount of information related to the IMSI. This function describes the data needed by the Telecommunication Network (within the HLR) to operate.

It will not be necessary to input all attributes at once but the minimum set of attributes to ensure integrity of the data may be as follows:

IMSI
International Mobile Subscriber ISDN number (mainMsisdn)
Associated MSISDN
Administrative State
MS Category

The object subscriberInHLR shall additionally contain at least one basic service group with one basic service.

It may also contain supplementary services with their data.

The operational state is set to **enabled** by the HLR itself only if the subscriber data is in a consistent state and the minimum set of attributes is supplied (see also subclause 6.4.5). Otherwise the operational state is set to **disabled**.

The remaining subscriber data can be added, removed or changed with the functions provided to modify the subscriber in HLR as described below.

The subscriber in HLR may be established in the following way (see also annex B):

The object *subscriberInHlr* is created in HLR with its attributes. This may only be possible if a corresponding object *subscriberInAuc* already exists. The attribute administrativeState is set to **locked**.

An IMSI needs to be associated with at least one MSISDN, which is the mainMSISDN, and which has been allocated to a basic service to which the subscriber subscribes to. This number would normally be taken as that associated with the Teleservice Telephony, if that service is provisioned.

For each Basic Service required a *basicServiceInHlr* object and the relevant *basicServiceGroupInHlr* object will be created if they do not already exist. The *basicServiceGroupInHlr* object is contained in the *subscriberInHlr* object and the *basicServiceInHlr* object is contained in the *basicServiceGroupInHlr* object.

Each basic service may be associated with one MSISDN, and this MSISDN is associated with the IMSI and the basic service. In the case of multi-numbering a pointer to the object *bcaSetInHlr* is set within the object *msisdnInHlr*.

For each supplementary service (SS) to be provisioned, the appropriate *supplementaryServiceInHlr* object is created. These objects are contained in the object *subscriberInHlr*. The necessary attributes are set depending on the SS involved (subscription options).

Some SS need parameters related to a BSG. If this is the case for each appropriate BSG additional *ssInHlrParameter* objects will be created, contained in the SS objects and associated with the basic service groups.

The requirements for adding a CUG are described in the next subclause.

After input of all necessary data, the administrative state of *subscriberInHlr* is set to **unlocked**. Now the subscriber is available for normal operation.

No MAP procedures are triggered with this function.

System management functions required:

Create subscriberInHlr
Create basicServiceGroupInHlr
Create basicServiceInHlr
Create supplementaryServiceInHlr
Create ssInHlrParameter
Create ssInHlrGUGSubscription
Replace Attribute

Notifications required (optional):

objectCreation
(May be used with Log Control Function and for billing)

6.4.2 Modify Subscriber in HLR

This function is equivalent to the OM_Modify_Subscriber_req in GSM 09.02 clause 17.

The subscriber data within the HLR can be modified in the following ways:

a) The modification is internal to the HLR.
When modification is internal to the HLR then it has no effect on the data in the VLR.
Whether or not a modification is only internal to the HLR depends on the attributes and their values, and need to be defined for each attribute.
Examples are: Changes to Barring of incoming calls, some changes to Operator Determined Barring, etc.
No MAP request primitive is initiated.

b) Data are modified both in HLR and VLR.
This can be considered as the normal case for modifications these being either changes to attributes or provision of basic services and/or supplementary services.
The MAP-INSERT-SUBSCRIBER-DATA request primitive is initiated.

c) Withdrawal of a basic service or a supplementary service.
If a basic or supplementary service is removed then the MAP-DELETE-SUBSCRIBER-DATA request primitive is initiated.

d) The modification effects the roaming of the subscriber.
If data effecting the roaming of the subscriber are modified (e.g. roaming restrictions, certain Operator Determined Barring values), the MAP-CANCEL-LOCATION request primitive is initiated.

Which case is valid for a particular attribute is described within the behaviour of each object and attribute in Annex B.

Since most of the modifications of subscriber data require a sequence of system management functions it needs to be ensured that only consistent data are interrogated via MAP.

Therefore a modification of subscriber data needs to be implemented as an atomic action.

One way to achieve this would be the use of the administrative state locked. However, this would always require a MAP-CANCEL-LOCATION.

A more efficient method would be the implementation of an additional control status with the value **partOfServicesLocked**. For the HLR this means that the MAP services are locked from updating the data of this specific subscriber and the interrogations should work on old data. The administrative state remains **Unlocked**. If the modifications would imply inconsistency in subscriber data when the **partOfServicesLocked** value is removed from the control status all the modifications are disregarded and the old subscriber data remains valid.

The control status attribute is read-write and set-valued (see CCITT X.731). For possible values see Annex B. When the value of this attribute is the empty set, none of the status conditions described below are present.

Administrative state and control status are described in subclause 6.4.5.

Modification of attributes in existing objects

This means the replacing of an attribute value in an existing object. Since this is an atomic action then normally no additional measures are necessary, but if the subscriber data becomes inconsistent the operational state should be set accordingly (see section 6.4.5).

Depending on the attribute and its value either a MAP-INSERT-SUBSCRIBER-DATA, a MAP-DELETE-SUBSCRIBER-DATA or a MAP-CANCEL-LOCATION request primitive may be initiated.

Adding of a supplementary service

Each subscriberInHlr object may contain supplementaryServicesInHlr objects.

In order to add a supplementary service to a subscriber, the control status of the subscriberInHlr object is set to **partOfServicesLocked,** the appropriate supplementaryServiceInHlr object will be created.

Also depending on the SS the ssInHlrParameter objects are created for each basicServiceGroupInHlr. The attributes for these objects are set and they are associated with the basic service group.

Now the partOfServicesLocked value is removed from the control status and the MAP-INSERT-SUBSCRIBER-DATA request primitive is initiated.

Adding of a basic service

Each *subscriberInHlr* object may contain *basicServiceGroupInHlr* objects which in turn will contain *basicServiceInHlr* objects.

In order to add a basic service to a subscriber, the control status of the *subscriberInHlr* object is set to **partOfServicesLocked,** the appropriate *basicServiceInHlr* object is created and the relevant *basicServiceGroupInHlr* object will be created if it does not already exist.

The basic service may now be associated with an MSISDN (if multi-numbering), and the MSISDN is associated with the IMSI and the basic service. In addition (also for multi-numbering) a pointer to the object *bcaSetInHlr* is set within the *msisdnInHlr* object.

If a new *basicServiceGroupInHlr* object has to be created, and there are existing SS, the following applies:

Some SS need parameters related to BSG. In this case additional *ssInHlrParameter* objects are created, one for each related SS, which are contained in the SS objects and associated to the basic service group.

For CUG, the *ssInHlrParameter* objects are only created if the basic service group is also added to the associatedOwnerBSG attribute in at least one *ssInHlrCUGSubscription* object.

Now the **partOfServicesLocked** value is removed from the control status and the MAP-INSERT-SUBSCRIBER-DATA request primitive is initiated.

Adding of a CUG

The control status is set to **partOfServicesLocked**.

If this is the first CUG the object ssInHlrCUG will be created. Then the object *ssInHlrCUGSubscription*, which contains the attributes for this CUG, will be created. A maximum of 10 of these objects is possible and the identification is the CUGIndex.

Then for each basic service group associated via the assocOwnerBSG attribute in the *ssInHlrCUGSubscription* object an *ssInHlrParameter* object will be created, if it does not already exist, and it will be associated with the basic service group.

Now the **partOfServicesLocked** value is removed from the control status and the MAP-INSERT-SUBSCRIBER-DATA request primitive is initiated.

Removing of a supplementary service

The control status is set to **partOfServicesLocked**.

The *supplementaryServiceInHlr* object will be deleted together with any *ssInHlrParameter* objects it contains. Any associations in the *basicServiceGroupInHlr* objects are removed.

Now the **partOfServicesLocked** value is removed from the control status and the MAP-DELETE-SUBSCRIBER-DATA request primitive is initiated.

Removing of a basic service

The control status is set to **partOfServicesLocked**.

The *basicServiceInHlr* object is deleted and the association to the MSISDN is removed. For multi-numbering the *msisdnInHlr* object is either locked or set to an announcement. For single numbering the *msisdnInHlr* object is either locked or set to an announcement only if the basic service being removed is the last basic service subscribed to by the subscriber.

If the associated *basicServiceGroupInHlr* object is now empty, it is deleted and also all associated *ssInHlrParameter* objects have to be deleted.

If the basic service group is associated with *ssInHlrCUGSubscription* objects, the association has to be removed.

Now the **partOfServicesLocked** value is removed from the control status and the MAP-DELETE-SUBSCRIBER-DATA request primitive is initiated.

Removing of a single CUG

The control status is set to **partOfServicesLocked**.

The *ssInHlrCUGSubscription* object and the *ssInHlrParameter* objects which only apply to this *ssInHlrCUGSubscription* object are deleted. The associations to the deleted *ssInHlrParameter* objects in the BSG objects will also be removed.

If the *supplementaryServiceInHlr* object for CUG is now empty then it is also removed.

The **partOfServicesLocked** value is then removed from the control status and the MAP-DELETE-SUBSCRIBER-DATA request primitive is initiated.

System management functions required:

Create and Delete basicServiceGroupInHlr
Create and Delete basicServiceInHlr
Create and Delete supplementaryServiceInHlr
Create and Delete ssInHlrParameter
Create and Delete ssInHlrCUGSubscription
Replace Attribute
Add Attribute
Remove Attribute

Notifications required (optional):

objectCreation
objectDeletion
attributeValueChange

(May be used with Log Control Function and for billing)

6.4.3 Deleting Subscriber in HLR

This subclause defines the function necessary following cessation of a subscription. The function is equivalent to the OM_Delete_Subscriber_req in GSM 09.02 clause 17.

For this purpose the Administrative State is used. An IMSI and its associated data can only be removed if the IMSI is in administrative state **Locked**.

The sequence to be employed needs to ensure data integrity across the network and should consist of the procedure as described in subclause 6.4.5.

If the IMSI is in state **Locked**, the subscriber data now can be subsequently removed from the data base. This means deleting the object subscriberInHlr with all contained objects.

The relationships to the corresponding MSISDN have to be removed and the MSISDN objects have to be set to announcement, locked or deleted.

System management functions required:

Delete subscriberInHlr with all contained objects
Replace Attribute (MSISDN)
Delete msisdnInHlr

Notifications required (optional):

objectDeletion
(May be used with Log Control Function and for billing)

6.4.4 Interrogating Subscriber in HLR

It shall be possible to interrogate subscriber data in HLR in order to respond to subscriber enquiries.

System management functions required:

Get Attribute

6.4.5 Removing Subscriber Temporarily from Service

In order to update data, or to avoid fraudulent usage and/or complaints from a subscriber, an Operator of a PLMN needs to be able to invalidate subscriber data within the HLR and VLR for a certain period of time. This would be needed, for instance, if the Operator was aware of non-paid bills by a particular subscriber. The following possibilities exist:

Operator Determined Barring:

Most of the above requirements can be achieved with the Operator Determined Barring feature as described in GSM 02.41 and GSM 03.15. This feature is not applied to Emergency Calls.

Administrative State:

This attribute has the values **Unlocked**, **Shutting down** and **Locked** (see CCITT X.731). If the state is **Locked**, the subscriber is temporarily removed from service.

In the **Locked** state the service will not be offered again until a restore function has been activated by the PLMN Operator (*unlockSubscriberInHlr*). The HLR needs to inform the VLR; which is a necessary feature with respect to interworking between PLMN. An established call will not be prematurely cleared since the VLR provides the subscriber status to the MSC only on subsequent request for calls or services. Should there be an urgent requirement to clear a call then NM procedures to be defined may be applied.

Emergency calls based on the IMSI are not allowed in such a situation, but there is still the possibility to make emergency calls based on the IMEI.

Procedure to remove subscriber from service:

- In principle the state transitions as defined in CCITT X.731 apply.

- The action lockSubscriberInHlr is performed on the managed object instance related to the IMSI. The administrative state is set to **Shutting Down**.

- HLR initiates a MAP-CANCEL-LOCATION request primitive, if necessary, to the relevant VLR (see GSM 03.12 and 09.02). This point is essential to interworking between PLMN.

- A confirmation is generated once the sequence is complete.

- After reception of the confirmation the administrative state is set to **Locked**.

In administrative state **Locked** then subsequent call establishment or location update requests will be rejected.

System Management Functions required:

Actions:
Lock Subscriber In Hlr

Procedure for restoring subscriber to service:

Restoring service is achieved by the action unlockSubscriberInHlr, which means all functions are now available to the subscriber. However, the MS needs to register again.

System management functions required:

Actions:
Unlock Subscriber InHlr

Control Status

Most of the modifications of subscriber data require a sequence of basic TMN management functions, therefore it needs to be ensured that only consistent data are interrogated via MAP.

This implies that a modification of subscriber data needs to be implemented as an atomic action. Specific support of atomic synchronisation and cross-object synchronisation in a particular open system is, according to CCITT X.720, a matter **local** to that system.

Implementation of the administrative state **Locked** has the drawback that a MAP-CANCEL-LOCATION is always initiated, which in most cases would not be necessary.

A more efficient method would be the optional use of the control status setting its value to 'partOfServicesLocked'. For the HLR this means that the MAP Services are locked from updating the data of this specific subscriber, and that interrogations should work on old data. The administrative state remains **Unlocked**.

The control status attribute is read-write and set-valued (see CCITT X.731). For possible values see Annex B. When the value of this attribute is the empty set then none of the status conditions described below are present.

If the administrative state is set to **Locked**,then MAP Interrogations are rejected.

System management functions required:

Actions:
Lock MAP Service
Unlock MAP Service

Notifications required (optional):

stateChange
(May be used with Log Control and Alarm Reporting Function)

Operational State

This attribute can have the values **Enabled** or **Disabled** (see CCITT X.731). If the state is **Disabled** the subscriber is temporarily removed from service.

The operational state is set to **Enabled** by the HLR itself only if the subscriber data is in a consistent state and the minimum set of attributes is supplied. In particular a main MSISDN and at least one basic service needs to be supplied, otherwise the operational state remains **Disabled** even if the administrative state is set to **Unlocked**.

If during subsequent modifications the subscriber data becomes inconsistent again (e.g. all the basic services are deleted), the operational state is again set to **Disabled** by the HLR, and the HLR initiates a MAP-CANCEL-LOCATION request primitive, if necessary, to the relevant VLR.

In operational state **Disabled** subsequent call establishment or location update requests have to be rejected.

6.4.6 Managing of Regional Subscription Zone Lists

A regional subscription zone list is defined as a set of one or more zones where regional subscription is required. The zone list is not included directly in the subscriber profile but held separately in the object *rsziListInHlr*.

The use and interpretation of the zone identities is not defined in this ETS. Each list can be stored as an instance of the object *rsziListInHlr*. A pointer consisting of the RDN of the *rsziListInHlr* object can be stored per subscriber in the *subscriberInHlr* object.

System management functions required:

Create and Delete rsziListInHlr
Replace Attribute

Notifications required (optional):

objectCreation
objectDeletion
attributeValueChange

6.4.7 Managing of Bearer Capability Allocation

In multi numbering systems the bearer capability allows call compatibility checking on incoming calls to each allocated msisdn individually. To accomodate this a Bearer Capability Allocation (BCA) consisting of one or more individual bearer capabilities can be allocated to an msisdn for a subscriber.

A Bearer Capability Allocation is defined as a set of one or more bearer capabilities. Each set is stored as an instance of the object bcaSetInHlr. A pointer consisting of the RDN of the bcaSetInHlr object can be stored per msisdn.

System management functions required:

Create and Delete bcaSetInHlr
Replace Attribute
Add Attribute
Remove Attribute

Notifications required (optional):

objectCreation
objectDeletion
attributeValueChange

6.5 Manage Subscriber in VLR

6.5.1 Create Subscriber in VLR

A subscriber profile in VLR can only be created by an internal operation. It cannot be created by a management operation although the event of creation can optionally be notified.

System management functions required:

none

Notifications required (optional):

objectCreation

May be used with the Log Control Function or the Alarm Reporting Function

6.5.2 Interrogate Subscriber in VLR

It shall be possible to interrogate subscriber data in VLR to respond to subscriber enquiries.

System management functions required:

Get attribute

6.5.3 Modify Subscriber in VLR

A subscriber in VLR can only be modified by internal operation. It cannot be modified by management operation although the event of modification can be notified optionally.

System management functions required:

none

Notifications required (optional):

attributeValueChange
May be used with the Log Control Function or the Alarm Reporting Function.

6.5.4 Delete Subscriber in VLR

Subscribers within the VLR may be deleted, but there is no means to prevent a subscriber from registering again immediately.

System management functions required:

Delete SubscriberInVlr

Notifications required (optional):

objectDeletion
May be used with Log Control Function or Alarm Reporting Function

6.5.5 Identity Request in VLR

The function is equivalent to the OM_Subscriber_Identity_req in GSM 09.02.

This function allows an operator to retrieve the IMSI of any MSISDN via the MAP_SEND_IMSI request primitive from the relevant HLR.

6.6 Functions Required in the EIR

6.6.1 General List Administration

The three lists white, black and grey have similar structures and are all managed in the same way. The lists are composed of objects each covering IMEI ranges. If an individual IMEI is required to be stored on a particular list then this can be done by storing the IMEI as a range of one.

The reason that the entries on the lists are stored as ranges is due to the fact that the IMEI ranges are considered to form an individual entity particularly for the white and the grey lists, i.e. that a range is created composing of IMEIs which logically belong together. The black list would generally (but not necessarily exclusively) be composed of individual IMEIs The possibility to alter such a range once created is not considered necessary and so a modify function is not included. The function, if needed, would be performed by the original object being deleted, and one or two (depending on where the range alteration lies) new objects being created in its place.

A new object instance (i.e. a new range of IMEI) can only be created on a list if no part of the specified range of IMEI already exists in the same list. This will be ensured by the firstImei and lastImei of the new object being checked against the **firstImei** and **lastImei** of the object instances already existing in the list.

Only valid IMEIs will be stored in the EIR lists.

A valid IMEI is composed of 15 digits, of which the 15th digit (i.e. the spare byte) is assigned the value zero while the usage of this digit is not clearly specified.

Interrogation can be performed by specifying the values of the **firstImei** and the **lastImei** required using a filter to select the objects in the range of IMEI required.

6.6.2 Create WhiteEquipmentInEir

This object is created according to the rules defined in subclause 6.6.1 above.

System management functions required:

Create WhiteEquipmentInEir

Notifications required (optional)

objectCreation
(May be used with Log Control Function)

6.6.3 Delete WhiteEquipmentInEir

System management functions required:

Delete equipmentInEir

Notifications required (optional):

objectDeletion
(May be used with Log Control Function)

6.6.4 Interrogate WhiteEquipmentInEir

It shall be possible to interrogate data in the equipmentInEir objects according to the rules defined in subclause 6.6.1 above.

System management functions required:

Get Attribute

6.6.5 Create GreyEquipmentInEir

This object is created according to the rules defined in subclause 6.6.1 above.

System management functions required:

Create equipmentInEir

Notifications required (optional):

objectCreation
(May be used with Log Control Function)

6.6.6 Delete GreyEquipmentInEir

System management functions required:

Delete equipmentInEir

Notifications required (optional):

objectDeletion
(May be used with Log Control Function)

6.6.7 Interrogate GreyEquipmentInEir

It shall be possible to interrogate data in the equipmentInEir objects according to the rules defined in subclause 6.6.1 above.

System management functions required:

Get Attribute

6.6.8 Create BlackEquipmentInEir

This object is created according to the rules defined in subclause 6.6.1 above.

System management functions required:

Create equipmentInEir

Notifications required (optional):

objectCreation
(May be used with Log Control Function)

6.6.9 Delete BlackEquipmentInEir

This object is deleted according to the rules defined in subclause 6.6.1 above.

System management functions required:

Delete equipmentInEir

Notifications required (optional):

objectDeletion
(May be used with Log Control Function)

6.6.10 Interrogate BlackEquipmentInEir

It shall be possible to interrogate data in the equipmentInEir objects according to the rules defined in subclause 6.6.1 above.

System management functions required:

Get Attribute

6.6.11 Process EIRManagementFile

This is part of the Bulk Transfer Management of the EIR. When the transfer of a management file towards an NEF is completed the NEF is requested to start processing the management file by performing the management operations that are held in that file. This start is initiated by a startManagementFileExecution Action.

When the execution of the management file has ended the NEF informs the OSF by sending a managementFileExecuted Notification. This notification can be stored to log as managementFileExecutedLogEntry.

System management functions required :

Action Start Management File Execution

Notifications required :

Management File Executed

6.6.12 Interrogate EIRManagementFileExecution

This is part of the Bulk Transfer Management of the EIR. Using this management function the OSF may interrogate the NEF at any time about the progress of the management file execution.

System management functions required :

Get Attribute

6.6.13 Remove EIRManagementFile

When the OSF has decided that management file(s) can be disposed of in the NEF, the NEF is informed about this using a **disposeOfManagementFile** Action.

System management functions required :

Action Dispose of Management File

Annex A (normative): Common requirements

A.1 General

The final result of this ETS is intended to be the definition of Q.3 interfaces between managed elements which implement the NEF AUC, HLR, VLR and EIR, and one or more operation systems (OS).

More than one NEF may be implemented in a managed element where the Q.3 interface and its associated resources are provided.

As defined in GSM 12.00, an interface consists of a Communication Profile and an Information Model. The specification therefore contains the protocol stack and the message set.

The protocol stack up to OSI Layer 7 including CMIP/CMISE used for this interface is defined in GSM 12.01.

The message set of the information model can be divided into a specific and a common set.

The specific set is defined in Annex B and Annex C (or GSM 12.00) according to the concepts defined in CCITT X.720, and the guidelines specified in CCITT X.722.

The common set is defined here.

A.2 Common Functions

The common functions are the System Management Functions as defined in the CCITT X.73x. These functions are implemented in the managed element. For definition of the managedElement object see GSM 12.00 and CCITT M.3100.

A.2.1 Object Management Function

This function provides the possibility to:

- create and delete objects
- replace attributes
- add and remove values to and from attributes
- get attribute values
- initiate actions on objects
- initiate notifications on configuration changes

It is defined in CCITT X.730.

A.2.2 State Management Function

This function defines the values of certain standardised state attributes and provides the possibility to:

- report changes in the state attributes
- read the state attributes
- change the state attributes
- initiate notifications on configuration changes

It is defined in CCITT X.731.

A.2.3 Relationship Management Function

This function provides the general attributes, operations and notifications for relationship management. It is defined in CCITT X.732.

A.2.4 Alarm Reporting Function

This function provides the possibility to report alarms, errors and related information. It is defined in CCITT X.733.

A.2.5 Event Report Management Function

This function provides:

- the definition of a flexible event report control service allowing systems to select which event report are to be sent to particular managing systems.

- the specification of the destinations (e.g. the identities of managing systems) to which event reports are sent.

- the specification of a mechanism to control the forwarding of event reports, e.g. by suspending and resuming the forwarding of those reports.

- the ability for an external managing system to modify the conditions used in the reporting of events.

- the ability to designate a backup location to which event reports can be sent if the primary location is not available.

It is defined in CCITT X.734.

A.2.6 Log Control Function

It may be necessary to be able to preserve information about events that have occurred or operations that have been performed by, or on, the various objects. Resources may be allocated to store such information. In OSI management these resources are modelled by logs and log records contained in those logs.

The management needs for the type of information that is to be logged may change from time to time. Furthermore, when such information is retrieved from a log the manager needs to be able to determine whether any records were lost, or whether the characteristics of the records stored in the log were modified at any time.

The log control function provides

- the definition of a flexible log control service which allows selection of records that are to be logged by a management system in a particular log.

- the ability for an external system to modify the criteria used in logging records.

- the ability for an external system to determine whether the logging characteristics were modified or whether log records have been lost.

- specification of a mechanism to control the time during which logging occurs.

- the ability for an external system to retrieve and delete log records.

- the ability for an external system to create and delete logs.

It is defined in CCITT X.735.

A.3 Common Objects

The implementation of the common functions requires that a set of common objects have to be implemented. These common objects are defined mainly in CCITT Recommendation M.3100, X.721 or Q.821, and can be used either as defined or as superclasses of GSM specific objects. Other common objects may be used as soon as they are defined and fit within the generic network model.

A.3.1 Common Objects from M.3100

The *network* object class is a class of managed objects that are a collection of interconnected telecommunications and management objects (logical and physical) capable of exchanging information. These objects have one or more common characteristics, for example they may be owned by a single customer or provider. A network may be nested within another (larger) network, thereby forming a containment relationship. A *plmnNetwork* is a subclass of a *network* (see below).

The *managedElement* object class represents telecommunications equipment or TMN entities (either groups or parts) within the telecommunications network that performs managed element functions, i.e. functions that provide support and/or service to the subscriber. Managed elements may or may not additionally perform mediation/OS functions. A managed element communicates with the manager over one or more standard Q-interfaces for the purpose of being monitored and/or controlled. A managed element contains equipment that may or may not be geographically distributed.

A *managedElement* object instance may also contain objects defined by the object classes in the next subclause.

The *managedFunction* object class is a class of managed objects that are contained within a managed element. Instances of this object class can be used to partition functions of a managed element. The *managedFunction* object class is the superclass of some GSM specific object classes (see below).

A.3.2 Common Objects from X.721

Most of these objects (with the exception of system and top) are contained in the *managedElement* object (see M.3100) or contained in other common objects below.

The object classes, their name bindings, packages, attributes and types are defined in CCITT X.721.

- alarmRecord;
- attributeValueChangeRecord;
- eventForwardingDiscriminator;
- eventLogRecord;
- log;
- logRecord;
- objectCreationRecord;
- objectDeletionRecord;
- relationshipChangeRecord;
- stateChangeRecord;
- system;
- top.

A.3.3 GSM specific Managed Objects

The GSM specific top level object classes as well as the top level containment and inheritance trees are defined in GSM 12.00.

A.3.4 Managed Functions

The following GSM specific functions are defined in GSM 12.00

- hlrFunction
- aucFunction
- vlrFunction
- eirFunction
- generalFileTransferControlFunction

Other GSM specific functions may be defined later.

The managed object class for each function is characterized by mandatory and conditional packages. The requirements for these packages are defined in the responsible technical specifications. Each object instance of a managed function may also contain additional objects.

Annex B (normative): Functional Entity requirements

In this annex all requirements for the functional entities such as managed objects and their behaviour, their attributes, actions, notifications and associated name bindings are described in prose.

The status of the functional entities (i.e. mandatory, standard option, option) is also defined.

B.1 HLR Functional Entities

B.1.1 General

A simplified Entity Relationship Model of the subscriber data in the HLR is shown in Figure B.1.1.

The *logicalHlr* object contains the *subscriberInHlr* objects and the *msisdnInHlr* objects. These two objects may be associated by a group relationship, where *subscriberInHlr* is the owner and *msisdnInHlr* is the member.

The *subscriberInHlr* object contains the *supplementaryServiceInHlr* objects and the *basicServiceGroupInHlr* objects, one for each SS and basic Service Group provisioned.

The *basicServiceGroupInHlr* objects contain one or more *basicServiceInHlr* objects of the relevant group. Each *basicServiceInHlr* object is associated with one *msisdnInHlr* object in a group relationship, where *basicServiceInHlr* is the owner and *msisdnInHlr* is the member. One *msisdnInHlr* may be associated with more than one basic service.

The *supplementaryServiceInHlr* class is the superclass of the following subclasses:

ssInHlrSimple (COLR, HOLD, MPTY, AOCI, AOCC)
ssInHlrCLP
ssInHlrCLIR
ssInHlrCW
ssInHlrBarring (all Barring SS)
ssInHlrCFU
ssInHlrCFB
ssInHlrCFNRy
ssInHlrCFNRc
ssInHlrCUG

With the exception of *ssInHlrSimple, ssInHlrCLP* and *ssInHlrCLIR* all other subclasses for supplementary services contain the corresponding *ssInHlrParameter* objects, one for each *basicServiceGroupInHlr* object.

The ssInHlrCLP object consists of data related to the supplementary services CLIP and COLP.

The *ssInHlrParameter* class is the superclass of the following subclasses:

ssInHlrParameterSimple (for CW and all Barring SS)
ssInHlrParameterCFU
ssInHlrParameterCFB
ssInHlrParameterCFNRy
ssInHlrParameterCFNRc
ssInHlrParameterCUG

Each *ssInHlrParameter* subclass object is associated with a *basicServiceGroupInHlr* object in a group relationship, where *basicServiceGroupInHlr* is the owner and *ssInHlrParameter* is the member.

The *ssInHlrCUG* object contains one or more (up to 10) *ssInHlrCUGSubscription* objects, one for each CUG where the subscriber is a member.

Each *ssInHlrCUGSubscription* object is associated with a *basicServiceGroupInHlr* object in a group relationship, where *basicServiceGroupInHlr* is the owner and *ssInHlrCUGSubscription* is the member.

The general organisation of subscriber data in the HLR, including the attributes, is shown in Figure B.1.2. The attributes are listed for each object class. For each supplementary service or group of SS shown on the left side, the relevant *ssInHlrParamete*r attributes are shown on the right side. The names of the subclasses are not shown because of space restrictions, but are reasonably self-evident. The containment and inheritance trees for the HLR are shown in figures B.1.3 and B.1.4 respectively.

