ETSI TS 101 377-3-2 V1.1.1 (2001-03)

Technical Specification

GEO-Mobile Radio Interface Specifications;
Part 3: Network specifications;
Sub-part 2: Network Architecture;
GMR-2 03.002

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IPRs:

Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,715,365	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,754,974	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,226,084	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,701,390	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,826,222	US

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Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Ericsson Mobile Communication	Improvements in, or in relation to, equalisers	GB	GB 2 215 567	GB
TS 101 377 V1.1.1	Ericsson Mobile Communication	Power Booster	GB	GB 2 251 768	GB
TS 101 377 V1.1.1	Ericsson Mobile Communication	Receiver Gain	GB	GB 2 233 846	GB
TS 101 377 V1.1.1	Ericsson Mobile Communication	Transmitter Power Control for Radio Telephone System	GB	GB 2 233 517	GB

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Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Hughes Network Systems		US	Pending	US

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Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	2.4-to-3 KBPS Rate Adaptation Apparatus for Use in Narrowband Data and Facsimile Communication Systems	US	US 6,108,348	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Cellular Spacecraft TDMA Communications System with Call Interrupt Coding System for Maximizing Traffic ThroughputCellular Spacecraft TDMA Communications System with Call Interrupt Coding System for Maximizing Traffic Throughput	US	US 5,717,686	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Enhanced Access Burst for Random Access Channels in TDMA Mobile Satellite System	US	US 5,875,182	
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System	US	US 5,974,314	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System	US	US 5,974,315	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System with Mutual Offset High-argin Forward Control Signals	US	US 6,072,985	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System with Spot Beam Pairing for Reduced Updates	US	US 6,118,998	US

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

The contents of the present document are subject to continuing work within TC-SES and may change following formal TC-SES approval. Should TC-SES modify the contents of the present document it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

Version 1.m.n

where:

- the third digit (n) is incremented when editorial only changes have been incorporated in the specification;

- the second digit (m) is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

The present document is part 3, sub-part 2 of a multi-part deliverable covering the GEO-Mobile Radio Interface Specifications, as identified below:

Part 1:   "General specifications";

Part 2:   "Service specifications";

Part 3:   "Network specifications";

Sub-part 1:   "Network Functions; GMR-2 03.001";

Sub-part 2:   "Network Architecture; GMR-2 03.002";

Sub-part 3:   "Numbering, Addressing and Identification; GMR-2 03.003";

Sub-part 4:   "Restoration Procedures; GMR-2 03.007";

Sub-part 5:   "Organization of Subscriber Data; GMR-2 03.008";

Sub-part 6:   "Handover Procedures; GMR-2 03.009";

Sub-part 7:   "Technical Realization of Short Message Service (SMES) Point-to-Point; GMR-2 03.040";

Sub-part 8:   "Location Registration Procedures; GMR-2 03.012";

Sub-part 9:   "Discontinuous Reception (DRX) in the GMR-2 System; GMR-2 03.013";

Sub-part 10:   "Security Related Network Functions; GMR-2 03.020";

Sub-part 11:   "Functions Related to Mobile Earth Station (MES) in idle Mode; GMR-2 03.022";

Sub-part 12:   "Technical Realization of Facsimile Group 3 Transparent; GMR-2 03.045";

Sub-part 13:   "Transmission Planning Aspects of the Speech Service in the Public Satellite Mobile Network (PSMN) system; GMR-2 03.050";

Sub-part 14:   "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2; GMR-2 03.083";

Sub-part 15:   "Multiparty Supplementary Services; GMR-2 03.084";

Sub-part 16:   "Technical Realization of Operator Determined Barring; GMR-2 03.015";

Sub-part 17:   "Call Barring (CB) Supplementary Services - Stage 2; GMR-2 03.088";

Part 4:   "Radio interface protocol specifications";

Part 5:   "Radio interface physical layer specifications";

Part 6:   "Speech coding specifications";

Part 7: "Terminal adaptor specifications".

Introduction

GMR stands for GEO (Geostationary Earth Orbit) Mobile Radio interface, which is used for mobile satellite services (MSS) utilizing geostationary satellite(s). GMR is derived from the terrestrial digital cellular standard GSM and supports access to GSM core networks.

