

ETSI TS 124 008 V13.6.0 (2016-07)



**Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
Mobile radio interface Layer 3 specification;
Core network protocols;
Stage 3
(3GPP TS 24.008 version 13.6.0 Release 13)**



Reference

RTS/TSGC-0124008vd60

Keywords

GSM,LTE,UMTS

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

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (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
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

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 (<https://ipr.etsi.org>).

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 Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	27
Introduction	27
1 Scope	28
1.1 Scope of the Technical Specification	28
1.2 Application to the interface structures.....	28
1.3 Structure of layer 3 procedures.....	28
1.4 Test procedures	29
1.5 Use of logical channels in A/Gb mode.....	29
1.6 Overview of control procedures	29
1.6.1 List of procedures	29
1.7 Applicability of implementations	31
1.7.1 Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS).....	31
1.7.2 General Packet Radio Service (GPRS)	31
1.7.2.1 Packet services in GSM (A/Gb mode only)	31
1.7.2.2 Packet services in Iu mode (Iu mode only)	32
1.8 Handling of NAS signalling low priority indication	32
1.9 Restrictions.....	33
2 References	33
2.1 Definitions and abbreviations.....	39
2.1.1 Random values.....	40
2.1.2 Vocabulary.....	40
3 Radio Resource management procedures.....	45
4 Elementary procedures for Mobility Management.....	45
4.1 General	45
4.1.1 MM and GMM procedures	46
4.1.1.1 Types of MM and GMM procedures	46
4.1.1.1.1 Integrity Checking of Signalling Messages in the Mobile Station (Iu mode only).....	47
4.1.1.1.1a Integrity protection for emergency call (Iu mode only).....	49
4.1.1.2 MM-GMM co-ordination for GPRS MS's	49
4.1.1.2.1 GPRS MS operating in mode A or B in a network that operates in mode I	49
4.1.1.2.2 GPRS MS operating in mode A or B in a network that operates in mode II.....	51
4.1.1.2A Coordination between GMM and EMM	51
4.1.1.3 Core Network System Information for MM (Iu mode only).....	51
4.1.1.4 Core Network System Information for GMM (Iu mode only).....	51
4.1.1.4.1 General	51
4.1.1.4.2 Control of Network Mode of Operation I.....	52
4.1.1.5 Access class control	52
4.1.1.6 Specific requirements for MS configured to use timer T3245	52
4.1.1.6A Specific requirements for the MS when receiving non-integrity protected reject messages	53
4.1.1.7 Handling of NAS level mobility management congestion control.....	57
4.1.1.8 Handling of security related parameters at switch on and switch off.....	58
4.1.1.9 Equivalent PLMNs list.....	58
4.1.1.10 Dedicated core network.....	59
4.1.2 MM sublayer states.....	59
4.1.2.1 MM sublayer states in the mobile station.....	59
4.1.2.1.1 Main states.....	59
4.1.2.1.2 Substates of the MM IDLE state	63
4.1.2.2 The update Status	65
4.1.2.3 MM sublayer states on the network side	65
4.1.3 GPRS mobility management (GMM) sublayer states.....	67

4.1.3.1	GMM states in the MS	67
4.1.3.1.1	Main states.....	67
4.1.3.1.2	Substates of state GMM-DEREGISTERED.....	68
4.1.3.1.3	Substates of state GMM-REGISTERED.....	68
4.1.3.2	GPRS update status.....	71
4.1.3.3	GMM mobility management states on the network side.....	71
4.1.3.3.1	Main States	72
4.1.3.3.2	Substates of state GMM-REGISTERED.....	72
4.2	Behaviour of the MS in MM Idle state, GMM-DEREGISTERED state and GMM-REGISTERED state	73
4.2.1	Primary Service State selection	73
4.2.1.1	Selection of the Service State after Power On.....	73
4.2.1.2	Other Cases	74
4.2.2	Detailed Description of the MS behaviour in MM IDLE State.	74
4.2.2.1	Service State, NORMAL SERVICE.....	74
4.2.2.2	Service State, ATTEMPTING TO UPDATE	75
4.2.2.3	Service State, LIMITED SERVICE.....	75
4.2.2.4	Service State, NO IMSI.....	76
4.2.2.5	Service State, SEARCH FOR PLMN, NORMAL SERVICE.....	76
4.2.2.6	Service State, SEARCH FOR PLMN	77
4.2.2.7	Service State, RECEIVING GROUP CALL (NORMAL SERVICE).....	77
4.2.2.8	Service State, RECEIVING GROUP CALL (LIMITED SERVICE).....	77
4.2.2.9	Service State, eCALL INACTIVE.....	78
4.2.3	Service state when back to state MM IDLE from another state.....	78
4.2.4	Behaviour in state GMM-DEREGISTERED.....	79
4.2.4.1	Primary substate selection.....	79
4.2.4.1.1	Selection of the substate after power on or enabling the MS's GPRS capability.....	79
4.2.4.1.2	Other Cases.....	80
4.2.4.2	Detailed description of the MS behaviour in state GMM-DEREGISTERED.....	80
4.2.4.2.1	Substate, NORMAL-SERVICE	80
4.2.4.2.2	Substate, ATTEMPTING-TO-ATTACH	80
4.2.4.2.3	Substate, LIMITED-SERVICE	81
4.2.4.2.4	Substate, NO-IMSI.....	81
4.2.4.2.5	Substate, NO-CELL	81
4.2.4.2.6	Substate, PLMN-SEARCH	81
4.2.4.2.7	Substate, ATTACH-NEEDED	81
4.2.4.2.8	Substate, SUSPENDED (A/Gb mode only).....	81
4.2.4.3	Substate when back to state GMM-DEREGISTERED from another GMM state	81
4.2.5	Behaviour in state GMM-REGISTERED.....	82
4.2.5.1	Detailed description of the MS behaviour in state GMM-REGISTERED.....	82
4.2.5.1.1	Substate, NORMAL-SERVICE	82
4.2.5.1.2	Substate, SUSPENDED (A/Gb mode only).....	82
4.2.5.1.3	Substate, UPDATE-NEEDED.....	83
4.2.5.1.4	Substate, ATTEMPTING-TO-UPDATE	83
4.2.5.1.5	Substate, NO-CELL-AVAILABLE	83
4.2.5.1.6	Substate, LIMITED-SERVICE	83
4.2.5.1.7	Substate, ATTEMPTING-TO-UPDATE-MM	84
4.2.5.1.8	Substate, PLMN-SEARCH	84
4.3	MM common procedures	84
4.3.1	TMSI reallocation procedure.....	84
4.3.1.1	TMSI reallocation initiation by the network.....	85
4.3.1.2	TMSI reallocation completion by the mobile station.....	85
4.3.1.3	TMSI reallocation completion in the network.....	85
4.3.1.4	Abnormal cases in the mobile station.....	85
4.3.1.5	Abnormal cases on the network side.....	85
4.3.2	Authentication procedure.....	86
4.3.2a	Authentication procedure used for a UMTS authentication challenge.....	86
4.3.2b	Authentication Procedure used for a GSM authentication challenge.....	86
4.3.2.1	Authentication request by the network.....	87
4.3.2.2	Authentication response by the mobile station.....	87
4.3.2.3	Authentication processing in the network	88
4.3.2.3a	128-bit circuit-switched GSM ciphering key	88
4.3.2.4	Ciphering key sequence number	88

