



SLOVENSKI STANDARD

SIST EN 300 940 V6.4.3:2005

01-februar-2005

8 [[[HJb]`W] b]`hY`ca i b]_UW`g_]`g]ghYa `fZuU&ZL!`Ja Ygb]_`nUa cV]b]`fUX]c`!
GdYWZ]_UW]UfYhY`d`Ugh]f] GA`\$(`\$, žfUh`] JW*`(` " ž]nXUU%`-`+L

Digital cellular telecommunications system (Phase 2+) (GSM); Mobile radio interface layer 3 specification (GSM 04.08 version 6.4.3 Release 1997)

iteh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **EN 300 940 Version 6.4.3**
<https://standards.iteh.ai/catalog/standards/sist/b6c572a1-c546-4e59-b991-23b78ecb9295/sist-en-300-940-v6-4-3-2005>

ICS:

33.070.01 Mobilni servisi na splošno Mobile services in general

SIST EN 300 940 V6.4.3:2005 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 300 940 V6.4.3:2005](https://standards.iteh.ai/catalog/standards/sist/fbe572a1-c546-4c99-b991-23b78ecb9295/sist-en-300-940-v6-4-3-2005)

<https://standards.iteh.ai/catalog/standards/sist/fbe572a1-c546-4c99-b991-23b78ecb9295/sist-en-300-940-v6-4-3-2005>

ETSI EN 300 940 V6.4.3 (1999-12)

European Standard (Telecommunications series)

Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification (GSM 04.08 version 6.4.3 Release 1997)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

GSM®
GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS

[SIST EN 300 940 V6.4.3:2005](https://standards.iteh.ai/catalog/standards/sist/fbe572a1-c546-4c99-b991-23b78ecb9295/sist-en-300-940-v6-4-3-2005)

<https://standards.iteh.ai/catalog/standards/sist/fbe572a1-c546-4c99-b991-23b78ecb9295/sist-en-300-940-v6-4-3-2005>



Reference

REN/SMG-030408Q6R2

KeywordsDigital cellular telecommunications system,
Global System for Mobile communications (GSM)**ETSI**

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address650 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-Prefecture de Grasse (06) N° 7803/88

<https://standards.etsi.org/standards-search/#/standards-search/300-940-46-4c99-b991-23b78ecb9295/sist-en-300-940-v6-4-3-2005>

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 1999.
All rights reserved.

Contents

Intellectual Property Rights	27
Foreword.....	27
Introduction	28
0 Scope	29
0.1 Scope of the Technical Specification	29
0.2 Application to the interface structures	29
0.3 Structure of layer 3 procedures.....	29
0.4 Test procedures	29
0.5 Use of logical channels.....	29
0.6 Overview of control procedures	30
0.6.1 List of procedures	30
0.7 Applicability of implementations	32
0.7.1 Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS).....	32
0.7.2 General Packet Radio Service (GPRS).....	33
1 References	33
2 Definitions and abbreviations	37
2.1 Random values	37
2.2 Vocabulary	37
3 Radio Resource management procedures	39
3.1 Overview/General.....	39
3.1.1 General.....	39
3.1.2 Services provided to upper layers	39
3.1.2.1 Idle mode.....	39
3.1.2.2 Dedicated mode.....	39
3.1.2.3 Group receive mode	40
3.1.2.4 Group transmit mode.....	40
3.1.2.5 Packet idle mode	40
3.1.2.6 Packet transfer mode	40
3.1.3 Services required from data link and physical layers	41
3.1.4 Change of dedicated channels.....	41
3.1.4.1 Change of dedicated channels using SAPI = 0.....	41
3.1.4.2 Change of dedicated channels using other SAPIs than 0.....	41
3.1.4.3 Sequenced message transfer operation	41
3.1.4.3.1 Variables and sequence numbers.....	42
3.1.4.3.1.2 Send sequence number N(SD)	42
3.1.4.3.2 Procedures for the initiation, transfer execution and termination of the sequenced message transfer operation.....	42
3.1.4.3.2.2 Transfer Execution.....	42
3.1.5 Procedure for Service Request and Contention Resolution	42
3.2 Idle mode procedures and general procedures in packet idle and packet transfer modes.....	43
3.2.1 Mobile Station side	43
3.2.2 Network side	43
3.2.2.1 System information broadcasting	43
3.2.2.2 Paging.....	45
3.3 RR connection establishment.....	45
3.3.1 RR connection establishment initiated by the mobile station.....	45
3.3.1.1 Entering the dedicated mode : immediate assignment procedure	45
3.3.1.1.1 Permission to access the network	45
3.3.1.1.2 Initiation of the immediate assignment procedure	45
3.3.1.1.3 Answer from the network	46
3.3.1.1.3.1 On receipt of a CHANNEL REQUEST message.....	46
3.3.1.1.3.2 Assignment rejection.....	47