Due to the differences between terrestrial and satellite channels, some modifications to the GSM standard are necessary. Some GSM specifications are directly applicable, whereas others are applicable with modifications. Similarly, some GSM specifications do not apply, while some GMR specifications have no corresponding GSM specification.

Since GMR is derived from GSM, the organization of the GMR specifications closely follows that of GSM. The GMR numbers have been designed to correspond to the GSM numbering system. All GMR specifications are allocated a unique GMR number as follows:

GMR-n xx.zyy

where:

xx.0yy (z=0) is used for GMR specifications that have a corresponding GSM specification. In this case, the numbers xx and yy correspond to the GSM numbering scheme.

xx.2yy (z=2) is used for GMR specifications that do not correspond to a GSM specification. In this case, only the number xx corresponds to the GSM numbering scheme and the number yy is allocated by GMR.

n denotes the first (n=1) or second (n=2) family of GMR specifications.

A GMR system is defined by the combination of a family of GMR specifications and GSM specifications as follows:

- If a GMR specification exists it takes precedence over the corresponding GSM specification (if any). This precedence rule applies to any references in the corresponding GSM specifications.

  NOTE: Any references to GSM specifications within the GMR specifications are not subject to this precedence rule. For example, a GMR specification may contain specific references to the corresponding GSM specification.

- If a GMR specification does not exist the corresponding GSM specification may or may not apply. The applicability of the GSM specifications is defined in GMR-n 01.201.

1   Scope

The present document presents the possible architectures of the mobile system. Clause 4 of the present document contains a definition of the different functional entities needed to support the mobile service. In clause 5, the configuration of a PSMN is described as well as the organization of the functional entities; the configuration presented is the most general in order to cope with all the possible implementations which can be imagined in the different countries. To illustrate that purpose, some examples of possible configurations are presented. Clause 6 of the present document contains a brief description of the interfaces involved which shows the principle of the organization considered.

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, subsequent revisions do apply.

[1]   GMR-2 01.004 (ETSI TS 101 377-1-1): "GEO-Mobile Radio Interface Specifications; Part 1: General specifications; Sub-part 1: Abbreviations and Acronyms".

[2]   GSM 02.16 (ETSI ETS 300 508): "Digital cellular telecommunications system (Phase 2); International Mobile station Equipment Identities (IMEI)" (V4.5.0).

[3]   GMR-2 03.003 (ETSI TS 101 377-3-3): "GEO-Mobile Radio Interface Specifications; Part 3: Network specifications; Sub-part 3: Numbering, Addressing and Identification".

[4]   GSM 03.04: "Digital cellular telecommunications system (Phase 2); Signalling requirements relating to routing of calls to mobile subscribers" (V4.0.4).

[5]   GMR-2 03.008 (ETSI TS 101 377-3-5): "GEO-Mobile Radio Interface Specifications; Part 3: Network specifications; Sub-part 5: Organization of Subscriber Data".

[6]   GMR-2 03.012 (ETSI TS 101 377-3-8): "GEO-Mobile Radio Interface Specifications; Part 3: Network specifications; Sub-part 8: Location Registration Procedures".

[7]   GMR-2 03.020 (ETSI TS 101 377-3-10): "GEO-Mobile Radio Interface Specifications; Part 3: Network specifications; Sub-part 10: Security related Network Functions".

[8]   GSM 04.02 (ETSI ETS 300 551): "Digital cellular telecommunications system (Phase 2); GSM Public Land Mobile Network (PLMN) access reference configuration" (V4.0.4).

[9]   GSM 08.02 (ETSI ETS 300 587-2): "Digital cellular telecommunications system (Phase 2); Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; Interface principles" (V4.2.0).

[10]   GSM 09.02 (ETSI ETS 300 599): "Digital cellular telecommunications system (Phase 2); Mobile Application Part (MAP) specification" (V4.18.0).

[11]   GSM 09.04 (ETSI ETS 300 601): "Digital cellular telecommunications system (Phase 2); Interworking between the Public Land Mobile Network (PLMN) and the Circuit Switched Public Data Network (CSPDN)" (V4.0.2).

[12]   GSM 09.05 (ETSI ETS 300 602): "Digital cellular telecommunications system (Phase 2); Interworking between the Public Land Mobile Network (PLMN) and the Packet Switched Public Data Network (PSPDN) for Packet Assembly/Disassembly facility (PAD) access" (V4.4.2).