4.3.2.5	Authentication not accepted by the network	89
4.3.2.5.1	Authentication not accepted by the MS	90
4.3.2.6	Abnormal cases	90
4.3.2.6.1	MS behaviour towards a network that has failed the authentication procedure.....	93
4.3.2.7	Handling of keys at intersystem change from Iu mode to A/Gb mode	93
4.3.2.7a	Use of established security contexts.....	94
4.3.2.8	Handling of keys at intersystem change from A/Gb mode to Iu mode	95
4.3.2.9	Void.....	96
4.3.2.10	Derivation of keys at SRVCC or vSRVCC handover from S1 mode	96
4.3.2.10.0	General	96
4.3.2.10.1	PDN connection with integrity protection	96
4.3.2.10.2	PDN connection without integrity protection.....	96
4.3.2.11	Derivation of keys at SRVCC handover from Iu mode to Iu mode	96
4.3.2.11.1	PDN connection with integrity protection.....	96
4.3.2.11.2	PDN connection without integrity protection.....	97
4.3.2.12	Derivation of keys at SRVCC handover from Iu mode to A/Gb mode.....	98
4.3.2.12.1	PDN connection with integrity protection.....	98
4.3.2.12.2	PDN connection without integrity protection.....	99
4.3.2.13	Derivation of keys at CS to PS SRVCC handover from A/Gb mode to Iu mode	99
4.3.3	Identification procedure	101
4.3.3.1	Identity request by the network.....	101
4.3.3.2	Identification response by the mobile station.....	101
4.3.3.3	Abnormal cases	101
4.3.4	IMSI detach procedure.....	102
4.3.4.0	General	102
4.3.4.1	IMSI detach initiation by the mobile station	102
4.3.4.2	IMSI detach procedure in the network	103
4.3.4.3	IMSI detach completion by the mobile station.....	103
4.3.4.4	Abnormal cases	103
4.3.5	Abort procedure	103
4.3.5.1	Abort procedure initiation by the network	103
4.3.5.2	Abort procedure in the mobile station.....	104
4.3.6	MM information procedure.....	104
4.3.6.1	MM information procedure initiation by the network.....	104
4.3.6.2	MM information procedure in the mobile station	104
4.4	MM specific procedures	104
4.4.1	Location updating procedure	104
4.4.2	Periodic updating	106
4.4.3	IMSI attach procedure	107
4.4.4	Generic Location Updating procedure.....	108
4.4.4.1	Location updating initiation by the mobile station.....	108
4.4.4.1a	Network Request for Additional mobile station Capability Information	108
4.4.4.2	Identification request from the network	108
4.4.4.3	Authentication by the network	108
4.4.4.4	Security mode setting by the network	108
4.4.4.5	Location Update Attempt Counter	108
4.4.4.6	Location updating accepted by the network.....	109
4.4.4.7	Location updating not accepted by the network.....	111
4.4.4.8	Release of RR connection after location updating	113
4.4.4.9	Abnormal cases on the mobile station side	113
4.4.4.10	Abnormal cases on the network side.....	115
4.4.5	Void.....	115
4.4.6	Void.....	115
4.4.7	eCall inactivity procedure.....	115
4.5	Connection management sublayer service provision	116
4.5.1	MM connection establishment.....	116
4.5.1.1	MM connection establishment initiated by the mobile station.....	116
4.5.1.2	Abnormal cases	120
4.5.1.3	MM connection establishment initiated by the network	121
4.5.1.3.1	Mobile Terminating CM Activity.....	121
4.5.1.3.2	Mobile Originating CM Activity \$(CCBS)\$	122
4.5.1.3.3	Paging response in Iu mode (Iu mode only).....	123