3.3.1.1.4	Assignment completion	48
3.3.1.1.4.1	Early classmark sending.....	48
3.3.1.1.4.2	GPRS suspension procedure	48
3.3.1.1.5	Abnormal cases.....	48
3.3.1.2	Entering the group transmit mode: uplink access procedure	49
3.3.1.2.1	Mobile station side	49
3.3.1.2.1.1	Uplink investigation procedure	49
3.3.1.2.1.2	Uplink access procedure	49
3.3.1.2.2	Network side.....	50
3.3.1.2.3	Abnormal cases.....	50
3.3.1.3	Dedicated mode and GPRS	50
3.3.2	Paging procedure for RR connection establishment	51
3.3.2.1	Paging initiation by the network.....	51
3.3.2.1.1	Paging initiation using paging subchannel on CCCH	51
3.3.2.1.2	Paging initiation using paging subchannel on PCCCH.....	52
3.3.2.1.3	Paging initiation using PACCH.....	53
3.3.2.2	Paging response.....	53
3.3.2.3	Abnormal cases	53
3.3.3	Notification procedure	53
3.3.3.1	Notification of a call.....	53
3.3.3.2	Joining a VGCS or VBS call.....	54
3.3.3.3	Reduced NCH monitoring mechanism.....	54
3.4	Procedures in dedicated mode and in group transmit mode	55
3.4.1	SACCH procedures.....	55
3.4.1.1	General	55
3.4.1.2	Measurement report.....	56
3.4.1.3	Extended measurement report \$(MAFA)\$	56
3.4.2	Transfer of messages and link layer service provision.....	57
3.4.3	Channel assignment procedure.....	57
3.4.3.1	Channel assignment initiation.....	57
3.4.3.2	Assignment completion.....	58
3.4.3.3	Abnormal cases.....	59
3.4.4	Handover procedure.....	59
3.4.4.1	Handover initiation.....	60
3.4.4.2	Physical channel establishment	61
3.4.4.2.1	Finely synchronized cell case	61
3.4.4.2.2	Non synchronized cell case.....	61
3.4.4.2.3	Pseudo-synchronized cell case.....	62
3.4.4.2.4	Pre-synchronized cell case.....	62
3.4.4.3	Handover completion	63
3.4.4.4	Abnormal cases	63
3.4.5	Frequency redefinition procedure	64
3.4.5.1	Abnormal cases	64
3.4.6	Channel mode modify procedure	64
3.4.6.1	Normal channel mode modify procedure	65
3.4.6.1.1	Initiation of the channel mode modify procedure	65
3.4.6.1.2	Completion of channel mode modify procedure.....	65
3.4.6.1.3	Abnormal cases.....	65
3.4.6.2	Channel mode modify procedure for a voice group call talker.....	65
3.4.6.2.1	Initiation of the channel mode modify procedure	65
3.4.6.2.2	Completion of mode change procedure	66
3.4.6.2.3	Abnormal cases.....	66
3.4.7	Ciphering mode setting procedure	66
3.4.7.1	Ciphering mode setting initiation	66
3.4.7.2	Ciphering mode setting completion.....	66
3.4.8	Additional channel assignment procedure	67
3.4.8.1	Additional assignment procedure initiation.....	67
3.4.8.2	Additional assignment procedure completion	67
3.4.8.3	Abnormal cases	67
3.4.9	Partial channel release procedure.....	67

3.4.9.1	Partial release procedure initiation.....	68
3.4.9.2	Abnormal cases	68
3.4.10	Classmark change procedure	68
3.4.11	Classmark interrogation procedure	68
3.4.11.1	Classmark interrogation initiation	68
3.4.11.2	Classmark interrogation completion.....	68
3.4.12	Indication of notifications and paging information.....	69
3.4.13	RR connection release procedure.....	69
3.4.13.1	Normal release procedure.....	69
3.4.13.1.1	Channel release procedure initiation in dedicated mode and in group transmit mode.....	69
3.4.13.1.2	Abnormal cases.....	70
3.4.13.2	Radio link failure in dedicated mode.....	70
3.4.13.2.1	Mobile side	71
3.4.13.2.2	Network side.....	71
3.4.13.3	RR connection abortion in dedicated mode.....	71
3.4.13.4	Uplink release procedure in group transmit mode.....	71
3.4.13.5	Radio link failure in group transmit mode.....	71
3.4.13.5.1	Mobile side	72
3.4.13.5.2	Network side.....	72
3.4.14	Receiving a RR STATUS message by a RR entity	72
3.4.15	Group receive mode procedures	72
3.4.15.1	Mobile station side	72
3.4.15.1.1	Reception of the VGCS or VBS channel.....	72
3.4.15.1.2	Monitoring of downlink messages and related procedures	73
3.4.15.1.2.1	Spare	73
3.4.15.1.2.2	Spare	73
3.4.15.1.2.3	Channel mode modify procedure	73
3.4.15.1.2.4	Notification and paging information.....	73
3.4.15.1.2.4.1	Use of Reduced NCH monitoring.....	73
3.4.15.1.2.5	Uplink status messages.....	74
3.4.15.1.2.6	Channel release message.....	74
3.4.15.1.2.7	Information on paging channel restructuring.....	74
3.4.15.1.3	Uplink reply procedure.....	74
3.4.15.1.4	Leaving the group receive mode.....	74
3.4.15.2	Network side	75
3.4.15.2.1	Provision of messages on the VGCS or VBS channel downlink	75
3.4.15.2.2	Release of the VGCS or VBS Channels	76
3.4.15.3	Failure cases	76
3.4.16	Configuration change procedure	76
3.4.16.1	Configuration change initiation	76
3.4.16.2	Configuration change completion	76
3.4.16.3	Abnormal cases	76
3.4.17	Mapping of user data substreams onto timeslots in a multislot configuration.....	77
3.4.18	Handling of classmark information at band change	77
3.4.19	Assignment to a Packet Data channel	77
3.4.19.1	Assignment to PDCH initiation.....	78
3.4.19.2	Completion of the Assignment to PDCH procedure.....	79
3.4.19.3	Abnormal cases	79
3.4.20	RR-Network Commanded Cell Change Order	79
3.4.20.1	RR-network commanded cell change order initiation	80
3.4.20.2	Network controlled cell reselection completion	80
3.4.20.3	Abnormal cases	80
3.5	RR procedures on CCCH related to temporary block flow establishment.....	81
3.5.1	Packet paging procedure using CCCH.....	81
3.5.1.1	Packet paging initiation by the network	81
3.5.1.2	On receipt of a packet paging request	82
3.5.2	Packet access procedure using CCCH	82
3.5.2.1	Entering the packet transfer mode: packet access procedure.....	82
3.5.2.1.1	Permission to access the network	82
3.5.2.1.2	Initiation of the packet access procedure: channel request	82

