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

Reference

RTS/SES-00423

Keywords

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The present document is part 5, sub-part 1 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 04.007";

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";

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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".

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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.

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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 specifications are not subject to this precedence rule. For example, a GMR 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 and 3GPP specifications are defined in ETSI TS 101 376-1-2 [7].

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1 Scope

The present document provides the description of the GMR-1 3G Packet Data Convergence Protocol (PDCP).

2 References

2.1 Normative 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 referenced document (including any amendments) applies.

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In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest release and the latest version of that document up to and including Release 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.

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[1] ETSI TS 123 060: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); Service description; Stage 2 (3GPP TS 23.060 Release 7)".

[2] ETSI TS 125 331 (Release 7): "Universal Mobile Telecommunications System (UMTS); Radio Resource Control (RRC); Protocol specification (3GPP TS 25.331 Release 7)".

[3] ETSI TS 125 322 (Release 7): "Universal Mobile Telecommunications System (UMTS); Radio Link Control (RLC) protocol specification (3GPP TS 25.322 Release 7)".

[4] IETF RFC 2507: "IP Header Compression".

[5] IETF RFC 3095: "RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP, and uncompressed".

[6] 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.

[7] 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".

[8] Recommendation ITU-T V.44 (11-2000): "Data compression procedures".

[9] IETF RFC 768 (August 1980): "User Datagram Protocol".

[10] IETF RFC 791 (September 1981): "Internet Protocol".

[11] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

2.2 Informative references

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[i.1] ETSI TS 125 401: "Universal Mobile Telecommunications System (UMTS); UTRAN overall description (3GPP TS 25.401 Release 7)".

[i.2] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications".

[i.3] ETSI TR 121 905: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Vocabulary for 3GPP Specifications (3GPP TR 21.905)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TR 121 905 [i.3], ETSI TS 101 376-1-2 [7] and the following apply:

N-context Refers collectively to both *N-context-C* and *N-context-D*

*N-context** Refers collectively to both *N-context-C** and *N-context-D**

N-context-C The compression context for downlink in RNC at any given point of time

N-context-C* The frozen snapshot of the compression context for downlink taken by RNC

N-context-C-static* The frozen snapshot of the static part of the compression context for downlink taken by RNC

N-context-D The decompression context for uplink in RNC at any given point of time

N-context-D* The frozen snapshot of the decompression context for uplink taken by RNC

N-context-D-static* The frozen snapshot of the static part of the decompression context for uplink taken by RNC

M-context Refers collectively to both *M-context-C* and *M-context-D*

*M-context** Refers collectively to both *M-context-C** and *M-context-D**

M-context-C The compression context for uplink in MES at any given point of time

M-context-C* The frozen snapshot of the compression context for uplink taken by MES

M-context-C-static* The frozen snapshot of the static part of the compression context for uplink taken by MES

M-context-D The decompression context for downlink in MES at any given point of time

M-context-D* The frozen snapshot of the decompression context for downlink taken by MES

M-context-D-static* The frozen snapshot of the static part of the decompression context for downlink taken by MES

M-HC Entity located in the mobile terminal that performs header compression for uplink (i.e. MES PDCP)

M-HCD Refers collectively to both *M-HC* and *M-HD*

M-HD Entity located in the mobile terminal that performs header decompression for downlink (i.e. MES PDCP)

N-HC Entity located in the network that performs header compression for downlink (i.e. RNC PDCP)

N-HCD Refers collectively to N-HC and N-HD

N-HD Entity located in the network that performs header decompression for uplink (i.e. RNC PDCP)

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3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 101 376-1-1 [6] and the following apply:

AS	Access Stratum
CID	Context Identifier
C-SAP	Control Service Access Point
GMR-1 3G LLA	GMR1-3G Lower Layer Assisted
HC	Header Compression
HCL	Header Compression Lower layer
HCU	Header compression Upper layer
IETF	Internet Engineering Task Force
IP	Internet Protocol
L2	Layer 2 (data link layer)
MBMS	Multimedia Broadcast Multicast Service
M-HC	Mobile Header Compressor
M-HCD	Mobile Header Compressor/Decompressor
M-HD	Mobile Header Decompressor
NAS	Non Access Stratum
N-HC	Network Header Compressor
N-HCD	Network Header Compressor/Decompressor
N-HD	Network Header Decompressor
PDCP	Packet Data Convergence Protocol
PDU	Protocol Data Unit
PID	Packet Identifier
PPP	Point-to-Point Protocol
RAB	Radio Access Bearer
RB	Radio Bearer
RFC	Request for Comments
RLC	Radio Link Control
RNC	Radio Network Controller
RoHC LLA	Robust Header Compression Link Layer Assisted
RoHC	Robust Header Compression
RTP	Real Time Protocol
SDU	Service Data Unit
SE-VoIP	Spectrally Efficient Voice over IP
SIP	Session Initiation Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial Radio Access Network

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4 General

4.1 Objective

The present document describes the functionality of the GMR-1 3G Packet Data Convergence Protocol (PDCP).

4.2 Overview on Sublayer Architecture

Figure 1 shows the model of the PDCP within the radio interface protocol architecture. The PDCP sublayer is defined for the PS domain only.

Every PS domain Radio Access Bearer (RAB) is associated with one Radio Bearer (RB), which in turn, is associated with one PDCP entity. Each PDCP entity is associated with one or two (one for each direction) RLC entities depending on the RB characteristic (i.e. unidirectional or bidirectional) and RLC mode. The PDCP entities are located in the PDCP sublayer.