



# SLOVENSKI STANDARD

## SIST EN 301 344 V7.1.1:2004

01-oktober-2004

---

8 [[ ]HJb]`WV] b]`hY`ca i b]\_UW`g\_]`g]ghYa `fZuU&ZL!`Gd`cýbUfUX]`g\_Ug]cf]Hj `g  
dU\_Yh]fU]a ]`dcXU]`f] DFGL!`Cd]g`g]cf]Hj Y!`&`r`g]c]db`U

Digital cellular telecommunications system (Phase 2+) (GSM); General Packet Radio Service (GPRS); Service description; Stage 2 (GSM 03.60 version 7.1.1 Release 1998)

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

Ta slovenski standard je istoveten z: ~~SIST EN 301 344 V7.1.1:2004~~ **EN 301 344 Version 7.1.1**  
<https://standards.iteh.ai/catalog/standards/sis/1250a349-bd9e-4534-b5cc-c37a8532c1c3/sist-en-301-344-v7-1-1-2004>

---

**ICS:**

33.070.01      Mobilni servisi na splošno      Mobile services in general

**SIST EN 301 344 V7.1.1:2004**      en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 301 344 V7.1.1:2004

<https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-c37a8532c1c3/sist-en-301-344-v7-1-1-2004>

# ETSI EN 301 344 V7.1.1 (2000-01)

*European Standard (Telecommunications series)*

**Digital cellular telecommunications system (Phase 2+);  
General Packet Radio Service (GPRS);  
Service description;  
Stage 2  
(GSM 03.60 version 7.1.1 Release 1998)**

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

**GSM**®  
GLOBAL SYSTEM FOR  
MOBILE COMMUNICATIONS

[SIST EN 301 344 V7.1.1:2004](https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-c37a8532c1c3/sist-en-301-344-v7-1-1-2004)

<https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-c37a8532c1c3/sist-en-301-344-v7-1-1-2004>



---

**Reference**

REN/SMG-030360Q7

---

**Keywords**

Digital cellular telecommunications system,  
Global System for Mobile communications  
(GSM), GPRS

**ETSI**

---

**Postal address**

F-06921 Sophia Antipolis Cedex - FRANCE

---

**Office address**

650 Route des Lucioles - Sophia Antipolis  
Valbonne - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C

Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Internet**

secretariat@etsi.fr

Individual copies of this ETSI deliverable  
can be downloaded from

<http://www.etsi.org>

If you find errors in the present document, send your  
comment to: editor@etsi.fr

---

**Important notice**

This ETSI deliverable may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF).

In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2000.  
All rights reserved.

# 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 .....   | 13 |
| 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 .....                                    | 15 |
| 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 .....                                    | 17 |
| 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 Cipherring 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.....                  | 18 |
| 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 .....                                    | 19 |
| 5.4.1 GPRS Support Nodes .....                                    | 19 |
| 5.4.2 GPRS Backbone Networks .....                                | 20 |
| 5.4.3 HLR .....   | 20 |
| 5.4.4 SMS-GMSC and SMS-IWMSC .....                                | 20 |
| 5.4.5 GPRS Mobile Stations .....                                  | 21 |
| 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 Ciphering.....                                | 43 |
| 6.8.3.2   | GPRS Ciphering 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       | Octet Stream Protocol Functionality.....                                   | 74 |
| 12.4.1     | PAD Function.....  | 75 |
| 12.4.1.1   | Packet Assembler.....  | 75 |
| 12.4.1.1.1 | Buffer Full.....   | 75 |
| 12.4.1.1.2 | Inactivity Timer Expiry.....   | 76 |
| 12.4.1.1.3 | Maximum Buffer Delay Timer Expiry.....                                     | 76 |
| 12.4.1.1.4 | Special Character.....   | 76 |
| 12.4.1.1.5 | Change in Flow Control State.....  | 76 |