3.5.2.1.3	Packet immediate assignment	83
3.5.2.1.4	Packet access completion	85
3.5.2.1.5	Abnormal cases.....	86
3.5.2.2	Sending an RLC/MAC control message: single block packet access procedure	86
3.5.3	Packet downlink assignment procedure using CCCH.....	86
3.5.3.1	Entering the packet transfer mode: packet downlink assignment procedure	86
3.5.3.1.2	Initiation of the packet downlink assignment procedure.....	86
3.5.3.1.3	Packet downlink assignment completion	88
3.5.3.1.4	Abnormal cases.....	88
3.5.3.2	Sending an RLC/MAC control message: single block packet downlink assignment procedure.....	88
4	Elementary procedures for Mobility Management	89
4.1	General	89
4.1.1	MM and GMM procedures	89
4.1.1.1	Types of MM and GMM procedures	89
4.1.1.2	MM-GMM co-ordination for GPRS MS's	91
4.1.1.2.1	GPRS MS operating in mode A or B in a network that operates in mode I.....	91
4.1.1.2.2	GPRS MS operating in mode A or B in a network that operates in mode II or III.....	91
4.1.2	MM sublayer states	91
4.1.2.1	MM sublayer states in the mobile station	92
4.1.2.1.1	Main states.....	92
4.1.2.1.2	Substates of the MM IDLE state.....	95
4.1.2.2	The update Status	96
4.1.2.3	MM sublayer states on the network side	97
4.1.3	GPRS mobility management (GMM) sublayer states	98
4.1.3.1	GMM states in the MS	98
4.1.3.1.1	Main states.....	98
4.1.3.1.1.1	GMM-NULL.....	98
4.1.3.1.1.2	GMM-DEREGISTERED.....	98
4.1.3.1.1.3	GMM-REGISTERED-INITIATED.....	98
4.1.3.1.1.4	GMM-REGISTERED.....	99
4.1.3.1.1.5	GMM-DEREGISTERED-INITIATED.....	99
4.1.3.1.2.5	GMM-DEREGISTERED.NO-IMSI.....	99
4.1.3.1.2.6	GMM-DEREGISTERED.NO-CELL-AVAILABLE.....	99
4.1.3.1.2.7	GMM-DEREGISTERED.PLMN-SEARCH.....	99
4.1.3.1.2.8	GMM-DEREGISTERED.SUSPENDED.....	100
4.1.3.1.3	Substates of state GMM-REGISTERED	100
4.1.3.1.3.1	GMM-REGISTERED.NORMAL-SERVICE	100
4.1.3.1.3.2	GMM-REGISTERED.SUSPENDED.....	100
4.1.3.1.3.3	GMM-REGISTERED.UPDATE-NEEDED	100
4.1.3.1.3.4	GMM-REGISTERED.ATTEMPTING-TO-UPDATE.....	100
4.1.3.1.3.5	GMM-REGISTERED.NO-CELL-AVAILABLE	100
4.1.3.1.3.7	GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM	101
4.1.3.2	GPRS update status	101
4.1.3.3	GMM mobility management states on the network side.....	102
4.1.3.3.1	Main States	102
4.1.3.3.1.1	GMM-DEREGISTERED.....	102
4.1.3.3.1.2	GMM-COMMON-PROCEDURE-INITIATED	102
4.1.3.3.1.3	GMM-REGISTERED	102
4.1.3.3.1.4	GMM-DEREGISTERED-INITIATED	102
4.1.3.3.2	Substates of state GMM-REGISTERED	103
4.1.3.3.2.1	GMM-REGISTERED.NORMAL-SERVICE	103
4.1.3.3.2.2	GMM-REGISTERED.SUSPENDED	103
4.2	Behaviour of the MS in MM Idle state, GMM-DEREGISTERED state and GMM-REGISTERED state.....	103
4.2.1	Primary Service State selection.....	104
4.2.1.1	Selection of the Service State after Power On.....	104
4.2.1.2	Other Cases	104
4.2.2	Detailed Description of the MS behaviour in MM IDLE State.....	105
4.2.2.1	Service State, NORMAL SERVICE	105
4.2.2.2	Service State, ATTEMPTING TO UPDATE	105
4.2.2.3	Service State, LIMITED SERVICE.....	106

