



**SLOVENSKI STANDARD**  
**SIST EN 301 349 V6.6.1:2005**

**01-februar-2005**

---

8 [[ ]HJb]`WV] b]`hY`Y\_ca i b]\_ UW`g\_ ]`g]ghYa `fZUnU&ZL!`Gd`cybUfUX]`g\_Ug]cf]Hj `g  
dU\_Yh]fUbj]a ]`dcXUh\_]`f] DFGL!`AcV]`bUdcghU`UfA GL!`Ja Ygb]\_ `g]ghYa UVUhb]\  
dcghU`f6 GGL`dfc]c\_c``\_cb]fc`YfUX]`g\_Y`dcj YnUj Y]b`Xc]ghcdUXc`dfYbc]gbY[ U  
a YX]`UfF @`#A57L`f] GA`\$( `\* \$zfUh` ]WU\*`\*`%z]nXUU% - +L

Digital cellular telecommunications system (Phase 2+) (GSM); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol (GSM 04.60 version 6.6.1 Release 1997)

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

[SIST EN 301 349 V6.6.1:2005](https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005>

**Ta slovenski standard je istoveten z: EN 301 349 Version 6.6.1**

---

**ICS:**

33.070.01 Mobilni servisi na splošno Mobile services in general

**SIST EN 301 349 V6.6.1:2005 en**

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

[SIST EN 301 349 V6.6.1:2005](https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005>

# ETSI EN 301 349 V6.6.1 (2000-06)

*European Standard (Telecommunications series)*

**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  
(GSM 04.60 version 6.6.1 Release 1997)**

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

**GSM**®  
GLOBAL SYSTEM FOR  
MOBILE COMMUNICATIONS

[SIST EN 301 349 V6.6.1:2005](https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005>



---

**Reference**

REN/SMG-020460Q6R2

---

**Keywords**

Digital cellular telecommunications system,  
Global System for Mobile communications  
(GSM), General Packet Radio Service (GPRS)

**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - 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

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

SIST EN 301 349 V6.6.1:2005

<https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ca21a2bc14d/sist-en-301-349-v6-6-1-2005>

---

**Important notice**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document 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.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at <http://www.etsi.org/tb/status/>

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

---

**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 .....   | 10 |
| Foreword .....   | 10 |
| 1 Scope .....  | 11 |
| 2 References .....   | 12 |
| 3 Definitions and abbreviations .....  | 13 |
| 3.1 Vocabulary .....   | 13 |
| 4 Layered overview of radio interface .....                                      | 14 |
| 4.1 Layer services .....   | 15 |
| 4.2 Layer functions .....  | 15 |
| 4.3 Service primitives .....   | 15 |
| 4.4 Services required from lower layers .....                                    | 15 |
| 5 Introduction to the Medium Access Control (MAC) procedures .....               | 15 |
| 5.1 General .....  | 15 |
| 5.2 Multiplexing principles .....  | 16 |
| 5.2.1 Temporary Block Flow .....   | 16 |
| 5.2.2 Temporary Flow Identity .....  | 16 |
| 5.2.3 Uplink State Flag .....  | 16 |
| 5.2.4 Medium Access modes .....  | 16 |
| 5.3 Packet idle mode .....   | 17 |
| 5.4 Packet transfer mode .....   | 17 |
| 5.5 General procedures in packet idle and packet transfer modes .....            | 17 |
| 5.5.1 Mobile station side .....  | 17 |
| 5.5.1.1 Cell reselection .....   | 17 |
| 5.5.1.2 System information on PBCCH .....  | 18 |
| 5.5.1.2.1 Supervision of PBCCH_CHANGE_MARK and update of PBCCH information ..... | 18 |
| 5.5.1.2.2 Replacement of PBCCH .....   | 19 |
| 5.5.1.2.3 PSI1 reception failure .....   | 19 |
| 5.5.1.3 System information on BCCH .....   | 19 |
| 5.5.1.3.1 Supervision of BCCH_CHANGE_MARK and update of BCCH information .....   | 20 |
| 5.5.1.3.2 Establishment of PBCCH .....   | 20 |
| 5.5.1.3.3 SI13 reception failure .....   | 20 |
| 5.5.1.4 Acquisition of system information on the broadcast channel .....         | 20 |
| 5.5.1.4.1 Consistent sets of system information messages .....                   | 21 |
| 5.5.1.4.2 Suspension of operation to receive system information .....            | 21 |
| 5.5.1.4.3 Request for acquisition of system information .....                    | 22 |
| 5.5.1.5 Discontinuous reception (DRX) .....                                      | 22 |
| 5.5.1.6 Page mode procedures on PCCCH .....                                      | 22 |
| 5.5.1.7 Frequency Parameters .....   | 23 |
| 5.5.1.8 TLLI management .....  | 24 |
| 5.5.2 Network side .....   | 24 |
| 5.5.2.1 System Information broadcasting .....                                    | 24 |
| 5.5.2.1.1 System information on PBCCH .....                                      | 24 |
| 5.5.2.1.2 System information on BCCH .....                                       | 25 |
| 5.5.2.1.3 System information on PACCH (and other logical channels) .....         | 25 |
| 5.5.2.1.4 Consistent sets of system information messages .....                   | 26 |
| 5.5.2.2 Paging .....   | 26 |
| 5.6 Measurement reports .....  | 26 |
| 5.6.1 Network Control (NC) measurement reporting .....                           | 26 |
| 5.6.2 Extended measurement (EM) reporting .....                                  | 27 |
| 6 Paging procedures .....  | 28 |
| 6.1 Paging procedure for RR connection establishment .....                       | 28 |

