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Digital cellular telecommunications system (Phase 2+) (GSM); General Packet Radio Service (GPRS); Service description; Stage 2 (GSM 03.60 version 6.3.2 Release 1997)

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**Digital cellular telecommunications system (Phase 2+);
General Packet Radio Service (GPRS);
Service description;
Stage 2
(GSM 03.60 version 6.3.2 Release 1997)**

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GSM®
GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS

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Contents

Intellectual Property Rights.....	8
Foreword	8
1 Scope.....	9
2 References.....	9
3 Definitions, abbreviations and symbols.....	11
3.1 Definitions	11
3.2 Abbreviations.....	11
3.3 Symbols	12
4 Main Concepts	13
5 General GPRS Architecture and Transmission Mechanism.....	14
5.1 GPRS Access Interfaces and Reference Points.....	14
5.2 Network Interworking.....	14
5.2.1 PSPDN Interworking.....	15
5.2.2 Internet (IP) Interworking	15
5.3 High-Level Functions Required for GPRS	15
5.3.1 Network Access Control Functions.....	15
5.3.1.1 Registration Function.....	16
5.3.1.2 Authentication and Authorisation Function.....	16
5.3.1.3 Admission Control Function.....	16
5.3.1.4 Message Screening Function.....	16
5.3.1.5 Packet Terminal Adaptation Function.....	16
5.3.1.6 Charging Data Collection Function.....	16
5.3.2 Packet Routing and Transfer Functions.....	16
5.3.2.1 Relay Function.....	16
5.3.2.2 Routing Function.....	16
5.3.2.3 Address Translation and Mapping Function.....	17
5.3.2.4 Encapsulation Function	17
5.3.2.5 Tunnelling Function.....	17
5.3.2.6 Compression Function.....	17
5.3.2.7 Ciphering Function.....	17
5.3.2.8 Domain Name Server Function	17
5.3.3 Mobility Management Functions.....	17
5.3.4 Logical Link Management Functions.....	17
5.3.4.1 Logical Link Establishment Function.....	17
5.3.4.2 Logical Link Maintenance Functions.....	18
5.3.4.3 Logical Link Release Function	18
5.3.5 Radio Resource Management Functions	18
5.3.5.1 Um Management Function	18
5.3.5.2 Cell Selection Function.....	18
5.3.5.3 Um-tranx Function.....	18
5.3.5.4 Path Management Function	18
5.3.6 Network Management Functions.....	18
5.4 Logical Architecture	18
5.4.1 GPRS Support Nodes.....	19
5.4.2 GPRS Backbone Networks	19
5.4.3 HLR.....	20
5.4.4 SMS-GMSC and SMS-IWMSC.....	20
5.4.5 GPRS Mobile Stations	20
5.5 Assignment of Functions to General Logical Architecture	21
5.6 Transmission and Signalling Planes.....	22
5.6.1 Transmission Plane	22
5.6.2 Signalling Plane.....	23
5.6.2.1 MS - SGSN.....	23