4.2.2.4	Service State, NO IMSI.....	106
4.2.2.5	Service State, SEARCH FOR PLMN, NORMAL SERVICE.....	107
4.2.2.6	Service State, SEARCH FOR PLMN.....	107
4.2.2.7	Service State, RECEIVING GROUP CALL (NORMAL SERVICE).....	107
4.2.2.8	Service State, RECEIVING GROUP CALL (LIMITED SERVICE).....	108
4.2.3	Service state when back to state MM IDLE from another state.....	108
4.2.4	Behaviour in state GMM-DEREGISTERED.....	109
4.2.4.1	Primary substate selection.....	109
4.2.4.1.1	Selection of the substate after power on or enabling the MS's GPRS capability.....	109
4.2.4.1.2	Other Cases.....	110
4.2.4.2	Detailed description of the MS behaviour in state GMM-DEREGISTERED.....	110
4.2.4.2.1	Substate, NORMAL-SERVICE.....	110
4.2.4.2.2	Substate, ATTEMPTING-TO-ATTACH.....	110
4.2.4.2.3	Substate, LIMITED-SERVICE.....	110
4.2.4.2.4	Substate, NO-IMSI.....	110
4.2.4.2.5	Substate, NO-CELL.....	110
4.2.4.2.6	Substate, PLMN-SEARCH.....	111
4.2.4.2.7	Substate, ATTACH-NEEDED.....	111
4.2.4.2.8	Substate, SUSPENDED.....	111
4.2.4.3	Substate when back to state GMM-DEREGISTERED from another GMM state.....	111
4.2.5	Behaviour in state GMM-REGISTERED.....	111
4.2.5.1	Detailed description of the MS behaviour in state GMM-REGISTERED.....	112
4.2.5.1.1	Substate, NORMAL-SERVICE.....	112
4.2.5.1.2	Substate, SUSPENDED.....	112
4.2.5.1.3	Substate, UPDATE-NEEDED.....	112
4.2.5.1.4	Substate, ATTEMPTING-TO-UPDATE.....	112
4.2.5.1.5	Substate, NO-CELL-AVAILABLE.....	112
4.2.5.1.6	Substate, LIMITED-SERVICE.....	113
4.2.5.1.7	Substate, ATTEMPTING-TO-UPDATE-MM.....	113
4.3	MM common procedures.....	113
4.3.1	TMSI reallocation procedure.....	113
4.3.1.1	TMSI reallocation initiation by the network.....	113
4.3.1.2	TMSI reallocation completion by the mobile station.....	114
4.3.1.3	TMSI reallocation completion in the network.....	114
4.3.1.4	Abnormal cases.....	114
4.3.2	Authentication procedure.....	115
4.3.2.1	Authentication request by the network.....	115
4.3.2.2	Authentication response by the mobile station.....	115
4.3.2.3	Authentication processing in the network.....	115
4.3.2.4	Ciphering key sequence number.....	115
4.3.2.5	Unsuccessful authentication.....	115
4.3.2.6	Abnormal cases.....	116
4.3.3	Identification procedure.....	116
4.3.3.1	Identity request by the network.....	117
4.3.3.2	Identification response by the mobile station.....	117
4.3.3.3	Abnormal cases.....	117
4.3.4	IMSI detach procedure.....	117
4.3.4.1	IMSI detach initiation by the mobile station.....	117
4.3.4.2	IMSI detach procedure in the network.....	118
4.3.4.3	IMSI detach completion by the mobile station.....	118
4.3.4.4	Abnormal cases.....	118
4.3.5	Abort procedure.....	118
4.3.5.1	Abort procedure initiation by the network.....	118
4.3.5.2	Abort procedure in the mobile station.....	118
4.3.6	MM information procedure.....	119
4.3.6.1	MM information procedure initiation by the network.....	119
4.3.6.2	MM information procedure in the mobile station.....	119
4.4	MM specific procedures.....	119
4.4.1	Location updating procedure.....	119
4.4.2	Periodic updating.....	120