|             |  |    |
|-------------|--|----|
| 6.1.1       | Paging initiation using paging subchannel on CCCH .....              | 28 |
| 6.1.2       | Paging initiation using paging subchannel on PCCCH .....             | 28 |
| 6.1.3       | Paging initiation using PACCH .....                                  | 28 |
| 6.1.4       | Paging response .....  | 29 |
| 6.2         | Paging procedure for downlink packet transfer .....                  | 29 |
| 6.2.1       | Paging procedure using paging subchannel on CCCH.....                | 29 |
| 6.2.2       | Paging using paging subchannel on PCCCH .....                        | 29 |
| 6.2.3       | Paging response .....  | 29 |
| 7           | Medium Access Control (MAC) procedures on PCCCH .....                | 29 |
| 7.1         | TBF establishment initiated by the mobile station on PCCCH.....      | 30 |
| 7.1.1       | Permission to access the network.....                                | 30 |
| 7.1.2       | Initiation of a TBF establishment.....                               | 30 |
| 7.1.2.1     | Initiation of the packet access procedure.....                       | 30 |
| 7.1.2.1.1   | Access persistence control on PRACH.....                             | 31 |
| 7.1.2.2     | Packet assignment procedure .....                                    | 32 |
| 7.1.2.2.1   | On receipt of a PACKET CHANNEL REQUEST message.....                  | 32 |
| 7.1.2.2.2   | Packet access queuing notification procedure .....                   | 33 |
| 7.1.2.2.3   | Packet polling procedure .....                                       | 33 |
| 7.1.2.2.4   | Packet access reject procedure .....                                 | 33 |
| 7.1.2.3     | Contention resolution at one phase access .....                      | 34 |
| 7.1.2.4     | One phase packet access completion.....                              | 35 |
| 7.1.2.5     | Timing Advance .....   | 35 |
| 7.1.3       | TBF establishment using two phase access.....                        | 35 |
| 7.1.3.1     | Initiation of the Packet resource request procedure.....             | 35 |
| 7.1.3.2     | Packet resource assignment for uplink procedure .....                | 36 |
| 7.1.3.2.1   | On receipt of a PACKET RESOURCE REQUEST message .....                | 36 |
| 7.1.3.3     | Contention resolution at two phase access .....                      | 36 |
| 7.1.3.4     | Two phase packet access completion.....                              | 36 |
| 7.1.3.5     | Timing Advance.....  | 36 |
| 7.1.4       | Abnormal cases.....  | 37 |
| 7.2         | TBF establishment initiated by the network on PCCCH .....            | 37 |
| 7.2.1       | Entering the packet transfer mode.....                               | 37 |
| 7.2.1.1     | Packet downlink assignment procedure.....                            | 37 |
| 7.2.1.2     | Packet downlink assignment procedure completion.....                 | 38 |
| 7.2.1.3     | Packet polling procedure.....  | 38 |
| 7.2.2       | Abnormal cases.....  | 38 |
| 7.3         | Procedure for measurement report sending in packet idle mode .....   | 39 |
| 7.3.1       | Measurement report sending procedure initiated on PCCCH .....        | 39 |
| 7.3.1.1     | On receipt of a PACKET CHANNEL REQUEST message .....                 | 39 |
| 7.3.1.2     | On receipt of a PACKET UPLINK ASSIGNMENT message .....               | 39 |
| 7.3.1.3     | On receipt of a PACKET ACCESS REJECT message .....                   | 40 |
| 7.3.1.4     | Abnormal cases .....   | 40 |
| 7.3.2       | Measurement report sending procedure initiated on CCCH .....         | 40 |
| 7.4         | Cell Change Order procedures in Packet Idle mode.....                | 40 |
| 7.4.1       | Cell Change Order procedure initiated on PCCCH .....                 | 40 |
| 7.4.2       | Cell Change Order procedure initiated on CCCH.....                   | 41 |
| 7.5         | Measurement Order procedures in Packet Idle mode .....               | 41 |
| 7.5.1       | Measurement Order procedures initiated on PCCCH .....                | 41 |
| 7.5.2       | Measurement Order procedures initiated on CCCH .....                 | 42 |
| 8           | Medium Access Control (MAC) Procedures in Packet Transfer Mode ..... | 42 |
| 8.1         | Transfer of RLC data blocks .....                                    | 42 |
| 8.1.1       | Uplink RLC data block transfer .....                                 | 42 |
| 8.1.1.1     | Dynamic allocation uplink RLC data block transfer .....              | 43 |
| 8.1.1.1.1   | PACCH operation.....   | 44 |
| 8.1.1.1.2   | Resource Reallocation for Uplink.....                                | 44 |
| 8.1.1.1.2.1 | Abnormal cases .....   | 45 |
| 8.1.1.1.3   | Establishment of Downlink TBF .....                                  | 46 |
| 8.1.1.1.3.1 | Abnormal cases .....   | 46 |
| 8.1.1.2     | Extended Dynamic Allocation uplink RLC data block transfer .....     | 46 |

