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GEO-Mobile Radio Interface Specifications (Release 3);
Third Generation Satellite Packet Radio Service;
Part 4: Radio interface protocol specifications;
Sub-part 7: Mobile Radio Interface Signalling Layer 3
General Aspects;
GMR-1 3G 24.007

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RTS/SES-00328-4-7

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Contents

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Foreword

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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 3.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 4, sub-part 7 of a multi-part deliverable covering the GEO-Mobile Radio Interface Specifications (Release 3) Third Generation Satellite Packet Radio Service, as identified below:

Part 1: "General specifications":

Part 2: "Service specifications";

Part 3: "Network specifications";

Part 4: "Radio interface protocol specifications";

Sub-part 1: "Mobile Earth Station-Gateway Station System (MES-GSS) Interface; GMR-1 04.001";

Sub-part 2: "GMR-1 Satellite Network Access Reference Configuration; GMR-1 04.002";

Sub-part 3: "Channel Structures and Access Capabilities; GMR-1 04.003";

Sub-part 4: "Layer 1 General Requirements; GMR-1 3G 44.004";

Sub-part 5: "Data Link Layer General Aspects; GMR-1 04.005";

Sub-part 6: "Mobile earth Station-Gateway Station Interface Data Link Layer Specifications; GMR-1 04.006";

Sub-part 7: "Mobile Radio Interface Signalling Layer 3 General Aspects; GMR-1 3G 24.007";

Sub-part 8: "Mobile Radio Interface Layer 3 Specifications; GMR-1 3G 44.008";

Sub-part 9: "Performance Requirements on the Mobile Radio Interface; GMR-1 04.013";

Sub-part 10: "Rate Adaptation on the Access Terminal-Gateway Station Subsystem (MES-GSS) Interface; GMR-1 04.021";

Sub-part 11: "Radio Link Protocol (RLP) for Data Services; GMR-1 04.022";

Sub-part 12: "Mobile Earth Station (MES) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol; GMR-1 3G 44.060";

Sub-part 13: "Radio Resource Control (RRC) protocol; Iu Mode; GMR-1 3G 44.118";

Sub-part 14: "Mobile Earth Station (MES) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol; Iu Mode; GMR-1 3G 44.160";

Sub-part 15: "Packet Data Convergence Protocol (PDCP) specification; GMR-1 3G 25.323";

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.

The present document is part of the GMR Release 3 specifications. Release 3 specifications are identified in the title and can also be identified by the version number:

- Release 1 specifications have a GMR 1 prefix in the title and a version number starting with "1" (V1.x.x).
- Release 2 specifications have a GMPRS 1 prefix in the title and a version number starting with "2" (V2.x.x).
- Release 3 specifications have a GMR-1 3G prefix in the title and a version number starting with "3" (V3.x.x).

The GMR release 1 specifications introduce the GEO Mobile Radio interface specifications for circuit mode Mobile Satellite Services (MSS) utilizing geostationary satellite(s). GMR release 1 is derived from the terrestrial digital cellular standard GSM (phase 2) and it supports access to GSM core networks.

The GMR release 2 specifications add packet mode services to GMR release 1. The GMR release 2 specifications introduce the GEO Mobile Packet Radio Service (GMPRS). GMPRS is derived from the terrestrial digital cellular standard GPRS (included in GSM Phase 2+) and it supports access to GSM/GPRS core networks.

The GMR release 3 specifications evolve packet mode services of GMR release 2 to 3rd generation UMTS compatible services. The GMR release 3 specifications introduce the GEO-Mobile Radio Third Generation (GMR-1 3G) service. Where applicable, GMR-1 3G is derived from the terrestrial digital cellular standard 3GPP and it supports access to 3GPP core networks.

Due to the differences between terrestrial and satellite channels, some modifications to the GSM or 3GPP standard are necessary. Some GSM and 3GPP specifications are directly applicable, whereas others are applicable with modifications. Similarly, some GSM and 3GPP specifications do not apply, while some GMR specifications have no corresponding GSM or 3GPP specification.