|            |  |    |
|------------|--|----|
| 12.4.1.1.6 | Immediate Forwarding Request.....                            | 76 |
| 12.4.1.2   | Packet Disassembler.....                                     | 76 |
| 12.4.2     | Quality of Service .....                                     | 76 |
| 12.5       | Point-to-Point Protocol Functionality.....                   | 76 |
| 12.5.1     | Transmission Plane for PDP Type PPP .....                    | 76 |
| 12.5.2     | Functions.....   | 77 |
| 12.6       | Gb Interface.....  | 77 |
| 12.6.1     | Physical Layer Protocol .....                                | 77 |
| 12.6.2     | Link Layer Protocols.....                                    | 77 |
| 12.6.3     | BSS GPRS Protocol.....                                       | 78 |
| 12.6.3.1   | Inter-dependency of the BSSGP and LLC Functions .....        | 78 |
| 12.6.3.2   | BSSGP Addressing .....                                       | 79 |
| 12.6.3.3   | BVCI Contexts in BSS and in SGSN .....                       | 79 |
| 12.6.3.4   | Flow Control Between SGSN and BSS over the Gb Interface..... | 79 |
| 12.7       | Abis Interface .....   | 80 |
| 12.7.1     | Remote Packet Control Unit .....                             | 81 |
| 13         | Information Storage.....                                     | 81 |
| 13.1       | HLR.....   | 81 |
| 13.2       | SGSN.....  | 83 |
| 13.3       | GGSN .....   | 84 |
| 13.4       | MS .....   | 85 |
| 13.5       | MSC/VLR .....  | 86 |
| 13.6       | Recovery and Restoration Procedures .....                    | 86 |
| 13.6.1     | HLR Failure .....  | 86 |
| 13.6.2     | SGSN Failure.....  | 87 |
| 13.6.3     | GGSN Failure.....  | 87 |
| 13.6.4     | VLR Failure.....   | 87 |
| 14         | Identities .....   | 88 |
| 14.1       | IMSI .....   | 88 |
| 14.2       | Packet TMSI.....   | 88 |
| 14.3       | NSAPI and TLLI.....  | 88 |
| 14.4       | PDP Address .....  | 89 |
| 14.5       | TID .....  | 89 |
| 14.6       | Routeing Area Identity .....                                 | 89 |
| 14.7       | Cell Identity.....   | 90 |
| 14.8       | GSN Addresses.....   | 90 |
| 14.8.1     | GSN Address .....  | 90 |
| 14.8.2     | GSN Number .....   | 90 |
| 14.9       | Access Point Name.....                                       | 90 |
| 15         | Operational Aspects .....                                    | 90 |
| 15.1       | Charging .....   | 90 |
| 15.1.1     | Charging Information.....                                    | 91 |
| 15.1.2     | Reverse Charging.....  | 91 |
| 15.2       | Quality of Service Profile.....                              | 91 |
| 15.2.1     | Precedence Class .....                                       | 92 |
| 15.2.2     | Delay Class .....  | 92 |
| 15.2.3     | Reliability Class .....                                      | 92 |
| 15.2.4     | Throughput Classes.....                                      | 93 |
| 15.2.4.1   | Peak Throughput Class.....                                   | 93 |
| 15.2.4.2   | Mean Throughput Class .....                                  | 93 |
| 16         | Interactions with Other GSM Services .....                   | 94 |
| 16.1       | Point-to-point Short Message Service .....                   | 94 |
| 16.1.1     | Mobile-terminated SMS Transfer .....                         | 95 |
| 16.1.1.1   | Unsuccessful Mobile-terminated SMS Transfer.....             | 95 |
| 16.1.2     | Mobile-originated SMS Transfer .....                         | 97 |
| 16.2       | Circuit-switched Services .....                              | 97 |
| 16.2.1     | Suspension of GPRS Services.....                             | 97 |
| 16.2.2     | GPRS and Dedicated Mode Priority Handling .....              | 98 |

iTech STANDARD PREVIEW  
(standards.itech.ai)



|                               |   |            |
|-------------------------------|---|------------|
| 16.3                          | Supplementary Services.....   | 99         |
| <b>Annex A (normative):</b>   | <b>GGSN Selection Decision Tree .....</b>                                 | <b>100</b> |
| A.1                           | Definitions.....  | 100        |
| A.2                           | APN (R).....  | 100        |
| A.3                           | APN Selection Rules.....  | 100        |
| <b>Annex B (normative):</b>   | <b>Internet-Hosted Octet Stream Service.....</b>                          | <b>104</b> |
| B.1                           | Direction of Connection Setup.....  | 104        |
| B.2                           | Bearer .....  | 104        |
| B.3                           | Setup Data .....  | 104        |
| B.3.1                         | Protocol Type – TCP or UDP .....  | 104        |
| B.3.2                         | Host Name.....  | 105        |
| B.3.3                         | Port Number .....   | 105        |
| B.3.4                         | PAD Parameters .....  | 105        |
| B.4                           | Flow Control .....  | 105        |
| B.5                           | Break Signal .....  | 105        |
| B.6                           | Connection Establishment Procedure .....                                  | 105        |
| B.6.1                         | Fully User-Specified Establishment .....                                  | 106        |
| B.6.2                         | Default Internet Endpoint Parameters Establishment .....                  | 106        |
| B.7                           | Connection Termination.....   | 106        |
| B.7.1                         | MS-initiated TCP IHOSS Connection Termination .....                       | 106        |
| B.7.2                         | MS-initiated UDP IHOSS Connection Termination .....                       | 106        |
| B.7.3                         | Internet Host Initiated TCP IHOSS Connection Termination .....            | 107        |
| B.8                           | Quality of Service .....  | 107        |
| B.9                           | Security .....  | 107        |
| B.9.1                         | Authentication of the GPRS User.....                                      | 107        |
| B.9.2                         | Malicious Reconfiguration of the GPRS Device .....                        | 107        |
| B.10                          | Maintenance .....   | 107        |
| <b>Annex C (informative):</b> | <b>Data Transmission Routeing Examples.....</b>                           | <b>108</b> |
| C.1                           | Data Routeing for an MS in its Home PLMN to and from an External PDN..... | 108        |
| C.2                           | Data Routeing for a Roaming MS to and from an External PDN.....           | 109        |
| C.3                           | MS-to-MS Data Routeing via the Same GGSN .....                            | 109        |
| C.4                           | MS-to-MS Data Routeing via Different GGSNs .....                          | 110        |
| <b>Annex D (informative):</b> | <b>Figures .....</b>  | <b>111</b> |
| <b>Annex E (informative):</b> | <b>Tables.....</b>  | <b>113</b> |
| <b>Annex F (informative):</b> | <b>Document history.....</b>  | <b>114</b> |
| History .....                 |   | 115        |

