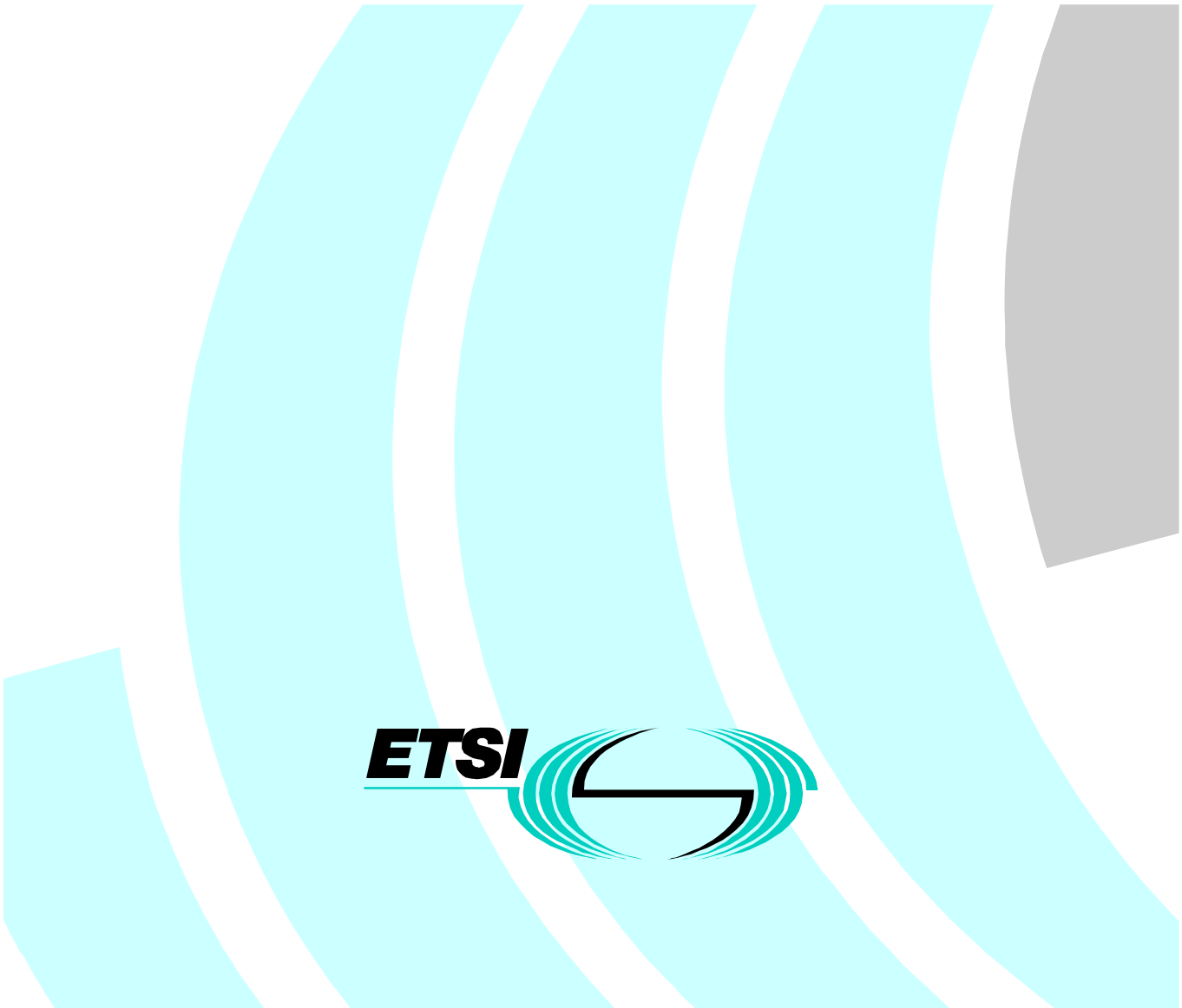
ETSI TS 101 377-1-2 V1.1.1 (2001-03)

Technical Specification

GEO-Mobile Radio Interface Specifications;
Part 1: General specifications;
Sub-part 2: Introduction to the GMR-2 family of specifications;
GMR-2 01.201



