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Technical Specification

**GEO-Mobile Radio Interface Specifications (Release 3);
Third Generation Satellite Packet Radio Service;
Part 4: Radio interface protocol specifications;
Sub-part 14: Mobile Earth Station (MES) -
Base Station System (BSS) interface; Radio Link Control
/Medium Access Control (RLC/MAC) protocol; lu Mode;
GMR-1 3G 44.160**

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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 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 14 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";

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

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

Sub-part 4: "Layer 1 General Requirements";

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

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

Sub-part 7: "Mobile Radio Interface Signalling Layer 3 General Aspects";

Sub-part 8: "Mobile Radio Interface Layer 3 Specifications";

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

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

- Sub-part 11: "Radio Link Protocol (RLP) for Data Services";
- Sub-part 12: "Mobile Earth Station (MES) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol";
- Sub-part 13: "Radio Resource Control (RRC) protocol; Iu Mode";
- Sub-part 14: "Mobile Earth Station (MES) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol; Iu Mode";**
- 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.yy (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 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 or 3GPP specifications is defined in GMR-1 3G 41.201 [2].

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<https://standards.iteh.ai/catalog/standards/sist/f7280b7d-e409-4d6e-a4e0-52168387abd0/etsi-ts-101-376-4-14-v3.1.1-2009-07>

1 Scope

1.1 General

The present document specifies procedures for the following layers of the radio interface (*Um* reference point), the interface between the GSM/EDGE Radio Access Network (GERAN) and the Mobile Station (MS) in GERAN *Iu mode*:

- Radio Link Control (RLC).
- Medium Access Control (MAC), including Physical Link Control functions.

1.2 Related documents

The following documents provide information related to the present document:

- GMR-1 3G 43.051 [9] is an overall description of the GSM/EDGE Radio Access Network (GERAN) in *Iu mode*.
- GMR-1 04.004 [3] specifies services offered by the physical layer of the *Um* reference point. It also specifies control channels. RLC and MAC use these services and control channels.
- GMPRS-1 04.007 [13] specifies, in general terms, this protocol's structured functions, its procedures and its relationship with other layers and entities. It also specifies the basic message format and error handling applied by layer 3 protocols.
- GMR-1 3G 44.118 [4] specifies the RRC procedures when operating in *Iu mode*.
- GMR-1 3G 44.060 [10] specifies RLC/MAC procedures specific to *A/Gb mode* as well as the procedures that are common to both *A/Gb mode* and *Iu mode*. It also specifies the messages and Information Elements for both modes.

1.3 Use of logical control channels

GMR-1 3G 45.002 [5] defines the following logical control channels:

- Broadcast Control Channel (BCCH): downlink only, used to broadcast Cell specific information.
- Packet Random Access Channel (PRACH): uplink only, used to request GPRS resources.
- Packet Access Grant Channel (PAGCH): downlink only, used to allocate GPRS resources.
- Packet Associated Control Channel (PACCH): bi-directional, associated with a Temporary Block Flow (TBF).
- Packet Timing advance control channel uplink (PTCCH/U): used to transmit random access bursts to allow estimation of the timing advance for one MS in transfer state.
- Packet Timing advance control channel downlink (PTCCH/D): used to transmit timing advance updates for several MS. One PTCCH/D is paired with several PTCCH/Us.

1.4 Use of logical traffic channels

GMR-1 3G 45.002 [5] defines the following logical traffic channels used by RLC and MAC:

- Dedicated Traffic Channel (DTCH): bidirectional, carries encoded speech on a dedicated channel (DCH).
- Packet Data Traffic Channel (PDTCH): downlink or uplink, carries user data.

1.4a Use of transport channels

FLO is not supported in GMR-1 3G.

1.5 Conventions

Unless explicitly stated otherwise, the following conventions apply:

- The notations "further study", "FS" or "FFS" indicate the annotated text is not normative.

2 References

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

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

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 indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] 3GPP TR 21.905 (ETSI TR 121 905): "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications".
- [2] GMR-1 3G 41.201 (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".
- [3] GMR-1 04.004: (ETSI TS 101 376-4-4): "GEO-Mobile Radio Interface Specifications; Part 4: Radio interface protocol specifications; Sub-part 4: Layer 1 General Requirements".

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

- [4] GMR-1 3G 44.118: (ETSI TS 101 376-4-13): "GEO-Mobile Radio Interface Specifications (Release 3); Third Generation Satellite Packet Radio Service; Part 4: Radio interface protocol specifications; Sub-part 13: Radio Resource Control (RRC) protocol; Iu Mode".
- [5] GMR-1 3G 45.002: (ETSI TS 101 376-5-2): "GEO-Mobile Radio Interface Specifications (Release 3); Third Generation Satellite Packet Radio Service; Part 5: Radio interface physical layer specifications; Sub-part 2: Multiplexing and Multiple Access; Stage 2 Service Description".
- [6] GMR-1 3G 45.003: (ETSI TS 101 376-5-3): "GEO-Mobile Radio Interface Specifications (Release 3); Third Generation Satellite Packet Radio Service; Part 5: Radio interface physical layer specifications; Sub-part 3: Channel Coding".