|             |  |    |
|-------------|--|----|
| 8.1.1.2.1   | Uplink PDCH Allocation.....  | 47 |
| 8.1.1.2.2   | PACCH operation.....   | 47 |
| 8.1.1.2.3   | Neighbour cell power measurements.....                                 | 47 |
| 8.1.1.3     | Fixed Allocation uplink RLC data block transfer.....                   | 47 |
| 8.1.1.3.1   | Transfer of RLC/MAC blocks .....                                       | 48 |
| 8.1.1.3.2   | Reallocation for open-ended TBF .....                                  | 49 |
| 8.1.1.3.2.1 | At the beginning of each fixed allocation.....                         | 50 |
| 8.1.1.3.2.2 | Upon receipt of the reallocation request .....                         | 50 |
| 8.1.1.3.2.3 | Upon exhaustion of the current allocation .....                        | 50 |
| 8.1.1.3.2.4 | Ending the TBF.....  | 51 |
| 8.1.1.3.2.5 | Abnormal Cases .....   | 51 |
| 8.1.1.3.3   | Neighbour cell power measurements.....                                 | 51 |
| 8.1.1.3.4   | PACCH operation.....   | 51 |
| 8.1.1.3.5   | Establishment of Downlink TBF .....                                    | 52 |
| 8.1.1.3.5.1 | Abnormal cases .....   | 53 |
| 8.1.1.4     | Network initiated release of uplink TBF .....                          | 53 |
| 8.1.1.5     | Abnormal cases .....   | 54 |
| 8.1.2       | Downlink RLC data block transfer .....                                 | 54 |
| 8.1.2.1     | Downlink RLC data block transfer.....                                  | 54 |
| 8.1.2.1.1   | Abnormal cases.....  | 55 |
| 8.1.2.2     | Polling for Packet Downlink Ack/Nack .....                             | 55 |
| 8.1.2.3     | Spare .....  | 56 |
| 8.1.2.4     | Resource Reassignment for Downlink .....                               | 56 |
| 8.1.2.4.1   | Abnormal cases.....  | 56 |
| 8.1.2.5     | Establishment of uplink TBF .....                                      | 57 |
| 8.1.2.5.1   | Abnormal cases.....  | 58 |
| 8.1.2.6     | Spare .....  | 59 |
| 8.1.2.7     | Fixed allocation neighbour cell power measurements.....                | 59 |
| 8.1.2.8     | Network initiated abnormal release of downlink TBF .....               | 59 |
| 8.1.3       | Concurrent TBF procedures for half duplex operation .....              | 59 |
| 8.1.3.1     | Spare .....  | 59 |
| 8.1.3.2     | Spare .....  | 59 |
| 8.1.3.2.1   | Saving downlink TBF state and initiating uplink TBF .....              | 60 |
| 8.1.3.2.2   | Saving downlink TBF state and restoring uplink TBF state .....         | 60 |
| 8.1.3.2.3   | Ending downlink TBF and restoring uplink TBF state .....               | 60 |
| 8.1.3.2.4   | Saving uplink TBF state and initiating downlink TBF .....              | 60 |
| 8.1.3.2.5   | Saving uplink TBF state and restoring downlink TBF state .....         | 60 |
| 8.1.3.2.6   | Ending uplink TBF and restoring downlink TBF state .....               | 60 |
| 8.2         | Packet PDCH Release .....  | 60 |
| 8.3         | Procedure for measurement report sending in Packet Transfer mode ..... | 61 |
| 8.4         | Network controlled cell reselection procedure .....                    | 61 |
| 8.4.1       | Network controlled cell reselection completion.....                    | 61 |
| 8.4.2       | Abnormal cases.....  | 62 |
| 8.5         | Measurement Order procedures in Packet Transfer mode.....              | 62 |
| 8.6         | PACKET CONTROL ACKNOWLEDGEMENT.....                                    | 63 |
| 8.7         | Abnormal cases .....   | 63 |
| 8.7.1       | Abnormal release with return to CCCH or PCCCH.....                     | 63 |
| 8.7.2       | Abnormal release with random access .....                              | 63 |
| 8.7.3       | Abnormal release with system information.....                          | 63 |
| 9           | Radio Link Control (RLC) procedures in packet transfer mode.....       | 64 |
| 9.1         | Procedures and parameters for peer-to-peer operation.....              | 64 |
| 9.1.1       | Send state variable V(S) .....   | 64 |
| 9.1.1a      | Control send state variable V(CS) .....                                | 64 |
| 9.1.2       | Acknowledge state variable V(A).....                                   | 65 |
| 9.1.3       | Acknowledge state array V(B).....                                      | 65 |
| 9.1.4       | Block sequence number BSN .....  | 65 |
| 9.1.4a      | Reduced Block Sequence Number RBSN .....                               | 65 |
| 9.1.5       | Receive state variable V(R) .....                                      | 65 |
| 9.1.6       | Receive window state variable V(Q) .....                               | 66 |
| 9.1.7       | Receive state array V(N).....  | 66 |

