

SLOVENSKI STANDARD
SIST EN 300 940 V6.2.1:2005

01-februar-2005

8][JhUb]WW] b]hYY_ca i b]_UWg]g]ghYa fUhU&ž! Ja Ygb]_nUa cV]b]fUX)c!
GdYwZ_UWYUfYhY'd`Ugh]f] GA \$('\$, žfUn]]WJ* "&%ž]nXUJ% - +Ł

Digital cellular telecommunications system (Phase 2+) (GSM); Mobile radio interface;
Layer 3 specification (GSM 04.08 version 6.2.1 Release 1997)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: [SIST EN 300 940 V6.2.1:2005
https://standards.iteh.ai/catalog/standards/sist/dect21ad-8c37-44da-aafa-91a3b2fc665d/sist-en-300-940-v6-2-1-2005](https://standards.iteh.ai/catalog/standards/sist/dect21ad-8c37-44da-aafa-91a3b2fc665d/sist-en-300-940-v6-2-1-2005)

ICS:

33.070.01 Mobilni servisi na splošno Mobile services in general

SIST EN 300 940 V6.2.1:2005 en

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

SIST EN 300 940 V6.2.1:2005

<https://standards.iteh.ai/catalog/standards/sist/decf21ad-8c37-44da-aafa-91a3b2fc665d/sist-en-300-940-v6-2-1-2005>

EN 300 940 V6.2.1 (1990-04)

European Standard (Telecommunications series)

Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification (GSM 04.08 version 6.2.1 Release 1997)



Reference

DEN/SMG-030408Q6 (8pc030oo.PDF)**Keywords**

Digital cellular telecommunications system,
Global System for Mobile communications (GSM)***ETSI*****Postal address**

F-06921 Sophia Antipolis Cedex FRANCE**(standards.etsi.ai)**

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 8c37-44da-aafa-
Association à but non lucratif enregistrée à la
Sous-Prefecture de Grasse (06) N° 7803/88**Internet**

secretariat@etsi.frIndividual copies of this ETSI deliverable
can be downloaded from
<http://www.etsi.org>***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.....	26
Foreword	26
Introduction	26
0 Scope	28
0.1 Scope of the Technical Specification.....	28
0.2 Application to the interface structures	28
0.3 Structure of layer 3 procedures	28
0.4 Test procedures.....	28
0.5 Use of logical channels	28
0.6 Overview of control procedures.....	29
0.6.1 List of procedures.....	29
0.7 Applicability of implementations.....	31
0.7.1 Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS).....	31
0.7.2 General Packet Radio Service (GPRS)	32
1 Normative references	32
2 Definitions and abbreviations	36
2.1 Random values.....	36
2.2 Vocabulary.....	36
3 Radio Resource management procedures.....	37
3.1 Overview/General.....	37
3.1.1 General	37
3.1.2 Services provided to upper layers	38
3.1.2.1 Idle mode.....	38
3.1.2.2 Dedicated mode.....	38
3.1.2.3 Group receive mode.....	38
3.1.2.4 Group transmit mode	39
3.1.2.5 Packet idle mode.....	39
3.1.2.6 Packet transfer mode	39
3.1.3 Services required from data link and physical layers	39
3.1.4 Change of dedicated channels	40
3.1.4.1 Change of dedicated channels using SAPI = 0	40
3.1.4.2 Change of dedicated channels using other SAPIs than 0	40
3.1.4.3 Sequenced message transfer operation	40
3.1.4.3.1 Variables and sequence numbers	40
3.1.4.3.1.2 Send sequence number N(SD)	40
3.1.4.3.2 Procedures for the initiation, transfer execution and termination of the sequenced message transfer operation	41
3.1.4.3.2.2 Transfer Execution.....	41
3.1.5 Procedure for Service Request and Contention Resolution.....	41
3.2 Idle mode and packet idle mode procedures	42
3.2.1 Mobile Station side	42
3.2.1.1 Mobile station supporting GPRS	42
3.2.2 Network side	43
3.2.2.1 System information broadcasting.....	43
3.2.2.2 Paging	44
3.3 RR connection establishment.....	44
3.3.1 RR connection establishment initiated by the mobile station	44
3.3.1.1 Entering the dedicated mode : immediate assignment procedure	44
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.....	47
3.3.1.1.4.1	Early classmark sending.....	47
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.....	50
3.3.2.1	Paging initiation by the network	50
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	52
3.3.2.2	Paging response	52
3.3.2.3	Abnormal cases.....	52
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	53
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	55
3.4.1.3	Extended measurement report \$(MRAA)\$	56
3.4.2	Transfer of messages and link layer service provision	56
3.4.3	Channel assignment procedure	56
3.4.3.1	Channel assignment initiation.....	57
3.4.3.2	Assignment completion	58
3.4.3.3	Abnormal cases.....	58
3.4.4	Handover procedure	59
3.4.4.1	Handover initiation	59
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	61
3.4.4.2.4	Pre-synchronized cell case	62
3.4.4.3	Handover completion	62
3.4.4.4	Abnormal cases.....	62
3.4.5	Frequency redefinition procedure.....	63
3.4.5.1	Abnormal cases.....	63
3.4.6	Channel mode modify procedure	64
3.4.6.1	Normal channel mode modify procedure.....	64
3.4.6.1.1	Initiation of the channel mode modify procedure	64
3.4.6.1.2	Completion of channel mode modify procedure	64
3.4.6.1.3	Abnormal cases.....	64
3.4.6.2	Channel mode modify procedure for a voice group call talker.....	64
3.4.6.2.1	Initiation of the channel mode modify procedure	64
3.4.6.2.2	Completion of mode change procedure.....	65
3.4.6.2.3	Abnormal cases.....	65
3.4.7	Ciphering mode setting procedure.....	65
3.4.7.1	Ciphering mode setting initiation.....	65
3.4.7.2	Ciphering mode setting completion	65
3.4.8	Additional channel assignment procedure	66
3.4.8.1	Additional assignment procedure initiation	66
3.4.8.2	Additional assignment procedure completion.....	66
3.4.8.3	Abnormal cases.....	66
3.4.9	Partial channel release procedure	67
3.4.9.1	Partial release procedure initiation	67