4.5.1.3.4	Paging response for CS fallback.....	123
4.5.1.4	Abnormal cases	124
4.5.1.5	MM connection establishment for emergency calls.....	124
4.5.1.5a	MM connection establishment for emergency calls for CS fallback.....	125
4.5.1.6	Call re-establishment.....	125
4.5.1.6.1	Call re-establishment, initiation by the mobile station	125
4.5.1.6.2	Abnormal cases	127
4.5.1.7	Forced release during MO MM connection establishment	128
4.5.1.8	MM connection establishment due to SRVCC or vSRVCC handover	128
4.5.2	MM connection information transfer phase.....	129
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.....	130
4.5.3.2	Uplink release in a voice group call.....	130
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 (A/Gb mode only).....	131
4.7.1.2a	Integrity protection of layer 3 signalling messages (A/Gb mode only and when integrity protection is required).....	131
4.7.1.2a.1	General	131
4.7.1.2a.2	Integrity checking of GMM signalling messages in the MS	131
4.7.1.2a.3	Integrity checking of layer 3 signalling messages in the network	132
4.7.1.3	P-TMSI signature.....	133
4.7.1.4	Radio resource sublayer address handling	133
4.7.1.4.1	Radio resource sublayer address handling (A/Gb mode only)	133
4.7.1.5	P-TMSI handling.....	134
4.7.1.5.1	P-TMSI handling in A/Gb mode	134
4.7.1.5.2	P-TMSI handling in Iu mode.....	135
4.7.1.5.3	Void.....	135
4.7.1.5.4	Void.....	135
4.7.1.6	Change of network mode of operation.....	135
4.7.1.6.1	Change of network mode of operation in A/Gb mode (A/Gb mode only)	135
4.7.1.6.2	Change of network mode of operation in Iu mode (Iu mode only)	136
4.7.1.6.3	Change of network mode of operation at Iu mode to A/Gb mode inter-system change.....	136
4.7.1.6.4	Change of network mode of operation at A/Gb mode to Iu mode inter-system change.....	137
4.7.1.7	Intersystem change between A/Gb mode and Iu mode	137
4.7.1.7a	Intersystem change from S1 mode to A/Gb mode or S1 mode to Iu mode with ISR activated	138
4.7.1.8	List of forbidden PLMNs for GPRS service	139
4.7.1.8a	Establishment of the PS signalling connection (Iu mode only).....	139
4.7.1.9	Release of the PS signalling connection (Iu mode only).....	140
4.7.2	GPRS Mobility management timers and UMTS PS signalling connection control.....	140
4.7.2.1	READY timer behaviour.....	140
4.7.2.1.1	READY timer behaviour (A/Gb mode only).....	140
4.7.2.1.2	Handling of READY timer in the MS in Iu mode and S1 mode	142
4.7.2.1.2a	Handling of READY timer in the network in Iu mode and S1 mode	142
4.7.2.2	Periodic routing area updating	142
4.7.2.3	PMM-IDLE mode and PMM-CONNECTED mode (Iu mode only)	144
4.7.2.4	Handling of <i>Force to standby</i> in Iu mode (Iu mode only).....	145
4.7.2.5	RA Update procedure for Signalling Connection Re-establishment (Iu mode only).....	145
4.7.2.6	Cell Update triggered by low layers.....	145
4.7.2.7	Handling of timer T3302.....	145
4.7.2.8	Handling of timer T3324 (A/Gb mode, Iu mode and S1 mode).....	145
4.7.2.9	Power saving mode	146
4.7.2.10	Extended idle-mode DRX cycle.....	147
4.7.2.11	Interaction between power saving mode and extended idle mode DRX cycle	147
4.7.2.12	Extended coverage for GSM.....	148
4.7.3	GPRS attach procedure.....	148
4.7.3.1	GPRS attach procedure for GPRS services.....	150

4.7.3.1.1	GPRS attach procedure initiation	150
4.7.3.1.2	GMM common procedure initiation	151
4.7.3.1.3	GPRS attach accepted by the network	151
4.7.3.1.4	GPRS attach not accepted by the network	154
4.7.3.1.4a	GPRS attach for emergency bearer services not accepted by the network (UTRAN Iu mode only)	158
4.7.3.1.4b	Attach for initiating a PDN connection for emergency bearer services not accepted by the network (UTRAN Iu mode only)	159
4.7.3.1.5	Abnormal cases in the MS	159
4.7.3.1.6	Abnormal cases on the network side	162
4.7.3.2	Combined GPRS attach procedure for GPRS and non-GPRS services	163
4.7.3.2.1	Combined GPRS attach procedure initiation	164
4.7.3.2.2	GMM Common procedure initiation	164
4.7.3.2.3	Combined GPRS attach accepted by the network	164
4.7.3.2.4	Combined GPRS attach not accepted by the network	166
4.7.3.2.5	Abnormal cases in the MS	170
4.7.3.2.6	Abnormal cases on the network side	171
4.7.4	GPRS detach procedure	171
4.7.4.0	General	171
4.7.4.1	MS initiated GPRS detach procedure	171
4.7.4.1.1	MS initiated GPRS detach procedure initiation	171
4.7.4.1.2	MS initiated GPRS detach procedure completion for GPRS services only	172
4.7.4.1.3	MS initiated combined GPRS detach procedure completion	172
4.7.4.1.4	Abnormal cases in the MS	172
4.7.4.1.5	Abnormal cases on the network side	175
4.7.4.2	Network initiated GPRS detach procedure	175
4.7.4.2.1	Network initiated GPRS detach procedure initiation	175
4.7.4.2.2	Network initiated GPRS detach procedure completion by the MS	175
4.7.4.2.3	Network initiated GPRS detach procedure completion by the network	180
4.7.4.2.4	Abnormal cases on the network side	180
4.7.5	Routing area updating procedure	181
4.7.5.1	Normal and periodic routing area updating procedure	183
4.7.5.1.1	Normal and periodic routing area updating procedure initiation	185
4.7.5.1.2	GMM Common procedure initiation	186
4.7.5.1.3	Normal and periodic routing area updating procedure accepted by the network	186
4.7.5.1.4	Normal and periodic routing area updating procedure not accepted by the network	191
4.7.5.1.4a	Routing area updating procedure for initiating a PDN connection for emergency bearer services not accepted by the network (UTRAN Iu mode only)	197
4.7.5.1.5	Abnormal cases in the MS	197
4.7.5.1.6	Abnormal cases on the network side	201
4.7.5.2	Combined routing area updating procedure	203
4.7.5.2.0	General	203
4.7.5.2.1	Combined routing area updating procedure initiation	203
4.7.5.2.2	GMM Common procedure initiation	205
4.7.5.2.3	Combined routing area updating procedure accepted by the network	205
4.7.5.2.4	Combined routing area updating not accepted by the network	207
4.7.5.2.5	Abnormal cases in the MS	212
4.7.5.2.6	Abnormal cases on the network side	213
4.7.6	P-TMSI reallocation procedure	213
4.7.6.0	General	213
4.7.6.1	P-TMSI reallocation initiation by the network	213
4.7.6.2	P-TMSI reallocation completion by the MS	213
4.7.6.3	P-TMSI reallocation completion by the network	213
4.7.6.3A	Abnormal cases in the MS	214
4.7.6.4	Abnormal cases on the network side	214
4.7.7	Authentication and ciphering procedure	215
4.7.7a	Authentication and ciphering procedure used for UMTS authentication challenge	215
4.7.7b	Authentication and ciphering procedure used for GSM authentication challenge	216
4.7.7c	Change of the ciphering algorithm at PS Handover	216
4.7.7.1	Authentication and ciphering initiation by the network	216
4.7.7.2	Authentication and ciphering response by the MS	217
4.7.7.3	Authentication and ciphering completion by the network	219