|          |  |    |
|----------|--|----|
| 9.1.8    | Starting sequence number (SSN) and received block bitmap (RBB).....        | 66 |
| 9.1.9    | Window Size.....   | 67 |
| 9.1.10   | Segmentation of LLC PDUs into RLC data units .....                         | 67 |
| 9.1.11   | Re-assembly of LLC PDUs from RLC data units .....                          | 67 |
| 9.1.11a  | Segmentation of RLC/MAC control messages into RLC/MAC control blocks ..... | 68 |
| 9.1.11b  | Re-assembly of RLC/MAC control messages from RLC/MAC control blocks .....  | 68 |
| 9.1.12   | Priority of LLC PDUs.....  | 68 |
| 9.2      | Operation during RLC/MAC control message transfer .....                    | 68 |
| 9.3      | Operation during RLC data block transfer .....                             | 69 |
| 9.3.1    | Countdown procedure.....   | 69 |
| 9.3.2    | Acknowledged mode operation .....  | 70 |
| 9.3.2.1  | Establishment of Temporary Block Flow.....                                 | 70 |
| 9.3.2.2  | Operation of uplink Temporary Block Flow .....                             | 70 |
| 9.3.2.3  | Release of uplink Temporary Block Flow.....                                | 71 |
| 9.3.2.4  | Operation of downlink Temporary Block Flow .....                           | 71 |
| 9.3.2.5  | Release of downlink Temporary Block Flow .....                             | 71 |
| 9.3.3    | Unacknowledged mode operation.....   | 72 |
| 9.3.3.1  | Establishment of Temporary Block Flow.....                                 | 72 |
| 9.3.3.2  | Operation of uplink Temporary Block Flow .....                             | 72 |
| 9.3.3.3  | Release of uplink Temporary Block Flow.....                                | 73 |
| 9.3.3.4  | Operation of downlink Temporary Block Flow .....                           | 73 |
| 9.3.3.5  | Release of downlink Temporary Block Flow .....                             | 73 |
| 9.4      | Abnormal release cases .....   | 74 |
| 9.4.1    | Abnormal release with random access .....                                  | 74 |
| 9.4.2    | Abnormal release with cell reselection .....                               | 74 |
| 10       | RLC/MAC block structure.....   | 74 |
| 10.1     | Spare bits.....  | 75 |
| 10.2     | RLC data blocks .....  | 75 |
| 10.2.1   | Downlink RLC data block .....  | 75 |
| 10.2.2   | Uplink RLC data block .....  | 76 |
| 10.3     | RLC/MAC control blocks .....   | 76 |
| 10.3.1   | Downlink RLC/MAC control block .....                                       | 76 |
| 10.3.2   | Uplink RLC/MAC control block .....   | 77 |
| 10.4     | Header fields .....  | 77 |
| 10.4.1   | Uplink state flag (USF) field.....   | 77 |
| 10.4.2   | Retry (R) bit.....   | 77 |
| 10.4.3   | Stall indicator (SI) bit .....   | 78 |
| 10.4.4   | Supplementary/Polling (S/P) Bit .....                                      | 78 |
| 10.4.5   | Relative Reserved Block Period (RRBP) field .....                          | 78 |
| 10.4.6   | Countdown Value (CV) field.....  | 79 |
| 10.4.7   | Payload Type field.....  | 79 |
| 10.4.8   | Final block indicator (FBI) bit.....                                       | 79 |
| 10.4.9   | TLLI Indicator (TI) bit .....  | 79 |
| 10.4.9a  | Address Control (AC) bit.....  | 80 |
| 10.4.9b  | Final Segment (FS) bit.....  | 80 |
| 10.4.9c  | Radio Transaction Identifier (RTI) field.....                              | 80 |
| 10.4.9d  | Direction (D) bit .....  | 80 |
| 10.4.10  | Temporary Flow Identifier (TFI) field.....                                 | 81 |
| 10.4.10a | Power Reduction (PR) field.....  | 81 |
| 10.4.11  | Extension (E) Bit .....  | 81 |
| 10.4.12  | Block Sequence Number (BSN) field.....                                     | 81 |
| 10.4.12a | Reduced Block Sequence Number (RBSN) bit .....                             | 82 |
| 10.4.13  | More (M) bit .....   | 82 |
| 10.4.14  | Length Indicator (LI) field.....   | 82 |
| 10.4.15  | TLLI field .....   | 82 |
| 10.4.16  | RLC data field.....  | 82 |
| 10.4.17  | Control message contents field .....                                       | 83 |
| 11.1     | Handling of erroneous protocol data .....                                  | 83 |
| 11.1.1   | Message classification .....   | 84 |
| 11.1.1.1 | Distribution messages.....   | 84 |