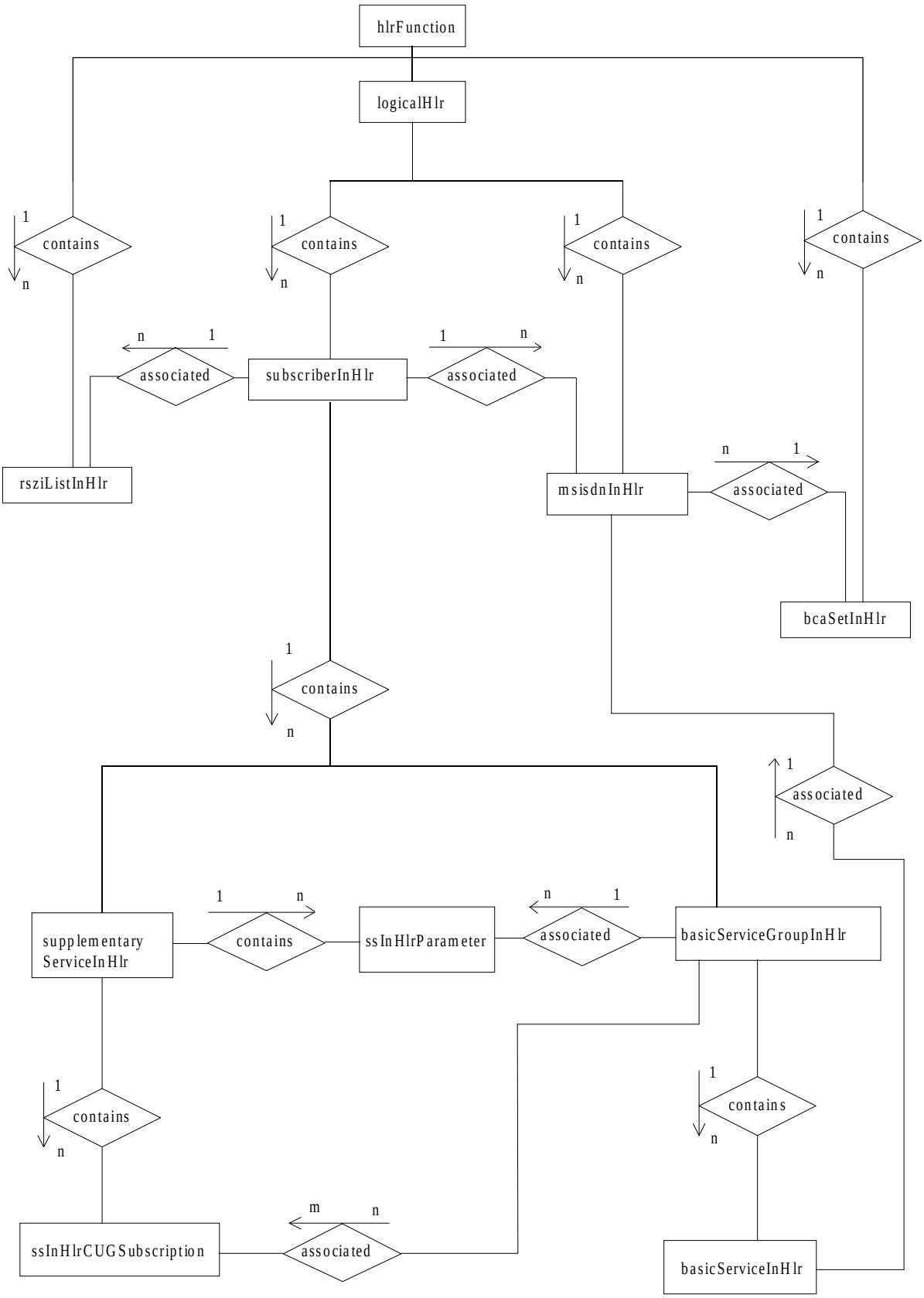

Figure B.1.1: HLR Branch of the Entity Relationship Model

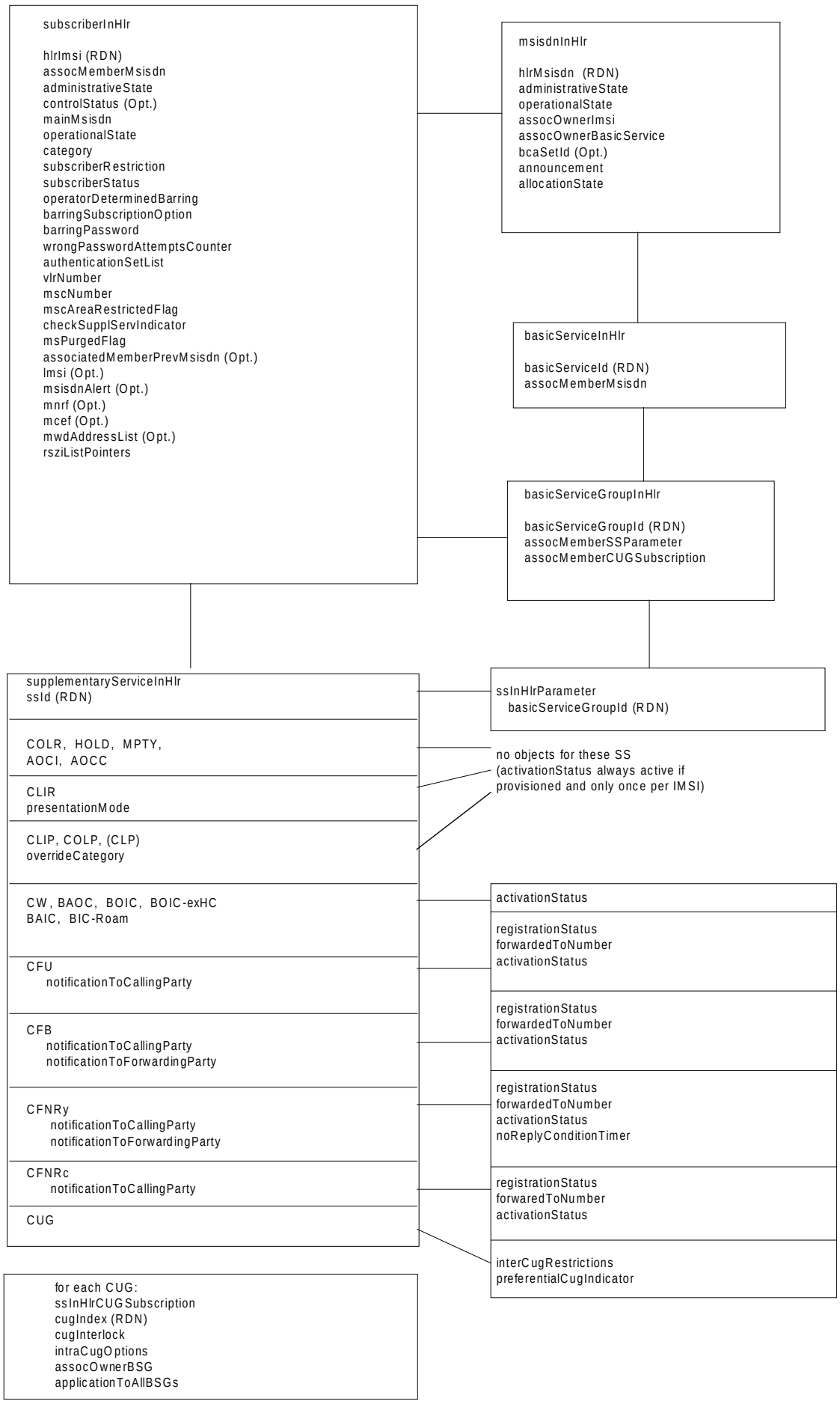

Figure B.1.2: General Organisation of Subscriber Data in HLR with Attributes

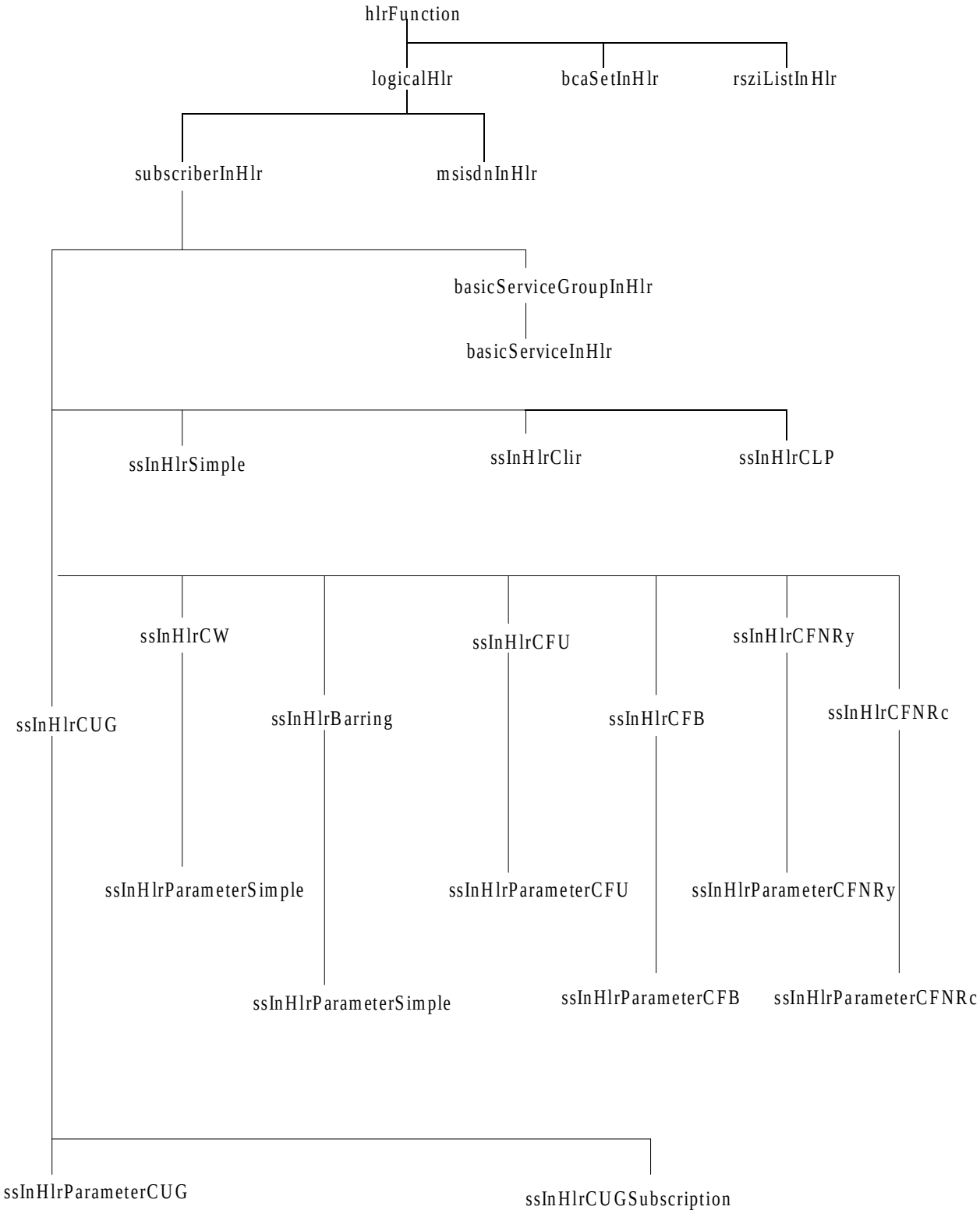

Figure B.1.3: Subscriber Administration Containment Tree for the HLR

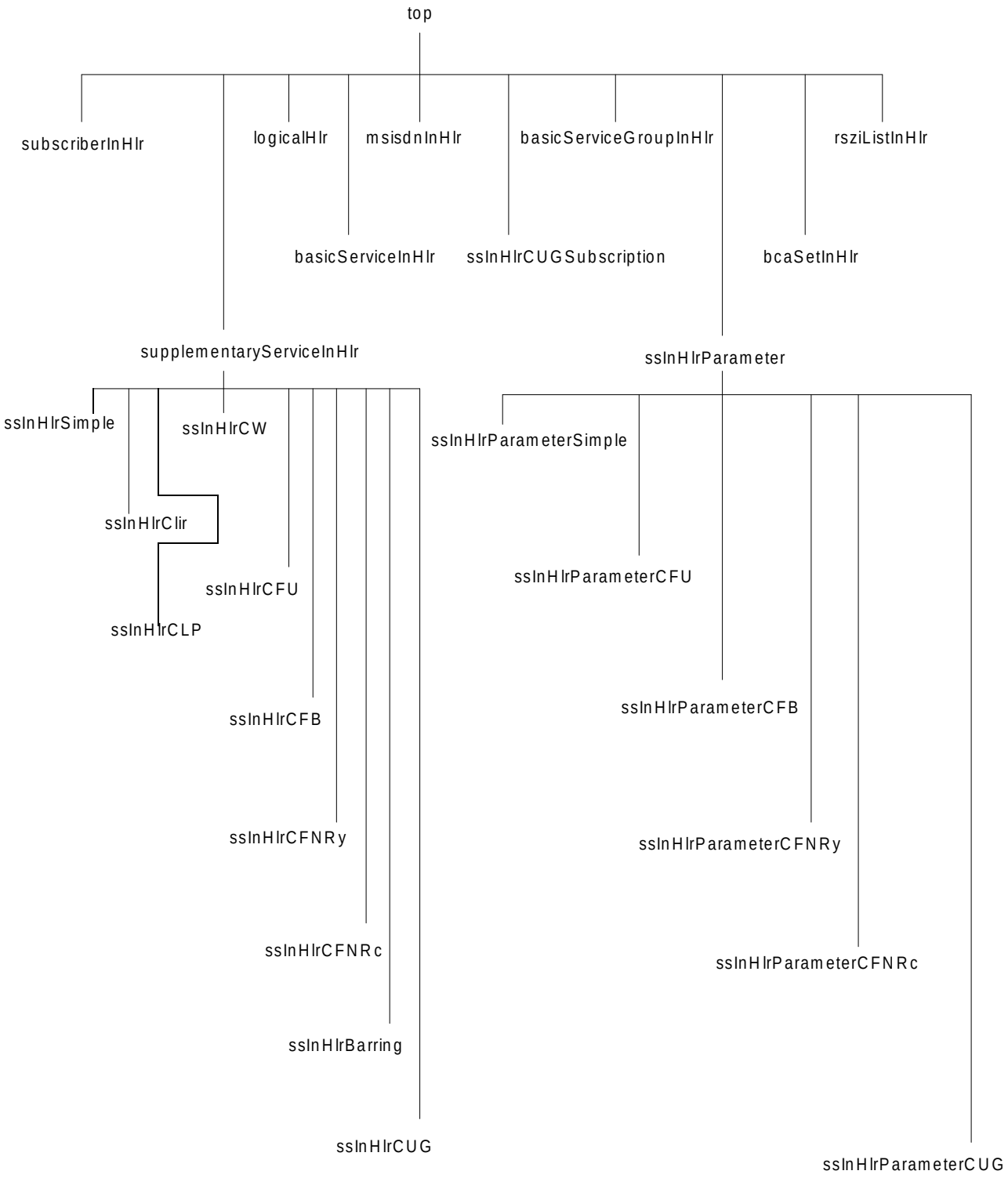

Figure B.1.4: Subscriber Administration Inheritance Tree for the HLR

B.1.2 Managed Object Classes

B.1.2.1 msisdnInHlr

The *msisdnInHlr* object class is a resource in its own right. It contains all data related to the MSISDN and may exist without an associated *subscriberInHlr* object (IMSI). The *msisdnInHlr* objects are contained in the logicalHlr object.

Creation or deletion of an *msisdnInHlr* object will not initiate a MAP request primitive. The maximum number of objects that can be created within a *logicalHlr* is defined by the attribute **maxNumberOfMsisdnInLogicalHlr**, and the maximum number of objects that can be created within an *hlrFunction* is defined by the attribute **maxNumberOfMsisdnInHlr**.

An *msisdnInHlr* object instance may be associated with a *subscriberInHlr* object instance and a *basicServiceInHlr* object instance. If an MSISDN of a *subscriberInHlr* is changed then the previous MSISDN may still be kept to return the error cause **NumberChanged** to the interrogating MSC. In this case the *msisdnInHlr* object may still be associated with a *subscriberInHlr* object, but not with a basicServiceInHlr object.

An *msisdnInHlr* with allocationState **allocated to IMSI** needs to be associated to at least one *basicServiceInHlr* object. Removing the last *basicServiceInHlr* object is equivalent to changing the **allocationState**. This means that an MSISDN without a basic service cannot be allocated to an IMSI.

If there is no association to a *subscriberInHlr* object then the allocationState is either set to **not allocated** and the operational state is set to **disabled**, or the msisdnInHlr is allocated to an announcement. For multi-numbering the *msisdnInHlr* object defines the bearer capability allocation for the related basic service. Each bearer capability (or set of bearer capabilities) is stored as an instance of the object *bcaSetInHlr* and the *msisdnInHlr* object then stores a pointer (bcaSetId) to that object. If the *msisdnInHlr* object is deleted then the relationships within the *subscriberInHlr* and *basicServiceInHlr* objects needs to be removed.

Name	M/O	Value-Set	Remarks
hlrMsisdn	RDN	Single	
administrativeState	M	Single acc. to X.731	
operationalState	M	Single acc. to X.731	Read Only
allocationState	M	Single	
assocOwnerImsi	M	Set acc. to X.732	
assocOwnerBasicService	M	Set acc. to X.732	
bcaSetId	O	Single	
announcement	O	Single	

B.1.2.2 bcaSetInHlr

The *bcaSetInHlr* object class is a resource in its own right. It holds sets of bearer capabilities and may exist without an associated *msisdnInHlr* object (per IMSI). The *bcaSetInHlr* objects are contained in the hlrFunction object.

The attribute *bcaSetId* allows a pointer from *msisdnInHlr* object to be set up. This means that instead of the bca being stored in the *msisdnInHlr* object itself, only a pointer need be administered, thus permitting greater flexibility in the management of bcas.

Name	M/O	Value-Set	Remarks
bcaSetId	RDN	Single	
bcaSet	M	Set	

B.1.2.3 subscriberInHlr

The *subscriberInHlr* object class is a resource in its own right. It consists of all data related to the IMSI, and shall not be used to represent a subscriber without one or more *msisdnInHlr* objects (MSISDN) being associated. The *subscriberInHlr* objects are contained in the logicalHlr object.

Creation of a *subscriberInHlr* object does not initiate a MAP request primitive. The maximum number of *subscriberInHlr* objects that can be created within a *logicalHlr* is defined by the attribute **maxNumberOfImsiInLogicalHlr**, the maximum number of *subscriberInHlr* objects that can be created within a *hlrFunction* is defined by the attribute **maxNumberOfImsiInHlr**,

Deletion of a *subscriberInHlr* object is only possible in administrative state **Locked**. It initiates a MAP-CANCEL-LOCATION request primitive to the VLR where the subscriber is registered.

A *subscriberInHlr* object instance may be associated with one (in the case of single numbering) or more *msisdnInHlr* object instances. A *subscriberInHlr* object instance contains *basicServiceGroupInHlr* objects and may contain *supplementaryServiceInHlr* objects. If the *subscriberInHlr* object is deleted, all contained objects need also to be deleted and all associations need to be removed.

Name	M/O	Value-Set	Remarks
hlrImsi	RDN	Single	
administrativeState	M	Single acc. to X.731	
controlStatus	O	Set acc. to X.731	
operationalState	M	Single acc. to X.731	Read Only
mainMsisdn	M	Single	
assocMemberMsisdn	M	Set acc. to X.732	
assocMemberPrevMsisdn	O	Set acc. to X.732	
category	M	Single	
subscriptionRestriction	M	Single	
subscriberStatus	M	Single	Read Only
operatorDeterminedBarring	M	Single	
barringSubscriptionOption	M	Single	
barringPassword	M	Single	Set to def. only
wrongPasswordAttemptsCounter	M	Single	Read Only
lmsi	O	Single	Read Only
authenticationSetFlag	O	Single	Read Only
vlrNumber	M	Single	Read Only
mscNumber	M	Single	Read Only
mscAreaRestrictedFlag	M	Single	Read Only
checkSupplServIndicator	M	Single	Read Only
msPurgedFlag	M	Single	Read Only
msisdnAlert	O	Single	
mnrf	O	Single	Read Only
mcef	O	Single	Read Only
mwdAddressList	O	Set	Read Only
rsziListPointers	O	Set	

B.1.2.4 basicServiceGroupInHlr

A *basicServiceGroupInHlr* object instance stores only the basic service group Id, and the provisioned basic services are contained as object instances within this object instance.

If *ssInHlrParameter* object instances are associated with this basic service group, then the relationships to the SS Parameter data are stored in the **assocMemberSSParameter** attribute.

If *ssInHlrCUGSubscription* objects are associated with this basic service group, then the relationships are stored in the **assocMemberCUGSubscription** attribute.

If a *basicServiceGroupInHlr* object is deleted, all *ssInHlrParameter* objects referenced by the **assocMemberSSParameter** attribute shall be deleted, and the associations within *ssInHlrCUGSubscription* objects that might subsequently have been made (in attribute **assocOwnerBSG**) shall be removed.

Name	M/O	Value-Set	Remarks
basicServiceGroupId	RDN	Single	
assocMemberSSParameter	M	Set acc. to X.732	
assocMemberCUGSubscription	M	Set acc. to X.732	

B.1.2.5 basicServiceInHlr

This object class shows the relationship to an associated MSISDN. For single numbering this will be the main MSISDN which is also used as the default. The object instances are contained in the *basicServiceGroupInHlr* object.

A *basicServiceInHlr* object can only be created if the basic service is supported in the network element. The association in the *msisdnInHlr* object is made (if required).

If a *basicServiceInHlr* object is deleted then the association to this basic service within the *msisdnInHlr* object has to be removed and the **allocationState** within *msisdnInHlr* has to be updated accordingly.

If the *basicServiceGroupInHlr* object which contained this *basicServiceInHlr* object now contains no other basic services then this object shall also be deleted.

Creation of a *basicServiceInHlr* object initiates a MAP-INSERT-SUBSCRIBER-DATA request primitive to the VLR where the subscriber is registered.

Deletion of a *basicServiceInHlr* object initiates a MAP-DELETE-SUBSCRIBER-DATA request primitive to the VLR where the subscriber is registered.

Name	M/O	Value-Set	Remarks
basicServiceId	RDN	Single	
assocMemberMsisdn	M	Set acc. to X.732	

B.1.2.6 supplementaryServiceInHlr

The object class *supplementaryServiceInHlr* is the superclass of all supplementary service object classes and consists of the common characteristics of all supplementary service subclasses. This class is not instantiated.

A *supplementaryServiceInHlr* object can only be created if this supplementary service is supported in the network element. Creation of a *supplementaryServiceInHlr* object may initiate a MAP-INSERT-SUBSCRIBER-DATA request primitive to the VLR where the subscriber is registered.

Deletion of a *supplementaryServiceInHlr* object initiates a MAP-DELETE-SUBSCRIBER-DATA request primitive to the VLR where the subscriber is registered.

Name	M/O	Value-Set	Remarks
ssId	RDN	Single	

B.1.2.6.1 ssInHlrSimple

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for all simple supplementary services which have no additional parameters.

The supplementary services so far defined are COLR, HOLD, MPTY, AOCI, AOCC.

No *ssInHlrParameter* objects have to be created for this subclass.

B.1.2.6.2 ssInHlrCLP

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the supplementary services CLIP and COLP.

No *ssInHlrParameter* objects have to be created for this subclass.

Name	M/O	Value-Set	Remarks
overrideCategory	O	Single	

B.1.2.6.3 ssInHlrCLIR

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the SS CLIR.

No *ssInHlrParameter* objects have to be created for this subclass.

Name	M/O	Value-Set	Remarks
presentationMode	M	Single	

B.1.2.6.4 ssInHlrCW

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the supplementary service Call Waiting.

If the *ssInHlrCW* object is instanciated then all objects that it needs to contain will be created. The object identifier of the *ssInHlrParameter* objects needs to be added to the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If an instance of the *ssInHlrCW* object is deleted, then all objects it contains needs to be deleted. If *ssInHlrParameter* objects are deleted, then the object identifier of the parameter objects needs to be removed from the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

This subclass contains *ssInHlrParameter* object instances for each basic service group provisioned (only for circuit switched basic services with the exception of emergency calls).

There are no additional attributes.

B.1.2.6.5 ssInHlrBarring

This object class is a subclass of *supplementaryServiceInHlr* and can be instanciated for the barring SS.

If the *ssInHlrBarring* object is instanciated then all objects that it needs to contain will be created. The object identifier of the *ssInHlrParameter* objects needs to be added to the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If an instance of the *ssInHlrBarring* object is deleted, then all objects it contains needs to be deleted. If *ssInHlrParameter* objects are deleted, then the object identifier of the parameter objects needs to be removed from the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If at least one barring SS is provisioned, then the barring subscription option in the *subscriberInHlr* object needs to be set appropriately.

This subclass contains *ssInHlrParameter* object instances for each basic service group provisioned.

There are no additional attributes.

B.1.2.6.6 ssInHlrCFU

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the SS CFU.

If the *ssInHlrCFU* object is instanciated then all objects that it needs to contain will be created. The object identifier of the *ssInHlrParameter* objects needs to be added to the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If an instance of the *ssInHlrCFU* object is deleted, then all objects it contains needs to be deleted. If *ssInHlrParameter* objects are deleted, then the object identifier of the parameter objects needs to be removed from the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

This subclass contains *ssInHlrParameter* object instances for each basic service group provisioned.

Name	M/O	Value-Set	Remarks
notificationToCallingPty	M	Single	

B.1.2.6.7 ssInHlrCFB

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the SS CFB.

If the *ssInHlrCFB* object is instanciated then all objects that it needs to contain will be created. The object identifier of the *ssInHlrParameter* objects needs to be added to the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If an instance of the *ssInHlrCFB* object is deleted, then all objects it contains needs to be deleted. If *ssInHlrParameter* objects are deleted, then the object identifier of the parameter objects needs to be removed from the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

This subclass contains *ssInHlrParameter* object instances for each basic service group provisioned.

Name	M/O	Value-Set	Remarks
notificationToCallingPty	M	Single	
notificationToForwardingPty	M	Single	

B.1.2.6.8 ssInHlrCFNRy

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the SS CFNRy.

If the *ssInHlrCFNRy* object is instanciated then all objects that it needs to contain will be created. The object identifier of the *ssInHlrParameter* objects needs to be added to the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If an instance of the *ssInHlrCFNRy* object is deleted, then all objects it contains needs to be deleted. If *ssInHlrParameter* objects are deleted, then the object identifier of the parameter objects needs to be removed from the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

This subclass contains *ssInHlrParameter* object instances for each basic service group provisioned.

Name	M/O	Value-Set	Remarks
notificationToCallingPty	M	Single	
notificationToForwardingPty	M	Single	

B.1.2.6.9 ssInHlrCFNRc

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the SS CFNRc.

If the *ssInHlrCFNRc* object is instanciated then all objects that it needs to contain will be created. The object identifier of the *ssInHlrParameter* objects needs to be added to the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

If an instance of the *ssInHlrCFNRc* object is deleted, then all objects it contains needs to be deleted. If *ssInHlrParameter* objects are deleted, then the object identifier of the parameter objects needs to be removed from the attribute *assocMemberSSParameter* in the *basicServiceGroupInHlr* object.

This subclass contains *ssInHlrParameter* object instances for each basic service group provisioned.

Name	M/O	Value-Set	Remarks
notificationToCallingPty	M	Single	

B.1.2.6.10 ssInHlrCUG

This object class is a subclass of *supplementaryServiceInHlr* and can be instantiated for the SS CUG.

It contains an object instance of *ssInHlrCUGSubscription* for each CUG the subscriber is a member and it contains an *ssInHlrParameter* object instance for each basic service group associated via the *assocOwnerBSG* attribute in the *ssInHlrCUGSubscription* objects.

There are no additional attributes.

B.1.2.7 ssInHlrCUGSubscription

This object class characterizes each CUG, of which the subscriber is a member. The object instances are contained in the object instance CUG. A maximum of 10 instances may be created per subscriber.

The *assocOwnerBSG* may store associations to all BSG except SMS, dedicated PAD access and dedicated packet access.

Creation and deletion of a *ssInHlrCUGSubscription* object initiates a MAP-INSERT-SUBSCRIBER-DATA request primitive to the VLR where the subscriber is registered.

Name	M/O	Value-Set	Remarks
cugIndex	RDN	Single	
cugInterlock	M	Single	
intraCugOptions	M	Single	
assocOwnerBSG	M	Set acc. to X.732	
applicationToAllBSGs	M	Single	

B.1.2.8 ssInHlrParameter

The object class *ssInHlrParameter* is the superclass of all *ssInHlrParameter* object classes and contains the common characteristics of all subclasses. This class is not instantiated.

Instances of subclasses are contained within the relevant *supplementaryServiceInHlrobject*. If a supplementary service is created then all *ssInHlrParameter* instances contained also have to be created, and the reference within the *basicServiceGroupInHlr* instance in the attribute **assocMemberSSParameter** needs to be added. It should be noted, that not every combination of supplementary service and basic service group is permitted (e.g. CW is only applicable for circuit switched basic services).

If a supplementary service is deleted then all *ssInHlrParameter* instances contained needs to be deleted, and the reference within the *basicServiceGroupInHlr* instance in the attribute **assocMemberSSParameter** needs to be removed.

If a *basicServiceGroupInHlr* instance is created then all instances of *ssInHlrParameter* associated with this *basicServiceGroupInHlr* instance needs to be created.

If a *basicServiceGroupInHlr* is deleted then all instances of *ssInHlrParameter* with the corresponding **basicServiceGroupId** attribute have to be deleted.

Modification of a *ssInHlrParameter* object may initiate a MAP-INSERT-SUBSCRIBER-DATA request primitive to the VLR where the subscriber is registered.

Name	M/O	Value-Set	Remarks
basicServiceGroupId	RDN	Single	
activationStatus	M	Single	

B.1.2.8.1 ssInHlrParameterSimple

This object class is a subclass of *ssInHlrParameter* and can be instantiated for all simple *'ssInHlrParameter'* objects with no additional parameters.

The supplementary services so far defined are CW and all barring services.

B.1.2.8.2 ssInHlrParameterCFU

This object class is a subclass of *ssInHlrParameter* and is valid for the SS CFU.

Name	M/O	Value-Set	Remarks
registrationStatus	M	Single	
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	

B.1.2.8.3 ssInHlrParameterCFB

This object class is a subclass of *ssInHlrParameter* and is valid for the SS CFB.

Name	M/O	Value-Set	Remarks
registrationStatus	M	Single	
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	

B.1.2.8.4 ssInHlrParameterCFNRy

This object class is a subclass of *ssInHlrParameter* and is valid for the SS CFNRy.

Name	M/O	Value-Set	Remarks
registrationStatus	M	Single	
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	
noReplyConditionTimer	M	Single	

B.1.2.8.5 ssInHlrParameterCFNRc

This object class is a subclass of *ssInHlrParameter* and is valid for the SS CFNRc.

Name	M/O	Value-Set	Remarks
registrationStatus	M	Single	
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	

B.1.2.8.6 ssInHlrParameterCUG

This object class is a subclass of *ssInHlrParameter* and is valid for the SS CUG.

The Activation Status for CUG is always active.

Name	M/O	Value-Set	Remarks
interCugRestrictions	M	Single	
preferentialCugIndicator	M	Single	

B.1.2.9 Other Objects

See also Annex A - GSM Specific Managed Elements.

B.1.2.9.1. hlrFunctionPackage1202

The **hlrFunctionPackage1202** is a package containing the behaviour and all attributes necessary to be implemented in the managed object class *hlrFunction* from the point of view of this ETS. Other packages defined elsewhere may be needed to implement the full HLR Function (e.g. Billing, CCITT#7 Management, etc.).

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
maxNumberOfLogicalHlr	M	Single	
currentNumberOfLogicalHlr	M	Single	Read Only
maxNumberOfImsiInHlr	M	Single	
currentNumberOfImsiInHlr	M	Single	Read Only
maxNumberOfMsisdnInHlr	M	Single	
currentNumberOfMsisdnInHlr	M	Single	Read Only
defaultPW	M	Single	
defaultAnnouncement	O	Single	
listOfValidCUGInterlockCodes	O	Set	

B.1.2.9.2 logicalHlr

The *logicalHlr* object class represents the functionality of a logical HLR, where the current location and all subscriber data of a customer are permanently stored.

The *logicalHlr* object is a resource in its own right and is contained in the object class implementing the **hlrFunctionPackage1202**. The maximum number of *logicalHlr* objects that can be created within a *hlrFunction* is defined by the attribute **maxNumberOfLogicalHlr** contained in the **hlrFunctionPackage1202**.

A *logicalHlr* object instance can only be deleted if it does not contain any objects.

The following attributes have so far been identified:

Name	M/O	Value-Set	Remarks
hlrId	RDN	Single	
hlrNumber	M	Single	
administrativeState	M	Single acc. to X.721	
operationalState	M	Single acc. to X.721	Read Only
maxNumberOfImsiInLogicalHlr	M	Single	
currentNumberOfImsiInLogicalHlr	M	Single	Read Only
maxNumberOfMsisdnInLogicalHlr	M	Single	
currentNumberOfMsisdnInLogicalHlr	M	Single	Read Only
msisdnRangeInLogicalHlr	O	Set	

B.1.2.9.3 rsziListInHlr

This object class contains a defined list of regional restriction zones grouped under a logical id. This allows a pointer in the *subscriberInHlr* object to reference a list of such zones via a pointer.

Name	M/O	Value-Set	Remarks
rsziListId	RDN	Single	
rsziList	M	Single	

B.1.3 Name Bindings

The following name bindings are defined:

logicalHlr - hlrFunction

msisdnInHlr - logicalHLR

subscriberInHlr - logicalHlr

rsziListInHlr - hlrFunction

bcaSetInHlr - hlrFunction

basicServiceGroupInHlr - subscriberInHlr

basicServiceInHlr - basicServiceGroupInHlr

ssInHlrParameterSimple - ssInHlrCW

ssInHlrParameterSimple - ssInHlrBarring

supplementaryServiceInHlr - subscriberInHlr

ssInHlrParameterCFU- ssInHlrCFU

ssInHlrParameterCFB - ssInHlrCFB

ssInHlrParameterCFNRy - ssInHlrCFNRy

ssInHlrParameterCFNRc - ssInHlrCFNRc

ssInHlrParameterCUG - ssInHlrCUG

ssInHlrCUGSubscription - ssInHlrCUG

B.1.4 Relationships

The following relationships are defined:

a) Containment Relationships (see Name Bindings).
b) Group Relationships.