4.7.7.3a	128-bit packet-switched GSM ciphering key	220
4.7.7.3b	128-bit packet-switched GSM integrity key	220
4.7.7.4	GPRS ciphering key sequence number	220
4.7.7.5	Authentication not accepted by the network	222
4.7.7.5.1	Authentication not accepted by the MS	222
4.7.7.6	Abnormal cases	223
4.7.7.6.1	MS behaviour towards a network that has failed the authentication procedure.....	227
4.7.7.7	Use of established security contexts.....	227
4.7.7.8	Handling of keys at intersystem change from Iu mode to A/Gb mode	228
4.7.7.9	Handling of keys at intersystem change from A/Gb mode to Iu mode	229
4.7.7.10	Handling of keys at intersystem change from S1 mode to Iu mode or A/Gb mode	229
4.7.8	Identification procedure	232
4.7.8.1	Identification initiation by the network	232
4.7.8.2	Identification response by the MS	232
4.7.8.3	Identification completion by the network	232
4.7.8.3a	Abnormal cases in the MS	232
4.7.8.4	Abnormal cases on the network side	232
4.7.9	Paging procedure	233
4.7.9.1	Paging for GPRS services	233
4.7.9.1.1	Paging for GPRS services using P-TMSI	233
4.7.9.1.2	Paging for GPRS services using IMSI	235
4.7.9.2	Paging for non-GPRS services	235
4.7.10	Receiving a GMM STATUS message by a GMM entity	235
4.7.11	Void	236
4.7.12	GMM Information procedure	236
4.7.12.1	GMM information procedure initiation by the network	236
4.7.12.2	GMM information procedure in the mobile station	236
4.7.13	Service Request procedure (Iu mode only).....	236
4.7.13.1	Service Request procedure initiation.....	238
4.7.13.2	GMM common procedure initiation	238
4.7.13.3	Service request procedure accepted by the network.....	238
4.7.13.4	Service request procedure not accepted by the network.....	240
4.7.13.4a	Service request procedure for initiating a PDN connection for emergency bearer services not accepted by the network (UTRAN Iu mode only)	244
4.7.13.5	Abnormal cases in the MS	244
4.7.13.6	Abnormal cases on the network side	247
4.7.14	Void	248
5	Elementary procedures for circuit-switched Call Control	248
5.1	Overview	248
5.1.1	General.....	248
5.1.2	Call Control States	256
5.1.2.1	Call states at the mobile station side of the interface	256
5.1.2.1.1	Null (State U0)	256
5.1.2.1.2	MM Connection pending (U0.1)	256
5.1.2.1.2a	CC prompt present (U0.2) \$(CCBS)\$	256
5.1.2.1.2b	Wait for network information (U0.3) \$(CCBS)\$.....	256
5.1.2.1.2c	CC-Establishment present (U0.4) \$(CCBS)\$	256
5.1.2.1.2d	CC-Establishment confirmed (U0.5) \$(CCBS)\$	257
5.1.2.1.2e	Recall present (U0.6) \$(CCBS)\$	257
5.1.2.1.3	Call initiated (U1).....	257
5.1.2.1.4	Mobile originating call proceeding (U3)	257
5.1.2.1.5	Call delivered (U4).....	257
5.1.2.1.6	Call present (U6)	257
5.1.2.1.7	Call received (U7)	257
5.1.2.1.8	Connect Request (U8)	257
5.1.2.1.9	Mobile terminating call confirmed (U9).....	257
5.1.2.1.10	Active (U10).....	257
5.1.2.1.11	Disconnect request (U11)	257
5.1.2.1.12	Disconnect indication (U12).....	258
5.1.2.1.13	Release request (U19).....	258
5.1.2.1.14	Mobile originating modify (U26)	258

5.1.2.1.15	Mobile terminating modify (U27)	258
5.1.2.2	Network call states	258
5.1.2.2.1	Null (State N0)	258
5.1.2.2.2	MM connection pending (N0.1)	258
5.1.2.2.2a	CC connection pending (N0.2) \$(CCBS)\$	258
5.1.2.2.2b	Network answer pending (N0.3) \$(CCBS)\$	258
5.1.2.2.2c	CC-Establishment present (N0.4) \$(CCBS)\$	258
5.1.2.2.2d	CC-Establishment confirmed (N0.5) \$(CCBS)\$	258
5.1.2.2.2e	Recall present (N0.6) \$(CCBS)\$	258
5.1.2.2.3	Call initiated (N1)	259
5.1.2.2.4	Mobile originating call proceeding (N3)	259
5.1.2.2.5	Call delivered (N4)	259
5.1.2.2.6	Call present (N6)	259
5.1.2.2.7	Call received (N7)	259
5.1.2.2.8	Connect request (N8)	259
5.1.2.2.9	Mobile terminating call confirmed (N9)	259
5.1.2.2.10	Active (N10)	259
5.1.2.2.11	Not used	259
5.1.2.2.12	Disconnect indication (N12)	259
5.1.2.2.13	Release request (N19)	259
5.1.2.2.14	Mobile originating modify (N26)	259
5.1.2.2.15	Mobile terminating modify (N27)	260
5.1.2.2.16	Connect Indication (N28)	260
5.2	Call establishment procedures	260
5.2.1	Mobile originating call establishment	260
5.2.1.1	Call initiation	261
5.2.1.2	Receipt of a setup message	261
5.2.1.3	Receipt of a CALL PROCEEDING message	263
5.2.1.4	Notification of progressing mobile originated call	263
5.2.1.4.1	Notification of interworking in connection with mobile originated call establishment	264
5.2.1.4.2	Call progress in the PLMN/ISDN environment	264
5.2.1.5	Alerting	264
5.2.1.6	Call connected	265
5.2.1.7	Call rejection	266
5.2.1.8	Transit network selection	266
5.2.1.9	Traffic channel assignment at mobile originating call establishment	266
5.2.1.10	Call queuing at mobile originating call establishment	266
5.2.1.11	Speech Codec Selection	266
5.2.1.12	Cellular Text telephone Modem (CTM) selection	267
5.2.2	Mobile terminating call establishment	268
5.2.2.1	Call indication	268
5.2.2.2	Compatibility checking	268
5.2.2.3	Call confirmation	268
5.2.2.3.1	Response to SETUP	268
5.2.2.3.2	Receipt of CALL CONFIRMED and ALERTING by the network	269
5.2.2.3.3	Call failure procedures	270
5.2.2.3.4	Called mobile station clearing during mobile terminating call establishment	270
5.2.2.4	Notification of interworking in connection with mobile terminating call establishment	270
5.2.2.5	Call accept	271
5.2.2.6	Active indication	271
5.2.2.7	Traffic channel assignment at mobile terminating call establishment	271
5.2.2.8	Call queuing at mobile terminating call establishment	272
5.2.2.9	User connection attachment during a mobile terminating call	272
5.2.2.10	Speech Codec Selection	272
5.2.2.11	Cellular Text telephone Modem (CTM) selection	272
5.2.3	Network initiated MO call \$(CCBS)\$	272
5.2.3.1	Initiation	272
5.2.3.2	CC-Establishment present	273
5.2.3.2.1	Recall Alignment Procedure	274
5.2.3.3	CC-Establishment confirmation	275
5.2.3.4	Recall present	275
5.2.3.5	Traffic channel assignment during network initiated mobile originating call establishment	276