ITeH STANDARD PREVIEW

(standards.iteh.ai)

SIST EN 301 349 V6.6.1:2005

<https://standards.iteh.ai/catalog/standards/sist/92447281-e95c-428a-a4b6-3ea21a2bc14d/sist-en-301-349-v6-6-1-2005>

3ea21a2bc14d/sist-en-301-349-v6-6-1-2005



|            |   |     |
|------------|---|-----|
| 11.1.1.2   | Non-distribution messages .....                                   | 84  |
| 11.1.1.2.1 | Format of the address information.....                            | 85  |
| 11.1.2     | Error detection mechanism .....                                   | 85  |
| 11.1.3     | Error labels .....  | 85  |
| 11.1.3.1   | Generic error labels .....  | 85  |
| 11.1.3.2   | 'Ignore' error label .....  | 86  |
| 11.1.3.3   | 'Message escape' error label .....                                | 86  |
| 11.1.4     | Error detection and order of precedence.....                      | 86  |
| 11.1.4.1   | Unknown message type.....   | 87  |
| 11.1.4.2   | Message not compatible with current protocol state .....          | 87  |
| 11.1.4.3   | Syntactically incorrect message.....                              | 87  |
| 11.1.4.3.1 | Messages with error label: 'Distribution part error'.....         | 87  |
| 11.1.4.3.2 | Messages with error label: 'Address information part error' ..... | 87  |
| 11.1.4.3.3 | Messages with error label: 'Non-distribution part error' .....    | 87  |
| 11.1.4.3.4 | Messages with error label: 'Message escape' .....                 | 87  |
| 11.1.4.3.5 | Messages with error label: 'Ignore' .....                         | 88  |
| 11.1.4.4   | Syntactic error in truncated concatenation .....                  | 88  |
| 11.1.4.5   | Exceptions .....  | 88  |
| 11.2       | RLC/MAC control messages .....                                    | 88  |
| 11.2.0     | Message format.....   | 89  |
| 11.2.0.1   | Downlink RLC/MAC messages .....                                   | 90  |
| 11.2.0.2   | Uplink RLC/MAC messages .....                                     | 90  |
| 11.2.1     | Packet Access Reject .....  | 91  |
| 11.2.2     | Packet Control Acknowledgement.....                               | 92  |
| 11.2.3     | Packet Cell Change Failure.....                                   | 94  |
| 11.2.4     | Packet Cell Change Order.....                                     | 95  |
| 11.2.5     | Packet Channel Request.....                                       | 97  |
| 11.2.6     | Packet Downlink Ack/Nack.....                                     | 99  |
| 11.2.7     | Packet Downlink Assignment.....                                   | 101 |
| 11.2.8     | Packet Downlink Dummy Control Block.....                          | 103 |
| 11.2.8b    | Packet Uplink Dummy Control Block.....                            | 104 |
| 11.2.9     | Packet Measurement Report.....                                    | 105 |
| 11.2.9b    | Packet Measurement Order.....                                     | 108 |
| 11.2.9c    | Packet Mobile TBF Status .....                                    | 112 |
| 11.2.10    | Packet Paging Request.....  | 113 |
| 11.2.11    | Packet PDCH Release.....  | 114 |
| 11.2.12    | Packet Polling Request .....                                      | 116 |
| 11.2.13    | Packet Power Control/Timing Advance.....                          | 117 |
| 11.2.14    | Packet PRACH Parameters.....                                      | 118 |
| 11.2.15    | Packet Queueing Notification .....                                | 119 |
| 11.2.16    | Packet Resource Request .....                                     | 120 |
| 11.2.17    | Packet PSI Status .....   | 122 |
| 11.2.18    | Packet System Information Type 1 .....                            | 124 |
| 11.2.19    | Packet System Information Type 2 .....                            | 126 |