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Contents

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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

IPR Owner: Hughes Network Systems
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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 1, sub-part 2 of a multi-part deliverable covering the GEO-Mobile Radio Interface Specifications, as identified below:

Part 1: "General specifications";

Sub-part 1: "Abbreviations and Acronyms; GMR-2 01.004";

Sub-part 2: "Introduction to the GMR-2 family of specifications; GMR-2 01.201";

Sub-part 3: "GMR-2 General System Requirements; GMR-2 01.202";

Part 2: "Service specifications";

Part 3: "Network specifications";

Part 4: "Radio interface protocol specifications";

Part 5: "Radio interface physical layer specifications";

Part 6: "Speech coding 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 provides an introduction to the GMR-2 series of technical specifications. Where possible, terminology used throughout the GMR-2 series of Technical Specifications has been derived from the ETSI GSM specifications. For ease of reference a GSM to GMR-2 terminology cross-reference is also provided in the present document.

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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[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; GMR-2 01.004".

3 Abbreviations

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

4 GEO Mobile Radio Interface specifications (GMR-2)

4.1 Origins and scope of the GMR-2 family of specifications

The GEO-Mobile Radio Interface Specifications (GMR-2) are a collection of individual specifications which document the requirements necessary for successful two-way communication between a Mobile Earth Station (MES), the Satellite, Gateway and the Network Control Centre (NCC). The user MES may be a handheld, mobile or fixed terminal.

The GMR-2 communications waveform is based upon the GSM (Global Systems Mobile) standard and the GMR-2 series of specifications have, accordingly, been derived from existing ETSI GSM standards, adapted to enable satellite mode "spotbeam" communication services.

These GMR-2 technical specifications document the radio interface requirements between the MES, the Satellite, Gateway, and the NCC. As such, the scope of these specifications has been limited to the GMR-2 modified GSM waveform and does not include for example, operational communications between a Gateway and the Satellite i.e. spacecraft telemetry, tracking and command, and inter-station communications, which are considered to be system specific.

The GMR-2 family of specifications includes details of the first three OSI layers of the radio interface:

- the physical layer (L1);
- the data link layer (L2);
- the network layer (L3).

The current release of GMR-2 specifies physical layer (RF interface), Network and MES protocol requirements and details related to speech processing functions.

4.2 Contents of GMR-2 family of specifications

The complete contents of the GMR-2 family of specifications are given in annex A.

Where appropriate the GMR-2 specifications include references to the corresponding GSM specifications. The relationship between the GMR-2 specifications and the corresponding GSM specifications is defined in annex A using the terminology defined in table 1.

Table 1: GMR-2 specifications

Terminology	Definition
GSM applies	This feature is identical to GSM and hence the associated GSM specification applies.
GMR specific	This GMR specification describes a new GMR feature that has no equivalent feature in GSM
Replaces GSM	The GMR specification is a replacement for the associated GSM specification. The GMR specification may make reference to the associated GSM specification.
NOTE 1: The associated GSM specification (if any) is directly indicated by the document number as described in clause 4.4. NOTE 2: In the case of "GSM applies" or "Replaces GSM" the terminology translation defined in clause 5 should be applied when reading the associated GSM specification.	

4.3 Structure of the GMR-2 document series

The GMR-2 family of specifications are organized in document series that correspond to the GSM document structure as follows:

- 01-series; General specifications;
- 02-series; Service specifications;
- 03-series; Network specifications;
- 04-series; Radio interface protocol specifications;
- 05-series; Radio interface physical layer specifications;
- 06-series; Speech coding specifications;
- 07-series; Terminal adapter specifications.

4.4 Numbering of GMR-2 specifications

With the exception of GMR-2 specific documents i.e. those for which no equivalent GSM specification exists, the GMR-2 document numbers can be associated easily with the original GSM specification, for example, GSM 03.01 is associated with GMR-2 03.001. All GMR-2 and GMR-2 documents follow the same numbering format as described in the Introduction clause to the present document. Note however that the GMR documents allow for 3 digits to be used following the 2-digit series identifier. This is to enable a GMR-2 document, for which no equivalent GSM document exists, to be numbered accordingly e.g. this GMR-2 01 series document is numbered GMR-2 01.201 because there is no direct equivalent GSM series document.