3.4.9.2	Abnormal cases.....	67
3.4.10	Classmark change procedure	67
3.4.11	Classmark interrogation procedure.....	67
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	68
3.4.13	RR connection release procedure.....	68
3.4.13.1	Normal release procedure	68
3.4.13.1.1	Channel release procedure initiation in dedicated mode and in group transmit mode	68
3.4.13.1.2	Abnormal cases	69
3.4.13.2	Radio link failure in dedicated mode	69
3.4.13.2.1	Mobile side	70
3.4.13.2.2	Network side	70
3.4.13.3	RR connection abortion in dedicated mode	70
3.4.13.4	Uplink release procedure in group transmit mode	70
3.4.13.5	Radio link failure in group transmit mode	71
3.4.13.5.1	Mobile side	71
3.4.13.5.2	Network side	71
3.4.14	Receiving a RR STATUS message by a RR entity.	71
3.4.15	Group receive mode procedures.....	71
3.4.15.1	Mobile station side	71
3.4.15.1.1	Reception of the VGCS or VBS channel	71
3.4.15.1.2	Monitoring of downlink messages and related procedures	72
3.4.15.1.2.1	Spare.....	72
3.4.15.1.2.2	Spare.....	72
3.4.15.1.2.3	Channel mode modify procedure.....	72
3.4.15.1.2.4	Notification and paging information.....	72
3.4.15.1.2.4.1	Use of Reduced NCH monitoring.....	72
3.4.15.1.2.5	Uplink status messages.....	73
3.4.15.1.2.6	Channel release message	73
3.4.15.1.2.7	Information on paging channel restructuring.....	73
3.4.15.1.3	Uplink reply procedure	73
3.4.15.1.4	Leaving the group receive mode	73
3.4.15.2	Network side.....	74
3.4.15.2.1	Provision of messages on the VGCS or VBS channel downlink.....	74
3.4.15.2.2	Release of the VGCS or VBS Channels.....	75
3.4.15.3	Failure cases	75
3.4.16	Configuration change procedure	75
3.4.16.1	Configuration change initiation	75
3.4.16.2	Configuration change completion.....	75
3.4.16.3	Abnormal cases.....	75
3.4.17	Mapping of user data substreams onto timeslots in a multislot configuration	76
3.4.18	Handling of classmark information at band change.....	76
3.4.19	Assignment to a Packet Data channel.....	76
3.4.19.1	Assignment to PDCH initiation	77
3.4.19.2	Completion of the Assignment to PDCH procedure	78
3.4.19.3	Abnormal cases.....	78
3.4.20	RR-Network Commanded Cell Change Order	78
3.4.20.1	RR-network commanded cell change order initiation	79
3.4.20.2	Network controlled cell reselection completion	79
3.4.20.3	Abnormal cases.....	79
3.5	RR procedures on CCCH related to temporary block flow establishment	80
3.5.1	Packet paging procedure using CCCH	80
3.5.1.1	Packet paging initiation by the network.....	80
3.5.1.2	On receipt of a packet paging request.....	81
3.5.2	Packet access procedure using CCCH.....	81
3.5.2.1	Entering the packet transfer mode: packet access procedure	81
3.5.2.1.1	Permission to access the network.....	81
3.5.2.1.2	Initiation of the packet access procedure: channel request.....	81
3.5.2.1.3	Packet immediate assignment	82
3.5.2.1.4	Packet access completion	84