Since GMR is derived from GSM and 3GPP, the organization of the GMR specifications closely follows that of GSM or 3GPP as appropriate. The GMR numbers have been designed to correspond to the GSM and 3GPP numbering system. All GMR specifications are allocated a unique GMR number. This GMR number has a different prefix for Release 2 and Release 3 specifications as follows:

- Release 1: GMR n xx.zyy.
- Release 2: GMPRS n xx.zyy.
- Release 3: GMR-1 3G xx.zyy.

where:

xx.0yy (z = 0) is used for GMR specifications that have a corresponding GSM or 3GPP specification. In this case, the numbers xx and yy correspond to the GSM or 3GPP numbering scheme.

xx.2yy (z = 2) is used for GMR specifications that do not correspond to a GSM or 3GPP specification. In this case, only the number xx corresponds to the GSM or 3GPP 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 and 3GPP specifications as follows:

- If a GMR specification exists it takes precedence over the corresponding GSM or 3GPP specification (if any). This precedence rule applies to any references in the corresponding GSM or 3GPP specifications.

NOTE: Any references to GSM or 3GPP specifications within the GMR or 3GPP specifications are not subject to this precedence rule. For example, a GMR or 3GPP specification may contain specific references to the corresponding GSM or 3GPP specification.

- If a GMR specification does not exist, the corresponding GSM or 3GPP specification may or may not apply. The applicability of the GSM or 3GPP specifications is defined in TS 101 376-1-2 [2].

The clause numbering and the table numbering and figure numbering in the present document are aligned to the corresponding numbering of TS 101 376-4-7 (Release 2) [3] as far as possible. In several places, this means that the table numbering and figure numbering is non-continuous in the present document in order to maintain this alignment, the following rules apply:

- A table that uses the same table number replaces the corresponding table in TS 101 376-4-7 (Release 2) [3];

- A table that uses a different table number is a new additional table.

1 Scope

The present document defines the architecture of Layer 3 and its sublayers on the GeoMobile (GMR-1) Air Interface. Most of the procedures defined for Layer 3 are similar to those defined in 3GPP system as defined in TS 124 007 [5]. Only significant differences are described here.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in Release 7 or to the latest version of that document in the latest release less than 7.

In the case of a reference to a GMR-1 3G document, a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] ETSI TS 101 376-1-1: "GEO-Mobile Radio Interface Specifications (Release 2) General Packet Radio Service; Part 1: General specifications; Sub-part 1: Abbreviations and acronyms; GMPRS-1 01.004".

NOTE: This is a reference to a GMR-1 Release 2 specification. See the introduction for more details.

[2] ETSI TS 101 376-1-2: "GEO-Mobile Radio Interface Specifications (Release 3); Third Generation Satellite Packet Radio Service; Part 1: General specifications; Sub-part 2: Introduction to the GMR-1 family; GMR-1 3G 41.201".

[3] ETSI TS 101 376-4-7: "GEO-Mobile Radio Interface Specifications (Release 2) General Packet Radio Service; Part 4: Radio interface protocol specifications; Sub-part 7: Mobile Radio Interface Signalling Layer 3 General Aspects; GMPRS-1 04.007".

NOTE: This is a reference to a GMR-1 Release 2 specification. See the introduction for more details.

[4] ETSI TS 101 376-4-8: "GEO-Mobile Radio Interface Specifications (Release 3); Third Generation Satellite Packet Radio Service; Part 4: Radio interface protocol specifications; Sub-part 8: Mobile Radio Interface Layer 3 Specifications; GMR-1 3G 44.008".

[5] ETSI TS 124 007: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio interface signalling layer 3; General Aspects (3GPP TS 24.007)".

[6] ETSI TS 124 008: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008)".

[7] ETSI TS 124 010: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile Radio Interface Layer 3 - Supplementary Services Specification - General Aspects (3GPP TS 24.010)".

[8] ETSI TS 124 011: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface (3GPP TS 24.011)".

[9] ETSI TS 124 080: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio Layer 3 supplementary service specification; Formats and coding (3GPP TS 24.080)".

[10] ETSI TS 124 081: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Line Identification Supplementary Service; Stage 3 (3GPP TS 24.081)".

[11] ETSI TS 124 082: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Call Forwarding (CF) supplementary services; Stage 3 (3GPP TS 24.082)".