Relationship attributes of managed objects comprise the generic relationship model for group relationships as defined by CCITT X.732.

The following groups of managed objects have been identified:

Subscriber Group

The following relationship has been identified within this group:

The owner object class is *subscriberInHlr* with attribute **assocMemberMsisdn** pointing to the member object class.

The member object class is *msisdnInHlr* with attribute **assocOwnerImsi** pointing to the owner object class.

Basic Service Group

The following relationships have been identified within this group:

The owner object class is *basicServiceGroupInHlr* with the following attributes:

- **assocMemberSSParameter**
- **assocMemberCUGSubscription**

pointing to the member object classes.

The member object classes are *ssInHlrCUGSubscription* with attribute **assocOwnerBSG** pointing to the owner object class, and *ssInHlrParameter*.

In the latter object class the relationship pointer is implicit in the RDN (*basicServiceGroupId*)

Basic Service

The following relationship has been identified within this group:

The owner object class is *basicServiceInHlr* with attribute **assocMemberMsisdn** pointing to the member object class.

The member object class is *msisdnInHlr* with attribute assocOwnerBasicService pointing to the owner object class.

B.1.5 Attributes

B.1.5.1 msisdnInHlr

Changing of attributes of the *msisdnInHlr* object initiates no MAP request primitives of its own, but MAP request primitives may be invoked through the changing of associated attributes in other objects (see below).

hlrMsisdn

This attribute is the key (RDN) to the object *msisdnInHlr* and it is single valued. The internal structure is defined in GSM 03.03 and the syntax is defined in GSM-12-02-Syntax as 'GraphicString'.

Only the relevant part for the HLR needs to be stored. This is operator and implementation dependent.

administrativeState

The administrative state is used to lock the *msisdnInHlr* object from being used. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Locked** and **Unlocked**.

There are no actions defined for *msisdnInHlr*, the attribute simply being set. If the MSISDN is in state **Locked** then it cannot be used.

operationalState

The attribute describes the operational state of the MSISDN and it is read-only. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Enabled** and **Disabled**.

The MSISDN is in state **Disabled** when no IMSI is associated and no announcement is set. If the MSISDN is in state **Disabled** then it cannot be used.

allocationState

This attribute defines the allocation state of the MSISDN**.** It is single valued and the syntax is defined in GSM-12-02-Syntax as AllocationState.

Possible values are:
- not allocated
- allocated to IMSI
- allocated to previous IMSI
- allocated to announcement

If the state is not allocated then the operational state needs to be set to **Disabled**. The error cause **UnknownSubscriber** is returned with MAP-SendRoutingInfo.

If the state is 'allocated to IMSI' then the **associatedOwnerImsi** attribute needs to contain the pointer to a valid *subscriberInHlr* object.

If the state is 'allocated to previous IMSI' then the **associatedOwnerImsi** attribute may contain the pointer to a valid *subscriberInHlr* object (optional), or it may be set to a null value and the error cause **NumberChanged** needs to be returned with MAP-SendRoutingInfo.

assocOwnerImsi

This attribute associates the *msisdnInHlr* object with a valid IMSI (*subscriberInHlr* object). It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

The possible value is any existing *subscriberInHlr* object identifier within the same logical HLR. An *msisdnInHlr* object can only point to one *subscriberInHlr*

The *subscriberInHlr* pointed to may be either the current or the previous IMSI depending on the state held in the attribute **allocationState**.

If the association is removed then the allocation state needs to be set to 'not allocated' or 'allocated to announcement'. The association may also be removed and set to 'allocated to previous IMSI' if the optional attribute **assocMemberPrevMsisdn** is implemented in the *subscriberInHlr* object.

assocOwnerBasicService

This attribute associates the *msisdnInHlr* object with one or more valid basic services (*basicServiceInHlr* object). It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

The possible values are any existing *basicServiceInHlr* object identifiers in the same *subscriberInHlr* object. An *msisdnInHlr* object can point to more than one *basicServiceInHlr* object.

If the *basicServiceInHlr* is deleted then the association needs to be removed at the associated *msisdnInHlr* object.

bcaSetId

The Bearer Capability Allocation Set Id attribute is conditional and used only within the *msisdnInHlr* object if required i.e. for multi-numbering.

It is single valued and is a reference to an instance of the *bcaSetInHlr* object defining the Bearer Capability Information element (or elements) related to the basic service connected with this *msisdnInHlr*.

The syntax is defined in GSM-12-02 SYNTAX as GraphicString (SIZE(1..8)).

announcement

This attribute is conditional and may be used to connect a *msisdnInHlr* that is not associated to a *subscriberInHlr* to an announcement.

If the MSISDN is interrogated by MAP then the value of this attribute may be returned as roamingNumber, thus rerouting calls to this MSISDN to a general or special (per subscriber) announcement somewhere in the network.

A default announcement may be defined within the **hlrFunctionPackage1202** attribute **defaultAnnouncement.**

The syntax is defined in MAP-CommonDataTypes as ISDN-AddressString.

B.1.5.2 bcaSetInHlr

bcaSetId

This attribute is single valued and is the RDN of the *bcaSetInHlr* object which defines a Bearer Capability Information element (or elements) which may be related to a basic service connected with an *msisdnInHlr*.

The syntax is defined in GSM-12-02 SYNTAX as GraphicString (SIZE(1..8)).

bcaSet

The Bearer Capability Allocation attribute is conditional and used only within the *msisdnInHlr* object if required i.e. for multi-numbering.

It is defined in GSM 09.07 (Values) and 03.08.

It is set valued and contains the data of the Bearer Capability Information element related to the basic service connected with this *msisdnInHlr*.

The syntax is defined in GSM-12-02.BcaSet.

The internal structure of the data is not relevant within the HLR.

B.1.5.3 subscriberInHlr

hlrImsi

This attribute is the key (RDN) to the object *subscriberInHlr* and is single valued. The internal structure is defined in GSM 03.03 and the syntax is defined in GSM-12-02-Syntax as GraphicString.

Only the relevant part for the HLR needs to be stored. This is operator and implementation dependent.

administrativeState

This state is used to lock a *subscriberInHlr* object before deletion or to completely remove it from service.

The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Locked**, **Shutting Down** and **Unlocked**.

The state is set to **Locked** by invoking the Action lockSubscriberInHlr. Initially the state is set to **Shutting Down** and a MAP-CANCEL-LOCATION request primitive is invoked if the subscriber is registered in a VLR. After the confirmation is received then the state is set to **Locked**. This triggers a stateChange notification.

The *subscriberInHlr* is unlocked by invoking the Action unlockSubscriberInHlr**.** The state is set to **Unlocked** and no MAP request primitive is invoked.

controlStatus

This status is conditional and may be used to remove a *subscriberInHlr* temporarily from service. It can be used if more than one system management function is necessary to modify the subscriber data, or to prevent MAP operations operating on inconsistent data when no atomic synchronisation according to CCITT X.720 is available.

According to CCITT X.731 the attribute is set valued. Possible values are partOfServicesLocked and empty set.

The control status may be set to partOfServicesLocked by the action lockMAPService.

If MAP Service is locked then any incoming MAP primitives will operate on old data. If the value partOfServicesLocked is removed by action unlockMAPService, then MAP may operate on the new data. Depending on the data that has been changed, a MAP operation may be invoked.

If the modifications would imply inconsistency in subscriber data when the **partOfServicesLocked** value is removed from the control status all the modifications are disregarded and the old subscriber data remains valid.

operationalState

The attribute describes the operational state of the IMSI. It is read-only. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Enabled** and **Disabled**.

If the state is **Disabled** then the subscriber is temporarily removed from service.

The operational state is set to **Enabled** by the HLR itself only if the subscriber data is in a consistent state and the minimum set of attributes is supplied. Specifically a main MSISDN and at least one basic service needs to be supplied, otherwise the operational state will remain **Disabled**, even if the administrative state is set to **Unlocked**.

If, during subsequent modifications, the subscriber data becomes inconsistent once more (e.g. by deletion of all basic services) then the operational state is again set to **Disabled** by the HLR, and, if necessary, the HLR initiates a MAP-CANCEL-LOCATION request primitive to the relevant VLR.

In operational state **Disabled** subsequent call establishment or location update requests needs to be rejected.

mainMsisdn

This attribute contains the main MSISDN. For single numbering systems this will be the allocated MSISDN. For multi numbering systems this can be one of the MSISDNs allocated to the subscriber profile per basic service, which would by default be the MSISDN associated with the Teleservice Telephony if this is allocated (although any associated MSISDN may be assigned to be the main MSISDN). If a subscriber profile does not have Teleservice Telephony then the basic MSISDN needs to be assigned from the MSISDNs associated with the subscriber profile.

The mainMsisdn is the MSISDN transmitted on MAP interrogations e.g. on location update.

Its possible value is any valid MSISDN within the same logical HLR (see *msisdnInHlr* object). The internal structure is defined in GSM 03.03 and the syntax is defined in MAP-CommonDataTypes as ISDN-AddressString.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

assocMemberMsisdn

This attribute associates the *subscriberInHlr* object with valid MSISDN (*msisdnInHlr* objects) to which the IMSI is currently connected. It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

Possible values are any existing *msisdnInHlr* object identifier within the same logical HLR.

assocMemberPrevMsisdn

This optional attribute associates the *subscriberInHlr* object with valid MSISDN (*msisdnInHlr* objects) to which the IMSI was previously connected. It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

Possible values are any existing *msisdnInHlr* object identifier within the same logical HLR, with allocationState **allocated to previous IMSI**. A *subscriberInHlr* object can point to more than one *msisdnInHlr* object to facilitate multi-numbering.

category

This attribute is single valued. The syntax is defined in MAP-CommonDataTypes Category and the internal structure is defined in Q.763 and in GSM 03.08.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

subscriptionRestriction

This attribute is single valued. The syntax is defined in GSM-12-02-Syntax SubscriptionRestriction and the values are defined in GSM 03.08.

Possible values are:

- all GSM PLMN
- one national and all foreign PLMNs
- regional restricted (Part of a GSM PLMN in one country)
- regional restricted plus all other GSM PLMNs

The regional restrictions which are subscribed to are defined using the rszi list pointers.

If this attribute is changed then no MAP request primitive is invoked, but changes to this attribute may introduce changes to the attribute mscAreaRestrictedFlag (see below).

subscriberStatus

This attribute is single valued and read only. The syntax is defined in MAP-MS-DataTypes SubscriberStatus.

Possible values for this attribute are:

- serviceGranted
- operatorDeterminedBarring

operatorDeterminedBarring

This attribute is single valued and is defined in GSM 02.41 and 03.15 (Values).

The network feature Operator Determined Barring (ODB) allows the network operator or service provider to regulate access by subscribers to GSM services using the barring of incoming or outgoing traffic or of roaming.

It consists of one part that is only relevant in the HLR and of another part that is relevant for both the HLR and VLR. The syntax of the first part is defined in GSM-12-02-Syntax OperatorDeterminedBarring and the syntax of the second part is defined in MAP-MS-DataTypes ODB-Data.

The first part additionally contains:

Barring of roaming outside the home PLMN
Barring of roaming outside the home PLMN country
Barring of all outgoing calls when roaming outside the HPLMN country
Barring of all incoming calls
Barring of all incoming calls when roaming outside the HPLMN country

If the first part of the attribute is changed then no MAP request primitive is invoked, although changes to this part of the attribute may introduce changes to the attribute **mscAreaRestrictedFlag** (see below).

If the second part of the attribute is changed then the MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

barringSubscriptionOption

This attribute is single valued. The syntax is defined in GSM-12-02-Syntax BarringSubscriptionOption.

It is defined in GSM 03.88 as "the control of barring services subscription option".

This data is valid for ALL barring services and therefore unique per IMSI. It defines whether the barring services are controlled by subscriber using a password, or by the service provider.

Possible values are:

- Control of Barring Services by subscriber using a password.
- Control of Barring Services by the service provider.

This attribute is only valid if at least one barring service is provisioned.

The attribute may also be changed by the *wrongPasswordAttemptsCounter.* If this attribute is changed, then no MAP request primitive is invoked.

barringPassword

This attribute is single valued and write-only by the operator (replace with default). It is defined in GSM 03.88. The syntax is defined in MAP-SS-DataTypes Password.

This attribute is only valid if the Barring Subscription Option is set to control of barring by subscriber.

This attribute may only be changed by the subscriber, the operator only being able to replace the value with a default (this default is defined as an attribute in the **hlrFunctionPackage1202**).

If this attribute is changed then no MAP request primitive is invoked.

wrongPasswordAttemptsCounter

This attribute is single valued and read-only. It is defined in GSM 03.88. The syntax is defined in GSM-12-02-Syntax WrongPasswordAttemptsCounter.

This attribute is only valid if the Barring Subscription Option is set to control of barring by subscriber using a password.

The value is set to 0 when a password is registered by the service provider. If a password check is done with an incorrect password then the counter is incremented by 1. If a password check is

passed the counter is set to 0. If the counter has reached the value 3 then the *barringSubscriptionOption* is set to "Controll of Barring services by the Service Provider". This prevents further registration, activation and deactivation of barring SS. The only possibility to reset the wrongPassordAttemptCounter is to register a new password by the service provider.

lmsi

This attribute is single valued and read only. The syntax is defined in MAP-CommonDataTypes LMSI. The implementation is optional.

Defined in GSM 03.03 (Internal structure) and 03.08.

authenticationSetFlag

This attribute is single valued and read only.

The value is established in the HLR depending on the presence or absence of authentication set. The authentication set is defined in GSM 03.20 (values) and o3.08 and contains a list of authentication sets, each containing RAND, SRES and Kc.

The syntax is defined in GSM-12-02-Syntax.AuthenticationSetFlag.

The implementation of this attribute is optional.

vlrNumber

This attribute is single valued and read only. The syntax is defined as ISDN-AddressString in GSM 12.00.

Defined in GSM 03.03 (Internal structure) and 03.08.

If this attribute contains a valid value then the subscriber is registered somewhere in the network.

mscNumber

This attribute is single valued and read only. The syntax is defined as ISDN-AddressString in GSM 12.00..

It is defined in GSM 03.03 (Internal structure) and 03.08.

mscAreaRestrictedFlag

This attribute is single valued and read only. The syntax is defined in GSM-12-02-Syntax as MscAreaRestrictedFlag.

Defined in GSM 03.08.

The value is established in the HLR depending on location updating information (e.g. VLR number, MSC Number) and may be associated with other data indicating the area in the GSM system area where the mobile subscriber is allowed to roam. These parameters are subject to national choice. (e.g. Subscription Restriction, Operator Determined Barring).

The attribute has two values:

- MSC Area Restricted
- MSC Area Not Restricted

In MAP V2, in addition to the RoamingNotAllowed Error a RoamingNotAllowedCause is transmitted supplying more detailed information.

The value of mscAreaRestrictedFlag may be established depending on the values of the following:

- Subscription restriction (including zones)

- Operator Determined Barring
- VLR Number (related to zones)
- MSC Number (related to zones)

If the attribute is changed by the system to the value roaming not allowed and the subscriber is registered, then a MAP-CANCEL-LOCATION request primitive is invoked.

checkSupplServIndicator

This attribute is single valued and read only. The syntax is defined in GSM-12-02-Syntax as CheckSupplServIndicator.

Defined in GSM 03.08.

msPurgedFlag

This attribute is single valued and read only. The syntax is defined in GSM-12-02-Syntax as MsPurgedFlag.

Defined in GSM 03.08.

msisdnAlert

This attribute belongs to the Message Waiting Data. It is single valued and read/write. The syntax is defined in MAP-CommonDataTypes as ISDN-AddressString. The implementation is optional; but if it is implemented then also mnrf, mcef and mwdAddressList shall be implemented.

The semantics are defined in GSM 03.40. The default value is the main MSISDN, and it needs to be supplied if the subscriber has provisioned the Teleservice SMS and the Message Waiting Information is implemented. If the HLR wants to alert a Service Center that an MS is once more attainable then it will use this MSISDN value.

mnrf

This attribute belongs to the Message Waiting Data. It is single valued and read only. The syntax is defined in GSM-12-02-Syntax as Boolean. The implementation is optional; but if it is implemented, also msisdnAlert, mcef and mwdAddressList shall be implemented.

The semantics are defined in GSM 03.40. The Mobile-Station-Not-Reachable-Flag has the value TRUE if the mwdAddressList contains one or more entries. An entry is made in mwdAddressList when an attempt to deliver a short message to an MS has failed with a cause of Absent Subscriber.

mcef

This attribute belongs to the Message Waiting Data. It is single valued and read only. The syntax is defined in GSM-12-02-Syntax as Boolean. The implementation is optional; but if it is implemented, also msisdnAlert, mnrf, and mwdAddressList have to be implemented.

The semantics are defined in GSM 03.40. The Mobile-Station-Memory-Capacity-Exceeded-Flag will have the value TRUE if the mwdAddressList contains one or more entries. An entry is made in mwdAddressList when an attempt to deliver a short message to an MS has failed with a cause of MS Memory Capacity Exceeded.

mwdAddressList

This attribute belongs to the Message Waiting Data. It is set valued and read only. The syntax is defined in GSM-12-02-Syntax as ScAddressList. The implementation is optional; but if implemented, also msisdnAlert, mnrf, mcef and mwdAddressList have to be implemented.

The semantics are defined in GSM 03.40. If the Mobile-Station-Memory-Capacity-Exceeded-Flag has the value TRUE, then an attempt to deliver a short message to an MS has failed with a cause of MS Memory Capacity Exceeded and the mwdAddressList contains one or more entries of

Service Center Addresses. When the MS is again reachable, the HLR will alert the Service Center(s) and set the mcef to FALSE.

If the Mobile-Station-Not-Reachable-Flag has the value TRUE (meaning that an attempt to deliver a short message to an MS has failed with a cause of 'Absent Subscriber') then the mwdAddressList will hold one or more entries of Service Center Addresses. When the MS is again reachable then the HLR will alert the Service Center or Centers, and set the mnrf to FALSE.

rsziListPointers

It is set valued. It consists of pointers to instances of the *rsziListInHlr* object defining the zones allocated to a subscriber for the purposes of regional subscription. It is also valid for the set to be empty. A zone list is composed of the country code (CC), the national destination code (NDC) and the list of zones in this particular list.

The syntax is defined in GSM-12-02 SYNTAX as RsziListIdSet.

B.1.5.4 basicServiceGroupInHlr

basicServiceGroupId

This attribute is the key (RDN) to the object *basicServiceGroupInHlr*. It is single valued.

The Basic Service Groups are defined in GSM 02.04.

The syntax is defined in GSM-12-02-Syntax as GraphicString.

Since the basic service groups are mainly used to group the basic services for the SS handling, and the BS 61 and BS 81 belong to group 7 and 8 (see also GSM 02.04) then the possible values of the BSG (for Phase 2) are:

BSG

1 Speech
May contain only TS 11 (Telephony)
TS 12 (Emergency) cannot be subscribed to

2 Short Message Service
may contain only TS 21 and TS 22
TS 23 (Cell Broadcast) cannot be subscribed to

6 Facsimile Services
may contain only TS 61 ad TS 62

7 All Data circuit asynchronous
may contain only BS 21 to BS 26
and BS 61A and BS 81A

8 All Data circuit synchronous
may contain only BS 31 to BS 34
and BS 61S and BS 81S

9 All PAD access
may contain only BS 41 to BS 46

10 All Data Packet
may contain only BS 51 to BS 53

11 12 Kbits unrestricted digital
contains only BS 71

assocMemberSSParameter

This attribute associates the *basicServiceGroupInHlr* object with all *ssInHlrParameter* objects of this subscriber where data exists for this basic service group. It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

If a new *ssInHlrParameter* object for this BSG is created then the value for this object shall be added to this list.

If an *ssInHlrParameter* object for this BSG is deleted then the value object has to be removed from this list.

assocMemberCUGSubscription

This attribute associates the *basicServiceGroupInHlr* object with all *ssInHlrCUGSubscription* objects of this subscriber, where the CUG is applicable to this basic service group. It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

B.1.5.5 basicServiceInHlr

basicServiceId

This attribute is the key (RDN) to the object *basicServiceInHlr*. It is single valued.

The values of the Bearer Services are defined in GSM 02.02 and the values of the Teleservices in GSM 02.03.

The syntax is defined in GSM-12-02-Syntax as GraphicString.

Possible values (for Phase 2) are:

TS 11
TS 21 to TS 22
TS 61 to TS 62
BS 21 to BS 26
BS 31 to BS 34
BS 41 to BS 46
BS 51 to BS 53
BS 61A
BS 61S
BS 71
BS 81A
BS 81S

TS 12 and TS 23 cannot be subscribed to.

assocMemberMsisdn

This attribute associates the *basicServiceInHlr* object with a valid *msisdnInHlr* object of this subscriber. It is set valued with the restriction that one *basicServiceInHlr* object can only be associated with one MSISDN.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

B.1.5.6 supplementaryServiceInHlr

ssId

This attribute is the key (RDN) to the generic object *supplementaryServiceInHlr*. It is single valued.

The Supplementary Services are defined in GSM 02.04.

The syntax is defined in GSM-12-02-Syntax as GraphicString.

Provision and withdrawal of an SS shall apply to ALL Basic Services the subscriber subscribed to.

Registration, erasure, activation and deactivation of a SS shall apply to one or more group(s) of Basic Services (as defined in GSM 2.04).

Possible values (Phase 2) are:

CLIP
CLIR
CoLP
CoLR
CFU
CFB
CFNRy
CFNRc
CW
HOLD
MPTY
CUG
AoCI
AoCC
BAOC
BOIC
BOICexHC
BAIC
BICRoam

This list can be extended by the operator specific supplementary services.

overrideCategory

This attribute is single valued and is defined in GSM 2.81. The syntax is defined in MAP-SS-DataTypes OverrideCategory.

Depending on national regulations some networks may define categories of subscribers that have the ability to override the presentation restriction (CLIR), and also have the calling line identity presented (e.g. the Police). The ability to have such override category is a national option.

The override category is only applicable within the HPLMN country.

Possible values are:

- Override Enabled
- Override Disabled

This attribute is optional.

If this attribute is changed then the MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

presentationMode

This attribute is single valued and contained in the object *ssInHlrCLIR*.

It is defined in GSM 03.81 as "the presentation mode subscription option".

The syntax is defined in GSM-12-02-Syntax.PresentationMode.

Possible values for the attribute are:

PresentationPermanent
PresentationPerCall

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive will be invoked.

notificationToCallingPty

This attribute is single valued and contained in the objects *ssInHlrCFx*.

It is defined in GSM 03.82 as "notification to calling party subscription option".

The syntax is defined in GSM-12-02-Syntax as NotificationToCallingPty.

This data is required for all call forwarding services. It indicates whether or not the calling party should receive a notification when the call is forwarded.

Possible values are:

No notification
Notification

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

notificationToForwardingPty

This attribute is single valued and contained in the objects *ssInHlrCFB* and *CFNRy*.

It is defined in GSM 03.82 as "subscription option notification to the forwarding party ".

The syntax is defined in GSM-12-02-Syntax as NotificationToForwardingPty.

This data is required only for CFB and CFNRy. It indicates whether or not the forwarding party should receive a notification when the call is forwarded.

Possible values are:

No notification
Notification

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

B.1.5.7 ssInHlrCUGSubscription

cugIndex

This attribute is the key (RDN) for the object *ssInHlrCUGSubscription*, and it is single valued.

The value may range between 1 and 10.

The CUG index is the same as defined for ISDN. It is for local reference only.

The syntax is defined in MAP-SS-DataTypes CUG-Index and the internal structure is defined in TS ETS 300 138:1991.

See GSM 03.85.

cugInterlock

This attribute is single valued. It is defined in GSM 03.85.

The syntax is defined in MAP-SS-DataTypes CUG-Interlock and the internal structure is defined in TS ETS 300 138:1991.

The CUG interlock code is the same as defined for ISDN. It consists of an international part plus a national part, and it uniquely identifies a CUG.

The CUG Interlock code may be validated with the optional attribute **listOfValidCUGInterlockCodes** within the **hlrFunctionPackage1202**.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

intraCugOptions

This attribute is single valued.

It is defined in GSM 03.85.

The syntax is defined in MAP-SS-DataTypes IntraCUG-Options. It indicates whether incoming or outgoing calls are barred within the CUG. It is applicable to each CUG separately.

Possible values are:

noCUG-Restrictions
cugIC-CallBarred
cugOG-CallBarred

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

assocOwnerBSG

This attribute associates the *ssInHlrCUGSubscription* object with all *basicServiceGroupInHlr* objects of this subscriber, if the CUG is applicable to this basic service group. It is set valued.

The semantics are defined in CCITT X.732 and the syntax is defined in CCITT X.721 Attribute-ASN1Module GroupObjects.

It is defined in GSM 02.85 as "Applicability to Basic Services".

This is a list of one or more basic service groups to which the CUG applies. It is applicable to each CUG separately.

In case attribute applicationToAllBSGs is true, assocOwnerBSG contains all BSGs the subscriber subscribes to, except emergency call, SMS, dedicated PAD access and dedicated Packet access.

According to GSM 02.85 a CUG may be applicable to all basic services except emergency calls, SMS, dedicated PAD access and dedicated packet access.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

applicationToAllBSGs

The attribute indicates whether the CUG applies to all BSGs subscribed to, except those for which the CUG supplementary service cannot be applied at all. It is single valued. The syntax is defined in GSM-12-02-SYNTAX. ApplicationToAllBSGs.

B.1.5.8 ssInHlrParameter

basicServiceGroupId

This attribute is the key (RDN) for the object *ssInHlrParameter*. It is single valued.

The Basic Service Groups are defined in GSM 02.04.

The syntax is defined in GSM-12-02 as GraphicString.

For possible values (for Phase 2) see basicServiceGroupInHlr.

activationStatus

This attribute is single valued.

The syntax is defined in GSM-12-02-Syntax ActivationStatus. Possible values are **active and operative** and **deactivated**. For conditional call forwarding services and BICRoam the attribute may take the additional value **active and quiescent**. Only the first two values can be set by the operator or the subscriber i.e. **active and operative** and **deactivated**.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive might be invoked.

registrationStatus

This attribute is single valued. It is only contained in certain *ssInHlrParameter* objects.

The syntax is defined in GSM-12-02-Syntax RegistrationStatus. Possible values are **registered** and **erased**.

The attribute is changed implicitly by providing values to certain attributes.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

forwardedToNumber

This attribute is single valued and only contained in *ssInHlrParameter* objects for the call forwarding services.

It is defined in GSM 03.82.

The syntax is defined as **AddressString**.

The attribute may be changed by both the operator and by the subscriber.

If this attribute is set then the registration status is set to registered.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked (with the exception of CFU).

forwardedToSubaddress

This attribute is single valued. It is only contained in *ssInHlrParameter* objects for call forwarding services.

It is defined in GSM 09.02.

The syntax is defined as ISDN-SubaddressString.

The attribute may be changed by both the operator and by the subscriber.

If this attribute is set then the registration status is set to registered.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked (with the exception of CFU).

noReplyConditionTimer

This attribute is single valued and only contained in *ssInHlrParameter* objects for CFNRy.

It is defined in GSM 03.82.

The syntax is defined in MAP-SS-DataTypes NoReplyConditionTime.

The attribute may be changed by both the operator and by the subscriber.

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

interCugRestrictions

This attribute is single valued and it is only contained in *ssInHlrParameter* objects for CUG.

It is defined in GSM 03.85 as "The CUG facilities subscription option".

The syntax is defined in MAP-SS-DataTypes InterCUG-Restrictions.

Also called **Type of inter CUG accessibility** it defines if incoming access, outgoing access, both or none within this BSG (according to GSM 02.85) are allowed. It applies to all CUG that the mobile subscriber is a member of.

Possible values are:

CUG only facilities
CUG with outgoing access
CUG with incoming access
CUG with both outgoing and incoming access

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

preferentialCugIndicator

This attribute is single valued and only contained in *ssInHlrParameter* objects for CUG.

It is defined in GSM 03.85.

It indicates whether a preferential CUG is provided for a BSG, and if so, to which CUG index it applies.

The syntax is defined in GSM-12-02-Syntax.PreferentialCUG-Indicator

If this attribute is changed then a MAP-INSERT-SUBSCRIBER-DATA request primitive is invoked.

B.1.5.9 hlrFunctionPackage1202

maxNumberOfLogicalHlr

This attribute contains the maximum number of *logicalHlr* objects that can be contained within this *hlrFunction* It is single valued. The syntax is defined in GSM-12-02 as **MaxNumberOfLogicalHlr**.

currentNumberOfLogicalHlr

This attribute contains the current number of *logicalHlr* objects that are contained within the *hlrFunction*. It is single valued and read only. The syntax is defined in GSM-12-02 as **CurrentNumberOfLogicalHlr**.

maxNumberOfImsiInHlr

This attribute contains the maximum number of *subscriberInHlr* objects that can be contained within this *hlrFunction*. It is single valued. The syntax is defined in GSM-12-02 as **MaxNumberOfImsiInHlr**.

currentNumberOfImsiInHlr

This attribute contains the current number of *subscriberInHlr* objects that are contained within this *hlrFunction*. It is single valued and read only. The syntax is defined in GSM-12-02 as **currentNumberOfImsiInHlr**.

maxNumberOfMsisdnInHlr

This attribute contains the maximum number of *msisdnInHlr* objects that can be contained within this *hlrFunction*. It is single valued. The syntax is defined in GSM-12-02 as **MaxNumberOfMsisdnInHlr**.

currentNumberOfMsisdnInHlr

This attribute contains the current number of *msisdnInHlr* objects that are contained within this *hlrFunction*. It is single valued and read only. The syntax is defined in GSM-12-02 as **currentNumberOfMsisdnInHlr**.

defaultPW

This attribute contains the default password to be used within the *subscriberInHlr* object attribute **barringPassword**. It is single valued.

The syntax is defined in MAP-SS-DataTypes as **Password**.

defaultAnnouncement

The attribute contains the default announcement to be used in the *msisdnInHlr* object attribute announcement. It is single valued.

The syntax is defined in MAP-CommonDataTypes as **ISDN-AddressString**.

listOfValidCUGInterlockCodes

This attribute contains a list of all valid CUG InterlockCodes. It is set valued.

The syntax is defined in GSM-12-02 as **ListOfValidCUGInterlockCodes**.

It is used for error checking with the creation of *logicalHlr* objects.

B.1.5.10 logicalHlr

hlrId

This attribute is the key (RDN) for the object *logicalHlr*. It is single valued.

The syntax is defined in GSM-12-02 as **GraphicString**.

Whether only the PLMN relevant part of the HLR-Id as defined in the MAP-CommonDataTypes is used, or the whole HLR-Id (including MCC and MNC) is used, is operator and implementation dependent.

administrativeState

The administrative state is used to lock the *logicalHlr* object from being used. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Locked**, **Shutting Down**, and **Unlocked**.

There are no actions defined for *LogicalHlr*, the attribute simply being set. If the logicalHlr is in state **Locked** then it cannot be used.

operationalState

The attribute describes the operational state of the logicalHlrr and it is read-only. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Enabled** and **Disabled.**

If the logicalHlr is in state **Disabled** then it cannot be used.

hlrNumber

This attribute contains the HLR number for this logical HLR. It is single valued.