3.5.2.1.5	Abnormal cases	84
3.5.3	Packet downlink assignment procedure using CCCH	84
3.5.3.1	Entering the packet transfer mode: packet downlink assignment procedure.....	84
3.5.3.1.2	Initiation of the packet downlink assignment procedure	84
3.5.3.1.3	Packet downlink assignment completion	85
3.5.3.1.4	Abnormal cases	85
3.5.3.2	Sending an RLC/MAC control message: single block packet downlink assignment procedure	86
4	Elementary procedures for Mobility Management	86
4.1	General.....	86
4.1.1	Type of MM and GMM procedures	87
4.1.2	MM sublayer states	88
4.1.2.1	MM sublayer states in the mobile station	88
4.1.2.1.1	Main states	88
4.1.2.1.2	Substates of the MM IDLE state	92
4.1.2.2	The update Status	93
4.1.2.3	MM sublayer states on the network side.....	94
4.1.3	GPRS mobility management (GMM) sublayer states.....	95
4.1.3.1	GMM states in the MS.....	95
4.1.3.1.1	Main states	95
4.1.3.1.1.1	GMM-NULL	95
4.1.3.1.1.2	GMM-DEREGISTERED	95
4.1.3.1.1.3	GMM-REGISTERED-INITIATED	95
4.1.3.1.1.4	GMM-REGISTERED	95
4.1.3.1.1.5	GMM-DEREGISTERED-INITIATED	96
4.1.3.1.2.5	GMM-DEREGISTERED.NO-IMSI.....	96
4.1.3.1.2.6	GMM-DEREGISTERED.NO-CELL-AVAILABLE	96
4.1.3.1.2.7	GMM-DEREGISTERED.PLMN-SEARCH	96
4.1.3.1.3	Substates of state GMM-REGISTERED	96
4.1.3.1.3.1	GMM-REGISTERED.NORMAL-SERVICE	96
4.1.3.1.3.2	GMM-REGISTERED.SUSPENDED	97
4.1.3.1.3.3	GMM-REGISTERED.UPDATE-NEEDED.....	97
4.1.3.1.3.4	GMM-REGISTERED.ATTEMPTING-TO-UPDATE.....	97
4.1.3.1.3.5	GMM-REGISTERED.NO-CELL-AVAILABLE	97
4.1.3.2	GPRS update status	98
4.1.3.3	GMM mobility management states on the network side	98
4.1.3.3.1	Main States	98
4.1.3.3.1.1	GMM-DEREGISTERED	98
4.1.3.3.1.2	GMM-COMMON-PROCEDURE-INITIATED	98
4.1.3.3.1.3	GMM-REGISTERED	98
4.1.3.3.1.4	GMM-DEREGISTERED-INITIATED	98
4.1.3.3.2	Substates of state GMM-REGISTERED	99
4.1.3.3.2.1	GMM-REGISTERED.NORMAL-SERVICE	99
4.1.3.3.2.2	GMM-REGISTERED.SUSPENDED	99
4.2	Behaviour of the MS in MM Idle state, GMM-DEREGISTERED state and GMM-REGISTERED state	99
4.2.1	Primary Service State selection	100
4.2.1.1	Selection of the Service State after Power On	100
4.2.1.2	Other Cases.....	100
4.2.2	Detailed Description of the MS behaviour in MM IDLE State.....	101
4.2.2.1	Service State, NORMAL SERVICE.....	101
4.2.2.2	Service State, ATTEMPTING TO UPDATE.....	101
4.2.2.3	Service State, LIMITED SERVICE	102
4.2.2.4	Service State, NO IMSI	102
4.2.2.5	Service State, SEARCH FOR PLMN, NORMAL SERVICE	102
4.2.2.6	Service State, SEARCH FOR PLMN	103
4.2.2.7	Service State, RECEIVING GROUP CALL (NORMAL SERVICE)	103
4.2.2.8	Service State, RECEIVING GROUP CALL (LIMITED SERVICE).....	103
4.2.3	Service state when back to state MM IDLE from another state	104
4.2.4	Behaviour in state GMM-DEREGISTERED	104
4.2.4.1	Primary substate selection	105
4.2.4.1.1	Selection of the substate after power on or enabling the MS's GPRS capability	105
4.2.4.1.2	Other Cases	105