5.6.2.2	SGSN - HLR.....	23
5.6.2.3	SGSN - MSC/VLR	24
5.6.2.4	SGSN - EIR.....	24
5.6.2.5	SGSN - SMS-GMSC or SMS-IW MSC	24
5.6.2.6	GSN - GSN.....	25
5.6.2.7	GGSN - HLR.....	25
5.6.2.7.1	MAP-based GGSN - HLR Signalling	25
5.6.2.7.2	GTP and MAP-based GGSN - HLR Signalling.....	26
6	Mobility Management Functionality	26
6.1	Definition of Mobility Management States.....	26
6.1.1	IDLE (GPRS) State.....	26
6.1.2	STANDBY State.....	26
6.1.3	READY State.....	27
6.2	IDLE / STANDBY / READY State Functionality.....	28
6.2.1	State Transitions and Functions.....	28
6.2.2	READY Timer Function	30
6.2.3	Periodic RA Update Timer Function.....	30
6.2.4	Mobile Reachable Timer Function.....	30
6.3	Interactions Between SGSN and MSC/VLR.....	31
6.3.1	Administration of the SGSN - MSC/VLR Association	31
6.3.2	Combined RA / LA Updating.....	32
6.3.3	CS Paging.....	32
6.3.3.1	Paging Co-ordination.....	33
6.3.4	Non-GPRS Alert	34
6.3.5	MS Information Procedure.....	34
6.3.6	MM Information Procedure.....	35
6.4	MM Procedures	35
6.5	Attach Function.....	36
6.6	Detach Function.....	39
6.6.1	MS-Initiated Detach Procedure.....	40
6.6.2	Network-Initiated Detach Procedure.....	40
6.6.2.1	SGSN-Initiated Detach Procedure.....	40
6.6.2.2	HLR-Initiated Detach Procedure.....	41
6.7	Purge Function.....	41
6.8	Security Function.....	42
6.8.1	Authentication of Subscriber.....	42
6.8.2	User Identity Confidentiality.....	43
6.8.2.1	P-TMSI Signature.....	43
6.8.2.2	P-TMSI Reallocation Procedure.....	43
6.8.3	User Data and GMM/SM Signalling Confidentiality	43
6.8.3.1	Scope of Cipherring	43
6.8.3.2	GPRS Cipherring Algorithm.....	44
6.8.4	Identity Check Procedures.....	44
6.9	Location Management Function.....	44
6.9.1	Location Management Procedures	45
6.9.1.1	Cell Update Procedure.....	45
6.9.1.2	Routeing Area Update Procedure	45
6.9.1.2.1	Intra SGSN Routeing Area Update	46
6.9.1.2.2	Inter SGSN Routeing Area Update	47
6.9.1.3	Combined RA / LA Update Procedure	49
6.9.1.3.1	Combined Intra SGSN RA / LA Update	49
6.9.1.3.2	Combined Inter SGSN RA / LA Update	51
6.9.1.4	Periodic RA and LA Updates	54
6.10	Subscriber Management Function.....	54
6.10.1	Subscriber Management Procedures	54
6.10.1.1	Insert Subscriber Data Procedure	54
6.10.1.2	Delete Subscriber Data Procedure.....	55
6.11	Classmark Handling.....	55
6.11.1	Radio Access Classmark	55
6.11.2	SGSN Classmark.....	56

7	Network Management Functionality.....	56
8	Radio Resource Functionality.....	56
8.1	Cell Selection and Reselection.....	56
8.2	Discontinuous Reception.....	57
8.3	Radio Resource Management.....	57
8.3.1	Layer Functions.....	57
8.3.2	Model of Operation.....	57
8.3.2.1	Dynamic Allocation of Radio Resources.....	57
8.4	Paging for GPRS Downlink Transfer.....	57
9	Packet Routing and Transfer Functionality.....	58
9.1	Definition of Packet Data Protocol States.....	58
9.1.1	INACTIVE State.....	58
9.1.2	ACTIVE State.....	59
9.2	PDP Context Activation, Modification, and Deactivation Functions.....	59
9.2.1	Static and Dynamic PDP Addresses.....	60
9.2.2	Activation Procedures.....	60
9.2.2.1	PDP Context Activation Procedure.....	60
9.2.2.2	Network-Requested PDP Context Activation Procedure.....	61
9.2.2.2.1	Successful Network-Requested PDP Context Activation Procedure.....	62
9.2.2.2.2	Unsuccessful Network-Requested PDP Context Activation Procedure.....	63
9.2.2.3	Anonymous Access PDP Context Activation Procedure.....	64
9.2.3	Modification Procedures.....	66
9.2.3.1	PDP Context Modification Procedure.....	66
9.2.4	Deactivation Procedures.....	67
9.2.4.1	PDP Context Deactivation Initiated by MS Procedure.....	67
9.2.4.2	PDP Context Deactivation Initiated by SGSN Procedure.....	67
9.2.4.3	PDP Context Deactivation Initiated by GGSN Procedure.....	68
9.2.4.4	Anonymous Access PDP Context Deactivation Initiated by MS Procedure.....	68
9.2.4.5	Anonymous Access PDP Context Deactivation Initiated by GGSN Procedure.....	68
9.3	Packet Routing and Transfer Function.....	69
9.4	Relay Function.....	70
9.5	Packet Terminal Adaptation Function.....	70
9.6	Encapsulation Function.....	70
9.6.1	Encapsulation Between SGSN and GGSN.....	70
9.6.2	Encapsulation Between SGSN and MS.....	70
10	Message Screening Functionality.....	71
11	Compatibility Issues.....	71
12	Transmission.....	71
12.1	Transmission Modes.....	71
12.1.1	GTP Transmission Modes.....	71
12.1.2	LLC Transmission Modes.....	71
12.1.3	RLC Transmission Modes.....	72
12.2	Logical Link Control Functionality.....	72
12.2.1	Addressing.....	72
12.2.2	Services.....	72
12.2.3	Functions.....	72
12.3	Subnetwork Dependent Convergence Functionality.....	73
12.3.1	Services.....	73
12.3.2	Subfunctions.....	74
12.4	Gb Interface.....	74
12.4.1	Physical Layer Protocol.....	74
12.4.2	Link Layer Protocols.....	75
12.4.3	BSS GPRS Protocol.....	75
12.4.3.1	Inter-dependency of the BSSGP and LLC Functions.....	75
12.4.3.2	BSSGP Addressing.....	76
12.4.3.3	BVCI Contexts in BSS and in SGSN.....	76
12.4.3.4	Flow Control Between SGSN and BSS over the Gb Interface.....	76