The syntax is defined in MAP-MS-DataTypes as **ISDN-AddressString**.

maxNumberOfImsiInLogicalHlr

This attribute contains the maximum number of IMSI (i.e. of *subscriberInHlr* objects) that can be stored within this logical HLR. It is single valued.

The syntax is defined in GSM-12-02 as **MaxNumberOfImsiInLogicalHlr**.

The attribute is used for error checking with the creation of *subscriberInHlr* objects.

currentNumberOfImsiInLogicalHlr

This attribute contains the number of IMSI (i.e. of *subscriberInHlr* objects) that are stored within this logical HLR. It is single valued.

The syntax is defined in GSM-12-02 as **CurrentNumberOfImsiInLogicalHlr**.

maxNumberOfMsisdnInLogicalHlr

This attribute contains the maximum number of MSISDN (i.e. of *msisdnInHlr* objects) that can be stored within this logical HLR. It is single valued.

The syntax is defined in GSM-12-02 as **MaxNumberOfMsisdnInLogicalHlr**.

The attribute is used for error checking with the creation of *msisdnInHlr* objects.

currentNumberOfMsisdnInLogicalHlr

This attribute contains the number of MSISDN (i.e. of *msisdnInHlr* objects) that are stored within this logical HLR. It is single valued.

The syntax is defined in GSM-12-02 as **CurrentNumberOfMsisdnInLogicalHlr**.

The attribute is used for error checking with the creation of *msisdnInHlr* objects.

msisdnRangeInLogicalHlr

This attribute is set valued and defines ranges of MSISDNs within a logical HLR. The syntax of each element is GraphicString.

Only those MSISDNs whose leading digits coincide with the elements of the msisdnRangeInLogicalHlr belong to this particular logical HLR. The MSISDNs of a physical HLR NE are thus partitioned into ranges corresponding to logical HLRs.

Only the relevant parts for the HLR need to be stored. This is operator and implementation dependent.

B.1.5.11 rsziListInHlr

rsziListId

This attribute is single valued and is the RDN of the *rsziListInHlr* object each instance of which defines a list of regional subscription zones.

The syntax is defined in GSM-12-02 SYNTAX as GraphicString (SIZE(1..8)).

rsziList

This attribute defines a list of regional subscription zones.

It is single valued.

The syntax is defined in GSM-12-02 SYNTAX RsziList.

B.1.6 Actions

lockSubscriberInHlr
unlockSubscriberInHlr
lockMAPService
unlockMAPService

B.1.7 Notifications

For each object:

Create object
Delete object
AttributeValueChange

B.2 AUC Functional Entities

B.2.1 General

The general organisation of the data in the AUC is quite simple as the only objects required are the *logicalAuc* object itself and the *subscriberInAuc* object.

See also objects mentioned in Annex A. These objects would, in general, not be contained in the *logicalAuc* object, but rather in the *managedElement* object (see GSM 12.00 and CCITT M.3100).

B.2.2 Managed Object Classes

B.2.2.1 subscriberInAuc

The *subscriberInAuc* object class is a resource in its own right. The *subscriberInAuc* object is contained in the *logicalAuc* object.

The maximum number of *subscriberInAuc* objects that can be created within a logicalAuc is defined by the attribute **maxNumberOfImsiInLogicalAuc**, the maximum number of *subscriberInAuc* objects that can be created within a *aucFunction* is defined by the attribute **maxNumberOfImsiInAuc**,

Name	M/O	Value-Set	Remarks
aucImsi	RDN	Single	
ki	M	Single	encrypted
administrativeState	M	Single acc. to X.731	
algorithmA3A8	M	Single	
encryptionType	O	Single	

B.2.2.2 Other Objects

See also Annex A - GSM Specific Managed Elements.

B.2.2.2.1 hlrFunctionPackage1202

The **hlrFunctionPackage1202** is a package containing the behaviour and all attributes necessary to be implemented in the managed object class *aucFunction* from the point of view of this ETS. Other packages defined elsewhere may be needed to implement the full AUC Function.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
maxNumberOfLogicalAuc	M	Single	
currentNumberOfLogicalAuc	M	Single	Read Only
maxNumberOfImsiInAuc	M	Single	
currentNumberOfImsiInAuc	M	Single	Read Only

B.2.2.2.2 logicalAuc

The *logicalAuc* object class represents the functionality of a logical AUC, which stores the authentication of all subscribers belonging to this logical AUC.

The *logicalAuc* object is a resource in its own right and is contained in the object class implementing the **hlrFunctionPackage1202.** The maximum number of *logicalAuc* objects that can be created within an *aucFunction* is defined by the attribute **maxNumberOfLogicalAuc** contained in the **hlrFunctionPackage1202.**

A *logicalAuc* object instance can only be deleted if it does not contain any objects.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
aucId	RDN	Single	
aucNumber	M	Single	
maxNumberOfImsiInLogicalAuc	M	Single	
currentNumberOfImsiInLogicalAuc	M	Single	Read Only
administrativeState	M	Single acc. to X.731	
operationalState	M	Single acc. to X.731	Read Only

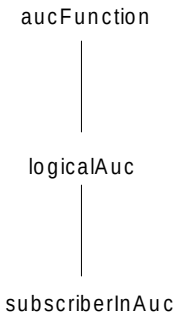

Figure B.2.1: Subscriber Administration Containment Tree for the AUC

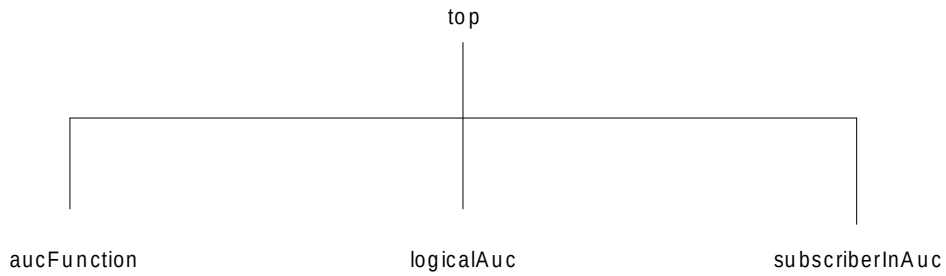

Figure B.2.2: Subscriber Administration Inheritance Tree for the AUC

B.2.3 Name bindings

The following name bindings are defined:

logicalAuc - aucFunction

subscriberInAuc - logicalAuc

B.2.4 Relationships

Containment relationships (see Name Bindings).

B.2.5 Attributes

B.2.5.1 subscriberInAuc

aucImsi

This attribute is the key (RDN) to the object *subscriberInAuc* and it is single valued. The internal structure is defined in GSM 03.03 and the syntax is defined in GSM-12-02-Syntax as GraphicString.

Only the part of the attribute relevant for the AUC needs to be stored. This is particularly true if the AUC is combined with the HLR. This is, however, operator and implementation dependent.

ki

This attribute is single valued and write-only. It is defined in GSM 03.08 and 03.20. The syntax is defined in MAP-MS-DataTypes Ki.

The key Ki is used to calculate the parameter SRES. The key is also stored in the SIM and is therefore available in the MS.

The Ki value is transmitted and stored encrypted. Therefore, it can only be read in encrypted form by the operator.

administrativeState

Possible values of this attribute according to X.731 are **Locked** and **Unlocked**.

This state may be used to lock a *subscriberInAuc*. This means that no further authentication is possible after the triplets are used up.

algorithmA3A8

This attribute is single valued and the syntax is defined in GSM-12-02-Syntax.

It defines which version of the algorithm A3/A8 should be used for this subscriber.

encryptionType

This attribute is single valued and the syntax is defined in GSM-12-02-Syntax.

It defines the type of encryption that has been used to encrypt the associated Ki on the OS/NE interface.

B.2.5.2 hlrFunctionPackage1202

maxNumberOfLogicalAuc

This attribute contains the maximum number of *logicalAuc* objects that can be contained within this object. It is single valued.

The syntax is defined in GSM-12-02 as **MaxNumberOfLogicalAuc**.

The number of logical AUC is used for error checking with the creation of *logicalAuc* objects.

currentNumberOfLogicalAuc

This attribute contains the current number of *logicalAuc* objects that can be contained within this object. It is single valued and read only.

The syntax is defined in GSM-12-02 as **CurrentNumberOfLogicalAuc**.

The number of logical AUC is used for error checking with the creation of *logicalAuc* objects.

maxNumberOfImsiInAuc

This attribute contains the maximum number of imsi that can be contained within an AUC. It is single valued.

The syntax is defined in GSM-12-02 as **MaxNumberOfImsiInAuc**.

This attribute is used for error checking with the creation of *subscriberInAuc* objects.

currentNumberOfImsiInAuc

This attribute contains the current number of imsi that can be contained within an AUC. It is single valued and read only.

The syntax is defined in GSM-12-02 as **CurrentNumberOfImsiInAuc**.

This attribute is used for error checking with the creation of *subscriberInAuc* objects.

B.2.5.3 logicalAuc

aucId

This attribute is the key (RDN) for the object *logicalAuc*. It is single valued.

The syntax is defined in GSM-12-02 as **GraphicString**.

Whether only the PLMN relevant part of the AUC-Id as defined in the MAP-CommonDataTypes is used, or the whole AUC-Id (including MCC and MNC) is used, is operator and implementation dependent.

aucNumber

This attribute contains the AUC number for this logical AUC. It is single valued.

The syntax is defined in MAP-MS-DataTypes as **ISDN-AddressString**.

maxNumberOfImsiInLogicalAuc

This attribute contains the maximum number of IMSI (i.e. of *subscriberInAuc* objects) that can be stored within this logical AUC. It is single valued.

The syntax is defined in GSM-12-02 as **MaxNumberOfImsiInLogicalAuc**.

The attribute is used for error checking with the creation of *subscriberInAuc* objects.

currentNumberOfImsiInLogicalAuc

This attribute contains the current number of IMSI (i.e. of *subscriberInAuc* objects) that is currently stored within this logical AUC. It is single valued.

The syntax is defined in GSM-12-02 as **CurrentNumberOfImsiInLogicalAuc**.

The attribute is used for error checking with the creation of *subscriberInAuc* objects.

administrativeState

The administrative state is used to lock the *logicalAuc* object from being used. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Locked** and **Unlocked**.

There are no actions defined for *logicalAuc*, the attribute simply being set. If the logical AUC is in state **Locked** then it cannot be used.

operationalState

The attribute describes the operational state of the logical AUC and it is read-only. The semantics are defined in CCITT X.731 and the syntax is defined in CCITT X.721.

Possible values according to X.731 are **Enabled** and **Disabled**.

The logical AUC is in state **Disabled** when it is not capable of functioning correctly as an AUC NE in the network.

B.2.6 Actions

None defined.

B.2.7 Notifications

For each object:

Create object
Delete object
AttributeValueChange

B.3 VLR Functional Entities

B.3.1 General

The Entity Relationship Model of the subscriber data in the VLR is much simpler than the ER-Model of the HLR because all attributes are read-only, there is no data to be managed, there are no basic service and basic service group objects, and also there are no associations.

The *logicalVlr* object contains only the *subscriberInVlr* objects.

The *subscriberInVlr* object contains the *supplementaryServiceInVlr* objects. The basic services are listed in a *bearerServiceList* and a *teleserviceList* as attributes in *subscriberInVlr*.

The *supplementaryServiceInVlr* class is the superclass of the following subclasses:

ssInVlrSimple (COLR, HOLD, MPTY, AOCI, AOCC)
ssInVlrCLP
ssInVlrCLIR
ssInVlrStandard (CW, all Barring and CF SS)
ssInVlrCUG

The ssInVlrCLP object consists of data related to the CLIP and COLP supplementary services.

With the exception of *ssInVlrSimple, ssInVlrCLP* and *ssInVlrCLIR* all other subclasses contain *ssInVlrParameter* objects, one for each basic service group.

The *ssInVlrParameter* class is the superclass of the following subclasses:

ssInVlrParameterSimple (for CW, CFU and all Barrings)
ssInVlrParameterCFB
ssInVlrParameterCFNRy
ssInVlrParameterCFNRc
ssInVlrParameterCUG

The *ssInVlrCUG* object contains one or more (up to maximum 10) *ssInVlrCUGSubscription* objects, one for each CUG of which the subscriber is a member.

The general organisation of subscriber data in the VLR together with the attributes is shown in Figure B.3.1.

The attributes are listed for each object class. For each supplementary service or group of supplementary services on the left side the relevant *ssInVlrParameter* attributes are shown on the right side. The names of the subclasses are not shown because of space restrictions, but appear to be self evident.

The containment and inheritance trees for the VLR are shown in figures B.3.2 and B.3.3 respectively.

As an alternative a completely flat data structure may be implemented which contains all the data for the supplementary services in one attribute *ssInfoList*, thus having only one object per subscriber (i.e. only the object *subscriberInVlr*).

B.3.2 Managed Object Classes

B.3.2.1 subscriberInVlr

The *subscriberInVlr* object class is a resource in its own right. The *subscriberInVlr* object is contained in the *logicalVlr* object.

The *subscriberInVlr* is created and deleted by the VLR itself.

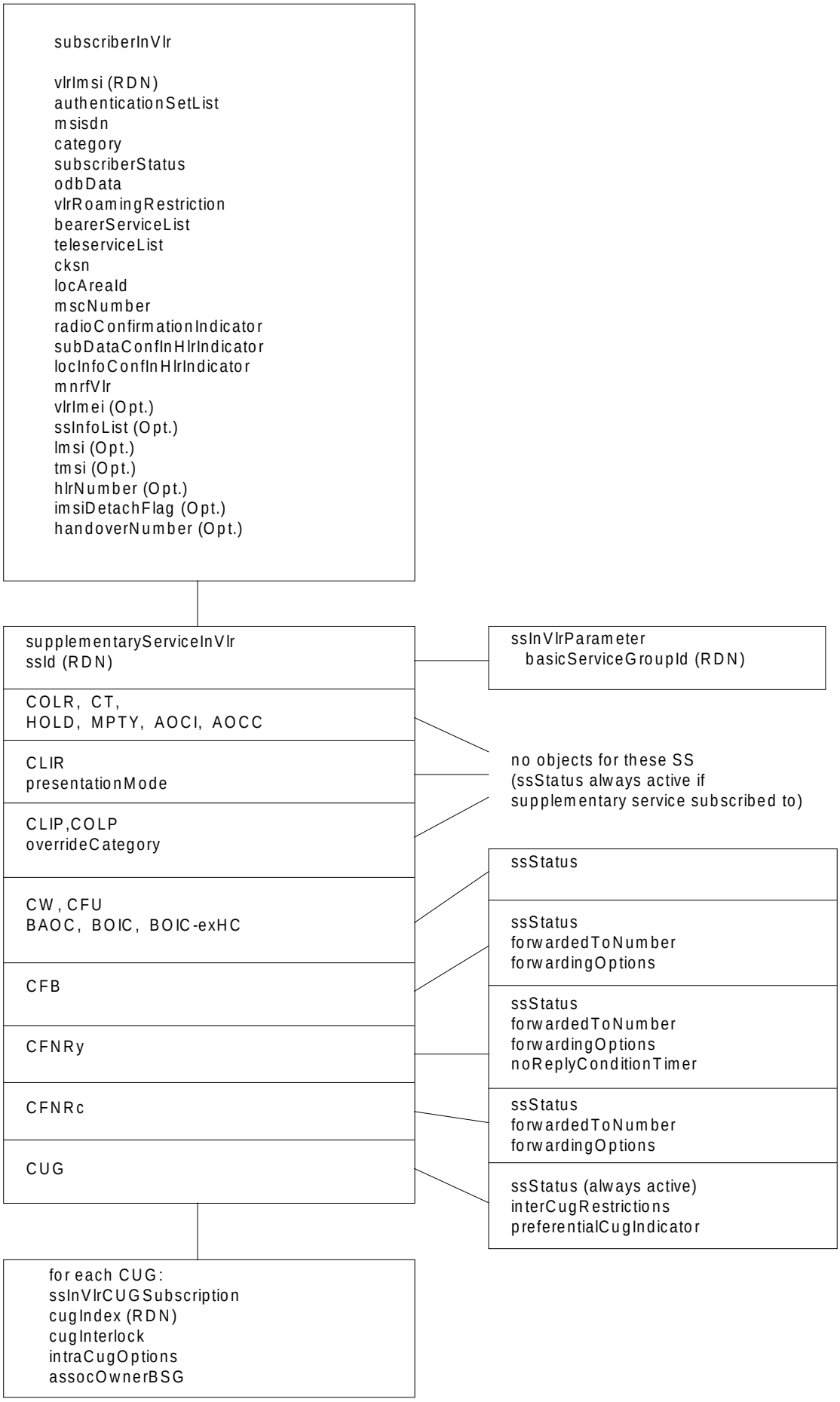

Figure B.3.1: General Organisation of Subscriber Data in VLR with Attributes

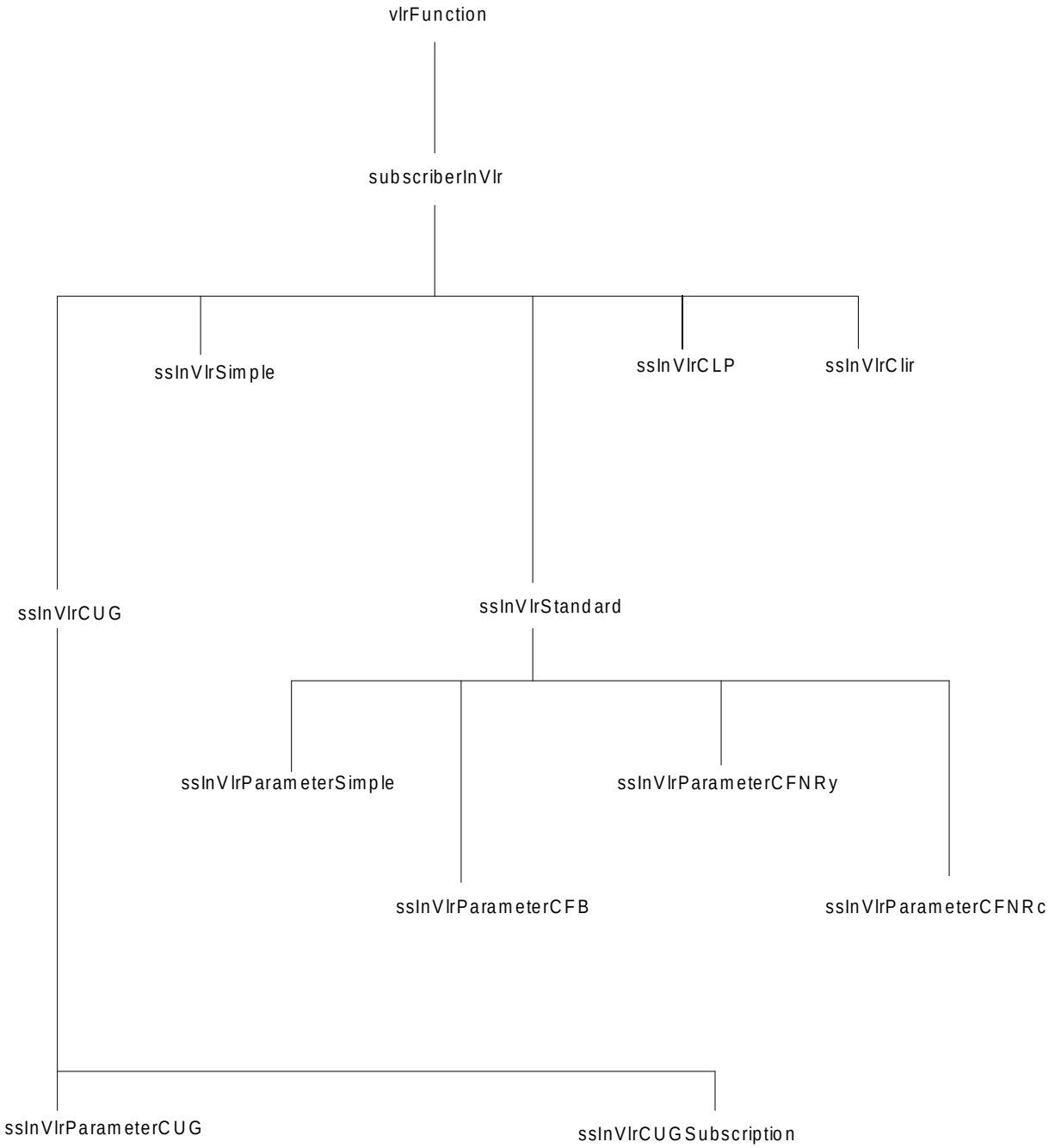

Figure B.3.2: Subscriber Administration Containment Tree for the VLR

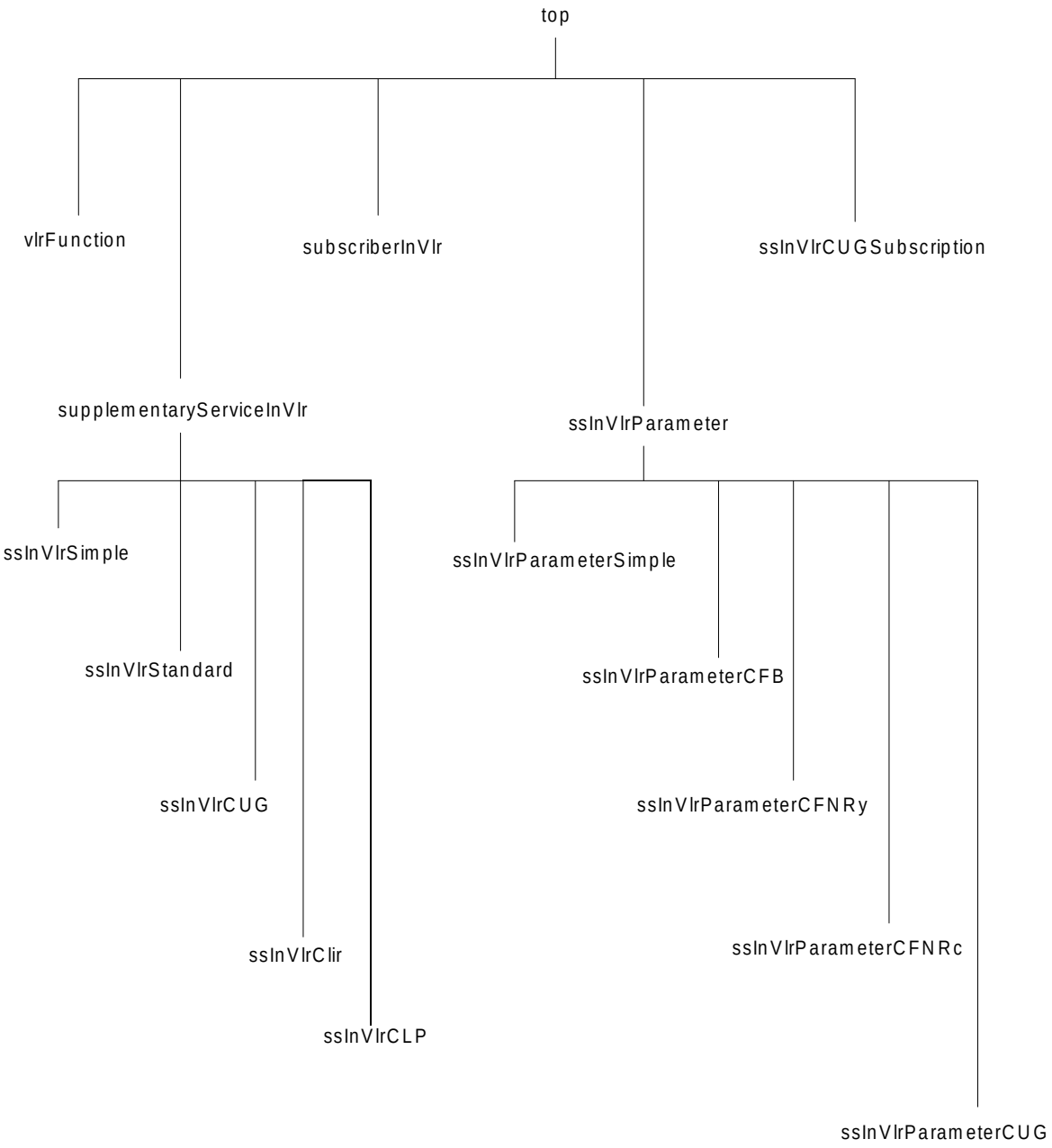

Figure B.3.3: Subscriber Administration Inheritance Tree for the VLR

A *subscriberInVlr* may contain *supplementaryServiceInVlr* objects. If the object is deleted then all contained objects are deleted.

Name	M/O	Value-Set	Remarks
vlrImsi	RDN	Single	Read Only
vlrImei	O	Single	Read Only
authenticationSetFlag	O	Single	Read Only
msisdn	M	Single	Read Only
category	M	Single	Read Only
subscriberStatus	M	Single	Read Only
odbData	M	Single	Read Only
vlrRoamingRestriction	M	Single	Read Only
bearerServiceList	M	Set	Read Only
teleserviceList	M	Set	Read Only
ssInfoList	O	Set	Read Only
lmsi	O	Single	Read Only
tmsi	O	Single	Read Only
cksn	M	Single	Read Only
locAreaId	M	Single	Read Only
hlrNumber	O	Single	Read Only
mscNumber	M	Single	Read Only
imsiDetachFlag	O	Single	Read Only
radioConfirmationIndicator	M	Single	Read Only
subDataConfByHlrIndicator	M	Single	Read Only
locInfoConfInHlrIndicator	M	Single	Read Only
handoverNumber	O	Single	Read Only
mnrfVlr	M	Single	Read Only

Since the structure of the data in VLR cannot be managed from an OSF, it is not necessary to provide basic service group and basic service objects. Also the data belonging to supplementary services can optionally be retrieved from ssInfoList, if the *supplementaryServiceInVlr* objects are not implemented.

B.3.2.2 supplementaryServiceInVlr

The object class *supplementaryServiceInVlr* is the superclass of all supplementary services object classes and contains the common characteristics of all supplementary services subclasses. This class is not instantiated.

If any of the subclasses is instantiated then all necessary contained objects are created.

If an instance of a subclass is deleted then all contained objects are deleted.

The SS objects are created and deleted by the VLR itself.

Name	M/O	Value-Set	Remarks
ssId	RDN	Single	

B.3.2.2.1 ssInVlrSimple

This object class is a subclass of *supplementaryServiceInVlr* and can be instantiated for all simple supplementary services with no additional parameters.

The supplementary services defined so far are COLR, HOLD, MPTY, AOCI, AOCC.

No *ssInVlrParameter* objects exist for this subclass.

B.3.2.2.2 ssInVlrCLP

This object is a subclass of *supplementaryServiceInVlr* and can be instantiated for the SS CLIP and COLP.

No *ssInVlrParameter* objects exists for this subclass

Name	M/O	Value-Set	Remarks
overrideCategory	O	Single	

B.3.2.2.3 ssInVlrCLIR

This object class is a subclass of *supplementaryServiceInVlr* and can be instantiated for the SS CLIR.

No *ssInVlrParameter* objects exists for this subclass.

Name	M/O	Value-Set	Remarks
presentationMode	M	Single	

B.3.2.2.4 ssInVlrStandard

This object class is a subclass of *supplementaryServiceInVlr* and can be instantiated for CW, all barring SS and the call forwarding SS.

This subclass contains *ssInVlrParameter* object instances for each basic service group provisioned, with the following restrictions:

a) an *ssInVlrParameterCFB* object can only be created contained in an s*sInVlrStandard* object representing the supplementary service CFB.
b) an *ssInVlrParameterCFNRy* object can only be created contained in an *ssInVlrStandard* object representing the supplementary service CFNRY.
c) an *ssInVlrParameterCFNRc* object can only be created contained in an *ssInVlrStandard* object representing the supplementary service CFNRc.

There are no additional attributes.

B.3.2.2.5 ssInVlrCUG

This object class is a subclass of *supplementaryServiceInVlr* and can be instantiated for the SS CUG.

It contains an object instance of *ssInVlrCUGSubscription* for each CUG the subscriber is a member and it contains an ssInVlrParameter object instance for each basic service group which occurs in the basicServiceGroupList attribute of the *ssInVlrCUGSubscription* objects.

There are no additional attributes.

B.3.2.3 ssInVlrCUGSubscription

This object class characterizes each CUG of which the subscriber is a member. The object instances are contained in the object instance CUG. A maximum of 10 instances may exist per subscriber.

The objects are created and deleted by the VLR itself.

Name	M/O	Value-Set	Remarks
cugIndex	RDN	Single	
cugInterlock	M	Single	
IntraCugOptions	M	Single	
basicServiceGroupList	M	Set	

B.3.2.4 ssInVlrParameter

The object class *ssInVlrParameter* is the superclass of all *ssInVlrParameter* object classes and consists of the common characteristics of all subclasses. This class is not instantiated.

Instances of subclasses are contained within the relevant *supplementaryServiceInVlr* object. If a Supplementary Service is deleted then all the *ssInVlrParameter* object instances it contains are deleted.

If a BSG is deleted then all instances of this BSG are deleted.

The SS objects are created and deleted by the VLR itself.

Name	M/O	Value-Set	Remarks
basicServiceGroupId	RDN	Single	
ssStatus	M	Single	

B.3.2.4.1 ssInVlrParameterSimple

This object class is a subclass of *ssInVlrParameter* and can be instantiated for all simple *ssInVlrParameter* which have no additional parameters.

The supplementary services so far defined are CW, the Barring SS and CFU. For CFU only the ssStatus (activation Status) is needed in VLR.

B.3.2.4.2 ssInVlrParameterCFB

This object class is a subclass of *ssInVlrParameter* and is valid for the SS CFB.

Name	M/O	Value-Set	Remarks
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	
forwardingOptions	M	Single	

B.3.2.4.3 ssInVlrParameterCFNRy

This object class is a subclass of *ssInVlrParameter* and is valid for the SS CFNRy.

Name	M/O	Value-Set	Remarks
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	
forwardingOptions	M	Single	
noReplyConditionTimer	M	Single	

B.3.2.4.4 ssInVlrParameterCFNRc

This object class is a subclass of *ssInVlrParameter* and is valid for the SS CFNRc.

Name	M/O	Value-Set	Remarks
forwardedToNumber	M	Single	
forwardedToSubaddress	M	Single	
forwardingOptions	M	Single	

B.3.2.4.5 ssInVlrParameterCUG

This object class is a subclass of *ssInVlrParameter* and is valid for the SS CUG.

The Activation Status for CUG is always active.

Name	M/O	Value-Set	Remarks
interCugRestrictions	M	Single	
preferentialCugIndicator	M	Single	

B.3.2.5 Other Objects

See Annex A.

B.3.2.5.1 vlrFunctionPackage1202

The vlrFunctionPackage1202 is a package consisting of the behaviour and all attributes necessary to be implemented in the managed object class *vlrFunction* from the point of view of this ETS. Other packages defined elsewhere may be needed to implement the full VLR Function (e.g. Billing, CCITT #7 Management, etc.).

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
maxNumberOfImsiInVlr	M	Single	
currentNumberOfImsiInVlr	M	Single	

B.3.3 Name Bindings

The following name bindings are defined:

subscriberInVlr - vlrFunction

supplementaryServiceInVlr - subscriberInVlr

ssInVlrParameter - supplementaryServiceInVlr

ssInHlrCUGSubscription - ssInVlrCUG

B.3.4 Relationships

The following relationships are defined:

Containment Relationships (see Name Bindings).

B.3.5 Attributes

B.3.5.1 subscriberInVlr

vlrImsi

This attribute is the key (RDN) to the object *subscriberInVlr* and is single valued. The internal structure is defined in GSM 03.03 and the syntax is defined in GSM-12-02-Syntax as GraphicString.

vlrImei

This attribute is the RDN of the object *traceEquipmentList* and is single valued. The internal structure is defined in GSM 03.03 and the syntax is defined in MAP-CommonDataTypes.Imei.