| 11.2.19.1  | Reference Frequency Lists in PSI2 .....                           | 128 |
| 11.2.19.2  | Cell Allocation in PSI2 .....                                     | 128 |
| 11.2.19.3  | GPRS Mobile Allocation in PSI2.....                               | 128 |
| 11.2.19.4  | PCCCH Description .....   | 128 |
| 11.2.19.5  | Abnormal cases .....  | 129 |
| 11.2.20    | Packet System Information Type 3 .....                            | 130 |
| 11.2.21    | Packet System Information Type 3 bis .....                        | 135 |
| 11.2.22    | Packet System Information Type 4.....                             | 139 |
| 11.2.23    | Packet System Information Type 5 .....                            | 141 |
| 11.2.24    | Spare.....  | 145 |
| 11.2.25    | Packet System Information 13 .....                                | 146 |
| 11.2.26    | Packet TBF Release.....   | 149 |
| 11.2.27    | Spare.....  | 149 |
| 11.2.28    | Packet Uplink Ack/Nack.....                                       | 150 |
| 11.2.29    | Packet Uplink Assignment.....                                     | 153 |
| 11.2.30    | Spare.....  | 158 |

|          |  |     |
|----------|--|-----|
| 11.2.31  | Packet Timeslot Reconfigure .....            | 159 |
| 12       | Information element coding .....             | 166 |
| 12.1     | Overview .....                               | 166 |
| 12.2     | Spare.....                                   | 166 |
| 12.3     | Ack/Nack Description .....                   | 166 |
| 12.4     | ALLOCATION_BITMAP .....                      | 167 |
| 12.5     | Spare.....                                   | 167 |
| 12.6     | Spare.....                                   | 167 |
| 12.7     | Channel Request Description .....            | 168 |
| 12.8     | Frequency Parameters .....                   | 169 |
| 12.8.1   | Abnormal cases.....                          | 170 |
| 12.9     | Global Power Control Parameters .....        | 171 |
| 12.10    | Global TFI.....                              | 172 |
| 12.10a   | GPRS Mobile Allocation.....                  | 172 |
| 12.10a.1 | Abnormal cases.....                          | 173 |
| 12.11    | Packet Request Reference .....               | 174 |
| 12.12    | Packet Timing Advance.....                   | 174 |
| 12.12a   | Global Packet Timing Advance.....            | 175 |
| 12.13    | Power Control Parameters .....               | 176 |
| 12.14    | PRACH Control Parameters.....                | 177 |
| 12.15    | Temporary Flow Identifier (TFI).....         | 178 |
| 12.16    | Temporary Logical Link Identity (TLLI) ..... | 179 |
| 12.17    | Temporary Queueing Identifier (TQI).....     | 179 |
| 12.18    | TIMESLOT_ALLOCATION.....                     | 179 |
| 12.19    | TS_OVERRIDE.....                             | 179 |
| 12.20    | PAGE_MODE.....                               | 180 |
| 12.21    | Starting Frame Number Description.....       | 180 |
| 12.21.1  | Absolute Frame Number Encoding.....          | 180 |
| 12.21.2  | Relative Frame Number Encoding.....          | 180 |
| 12.22    | Spare.....                                   | 181 |
| 12.23    | Cell Identification.....                     | 181 |
| 12.24    | GPRS Cell Options.....                       | 182 |
| 12.25    | PCCCH Organization Parameters.....           | 184 |
| 12.26    | Extension Bits IE.....                       | 184 |
| 12.27    | Non GPRS Cell Options IE .....               | 185 |
| 13       | Timers and counters .....                    | 186 |
| 13.1     | Timers on the Mobile Station side.....       | 186 |
| 13.2     | Timers on the network side .....             | 190 |
| 13.3     | Counters on the Mobile Station side.....     | 191 |
| 13.4     | Counters on the Network side.....            | 191 |