12.5	Abis Interface.....	77
12.5.1	Remote Packet Control Unit.....	78
13	Information Storage	78
13.1	HLR	78
13.2	SGSN	80
13.3	GGSN	81
13.4	MS	82
13.5	MSC/VLR.....	83
13.6	Recovery and Restoration Procedures	83
13.6.1	HLR Failure	83
13.6.2	SGSN Failure	84
13.6.3	GGSN Failure.....	84
13.6.4	VLR Failure	84
14	Identities.....	84
14.1	IMSI.....	84
14.2	Packet TMSI.....	85
14.3	NSAPI and TLLI	85
14.4	PDP Address.....	86
14.5	TID	86
14.6	Routeing Area Identity.....	86
14.7	Cell Identity	86
14.8	GSN Addresses.....	87
14.8.1	GSN Address.....	87
14.8.2	GSN Number.....	87
14.9	Access Point Name.....	87
15	Operational Aspects.....	87
15.1	Charging	87
15.1.1	Charging Information	87
15.1.2	Reverse Charging	88
15.2	Quality of Service Profile.....	88
15.2.1	Precedence Class.....	89
15.2.2	Delay Class.....	89
15.2.3	Reliability Class	89
15.2.4	Throughput Classes.....	90
15.2.4.1	Peak Throughput Class	90
15.2.4.2	Mean Throughput Class.....	90
16	Interactions with Other GSM Services	91
16.1	Point-to-point Short Message Service.....	91
16.1.1	Mobile-terminated SMS Transfer.....	92
16.1.1.1	Unsuccessful Mobile-terminated SMS Transfer	92
16.1.2	Mobile-originated SMS Transfer	94
16.2	Circuit-switched Services.....	94
16.3	Supplementary Services.....	95

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Annex A (normative):	GGSN Selection Decision Tree	96
A.1	Definitions.....	96
A.2	APN (R)	96
A.3	APN Selection Rules.....	96
Annex B (informative):	Data Transmission Routeing Examples.....	100
B.1	Data Routeing for an MS in its Home PLMN to and from an External PDN	100
B.2	Data Routeing for a Roaming MS to and from an External PDN.....	101
B.3	MS-to-MS Data Routeing via the Same GGSN.....	101
B.4	MS-to-MS Data Routeing via Different GGSNs	102
Annex C (informative):	Figures	103
Annex D (informative):	Tables.....	105
Annex E (informative):	Document history.....	106
History		107

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Foreword

This European Standard (Telecommunications series) has been produced by the Special Mobile Group (SMG).

The present document defines the stage-2 service description for a General Packet Radio Service (GPRS) within the digital cellular telecommunications system (Phase 2+).

The contents of the present document are subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document it will then be re-submitted for OAP with an identifying change of release date and an increase in version number as follows:

Version 6.x.y

where:

- 6 indicates GSM Release 1997 of Phase 2+
- x the second digit is incremented for **changes of substance**, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated in the specification.

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1 Scope

The present document defines the stage-2 service description for a General Packet Radio Service (GPRS) on GSM. CCITT I.130 [29] describes a three-stage method for characterisation of telecommunication services, and CCITT Q.65 [31] defines stage 2 of the method.

This version of the stage-2 service description covers the first phase of GPRS, and does not meet all the services and functionality described in GSM 02.60 [3]. An update to the present document to meet all the services and functionality in GSM 02.60 is foreseen.