[12] ETSI TS 124 083: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Call Waiting (CW) and Call Hold (HOLD) Supplementary Service; Stage 3 (3GPP TS 24.083)".

[13] ETSI TS 124 084: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); MultiParty (MPTY) Supplementary Service; Stage 3 (3GPP TS 24.084)".

[14] ETSI TS 124 085: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Closed User Group (CUG) Supplementary Service; Stage 3 (3GPP TS 24.085)".

[15] ETSI TS 124 086: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Advice of Charge (AoC) Supplementary Service; Stage 3 (3GPP TS 24.086)".

[16] ETSI TS 124 088: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Call Barring (CB) Supplementary Service; Stage 3 (3GPP TS 24.088)".

[17] ETSI TS 124 090: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Unstructured Supplementary Service Data (USSD); Stage 3 (3GPP TS 24.090)".

[18] ETSI TS 124 030: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Location Services (LCS); Supplementary service operations; Stage 3 (3GPP TS 24.030 version)".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 101 376-1-2 [2] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 101 376-1-1 [1] apply.

4 Introduction

4.1 General

Same as clause 4.1 of TS 101 376-4-7 [3].

4.2 Applicability of functional blocks

Same as clause 4.2 of TS 101 376-4-7 [3].

4.3 Technique of description

Same as clause 4.3 of TS 101 376-4-7 [3].

4.3.1 Service description

Same as clause 4.3.1 of TS 101 376-4-7 [3].

4.3.2 Abstract service primitives

Same as clause 4.3.2 of TS 101 376-4-7 [3].

4.3.3 Protocols and peer-to-peer communication

Same as clause 4.3.3 of TS 101 376-4-7 [3].

4.3.4 Contents of layer 3 related Technical Specifications

- the Radio Resource (RR) management protocol is defined in TS 101 376-4-8 [4];
- the Mobility Management (MM) protocol is defined in TS 124 008 [6];
- the Session Management (SM) protocol is defined in TS 124 008 [6];
- the Call Control (CC) protocol is defined in TS 124 008 [6];
- the Supplementary Services (SS) protocol is defined in TS 124 010 [7], TS 124 080 [9], TS 124 081 [10], TS 124 082 [11], TS 124 083 [12], TS 124 084 [13], TS 124 085 [14], TS 124 086 [15], TS 124 088 [16], TS 124 090 [17] and TS 124 030 [18];
- the Short Message Service (SMS) protocol is defined in TS 124 011 [8].

5 Structure of layer 3 functions

5.1 Basic groups of functions

Same as clause 5.1 of TS 101 376-4-7 [3].

5.2 Protocol architecture

Same as clause 5.1 of TS 101 376-4-7 [3] with the following additional text:

Figure 5.5 shows the protocol architecture for a MES supporting the PS mode of operation UMTS service.