|                               |  |            |
|-------------------------------|--|------------|
| <b>Annex A (informative):</b> | <b>Bibliography.....</b>   | <b>192</b> |
| <b>Annex B (informative):</b> | <b>RLC data block encoding.....</b>                                  | <b>193</b> |
| B.1                           | Example 1.....   | 193        |
| B.2                           | Example 2.....   | 194        |
| B.3                           | Example 3.....   | 195        |
| B.4                           | Example 4.....   | 196        |
| B.5                           | Example 5.....   | 196        |
| B.6                           | Example 6.....   | 197        |
| B.7                           | Example 7.....   | 198        |
| <b>Annex C (informative):</b> | <b>Message Sequence Diagrams .....</b>                               | <b>199</b> |
| <b>Annex D (informative):</b> | <b>Examples of Fixed Allocation Timeslot Assignment .....</b>        | <b>200</b> |
| <b>Annex E (informative):</b> | <b>Repeated Fixed Allocations.....</b>                               | <b>204</b> |
| <b>Annex F (informative):</b> | <b>Examples of Countdown procedure operation .....</b>               | <b>206</b> |
| F.1                           | Example 1.....   | 206        |
| F.2                           | Example 2.....   | 207        |
| F.3                           | Example 3.....   | 207        |
| <b>Annex G (informative):</b> | <b>Handling of erroneous protocol data, examples .....</b>           | <b>208</b> |
| G.1                           | Application of error labels .....                                    | 208        |
| G.2                           | Application of the 'Message escape' error label.....                 | 208        |
| G.3                           | Application of truncated concatenation including 'padding bits'..... | 209        |
| G.4                           | Message extension using 'padding bits'.....                          | 210        |
| <b>Annex H (informative):</b> | <b>Document change History .....</b>                                 | <b>211</b> |
| History                       | .....  | 220        |

## 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 ETSI 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 ETSI 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 specifies the procedures used at the radio interface (Reference Point Um, see GSM 04.02) for the General Packet Radio Service (GPRS) Medium Access Control /Radio Link Control (MAC/RLC) layer 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.

### National transposition dates

|  |                   |
|--|-------------------|
| Date of adoption of this EN:   | 2 June 2000       |
| Date of latest announcement of this EN (doa):  | 30 September 2000 |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 31 March 2001     |
| Date of withdrawal of any conflicting National Standard (dow):                         | 31 March 2001     |

# 1 Scope

The present document specifies the procedures used at the radio interface (Reference Point Um, see GSM 04.02) for the General Packet Radio Service (GPRS) Medium Access Control /Radio Link Control (MAC/RLC) layer.

When the notations for "further study" or "FS" or "FFS" are present in the present document they mean that the indicated text is not a normative portion of the present document.

The present document is applicable to the following GPRS Um functional layers:

- Radio Link Control functions,
- Medium Access Control functions, and
- Physical Link Control functions.

The procedures described in the present document are for the RLC/MAC functions of the GPRS radio interface (Um) when operating on a Packet Data Channel (PDCH).

GSM 03.64 contains an overview of the GPRS radio interface (Um).

GSM 04.03 and GSM 04.04 contains the definition of the control channels used in the present document.

GSM 04.07 contains a description in general terms of the structured functions and procedures of this protocol and the relationship of this protocol with other layers and entities.

GSM 04.08 contains the definition of GPRS RLC/MAC procedures when operating on the Common Control Channel (CCCH).

GSM 04.64 contains functional procedures for the Logical Link Control (LLC) layer.

## Application to interface structure

The RLC/MAC procedures apply to the interface structures defined in GSM 04.03. They use the functions and services provided by layer 1 defined in GSM 04.04. GSM 04.07 gives the general description of layer 3 including procedures, messages format and error handling.