4.4.3	IMSI attach procedure	121
4.4.4	Generic Location Updating procedure	121
4.4.4.1	Location updating initiation by the mobile station	121
4.4.4.1a	Network Request for Additional mobile station Capability Information	121
4.4.4.2	Identification request from the network	121
4.4.4.3	Authentication by the network	121
4.4.4.4	Ciphering mode setting by the network	122
4.4.4.5	Attempt Counter	122
4.4.4.6	Location updating accepted by the network	122
4.4.4.7	Location updating not accepted by the network	123
4.4.4.8	Release of RR connection after location updating	123
4.4.4.9	Abnormal cases on the mobile station side	123
4.4.4.10	Abnormal cases on the network side	124
4.5	Connection management sublayer service provision	125
4.5.1	MM connection establishment	125
4.5.1.1	MM connection establishment initiated by the mobile station	125
4.5.1.2	Abnormal cases	128
4.5.1.3	MM connection establishment initiated by the network	129
4.5.1.3.1	Mobile Terminating CM Activity	129
4.5.1.3.2	Mobile Originating CM Activity \$(CCBS)\$	129
4.5.1.4	Abnormal cases	130
4.5.1.5	MM connection establishment for emergency calls	130
4.5.1.6	Call re-establishment	131
4.5.1.6.1	Call re-establishment, initiation by the mobile station	131
4.5.1.6.2	Abnormal cases	133
4.5.1.7	Forced release during MO MM connection establishment	133
4.5.2	MM connection information transfer phase	134
4.5.2.1	Sending CM messages	134
4.5.2.2	Receiving CM messages	134
4.5.2.3	Abnormal cases	134
4.5.3	MM connection release	134
4.5.3.1	Release of associated RR connection	135
4.5.3.2	Uplink release in a voice group call	135
4.6	Receiving a MM STATUS message by a MM entity	135
4.7	Elementary mobility management procedures for GPRS services	135
4.7.1	General	135
4.7.1.1	Lower layer failure	135
4.7.1.2	Ciphering of messages	135
4.7.1.3	P-TMSI signature	136
4.7.1.4	Radio resource sublayer address handling	136
4.7.1.5	P-TMSI handling	137
4.7.1.6	Change of network mode of operation	137
4.7.2	GPRS Mobility management timers	138
4.7.2.1	READY timer behaviour	138
4.7.2.2	Periodic routing area updating	139
4.7.3	GPRS attach procedure	140
4.7.3.1	GPRS attach procedure for GPRS services	141
4.7.3.1.1	GPRS attach procedure initiation	141
4.7.3.1.2	GMM common procedure initiation	141
4.7.3.1.3	GPRS attach accepted by the network	141
4.7.3.1.4	GPRS attach not accepted by the network	142
4.7.3.1.5	Abnormal cases in the MS	143
4.7.3.1.6	Abnormal cases on the network side	144
4.7.3.2	Combined GPRS attach procedure for GPRS and non-GPRS services	145
4.7.3.2.1	Combined GPRS attach procedure initiation	145
4.7.3.2.2	GMM Common procedure initiation	145
4.7.3.2.3	Combined GPRS attach accepted by the network	146
4.7.3.2.3.1	Combined attach successful for GPRS and non-GPRS services	146
4.7.3.2.3.2	Combined attach successful for GPRS services only	146
4.7.3.2.4	Combined GPRS attach not accepted by the network	147

4.7.3.2.5	Abnormal cases in the MS	148
4.7.3.2.6	Abnormal cases on the network side	148
4.7.4	GPRS detach procedure	148
4.7.4.1	MS initiated GPRS detach procedure	148
4.7.4.1.1	MS initiated GPRS detach procedure initiation	148
4.7.4.1.2	MS initiated GPRS detach procedure completion for GPRS services only	149
4.7.4.1.3	MS initiated combined GPRS detach procedure completion	149
4.7.4.1.4	Abnormal cases in the MS	149
4.7.4.2	Network initiated GPRS detach procedure	150
4.7.4.2.1	Network initiated GPRS detach procedure initiation	150
4.7.4.2.2	Network initiated GPRS detach procedure completion by the MS	150
4.7.4.2.3	Network initiated GPRS detach procedure completion by the network	152
4.7.4.2.4	Abnormal cases on the network side	152
4.7.5	Routing area updating procedure	153
4.7.5.1	Normal and periodic routing area updating procedure	153
4.7.5.1.1	Normal and periodic routing area updating procedure initiation	154
4.7.5.1.2	GMM Common procedure initiation	154
4.7.5.1.3	Normal and periodic routing area updating procedure accepted by the network	154
4.7.5.1.4	Normal and periodic routing area updating procedure not accepted by the network	154
4.7.5.1.5	Abnormal cases in the MS	155
4.7.5.1.6	Abnormal cases on the network side	156
4.7.5.2	Combined routing area updating procedure	157
4.7.5.2.1	Combined routing area updating procedure initiation	157
4.7.5.2.2	GMM Common procedure initiation	158
4.7.5.2.3	Combined routing area updating procedure accepted by the network	158
4.7.5.2.3.1	Combined routing area updating successful	158
4.7.5.2.3.2	Combined routing area updating successful for GPRS services only	159
4.7.5.2.4	Combined routing area updating not accepted by the network	160
4.7.5.2.5	Abnormal cases in the MS	160
4.7.5.2.6	Abnormal cases on the network side	161
4.7.6	P-TMSI reallocation procedure	161
4.7.6.1	P-TMSI reallocation initiation by the network	161
4.7.6.2	P-TMSI reallocation completion by the MS	161
4.7.6.3	P-TMSI reallocation completion by the network	162
4.7.6.4	Abnormal cases on the network side	162
4.7.7	Authentication and ciphering procedure	163
4.7.7.1	Authentication and ciphering initiation by the network	163
4.7.7.2	Authentication and ciphering response by the MS	164
4.7.7.3	Authentication and ciphering completion by the network	164
4.7.7.4	GPRS ciphering key sequence number	164
4.7.7.5	Unsuccessful authentication and ciphering	165
4.7.7.6	Abnormal cases on the network side	165
4.7.8	Identification procedure	166
4.7.8.1	Identification initiation by the network	166
4.7.8.2	Identification response by the MS	166
4.7.8.3	Identification completion by the network	166
4.7.8.4	Abnormal cases on the network side	166
4.7.9	Paging procedure	168
4.7.9.1	Paging for GPRS services	168
4.7.9.1.1	Paging for GPRS services using P-TMSI	168
4.7.9.1.2	Paging for GPRS services using IMSI	168
4.7.9.2	Paging for non-GPRS services	168
4.7.10	Receiving a GMM STATUS message by a GMM entity	168
4.7.11	GMM support for anonymous access	169
4.7.11.1	MS side	169
4.7.11.2	Network side	169
4.7.12	GMM Information procedure	169
4.7.12.1	GMM information procedure initiation by the network	169
4.7.12.2	GMM information procedure in the mobile station	169