5.2.4	Call establishment for SRVCC or vSRVCC.....	276
5.2.4.1	General.....	276
5.2.4.2	Call activation for SRVCC.....	276
5.2.4.2a	Call activation for vSRVCC.....	277
5.2.4.2b	Multimedia CAT and vSRVCC handover.....	278
5.2.4.3	Traffic channel assignment and user connection attachment.....	278
5.2.4.4	State verification.....	279
5.3	Signalling procedures during the "active" state.....	279
5.3.1	User notification procedure.....	279
5.3.2	Call rearrangements.....	279
5.3.3	Codec Change Procedure.....	279
5.3.4	Support of Dual Services.....	279
5.3.4.1	Service Description.....	279
5.3.4.2	Call establishment.....	280
5.3.4.2.1	Mobile Originating Establishment.....	280
5.3.4.2.2	Mobile Terminating Establishment.....	281
5.3.4.3	Changing the Call Mode.....	281
5.3.4.3.1	Initiation of in-call modification.....	281
5.3.4.3.2	Successful completion of in-call modification.....	282
5.3.4.3.3	Change of the channel configuration.....	283
5.3.4.3.4	Failure of in-call modification.....	283
5.3.4.4	Abnormal procedures.....	283
5.3.5	User initiated service level up- and downgrading (A/Gb mode and GERAN Iu mode only).....	284
5.3.5.1	Initiation of service level up- and downgrading.....	284
5.3.5.2	Successful completion of service level up- and downgrading.....	284
5.3.5.3	Rejection of service level up- and downgrading.....	285
5.3.5.4	Time-out recovery.....	285
5.3.6	Support of multimedia calls.....	285
5.3.6.1	Service description.....	285
5.3.6.2	Call establishment.....	285
5.3.6.2.1	Mobile originated multimedia call establishment.....	285
5.3.6.2.2	Mobile terminating multimedia call.....	286
5.3.6.2.2.1	Fallback to speech.....	287
5.3.6.3	In-call modification in the "active" state.....	287
5.3.6.3.1	Void.....	288
5.3.6.3.2	Void.....	288
5.3.6.3.3	Void.....	288
5.3.6.4	Multimedia CAT during the alerting phase of a mobile originated call.....	288
5.3.6.5	DTMF transmission during a multimedia call.....	289
5.3.6.6	vSRVCC handover to a circuit-switched multimedia call.....	289
5.4	Call clearing.....	289
5.4.1	Terminology.....	289
5.4.2	Exception conditions.....	289
5.4.3	Clearing initiated by the mobile station.....	290
5.4.3.1	Initiation of call clearing.....	290
5.4.3.2	Receipt of a DISCONNECT message from the mobile station.....	290
5.4.3.3	Receipt of a RELEASE message from the network.....	290
5.4.3.4	Receipt of a RELEASE COMPLETE message from the mobile station.....	290
5.4.3.5	Abnormal cases.....	290
5.4.4	Clearing initiated by the network.....	291
5.4.4.1	Clearing initiated by the network: mobile does not support "Prolonged Clearing Procedure".....	291
5.4.4.1.1	Clearing when tones/announcements provided.....	291
5.4.4.1.2	Clearing when tones/announcements not provided.....	291
5.4.4.1.3	Completion of clearing.....	292
5.4.4.2	Clearing initiated by the network: mobile supports "Prolonged Clearing Procedure".....	292
5.4.4.2.1	Clearing when tones/announcements provided and the network does not indicate that "CCBS activation is possible".....	292
5.4.4.2.2	Clearing when the network indicates that "CCBS activation is possible".....	293
5.4.4.2.3	Clearing when tones/announcements are not provided and the network does not indicate that "CCBS activation is possible".....	294
5.4.4.2.4	Receipt of a RELEASE message from the mobile station.....	294
5.4.4.2.5	Completion of clearing.....	295