The present document does not cover the lower layers of the GPRS GSM radio interface. GSM 03.64 [11] contains an overall description of the radio interface.

The present document does not cover the GPRS point-to-multipoint services. GSM 03.61 [9] contains the PTM multicast stage-2 service description. GSM 03.62 [10] contains the PTM group call stage-2 service description.

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, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

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 - [2] GSM 01.61: "Digital cellular telecommunications system (Phase 2+); GPRS ciphering algorithm requirements".
 - [3] GSM 02.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Service description; Stage 1".
 - [4] GSM 03.03: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".
 - [5] GSM 03.07: "Digital cellular telecommunications system (Phase 2+); Restoration procedures".
 - [6] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".
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 - [9] GSM 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".
 - [10] GSM 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".
 - [11] GSM 03.64: "Digital cellular telecommunications system (Phase 2+); Overall description of the General Packet Radio Service (GPRS) Radio interface; Stage 2".

- [12] GSM 04.07: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3; General aspects".
- [13] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [14] GSM 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol".
- [15] GSM 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Logical Link Control (LLC)".
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- [19] GSM 08.14: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface layer 1".
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- [29] CCITT Recommendations I.130: "General modelling methods – Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".
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- [34] CCITT Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [35] CCITT Recommendation X.28: "DTE / DCE interface for a start-stop mode data terminal equipment accessing the packet assembly / disassembly facility (PAD) in a public data network situated in the same country".
- [36] CCITT Recommendation X.29: "Procedures for the exchange of control information and user data between a packet assembly / disassembly (PAD) facility and a packet mode DTE or another PAD".
- [37] CCITT Recommendation X.75: "Packet-switched signalling system between public networks providing data transmission services".
- [38] CCITT Recommendation X.121: "International Numbering Plan for Public Data Networks".
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- [41] IETF RFC 792 (1981): "Internet Control Message Protocol" (STD 5).
- [42] IETF RFC 793 (1981): "Transmission Control Protocol" (STD 7).
- [43] IETF RFC 1034 (1987): "Domain Names – Concepts and Facilities" (STD 7).

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3 Definitions, abbreviations and symbols

3.1 Definitions

Refer to GSM 02.60.

3.2 Abbreviations

For the purposes of the present document the following abbreviations apply. Additional applicable abbreviations can be found in GSM 01.04 [1].

AA	Anonymous Access
APN	Access Point Name
ATM	Asynchronous Transfer Mode
BG	Border Gateway
BSSAP+	Base Station System Application Part +
BSSGP	Base Station System GPRS Protocol
BVCI	BSSGP Virtual Connection Identifier
CCU	Channel Codec Unit
CGI	Cell Global Identification
CS	Circuit Switched
DNS	Domain Name System
GGSN	Gateway GPRS Support Node
GMM/SM	GPRS Mobility Management and Session Management
GSN	GPRS Support Node
GTP	GPRS Tunnelling Protocol

ICMP	Internet Control Message Protocol
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISP	Internet Service Provider
LL-PDU	LLC PDU
LLC	Logical Link Control
MAC	Medium Access Control
MNRF	Mobile station Not Reachable Flag
MNRG	Mobile station Not Reachable for GPRS flag
MNRR	Mobile station Not Reachable Reason
MTP2	Message Transfer Part layer 2
MTP3	Message Transfer Part layer 3
NGAF	Non-GPRS Alert Flag
NS	Network Service
NSAPI	Network layer Service Access Point Identifier
NSS	Network SubSystem
P-TMSI	Packet TMSI
PCU	Packet Control Unit
PDCH	Packet Data Channel
PDN	Packet Data Network
PDP	Packet Data Protocol, e.g., IP or X.25 [34]
PDU	Protocol Data Unit
PPF	Paging Proceed Flag
PTM	Point To Multipoint
PTP	Point To Point
PVC	Permanent Virtual Circuit
RA	Routeing Area
RAC	Routeing Area Code
RAI	Routeing Area Identity
RLC	Radio Link Control
SGSN	Serving GPRS Support Node
SM	Short Message
SM-SC	Short Message service Service Centre
SMS-GMSC	Short Message Service Gateway MSC
SMS-IW MSC	Short Message Service Interworking MSC
SN-PDU	SNDCP PDU
SNDC	SubNetwork Dependent Convergence
SNDCP	SubNetwork Dependent Convergence Protocol
TCAP	Transaction Capabilities Application Part
TCP	Transmission Control Protocol
TID	Tunnel Identifier
TLLI	Temporary Logical Link Identity
TRAU	Transcoder and Rate Adaptor Unit
UDP	User Datagram Protocol