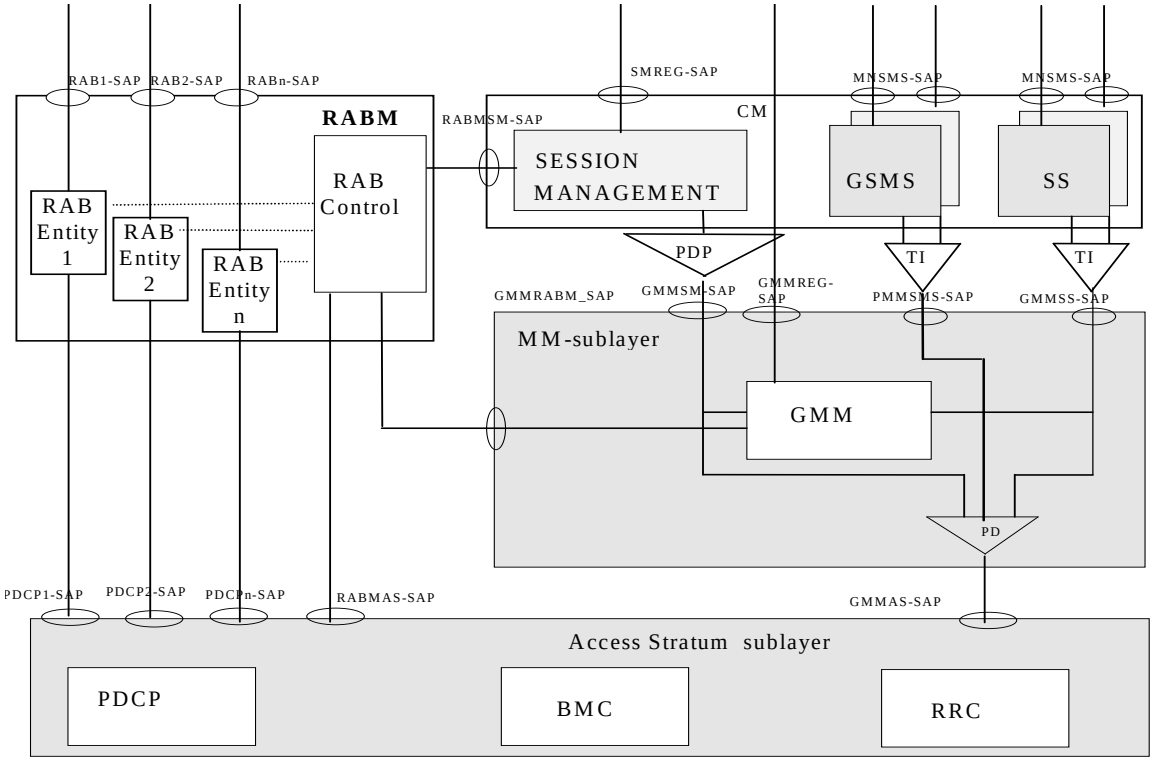

Figure 5.5: Protocol architecture of Non Access Stratum supporting PS mode of operation MESs, MES-side

Figure 5.5 defines three sublayers for UMTS PS domain services supporting PS mode of operation:

- the Access Stratum (AS) sublayer provides services to the MM sublayer and the RAB Manager (RABM) entity;
- the MM sublayer provides services to the SM, SS and GSMS entities of the CM. The MM sublayer includes one GMM entity;
- the CM sublayer includes the SM, SS and GSMS entities. The SM entity provides services to the RABM entity and uses services of the MM sublayer. The GSMS entity is identical to the SMS entity for GPRS services in GSM except it uses the services from the GMM sublayer. The SS entity is identical to the one for non-GPRS services except it uses the services from the LLC or PS signalling connection;
- the RABM hides the concepts of RABs that can be activated/released while a PDP context is active. If UL data in the terminal is to be sent on a RAB (NSAPI) that has been released the RABM will trigger a service request procedure in GMM.

6 Services provided by signalling layer 3 at the MS side

Same as clause 6 of TS 101 376-4-7 [3].

6.1 Registration services

Same as clause 6.1 of TS 101 376-4-7 [3].

6.2 Call Control services

Same as clause 6.2 of TS 101 376-4-7 [3].

6.3 Call-independent supplementary services support

Same as clause 6.3 of TS 101 376-4-7 [3].

6.4 Short Message Services support

Same as clause 6.4 of TS 101 376-4-7 [3].

6.5 MN-RR state services support

Same as clause 6.5 of TS 101 376-4-7 [3].

6.6 Position information support

Same as clause 6.6 of TS 101 376-4-7 [3].

6.7 DTMF digits transmission and reception service

Same as clause 6.7 of TS 101 376-4-7 [3].

6.8 Session Management Services for GMPRS-Services

Same as clause 6.5 of TS 124 007 [5].

6.9 Registration Services for GMPRS-Services

Same as clause 6.9 of TS 101 376-4-7 [3].

6.10 Services provided to SNDCP entities by GMPRS Logical Link Control services

Same as clause 6.10 of TS 101 376-4-7 [3].

6.11 Dark-beam information support

Same as clause 6.11 of TS 101 376-4-7 [3].

7 Services provided by signalling layer 3 on the Network side

7.1 Call Control services

Same as clause 7.1 of TS 101 376-4-7 [3].

7.2 Call-independent supplementary services support

Same as clause 7.2 of TS 101 376-4-7 [3].

7.3 Short Message Services support

Same as clause 7.3 of TS 101 376-4-7 [3].

7.4 Services provided to SNDCP and SMS entities by GMPRS Logical Link Control services

Same as clause 7.4 of TS 101 376-4-7 [3].