5.4.5	Call clearing for SRVCC from CS to PS	295
5.5	Miscellaneous procedures	295
5.5.1	In-band tones and announcements	295
5.5.2	Call collisions	296
5.5.3	Status procedures	296
5.5.3.1	Status enquiry procedure	296
5.5.3.2	Reception of a STATUS message by a CC entity	297
5.5.3.2.1	STATUS message with incompatible state	297
5.5.3.2.2	STATUS message with compatible state	297
5.5.4	Call re-establishment, mobile station side	297
5.5.4.1	Indication from the mobility management sublayer	297
5.5.4.2	Reaction of call control	297
5.5.4.3	Completion of re-establishment	298
5.5.4.4	Unsuccessful outcome	298
5.5.5	Call re-establishment, network side	298
5.5.5.1	State alignment	298
5.5.6	Progress	298
5.5.7	DTMF protocol control procedure	298
5.5.7.1	Start DTMF request by the mobile station	299
5.5.7.2	Start DTMF response by the network	299
5.5.7.3	Stop DTMF request by the mobile station	299
5.5.7.4	Stop DTMF response by the network	299
5.5.7.5	Sequencing of subsequent start DTMF requests by the mobile station	299
6	Support for packet services	300
6.1	GPRS Session management	300
6.1.1	General	300
6.1.2	Session management states	301
6.1.2.1	Session management states in the MS	301
6.1.2.1.1	PDP-INACTIVE	301
6.1.2.1.2	PDP-ACTIVE-PENDING	301
6.1.2.1.3	PDP-INACTIVE-PENDING	301
6.1.2.1.4	PDP-ACTIVE	301
6.1.2.1.5	PDP-MODIFY_PENDING	301
6.1.2.1.6	MBMS-ACTIVE-PENDING	301
6.1.2.1.7	MBMS-ACTIVE	301
6.1.2.2	Session management states on the network side	303
6.1.2.2.1	PDP-INACTIVE	303
6.1.2.2.2	PDP-ACTIVE-PENDING	303
6.1.2.2.3	PDP-INACTIVE-PENDING	303
6.1.2.2.4	PDP-ACTIVE	303
6.1.2.2.5	PDP-MODIFY_PENDING	303
6.1.2.2.6	MBMS-ACTIVE-PENDING	304
6.1.2.2.7	MBMS-INACTIVE-PENDING	304
6.1.2.2.8	MBMS-ACTIVE	304
6.1.2A	PDP address allocation	305
6.1.2A.1	General	305
6.1.2A.1.1	Interworking with PDN based on IP	305
6.1.2A.1.2	Interworking with PDN based on PPP	305
6.1.2A.2	IP address allocation via NAS signalling	306
6.1.3	Session Management procedures	306
6.1.3.0	General	306
6.1.3.1	PDP context activation	306
6.1.3.1.1	Successful PDP context activation initiated by the mobile station	307
6.1.3.1.2	Successful PDP context activation requested by the network	309
6.1.3.1.3	Unsuccessful PDP context activation initiated by the MS	310
6.1.3.1.3.1	General	310
6.1.3.1.3.2	Handling of network rejection due to SM cause #26	311
6.1.3.1.3.3	Handling of network rejection due to SM cause other than SM cause #26	312
6.1.3.1.3A	Void	316
6.1.3.1.4	Unsuccessful PDP context activation requested by the network	316
6.1.3.1.5	Abnormal cases	316

6.1.3.1.6	Handling Activate PDP context request for MS configured for dual priority	318
6.1.3.2	Secondary PDP Context Activation Procedure	318
6.1.3.2.1	Successful Secondary PDP Context Activation Procedure Initiated by the MS	319
6.1.3.2.1a	Successful Secondary PDP Context Activation Procedure Requested by the network	319
6.1.3.2.2	Unsuccessful Secondary PDP Context Activation Procedure initiated by the MS	321
6.1.3.2.2.1	General	321
6.1.3.2.2.2	Handling of network rejection due to SM cause #26	321
6.1.3.2.2.3	Handling of network rejection due to SM cause other than SM cause #26	323
6.1.3.2.2a	Unsuccessful secondary PDP context activation requested by the network	324
6.1.3.2.3	Abnormal cases	325
6.1.3.3	PDP context modification procedure	328
6.1.3.3.1	Network initiated PDP Context Modification	329
6.1.3.3.2	MS initiated PDP Context Modification accepted by the network	330
6.1.3.3.3	MS initiated PDP Context Modification not accepted by the network	331
6.1.3.3.3.1	General	331
6.1.3.3.3.2	Handling of network rejection due to SM cause #26	332
6.1.3.3.3.3	Handling of network rejection due to SM cause other than SM cause #26	333
6.1.3.3.3a	Network initiated PDP Context Modification not accepted by the MS	334
6.1.3.3.4	Abnormal cases	335
6.1.3.4	PDP context deactivation procedure	340
6.1.3.4.1	PDP context deactivation initiated by the MS	340
6.1.3.4.2	PDP context deactivation initiated by the network	341
6.1.3.4.3	Abnormal cases	343
6.1.3.4a	Void	344
6.1.3.5	Void	344
6.1.3.5a	Notification procedure	344
6.1.3.5a.1	General	344
6.1.3.5a.2	Notification procedure initiation by the network	344
6.1.3.5a.3	Notification procedure in the MS	345
6.1.3.6	Receiving a SM STATUS message by a SM entity	345
6.1.3.7	Protocol configuration options	346
6.1.3.8	MBMS context activation	346
6.1.3.8.1	Successful MBMS context activation	346
6.1.3.8.2	Unsuccessful MBMS context activation requested by the MS	346
6.1.3.8.2.1	General	346
6.1.3.8.2.2	Handling of network rejection due to SM cause #26	347
6.1.3.8.2.3	Handling of network rejection due to SM cause other than SM cause #26	348
6.1.3.8.3	Unsuccessful MBMS context activation requested by the network	349
6.1.3.8.4	Abnormal cases	349
6.1.3.9	MBMS context deactivation	350
6.1.3.9.1	MBMS context deactivation initiated by the network	350
6.1.3.9.2	Abnormal cases	350
6.1.3.10	MBMS protocol configuration options	351
6.1.3.11	Handling of APN based congestion control	351
6.1.3.11A	Handling of group specific session management congestion control	351
6.1.3.12	Handling session management request for MS configured for dual priority	351
6.1.3.13	Handling of network rejection not due to APN based congestion control	352
6.1.3.14	Handling of WLAN offload control	353
6.2	void	353
6.3	Coordination between SM and GMM for supporting ISR	353
6.4	MSISDN notification procedure	353
7	Examples of structured procedures	353
8	Handling of unknown, unforeseen, and erroneous protocol data	354
8.1	General	354
8.2	Message too short	354
8.3	Unknown or unforeseen transaction identifier	354
8.3.1	Call Control	354
8.3.2	Session Management	355
8.4	Unknown or unforeseen message type	356
8.5	Non-semantical mandatory information element errors	357