4.5 Terminology

A terminology translator, in addition to a comprehensive list of abbreviations, is given in GMR-2 01.004 [1]. This translator is important because there are several GMR-2 acronyms used throughout these specifications that equate to similar, but not identical, GSM network functions. For the reader's convenience, table 2 provides the GSM to GMR-2 terminology translator.

Table 2: GSM/GMR-2 system terminology translator

Existing GSM Acronym	Equivalent GMR-2 Acronym and Meaning
BTS	GTS = Gateway Transceiver Subsystem This comprises the Gateway Antenna and Radio (GAR) subsystem and the Traffic Channel Equipment (TCE)
BSC	GSC = Gateway Station Controller
BSS (= BTS + BSC)	GWS = GateWay Subsystem
MSC	MSC
BSS + MSC	GW = GateWay (GWS + MSC)
PLMN	PSMN = Public Satellite Mobile Network. The PSMN includes the core links between the Gateway(s) and the GSM PLMN.
MS	MES = Mobile Earth Station

Annex A (informative): Contents of the GMR-2 family

A.1 Contents of the 01-series

GMR number	GSM number	Short title	Comment
01.004		Abbreviations and acronyms	Replaces GSM
01.201		Introduction to the GMR-2 family.	GMR specific
01.202		GMR-2 General System Description	GMR specific

A.2 Contents of the 02-series

GMR number	GSM number	Short title	Comment
	02.01	Principles of Telecommunication Services Supported by a GSM Public Land Mobile Network(PLMN)	GSM applies
	02.02	Bearer Services (BS) Supported by a GSM Public Land Mobile Network (PLMN)	GSM applies
02.003		Teleservices Supported by a GSM Public Land Mobile Network (PLMN)	Replaces GSM
02.004		General on Supplementary Services	Replaces GSM
02.009		Security Aspects	Replaces GSM
02.011		Service Accessibility	Replaces GSM
	02.16	International Mobile Station Equipment Identities (IMEI)	GSM applies
	02.17	Subscriber Identity Modules, Functional Characteristics	GSM applies
	02.40	Procedures for Call Progress Indications	GSM applies
02.041		Operator Determined Barring	Replaces GSM
	02.81	Line Identification Supplementary Services- Stage 1	GSM applies
	02.82	Call Forwarding (CF) Supplementary Services - Stage 1	GSM applies
02.083		Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 1	Replaces GSM
02.084		MultiParty (MPTY) Supplementary Services - Stage 1	Replaces GSM
	02.85	Closed User Group (CUG) Supplementary Services - Stage 1	GSM applies
02.088		Call Barring (CB) Supplementary Services - Stage 1	Replaces GSM
	02.90	Stage 1 Decision of Unstructured Supplementary Service Data (USSD)	GSM applies

A.3 Contents of the 03-series

GMR number	GSM number	Short title	Comment
03.001		Network functions	Replaces GSM
03.002		Network architecture	Replaces GSM
03.003		Numbering, addressing and identification	Replaces GSM
	03.04	Signalling Requirements Relating to Routing of Calls to Mobile Subscribers	GSM applies
03.007		Restoration Procedures	Replaces GSM
03.008		Organization of subscriber data	Replaces GSM
	03.10	GMR network connection types	GSM applies
03.011		Technical realization of supplementary services	Replaces GSM
03.012		Location registration and position identification procedures	Replaces GSM
03.013		Discontinuous Reception (DRX) in the GMR-2 system	Replaces GSM
	03.14	Support of Dual Tone Multi-Frequency signalling (DTMF) via the GMR-2 system	GSM applies
03. 015		Technical Realization of Operator Determined Barring	Replaces GSM
	03.16	Subscriber Data Management	GSM applies
03.020		Security related network functions	Replaces GSM
03.022		Functions Related to the Mobile Earth Station (MES) in Idle Mode	Replaces GSM
	03.38	Alphabets and Language Specific Information for GSM	GSM applies
	03.040	Technical realization of the Short Message Service (SMES) Point-to-Point (PP)	GSM applies
	03.41	Technical realization of the Short Message Service Cell Broadcast (SMSCB)	GSM applies
03.045		Technical realization of group 3 facsimile using transparent mode of transmission	Replaces GSM
03.050		Transmission planning aspects of the speech service in the GMR-2 system	Replaces GSM
	0370	Routing of Calls to/from Public Data Networks (PDN)	GSM applies
	03.81	Line identification supplementary services – Stage 2	GSM applies
	03.82	Call Forwarding (CF) Supplementary Services - Stage 2	GSM applies
03.083		Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2	Replaces GSM
03.084		Multi Party (MPTY) Supplementary Services - Stage 2	Replaces GSM
	03.85	Closed user Group (CUG) Supplementary Services - Stage 2	GSM applies
03.088		Call Barring (CB) supplementary services – Stage 2	Replaces GSM
	03.90	Unstructured Supplementary Service Data (USSD) – Stage 2	GSM applies