4.2.4.2	Detailed description of the MS behaviour in state GMM-DEREGISTERED	105
4.2.4.2.1	Substate, NORMAL-SERVICE	106
4.2.4.2.2	Substate, ATTEMPTING-TO-ATTACH	106
4.2.4.2.3	Substate, LIMITED-SERVICE.....	106
4.2.4.2.4	Substate, NO-IMSI	106
4.2.4.2.5	Substate, NO-CELL	106
4.2.4.2.6	Substate, PLMN-SEARCH.....	106
4.2.4.2.7	Substate, ATTACH-NEEDED.....	106
4.2.4.3	Substate when back to state GMM-DEREGISTERED from another GMM state.....	106
4.2.5	Behaviour in state GMM-REGISTERED	107
4.2.5.1	Detailed description of the MS behaviour in state GMM-REGISTERED	107
4.2.5.1.1	Substate, NORMAL-SERVICE	107
4.2.5.1.2	Substate, SUSPENDED	107
4.2.5.1.3	Substate, UPDATE-NEEDED	107
4.2.5.1.4	Substate, ATTEMPTING-TO-UPDATE.....	108
4.2.5.1.5	Substate, NO-CELL-AVAILABLE	108
4.3	MM common procedures	108
4.3.1	TMSI reallocation procedure	108
4.3.1.1	TMSI reallocation initiation by the network.....	108
4.3.1.2	TMSI reallocation completion by the mobile station.....	109
4.3.1.3	TMSI reallocation completion in the network.....	109
4.3.1.4	Abnormal cases.....	109
4.3.2	Authentication procedure	109
4.3.2.1	Authentication request by the network	110
4.3.2.2	Authentication response by the mobile station	110
4.3.2.3	Authentication processing in the network.....	110
4.3.2.4	Ciphering key sequence number.....	110
4.3.2.5	Unsuccessful authentication.....	110
4.3.2.6	Abnormal cases.....	111
4.3.3	Identification procedure	111
4.3.3.1	Identity request by the network.....	111
4.3.3.2	Identification response by the mobile station.....	112
4.3.3.3	Abnormal cases.....	112
4.3.4	IMSI detach procedure	112
4.3.4.1	IMSI detach initiation by the mobile station.....	112
4.3.4.2	IMSI detach procedure in the network.....	112
4.3.4.3	IMSI detach completion by the mobile station	113
4.3.4.4	Abnormal cases.....	113
4.3.5	Abort procedure	113
4.3.5.1	Abort procedure initiation by the network	113
4.3.5.2	Abort procedure in the mobile station	113
4.3.6	MM information procedure	113
4.3.6.1	MM information procedure initiation by the network.....	114
4.3.6.2	MM information procedure in the mobile station	114
4.4	MM specific procedures	114
4.4.1	Location updating procedure.....	114
4.4.2	Periodic updating	115
4.4.3	IMSI attach procedure.....	116
4.4.4	Generic Location Updating procedure	116
4.4.4.1	Location updating initiation by the mobile station.....	116
4.4.4.1a	Network Request for Additional mobile station Capability Information	116
4.4.4.2	Identification request from the network.....	116
4.4.4.3	Authentication by the network.....	116
4.4.4.4	Ciphering mode setting by the network	117
4.4.4.5	Attempt Counter	117
4.4.4.6	Location updating accepted by the network.....	117
4.4.4.7	Location updating not accepted by the network	118
4.4.4.8	Release of RR connection after location updating.....	118
4.4.4.9	Abnormal cases on the mobile station side	118
4.4.4.10	Abnormal cases on the network side.....	119
4.5	Connection management sublayer service provision	120