8.5.1	Radio resource management	357
8.5.2	Mobility management	357
8.5.3	Call control	357
8.5.4	GMM mobility management.....	358
8.5.5	Session management.....	358
8.6	Unknown and unforeseen IEs in the non-imperative message part.....	358
8.6.1	IEs unknown in the message	358
8.6.2	Out of sequence IEs	358
8.6.3	Repeated IEs	359
8.7	Non-imperative message part errors.....	359
8.7.1	Syntactically incorrect optional IEs	359
8.7.2	Conditional IE errors	359
8.8	Messages with semantically incorrect contents.....	359
9	Message functional definitions and contents.....	360
9.1	Messages for Radio Resources management.....	361
9.2	Messages for mobility management	361
9.2.1	Authentication reject.....	361
9.2.2	Authentication request	362
9.2.2.1	Authentication Parameter AUTN.....	362
9.2.3	Authentication response.....	362
9.2.3.1	Authentication Response Parameter.....	363
9.2.3.2	Authentication Response Parameter (extension).....	363
9.2.3a	Authentication Failure	363
9.2.3a.1	Authentication Failure parameter.....	363
9.2.4	CM Re-establishment request.....	364
9.2.4.1	Location area identification.....	364
9.2.4.2	Mobile Station Classmark	364
9.2.4.3	Device properties	364
9.2.5	CM service accept.....	364
9.2.5a	CM service prompt \$(CCBS)\$.....	365
9.2.6	CM service reject.....	365
9.2.6.1	T3246 value.....	366
9.2.7	CM service abort.....	366
9.2.8	Abort.....	366
9.2.9	CM service request	367
9.2.9.1	Mobile Station Classmark	367
9.2.9.2	Priority	367
9.2.9.3	Additional update parameters.....	367
9.2.9.4	Device properties	367
9.2.10	Identity request	368
9.2.11	Identity response.....	368
9.2.12	IMSI detach indication.....	368
9.2.12.1	Mobile Station Classmark	369
9.2.13	Location updating accept	369
9.2.13.1	Follow on proceed.....	369
9.2.13.2	CTS permission.....	370
9.2.13.3	Equivalent PLMNs.....	370
9.2.13.4	Emergency Number List	370
9.2.13.5	Per MS T3212	370
9.2.14	Location updating reject	370
9.2.14.1	T3246 value.....	370
9.2.15	Location updating request.....	370
9.2.15.1	Location area identification.....	371
9.2.15.2	Mobile Station Classmark	371
9.2.15.3	Mobile Station Classmark for Iu mode	371
9.2.15.4	Additional update parameters.....	371
9.2.15.5	Device properties	371
9.2.15.6	MS network feature support.....	371
9.2.15a	MM information	372
9.2.15a.1	Full name for network.....	372
9.2.15a.2	Short name for network.....	372

9.2.15a.3	Local time zone	372
9.2.15a.4	Universal time and local time zone	372
9.2.15a.5	LSA Identity	373
9.2.15a.6	Network Daylight Saving Time	373
9.2.16	MM Status	373
9.2.17	TMSI reallocation command	373
9.2.18	TMSI reallocation complete	374
9.2.19	MM Null	374
9.3	Messages for circuit-switched call control	375
9.3.1	Alerting	375
9.3.1.1	Alerting (network to mobile station direction)	375
9.3.1.1.1	Facility	376
9.3.1.1.2	Progress indicator	376
9.3.1.1.3	User-user	376
9.3.1.2	Alerting (mobile station to network direction)	376
9.3.1.2.1	Facility	377
9.3.1.2.2	User-user	377
9.3.1.2.3	SS version	377
9.3.2	Call confirmed	377
9.3.2.1	Repeat indicator	378
9.3.2.2	Bearer capability 1 and bearer capability 2	378
9.3.2.3	Cause	379
9.3.2.4	CC Capabilities	379
9.3.2.5	Stream Identifier	379
9.3.2.6	Supported Codecs	379
9.3.3	Call proceeding	379
9.3.3.1	Repeat indicator	379
9.3.3.2	Bearer capability 1 and bearer capability 2	380
9.3.3.3	Facility	380
9.3.3.4	Progress Indicator	380
9.3.3.5	Priority granted	380
9.3.3.6	Network Call Control Capabilities	380
9.3.4	Congestion control	380
9.3.4.1	Cause	381
9.3.5	Connect	381
9.3.5.1	Connect (network to mobile station direction)	381
9.3.5.1.1	Facility	381
9.3.5.1.2	Progress indicator	381
9.3.5.1.3	User-user	381
9.3.5.2	Connect (mobile station to network direction)	381
9.3.5.2.1	Facility	382
9.3.5.2.2	User-user	382
9.3.5.2.3	SS version	382
9.3.5.2.4	Stream Identifier	382
9.3.6	Connect acknowledge	382
9.3.7	Disconnect	383
9.3.7.1	Disconnect (network to mobile station direction)	383
9.3.7.1.1	Facility	383
9.3.7.1.2	Progress indicator	383
9.3.7.1.3	User-user	383
9.3.7.1.4	Allowed actions \$(CCBS)\$	383
9.3.7.2	Disconnect (mobile station to network direction)	384
9.3.7.2.1	Facility	384
9.3.7.2.2	User-user	384
9.3.7.2.3	SS version	384
9.3.8	Emergency setup	384
9.3.8.1	Bearer capability	385
9.3.8.2	Stream Identifier	385
9.3.8.3	Supported Codecs	385
9.3.8.4	Emergency category	385
9.3.9	Facility	385
9.3.9.1	Facility (network to mobile station direction)	385