It is optionally present in the subscriber profile object *subscriberInVlr*.

authenticationSetFlag

This attribute is single valued and read only

The value is established in the VLR depending on the presence or absence of authentication set. The authentication set is defined in GSM 03.20 (values) and 03.08 and contains a list of authentication sets, each containing RAND, SRES and Kc.

The syntax is defined in GSM-12-02.Authentication.SetFlag.

The implementation of this attribute is optional.

msisdn

This attribute is single valued. It is defined in GSM 03.03 (internal structure) and GSM 03.08.

The syntax is defined in MAP-CommonDataTypes ISDN-AddressString.

category

This attribute is single valued. The syntax is defined in MAP-CommonDataTypes Category. The internal structure is defined in Q.763 and in GSM 03.08.

subscriberStatus

This attribute is single valued. The syntax is defined in MAP-MS-DataTypes SubscriberStatus.

Possible values for this attribute are:

serviceGranted
operatorDeterminedBarring

odbData

This attribute is single valued and is defined in GSM 02.41 and 03.15 (Values).

The network feature Operator Determined Barring (ODB) allows the network operator or service provider to regulate access by subscribers to GSM services using the barring of incoming or outgoing traffic or of roaming.

It consists of two parts, one that is only relevant in HLR and one that is relevant for both HLR and VLR. The syntax of the second part, which is used in the VLR, is defined in MAP-MS-DataTypes OperatorDeterminedBarringData.

vlrRoamingRestriction

This attribute is single valued. The syntax is defined in MAP-MS-DataTypes ZoneCodeList.

This attribute is different to the attribute hlrRoamingRestrictions in HLR.

bearerServiceList

This attribute is set valued. The syntax is defined in MAP-CommonDataTypes BearerServiceList.

teleserviceList

This attribute is set valued. The syntax is defined in MAP-CommonDataTypes TeleserviceList.

ssInfoList

This attribute is set valued and conditional. It is only present if the objects contained by *subscriberInVlr* are not implemented.

The syntax is defined in MAP-SS-DataTypes SS-InfoList.

lmsi

This attribute is single valued and read only. The syntax is defined in MAP-CommonDataTypes LMSI. The implementation is optional.

It is defined in GSM 03.03 (Internal structure) and GSM 03.08.

tmsi

This attribute is single valued and read only. The syntax is defined in MAP-CommonDataTypes TMSI. The implementation is optional.

cksn (Cipher Key Sequence Number)

This attribute is single valued and read only. The syntax is defined in MAP-MS-DataTypes CKSN.

It is defined in GSM 09.02 (handling), 04.08 (coding) and GSM 03.08.

CKSN is used to ensure authentication information (Kc) consistency between MS and VLR.

CKSN consists of one octet and is stored in the VLR.

locAreaId

This attribute is single valued and read only. The syntax is defined in GSM-12-02-Syntax.LocAreaId.

It is defined in GSM 03.03 (Values), 04.08 (coding) and GSM 03.08 as Location Area Identification.

hlrNumber

This attribute is single valued and read only. The syntax is defined in GSM 12.02 as ISDN-AddressString.

It is defined in GSM 03.03 (Values) and GSM 03.08.

The HLR number may optionally be stored in the VLR.

mscNumber

This attribute is single valued and read only. The syntax is defined as ISDN-AddressString in GSM 12.02.

It is defined in GSM 03.03 (Internal structure) and GSM 03.08.

imsiDetachFlag

This attribute is single valued and defined in GSM-12-02-Syntax ImsiDetachFlag.

It is defined in GSM 03.08.

The IMSI Detach Flag may optionally be stored in the VLR.

radioConfirmationIndicator

This attribute is single valued and defined in GSM-12-02-Syntax RadioConfirmationIndicator.

It is defined in GSM 03.08.

subDataConfByHlrIndicator

This attribute is single valued and defined in GSM-12-02-Syntax SubDataConfByHlrIndicator.

It is defined in GSM 03.08.

locInfoConfInHlrIndicator

This attribute is single valued and defined in GSM-12-02-Syntax LocInfoConfInHlrIndicator.

It is defined in GSM 03.08.

handoverNumber

This attribute is single valued and read only. The syntax is defined as ISDN-AddressString.

It is defined in GSM 03.03 (values), 3.09 and GSM 03.08.

The Handover Number may optionally be stored in the VLR.

mnrfVlr

This attribute belongs to the Message Waiting Data. It is single valued and read only. The syntax is defined in GSM-12-02-Syntax as Boolean. The implementation in the VLR is mandatory.

The semantics are defined in GSM 03.40. The Mobile-Station-Not-Reachable-Flag has the value TRUE if an attempt to deliver a short message to an MS has failed with a cause of Absent Subscriber.

B.3.5.2 supplementaryServiceInVlr

ssId

This attribute is the key (RDN) to the generic object *supplementaryServiceInVlr* and it is single valued.

The Supplementary Services are defined in GSM 02.04.

The syntax is defined in GSM-12-02-Syntax as GraphicString.

For possible values (Phase 2) see *subscriberInHlr*.

B.3.5.3 ssInVlrCLP

overrideCategory

This attribute is single valued and is defined in GSM 2.81. The syntax is defined in MAP-SS-DataTypes OverrideCategory.

Depending on national regulations some networks may define categories of subscribers that have the ability to override the presentation restriction (CLIR), and also have the calling line identity presented (e.g. the Police). The ability to have such override category is a national option.

The override category is only applicable within the HPLMN country.

Possible values are:

Override Enabled
Override Disabled

This attribute is optional.

B.3.5.4 ssInVlrCLIR

presentationMode

This attribute is single valued and is defined in GSM 03.81 as "the presentation mode subscription option".

The syntax is defined in GSM-12-02-Syntax.PresentationMode.

Possible values for the attribute are:

RestrictionPermanent
RestrictionPerCall

B.3.5.5 ssInVlrCUGSubscription

The syntax of the following attributes is defined in 09.02 MAP-SS-DataTypes.

cugIndex
cugInterlock
intraCugOptions

The syntax of the following attribute is defined in 09.02 MAP-CommonDataTypes.
BasicServiceGroupList

B.3.5.6 ssInVlrParameter

basicServiceGroupId

This attribute is the key (RDN) to the object *ssInVlrParameter* and it is single valued.

The Basic Service Groups are defined in GSM 02.04.

The syntax is defined in GSM-12-02 as GraphicString.

Possible values (Phase 2) see *basicServiceGroupInHlr*.

The syntax of preferentialCugIndicator is defined in GSM-12-02-Syntax.PreferentialCUG-Indicator.

The syntax of remaining attributes is defined in 09.02 MAP-SS-DataTypes.

There is a difference here to the organisation of data in the HLR. The *ssStatus* contains all the information about provision, registration and activation. Since this data is transferred to the VLR by MAP in one data element related to SS and BSG, it is therefore feasible to store it in the VLR with one data element in *ssInVlrParameter*.

The forwardingOptions related to the BSG are also transmitted via MAP. This data, therefore, can be stored in the VLR, using a data element in the object *ssInVlrParameter*.

ssStatus
forwardedToNumber
forwardedToSubaddress
forwardingOptions (Notifications)
noReplyConditionTimer
interCugRestrictions
preferentialCugIndicator

B.3.5.7 vlrFunctionPackageCommon

This package is defined in GSM 12.00 and used in vlrFunction object class together with vlrFunctionPackage1202 defined in this ETS. This package and attributes therein are presented here for information only.

vlrId

This attribute contains the VLR Identification for this VLR. It is single valued. The syntax is defined in GSM-12-00 as **GraphicString**.

Whether only the PLMN relevant part of the VLR-Id as defined in the MAP-CommonDataTypes is used, or the whole VLR-Id (including MCC and MNC) is used, is operator and implementation dependent.

vlrNumber

This attribute contains the VLR number for this VLR. It is single valued.

The syntax is defined in GSM 12.00 as **ISDN-AddressString**.

B.3.5.8 vlrFunctionPackage1202

maxNumberOfImsiInVlr

This attribute contains the maximum number of IMSI (i.e. of *subscriberInVlr* objects) that can be stored within this VLR. It is single valued.

The syntax is defined in GSM-12-02 as **MaxNumberOfImsiInVlr**.

The attribute is used for error checking with the creation of *subscriberInVlr* objects.

currentNumberOfImsiInVlr

This attribute contains the maximum number of IMSI (i.e. of *subscriberInVlr* objects) that are stored within this VLR. It is single valued.

The syntax is defined in GSM-12-02 as **CurrentNumberOfImsiInVlr**.

B.3.6 Actions

Identify Request (on HLR object)

B.3.7 Notifications

Create object
Delete object
AttributeValueChange

B.4 EIR Functional Entities

B.4.1 General

The general organisation of the data in the EIR is as follows:

There is an object for each list (*whiteListInEir*, *greyListInEir* and *blackListInEir*) which cannot be created or deleted, and which has only one instance. It should be noted that the Grey List is not mandatory in the EIR, and so objects for this list need not necessarily be included. The objects for the lists are contained in the *eirFunction* object, and they contain the entries in each list. The entries are represented as ranges and not as individual IMEI, each instance having as attributes the first and last IMEI in an unbroken range. If the entry represents an individual IMEI then the first and last IMEI will be the same.

The White List is an object instance of the *whiteListInEir* object class which contains the *equipmentInEir* objects, each instance of which represents a range of IMEI.

The Grey List is an object instance of the *greyListInEir* object class which contains the *equipmentInEir* objects, each instance of which represents a range of IMEI.

The Black List is an object instance of the *blackListInEir* object class which contains the *equipmentInEir* objects, each instance of which represents a range of IMEI.

The object *fileBasedManagement* controls the bulk transfer of management operations to the EIR, and their subsequent execution.

See also the objects mentioned in Annex A. These objects would, in general, not be contained in the *eirFunction* object, but rather in the *managedElement* object (see GSM 12.00) and CCITT M.3100.

The containment and inheritance trees for the EIR are shown in figures B.4.1 and B.4.2 respectively.

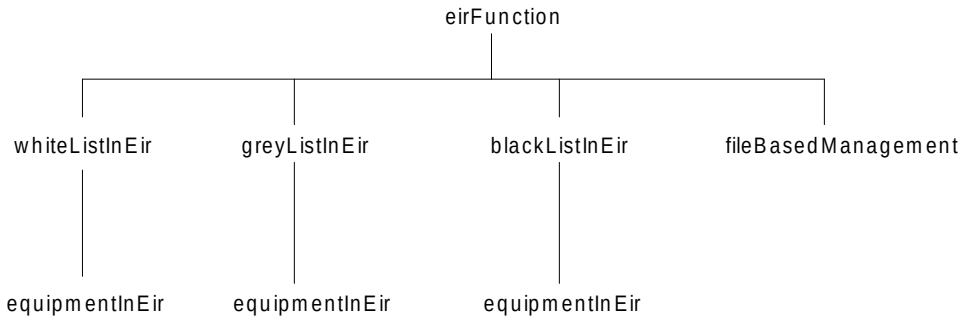

Figure B.4.1: Equipment Administration Containment Tree for the EIR

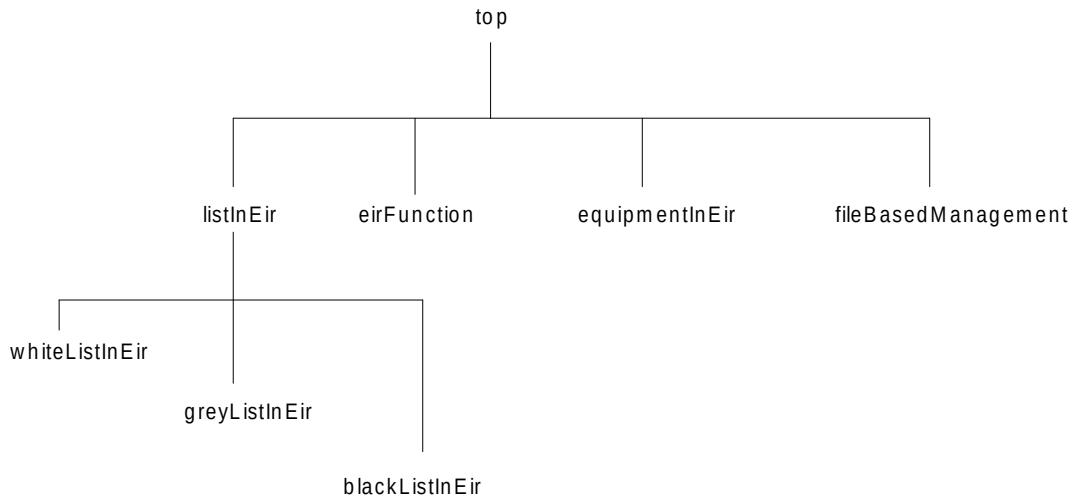

Figure B.4.2: Equipment Administration Inheritance Tree for the EIR

B.4.2 Managed Object Classes

B.4.2.1 whiteListInEir

The *whiteListInEir* object class has only one instance. The object is contained in the *eirFunction* object and created at the same time as the *eirFunction* object.

This object cannot be created or deleted by management operations.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
eirListId	RDN	Single	

B.4.2.2 greyListInEir

The *greyListInEir* object class has only one instance. The object is contained in the *eirFunction* object and created at the same time as the *eirFunction* object.

This object cannot be created or deleted by management operations.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
eirListId	RDN	Single	

B.4.2.3 blackListInEir

The *blackListInEir* object class has only one instance. The object is contained in the *logicalEir* object and created at the same time as the *eirFunction* object.

This object cannot be created or deleted by management operations.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
eirListId	RDN	Single	

B.4.2.4 equipmentInEir

The *equipmentInEir* object class defines one range of mobile equipment.

One instance of equipmentInEir will be created for each range of mobile equipment on the White, Grey and Black lists, and this instance represents an entry of a range of IMEIs on each of the lists.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
firstImei	RDN	Single	
lastImei	M	Single	

B.4.2.5 fileBasedManagement

This object class controls the bulk transfer of management operations to the EIR, and their subsequent execution.

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
fileBasedManagementId	RDN	Single	
fileExecutionProgressLevel	M	Single	

B.4.2.6 Other Objects

B.4.2.6.1 eirFunctionPackage1202

The **eirFunctionPackage1202** is a package consisting of the behaviour and all attributes necessary to be implemented in the managed object class *eirFunction* from the point of view of this ETS. Other packages defined elsewhere may be needed to implement the full EIR Function (e.g. Billing, CCITT #7 Management, etc.).

The following attributes have been identified:

Name	M/O	Value-Set	Remarks
maxNumberOfWhiteListEntries	M	Single	Read Only
maxNumberOfGreyListEntries	M	Single	Read Only
maxNumberOfBlackListEntries	M	Single	Read Only
currentNumberOfWhiteListEntries	M	Single	Read Only
currentNumberOfGreyListEntries	M	Single	Read Only
currentNumberOfBlackListEntries	M	Single	Read Only

B.4.2.6.2 managementFileExecutedLogEntry

The managementFileExecutedLogEntry is used to store the contents of the managementFileExecuted notification to the log. It is a subclass of logRecord and eventLogRecord (defined in CCITT X.721) and thus inherits all the properties of these classes including the namebinding logRecord-log. The object identifier value stored in the eventType attribute, inherited from eventLogRecord, shall be managementFileExecuted.

The following attributes in addition to the ones inherited from logRecord and eventLogRecord have been identified :

Name	M/O	Value-Set	Remarks
fileExecutedInfoValue	M	Single	Read Only

B.4.3 Name Bindings

The following name bindings are defined:

whiteListInEir - eirFunction
blackListInEir - eirFunction
greyListInEir - eirFunction
equipmentInEir - whiteListInEir
equipmentInEir - greyListInEir
equipmentInEir - blackListInEir
fileBasedManagement - eirFunction

B.4.4 Relationships

The following relationships are defined:

1.Containment Relationships (see Name Bindings).

B.4.5 Attributes

B.4.5.1 White, Black and Grey List Objects

firstImei

This attribute is the key (RDN) to the object *equipmentInEir* and is single valued. The syntax is defined in GSM-09.02 MAP-CommonDataTypes.Imei. This attribute is used in conjunction with **lastImei** to allow desired object instances to be accessed using a filter. Entries in individual lists are defined as ranges of IMEI.

lastImei

The use of this attribute is defined in the definition of **firstImei** above.

The syntax is defined in GSM-09.02 MAP-CommonDataTypes.

B.4.5.2 eirFunctionPackage1202

maxNumberOfWhiteListEntries

This attribute is single valued and read only. It is single valued. The syntax is defined in GSM-12-02-Syntax as TBCD-String.

maxNumberOfGreyListEntries

This attribute is single valued and read only. It is single valued. The syntax is defined in GSM-12-02-Syntax as TBCD-String.

maxNumberOfBlackListEntries

This attribute is single valued and read only. It is single valued. The syntax is defined in GSM-12-02-Syntax as TBCD-String.

currentNumberOfWhiteListEntries

This attribute is single valued and read only. It is single valued. The syntax is defined in GSM-12-02-Syntax as TBCD-String.

currentNumberOfGreyListEntries

This attribute is single valued and read only. It is single valued. The syntax is defined in GSM-12-02-Syntax as TBCD-String.

currentNumberOfBlackListEntries

This attribute is single valued and read only. It is single valued. The syntax is defined in GSM-12-02-Syntax as TBCD-String.

B.4.5.3 fileBasedManagement

fileBasedManagementId

This attribute contains the identification of the *fileBasedManagement* object. It is single valued. The syntax is defined in GSM-12-02 as **GraphicString**.

fileExecutionProgressLevel

This attribute is set valued and the syntax is defined in GSM-12-02-Syntax as FileExecutionProgressLevel.

The attribute consists of a list of all management files that were previously requested to be executed with information on the current state of execution of the file :

- execution ended
- execution busy
  (in this state, the progress level of execution (between 0 and 100 %) is also present.)
- execution scheduled

The information about a particular management file is added to this attribute on successful completion of the startManagementFileExecution action. The information about a particular management file is deleted from this attribute on successful completion of the disposeOfManagementFile action.

B.4.5.4 managementFileExecutedLogEntry

fileExecutedInfoValue

This attribute contains the information contents of the managementFileExecuted notification. The syntax is defined in GSM-12-02 as FileExecutedInfo.

B.4.6 Actions

startManagementFileExecution
disposeOfManagementFile

B.4.7 Notifications

Create and Delete *equipmentInEir* object.
Management File Executed

Annex C (normative): Data definitions

This annex contains the object model for implementing the requirements of this ETS (GSM 12.02).

The objects are based on the use of GDMO and aligned to GSM 12.00. All definitions and references contained GSM 12.00 are also valid for this ETS.

The main references are:

GSM 12.00 (ETS 300 612-1);
GSM 09.02 (ETS 300 599);
CCITT M.3100;
CCITT X.720;
CCITT X.721;
CCITT X.722.

C.1 Managed Objects

C.1.1 HLR Objects

C.1.1.1 msisdnInHlr

```
msisdnInHlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        msisdnInHlrPackage;

CONDITIONAL PACKAGES
        msisdnInHlrMultiPackage                                 PRESENT IF
                "multi-numbering is applied",

        announcementPackage PRESENT IF
                "routing to announcement is implemented",

        "Recommendation M.3100: 1992": createDeleteNotificationsPackage
        PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        "Recommendation M.3100: 1992": attributeValueChangeNotificationPackage
        PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object",

        "Recommendation M.3100: 1992": stateChangeNotificationPackage
        PRESENT IF
                "the stateChange notification (as defined in
                        CCITT X.721) is supported by this managed
                        object"
;
REGISTERED AS {gsm1202managedObjectClass 1};

msisdnInHlrPackage PACKAGE
BEHAVIOUR
        msisdnInHlrCommonBhv,
        msisdnInHlrCreateBhv,
        msisdnInHlrDeleteBhv,
        msisdnInHlrRelationBhv,
```

```
        msisdnInHlrStateBhv
;
ATTRIBUTES
        hlrMsisdn                   GET,  --RDN
        "CCITT X.721":administrativeState       GET-REPLACE,
        "CCITT X.721":operationalState GET,
        allocationState  GET-REPLACE,
        assocOwnerImsi          GET-REPLACE
                                    ADD-REMOVE,
        assocOwnerBasicService          GET-REPLACE
                                    ADD-REMOVE
;
REGISTERED AS {gsm1202package 1};

msisdnInHlrMultiPackage PACKAGE
BEHAVIOUR
        msisdnInHlrMultiBehaviour;
ATTRIBUTES
        bcaSetId                    GET-REPLACE
;
REGISTERED AS {gsm1202package 2};

announcementPackage PACKAGE
BEHAVIOUR
        announcementPackageBehaviour;
ATTRIBUTES
        announcement  GET-REPLACE
;
REGISTERED AS {gsm1202package 3};

msisdnInHlrCommonBhv BEHAVIOUR
DEFINED AS
"The msisdnInHlr object class is a resource in its own right.";

msisdnInHlrCreateBhv BEHAVIOUR
DEFINED AS
"Creation of an msisdnInHlr object will not initiate a MAP request primitive.";

msisdnInHlrDeleteBhv BEHAVIOUR
DEFINED AS
"If the msisdnInHlr object is deleted then the relationships within the subscriberInHlr and basicServiceInHlr
objects shall be removed. Deletion of an msisdnInHlr object will not initiate a MAP request primitive.";

msisdnInHlrRelationBhv BEHAVIOUR
DEFINED AS
"An msisdnInHlr object instance may be associated with a subscriberInHlr object instance and a
basicServiceInHlr object instance.";

msisdnInHlrStateBhv BEHAVIOUR
DEFINED AS
"If there is no association to a subscriberInHlr object then the operational state is set to disabled, or the
msisdnInHlr is connected to an announcement.";

msisdnInHlrMultiBehaviour BEHAVIOUR
DEFINED AS
"For multi-numbering the msisdnInHlr object defines the Bearer Capability Allocation for the related Basic
Service.";

announcementPackageBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.2 subscriberInHlr

```
subscriberInHlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        subscriberInHlrPackage;

CONDITIONAL PACKAGES
        subInHlrControlStatusPackage   PRESENT IF
                "controlStatus is implemented",

        prevMsisdnPackage      PRESENT IF
                "the association to the previous MSISDN is implemented",

        subInHlrAuthenticationPackage  PRESENT IF
                "authenticationSetFlag attribute is implemented in HLR.",

        subInHlrLmsiPackage    PRESENT IF
                "LMSI is stored in HLR",

        subInHlrMwdPackage    PRESENT IF
                "Message Waiting Data is implemented in HLR",

        rsziListInSubInHlrPackage         PRESENT IF
                "Regional Subscription is supported",

        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage       PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage       PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object",

        “Recommendation M.3100: 1992”: stateChangeNotificationPackage        PRESENT IF
                "the stateChange notification (as defined in
                        CCITT X.721) is supported by this managed
                        object"
;
REGISTERED AS {gsm1202managedObjectClass 2};


subscriberInHlrPackage PACKAGE
BEHAVIOUR
        subscriberInHlrCommonBhv,
        subscriberInHlrCreateBhv,
        subscriberInHlrDeleteBhv,
        subscriberInHlrRelationBhv,
        subscriberInHlrStateBhv
;
ATTRIBUTES
        hlrImsi             GET, --RDN
        "CCITT X.721":administrativeState        GET,
        "CCITT X.721":operationalState GET,
        mainMsisdn                GET-REPLACE,
        assocMemberMsisdn    GET-REPLACE
                                  ADD-REMOVE,
        category                  GET-REPLACE,
        subscriptionRestriction   GET-REPLACE,
        subscriberStatus          GET,
```

```
        operatorDeterminedBarring       GET-REPLACE,
        barringSubscriptionOption       GET-REPLACE,
        barringPassword         REPLACE-WITH-DEFAULT,
        wrongPasswordAttemptsCounter            GET,
        “GSM 12.00”:vlrNumber           GET,
        “GSM 12.00”:mscNumber           GET,
        mscAreaRestrictedFlag           GET,
        checkSupplServIndicator         GET,
        msPurgedFlag  GET;
ACTIONS
        lockSubscriberInHlr,
        unlockSubscriberInHlr
;
REGISTERED AS {gsm1202package 4};

subInHlrAuthenticationPackage PACKAGE
BEHAVIOUR
        subInHlrAuthenticationPackageBehaviour;
ATTRIBUTES
        authenticationSetFlag   GET
;
REGISTERED AS {gsm1202package 73};

subInHlrAuthenticationPackageBehaviour          BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";

subInHlrControlStatusPackage PACKAGE
BEHAVIOUR
        subInHlrControlStatusBehaviour;
ATTRIBUTES
        "CCITT X.721":controlStatus     GET
;
ACTIONS
        lockMAPService,
        unlockMAPService
;
REGISTERED AS {gsm1202package 5};

subInHlrControlStatusBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";


prevMsisdnPackage PACKAGE
BEHAVIOUR
        prevMsisdnPackageBehaviour;
ATTRIBUTES
        assocMemberPrevMsisdn       GET-REPLACE
                                    ADD-REMOVE;
REGISTERED AS {gsm1202package 6};

prevMsisdnPackageBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";


subInHlrLmsiPackage PACKAGE
BEHAVIOUR
        subInHlrLmsiPackageBehaviour;
ATTRIBUTES
        lmsi                        GET
;
```

```
REGISTERED AS {gsm1202package 8};

subInHlrLmsiPackageBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";


subInHlrMwdPackage PACKAGE
BEHAVIOUR
        subInHlrMwdPackageBehaviour;
ATTRIBUTES
        msisdnAlert             GET-REPLACE,
        mnrf                    GET,
        mcef                    GET,
        mwdAddressList          GET
;
REGISTERED AS {gsm1202package 9};

subInHlrMwdPackageBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";

subscriberInHlrCommonBhv BEHAVIOUR
DEFINED AS
        "The subscriberInHlr object class is a resource in its own right.";

subscriberInHlrCreateBhv BEHAVIOUR
DEFINED AS
        "Creation of an subscriberInHlr object will not initiate a MAP request primitive";

subscriberInHlrDeleteBhv BEHAVIOUR
DEFINED AS
"Deletion of a subscriberInHlr object is only possible in administrative state Locked";

subscriberInHlrRelationBhv BEHAVIOUR
DEFINED AS
"A subscriberInHlr object instance may be associated with one (in the case of single numbering) or more
msisdnInHlr object instances. A subscriberInHlr object instance contains basicServiceGroupInHlr objects
and may contain supplementaryServiceInHlr objects";

subscriberInHlrStateBhv BEHAVIOUR
DEFINED AS
"see GSM 12.02 annex B"
;

rsziListInSubInHlrPackage PACKAGE
BEHAVIOUR
        rsziListInSubInHlrPackageBhv;
ATTRIBUTES
        rsziListPointers  GET-REPLACE
                                ADD-REMOVE;
REGISTERED AS { gsm1202package 10 };

rsziListInSubInHlrPackageBhv BEHAVIOUR
DEFINED AS
        "see GSM12.02 annex B";
```

C.1.1.3 basicServiceGroupInHlr

```
basicServiceGroupInHlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        basicServiceGroupInHlrPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage       PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage       PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object"
;
REGISTERED AS {gsm1202managedObjectClass 3};


basicServiceGroupInHlrPackage PACKAGE
BEHAVIOUR
        basicServiceGroupInHlrCommonBhv,
        basicServiceGroupInHlrCreateBhv,
        basicServiceGroupInHlrDeleteBhv,
        basicServiceGroupInHlrRelationBhv
;

ATTRIBUTES
        basicServiceGroupId     GET,
        assocMemberSSParameter       GET-REPLACE ADD-REMOVE,
        assocMemberCUGSubscription GET-REPLACE ADD-REMOVE;
REGISTERED AS {gsm1202package 11};


basicServiceGroupInHlrCommonBhv BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B"
;

basicServiceGroupInHlrCreateBhv BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";


basicServiceGroupInHlrDeleteBhv BEHAVIOUR
DEFINED AS
"If a basicServiceGroupInHlr object is deleted, all ssInHlrParameter objects within the
assocMemberSSParameter attribute shall be deleted, and the associations within
ssInHlrCUGSubscription object that might subsequently have been made (in attribute assocOwnerBSG)
shall be removed.";

basicServiceGroupInHlrRelationBhv BEHAVIOUR
DEFINED AS
"A basicServiceGroupInHlr object instance contains only the basic service groupId, and the provisioned
supplementary services are contained in the assocMemberSSParameter attribute.";
```

C.1.1.4 basicServiceInHlr

```
basicServiceInHlr MANAGED OBJECT CLASS
DERIVED FROM
```

```
        "CCITT X.721":top;
CHARACTERIZED BY
        basicServiceInHlrPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage      PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object"
;
REGISTERED AS {gsm1202managedObjectClass 4};


basicServiceInHlrPackage PACKAGE
BEHAVIOUR
        basicServiceInHlrBehaviour;
ATTRIBUTES
        basicServiceId  GET,
        assocMemberMsisdn    GET-REPLACE ADD-REMOVE;
REGISTERED AS {gsm1202package 13};


basicServiceInHlrBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.5 supplementaryServiceInHlr

```
supplementaryServiceInHlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        supplementaryServiceInHlrPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage      PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object"
;
REGISTERED AS {gsm1202managedObjectClass 5};


supplementaryServiceInHlrPackage PACKAGE
BEHAVIOUR
        supplementaryServiceInHlrBehaviour;
ATTRIBUTES
        ssId                    GET
;
REGISTERED AS {gsm1202package 14};


supplementaryServiceInHlrBehaviour BEHAVIOUR
```

```
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.6 ssInHlrSimple

```
ssInHlrSimple MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrSimplePackage
;
REGISTERED AS {gsm1202managedObjectClass 6};

ssInHlrSimplePackage PACKAGE
BEHAVIOUR
        ssInHlrSimpleBehaviour
;
REGISTERED AS {gsm1202package 15};


ssInHlrSimpleBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.7 ssInHlrCLP

```
ssInHlrCLP MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCLPPackage;

CONDITIONAL PACKAGES
        subInHlrOverridePackage         PRESENT IF
                "Override Category is implemented"
;
REGISTERED AS {gsm1202managedObjectClass 46};

ssInHlrCLPPackage PACKAGE
BEHAVIOUR
        ssInHlrCLPBehaviour
;
REGISTERED AS {gsm1202package 74};

ssInHlrCLPBehaviour BEHAVIOUR
DEFINED AS
        “see GSM 12.02 annex B”;

subInHlrOverridePackage PACKAGE
BEHAVIOUR
        subInHlrOverridePackageBehaviour;
ATTRIBUTES
        overrideCategory        GET-REPLACE
;
REGISTERED AS {gsm1202package 75};

subInHlrOverridePackageBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";
```

C.1.1.8 ssInHlrCLIR

```
ssInHlrCLIR MANAGED OBJECT CLASS
```

```
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCLIRPackage
;
REGISTERED AS {gsm1202managedObjectClass 7};


ssInHlrCLIRPackage PACKAGE
BEHAVIOUR
        ssInHlrCLIRBehaviour;
ATTRIBUTES
        presentationMode        GET-REPLACE
;
REGISTERED AS {gsm1202package 16};


ssInHlrCLIRBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.9 ssInHlrCW

```
ssInHlrCW MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCWPackage
;
REGISTERED AS {gsm1202managedObjectClass 8};


ssInHlrCWPackage PACKAGE
BEHAVIOUR
        ssInHlrCWBehaviour;
REGISTERED AS {gsm1202package 17};


ssInHlrCWBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.10 ssInHlrBarring

```
ssInHlrBarring MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrBarringPackage;
REGISTERED AS {gsm1202managedObjectClass 9};


ssInHlrBarringPackage PACKAGE
BEHAVIOUR
        ssInHlrBarringBehaviour;
REGISTERED AS {gsm1202package 18};


ssInHlrBarringBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.11 ssInHlrCFU