[13] GSM 09.06 (ETSI ETS 300 603): "Digital cellular telecommunications system (Phase 2); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services" (V4.5.0).

[14] GSM 09.07 (ETSI ETS 300 604): "Digital cellular telecommunications system (Phase 2); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)" (V4.12.1).

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

location register: to establish a call to a mobile earth station the network must know where this mobile earth station is located. This information is stored in a function named location register

Home Location Register (HLR): the Home Location Register (HLR) is the location register to which a mobile subscriber is assigned for record purposes such as subscriber information

Visitor Location Register (VLR): the Visitor Location Register (VLR) is the location register, other than the HLR, used by an MSC to retrieve information for, e.g. handling of calls to or from a roaming mobile earth station currently located in its area

Authentication Centre (AuC): the Authentication Centre (AuC) is an entity which stores data for each mobile subscriber to allow the International Mobile Subscriber Identity (IMSI) to be authenticated and to allow communication over the radio path between the mobile earth station and the network to be ciphered. The AuC transmits the data needed for authentication and ciphering via the HLR to the VLR and MSC which need to authenticate a mobile earth station. The procedures used for authentication and ciphering are described more fully in GMR-2 03.20 [7]

Equipment Identity Register (EIR): the Equipment Identity Register (EIR) in the GMR system is the logical entity which is responsible for storing in the network the International Mobile Equipment Identities (IMEIs), used in the GMR system. The equipment is classified as "white listed", "grey listed", "black listed" or it may be unknown as specified in GSM 02.16 [2] and GSM 09.02 [10]

Mobile-services Switching Centre (MSC): the Mobile-services Switching Centre (MSC) constitutes the interface between the radio system and the fixed networks. The MSC performs all necessary functions in order to handle the calls to and from the mobile earth stations

Public Satellite Mobile Network (PSMN): a Public Satellite Mobile Network (PSMN) is established and operated by an administration or Recognized Private Operating Agency (RPOA) for the specific purpose of providing satellite mobile telecommunications services to the public. A PSMN may be regarded as an extension of a network (e.g. ISDN); it is a collection of MSCs areas within a common numbering plan (e.g. same National Destination Code) and a common routing plan. The MSCs are the functional interfaces between the fixed networks and a PSMN for call set-up

Functionally the PSMNs may be regarded as independent telecommunications entities even though different PSMNs may be interconnected through the ISDN/PSTN and PDNs for forwarding of calls or network information. A similar type of interconnection may exist for the interaction between the MSCs of one PSMN

cell (spotbeam): the cell is an area of radio coverage identified by a spotbeam of the satellite

Location Area (LA): the Location Area (LA) is defined as an area in which a mobile earth station may move freely without updating the location register. A location area may include one or several cells (spotbeams)

MSC area: the MSC area is the part of the network covered by an MSC. An MSC area may consist of one or several location areas

VLR area: the VLR area is the part of the network controlled by a VLR. A VLR area consists of one MSC area

zones for regional subscription: a PSMN operator may define a number of regional subscription areas, each of which is a subset of the service area for an unrestricted mobile subscriber. A regional subscription area may be contained within the service area of a single PSMN, or may lie within the service areas of two or more PSMNs. Each regional subscription area consists of one or more zones; each zone is contained within the service area of a PSMN

The definition of a mobile subscriber's regional subscription area is stored within the HLR per National Destination Code(s) (NDC) of a PSMN and is transferred to the VLRs of that PSMN. The VLR evaluates this information to extract the restricted or accessible MSC areas and location areas to which the mobile subscriber is allowed to roam. The VLR informs the HLR if an entire MSC area is restricted.

Zones for Regional Subscription and their handling are defined in GMR-2 03.003 [3], GMR-2 03.008 [5] and GSM 09.02 [10].

service area: the service area is defined as an area in which a mobile subscriber can be reached by another (mobile or fixed) subscriber without the subscriber's knowledge of the actual location of the mobile earth station within the area. A service area may consist of several PSMNs. One service area may consist of one country, be a part of a country or include several countries. The location registration system associated with each service area must thus contain a list of all mobile earth stations located within that service area

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in GMR-2 01.004 [1] apply.