5	Elementary procedures for circuit-switched Call Control	170
5.1	Overview	170
5.1.1	General.....	170
5.1.2	Call Control States	174
5.1.2.1	Call states at the mobile station side of the interface.....	174
5.1.2.1.1	Null (State U0)	174
5.1.2.1.2	MM Connection pending (U0.1)	174
5.1.2.1.2a	CC prompt present (U0.2) \$(CCBS)\$	175
5.1.2.1.2b	Wait for network information (U0.3) \$(CCBS)\$.....	175
5.1.2.1.2c	CC-Establishment present (U0.4) \$(CCBS)\$	175
5.1.2.1.2d	CC-Establishment confirmed (U0.5) \$(CCBS)\$.....	175
5.1.2.1.2e	Recall present (U0.6) \$(CCBS)\$	175
5.1.2.1.3	Call initiated (U1).....	175
5.1.2.1.4	Mobile originating call proceeding (U3)	175
5.1.2.1.5	Call delivered (U4).....	175
5.1.2.1.6	Call present (U6)	175
5.1.2.1.7	Call received (U7)	175
5.1.2.1.8	Connect Request (U8)	175
5.1.2.1.9	Mobile terminating call confirmed (U9).....	176
5.1.2.1.10	Active (U10).....	176
5.1.2.1.11	Disconnect request (U11)	176
5.1.2.1.12	Disconnect indication (U12).....	176
5.1.2.1.13	Release request (U19).....	176
5.1.2.1.14	Mobile originating modify (U26)	176
5.1.2.1.15	Mobile terminating modify (U27)	176
5.1.2.2	Network call states	176
5.1.2.2.1	Null (State N0)	176
5.1.2.2.2	MM connection pending (N0.1).....	176
5.1.2.2.2a	CC connection pending (N0.2) \$(CCBS)\$	176
5.1.2.2.2b	Network answer pending (N0.3) \$(CCBS)\$	176
5.1.2.2.2c	CC-Establishment present (N0.4) \$(CCBS)\$	177
5.1.2.2.2d	CC-Establishment confirmed (N0.5) \$(CCBS)\$	177
5.1.2.2.3	Call initiated (N1)	177
5.1.2.2.4	Mobile originating call proceeding (N3)	177
5.1.2.2.5	Call delivered (N4).....	177
5.1.2.2.6	Call present (N6)	177
5.1.2.2.7	Call received (N7)	177
5.1.2.2.8	Connect request (N8).....	177
5.1.2.2.9	Mobile terminating call confirmed (N9).....	177
5.1.2.2.10	Active (N10).....	177
5.1.2.2.11	Not used.....	177
5.1.2.2.12	Disconnect indication (N12).....	177
5.1.2.2.13	Release request (N19).....	178
5.1.2.2.14	Mobile originating modify (N26)	178
5.1.2.2.15	Mobile terminating modify (N27)	178
5.1.2.2.16	Connect Indication (N28)	178
5.2	Call establishment procedures	178
5.2.1	Mobile originating call establishment	178
5.2.1.1	Call initiation.....	179
5.2.1.2	Receipt of a setup message.....	179
5.2.1.3	Receipt of a CALL PROCEEDING message.....	180
5.2.1.4	Notification of progressing mobile originated call	181
5.2.1.4.1	Notification of interworking in connection with mobile originated call establishment.....	181
5.2.1.4.2	Call progress in the PLMN/ISDN environment.....	181
5.2.1.5	Alerting	181
5.2.1.6	Call connected.....	182
5.2.1.7	Call rejection.....	183
5.2.1.8	Transit network selection	183
5.2.1.9	Traffic channel assignment at mobile originating call establishment	183
5.2.1.10	Call queuing at mobile originating call establishment.....	183