```
ssInHlrCFU MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCFUPackage;
REGISTERED AS {gsm1202managedObjectClass 10};


ssInHlrCFUPackage PACKAGE
BEHAVIOUR
        ssInHlrCFUBehaviour;
ATTRIBUTES
        notificationToCallingPty  GET-REPLACE;
REGISTERED AS {gsm1202package 19};


ssInHlrCFUBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.12 ssInHlrCFB

```
ssInHlrCFB MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCFBPackage;
REGISTERED AS {gsm1202managedObjectClass 11};


ssInHlrCFBPackage PACKAGE
BEHAVIOUR
        ssInHlrCFBBehaviour;
ATTRIBUTES
        notificationToCallingPty  GET-REPLACE,
        notificationToForwardingPty       GET-REPLACE;
REGISTERED AS {gsm1202package 20};


ssInHlrCFBBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.13 ssInHlrCFNRy

```
ssInHlrCFNRy MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCFNRyPackage;
REGISTERED AS {gsm1202managedObjectClass 12};


ssInHlrCFNRyPackage PACKAGE
BEHAVIOUR
        ssInHlrCFNRyBehaviour;
ATTRIBUTES
        notificationToCallingPty  GET-REPLACE,
        notificationToForwardingPty       GET-REPLACE;
REGISTERED AS {gsm1202package 21};
```

```
ssInHlrCFNRyBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.14 ssInHlrCFNRc

```
ssInHlrCFNRc MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCFNRcPackage;
REGISTERED AS {gsm1202managedObjectClass 13};


ssInHlrCFNRcPackage PACKAGE
BEHAVIOUR
        ssInHlrCFNRcBehaviour;
ATTRIBUTES
        notificationToCallingPty  GET-REPLACE;
REGISTERED AS {gsm1202package 22};


ssInHlrCFNRcBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.15 ssInHlrCUG

```
ssInHlrCUG MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInHlr;
CHARACTERIZED BY
        ssInHlrCUGPackage;
REGISTERED AS {gsm1202managedObjectClass 14};


ssInHlrCUGPackage PACKAGE
BEHAVIOUR
        ssInHlrCUGBehaviour;
REGISTERED AS {gsm1202package 23};


ssInHlrCUGBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.16 ssInHlrCUGSubscription

```
ssInHlrCUGSubscription MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        ssInHlrCUGSubscriptionPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage       PRESENT IF
                "the objectCreation and objectDeletion
                                notifications (as defined in CCITT X.721)
                                are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage PRESENT IF
```

```
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object"
;
REGISTERED AS {gsm1202managedObjectClass 15};


ssInHlrCUGSubscriptionPackage PACKAGE
BEHAVIOUR
        ssInHlrCUGSubscriptionBehaviour;
ATTRIBUTES
        cugIndex                GET,
        cugInterlock            GET-REPLACE,
        intraCugOptions         GET-REPLACE,
        assocOwnerBSG           GET-REPLACE ADD-REMOVE,
        applicationToAllBSGs    GET-REPLACE;
REGISTERED AS {gsm1202package 24};


ssInHlrCUGSubscriptionBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.17 ssInHlrParameter

```
ssInHlrParameter MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        ssInHlrParameterPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage      PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object";
REGISTERED AS {gsm1202managedObjectClass 16};


ssInHlrParameterPackage PACKAGE
BEHAVIOUR
        ssInHlrParameterBehaviour;
ATTRIBUTES
        basicServiceGroupId     GET,
        activationStatus GET-REPLACE;
REGISTERED AS {gsm1202package 26};


ssInHlrParameterBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.18 ssInHlrParameterSimple

```
ssInHlrParameterSimple MANAGED OBJECT CLASS
DERIVED FROM
        ssInHlrParameter;
CHARACTERIZED BY
        ssInHlrParameterSimplePackage;
REGISTERED AS {gsm1202managedObjectClass 17};


ssInHlrParameterSimplePackage PACKAGE
BEHAVIOUR
        ssInHlrParameterSimpleBehaviour;
REGISTERED AS {gsm1202package 27};


ssInHlrParameterSimpleBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.19 ssInHlrParameterCFU

```
ssInHlrParameterCFU MANAGED OBJECT CLASS
DERIVED FROM
        ssInHlrParameter;
CHARACTERIZED BY
        ssInHlrParameterCFUPackage;
REGISTERED AS {gsm1202managedObjectClass 18};


ssInHlrParameterCFUPackage PACKAGE
BEHAVIOUR
        ssInHlrParameterCFUBehaviour;
ATTRIBUTES
        registrationStatus          GET-REPLACE,
        forwardedToNumber     GET-REPLACE,
        forwardedToSubaddress          GET-REPLACE;
REGISTERED AS {gsm1202package 28};


ssInHlrParameterCFUBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.20 ssInHlrParameterCFB

```
ssInHlrParameterCFB MANAGED OBJECT CLASS
DERIVED FROM
        ssInHlrParameter;
CHARACTERIZED BY
        ssInHlrParameterCFBPackage;
REGISTERED AS {gsm1202managedObjectClass 19};


ssInHlrParameterCFBPackage PACKAGE
BEHAVIOUR
        ssInHlrParameterCFBBehaviour;
ATTRIBUTES
        registrationStatus          GET-REPLACE,
        forwardedToNumber     GET-REPLACE,
        forwardedToSubaddress          GET-REPLACE;
REGISTERED AS {gsm1202package 29};
```

```
ssInHlrParameterCFBBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.21 ssInHlrParameterCFNRy

```
ssInHlrParameterCFNRy MANAGED OBJECT CLASS
DERIVED FROM
        ssInHlrParameter;
CHARACTERIZED BY
        ssInHlrParameterCFNRyPackage;
REGISTERED AS {gsm1202managedObjectClass 20};


ssInHlrParameterCFNRyPackage PACKAGE
BEHAVIOUR
        ssInHlrParameterCFNRyBehaviour;
ATTRIBUTES
        registrationStatus          GET-REPLACE,
        forwardedToNumber     GET-REPLACE,
        forwardedToSubaddress          GET-REPLACE,
        noReplyConditionTimer GET-REPLACE;
REGISTERED AS {gsm1202package 30};


ssInHlrParameterCFNRyBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.22 ssInHlrParameterCFNRc

```
ssInHlrParameterCFNRc MANAGED OBJECT CLASS
DERIVED FROM
        ssInHlrParameter;
CHARACTERIZED BY
        ssInHlrParameterCFNRcPackage;
REGISTERED AS {gsm1202managedObjectClass 21};


ssInHlrParameterCFNRcPackage PACKAGE
BEHAVIOUR
        ssInHlrParameterCFNRcBehaviour;
ATTRIBUTES
        registrationStatus          GET-REPLACE,
        forwardedToNumber     GET-REPLACE,
        forwardedToSubaddress          GET-REPLACE;
REGISTERED AS {gsm1202package 31};


ssInHlrParameterCFNRcBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.23 ssInHlrParameterCUG

```
ssInHlrParameterCUG MANAGED OBJECT CLASS
DERIVED FROM
        ssInHlrParameter;
CHARACTERIZED BY
        ssInHlrParameterCUGPackage;
REGISTERED AS {gsm1202managedObjectClass 22};
```

```
ssInHlrParameterCUGPackage PACKAGE
BEHAVIOUR
        ssInHlrParameterCUGBehaviour;
ATTRIBUTES
        interCugRestrictions      GET-REPLACE,
        preferentialCugIndicator GET-REPLACE;
REGISTERED AS {gsm1202package 32};


ssInHlrParameterCUGBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.24 logicalHlr

```
logicalHlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        logicalHlrPackageCommon,
        logicalHlrPackage1202
        ;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object",

        “Recommendation M.3100: 1992”: stateChangeNotificationPackage      PRESENT IF
                "the stateChange notification (as defined in
                        CCITT X.721) is supported by this managed
                        object",

        msisdnRangeInLogicalHlrPackage        PRESENT IF
                "msisdnRangeInLogicalHlr is implemented";

REGISTERED AS {gsm1202managedObjectClass 23};


logicalHlrPackageCommon PACKAGE
BEHAVIOUR logicalHLRPackageCommonBehaviour BEHAVIOUR
        DEFINED AS
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        hlrId                       GET,  --RDN
        "CCITT X.721":administrativeState       GET-REPLACE,
        "CCITT X.721":operationalState GET,
        hlrNumber                   GET-REPLACE
;
REGISTERED AS {gsm1202package 33};


logicalHlrPackage1202 PACKAGE
BEHAVIOUR logicalHlrPackage1202Behaviour BEHAVIOUR
        DEFINED AS
```

```
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        maxNumberOfImsiInLogicalHlr   GET-REPLACE,
        currentNumberOfImsiInLogicalHlr         GET,
        maxNumberOfMsisdnInLogicalHlr         GET-REPLACE,
        currentNumberOfMsisdnInLogicalHlr      GET

;
REGISTERED AS {gsm1202package 34};

msisdnRangeInLogicalHlrPackage PACKAGE
BEHAVIOUR
        msisdnRangeInLogicalHlrPackageBehaviour;
ATTRIBUTES
        msisdnRangeInLogicalHlr         GET-REPLACE
                                        ADD-REMOVE
;
REGISTERED AS {gsm1202package 76};

msisdnRangeInLogicalHlrPackageBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.1.25 hlrFunctionPackage1202

```
hlrFunctionPackage1202 PACKAGE
BEHAVIOUR hlrFunctionPackage1202Behaviour BEHAVIOUR
        DEFINED AS
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        maxNumberOfLogicalHlr         GET-REPLACE,
        currentNumberOfLogicalHlr      GET,
        maxNumberOfImsiInHlr GET-REPLACE,
        currentNumberOfImsiInHlr       GET,
        maxNumberOfMsisdnInHlr       GET-REPLACE,
        currentNumberOfMsisdnInHlr    GET,
        defaultPW                GET-REPLACE,
        defaultAnnouncement    GET-REPLACE,
        listOfValidCUGInterlockCodes   GET-REPLACE ADD-REMOVE

;
REGISTERED AS {gsm1202package 35};
```

C.1.1.26 rsziListInHlr

```
rsziListInHlr MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation X.721: 1992": top;
                CHARACTERIZED BY rsziListInHlrPackage;

        CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object"
;
```

```
REGISTERED AS  {gsm1202managedObjectClass 24};

rsziListInHlrPackage PACKAGE
BEHAVIOUR rsziListInHlrBhv;
ATTRIBUTES   rsziListId                          GET,
             rsziList                            GET-REPLACE;
REGISTERED AS  { gsm1202package 36 };

rsziListInHlrBhv BEHAVIOUR DEFINED AS
"see GSM 12.02 annex B";
```

C.1.1.27 bcaSetInHlr

```
bcaSetInHlr MANAGED OBJECT CLASS
        DERIVED FROM "Recommendation X.721: 1992": top;
                CHARACTERIZED BY bcaSetInHlrPackage;

        CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object"
;
REGISTERED AS  {gsm1202managedObjectClass 25};

bcaSetInHlrPackage PACKAGE
BEHAVIOUR bcaSetInHlrBhv;
ATTRIBUTES   bcaSetId                            GET,
             bcaSet                              GET-REPLACE
                                                 ADD-REMOVE;
REGISTERED AS  { gsm1202package 37 };

bcaSetInHlrBhv BEHAVIOUR DEFINED AS
"see GSM 12.02 annex B";
```

C.1.2 AUC Objects

C.1.2.1 subscriberInAuc

```
subscriberInAuc MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        subscriberInAucPackage;

CONDITIONAL PACKAGES
        subInAucEncryptionTypePackage          PRESENT IF
                "encryptionState is implemented",

        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object",
```

```
        “Recommendation M.3100: 1992”: stateChangeNotificationPackage        PRESENT IF
                "the stateChange notification (as defined in
                        CCITT X.721) is supported by this managed
                        object";
REGISTERED AS {gsm1202managedObjectClass 26};


subscriberInAucPackage PACKAGE
BEHAVIOUR
        subscriberInAucBehaviour;
ATTRIBUTES
        aucImsi         GET,
        ki                      REPLACE,
        algorithmA3A8   GET-REPLACE,
        "CCITT X.721":administrativeState       GET-REPLACE
;
REGISTERED AS {gsm1202package 38};

subscriberInAucBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";

subInAucEncryptionTypePackage PACKAGE
BEHAVIOUR
        subInAucEncryptionTypeBehaviour;
ATTRIBUTES
        encryptionType          REPLACE
;
REGISTERED AS {gsm1202package 39};

subInAucEncryptionTypeBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.2.2 logicalAuc

```
logicalAuc MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        logicalAucPackageCommon,
        logicalAucPackage1202
;

REGISTERED AS {gsm1202managedObjectClass 27};


logicalAucPackageCommon PACKAGE
BEHAVIOUR logicalAucPackageCommonBehaviour BEHAVIOUR
        DEFINED AS
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        aucId                   GET,  --RDN
        "CCITT X.721":administrativeState       GET-REPLACE,
        "CCITT X.721":operationalState GET,
        aucNumber               GET-REPLACE
;
REGISTERED AS {gsm1202package 40};


logicalAucPackage1202 PACKAGE
```

```
BEHAVIOUR logicalAucPackage1202Behaviour BEHAVIOUR
        DEFINED AS
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        maxNumberOfImsiInLogicalAuc GET-REPLACE,
        currentNumberOfImsiInLogicalAuc        GET
;
REGISTERED AS {gsm1202package 41};
```

C.1.2.3 aucFunctionPackage1202

```
aucFunctionPackage1202 PACKAGE
BEHAVIOUR aucFunctionPackage1202Behaviour BEHAVIOUR
        DEFINED AS
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        maxNumberOfLogicalAuc          GET-REPLACE,
        currentNumberOfLogicalAuc      GET,
        maxNumberOfImsiInAuc           GET-REPLACE,
        currentNumberOfImsiInAuc       GET

;
REGISTERED AS {gsm1202package 42};
```

C.1.3 VLR Objects

C.1.3.1 subscriberInVlr

```
subscriberInVlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        subscriberInVlrPackage;

CONDITIONAL PACKAGES
        subInVlrAuthenticationPackage PRESENT IF
        "authenticationSetFlag attribute is implemented in VLR.",

        subInVlrImeiPackage     PRESENT IF
                "it is required to access (read) the
                 IMEI for this subscriber in the VLR",

        subInVlrSsInfoPackage  PRESENT IF
                "SS-InfoList is implemented",

        subInVlrLmsiPackage    PRESENT IF
                "LMSI is stored in VLR",

        subInVlrTmsiPackage    PRESENT IF
                "TMSI is stored in VLR",

        subInVlrHlrNumberPackage       PRESENT IF
                "HLR-Number is stored in VLR",

        subInVlrImsiDetachPackage      PRESENT IF
                "IMSI-Detach Flag is stored in VLR",

        subInVlrHoNumberPackage        PRESENT IF
                "HandOver Number is stored in VLR",

        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage       PRESENT IF
```

```
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage      PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object",

        “Recommendation M.3100: 1992”: stateChangeNotificationPackage       PRESENT IF
                "the stateChange notification (as defined in
                        CCITT X.721) is supported by this managed
                        object"
;
REGISTERED AS {gsm1202managedObjectClass 28};


subscriberInVlrPackage PACKAGE
BEHAVIOUR
        subscriberInVlrBehaviour;
ATTRIBUTES
        vlrImsi             GET,
        msisdn              GET,
        category                    GET,
        subscriberStatus            GET,
        odbData                     GET,
        vlrRoamingRestriction       GET,
        bearerServiceList           GET,
        teleserviceList     GET,
        cksn                        GET,
        locAreaId                   GET,
        “GSM 12.00”:mscNumber                   GET,
        radioConfirmationIndicator      GET,
        subDataConfByHlrIndicator       GET,
        locInfoConfInHlrIndicator       GET,
        mnrfVlr             GET
;
REGISTERED AS {gsm1202package 43};

subscriberInVlrBehaviour BEHAVIOUR
DEFINED AS
        “see GSM 12.02 annex B”;

subInVlrAuthenticationPackage PACKAGE
BEHAVIOUR
        subInVlrAuthenticationPackageBehaviour;
ATTRIBUTES
        authenticationSetFlag    GET
;
REGISTERED AS {gsm1202package 77};

subInVlrAuthenticationPackageBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";

subInVlrImeiPackage PACKAGE
BEHAVIOUR
        subInVlrImeiBehaviour;
ATTRIBUTES
        vlrImei             GET;
REGISTERED AS {gsm1202package 44};

subInVlrImeiBehaviour BEHAVIOUR
```

```
DEFINED AS
        "see GSM 12.02 annex B";


subInVlrSsInfoPackage PACKAGE
BEHAVIOUR
        subInVlrSsInfoBehaviour;
ATTRIBUTES
        ssInfoList              GET;
REGISTERED AS {gsm1202package 45};

subInVlrSsInfoBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";


subInVlrLmsiPackage PACKAGE
BEHAVIOUR
        subInVlrLmsiBehaviour;
ATTRIBUTES
        lmsi                    GET;
REGISTERED AS {gsm1202package 46};

subInVlrLmsiBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";


subInVlrTmsiPackage PACKAGE
BEHAVIOUR
        subInVlrTmsiBehaviour;
ATTRIBUTES
        tmsi                    GET;
REGISTERED AS {gsm1202package 47};

subInVlrTmsiBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";


subInVlrHlrNumberPackage PACKAGE
BEHAVIOUR
        subInVlrHlrNumberBehaviour;
ATTRIBUTES
        hlrNumber               GET;
REGISTERED AS {gsm1202package 48};

subInVlrHlrNumberBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";


subInVlrImsiDetachPackage PACKAGE
BEHAVIOUR
        subInVlrImsiDetachBehaviour;
ATTRIBUTES
        imsiDetachFlag GET;
REGISTERED AS {gsm1202package 49};

subInVlrImsiDetachBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

```
subInVlrHoNumberPackage PACKAGE
BEHAVIOUR
        subInVlrHoNumberBehaviour;
ATTRIBUTES
        handoverNumber          GET;
REGISTERED AS {gsm1202package 50};

subInVlrHoNumberBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.2 supplementaryServiceInVlr

```
supplementaryServiceInVlr MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        supplementaryServiceInVlrPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage       PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage       PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object";
REGISTERED AS {gsm1202managedObjectClass 49};


supplementaryServiceInVlrPackage PACKAGE
BEHAVIOUR
        supplementaryServiceInVlrBehaviour;
ATTRIBUTES
        ssId                    GET;
REGISTERED AS {gsm1202package 52};


supplementaryServiceInVlrBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.3 ssInVlrSimple

```
ssInVlrSimple MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInVlr;
CHARACTERIZED BY
        ssInVlrSimplePackage;
REGISTERED AS {gsm1202managedObjectClass 29};


ssInVlrSimplePackage PACKAGE
BEHAVIOUR
        ssInVlrSimpleBehaviour;
REGISTERED AS {gsm1202package 53};


ssInVlrSimpleBehaviour BEHAVIOUR
DEFINED AS
```

"see GSM 12.02 annex B";

C.1.3.4 ssInVlrCLP

```
ssInVlrCLP MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInVlr;
CHARACTERIZED BY
        ssInVlrCLPPackage;

CONDITIONAL PACKAGES
        subInVlrOverridePackage          PRESENT IF
                "Override Category is implemented"
;
REGISTERED AS {gsm1202managedObjectClass 47};

ssInVlrCLPPackage PACKAGE
BEHAVIOUR
        ssInVlrCLPBehaviour;

REGISTERED AS {gsm1202package 78};

ssInVlrCLPBehaviour BEHAVIOUR
DEFINED AS
        “see GSM 12.02 annex B”;

subInVlrOverridePackage PACKAGE
BEHAVIOUR
        subInVlrOverridePackageBehaviour;
ATTRIBUTES
        overrideCategory          GET-REPLACE
;

REGISTERED AS {gsm1202package 79};

subInVlrOverridePackageBehaviour BEHAVIOUR
DEFINED AS
"see GSM12.02 annex B";
```

C.1.3.5 ssInVlrCLIR

```
ssInVlrCLIR MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInVlr;
CHARACTERIZED BY
        ssInVlrCLIRPackage;
REGISTERED AS {gsm1202managedObjectClass 30};


ssInVlrCLIRPackage PACKAGE
BEHAVIOUR
        ssInVlrCLIRBehaviour;
ATTRIBUTES
        presentationMode         GET
;
REGISTERED AS {gsm1202package 54};


ssInVlrCLIRBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.6 ssInVlrStandard

```
ssInVlrStandard MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInVlr;
CHARACTERIZED BY
        ssInVlrStandardPackage;
REGISTERED AS {gsm1202managedObjectClass 31};


ssInVlrStandardPackage PACKAGE
BEHAVIOUR
        ssInVlrStandardBehaviour;
REGISTERED AS {gsm1202package 55};


ssInVlrStandardBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.7 ssInVlrCUG

```
ssInVlrCUG MANAGED OBJECT CLASS
DERIVED FROM
        supplementaryServiceInVlr;
CHARACTERIZED BY
        ssInVlrCUGPackage;
REGISTERED AS {gsm1202managedObjectClass 32};


ssInVlrCUGPackage PACKAGE
BEHAVIOUR
        ssInVlrCUGBehaviour;
REGISTERED AS {gsm1202package 56};


ssInVlrCUGBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.8 ssInVlrCUGSubscription

```
ssInVlrCUGSubscription MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        ssInVlrCUGSubscriptionPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage       PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object";
REGISTERED AS {gsm1202managedObjectClass 33};


ssInVlrCUGSubscriptionPackage PACKAGE
BEHAVIOUR
```

```
        ssInVlrCUGSubscriptionBehaviour;
ATTRIBUTES
        cugIndex                GET,
        cugInterlock            GET,
        intraCugOptions         GET,
        basicServiceGroupList   GET;
REGISTERED AS {gsm1202package 57};


ssInVlrCUGSubscriptionBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.9 ssInVlrParameter

```
ssInVlrParameter MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        ssInVlrParameterPackage;

CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”: createDeleteNotificationsPackage      PRESENT IF
                "the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object",

        “Recommendation M.3100: 1992”: attributeValueChangeNotificationPackage      PRESENT IF
                "the attributeValueChange notification (as
                        defined in CCITT X.721) is supported by this
                        managed object";
REGISTERED AS {gsm1202managedObjectClass 34};


ssInVlrParameterPackage PACKAGE
BEHAVIOUR
        ssInVlrParameterBehaviour;
ATTRIBUTES
        basicServiceGroupId     GET,
        ssStatus                GET;
REGISTERED AS {gsm1202package 59};


ssInVlrParameterBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.10 ssInVlrParameterSimple

```
ssInVlrParameterSimple MANAGED OBJECT CLASS
DERIVED FROM
        ssInVlrParameter;
CHARACTERIZED BY
        ssInVlrParameterSimplePackage;
REGISTERED AS {gsm1202managedObjectClass 35};


ssInVlrParameterSimplePackage PACKAGE
BEHAVIOUR
        ssInVlrParameterSimpleBehaviour;
REGISTERED AS {gsm1202package 60};
```

```
ssInVlrParameterSimpleBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.11 ssInVlrParameterCFB

```
ssInVlrParameterCFB MANAGED OBJECT CLASS
DERIVED FROM
        ssInVlrParameter;
CHARACTERIZED BY
        ssInVlrParameterCFBPackage;
REGISTERED AS {gsm1202managedObjectClass 36};


ssInVlrParameterCFBPackage PACKAGE
BEHAVIOUR
        ssInVlrParameterCFBBehaviour;
ATTRIBUTES
        forwardedToNumber     GET,
        forwardedToSubaddress         GET,
        forwardingOptions       GET;
REGISTERED AS {gsm1202package 61};


ssInVlrParameterCFBBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.12 ssInVlrParameterCFNRy

```
ssInVlrParameterCFNRy MANAGED OBJECT CLASS
DERIVED FROM
        ssInVlrParameter;
CHARACTERIZED BY
        ssInVlrParameterCFNRyPackage;
REGISTERED AS {gsm1202managedObjectClass 37};


ssInVlrParameterCFNRyPackage PACKAGE
BEHAVIOUR
        ssInVlrParameterCFNRyBehaviour;
ATTRIBUTES
        forwardedToNumber     GET,
        forwardedToSubaddress         GET,
        forwardingOptions       GET,
        noReplyConditionTimer GET;
REGISTERED AS {gsm1202package 62};


ssInVlrParameterCFNRyBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.13 ssInVlrParameterCFNRc

```
ssInVlrParameterCFNRc MANAGED OBJECT CLASS
DERIVED FROM
        ssInVlrParameter;
CHARACTERIZED BY
        ssInVlrParameterCFNRcPackage;
REGISTERED AS {gsm1202managedObjectClass 38};
```

```
ssInVlrParameterCFNRcPackage PACKAGE
BEHAVIOUR
        ssInVlrParameterCFNRcBehaviour;
ATTRIBUTES
        forwardedToNumber     GET,
        forwardedToSubaddress         GET,
        forwardingOptions       GET;
REGISTERED AS {gsm1202package 63};


ssInVlrParameterCFNRcBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.3.14 ssInVlrParameterCUG

```
ssInVlrParameterCUG MANAGED OBJECT CLASS
DERIVED FROM
        ssInVlrParameter;
CHARACTERIZED BY
        ssInVlrParameterCUGPackage;
REGISTERED AS {gsm1202managedObjectClass 39};


ssInVlrParameterCUGPackage PACKAGE
BEHAVIOUR
        ssInVlrParameterCUGBehaviour;
ATTRIBUTES
        interCugRestrictions     GET,
        preferentialCugIndicator GET;
REGISTERED AS {gsm1202package 64};


ssInVlrParameterCUGBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B"
;
```

C.1.3.15 vlrFunctionPackage1202

```
vlrFunctionPackage1202 PACKAGE
BEHAVIOUR vlrFunctionPackage1202Behaviour BEHAVIOUR
        DEFINED AS
        “see GSM 12.02 annex B”;
;
ATTRIBUTES
        maxNumberOfImsiInVlr GET-REPLACE,
        currentNumberOfImsiInVlr        GET-REPLACE

;
REGISTERED AS {gsm1202package 65};
```

C.1.4 EIR Objects

C.1.4.1 listInEir

```
listInEir MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        listInEirPackage;
REGISTERED AS {gsm1202managedObjectClass 40};

listInEirPackage PACKAGE
BEHAVIOUR
        listInEirBhv;
ATTRIBUTES
        eirListId           GET;
REGISTERED AS {gsm1202package 66};

listInEirBhv BEHAVIOUR
DEFINED AS
        "see GSM 12-02 annex B";
```

C.1.4.2 whiteListInEir

```
whiteListInEir    MANAGED OBJECT CLASS
DERIVED FROM
        listInEir;
CHARACTERIZED BY
        whiteListInEirPackage;
REGISTERED AS {gsm1202managedObjectClass 41};

whiteListInEirPackage PACKAGE
BEHAVIOUR
        whiteListInEirBhv;
REGISTERED AS {gsm1202package 67};

whiteListInEirBhv BEHAVIOUR
DEFINED AS
        "see GSM 12-02 annex B";
```

C.1.4.3 greyListInEir

```
greyListInEir MANAGED OBJECT CLASS
DERIVED FROM
        listInEir;
CHARACTERIZED BY
        greyListInEirPackage;
REGISTERED AS {gsm1202managedObjectClass 42};

greyListInEirPackage PACKAGE
BEHAVIOUR greyListInEirBhv;
REGISTERED AS {gsm1202package 68};

greyListInEirBhv BEHAVIOUR
DEFINED AS
        "see GSM 12-02 annex B";
```

C.1.4.4 blackListInEir

```
blackListInEir MANAGED OBJECT CLASS
DERIVED FROM
        listInEir;
CHARACTERIZED BY
```

```
        blackListInEirPackage;
REGISTERED AS {gsm1202managedObjectClass 43};

blackListInEirPackage PACKAGE
BEHAVIOUR
        blackListInEirBhv;
REGISTERED AS {gsm1202package 69};

blackListInEirBhv BEHAVIOUR
DEFINED AS
        "see GSM 12-02 annex B";
```

C.1.4.5 equipmentInEir

```
equipmentInEir MANAGED OBJECT CLASS
DERIVED FROM "CCITT X.721":top;
CHARACTERIZED BY
        equipmentInEirPackage;
CONDITIONAL PACKAGES
        “Recommendation M.3100: 1992”:createDeleteNotificationsPackage      PRESENT IF
                “the objectCreation and objectDeletion
                        notifications (as defined in CCITT X.721)
                        are supported by this managed object”
;
REGISTERED AS {gsm1202managedObjectClass 44};

equipmentInEirPackage PACKAGE
BEHAVIOUR equipmentInEirBhv;
ATTRIBUTES
                firstImeiGET,
                lastImeiGET;

REGISTERED AS {gsm1202package 70};

equipmentInEirBhv BEHAVIOUR
DEFINED AS
        "see GSM 12-02 annex B";
```

C.1.4.6 eirFunctionPackage1202

```
eirFunctionPackage1202 PACKAGE
BEHAVIOUR
        eirFunctionPackage1202Behaviour
;
ATTRIBUTES
        maxNumberOfWhiteListEntries  GET,
        maxNumberOfGreyListEntries   GET,
        maxNumberOfBlackListEntries  GET,
        currentNumberOfWhiteListEntries      GET,
        currentNumberOfGreyListEntries       GET,
        currentNumberOfBlackListEntries      GET
;
REGISTERED AS {gsm1202package 71};

eirFunctionPackage1202Behaviour BEHAVIOUR
DEFINED AS
        "see GSM12.02 annex B";
```

C.1.4.7 fileBasedManagement

```
fileBasedManagement MANAGED OBJECT CLASS
DERIVED FROM
        "CCITT X.721":top;
CHARACTERIZED BY
        fileBasedManagementPackage;
REGISTERED AS {gsm1202managedObjectClass 45};


fileBasedManagementPackage PACKAGE
BEHAVIOUR
        fileBasedManagementPackageBehaviour;
ATTRIBUTES
        fileBasedManagementId GET, -- RDN
        fileExecutionProgressLevel      GET;
ACTIONS
        startManagementFileExecution,
        disposeOfManagementFile;
NOTIFICATIONS
        managementFileExecuted
;
REGISTERED AS {gsm1202package 72};

fileBasedManagementPackageBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.1.4.8 managementFileExecutedLogEntry

```
managementFileExecutedLogEntry MANAGED OBJECT CLASS
DERIVED FROM
        “CCITT X.721”:eventLogRecord;
CHARACTERIZED BY
        managementFileExecutedLogEntryPackage;
REGISTERED AS {gsm1202managedObjectClass 48};

managementFileExecutedLogEntryPackage PACKAGE
BEHAVIOUR
        managementFileExecutedLogEntryPackageBehaviour;
ATTRIBUTES
        fileExecutedInfoValue   GET;

REGISTERED AS {gsm1202package 80};

ManagementFileExecutedLogEntryPackageBehaviour BEHAVIOUR
DEFINED AS
        “see GSM 12.02 annex B”;
```

C.2 PACKAGES

[All packages which are defined are related to managed objects and so are defined with these objects in the section above (section 1. Managed Objects).]

C.3 ATTRIBUTES

C.3.1 hlrMsisdn

```
hlrMsisdn ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.HlrMsisdn;
MATCHES FOR
        EQUALITY, ORDERING;
BEHAVIOUR
        hlrMsisdnBehaviour;
REGISTERED AS {gsm1202attribute 1 };

hlrMsisdnBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.2 allocationState

```
allocationState ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.AllocationState;
MATCHES FOR
        EQUALITY;
BEHAVIOUR
        allocationStateBehaviour;
REGISTERED AS {gsm1202attribute 2 };

allocationStateBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.3 assocOwnerImsi

```
assocOwnerImsi ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        Attribute-ASN1Module.GroupObjects;
MATCHES FOR
        EQUALITY, SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR
        assocOwnerImsiBehaviour;
REGISTERED AS {gsm1202attribute 3 };

assocOwnerImsiBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B,
        PERMITTED VALUES
        any existing subscriberInHlr object
        within the same logical HLR";
```

C.3.4 assocOwnerBasicService