4.5.1	MM connection establishment	120
4.5.1.1	MM connection establishment initiated by the mobile station.....	120
4.5.1.2	Abnormal cases.....	123
4.5.1.3	MM connection establishment initiated by the network	124
4.5.1.3.1	Mobile Terminating CM Activity	124
4.5.1.3.2	Mobile Originating CM Activity \$(CCBS)\$.....	124
4.5.1.4	Abnormal cases.....	125
4.5.1.5	MM connection establishment for emergency calls.....	125
4.5.1.6	Call re-establishment	126
4.5.1.6.1	Call re-establishment, initiation by the mobile station	126
4.5.1.6.2	Abnormal cases.....	127
4.5.1.7	Forced release during MO MM connection establishment	128
4.5.2	MM connection information transfer phase	128
4.5.2.1	Sending CM messages	129
4.5.2.2	Receiving CM messages	129
4.5.2.3	Abnormal cases.....	129
4.5.3	MM connection release	129
4.5.3.1	Release of associated RR connection	129
4.5.3.2	Uplink release in a voice group call.....	129
4.6	Receiving a MM STATUS message by a MM entity.	130
4.7	Elementary mobility management procedures for GPRS services	130
4.7.1	General	130
4.7.1.1	Lower layer failure	130
4.7.1.2	Ciphering of messages	130
4.7.1.3	Radio resource sublayer address handling.....	130
4.7.2	GPRS Mobility management timers.....	131
4.7.2.1	READY timer behaviour	131
4.7.2.2	Periodic routing area updating.....	132
4.7.3	GPRS attach procedure	132
4.7.3.1	GPRS attach procedure for GPRS services	133
4.7.3.1.1	GPRS attach procedure initiation.....	133
4.7.3.1.2	GMM common procedure initiation	133
4.7.3.1.3	GPRS attach accepted by the network	133
4.7.3.1.4	GPRS attach not accepted by the network	134
4.7.3.1.5	Abnormal cases in the MS	135
4.7.3.1.6	Abnormal cases on the network side.....	135
4.7.3.2	Combined GPRS attach procedure for GPRS and non-GPRS services	137
4.7.3.2.1	Combined GPRS attach procedure initiation	137
4.7.3.2.2	GMM Common procedure initiation.....	137
4.7.3.2.3	Combined GPRS attach accepted by the network	137
4.7.3.2.3.1	Combined attach successful for GPRS and non-GPRS services.....	138
4.7.3.2.3.2	Combined attach successful for GPRS services only	138
4.7.3.2.4	Combined GPRS attach not accepted by the network	138
4.7.3.2.5	Abnormal cases in the MS	139
4.7.3.2.6	Abnormal cases on the network side.....	139
4.7.4	GPRS detach procedure	140
4.7.4.1	MS initiated GPRS detach procedure	140
4.7.4.1.1	MS initiated GPRS detach procedure initiation	140
4.7.4.1.2	MS initiated GPRS detach procedure completion for GPRS services only	140
4.7.4.1.3	MS initiated combined GPRS detach procedure completion	141
4.7.4.1.4	Abnormal cases in the MS	141
4.7.4.2	Network initiated GPRS detach procedure	142
4.7.4.2.1	Network initiated GPRS detach procedure initiation	142
4.7.4.2.2	Network initiated GPRS detach procedure completion.....	142
4.7.4.2.3	Abnormal cases on the network side.....	142
4.7.5	Routing area updating procedure	143
4.7.5.1	Normal and periodic routing area updating procedure	144
4.7.5.1.1	Normal and periodic routing area updating procedure initiation	144
4.7.5.1.2	GMM Common procedure initiation.....	144
4.7.5.1.3	Normal and periodic routing area updating procedure accepted by the network	144
4.7.5.1.4	Normal and periodic routing area updating procedure not accepted by the network	145

4.7.5.1.5	Abnormal cases in the MS	145
4.7.5.1.6	Abnormal cases on the network side	146
4.7.5.2	Combined routing area updating procedure	147
4.7.5.2.1	Combined routing area updating procedure initiation	147
4.7.5.2.2	GMM Common procedure initiation	148
4.7.5.2.3	Combined routing area updating procedure accepted by the network	148
4.7.5.2.3.1	Combined routing area updating successful	148
4.7.5.2.3.2	Combined routing are updating successful for GPRS services only	149
4.7.5.2.4	Combined routing area updating not accepted by the network	149
4.7.5.2.5	Abnormal cases in the MS	150
4.7.5.2.6	Abnormal cases on the network side	150
4.7.6	P-TMSI reallocation procedure	150
4.7.6.1	P-TMSI reallocation initiation by the network	150
4.7.6.2	P-TMSI reallocation completion by the MS	151
4.7.6.3	P-TMSI reallocation completion by the network	151
4.7.6.4	Abnormal cases in the MS	151
4.7.6.5	Abnormal cases on the network side	151
4.7.7	Authentication and ciphering procedure	152
4.7.7.1	Authentication and ciphering initiation by the network	152
4.7.7.2	Authentication and ciphering response by the MS	152
4.7.7.3	Authentication and ciphering completion by the network	153
4.7.7.4	GPRS ciphering key sequence number	153
4.7.7.5	Unsuccessful authentication and ciphering	153
4.7.7.6	Abnormal cases on the network side	153
4.7.8	Identification procedure	154
4.7.8.1	Identification initiation by the network	154
4.7.8.2	Identification response by the MS	154
4.7.8.3	Identification completion by the network	155
4.7.8.4	Abnormal cases on the network side	155
4.7.9	Paging procedure	155
4.7.9.1	Paging for GPRS services	155
4.7.9.2	Paging for non-GPRS services	156
4.7.10	Receiving a GMM STATUS message by a GMM entity	156
4.7.11	GMM support for anonymous access	156
4.7.11.1	MS side	156
4.7.11.2	Network side	156
4.7.12	GMM Information procedure	156
4.7.12.1	GMM information procedure initiation by the network	157
4.7.12.2	GMM information procedure in the mobile station	157
5	Elementary procedures for circuit-switched Call Control	157
5.1	Overview	157
5.1.1	General	157
5.1.2	Call Control States	161
5.1.2.1	Call states at the mobile station side of the interface	161
5.1.2.1.1	Null (State U0)	161
5.1.2.1.2	MM Connection pending (U0.1)	161
5.1.2.1.2a	CC prompt present (U0.2) \$(CCBS)\$	162
5.1.2.1.2b	Wait for network information (U0.3) \$(CCBS)\$	162
5.1.2.1.2c	CC-Establishment present (U0.4) \$(CCBS)\$	162
5.1.2.1.2d	CC-Establishment confirmed (U0.5) \$(CCBS)\$	162
5.1.2.1.2e	Recall present (U0.6) \$(CCBS)\$	162
5.1.2.1.3	Call initiated (U1)	162
5.1.2.1.4	Mobile originating call proceeding (U3)	162
5.1.2.1.5	Call delivered (U4)	162
5.1.2.1.6	Call present (U6)	162
5.1.2.1.7	Call received (U7)	162
5.1.2.1.8	Connect Request (U8)	162
5.1.2.1.9	Mobile terminating call confirmed (U9)	163
5.1.2.1.10	Active (U10)	163
5.1.2.1.11	Disconnect request (U11)	163
5.1.2.1.12	Disconnect indication (U12)	163