4 The entities of the mobile system

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

4.1 The Home Location Register (HLR)

This functional entity is a database in charge of the management of mobile subscribers. A PSMN may contain one or several HLRs: it depends on the number of mobile subscribers, on the capacity of the equipment and on the organization of the network. Two kinds of information are stored there:

- the subscription information;

- some location information enabling the charging and routing of calls towards the MSC where the MES is located (e.g. the MES Roaming Number, the VLR address, the MSC address).

Two types of number are attached to each mobile subscription and are stored in the HLR:

- the International Mobile Station Identity (IMSI);

- one or more Mobile Station International ISDN number(s) (MSISDN).

The IMSI or the MSISDN may be used as a key to access the information in the database for a mobile subscription.

The database contains other information such as:

- teleservices and bearer services subscription information;

- service restrictions (e.g. roaming limitation);

- supplementary services; the HLR contains the parameters attached to these services.

 NOTE: Supplementary services parameters need not all be stored in the HLR. However, it seems safer to store all subscription parameters in the HLR even when some are stored in a subscriber card.

The organization of the subscriber data is outlined in GMR-2 03.008 [5].

4.2   The Visitor Location Register (VLR)

A mobile earth station roaming in an MSC area is controlled by the Visitor Location Register in charge of this area. When a Mobile Earth Station (MES) enters a new location area it starts a registration procedure.

The VLR contains also the information needed to handle the calls set-up or received by the MESs registered in its database (for some supplementary services the VLR may have to obtain additional information from the HLR) the following elements are included:

-    the International Mobile Subscriber Identity (IMSI);

-    the Mobile Station International ISDN number (MSISDN);

-    the Mobile Station Roaming Number (MSRN), see GMR-2 03.003 [3] for allocation principles;

-    the Local Mobile Station Identity (LMSI), if used;

-    the location area where the mobile earth station has been registered. This data item will be used to call the station.

The information is passed between VLR and HLR by the procedures described in GMR-2 03.012 [6].

The VLR also contains supplementary service parameters attached to the mobile subscriber and received from the HLR. The organization of the subscriber data is outlined in GMR-2 03.008 [5].

4.3   The Authentication Centre (AuC)

The Authentication Centre (AuC) is associated with an HLR, and stores an identity key for each mobile subscriber registered with the associated HLR. This key is used to generate:

-    data which are used to authenticate the IMSI;

-    a key used to cipher communication over the radio path between the mobile earth station and the network.

The procedures used for authentication and ciphering are described more fully in GMR-2 03.020 [7].

The AuC communicates only with its associated HLR over an interface denoted the H-interface (see clause 6).

4.4   The Equipment Identity Register (EIR)

This functional entity contains one or several databases which store(s) the IMEIs used in the GSM system.

The mobile equipment may be classified as "white listed", "grey listed" and "black listed" and therefore may be stored in three separate lists.

An IMEI may also be unknown to the EIR.

An EIR shall as a minimum contain a "white list" (Equipment classified as "white listed").

4.5   The Mobile-services Switching Centre (MSC)

The Mobile-services Switching Centre is an exchange which performs all the switching and signalling functions for mobile earth stations located in a geographical area designated as the MSC area. The main difference between a MSC and an exchange in a fixed network is that the MSC has to take into account the impact of the allocation of radio resources and the mobile nature of the subscribers and has to perform in addition, at least the following procedures:

-    procedures required for the location registration (see GMR-2 03.012 [6]);

-    procedures required for handover (see GMR-2 05.008 [5]).

4.6   The Gateway MSC (GMSC)

If a network, delivering a call to the PSMN cannot interrogate the HLR, the call is routed to an MSC. This MSC will interrogate the appropriate HLR and then route the call to the MSC where the mobile earth station is located. The MSC which performs the routing function to the actual location of the MES is called the Gateway MSC (GMSC).

The acceptance of an interrogation to an HLR is the decision of the operator.

The choice of which MSCs can act as Gateway MSCs is for the operator to decide (i.e. all MSCs or some designated MSCs).

See also GSM 03.04 [4].

4.7   SMS Gateway MSC (SMS-GMSC)

The SMS Gateway MSC (SMS-GMSC) acts as an interface between a Short Message Service Centre and the PSMN, to allow short messages to be delivered to mobile earth stations from the Service Centre (SC).

4.8   SMS Interworking MSC

The SMS Interworking MSC acts as an interface between the PSMN and a Short Message Service Centre (SC) to allow short messages to be submitted from Mobile Earth Stations to the SC.