```
assocOwnerBasicService ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        Attribute-ASN1Module.GroupObjects;
MATCHES FOR
        EQUALITY, SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR
        assocOwnerBasicServiceBehaviour;
REGISTERED AS {gsm1202attribute 4 };

assocOwnerBasicServiceBehaviour BEHAVIOUR
DEFINED AS
```

```
        "see GSM 12.02 annex B,
        PERMITTED VALUES
        any existing basicServiceInHlr object
                of the same subscriberInHlr";
```

C.3.5 bcaSet

```
bcaSet ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.BcaSet;
MATCHES FOR
        EQUALITY, SUBSTRINGS;
BEHAVIOUR
        bcaSetBehaviour;
REGISTERED AS {gsm1202attribute 5 };

bcaSetBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.6 announcement

```
announcement ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        MAP-CommonDataTypes.ISDN-AddressString;
MATCHES FOR
        EQUALITY, SUBSTRINGS;
BEHAVIOUR
        announcementBehaviour;
REGISTERED AS {gsm1202attribute 6 };

announcementBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.7 hlrImsi

```
hlrImsi ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.HlrImsi;
MATCHES FOR
        EQUALITY, ORDERING;
BEHAVIOUR
        hlrImsiBehaviour;
REGISTERED AS {gsm1202attribute 7 };

hlrImsiBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.8 mainMsisdn

```
mainMsisdn ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        MAP-CommonDataTypes.ISDN-AddressString;
MATCHES FOR
        EQUALITY, SUBSTRINGS;
BEHAVIOUR
        mainMsisdnBehaviour;
REGISTERED AS {gsm1202attribute 8 };

mainMsisdnBehaviour BEHAVIOUR
DEFINED AS
```

"see GSM 12.02 annex B,
PERMITTED VALUES
any existing within associatedMemberMsisdn
within the same logical HLR";

C.3.9 assocMemberMsisdn

assocMemberMsisdn ATTRIBUTE
WITH ATTRIBUTE SYNTAX
Attribute-ASN1Module.GroupObjects;
MATCHES FOR
EQUALITY, SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR
assocMemberMsisdnBehaviour;
REGISTERED AS {gsm1202attribute 9 };

assocMemberMsisdnBehaviour BEHAVIOUR
DEFINED AS
"see GSM 12.02 annex B,
PERMITTED VALUES in subscriberInHlrPackage:
any existing *msisdnInHlr* object,
PERMITTED VALUES in basicServiceInHlrPackage:
any existing within assocMemberMsisdn of same
subscriberInHlr";

C.3.10 assocMemberPrevMsisdn

assocMemberPrevMsisdn ATTRIBUTE
WITH ATTRIBUTE SYNTAX
Attribute-ASN1Module.GroupObjects;
MATCHES FOR
EQUALITY, SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR
assocMemberMsisdnPrevBehaviour;
REGISTERED AS {gsm1202attribute 10 };

assocMemberMsisdnPrevBehaviour BEHAVIOUR
DEFINED AS
"see GSM 12.02 annex B,
PERMITTED VALUES
Possible values are any existing *msisdnInHlr* object identifier
within the same logical HLR, with allocationState allocated to
previous IMSI. A *subscriberInHlr* object can point to more than
one *msisdnHlr* object to facilitate multi-numbering.";

C.3.11 category

category ATTRIBUTE
WITH ATTRIBUTE SYNTAX
MAP-CommonDataTypes.Category;
MATCHES FOR
EQUALITY, SUBSTRINGS;
BEHAVIOUR
categoryBehaviour;
REGISTERED AS {gsm1202attribute 11 };

categoryBehaviour BEHAVIOUR
DEFINED AS
"see GSM 12.02 annex B";

C.3.12 subscriptionRestriction

subscriptionRestriction ATTRIBUTE

```
WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.SubscriptionRestriction;
MATCHES FOR
        EQUALITY, SUBSTRINGS;
BEHAVIOUR
        subscriptionRestrictionBehaviour;
REGISTERED AS {gsm1202attribute 12 };

subscriptionRestrictionBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.13 subscriberStatus

```
subscriberStatus ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        MAP-MS-DataTypes.SubscriberStatus;
MATCHES FOR
        EQUALITY;
BEHAVIOUR
        subscriberStatusBehaviour;
REGISTERED AS {gsm1202attribute 13 };

subscriberStatusBehaviour BEHAVIOUR
DEFINED AS
        "see GSM 12.02 annex B";
```

C.3.14 operatorDeterminedBarring

```
operatorDeterminedBarring ATTRIBUTE
WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.OperatorDeterminedBarring;
MATCHES FOR
        EQUALITY, SUBSTRINGS;
BEHAVIOUR
        operatorDeterminedBarringBehaviour;
REGISTERED AS {gsm1202attribute 14 };

operatorDeterminedBarringBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.15 overrideCategory

```
overrideCategory ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.OverrideCategory;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                overrideCategoryBehaviour;
REGISTERED AS {gsm1202attribute 15 };

overrideCategoryBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.16 barringSubscriptionOption

```
barringSubscriptionOption ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.BarringSubscriptionOption;
        MATCHES FOR
```

```
                EQUALITY;
        BEHAVIOUR
                barringSubscriptionOptionBehaviour;
REGISTERED AS {gsm1202attribute 16 };

barringSubscriptionOptionBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.17 barringPassword

```
barringPassword ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.Password;
        BEHAVIOUR
                barringPasswordBehaviour;
REGISTERED AS {gsm1202attribute 17 };

barringPasswordBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B,
                DEFAULT VALUE
                        defined in hlrFunctionPackage1202 attribute defaultPw";
```

C.3.18 wrongPasswordAttemptsCounter

```
wrongPasswordAttemptsCounter ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.WrongPasswordAttemptsCounter;
        BEHAVIOUR
                wrongPasswordAttemptsCounterBehaviour;
REGISTERED AS {gsm1202attribute 18 };

wrongPasswordAttemptsCounterBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.19 lmsi

```
lmsi ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.LMSI;
        MATCHES FOR
                EQUALITY, SUBSTRINGS;
BEHAVIOUR
                lmsiBehaviour;
REGISTERED AS {gsm1202attribute 19 };

lmsiBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.20 authenthicationSetFlag

```
authenticationSetFlag ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.AuthenticationSetFlag;
        BEHAVIOUR
                authenticationSetFlagBehaviour;
REGISTERED AS {gsm1202attribute 20 };

authenticationSetFlagBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.21 mscAreaRestrictedFlag

```
mscAreaRestrictedFlag ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MscAreaRestrictedFlag;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                mscAreaRestrictedFlagBehaviour;
REGISTERED AS {gsm1202attribute 23 };

mscAreaRestrictedFlagBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.22 checkSupplServIndicator

```
checkSupplServIndicator ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CheckSupplServIndicator;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                checkSupplServIndicatorBehaviour;
REGISTERED AS {gsm1202attribute 24 };

checkSupplServIndicatorBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.23 msPurgedFlag

```
msPurgedFlag ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MsPurgedFlag;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                msPurgedFlagBehaviour;
REGISTERED AS {gsm1202attribute 25 };

        msPurgedFlagBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.24 msisdnAlert

```
msisdnAlert ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.ISDN-AddressString;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                msisdnAlertBehaviour;
REGISTERED AS {gsm1202attribute 26 };

msisdnAlertBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B,
                PERMITTED VALUES
                any MSISDN within associatedMemberMsisdn";
```

C.3.25 mnrf

```
mnrf ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.Mnrf;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                mnrfBehaviour;
REGISTERED AS {gsm1202attribute 27 };

mnrfBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.26 mcef

```
mcef ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.Mcef;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                mcefBehaviour;
REGISTERED AS {gsm1202attribute 28 };

mcefBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.27 mwdAddressList

```
mwdAddressList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ScAddressList;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                mwdAddressListBehaviour;
REGISTERED AS {gsm1202attribute 29 };

mwdAddressListBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.28 basicServiceGroupId

```
basicServiceGroupId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.BasicServiceGroupId;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR
                basicServiceGroupIdBehaviour;
REGISTERED AS {gsm1202attribute 30 };

basicServiceGroupIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.29 assocMemberSSParameter

```
assocMemberSSParameter ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                Attribute-ASN1Module.GroupObjects;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                assocMemberSSParameterBehaviour;
REGISTERED AS {gsm1202attribute 31 };

assocMemberSSParameterBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B,
                PERMITTED VALUES
                any existing ssInHlrParameter object of same
                subscriberInHlr, with the following restrictions:
                        SMS(2) may only contain parameters of Barring SS
                        and 10 may not contain parameters of CW";
```

C.3.30 assocMemberCUGSubscription

```
assocMemberCUGSubscription ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                Attribute-ASN1Module.GroupObjects;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                assocMemberCUGSubscriptionBehaviour;
REGISTERED AS {gsm1202attribute 32 };

assocMemberCUGSubscriptionBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B,
                PERMITTED VALUES
                any existing ssInHLRCUGSubscription object
                of same subscriberInHlr";
```

C.3.31 basicServiceId

```
basicServiceId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.BasicServiceId;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR
                basicServiceIdBehaviour;
REGISTERED AS {gsm1202attribute 33 };

basicServiceIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.32 ssId

```
ssId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.SsId;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR
                ssIdBehaviour;
REGISTERED AS {gsm1202attribute 34 };

ssIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.33 presentationMode

```
presentationMode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.PresentationMode;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                presentationModeBehaviour;
REGISTERED AS {gsm1202attribute 35 };

presentationModeBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.34 notificationToCallingPty

```
notificationToCallingPty ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.NotificationToCallingPty;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                notificationToCallingPtyBehaviour;
REGISTERED AS {gsm1202attribute 36 };

notificationToCallingPtyBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.35 notificationToForwardingPty

```
notificationToForwardingPty ATTRIBUTE
```

```
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.NotificationToForwardingPty;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                notificationToForwardingPtyBehaviour;
REGISTERED AS {gsm1202attribute 37 };

notificationToForwardingPtyBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.36 cugIndex

```
cugIndex ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.CUG-Index;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR
                cugIndexBehaviour;
REGISTERED AS {gsm1202attribute 38 };

cugIndexBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.37 cugInterlock

```
cugInterlock ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.CUG-Interlock;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                cugInterlockBehaviour;
REGISTERED AS {gsm1202attribute 39 };

cugInterlockBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.38 intraCugOptions

```
intraCugOptions ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.IntraCUG-Options;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                intraCugOptionsBehaviour;
REGISTERED AS {gsm1202attribute 40 };

intraCugOptionsBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.39 assocOwnerBSG

```
assocOwnerBSG ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                Attribute-ASN1Module.GroupObjects;
        MATCHES FOR
```

```
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                assocOwnerBSGBehaviour;
REGISTERED AS {gsm1202attribute 41 };

assocOwnerBSGBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B,
                PERMITTED VALUES
                        any basicServiceGroupInHlr object of same subscriber with
                        the exception of SMS(2), dedicated PAD(9) and dedicated
                        Packet (10)";
```

C.3.40 activationStatus

```
activationStatus ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ActivationStatus;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                activationStatusBehaviour;
REGISTERED AS {gsm1202attribute 42 };

activationStatusBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.41 registrationStatus

```
registrationStatus ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.RegistrationStatus;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                registrationStatusBehaviour;
REGISTERED AS {gsm1202attribute 43 };

registrationStatusBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.42 forwardedToNumber

```
forwardedToNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ForwardedToNumber;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                forwardedToNumberBehaviour;
REGISTERED AS {gsm1202attribute 44 };

forwardedToNumberBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.43 forwardedToSubaddress

```
forwardedToSubaddress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ForwardedToSubaddress;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                forwardedToSubaddressBehaviour;
REGISTERED AS {gsm1202attribute 45 };

forwardedToSubaddressBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.44 noReplyConditionTimer

```
noReplyConditionTimer ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.NoReplyConditionTime;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                noReplyConditionTimerBehaviour;
REGISTERED AS {gsm1202attribute 46 };

noReplyConditionTimerBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.45 interCugRestrictions

```
interCugRestrictions ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.InterCUG-Restrictions;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                interCugRestrictionsBehaviour;
REGISTERED AS {gsm1202attribute 47 };

interCugRestrictionsBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.46 preferentialCugIndicator

```
preferentialCugIndicator ATTRIBUTE
```

```
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.PreferentialCUG-Indicator;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                preferentialCugIndicatorBehaviour;
REGISTERED AS {gsm1202attribute 48 };

preferentialCugIndicatorBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.47 maxNumberOfLogicalHlr

```
maxNumberOfLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfLogicalHlrBhv;
REGISTERED AS {gsm1202attribute 49 };

maxNumberOfLogicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.48 currentNumberOfLogicalHlr

```
currentNumberOfLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfLogicalHlrBhv ;
REGISTERED AS {gsm1202attribute 50 };

currentNumberOfLogicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.49 maxNumberOfImsiInHlr

```
maxNumberOfImsiInHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfImsiInHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfImsiInHlrBhv;
REGISTERED AS {gsm1202attribute 51 };

maxNumberOfImsiInHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.50 currentNumberOfImsiInHlr

```
currentNumberOfImsiInHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfImsiInHlr;
        MATCHES FOR
```

```
                EQUALITY;
        BEHAVIOUR
                currentNumberOfImsiInHlrBhv ;
REGISTERED AS {gsm1202attribute 52 };

currentNumberOfImsiInHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.51 maxNumberOfMsisdnInHlr

```
maxNumberOfMsisdnInHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfMsisdnInHlr ;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfMsisdnInHlrBhv;
REGISTERED AS {gsm1202attribute 53 };

maxNumberOfMsisdnInHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.52 currentNumberOfMsisdnInHlr

```
currentNumberOfMsisdnInHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfMsisdnInHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfMsisdnInHlrBhv;
REGISTERED AS {gsm1202attribute 54 };

currentNumberOfMsisdnInHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.53 defaultPW

```
defaultPW ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.Password;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                defaultPWBhv;
REGISTERED AS {gsm1202attribute 55 };

defaultPWBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.54 defaultAnnouncement

```
defaultAnnouncement ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.ISDN-AddressString;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                defaultAnnouncementBhv;
```

```
REGISTERED AS {gsm1202attribute 56 };

defaultAnnouncementBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.55 listOfValidCUGInterlockCodes

```
listOfValidCUGInterlockCodes ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ListOfValidCUGInterlockCodes;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                listOfValidCUGInterlockCodesBhv;
REGISTERED AS {gsm1202attribute 57 };

listOfValidCUGInterlockCodesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.56 hlrId

```
hlrId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.HlrId;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                hlrIdBhv;
REGISTERED AS {gsm1202attribute 58 };

hlrIdBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.57 hlrNumber

```
hlrNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.ISDN-AddressString;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                hlrNumberBhv;
REGISTERED AS {gsm1202attribute 59 };

hlrNumberBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.58 maxNumberOfImsiInLogicalHlr

```
maxNumberOfImsiInLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfImsiInLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfImsiInLogicalHlrBhv;
REGISTERED AS {gsm1202attribute 60 };

maxNumberOfImsiInLogicalHlrBhv BEHAVIOUR
```

```
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.59 currentNumberOfImsiInLogicalHlr

```
currentNumberOfImsiInLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfImsiInLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfImsiInLogicalHlrBhv;
REGISTERED AS {gsm1202attribute 61 };

currentNumberOfImsiInLogicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.60 maxNumberOfMsisdnInLogicalHlr

```
maxNumberOfMsisdnInLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfMsisdnInLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfMsisdnInLogicalHlrBhv;
REGISTERED AS {gsm1202attribute 62 };

maxNumberOfMsisdnInLogicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.61 currentNumberOfMsisdnInLogicalHlr

```
currentNumberOfMsisdnInLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfMsisdnInLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfMsisdnInLogicalHlrBhv;
REGISTERED AS {gsm1202attribute 63 };

currentNumberOfMsisdnInLogicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.62 aucId

```
aucId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.AucId;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR
                aucIdBehaviour;
REGISTERED AS {gsm1202attribute 64 };

aucIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.63 aucNumber

```
aucNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.ISDN-AddressString;
        MATCHES FOR
                EQUALITY,SUBSTRINGS;
        BEHAVIOUR
                aucNumberBehaviour;
REGISTERED AS {gsm1202attribute 65 };

aucNumberBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.64 aucImsi

```
aucImsi ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.AucImsi;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR
                aucImsiBehaviour;
REGISTERED AS {gsm1202attribute 66 };

aucImsiBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.65 ki

```
ki ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-MS-DataTypes.Ki;
        BEHAVIOUR
                kiBehaviour;
REGISTERED AS {gsm1202attribute 67 };

kiBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.66 algorithmA3A8

```
algorithmA3A8 ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.AlgorithmA3A8;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                algorithmA3A8Behaviour;
REGISTERED AS {gsm1202attribute 68 };

algorithmA3A8Behaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.67 encryptionType

```
encryptionType ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.EncryptionType;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                encryptionTypeBehaviour;
REGISTERED AS {gsm1202attribute 69 };

encryptionTypeBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.68 maxNumberOfLogicalAuc

```
maxNumberOfLogicalAuc ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfLogicalAuc;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfLogicalAucBhv;
REGISTERED AS {gsm1202attribute 70 };

maxNumberOfLogicalAucBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.69 currentNumberOfLogicalAuc

```
currentNumberOfLogicalAuc ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfLogicalAuc;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfLogicalAucBhv;
REGISTERED AS {gsm1202attribute 71 };

currentNumberOfLogicalAucBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.70 maxNumberOfImsiInAuc

```
maxNumberOfImsiInAuc ATTRIBUTE
```

```
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfImsiInAuc;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfImsiInAucBhv;
REGISTERED AS {gsm1202attribute 72 };

maxNumberOfImsiInAucBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.71 currentNumberOfImsiInAuc

```
currentNumberOfImsiInAuc ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfImsiInAuc;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfImsiInAucBhv;
REGISTERED AS {gsm1202attribute 73 };

currentNumberOfImsiInAucBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.72 maxNumberOfImsiInLogicalAuc

```
maxNumberOfImsiInLogicalAuc ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfImsiInLogicalAuc;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfImsiInLogicalAucBhv;
REGISTERED AS {gsm1202attribute 74 };

maxNumberOfImsiInLogicalAucBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.73 currentNumberOfImsiInLogicalAuc

```
currentNumberOfImsiInLogicalAuc ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfImsiInLogicalAuc;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfImsiInLogicalAucBhv ;
REGISTERED AS {gsm1202attribute 75 };

currentNumberOfImsiInLogicalAucBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.74 vlrImsi

```
vlrImsi ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.VlrImsi;
        MATCHES FOR
```

```
                EQUALITY, ORDERING;
        BEHAVIOUR
                vlrImsiBehaviour;
REGISTERED AS {gsm1202attribute 76 };

vlrImsiBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.75 msisdn

```
msisdn ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.ISDN-AddressString;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                msisdnBehaviour;
REGISTERED AS {gsm1202attribute 77 };

msisdnBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.76 odbData

```
odbData ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-MS-DataTypes.ODB-Data;
        MATCHES FOR
                EQUALITY, SUBSTRINGS;
        BEHAVIOUR
                odbDataBehaviour;
REGISTERED AS {gsm1202attribute 78 };

odbDataBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.77 vlrRoamingRestriction

```
vlrRoamingRestriction ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-MS-DataTypes.ZoneCodeList;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                vlrRoamingRestrictionBehaviour;
REGISTERED AS {gsm1202attribute 79 };

vlrRoamingRestrictionBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.78 vlrImei

```
vlrImei ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.IMEI;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                vlrImeiBehaviour;
```

```
REGISTERED AS {gsm1202attribute 80 };

vlrImeiBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.79 bearerServiceList

```
bearerServiceList ATTRIBUTE
WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.BearerServiceList;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                bearerServiceListBehaviour;
REGISTERED AS {gsm1202attribute 81 };

bearerServiceListBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.80 teleserviceList

```
teleserviceList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.TeleserviceList;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                teleserviceListBehaviour;
REGISTERED AS {gsm1202attribute 82 };

teleserviceListBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.81 ssInfoList

```
ssInfoList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.SS-InfoList;
        MATCHES FOR
                EQUALITY, SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
                ssInfoListBehaviour;
REGISTERED AS {gsm1202attribute 83 };

ssInfoListBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.82 tmsi

```
tmsi ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.TMSI;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                tmsiBehaviour;
REGISTERED AS {gsm1202attribute 84 };

tmsiBehaviour BEHAVIOUR
```

```
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.83 cksn

```
cksn ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CKSN;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                cksnBehaviour;
REGISTERED AS {gsm1202attribute 85 };

cksnBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.84 locAreaId

```
locAreaId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.LocAreaId;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                locAreaIdBehaviour;
REGISTERED AS {gsm1202attribute 86 };

locAreaIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.85 imsiDetachFlag

```
imsiDetachFlag ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ImsiDetachFlag;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                imsiDetachFlagBehaviour;
REGISTERED AS {gsm1202attribute 87 };

imsiDetachFlagBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.86 radioConfirmationIndicator

```
radioConfirmationIndicator ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.RadioConfirmationIndicator;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                radioConfirmationIndicatorBehaviour;
REGISTERED AS {gsm1202attribute 88 };

radioConfirmationIndicatorBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.87 subDataConfByHlrIndicator

```
subDataConfByHlrIndicator ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.SubDataConfByHlrIndicator;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                subDataConfByHlrIndicatorBehaviour;
REGISTERED AS {gsm1202attribute 89 };

subDataConfByHlrIndicatorBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.88 locInfoConfInHlrIndicator

```
locInfoConfInHlrIndicator ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.LocInfoConfInHlrIndicator;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                locInfoConfInHlrIndicatorBehaviour;
REGISTERED AS {gsm1202attribute 90 };

locInfoConfInHlrIndicatorBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.89 handoverNumber

```
handoverNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.ISDN-AddressString;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                handoverNumberBehaviour;
REGISTERED AS {gsm1202attribute 91 };

handoverNumberBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.90 mnrfVlr

```
mnrfVlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MnrfVlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                mnrfVlrBehaviour;
REGISTERED AS {gsm1202attribute 92 };

mnrfVlrBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.91 basicServiceGroupList

```
basicServiceGroupList ATTRIBUTE
```

```
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.BasicServiceGroupList;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                basicServiceGroupListBhv;
REGISTERED AS {gsm1202attribute 115 };

basicServiceGroupListBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B,
                PERMITTED VALUES
                        any basic service group of the same subscriber
                        with the exception of SMS(2) dedicated Pad (9)
                        and dedicated Packet (10)";
```

C.3.92 ssStatus

```
ssStatus ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.SS-Status;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                ssStatusBhv;
REGISTERED AS {gsm1202attribute 93 };

ssStatusBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.93 forwardingOptions

```
forwardingOptions ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-SS-DataTypes.ForwardingOptions;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                forwardingOptionsBhv;
REGISTERED AS {gsm1202attribute 94 };

forwardingOptionsBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.95 currentNumberOfImsiInVlr

```
currentNumberOfImsiInVlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfImsiInVlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfImsiInVlrBhv;
REGISTERED AS {gsm1202attribute 95 };

currentNumberOfImsiInVlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.96 maxNumberOfImsiInVlr

```
maxNumberOfImsiInVlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfImsiInVlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfImsiInVlrBhv;
REGISTERED AS {gsm1202attribute 96 };

maxNumberOfImsiInVlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.97 eirListId

```
eirListId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.EirListId;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                eirListIdBehaviour;
REGISTERED AS {gsm1202attribute 97 };

eirListIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.98 firstImei

```
firstImei ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.IMEI;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR firstImeiBehaviour;
REGISTERED AS {gsm1202attribute 98 };

firstImeiBehaviour BEHAVIOUR
        DEFINED AS "see GSM 12-02 annex B";
```

C.3.99 lastImei

```
lastImei ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                MAP-CommonDataTypes.IMEI;
        MATCHES FOR
                EQUALITY, ORDERING;
        BEHAVIOUR lastImeiBehaviour;
REGISTERED AS {gsm1202attribute 99 };

lastImeiBehaviour BEHAVIOUR
        DEFINED AS "see GSM 12-02 annex B";
```

C.3.100 maxNumberOfWhiteListEntries

```
maxNumberOfWhiteListEntries ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
        GSM-12-02-SYNTAX.MaxNumberOfWhiteListEntries;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfWhiteListEntriesBhv;
REGISTERED AS {gsm1202attribute 100 };

maxNumberOfWhiteListEntriesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.101 maxNumberOfGreyListEntries

```
maxNumberOfGreyListEntries ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfGreyListEntries;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfGreyListEntriesBhv;
REGISTERED AS {gsm1202attribute 101 };

maxNumberOfGreyListEntriesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.102 maxNumberOfBlackListEntries

```
maxNumberOfBlackListEntries ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MaxNumberOfBlackListEntries;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                maxNumberOfBlackListEntriesBhv;
REGISTERED AS {gsm1202attribute 102 };

maxNumberOfBlackListEntriesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.103 currentNumberOfWhiteListEntries

```
currentNumberOfWhiteListEntries ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfWhiteListEntries;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfWhiteListEntriesBhv;
REGISTERED AS {gsm1202attribute 103 };

currentNumberOfWhiteListEntriesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.104 currentNumberOfGreyListEntries

```
currentNumberOfGreyListEntries ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfGreyListEntries;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfGreyListEntriesBhv;
REGISTERED AS {gsm1202attribute 104 };

currentNumberOfGreyListEntriesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.105 currentNumberOfBlackListEntries

```
currentNumberOfBlackListEntries ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.CurrentNumberOfBlackListEntries;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                currentNumberOfBlackListEntriesBhv;
REGISTERED AS {gsm1202attribute 105 };

currentNumberOfBlackListEntriesBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12-02 annex B";
```

C.3.106 fileBasedManagementId

```
fileBasedManagementId ATTRIBUTE
```

```
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.FileBasedManagementId;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                fileBasedManagementIdBehaviour;
REGISTERED AS {gsm1202attribute 106 };

fileBasedManagementIdBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.107 fileExecutionProgressLevel

```
fileExecutionProgressLevel ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.FileExecutionProgressLevel;
        BEHAVIOUR
                fileExecutionProgressLevelBehaviour;
REGISTERED AS {gsm1202attribute 107 };

fileExecutionProgressLevelBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.3.108 rsziListId

```
        rsziListId ATTRIBUTE
                WITH ATTRIBUTE SYNTAX
                        GSM-12-02-SYNTAX.RsziListId;
                MATCHES FOR
                        EQUALITY;
                BEHAVIOUR
                        rsziListIdBehaviour;
REGISTERED AS  { gsm1202attribute 108 };

        rsziListIdBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.3.109 rsziList

```
        rsziList ATTRIBUTE
                WITH ATTRIBUTE SYNTAX
                        GSM-12-02-SYNTAX.RsziList;
                MATCHES FOR
                        EQUALITY;
                BEHAVIOUR
                        rsziListBehaviour;
REGISTERED AS  { gsm1202attribute 109 };

        rsziListBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.3.110 rsziListPointers

```
        rsziListPointers ATTRIBUTE
                WITH ATTRIBUTE SYNTAX
                        GSM-12-02-SYNTAX.RsziListIdSet;
                MATCHES FOR
                        EQUALITY;
                BEHAVIOUR
                        rsziListPointersBehaviour;
REGISTERED AS  { gsm1202attribute 110 };

        rsziListPointersBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.3.111 bcaSetId

```
        bcaSetId ATTRIBUTE
                WITH ATTRIBUTE SYNTAX
                        GSM-12-02-SYNTAX.BcaSetId;
                MATCHES FOR
                        EQUALITY;
                BEHAVIOUR
                        bcaSetIdBehaviour;
REGISTERED AS  { gsm1202attribute 111 };

        bcaSetIdBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.3.112 applicationToAllBSGs

```
applicationToAllBSGs ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.ApplicationToAllBSGs;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                applicationToAllBSGsBehaviour;
REGISTERED AS {gsm1202attribute 112};

        applicationToAllBSGsBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.3.113 msisdnRangeInLogicalHlr

```
msisdnRangeInLogicalHlr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.MsisdnRangeInLogicalHlr;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                msisdnRangeInLogicalHlrBehaviour;
REGISTERED AS {gsm1202attribute 113};

        msisdnRangeInLogicalHlrBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.3.114 fileExecutedInfoValue

```
fileExecutedInfoValue ATTRIBUTE
```

```
        WITH ATTRIBUTE SYNTAX
                GSM-12-02-SYNTAX.FileExecutedInfo;
        MATCHES FOR
                EQUALITY;
        BEHAVIOUR
                fileExecutedInfoValueBehaviour;
REGISTERED AS {gsm1202attribute 114};

        fileExecutedInfoValueBehaviour BEHAVIOUR
                DEFINED AS
                        "see GSM 12.02 annex B";
```

C.4 ACTIONS

C.4.1 lockSubscriberInHlr

```
lockSubscriberInHlr ACTION
        BEHAVIOUR
                lockSubscriberInHlrBehaviour;
        MODE
                CONFIRMED ;
REGISTERED AS {gsm1202action 1 };

lockSubscriberInHlrBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.4.2 unlockSubscriberInHlr

```
unlockSubscriberInHlr ACTION
        BEHAVIOUR
                unlockSubscriberInHlrBehaviour;
        MODE
                CONFIRMED ;
REGISTERED AS {gsm1202action 2 };

unlockSubscriberInHlrBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.4.3 lockMAPService

```
lockMAPService ACTION
        BEHAVIOUR
                lockMAPServiceBehaviour;
        MODE
                CONFIRMED ;
REGISTERED AS {gsm1202action 3 };

lockMAPServiceBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.4.4 unlockMAPService

```
unlockMAPService ACTION
        BEHAVIOUR
                unlockMAPServiceBehaviour;
        MODE
                CONFIRMED ;
REGISTERED AS {gsm1202action 4 };
```

```
unlockMAPServiceBehaviour BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.4.5 startManagementFileExecution

```
startManagementFileExecution ACTION
        BEHAVIOUR
                startManagementFileExecutionBehaviour;
        MODE
                CONFIRMED ;
        WITH INFORMATION SYNTAX
                GSM-12-02-SYNTAX.StartFileExecutionInfo;
        WITH REPLY SYNTAX
                GSM-12-02-SYNTAX.StartFileExecutionReply;
REGISTERED AS {gsm1202action 5 };

startManagementFileExecutionBehaviour BEHAVIOUR
        DEFINED AS
"This action is used to inform the NEF that one or more management files are present in its local filestore
and that execution of these files must be scheduled. Requests to start executing files are rejected if:
-       the file type is invalid
-       the file is not present in the filestore
-       the file is already scheduled for execution
-       the NEF currently has no more processing capacity for the execution of  management files i.e. the
NEF is 'busy'";
```

C.4.6 disposeOfManagementFile

```
disposeOfManagementFile ACTION
        BEHAVIOUR
                disposeOfManagementFileBehaviour;
        MODE
                CONFIRMED ;
        WITH INFORMATION SYNTAX
                GSM-12-02-SYNTAX.DisposeOfFileInfo;
        WITH REPLY SYNTAX
                GSM-12-02-SYNTAX.DisposeOfFileReply;
REGISTERED AS {gsm1202action 6 };

disposeOfManagementFileBehaviour BEHAVIOUR
        DEFINED AS
"This action is used to inform the NEF that the specified file(s) are no longer required in the NEF. The
NEF is free to delete the file(s). Requests to dispose of a file are rejected if:
-       the file type is invalid
-       the file is currently being executed.
-       the file is not present in the filestore";
```

C.5 Notifications

All used notifications are defined in CCITT X.721 with the exception of 5.5:

C.5.1 attributeValueChange

C.5.2 objectCreation

C.5.3 objectDeletion

C.5.4 stateChange

C.5.5 managementFileExecuted