5.1.2.1.13	Release request (U19).....	163
5.1.2.1.14	Mobile originating modify (U26).....	163
5.1.2.1.15	Mobile terminating modify (U27).....	163
5.1.2.2	Network call states.....	163
5.1.2.2.1	Null (State N0).....	163
5.1.2.2.2	MM connection pending (N0.1).....	163
5.1.2.2.2a	CC connection pending (N0.2) \$(CCBS)\$.....	163
5.1.2.2.2b	Network answer pending (N0.3) \$(CCBS)\$	163
5.1.2.2.2c	CC-Establishment present (N0.4) \$(CCBS)\$.....	164
5.1.2.2.2d	CC-Establishment confirmed (N0.5) \$(CCBS)\$.....	164
5.1.2.2.3	Call initiated (N1)	164
5.1.2.2.4	Mobile originating call proceeding (N3).....	164
5.1.2.2.5	Call delivered (N4)	164
5.1.2.2.6	Call present (N6).....	164
5.1.2.2.7	Call received (N7).....	164
5.1.2.2.8	Connect request (N8)	164
5.1.2.2.9	Mobile terminating call confirmed (N9)	164
5.1.2.2.10	Active (N10)	164
5.1.2.2.11	Not used	164
5.1.2.2.12	Disconnect indication (N12)	164
5.1.2.2.13	Release request (N19).....	165
5.1.2.2.14	Mobile originating modify (N26).....	165
5.1.2.2.15	Mobile terminating modify (N27).....	165
5.1.2.2.16	Connect Indication (N28).....	165
5.2	Call establishment procedures	165
5.2.1	Mobile originating call establishment	165
5.2.1.1	Call initiation.....	166
5.2.1.2	Receipt of a setup message	166
5.2.1.3	Receipt of a CALL PROCEEDING message.....	167
5.2.1.4	Notification of progressing mobile originated call	168
5.2.1.4.1	Notification of interworking in connection with mobile originated call establishment	168
5.2.1.4.2	Call progress in the PLMN/ISDN environment.....	168
5.2.1.5	Alerting.....	168
5.2.1.6	Call connected	169
5.2.1.7	Call rejection	170
5.2.1.8	Transit network selection.....	170
5.2.1.9	Traffic channel assignment at mobile originating call establishment.....	170
5.2.1.10	Call queuing at mobile originating call establishment	170
5.2.2	Mobile terminating call establishment.....	170
5.2.2.1	Call indication	170
5.2.2.2	Compatibility checking.....	171
5.2.2.3	Call confirmation	171
5.2.2.3.1	Response to SETUP	171
5.2.2.3.2	Receipt of CALL CONFIRMED and ALERTING by the network	171
5.2.2.3.3	Call failure procedures	172
5.2.2.3.4	Called mobile station clearing during mobile terminating call establishment	172
5.2.2.4	Notification of interworking in connection with mobile terminating call establishment.....	172
5.2.2.5	Call accept	173
5.2.2.6	Active indication.....	173
5.2.2.7	Traffic channel assignment at mobile terminating call establishment.....	173
5.2.2.8	Call queuing at mobile terminating call establishment	173
5.2.2.9	User connection attachment during a mobile terminating call	173
5.2.3	Network initiated MO call \$(CCBS)\$.....	174
5.2.3.1	Initiation	174
5.2.3.2	CC-Establishment present.....	174
5.2.3.2.1	Recall Alignment Procedure	175
5.2.3.3	CC-Establishment confirmation.....	176
5.2.3.4	Recall present	176
5.2.3.5	Traffic channel assignment during network initiated mobile originating call establishment	177
5.3	Signalling procedures during the "active" state	177
5.3.1	User notification procedure	177