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[SIST EN 301 344 V6.3.2:2005](https://standards.iteh.ai/catalog/standards/sist/9ee474b9-c1b5-4203-b1e8-11d1-3592f4/sist-en-301-344-v6-3-2-2005)

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3.3 Symbols

For the purposes of the present document the following symbols apply:

Gb	Interface between an SGSN and a BSS.
Gc	Interface between a GGSN and an HLR.
Gd	Interface between a SMS-GMSC and an SGSN, and between a SMS-IW MSC and an SGSN.
Gf	Interface between an SGSN and an EIR.
Gi	Reference point between GPRS and an external packet data network.

Gn	Interface between two GSNs within the same PLMN.
Gp	Interface between two GSNs in different PLMNs. The Gp interface allows support of GPRS network services across areas served by the co-operating GPRS PLMNs.
Gr	Interface between an SGSN and an HLR.
Gs	Interface between an SGSN and an MSC/VLR.
kbit/s	Kilobits per second.
R	Reference point between a non-ISDN compatible TE and MT. Typically this reference point supports a standard serial interface.
Um	Interface between the mobile station (MS) and the GPRS fixed network part. The Um interface is the GPRS network interface for providing packet data services over the radio to the MS. The MT part of the MS is used to access the GPRS services through this interface.

4 Main Concepts

GPRS uses a packet-mode technique to transfer high-speed and low-speed data and signalling in an efficient manner. GPRS optimises the use of network and radio resources. Strict separation between the radio subsystem and network subsystem is maintained, allowing the network subsystem to be reused with other radio access technologies. GPRS does not mandate changes to an installed MSC base.

New GPRS radio channels are defined, and the allocation of these channels is flexible: from 1 to 8 radio interface timeslots can be allocated per TDMA frame, timeslots are shared by the active users, and up and downlink are allocated separately. The radio interface resources can be shared dynamically between speech and data services as a function of service load and operator preference. Various radio channel coding schemes are specified to allow bitrates from 9 to more than 150 kbit/s per user.

Applications based on standard data protocols are supported, and interworking is defined with IP networks and X.25 networks. Specific point-to-point and point-to-multipoint services are supported for applications such as traffic telematics and UIC train control. GPRS allows SMS transfer over GPRS radio channels.

GPRS is designed to support from intermittent and bursty data transfers through to occasional transmission of large volumes of data. Several quality of service profiles are supported. GPRS is designed for fast reservation to begin transmission of packets, typically 0,5 to 1 second. Charging should typically be based on the amount of data transferred.

Three GPRS MS modes of operation are supported: An MS in class-A mode of operation operates GPRS and other GSM services simultaneously. An MS in class-B mode of operation monitors control channels for GPRS and other GSM services simultaneously, but can only operate one set of services at one time. An MS in class-C mode of operation exclusively operates GPRS services.

GPRS introduces two new network nodes in the GSM PLMN: The Serving GPRS Support Node (SGSN), which is at the same hierarchical level as the MSC, keeps track of the individual MSs' location and performs security functions and access control. The SGSN is connected to the base station system with Frame Relay. The Gateway GSN (GGSN) provides interworking with external packet-switched networks, and is connected with SGSNs via an IP-based GPRS backbone network. The HLR is enhanced with GPRS subscriber information, and the SMS-GMSCs and SMS-IWMSCs are upgraded to support SMS transmission via the SGSN. Optionally, the MSC/VLR can be enhanced for more-efficient co-ordination of GPRS and non-GPRS services and functionality: e.g., paging for circuit-switched calls that can be performed more efficiently via the SGSN, and combined GPRS and non-GPRS location updates.

GPRS security functionality is equivalent to the existing GSM security. The SGSN performs authentication and cipher setting procedures based on the same algorithms, keys, and criteria as in existing GSM. GPRS uses a ciphering algorithm optimised for packet data transmission. A GPRS ME can access the GPRS services with SIMs that are not GPRS-aware, and with GPRS-aware SIMs.

Cell selection may be performed autonomously by an MS, or the base station system instructs the MS to select a certain cell. The MS informs the network when it re-selects another cell or group of cells known as a routeing area.