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://www.etsi.org/ipr>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

## 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 7.x.y

where:

- 7 indicates GSM Release 1998 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.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-c37a8532c1e3/sist-en-301-344-v7-1-1-2004>

| <b>National transposition dates</b>  |                   |
|--|-------------------|
| Date of adoption of this EN:   | 31 December 1999  |
| Date of latest announcement of this EN (doa):  | 31 March 2000     |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 30 September 2000 |
| Date of withdrawal of any conflicting National Standard (dow):                         | 30 September 2000 |

## 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.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

- ITEL STANDARD PREVIEW  
(standards.iteh.ai)
- <https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-e37a8552c1c9/sist-en-301-344-v7.1.1-2004>
- SIST EN 301 344 V7.1.1:2004
- [1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [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".
- [7] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".
- [8] GSM 03.40: "Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS); Point-to-Point (PP)".
- [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)".
- [16] GSM 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".
- [17] GSM 07.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) supporting GPRS".
- [18] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface: Layer 3 specification".
- [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".
- [20] GSM 08.16: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Network Service".
- [21] GSM 08.18: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [22] GSM 08.60: "Digital cellular telecommunications system (Phase 2+); Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels."
- [23] GSM 09.02: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".
- [24] GSM 09.16: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface network service specification".
- [25] GSM 09.18: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification".
- [26] GSM 09.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [27] GSM 09.61: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) supporting General Packet Radio Service (GPRS) and Packet Data Networks (PDN)".
- [28] GSM 11.11: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".
- [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".
- [30] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

- [31] CCITT Recommendation Q.65: "Methodology – Stage 2 of the method for the characterization of services supported by an ISDN".
- [32] CCITT Recommendation V.42 bis: "Data communication over the telephone network – Data compression procedures for data circuit-terminating equipment (DCE) using error correction procedures".
- [33] CCITT Recommendation X.3: "Packet assembly disassembly facility (PAD) in a public data network".
- [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".
- [39] IETF RFC 768 (1980): "User Datagram Protocol" (STD 6).
- [40] IETF RFC 791 (1981): "Internet Protocol" (STD 5).
- [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).
- [44] IETF RFC 1661 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).
- [45] Bellcore GR-000301 Issue 2 December 1997: "Public Packet Switched Network Generic Requirements (PPSNGR)".

---

## 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                 |
| IHOSS     | Internet-Hosted Octet Stream Service            |
| IP        | Internet Protocol                               |
| IPv4      | Internet Protocol version 4                     |
| IPv6      | Internet Protocol version 6                     |
| IPX       | Internet Packet eXchange                        |
| ISP       | Internet Service Provider                       |
| L2TP      | Layer-2 Tunnelling Protocol                     |
| 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                               |
| OSP       | Octet Stream Protocol                           |
| 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                             |
| PPP       | Point-to-Point Protocol                         |
| 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-IWMSC | 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                          |

STANDARD PREVIEW  
(standards.iteh.ai)

[SIST EN 301 344 V7.1.1:2004](https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-c57a8532c1c3/sist-en-301-344-v7-1-1-2004)

<https://standards.iteh.ai/catalog/standards/sist/1230a549-bd9e-4534-b5e6-c57a8532c1c3/sist-en-301-344-v7-1-1-2004>

### 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