5.3.2	Call rearrangements.....	177
5.3.3	Not used	177
5.3.4	Support of Dual Services.....	177
5.3.4.1	Service Description.....	178
5.3.4.2	Call establishment.....	178
5.3.4.2.1	Mobile Originating Establishment	178
5.3.4.2.2	Mobile Terminating Establishment	179
5.3.4.3	Changing the Call Mode	179
5.3.4.3.1	Initiation of in-call modification	179
5.3.4.3.2	Successful completion of in-call modification	180
5.3.4.3.3	Change of the channel configuration.....	180
5.3.4.3.4	Failure of in-call modification.....	180
5.3.4.3.4.1	Network rejection of in-call modification	180
5.3.4.3.4.2	Mobile station rejection of in-call modification	180
5.3.4.3.4.3	Time-out recovery	180
5.3.4.4	Abnormal procedures	180
5.3.5	User initiated service level up- and downgrading	181
5.3.5.1	Initiation of service level up- and downgrading.....	181
5.3.5.2	Successful completion of service level up- and downgrading	181
5.3.5.3	Rejection of service level up- and downgrading.....	182
5.3.5.4	Time-out recovery	182
5.4	Call clearing.....	182
5.4.1	Terminology	182
5.4.2	Exception conditions	182
5.4.3	Clearing initiated by the mobile station.....	183
5.4.3.1	Initiation of call clearing.....	183
5.4.3.2	Receipt of a DISCONNECT message from the mobile station	183
5.4.3.3	Receipt of a RELEASE message from the network	183
5.4.3.4	Receipt of a RELEASE COMPLETE message from the mobile station	183
5.4.3.5	Abnormal cases.....	183
5.4.4	Clearing initiated by the network.....	184
5.4.4.1	Clearing initiated by the network: mobile does not support “Prolonged Clearing Procedure”	184
5.4.4.1.1	Clearing when tones/announcements provided.....	184
5.4.4.1.2	Clearing when tones/announcements not provided	184
5.4.4.1.3	Completion of clearing.....	185
5.4.4.2	Clearing initiated by the network: mobile supports “Prolonged Clearing Procedure”	185
5.4.4.2.1	Clearing when tones/announcements provided and the network does not indicate that “CCBS activation is possible”	185
5.4.4.2.2	Clearing when the network indicates that “CCBS activation is possible”	186
5.4.4.2.3	Clearing when tones/announcements are not provided and the network does not indicate that “CCBS activation is possible”	187
5.4.4.2.4	Receipt of a RELEASE message from the mobile station.....	187
5.4.4.2.5	Completion of clearing.....	188
5.4.5	Clear collision	188
5.5	Miscellaneous procedures.....	188
5.5.1	In-band tones and announcements.....	188
5.5.2	Call collisions.....	189
5.5.3	Status procedures	189
5.5.3.1	Status enquiry procedure	189
5.5.3.2	Reception of a STATUS message by a CC entity.....	189
5.5.3.2.1	STATUS message with incompatible state	189
5.5.3.2.2	STATUS message with compatible state	189
5.5.4	Call re-establishment, mobile station side	190
5.5.4.1	Indication from the mobility management sublayer.....	190
5.5.4.2	Reaction of call control.....	190
5.5.4.3	Completion of re-establishment.....	190
5.5.4.4	Unsuccessful outcome	190
5.5.5	Call re-establishment, network side	190
5.5.5.1	State alignment	190
5.5.6	Progress.....	190
5.5.7	DTMF protocol control procedure	191