## Test procedures

Test procedures of the GSM radio interface signalling are described in GSM 11.10 and GSM 11.2x series.

## Use of logical control channels

The logical control channels are defined in GSM 05.02. Two similar sets of logical channels are defined. The first set consists of the logical channels:

- Broadcast Control Channel (BCCH): downlink only, used to broadcast Cell specific information;
- Paging Channel (PCH): downlink only, used to send page requests to Mobile Stations (MSs);
- Random Access Channel (RACH): uplink only, used to request GPRS resources or a Dedicated Control Channel;
- Access Grant Channel (AGCH): downlink only, used to allocate GPRS resources or a Dedicated Control Channel;
- The second set consists of the logical channels:
  - Packet Broadcast Control Channel (PBCCH): downlink only, used to broadcast Cell specific information;
  - Packet Paging Channel (PPCH): downlink only, used to send page requests to Mobile Stations (MSs);
  - 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/U's.

---

## 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 1997 document, references to GSM documents are for Release 1997 versions (version 6.x.y).

- [1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 02.60: "Digital cellular telecommunications system (Phase 2+); Stage 1 Service Description of the General Packet Radio Service (GPRS)".
- [3] GSM 03.03: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".
- [4] GSM 03.13: "Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system".
- [5] GSM 03.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of GPRS radio Interface; Stage 2".
- [6] GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".
- [7] GSM 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Channel structures and access capabilities".
- [8] GSM 04.04: "Digital cellular telecommunications system (Phase 2+); Layer 1 General requirements".
- [9] GSM 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer General aspects".
- [10] GSM 04.07: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3 General aspects".
- [11] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [12] GSM 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Logical Link Control (LLC)".
- [13] GSM 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

- [14] GSM 05.03: "Digital cellular telecommunications system (Phase 2+); Channel coding".
- [15] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".
- [16] GSM 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronisation".
- [17] GSM 11.10: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformity specification".
- [18] GSM 11.21: "Digital cellular telecommunications system (Phase 2); The GSM Base Station System (BSS) equipment specification".

## 3 Definitions and abbreviations

Abbreviations used in the present document are listed in GSM 01.04 and GSM 02.60.

### 3.1 Vocabulary

For the purposes of the present document, the following terms and definitions apply.

**Block period:** A block period is the sequence of four timeslots on a PDCH used to convey one radio block.

**GPRS multislot class:** The term GPRS multislot class refers to the different mobile station capabilities to transmit and receive on different combinations of multiple PDCHs. The multislot classes are defined in GSM 05.02. Note that the mobile station may indicate different multislot classes for circuit mode services and for GPRS (see GSM 04.08). Different multislot class mobile stations are capable of supporting different medium access modes (see subclause 5.2.4).

**Packet idle mode:** In packet idle mode, the mobile station is prepared to transfer LLC PDUs on packet data physical channels (see subclause 5.3). The mobile station is not allocated any radio resource on a packet data physical channel; it listens to the PBCCH and PCCCH or, if those are not provided by the network, to the BCCH and the CCCH;

**Packet transfer mode:** In packet transfer mode, the mobile station is prepared to transfer LLC PDUs on packet data physical channels (see subclause 5.4). The mobile station is allocated radio resource on one or more packet data physical channels for the transfer of LLC PDUs.

**Radio block:** A radio block is the sequence of four normal bursts carrying one RLC/MAC protocol data unit (see GSM 04.04). (The one exception is a radio block occasionally used on PACCH consisting of a sequence of four access bursts, each carrying a repetition of one short RLC/MAC block.)

**Random values:** In a number of places in this Technical Specification, it is mentioned that some value must take a "random" value, in a given range, or more generally with some statistical distribution. For such random values refer to GSM 04.08.

**RLC/MAC block:** A RLC/MAC block is the protocol data unit exchanged between RLC/MAC entities (see clause 10 and GSM 04.04).

**RLC/MAC control block:** A RLC/MAC control block is the part of a RLC/MAC block carrying a control message between RLC/MAC entities (see subclause 10.3).

**RR connection:** An RR connection is a physical connection established between a mobile station and the network to support the upper layers' exchange of information flows. An RR connection is maintained and released by the two peer entities.

**RLC data block:** A RLC data block is the part of a RLC/MAC block carrying user data or upper layers' signalling data (see subclause 10.2).

**TBF abort:** The term "abort" as applied to TBF is used when the TBF is abruptly stopped without using the Release of TBF procedures defined in clause 9.