5.2.2	Mobile terminating call establishment	183
5.2.2.1	Call indication	183
5.2.2.2	Compatibility checking	184
5.2.2.3	Call confirmation.....	184
5.2.2.3.1	Response to SETUP	184
5.2.2.3.2	Receipt of CALL CONFIRMED and ALERTING by the network.....	185
5.2.2.3.3	Call failure procedures.....	185
5.2.2.3.4	Called mobile station clearing during mobile terminating call establishment.....	185
5.2.2.4	Notification of interworking in connection with mobile terminating call establishment	185
5.2.2.5	Call accept.....	186
5.2.2.6	Active indication	186
5.2.2.7	Traffic channel assignment at mobile terminating call establishment	186
5.2.2.8	Call queuing at mobile terminating call establishment	186
5.2.2.9	User connection attachment during a mobile terminating call.....	187
5.2.3	Network initiated MO call \$(CCBS)\$.....	187
5.2.3.1	Initiation	187
5.2.3.2	CC-Establishment present	187
5.2.3.2.1	Recall Alignment Procedure.....	188
5.2.3.3	CC-Establishment confirmation	189
5.2.3.4	Recall present.....	189
5.2.3.5	Traffic channel assignment during network initiated mobile originating call establishment.....	190
5.3	Signalling procedures during the "active" state	190
5.3.1	User notification procedure.....	190
5.3.2	Call rearrangements	190
5.3.3	Not used.....	191
5.3.4	Support of Dual Services	191
5.3.4.1	Service Description.....	191
5.3.4.2	Call establishment	191
5.3.4.2.1	Mobile Originating Establishment.....	191
5.3.4.2.2	Mobile Terminating Establishment.....	192
5.3.4.3	Changing the Call Mode.....	192
5.3.4.3.1	Initiation of in-call modification.....	193
5.3.4.3.2	Successful completion of in-call modification.....	193
5.3.4.3.3	Change of the channel configuration	193
5.3.4.3.4	Failure of in-call modification	193
5.3.4.3.4.1	Network rejection of in-call modification	193
5.3.4.3.4.2	Mobile station rejection of in-call modification.....	194
5.3.4.3.4.3	Time-out recovery.....	194
5.3.4.4	Abnormal procedures	194
5.3.5	User initiated service level up- and downgrading	194
5.3.5.1	Initiation of service level up- and downgrading	195
5.3.5.2	Successful completion of service level up- and downgrading.....	195
5.3.5.3	Rejection of service level up- and downgrading	195
5.3.5.4	Time-out recovery	195
5.4	Call clearing	195
5.4.1	Terminology.....	195
5.4.2	Exception conditions.....	196
5.4.3	Clearing initiated by the mobile station	196
5.4.3.1	Initiation of call clearing	196
5.4.3.2	Receipt of a DISCONNECT message from the mobile station	196
5.4.3.3	Receipt of a RELEASE message from the network	197
5.4.3.4	Receipt of a RELEASE COMPLETE message from the mobile station.....	197
5.4.3.5	Abnormal cases	197
5.4.4	Clearing initiated by the network	197
5.4.4.1	Clearing initiated by the network: mobile does not support "Prolonged Clearing Procedure".....	197
5.4.4.1.1	Clearing when tones/announcements provided.....	197
5.4.4.1.2	Clearing when tones/announcements not provided.....	198
5.4.4.1.3	Completion of clearing	198
5.4.4.2	Clearing initiated by the network: mobile supports "Prolonged Clearing Procedure"	199