5.5.7.1	Start DTMF request by the mobile station.....	191
5.5.7.2	Start DTMF response by the network.....	191
5.5.7.3	Stop DTMF request by the mobile station.....	191
5.5.7.4	Stop DTMF response by the network	191
5.5.7.5	Sequencing of subsequent start DTMF requests by the mobile station.....	191
6	Support for packet services.....	192
6.1	GPRS Session management.....	192
6.1.1	General	192
6.1.1.1	Radio resource sublayer address handling for anonymous access	192
6.1.2	Session management states.....	193
6.1.2.1	Session management states in the MS	193
6.1.2.1.1	PDP-INACTIVE.....	193
6.1.2.1.2	PDP-ACTIVE-PENDING	193
6.1.2.1.3	PDP-INACTIVE-PENDING	193
6.1.2.1.4	PDP-ACTIVE	193
6.1.2.2	Session management states on the network side	194
6.1.2.2.1	PDP-INACTIVE.....	194
6.1.2.2.2	PDP-ACTIVE-PENDING	194
6.1.2.2.3	PDP-INACTIVE-PENDING	194
6.1.2.2.4	PDP-ACTIVE	194
6.1.2.2.5	PDP-MODIFY-PENDING	194
6.1.3	Session Management procedures	195
6.1.3.1	PDP context activation	195
6.1.3.1.1	Successful PDP context activation initiated by the mobile station.....	195
6.1.3.1.2	Successful PDP context activation requested by the network	195
6.1.3.1.3	Unsuccessful PDP context activation initiated by the MS	196
6.1.3.1.4	Unsuccessful PDP context activation requested by the network	196
6.1.3.1.5	Abnormal cases	196
6.1.3.2	PDP context modification procedure	198
6.1.3.2.1	Abnormal cases	198
6.1.3.3	PDP context deactivation procedure.....	199
6.1.3.3.1	PDP context deactivation initiated by the MS	199
6.1.3.3.2	PDP context deactivation initiated by the network	199
6.1.3.3.3	Abnormal cases	199
6.1.3.4	AA PDP context activation.....	200
6.1.3.4.1	Successful AA PDP context activation initiated by the mobile station	200
6.1.3.4.2	Unsuccessful AA PDP context activation	200
6.1.3.4.3	Abnormal cases	201
6.1.3.5	AA PDP context deactivation	201
6.1.3.5.1	Implicit AA PDP context deactivation	201
6.1.3.5.2	Explicit AA PDP context deactivation	201
6.1.3.5.3	Abnormal cases	202
6.1.3.6	Receiving a SM STATUS message by a SM entity.....	202
7	Examples of structured procedures	202
7.1	General.....	202
7.1.1	Paging request	203
7.1.2	Immediate assignment	203
7.1.3	Service request and contention resolution	203
7.1.4	Authentication	204
7.1.5	Ciphering mode setting	204
7.1.6	Transaction phase.....	204
7.1.6.1	Channel mode modify	204
7.1.7	Channel release	205
7.2	Abnormal cases	205
7.3	Selected examples	205
7.3.1	Location updating.....	206
7.3.2	Mobile originating call establishment	207
7.3.3	Mobile terminating call establishment.....	211
7.3.4	Call clearing	213
7.3.5	DTMF protocol control.....	214

7.3.6	Handover.....	215
7.3.7	In-call modification.....	216
7.3.8	Call re-establishment.....	217
7.3.9	Network initiated mobile originating call \$(CCBS)\$	218
8	Handling of unknown, unforeseen, and erroneous protocol data	223
8.1	General.....	223
8.2	Message too short	223
8.3	Unknown or unforeseen transaction identifier	223
8.3.1	Call Control.....	223
8.3.2	Session Management.....	224
8.4	Unknown or unforeseen message type	225
8.5	Non-semantical mandatory information element errors	225
8.5.1	Radio resource management.....	226
8.5.2	Mobility management.....	226
8.5.3	Call control.....	226
8.6	Unknown and unforeseen IEs in the non-imperative message part	226
8.6.1	IEIs unknown in the message	226
8.6.2	Out of sequence IEs.....	226
8.6.3	Repeated IEs	226
8.7	Non-imperative message part errors	227
8.7.1	Syntactically incorrect optional IEs.....	227
8.7.2	Conditional IE errors.....	227
8.8	Messages with semantically incorrect contents.....	227
9	Message functional definitions and contents	227
9.1	Messages for Radio Resources management	228
9.1.1	Additional assignment.....	230
9.1.1.1	Mobile Allocation.....	231
9.1.1.2	Starting Time	231
9.1.2	Assignment command	231
9.1.2.1	Mode of the First Channel (Channel Set 1) and Mode of Channel Set "X" (2=<X=<8)	232
9.1.2.2	Description of the Second Channel.....	233
9.1.2.3	Mode of the Second Channel.....	233
9.1.2.4	Mobile Allocation and Frequency List, after the starting time	233
9.1.2.5	Starting Time	233
9.1.2.6	Reference cell frequency list.....	234
9.1.2.7	Cell Channel Description.....	234
9.1.2.8	Cipher Mode Setting.....	234
9.1.2.9	VGCS target mode Indication.....	234
9.1.2.10	Description of the multislot allocation.....	234
9.1.3	Assignment complete	234
9.1.4	Assignment failure.....	235
9.1.5	Channel mode modify	235
9.1.5.1	Channel Description	236
9.1.5.2	VGCS target mode Indication.....	236
9.1.6	Channel mode modify acknowledge.....	236
9.1.7	Channel release	237
9.1.7.1	Channel description and mobile allocation.....	238
9.1.7.2	Group Cipher Key Number.....	238
9.1.8	Channel request.....	238
9.1.9	Ciphering mode command	240
9.1.10	Ciphering mode complete	240
9.1.10.1	Mobile Equipment Identity.....	241
9.1.11	Classmark change.....	241
9.1.11.1	Additional Mobile Station Classmark Information	241
9.1.11.2	Mobile Station Classmark.....	241
9.1.12	Classmark enquiry	242
9.1.12a	Spare	242
9.1.12b	Configuration change command.....	242
9.1.12b.1	Description of the multislot allocation.....	243
9.1.12b.2	Mode of Channel Set "X" (1=<X=<8)	243