4.9   The Interworking Function (IWF)

The Interworking Function (IWF) is a functional entity associated with the MSC. The IWF provides the functionality necessary to allow interworking between a PSMN and the fixed networks (ISDN, PSTN and PDNs). The functions of the IWF depend on the services and the type of fixed network. The IWF is required to convert the protocols used in the PSMN to those used in the appropriate fixed network. The IWF may have no functionality where the service implementation in the PSMN is directly compatible with that at the fixed network. The interworking functions are described in GSM 09.04 [11], 09.05 [12], 09.06 [13] and 09.07 [14].

4.10   The Gateway Subsystem (GWS)

The Gateway Subsystem (GWS) is the system of base station equipments (transceivers, controllers, etc.) which is viewed by the MSC through a single A-interface as being the entity responsible for communicating with Mobile Earth Stations in a certain area. The functionality is described in GSM 08.02 [9].

A Gateway Station Controller (GSC) is a network component in the PSMN with the functions for control of the GTS.

A Gateway Transceiver Subsystem (GTS) is a network component controlled by the GSC.

The split of functions between GWS and MSC is described in the 08-series of GSM Specifications.

4.11   The Mobile Earth Station (MES)

The Mobile Earth Station consists of the physical equipment used by a PSMN subscriber; it comprises the Mobile Equipment (ME) and the Subscriber Identity Module (SIM). The ME comprises the Mobile Termination (MT) which, depending on the application and services, may support various combinations of Terminal Adapter (TA) and Terminal Equipment (TE) functional groups. These functional groups are described in GSM 04.02 [8].

4.12 Network Control Centre (NCC)

The Network Control Center provides centralized control for individual call setup, network timing synchronization, network resource management and network maintenance. The call set up functions include signalling on broadcast and common control channels, satellite payload configuration for single hop mobile to mobile connections, and long-haul call setups. NCC provides for overall network timing synchronization at the Gateways, satellite and user terminals. NCC manages the allocation of common network resources to the spotbeams, including satellite power and bandwidth in terms of physical communication traffic channels. NCC implements various network maintenance functions, including failure monitoring and error logging.

4.13 Satellite Control Facility (SCF)

The SCF plays a role in the establishment of single-hop mobile-to-mobile calls. During such calls, the SCF, under the direction of NCC, configures the communications resources in the communication payload of the satellite to establish the single-hop connection between the two MESs.

5 Configuration of a Public Satellite Mobile Network

5.1 General

The basic configuration of a Public Satellite Mobile Network and the interconnection to the PSTN/ISDN are presented in figure 5.1-1. This configuration presents signalling interfaces which can be found in a PSMN. Implementations may be different: some particular functions may be gathered in the same equipment and then some interfaces may become internal interfaces.