5.4.4.2.1	Clearing when tones/announcements provided and the network does not indicate that “CCBS activation is possible”	199
5.4.4.2.2	Clearing when the network indicates that “CCBS activation is possible”	199
5.4.4.2.3	Clearing when tones/announcements are not provided and the network does not indicate that “CCBS activation is possible”	200
5.4.4.2.4	Receipt of a RELEASE message from the mobile station	201
5.4.4.2.5	Completion of clearing	201
5.4.5	Clear collision	202
5.5	Miscellaneous procedures	202
5.5.1	In-band tones and announcements	202
5.5.2	Call collisions	202
5.5.3	Status procedures	203
5.5.3.1	Status enquiry procedure	203
5.5.3.2	Reception of a STATUS message by a CC entity	203
5.5.3.2.1	STATUS message with incompatible state	203
5.5.3.2.2	STATUS message with compatible state	203
5.5.4	Call re-establishment, mobile station side	203
5.5.4.1	Indication from the mobility management sublayer	204
5.5.4.2	Reaction of call control	204
5.5.4.3	Completion of re-establishment	204
5.5.4.4	Unsuccessful outcome	204
5.5.5	Call re-establishment, network side	204
5.5.5.1	State alignment	204
5.5.6	Progress	204
5.5.7	DTMF protocol control procedure	205
5.5.7.1	Start DTMF request by the mobile station	205
5.5.7.2	Start DTMF response by the network	205
5.5.7.3	Stop DTMF request by the mobile station	205
5.5.7.4	Stop DTMF response by the network	205
5.5.7.5	Sequencing of subsequent start DTMF requests by the mobile station	205
6	Support for packet services	206
6.1	GPRS Session management	206
6.1.1	General	206
6.1.1.1	Radio resource sublayer address handling for anonymous access	207
6.1.2	Session management states	207
6.1.2.1	Session management states in the MS	207
6.1.2.1.1	PDP-INACTIVE	207
6.1.2.1.2	PDP-ACTIVE-PENDING	207
6.1.2.1.3	PDP-INACTIVE-PENDING	207
6.1.2.1.4	PDP-ACTIVE	207
6.1.2.2	Session management states on the network side	208
6.1.2.2.1	PDP-INACTIVE	208
6.1.2.2.2	PDP-ACTIVE-PENDING	208
6.1.2.2.3	PDP-INACTIVE-PENDING	208
6.1.2.2.4	PDP-ACTIVE	208
6.1.2.2.5	PDP-MODIFY-PENDING	208
6.1.3	Session Management procedures	209
6.1.3.1	PDP context activation	209
6.1.3.1.1	Successful PDP context activation initiated by the mobile station	209
6.1.3.1.2	Successful PDP context activation requested by the network	210
6.1.3.1.3	Unsuccessful PDP context activation initiated by the MS	210
6.1.3.1.4	Unsuccessful PDP context activation requested by the network	210
6.1.3.1.5	Abnormal cases	210
6.1.3.2	PDP context modification procedure	212
6.1.3.2.1	Abnormal cases	212
6.1.3.3	PDP context deactivation procedure	213
6.1.3.3.1	PDP context deactivation initiated by the MS	213
6.1.3.3.2	PDP context deactivation initiated by the network	213
6.1.3.3.3	Abnormal cases	213
6.1.3.4	AA PDP context activation	214

6.1.3.4.1	Successful AA PDP context activation initiated by the mobile station.....	214
6.1.3.4.2	Unsuccessful AA PDP context activation.....	215
6.1.3.4.3	Abnormal cases.....	215
6.1.3.5	AA PDP context deactivation.....	215
6.1.3.5.1	Implicit AA PDP context deactivation	215
6.1.3.5.2	Explicit AA PDP context deactivation	216
6.1.3.5.3	Abnormal cases.....	216
6.1.3.6	Receiving a SM STATUS message by a SM entity	216
7	Examples of structured procedures	216
7.1	General	217
7.1.1	Paging request.....	217
7.1.2	Immediate assignment.....	217
7.1.3	Service request and contention resolution.....	218
7.1.4	Authentication.....	218
7.1.5	Ciphering mode setting	218
7.1.6	Transaction phase	219
7.1.6.1	Channel mode modify	219
7.1.7	Channel release	219
7.2	Abnormal cases	219
7.3	Selected examples	219
7.3.1	Location updating	220
7.3.2	Mobile originating call establishment	221
7.3.3	Mobile terminating call establishment	225
7.3.4	Call clearing.....	227
7.3.5	DTMF protocol control.....	228
7.3.6	Handover	229
7.3.7	In-call modification.....	230
7.3.8	Call re-establishment.....	231
7.3.9	Network initiated mobile originating call \$(CCBS)\$.....	232
8	Handling of unknown, unforeseen, and erroneous protocol data	237
8.1	General	237
8.2	Message too short.....	237
8.3	Unknown or unforeseen transaction identifier.....	238
8.3.1	Call Control	238
8.3.2	Session Management.....	238
8.4	Unknown or unforeseen message type.....	239
8.5	Non-semantic mandatory information element errors.....	240
8.5.1	Radio resource management	240
8.5.2	Mobility management	240
8.5.3	Call control	240
8.5.4	GMM mobility management.....	241
8.5.5	Session management	241
8.6	Unknown and unforeseen IEs in the non-imperative message part.....	241
8.6.1	IEs unknown in the message.....	241
8.6.2	Out of sequence IEs	241
8.6.3	Repeated IEs	241
8.7	Non-imperative message part errors	242
8.7.1	Syntactically incorrect optional IEs	242
8.7.2	Conditional IE errors	242
8.8	Messages with semantically incorrect contents	242
9	Message functional definitions and contents	242
9.1	Messages for Radio Resources management.....	243
9.1.1	Additional assignment.....	245
9.1.1.1	Mobile Allocation	246
9.1.1.2	Starting Time.....	246
9.1.2	Assignment command.....	246
9.1.2.1	Mode of the First Channel (Channel Set 1) and Mode of Channel Set "X" (2= X =<8).....	247
9.1.2.2	Description of the Second Channel	248