7.5 Session Management services for GMPRS-1

Same as clause 7.5 of TS 124 007 [5].

8 Services assumed from signalling layers 1 and 2

Same as clause 8 of TS 101 376-4-7 [3].

9 Interlayer service interfaces on the MES side

9.1 Services provided by the Radio Resource management entity

Same as clause 9.1 of TS 101 376-4-7 [3].

9.1.1 Service state diagram

Same as clause 9.1.1 of TS 101 376-4-7 [3].

9.1.2 Service primitives

Same as clause 9.1.2 of TS 101 376-4-7 [3].

9.2 Services provided by the Mobility Management entity

Same as clause 9.2 of TS 101 376-4-7 [3].

9.2.1 Service state diagram

Same as clause 9.2.1 of TS 101 376-4-7 [3].

9.2.2 Service primitives

Same as clause 9.2.2 of TS 101 376-4-7 [3].

9.3 Services provided by radio resource management entity for GMPRS services

Same as clause 9.3 of TS 101 376-4-7 [3].

9.3.1 Service primitives for GRR-SAP (A/Gb mode only)

Same as clause 9.3.1 of TS 101 376-4-7 [3].

9.3.2 Service primitives for GMMRR-SAP (A/Gb mode only)

Same as clause 9.3.2 of TS 101 376-4-7 [3].

9.3.3 Service primitives for RABMAS-SAP (Iu mode only)

Same as clause 9.3.3. of TS 124 007 [5].

9.3.4 Service primitives for GMMAS-SAP (Iu mode only)

Same as clause 9.3.4. of TS 124 007 [5].

9.4 Services provided by LLC entity for GMPRS services (A/Gb mode only)

Same as clause 9.4 of TS 101 376-4-7 [3].

9.5 Registration Services provided for GMPRS services

9.5.1 Service primitives for GMMSM-SAP

Same as clause 9.5.1 of TS 101 376-4-7 [3].

9.5.2 Void

9.5.3 Service primitives for GMMSMS-SAP

Same as clause 9.5.3 of TS 101 376-4-7 [3].

9.5.4 Service primitives for PMMSMS-SAP (Iu mode only)

Same as clause 9.5.4 of TS 124 007 [5].

9.5.5 Service primitives for GMMRABM-SAP (Iu mode only)

Same as clause 9.5.5 of TS 124 007 [5].

10 Interlayer service interfaces on the Network side

Same as clause 10 of TS 101 376-4-7 [3].

11 Standard layer 3 messages

Same as clause 11 of TS 101 376-4-7 [3].

11.1 Components of a standard layer 3 message

Same as clause 11.1 of TS 101 376-4-7 [3].

11.2 Imperative part of a standard layer 3 message

Same as clause 11.2 of TS 101 376-4-7 [3].

11.2.1 Protocol discriminator

Same as clause 11.2.1 of TS 101 376-4-7 [3].

11.2.2 Skip Indicator

Same as clause 11.2.2 of TS 101 376-4-7 [3].

11.2.3 Transaction identifier

Same as clause 11.2.3 of TS 101 376-4-7 [3].

11.2.4 Message type

Same as clause 11.2.4 of TS 101 376-4-7 [3].

11.2.5 Further information elements of the imperative part

Same as clause 11.2.5 of TS 101 376-4-7 [3].

11.3 Non-imperative part of a standard layer 3 message

Same as clause 11.3 of TS 101 376-4-7 [3].

11.4 Presence requirements of information elements

Same as clause 11.4 of TS 101 376-4-7 [3].

11.5 Handling of superfluous information

Same as clause 11.5 of TS 101 376-4-7 [3].

11.5.1 Information elements that are unnecessary in a message

Same as clause 11.5.1 of TS 101 376-4-7 [3].

Annex A (informative): MN-Services arrow diagram

Same as annex A of TS 101 376-4-7 [3].

Annex B (informative): Description of CSN.1

Same as annex B of TS 101 376-4-7 [3].

Annex C (informative): GPRS-Services sequence diagram

Same as annex C of TS 101 376-4-7 [3].

History

Document history		
V3.2.1	February 2011	Publication
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