5.2 Basic configuration

In the basic configuration presented in figure 5.1-1, all the functions are considered implemented in different equipments. Therefore, all the interfaces within PSMN are external. Interfaces A and Abis are defined in the GSM 08-series of Technical Specifications. Interfaces B, C, D, E, F and G need the support of the Mobile Application Part of the signalling system No. 7 to exchange the data necessary to provide the mobile service. No protocol for the H-interface is standardized. From this configuration, all the possible PSMN organizations can be deduced. In the case when some functions are contained in the same equipment, the relevant interfaces become internal to that equipment.
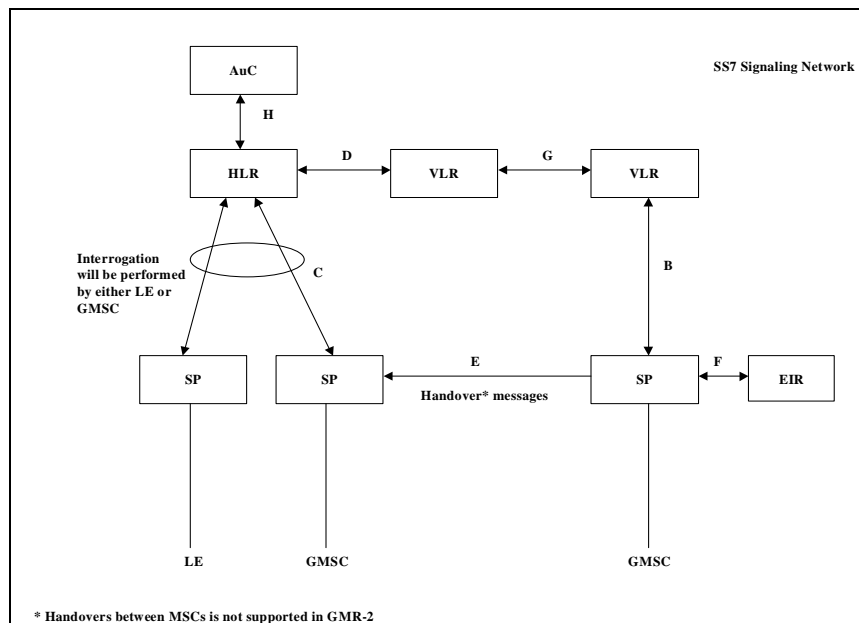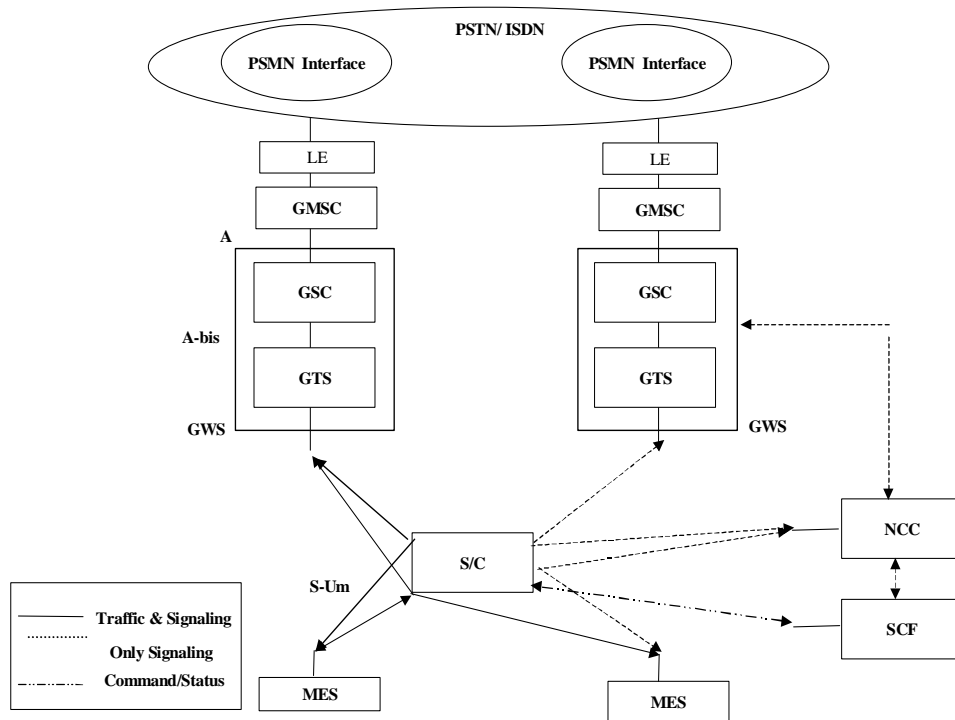
GWS: Gateway Subsystem
GSC: Gateway Station Controller
GTS: Gateway Transceiver Subsystem

Figure 5.1-1: Configuration of a PSMN and Interfaces

6 PSMN interfaces

6.1 General

The implementation of the mobile service with international roaming implies the exchange of data between the equipments involved in the service. The same No.7 signalling network should be used to transfer these data and the call-related signalling information. To transfer these data, the Mobile Application Part will use the Transaction Capabilities; see GSM 09.02 [10].

6.2 Interface between the MSC and Gateway Subsystem (A-interface)

The interface between the MSC and its GWS is specified in the 08-series of GSM Specifications.

The GWS-MSC interface is used to carry information concerning:

- GWS management;

- call handling;

- mobility management.

6.3 Interface between GSC and GTS (Abis-interface)

When the GWS consists of a Gateway Station Controller (GSC) and one or more Gateway Transceiver Subsystems (GTS), this interface is used between the GSC and GTS to support the services offered to the GMR users and subscribers.

The interface also allows control of the radio equipment and radio frequency allocation in the GTS.

The interface is specified in the 08.5x-series of GSM Specifications.