```
managementFileExecuted NOTIFICATION
        BEHAVIOUR
                managementFileExecutedBehaviour;
        WITH INFORMATION SYNTAX
                GSM-12-02-SYNTAX.FileExecutedInfo;
REGISTERED AS {gsm1202notification 1 };

managementFileExecutedBehaviour BEHAVIOUR
        DEFINED AS
"This notification is used to inform the OSF that the execution of a management file in the NEF has
completed.";
```

C.6 Parameters

C.6.1 equipmentCreationRefusal

```
equipmentCreationRefusal PARAMETER
        CONTEXT  SPECIFIC-ERROR;
        WITH SYNTAX GSM-12-02-SYNTAX.EquipmentCreationRefusal;
        BEHAVIOUR equipmentCreationRefusalBhv BEHAVIOUR
                DEFINED AS "see GSM 12.02";;
REGISTERED AS {gsm1202parameter 1 };
```

C.6.2 maxNumberExceeded

```
maxNumberExceeded PARAMETER
        CONTEXT SPECIFIC-ERROR;
        WITH SYNTAX GSM-12-02-SYNTAX.MaxNumberExceeded;
        BEHAVIOUR maxNumberExceededBhv BEHAVIOUR
                DEFINED AS "see GSM 12.02";;
REGISTERED AS {gsm1202parameter 2};
```

C.6.3 stateNotLockedErrorParamter

```
stateNotLockedErrorParameter PARAMETER
        CONTEXT SPECIFIC-ERROR;
        WITH SYNTAX GSM-12-02-SYNTAX.StateNotLockedErrorParamter;
        BEHAVIOUR stateNotLockedErrorParameterBhv BEHAVIOUR
                DEFINED AS "see GSM 12.02";;
REGISTERED AS {gsm1202parameter 3};
```

C.7 NAME BINDINGS

C.7.1 HLR Name Bindings

C.7.1.1 logicalhlr-hlrFunction Name Binding

```
logicalHlr-hlrFunction NAME BINDING

        SUBORDINATE OBJECT CLASS logicalHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS hlrFunction;
        WITH ATTRIBUTE hlrId;
        BEHAVIOUR logicalHlr-hlrFunctionBhv;
        CREATE maxNumberExceeded;
        DELETE;

REGISTERED AS {gsm1202nameBinding 1 };

logicalHlr-hlrFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.2 msisdnInHlr-logicalHlr Name Binding

```
msisdnInHlr-logicalHlr NAME BINDING

        SUBORDINATE OBJECT CLASS msisdnInHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS logicalHlr;
        WITH ATTRIBUTE hlrMsisdn;
        BEHAVIOUR msisdnInHlr-logicalHlrBhv;
        CREATE maxNumberExceeded;
        DELETE;

REGISTERED AS {gsm1202nameBinding 2 };

msisdnInHlr-logicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.3. subscriberInHlr-logicalHlr Name Binding

```
subscriberInHlr-logicalHlr NAME BINDING

        SUBORDINATE OBJECT CLASS subscriberInHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS logicalHlr;
        WITH ATTRIBUTE hlrImsi;
        BEHAVIOUR subscriberInHlr-logicalHlrBhv;
        CREATE maxNumberExceeded;
        DELETE DELETES-CONTAINED-OBJECTS stateNotLockedErrorParameter;

REGISTERED AS {gsm1202nameBinding 3 };

subscriberInHlr-logicalHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.4. bcaSetInHlr-logicalHlr Name Binding

```
bcaSetInHlr-hlrFunction NAME BINDING

        SUBORDINATE OBJECT CLASS bcaSetInHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS hlrFunction;
        WITH ATTRIBUTE bcaSetId;
        BEHAVIOUR bcaSetInHlr-hlrFunctionBhv;
        CREATE maxNumberExceeded;
        DELETE;

REGISTERED AS {gsm1202nameBinding 4 };

bcaSetInHlr-hlrFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.5 rsziListInHlr-logicalHlr Name Binding

```
rsziListInHlr-hlrFunction NAME BINDING

        SUBORDINATE OBJECT CLASS rsziListInHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS hlrFunction;
        WITH ATTRIBUTE rsziListId;
        BEHAVIOUR rsziListInHlr-hlrFunctionBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 5 };

rsziListInHlr-hlrFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.6 basicServiceGroupInHlr-subscriberInHlr Name Binding

```
basicServiceGroupInHlr-subscriberInHlr NAME BINDING

        SUBORDINATE OBJECT CLASS basicServiceGroupInHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS subscriberInHlr;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR bsg-subscriberInHlrBhv;
        CREATE;
        DELETE DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 6 };

bsg-subscriberInHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.7 basicServiceInHlr-basicServiceGroupInHlr Name Binding

```
basicServiceInHlr-basicServiceGroupInHlr NAME BINDING

        SUBORDINATE OBJECT CLASS basicServiceInHlr;
        NAMED BY
        SUPERIOR OBJECT CLASS basicServiceGroupInHlr;
        WITH ATTRIBUTE basicServiceId;
        BEHAVIOUR bs-bsgInHlrBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 7 };

bs-bsgInHlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.8 supplementaryServiceInHlr-subscriberInHlr Name Binding

```
supplementaryServiceInHlr-subscriberInHlr NAME BINDING

        SUBORDINATE OBJECT CLASS supplementaryServiceInHlr AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS subscriberInHlr;
        WITH ATTRIBUTE ssId;
        BEHAVIOUR supplementaryServiceInHlr-subscriberInHlrBhv;
        CREATE;
        DELETE DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 8 };

supplementaryServiceInHlr-subscriberInHlrBhv  BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.9 ssInHlrParameterSimple-ssInHlrCW Name Binding

```
ssInHlrParameterSimple-ssInHlrCW NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterSimple;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrCW;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterSimple-ssInHlrCWBhv;
        CREATE          WITH-REFERENCE-OBJECT;
        DELETE          DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 9 };

ssInHlrParameterSimple-ssInHlrCWBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.10 ssInHlrParameterSimple-ssInHlrBarring Name Binding

```
ssInHlrParameterSimple-ssInHlrBarring NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterSimple;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrBarring;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterSimple-ssInHlrBarringBhv;
        CREATE      WITH-REFERENCE-OBJECT;
        DELETE      DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 10 };

ssInHlrParameterSimple-ssInHlrBarringBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.11 ssInHlrParameterCFU-ssInHlrCFU Name Binding

```
ssInHlrParameterCFU-ssInHlrCFU NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterCFU;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrCFU;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterCFU-ssInHlrCFUBhv;
        CREATE      WITH-REFERENCE-OBJECT;
        DELETE      DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 11 };

ssInHlrParameterCFU-ssInHlrCFUBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.12 ssInHlrParameterCFB-ssInHlrCFB Name Binding

```
ssInHlrParameterCFB-ssInHlrCFB NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterCFB;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrCFB;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterCFB-ssInHlrCFBBhv;
        CREATE      WITH-REFERENCE-OBJECT;
        DELETE      DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 12 };

ssInHlrParameterCFB-ssInHlrCFBBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.13 ssInHlrParameterCFNRy-ssInHlrCFNRy Name Binding

```
ssInHlrParameterCFNRy-ssInHlrCFNRy NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterCFNRy;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrCFNRy;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterCFNRy-ssInHlrCFNRyBhv;
        CREATE      WITH-REFERENCE-OBJECT;
        DELETE      DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 13 };

ssInHlrParameterCFNRy-ssInHlrCFNRyBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.14 ssInHlrParameterCFNRc-ssInHlrCFNRc Name Binding

```
ssInHlrParameterCFNRc-ssInHlrCFNRc NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterCFNRc;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrCFNRc;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterCFNRc-ssInHlrCFNRcBhv;
        CREATE      WITH-REFERENCE-OBJECT;
        DELETE      DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 14 };

ssInHlrParameterCFNRc-ssInHlrCFNRcBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.15 ssInHlrParameterCUG-ssInHlrCUG Name Binding

```
ssInHlrParameterCUG-ssInHlrCUG NAME BINDING

        SUBORDINATE OBJECT CLASS ssInHlrParameterCUG;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInHlrCUG;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInHlrParameterCUG-ssInHlrCUGBhv;
        CREATE      WITH-REFERENCE-OBJECT;
        DELETE      DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 15 };

ssInHlrParameterCUG-ssInHlrCUGBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.1.16 ssInHlrCUGSubscription-ssInHlrCUG Name Binding

ssInHlrCUGSubscription-ssInHlrCUG NAME BINDING

SUBORDINATE OBJECT CLASS ssInHlrCUGSubscription;
NAMED BY
SUPERIOR OBJECT CLASS ssInHlrCUG;
WITH ATTRIBUTE cugIndex;
BEHAVIOUR ssInHlrCugSubscription-ssInHlrCUGBhv;
CREATE;
DELETE DELETES-CONTAINED-OBJECTS;

REGISTERED AS {gsm1202nameBinding 16 };

ssInHlrCugSubscription-ssInHlrCUGBhv BEHAVIOUR
DEFINED AS
"see GSM 12.02 annex B";

C.7.2 AUC Name Binding

C.7.2.1 logicalAuc-aucFunction Name Binding

logicalAuc-aucFunction NAME BINDING

SUBORDINATE OBJECT CLASS logicalAuc;
NAMED BY
SUPERIOR OBJECT CLASS aucFunction;
WITH ATTRIBUTE aucId;
BEHAVIOUR logicalAuc-aucFunctionBhv;
CREATE **maxNumberExceeded**;
DELETE;

REGISTERED AS {gsm1202nameBinding 17 };

logicalAuc-aucFunctionBhv BEHAVIOUR
DEFINED AS
"see GSM 12.02 annex B";

C.7.2.2 subscriberInAuc-logicalAuc Name Binding

subscriberInAuc-logicalAuc NAME BINDING

SUBORDINATE OBJECT CLASS subscriberInAuc;
NAMED BY
SUPERIOR OBJECT CLASS logicalAuc;
WITH ATTRIBUTE aucImsi;
BEHAVIOUR subscriberInAuc-logicalAucBhv;
CREATE maxNumberExceeded;
DELETE;

REGISTERED AS {gsm1202nameBinding 18 };

subscriberInAuc-logicalAucBhv BEHAVIOUR
DEFINED AS
“see GSM 12.02 annex B”;

C.7.3 VLR Name Bindings

C.7.3.1 subscriberInVlr-vlrFunction Name Binding

```
subscriberInVlr-vlrFunction NAME BINDING

        SUBORDINATE OBJECT CLASS subscriberInVlr;
        NAMED BY
        SUPERIOR OBJECT CLASS vlrFunction;
        WITH ATTRIBUTE vlrImsi;
        BEHAVIOUR subscriberInVlr-vlrFunctionBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 19 };

subscriberInVlr-vlrFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.3.2 supplementaryServiceInVlr-subscriberInVlr Name Binding

```
supplementaryServiceInVlr-subscriberInVlr NAME BINDING

        SUBORDINATE OBJECT CLASS supplementaryServiceInVlr AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS subscriberInVlr;
        WITH ATTRIBUTE ssId;
        BEHAVIOUR supplementaryServiceInVlr-subscriberInVlrBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 20 };

supplementaryServiceInVlr-subscriberInVlrBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.3.3 ssInVlrParameter-ssInVlrStandard Name Binding

```
ssInVlrParameter-ssInVlrStandard NAME BINDING

        SUBORDINATE OBJECT CLASS ssInVlrParameter AND SUBCLASSES;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInVlrStandard;
        WITH ATTRIBUTE basicServiceGroupId;
        BEHAVIOUR ssInVlrParameter-ssInVlrStandardBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 21 };

ssInVlrParameter-ssInVlrStandardBhv BEHAVIOUR
        DEFINED AS
        "see GSM 12.02 annex B.";
```

C.7.3.4 ssInVlrCUGSubscription-ssInVlrCUG Name Binding

```
ssInVlrCUGSubscription-ssInVlrCUG NAME BINDING

        SUBORDINATE OBJECT CLASS ssInVlrCUGSubscription;
        NAMED BY
        SUPERIOR OBJECT CLASS ssInVlrCUG;
```

```
        WITH ATTRIBUTE cugIndex;
        BEHAVIOUR ssInVlrCUGSubscription-ssInVlrCUGBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 22 };

ssInVlrCUGSubscription-ssInVlrCUGBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4 EIR Name Bindings

C.7.4.1 whiteListInEir-eirFunction Name Binding

```
whiteListInEir-eirFunction NAME BINDING

        SUBORDINATE OBJECT CLASS  whiteListInEir;
        NAMED BY
        SUPERIOR OBJECT CLASS eirFunction;
        WITH ATTRIBUTE eirListId;
        BEHAVIOUR whiteListInEir-eirFunctionBhv;

REGISTERED AS {gsm1202nameBinding 23 };

whiteListInEir-eirFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4.2 greyListInEir-eirFunction Name Binding

```
greyListInEir-eirFunction NAME BINDING

        SUBORDINATE OBJECT CLASS  greyListInEir;
        NAMED BY
        SUPERIOR OBJECT CLASS eirFunction;
        WITH ATTRIBUTE eirListId;
        BEHAVIOUR greyListInEir-eirFunctionBhv;

REGISTERED AS {gsm1202nameBinding 24 };

greyListInEir-eirFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4.3 blackListInEir-eirFunction Name Binding

```
blackListInEir-eirFunction NAME BINDING

        SUBORDINATE OBJECT CLASS  blackListInEir;
        NAMED BY
        SUPERIOR OBJECT CLASS eirFunction;
        WITH ATTRIBUTE eirListId;
        BEHAVIOUR blackListInEir-eirFunctionBhv;

REGISTERED AS {gsm1202nameBinding 25 };

blackListInEir-eirFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4.4 equipmentInEir-whiteListInEir Name Binding

```
equipmentInEir-whiteListInEir NAME BINDING

        SUBORDINATE OBJECT CLASS  equipmentInEir;
        NAMED BY
        SUPERIOR OBJECT CLASS whiteListInEir;
        WITH ATTRIBUTE firstImei;
        BEHAVIOUR equipmentInEir-whiteListInEirBhv;
        CREATE  WITH-AUTOMATIC-INSTANCE-NAMING equipmentCreationRefusal;
        DELETE;

REGISTERED AS {gsm1202nameBinding 26 };

equipmentInEir-whiteListInEirBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4.5 equipmentInEir-greyListInEir Name Binding

```
equipmentInEir-greyListInEir NAME BINDING

        SUBORDINATE OBJECT CLASS  equipmentInEir;
        NAMED BY
        SUPERIOR OBJECT CLASS greyListInEir;
        WITH ATTRIBUTE firstImei;
        BEHAVIOUR equipmentInEir-greyListInEirBhv;
        CREATE  WITH-AUTOMATIC-INSTANCE-NAMING equipmentCreationRefusal;
        DELETE;

REGISTERED AS {gsm1202nameBinding 27 };

equipmentInEir-greyListInEirBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4.6 equipmentInEir-blackListInEir Name Binding

```
equipmentInEir-blackListInEir NAME BINDING

        SUBORDINATE OBJECT CLASS  equipmentInEir;
        NAMED BY
        SUPERIOR OBJECT CLASS blackListInEir;
        WITH ATTRIBUTE firstImei;
        BEHAVIOUR equipmentInEir-blackListInEirBhv;
        CREATE  WITH-AUTOMATIC-INSTANCE-NAMING equipmentCreationRefusal;
        DELETE;

REGISTERED AS {gsm1202nameBinding 28 };

equipmentInEir-blackListInEirBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.7.4.7 fileBasedManagement-eirFunction Name Binding

```
fileBasedManagement-eirFunction NAME BINDING

        SUBORDINATE OBJECT CLASS  fileBasedManagement;
        NAMED BY
        SUPERIOR OBJECT CLASS eirFunction;
        WITH ATTRIBUTE fileBasedManagementId;
        BEHAVIOUR fileBasedManagement-eirFunctionBhv;
        CREATE;
        DELETE;

REGISTERED AS {gsm1202nameBinding 29 };

fileBasedManagement-eirFunctionBhv BEHAVIOUR
        DEFINED AS
                "see GSM 12.02 annex B";
```

C.8. Syntax Definitions

```
GSM-12-02-SYNTAX { ccitt (0) identified-organisation (4) etsi (0) mobileDomain (0)
        gsm-Operation-Maintenance (3) gsm-12-02 (2) informationModel (0)
        asn1Module (2) 1}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- EXPORTS everything

IMPORTS
        gsm-12-02
FROM GSM-DomainDefinitions{ ccitt (0) identified-organisation (4) etsi (0) mobileDomain (0)
        gsm-Operation-Maintenance (3) gsm-12-30 (30) informationModel (0)
        asn1Module (2) gsm-OM-DomainDefinitions (0) version1 (1)}

        Attribute,
        ObjectClass,
        ObjectInstance

FROM CMIP-1 {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)}

        FileList,
        FileSpec

FROM GSM1200BTypeModule {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0)
        gsm-Operation-Maintenance (3) gsm-12-00 (0) annexB (1) informationModel (0)
        asn1Module (2) version1 (1)}

        AddressString,
        ISDN-SubaddressString,
        ExternalSignalInfo

FROM MAP-CommonDataTypes  { ccitt identified-organisation (4) etsi (0) mobileDomain (0)
        gsmNetworkId (1) moduleId (3) map-CommonDataTypes (18) version2 (2)}

        maxNumOfZoneCodes,
        ODB-Data

FROM MAP-MS-Data-Types{ ccitt identified-organisation (4) etsi (0) mobileDomain (0)
        gsmNetworkId (1) moduleId (3) map-MS-DataTypes (11) version2 (2)}

        CUG-Index,
        CUG-Interlock,
        CliRestrictionOption

FROM MAP-SS-Data-Types{ ccitt identified-organisation (4) etsi (0) mobileDomain (0)
        gsmNetworkId (1) moduleId (3) map-SS-DataTypes (14) version2 (2)}
;
-- Object Identifiers.
-- Abstract Syntax

gsm1202abstractSyntax OBJECT IDENTIFIER ::= {gsm-12-02 abstractSyntax (1)}

-- Information Model Related Identifiers

gsm1202informationModel OBJECT IDENTIFIER ::= {gsm-12-02 informationModel (0)}

gsm1202managedObjectClass
        OBJECT IDENTIFIER ::= {gsm1202informationModel managedObjectClass (3)}
```

```
gsm1202package OBJECT IDENTIFIER ::= {gsm1202informationModel package (4)}

gsm1202parameter OBJECT IDENTIFIER ::= {gsm1202informationModel parameter (5)}

gsm1202nameBinding OBJECT IDENTIFIER ::= {gsm1202informationModel nameBinding (6)}

gsm1202attribute OBJECT IDENTIFIER ::= {gsm1202informationModel attribute (7)}

gsm1202action OBJECT IDENTIFIER ::= {gsm1202informationModel action (9)}

gsm1202notification OBJECT IDENTIFIER ::= {gsm1202informationModel notification (10)}

-- Application Context
gsm1202ApplicationContext OBJECT IDENTIFIER ::= {gsm-12-02 protocolSupport (1) applicationContext
(0) gsm-Management (0)}


-- ASN.1 Definitions

ActivationStatus ::= ENUMERATED {
                    activeAndOperative (0),
                    activeAndQuiescent (1),
                    deactivated (2) }

AlgorithmA3A8 ::= INTEGER (0..5)

AllocationState ::=  ENUMERATED {
                            notAllocated (0),
                            allocatedToIMSI (1),
                            allocatedToPreviousIMSI (2),
                            allocatedToAnnouncement (3)}

ApplicationToAllBSGs ::= BOOLEAN

AucId ::= GraphicString

AucImsi ::= GraphicString
        -- maybe only part of IMSI

AuthenticationSetFlag ::= BOOLEAN

BarringSubscriptionOption ::= ENUMERATED {
                    controlBySubscriberUsingPassword (0),
                    controlByServiceProvider (1)}

BasicServiceGroupId ::= GraphicString
        -- The following basic service groups are valid for GSM
        -- Phase 2:  1,2,6,7,8,9,10,11
        -- Values see GSM12.02 Annex B

BasicServiceId ::= GraphicString
        -- The following services are valid for GSM Phase 2:
                -- TS 11, TS 21, TS 22,
                -- TS 61, TS 62,
                -- BS 21, BS 22, BS 23, BS 24, BS 25, BS 26,
                -- BS 31, BS 32, BS 33, BS 34,
                -- BS 41, BS 42, BS 43, BS 44, BS 45, BS 46,
                -- BS 51, BS 52, BS 53,
                -- BS 61A, BS 61S, BS 71, BS 81A, BS 81S
                -- Values see GSM12.02 Annex B

BcaSetId ::= GraphicString (SIZE(1..8))
```

```
BcaSet ::= SET OF ExternalSignalInfo   -- MAP-CommonDataTypes

CheckSupplServIndicator ::= BOOLEAN
                -- TRUE  = if information to check SS has not be given to MS
                -- FALSE = else

CKSN ::= OCTET STRING (SIZE (1))

Cc ::= NumericString(SIZE(1..4))

CurrentNumberOfImsiInAuc ::= INTEGER

CurrentNumberOfImsiInHlr ::= INTEGER

CurrentNumberOfImsiInVlr ::= INTEGER

CurrentNumberOfImsiInLogicalAuc ::= INTEGER

CurrentNumberOfImsiInLogicalHlr ::= INTEGER

CurrentNumberOfLogicalAuc ::= INTEGER

CurrentNumberOfLogicalHlr ::= INTEGER

CurrentNumberOfMsisdnInHlr ::= INTEGER

CurrentNumberOfMsisdnInLogicalHlr ::= INTEGER

EncryptionType ::= INTEGER (0..100)

ForwardedToNumber ::= AddressString

ForwardedToSubaddress ::= ISDN-SubaddressString

HlrId ::= GraphicString

HlrImsi ::= GraphicString
        -- maybe only part of IMSI

HlrMsisdn ::= GraphicString
        -- maybe only part of MSISDN

ImsiDetachFlag ::= BOOLEAN
                -- TRUE  = IMSI Detached Flag set
                -- FALSE = IMSI Detached Flag not set

ListOfValidCUGInterlockCodes ::= SET OF CUG-Interlock

LocAreaId ::= OCTET STRING (SIZE(2..5))

LocInfoConfInHlrIndicator ::= BOOLEAN

MaxNumberExceeded ::= INTEGER

MaxNumberOfImsiInAuc ::= INTEGER

MaxNumberOfImsiInHlr ::= INTEGER

MaxNumberOfImsiInLogicalAuc ::= INTEGER

MaxNumberOfImsiInLogicalHlr ::= INTEGER

MaxNumberOfImsiInVlr ::= INTEGER
```

```
MaxNumberOfLogicalAuc ::= INTEGER

MaxNumberOfLogicalHlr ::= INTEGER

MaxNumberOfMsisdnInHlr ::= INTEGER

MaxNumberOfMsisdnInLogicalHlr ::= INTEGER

Mcef ::= BOOLEAN
                -- TRUE  = if mcefScAddressList contains one or more entries
                -- FALSE = mcefScAddressList contains no entries

Mnrf ::= BOOLEAN
                -- TRUE  = if mnrfScAddressList contains one or more entries
                -- FALSE = mnrfScAddressList contains no entries

MnrfVlr ::= BOOLEAN
                -- TRUE  = an attempt to to deliver a short message to
                           an MS has failed with a cause of absent subscriber.
                -- FALSE =  no failure detected.

MscAreaRestrictedFlag ::= ENUMERATED {
                mscAreaRestricted (0),
                mscAreaNotRestricted (1) }

MsisdnRangeInLogicalHlr ::= SET OF GraphicString

MsPurgedFlag ::= BOOLEAN

Ndc ::= NumericString(SIZE(1..5))

NotificationToCallingPty ::= BOOLEAN
                -- TRUE  = Notification to calling party
                -- FALSE = No Notification

NotificationToForwardingPty ::= BOOLEAN
                -- TRUE  = Notification to forwarding party
                -- FALSE = No Notification

PlmnRestrictions ::= ENUMERATED {
                allGSMPLMNs (1),
                oneNationalAllOtherForeignPLMNs (2),
                regionalRestricted (3),
                regionalRestrictedPlusAllOtherPLMNs (4)}

OperatorDeterminedBarring ::= SEQUENCE {
                oDB-HLR-Data  ODB-HLR-Data,
                oDB-Data                ODB-Data}

ODB-HLR-Data ::= BIT STRING{
                        barringOfRoamingOutsideHPLMN (0),
                        barringOfRoamingOutsideHPLMNCountry (1),
                        barringOfOutgoingCallswhenRoamingOutsideHPLMNCountry (2),
                        barringOfAllIncomingCalls (3),
                        bAICwhenRoamingOutsideHPLMNCountry (4)}

PresentationMode::= CliRestrictionOption

RadioConfirmationIndicator ::= BOOLEAN
                -- TRUE  = MS location confirmed
                -- FALSE = MS location not confirmed
```

```
PreferentialCUG-Indicator ::= CHOICE {
                        nonDesignated           [0] NULL,
                        preferentialCugIndex            [1] CUG-Index}

RegistrationStatus ::= BOOLEAN
                -- TRUE  = registered
                -- FALSE = not registered

RsziList ::=  SEQUENCE          { cc [0]  Cc,
        ndc     [1]     Ndc,
        zcList  [2]     ZcList
        }

RsziListId ::= GraphicString (SIZE(1..8))

RsziListIdSet ::= SET OF RsziListId

StateNotLockedErrorParameter ::= ENUMERATED{
        stateNotLocked (0)}

SubDataConfByHlrIndicator ::= BOOLEAN
                -- TRUE  = MS location confirmed by HLR since last HLR or VLR failure
                -- FALSE = MS location not confirmed

SubscriptionRestriction ::= PlmnRestrictions

ScAddressList ::= SET OF ServiceCenterAddress

ServiceCenterAddress ::= AddressString

SsId ::= GraphicString
        -- The following supplementary services are valid for GSM Phase 2:
                -- CLIP, CLIR, CoLP, CoLR,
                -- CFU, CFB, CFNRy, CFNRc,
                -- CW, HOLD, MPTY, CUG, AoCI, AoCC,
                -- BAOC, BOIC, BOICexHC, BAIC, BICRoam
                -- Values see GSM12.02 Annex B

VlrImsi ::= GraphicString
        -- full IMSI

WrongPasswordAttemptsCounter ::= INTEGER

Zc ::= OCTET STRING (SIZE(2))

ZcList ::= SET SIZE (1..maxNumOfZoneCodes) OF Zc
        - note that the maximum number of zone
        - codes according to GSM TS 09.02 is 10.

-- Syntax of Eir object Attributes and Parameters --

CurrentNumberOfBlackListEntries ::= INTEGER

CurrentNumberOfGreyListEntries ::= INTEGER

CurrentNumberOfWhiteListEntries ::= INTEGER

EirListId ::= ENUMERATED {
                whiteList (0),
                blackList (1),
                greyList (2)}

EquipmentCreationRefusal ::= ENUMERATED {   noMoreSpaceOnEquipmentList (0),
```

```
                                        someOrAllEquipmentAlreadyOnList (1),
                                                -- refer to GSM 12.02 Section 4.6.1
                                        otherReasonForCreationRefusal (2) } -- f.f.s

FileBasedManagementId ::= GraphicString

MaxNumberOfBlackListEntries ::= INTEGER

MaxNumberOfGreyListEntries ::= INTEGER

MaxNumberOfWhiteListEntries ::= INTEGER


-- ASN.1 Syntax for EIR File Management --

ManagementFile ::= SEQUENCE {
                productionDateTime              [0]  GeneralizedTime,
                managementFunctions             [1]  SEQUENCE OF ManagementFunction,
                noOfManagementFunctions         [2]  INTEGER}

ManagementFunction ::= SEQUENCE{
                managementOperation  [0] ManagementOperation,
                objectClass             [1] ObjectClass,
                -- objectClass corresponds to:
                        --  equipmentInEir
                objectInstance          [2] ObjectInstance,
                attributeList           [3] SET OF Attribute OPTIONAL
                -- attributeList will not contain the attribute that is already
                -- present in objectInstance for naming the object instance
                -- to be created or deleted
                --
                -- attributeList should contain the necessary attributes to
                -- properly perform the required management operation
                -- i.e. for objectCreation :
                -- as a minimum all mandatory attributes should be provided.
                -- No contradictory optional attributes should be provided.
                -- For objectDeletion :
                -- no attributeList should be provided
                        }

ManagementOperation ::= INTEGER {
                objectCreation (0),
                objectDeletion (1) }

-- SYNTAX for the fileBasedManagementPackage

-- SYNTAX for the fileExecutionProgressLevel attribute

FileExecutionProgressLevel ::= SET OF SEQUENCE {
                managementFile                  [0] FileSpec,
                fileStatus              [1] FileStatus,
                progressLevel           [2] INTEGER (0 .. 100) OPTIONAL
                -- present only if fileStatus
                -- equals fileExecuting
                }
```

```
FileStatus ::= ENUMERATED {
                fileExecuting (0),          -- The file is currently being executed.
                                            -- The progress level is also reported
                fileExecuted (1),                   -- The file execution has ended
                fileScheduled (2)           -- the file is scheduled for execution and will be
                                            -- executed as soon as possible
                }

 -- SYNTAX for the startManagementFileExecution ACTION

StartFileExecutionInfo ::= FileList

StartFileExecutionReply ::= SET OF SEQUENCE {
                managementFile                  [0] FileSpec,
                startFileExecutionResult[1] StartFileExecutionResult}

StartFileExecutionResult ::= ENUMERATED {
                executionScheduled (0),         -- successful case
                                                -- the file is scheduled for execution, and will
                                                -- be executed as soon as possible
                                                -- unsuccessful cases
                executionNotScheduled (1),      -- already a full schedule in the NEF
                executionAlreadyScheduled (2), -- file was already scheduled
                invalidFileType (3),            -- filetype specified was not a management file
                fileNotInFileStore (4),         -- specified file is not present in the filestore
                                                -- of the NEF
                otherRejectReason (5) -- f.f.s.
                }

 -- SYNTAX for the disposeOfManagementFile ACTION

DisposeOfFileInfo ::= FileList

DisposeOfFileReply ::= SET OF SEQUENCE {
                managementFile [0] FileSpec,
                disposeOfFileResult [1] DisposeOfFileResult}

DisposeOfFileResult ::= ENUMERATED {
                fileDisposed (0),                   -- successful case
                                        -- the management file is cleared in the NEF
                                        -- unsuccesful cases:
                fileIsBeingExecuted (1), -- file cannot be cleared since
                                        -- it is currently being executed
                invalidFileType (2),    -- specified file type is not a management file
                fileNotInFileStore (3), -- specified file is not in the file store of the NEF
                otherRejectReason (4) -- f.f.s.
                }


-- SYNTAX for the managementFileExecuted NOTIFICATION

ExecutionResult ::= ENUMERATED {
                fileExecuted (0),                   -- successful case
                                        -- all commands in commandfile are executed successfully
                                        -- unsuccesful cases
                filePartiallyExecuted (1),-- not all commands are executed successfully
                fileError (2),          -- file could not be executed
                invalidFileSyntax (3),  -- an invalid syntax was found while executing the file
                otherRejectReason (4) -- f.f.s.
                }
```

```
FileExecutedInfo ::= SEQUENCE{
                managementFile [0] FileSpec,
                executionResult [1] ExecutionResult}


END
```

C.9. Application Context

The Application Context Name of the 12.02 application context shall have the following object identifier value:

{gsm-OM-DomainId gsm-12-02 (2) protocolSupport (1) applicationContext (0) gsm-Management (0) }

and the following object description value:

"gsm 12.02 management application context"

The object identifier gsm-OM-DomainId in the ETR GSM 12.30.

History

Document history			
August 1995	Public Enquiry	PE 89:	1995-08-07 to 1995-12-01
March 1996	Vote	V 100:	1996-03-25 to 1996-05-17