A.4 Contents of the 04-series

GMR number	GSM number	Short title	Comment
04.001		Mobile Station - Base Station System (MS - BSS) Interface General Aspects and Principles	Replaces GSM
	04.02	GSM Public Land Mobile Network (PLMN) Access Reference Configuration	GSM applies
04.003		Mobile Station - Base Station System (MS - BSS) Interface Channel Structures and Access Capabilities	Replaces GSM
04.004		Layer 1 - General Requirements	Replaces GSM
04.005		Data Link (DL) Layer General Aspects	Replaces GSM
04.006		Mobile Station - Base Stations System (MS – BSS) Interface Data Link (DL) Layer Specification	Replaces GSM
04.007		Mobile Radio Interface Signalling Layer 3 - General Aspects	Replaces GSM
04.008		Mobile Radio Interface - Layer 3 Specification	Replaces GSM
	04.10	Mobile Radio Interface Layer 3 - Supplementary Services Specification - General Aspects	GSM applies
04.011		Point-to-Point (PP) Short Message Service (SMS) Support on Mobile Radio Interface	GSM applies
	04.12	Short Message Service Cell Broadcast (SMSCB) Support on the Mobile Radio Interface	GSM applies
04.013		Performance Requirements on Mobile Radio Interface	Replaces GSM
04.021		Rate Adaption on the Mobile Station - Base Station System (MS-BSS) Interface	Replaces GSM
	04.22	Radio Link Protocol (RLP) for Data and Telematic Services on the (MS-BSS) Interface and the Base Station System - Mobile-services Switching Centre (BSS-MSC) Interface	GSM applies
	04.80	Mobile Radio Interface Layer 3 - Supplementary Services Specification Formats and Coding	GSM applies
	04.81	Line Identification Supplementary Services - Stage 3	GSM applies
	04.82	Call Forwarding (CF) Supplementary Services - Stage 3	GSM applies
04.083		Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 3	Replaces GSM
04.084		Multi Party (MPTY) Supplementary Services - Stage 3	Replaces GSM
	04.85	Closed User Group (CUG) Supplementary Services - Stage 3	GSM applies
04.088		Call Barring (CB) Supplementary Services - Stage 3	Replaces GSM
	04.90	Unstructured Supplementary Service Data (USSD)	GSM applies
04.201		Technical Realization of the Early Flag Technique	GMR specific

A.5 Contents of the 05-series

GMR number	GSM number	Short title	Comment
05.001		Physical Layer on the Radio Path (General Description)	Replaces GSM
05.002		Multiplexing and Multiple Access on the Radio Path	Replaces GSM
05.003		Channel Coding	Replaces GSM
05.004		Modulation	Replaces GSM
05.005		Radio Transmission and Reception	Replaces GSM
05.008		Radio Subsystem Link Control	Replaces GSM
05.010		Radio Subsystem Synchronization	Replaces GSM

A.6 Contents of the 06-series

GMR number	GSM number	Short title	Comment
06.001		Basic Rate Speech Processing Functions	Replaces GSM

History

Document history		
V1.1.1	March 2001	Publication