6.4 Interface between the MSC and its associated VLR (B-interface)

The VLR is the location and management database for the mobile subscribers roaming in the area controlled by the associated MSC(s). Whenever the MSC needs data related to a given mobile earth station currently located in its area, it interrogates the VLR. When a mobile earth station initiates a location updating procedure with an MSC, the MSC informs its VLR which stores the relevant information. This procedure occurs whenever an MES roams to another location area. Also, when a subscriber activates a specific supplementary service or modifies some data attached to a service, the MSC informs (via the VLR) the HLR which stores these modifications and updates the VLR if required.

6.5 Interface between the HLR and the MSC (C-interface)

The Gateway MSC must interrogate the HLR of the required subscriber to obtain routing information for a call or a short message directed to that subscriber.

6.6 Interface between the HLR and the VLR (D-interface)

This interface is used to exchange the data related to the location of the mobile earth station and to the management of the subscriber. The main service provided to the mobile subscriber is the capability to set up or to receive calls within the whole service area. To support this, the location registers have to exchange data. The VLR informs the HLR of the location of a mobile earth station managed by the latter and provides it (either at location updating or at call set-up) with the roaming number of that station. The HLR sends to the VLR all the data needed to support the service to the mobile subscriber. The HLR then instructs the previous VLR to cancel the location registration of this subscriber. Exchanges of data may occur when the mobile subscriber requires a particular service, when he wants to change some data attached to his subscription or when some parameters of the subscription are modified by administrative means.

6.7 Interface between MSCs (E-interface)

When a mobile earth station moves from one MSC area to another during a call, a handover procedure has to be performed in order to continue the communication. For that purpose the MSCs have to exchange data to initiate and then to realize the operation.

After the handover operation has been completed, the MSCs will exchange information to transfer A-interface signalling as necessary.

When a short message is to be transferred between a Mobile Earth Station and Short Message Service Centre (SC), in either direction, this interface is used to transfer the message between the MSC serving the Mobile Earth Station and the MSC which acts as the interface to the SC.

6.8 Interface between MSC and EIR (F-interface)

This interface is used between MSC and EIR to exchange data, in order that the EIR can verify the status of the IMEI retrieved from the Mobile Earth Station.

6.9 Interface between VLRs (G-interface)

When a mobile subscriber moves from a VLR area to another Location Registration procedure will happen. This procedure may include the retrieval of the IMSI and authentication parameters from the old VLR.

6.10 Interface between HLR and AuC (H-Interface)

When an HLR receives a request for authentication and ciphering data for a Mobile Subscriber and it does not hold the requested data, the HLR requests the data from the AuC. The protocol used to transfer the data over this interface is not standardized.

6.11 Interface between Mobile Earth Station and Gateway Subsystem (S-Um-interface)

The interface between the MES and the GW via the Satellite is specified in the 04- and 05-series of GMR-2 Specifications.

6.12 Interface between the Mobile Earth Station (MES) and the Network Control Center (NCC)

This interface is used to broadcast system-related information from the NCC to the MESs in a spotbeam via the Satellite. Furthermore, the interface supports the common control channels, which are used for mobile-originated and mobile-terminated call setups.

6.13 Interfaces between the Gateway and the Network Control Center

The interface between the Gateways and the NCC via the Satellite is standard, whereas the interface between the Gateways and the NCC via other entities is optional. In any case, the interface is used to transport signalling information during call setup and also to transport subscriber related information during long-haul call setup. During long-haul call setup, the mobile subscriber data is transported from the Home Gateway to the 'visited' Gateway via the NCC.

6.14 Interface between the Network Control Center (NCC) and the Satellite Control Facility (SCF)

The establishment of single-hop calls between two MESs requires appropriate switching in the communication payload of the satellite. In such cases, the NCC determines and communicates the appropriate payload configuration on the interface between the NCC and the SCF.

6.15 Interface between the Satellite Control Facility (SCF) and the Satellite

This interface is used to transport communication payload configuration commands and status reports between the SCF and the satellite.

7 Interface between the fixed networks and the MSC

The MSC is based on a normal ISDN exchange. It has, for call control, the same interface as the fixed network exchanges. The signalling interface considered in the GSM Specifications is related to the signalling system No. 7 User Parts TUP and ISUP associated to the circuits used for incoming and outgoing calls.

The interfaces with fixed networks, including dedicated networks, are described in the 09-series of GSM Specifications.

History

Document history		
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