9.3.9.2	Facility (mobile station to network direction).....	386
9.3.9.2.1	SS version.....	386
9.3.10	Hold.....	387
9.3.11	Hold Acknowledge.....	387
9.3.12	Hold Reject.....	387
9.3.13	Modify.....	388
9.3.13.1	Low layer compatibility.....	388
9.3.13.2	High layer compatibility.....	388
9.3.13.3	Reverse call setup direction.....	388
9.3.13.4	Void.....	389
9.3.13.5	Network-initiated Service Upgrade indicator.....	389
9.3.14	Modify complete.....	389
9.3.14.1	Low layer compatibility.....	389
9.3.14.2	High layer compatibility.....	389
9.3.14.3	Reverse call setup direction.....	389
9.3.15	Modify reject.....	389
9.3.15.1	Low layer compatibility.....	390
9.3.15.2	High layer compatibility.....	390
9.3.16	Notify.....	390
9.3.17	Progress.....	390
9.3.17.1	User-user.....	391
9.3.17.2	Progress indicator.....	391
9.3.17a	CC-Establishment \$(CCBS)\$.....	391
9.3.17a.1	Void.....	392
9.3.17a.2	Setup container.....	392
9.3.17b	CC-Establishment confirmed \$(CCBS)\$.....	392
9.3.17b.1	Repeat indicator.....	392
9.3.17b.2	Bearer capability 1 and bearer capability 2.....	393
9.3.17b.3	Cause.....	393
9.3.17b.4	Supported Codecs.....	393
9.3.18	Release.....	393
9.3.18.1	Release (network to mobile station direction).....	393
9.3.18.1.1	Cause.....	393
9.3.18.1.2	Second cause.....	393
9.3.18.1.3	Facility.....	394
9.3.18.1.4	User-user.....	394
9.3.18.2	Release (mobile station to network direction).....	394
9.3.18.2.1	Cause.....	394
9.3.18.2.2	Second cause.....	394
9.3.18.2.3	Facility.....	394
9.3.18.2.4	User-user.....	395
9.3.18.2.5	SS version.....	395
9.3.18a	Recall \$(CCBS)\$.....	395
9.3.18a.1	Recall Type.....	395
9.3.18a.2	Facility.....	395
9.3.19	Release complete.....	395
9.3.19.1	Release complete (network to mobile station direction).....	395
9.3.19.1.1	Cause.....	396
9.3.19.1.2	Facility.....	396
9.3.19.1.3	User-user.....	396
9.3.19.2	Release complete (mobile station to network direction).....	396
9.3.19.2.1	Cause.....	397
9.3.19.2.2	Facility.....	397
9.3.19.2.3	User-user.....	397
9.3.19.2.4	SS version.....	397
9.3.20	Retrieve.....	397
9.3.21	Retrieve Acknowledge.....	398
9.3.22	Retrieve Reject.....	398
9.3.23	Setup.....	399
9.3.23.1	Setup (mobile terminated call establishment).....	399
9.3.23.1.1	BC repeat indicator.....	400
9.3.23.1.2	Bearer capability 1 and bearer capability 2.....	401

9.3.23.1.3	Facility.....	401
9.3.23.1.4	Progress indicator.....	401
9.3.23.1.4a	Called party BCD number.....	401
9.3.23.1.5	Called party subaddress.....	401
9.3.23.1.6	LLC repeat indicator.....	401
9.3.23.1.7	Low layer compatibility I.....	401
9.3.23.1.8	Low layer compatibility II.....	401
9.3.23.1.9	HLC repeat indicator.....	401
9.3.23.1.10	High layer compatibility i.....	401
9.3.23.1.11	High layer compatibility ii.....	402
9.3.23.1.12	User-user.....	402
9.3.23.1.13	Redirecting party BCD number.....	402
9.3.23.1.14	Redirecting party subaddress.....	402
9.3.23.1.15	Priority.....	402
9.3.23.1.16	Alert \$(Network Indication of Alerting in the MS)\$.....	402
9.3.23.1.17	Network Call Control Capabilities.....	402
9.3.23.1.18	Cause of No CLI.....	402
9.3.23.1.19	Backup bearer capability.....	402
9.3.23.2	Setup (mobile originating call establishment).....	402
9.3.23.2.1	BC repeat indicator.....	403
9.3.23.2.2	Facility.....	404
9.3.23.2.3	LLC repeat indicator.....	404
9.3.23.2.4	Low layer compatibility I.....	404
9.3.23.2.5	Low layer compatibility II.....	404
9.3.23.2.6	HLC repeat indicator.....	404
9.3.23.2.7	High layer compatibility i.....	404
9.3.23.2.8	High layer compatibility ii.....	404
9.3.23.2.9	User-user.....	404
9.3.23.2.10	SS version.....	404
9.3.23.2.11	CLIR suppression.....	404
9.3.23.2.12	CLIR invocation.....	405
9.3.23.2.13	CC Capabilities.....	405
9.3.23.2.14	Stream Identifier.....	405
9.3.23.2.15	Bearer capability 1 and bearer capability 2.....	405
9.3.23.2.16	Supported Codecs.....	405
9.3.23.2.17	Redial.....	405
9.3.23a	Start CC \$(CCBS)\$.....	405
9.3.23a.1	CC Capabilities.....	405
9.3.24	Start DTMF.....	406
9.3.25	Start DTMF Acknowledge.....	406
9.3.25.1	Keypad facility.....	406
9.3.26	Start DTMF reject.....	406
9.3.27	Status.....	407
9.3.27.1	Auxiliary states.....	407
9.3.28	Status enquiry.....	407
9.3.29	Stop DTMF.....	408
9.3.30	Stop DTMF acknowledge.....	408
9.3.31	User information.....	409
9.3.31.1	User-user.....	409
9.3.31.2	More data.....	409
9.4	GPRS Mobility Management Messages.....	409
9.4.1	Attach request.....	409
9.4.1.1	Old P-TMSI signature.....	411
9.4.1.2	Requested READY timer value.....	411
9.4.1.3	TMSI status.....	411
9.4.1.4	PS LCS Capability.....	411
9.4.1.5	UE network capability.....	411
9.4.1.6	Mobile station classmark 2.....	411
9.4.1.7	Mobile station classmark 3.....	411
9.4.1.8	Supported Codecs.....	411
9.4.1.9	Additional mobile identity.....	411
9.4.1.10	Additional old routing area identification.....	411

9.4.1.11	Voice domain preference and UE's usage setting.....	411
9.4.1.12	Device properties	412
9.4.1.13	P-TMSI type.....	412
9.4.1.14	MS network feature support.....	412
9.4.1.15	Old location area identification	412
9.4.1.16	Additional update type	412
9.4.1.17	TMSI based NRI container	412
9.4.1.18	T3324 value.....	412
9.4.1.19	T3312 extended value	412
9.4.1.20	Extended DRX parameters.....	412
9.4.2	Attach accept	412
9.4.2.1	P-TMSI signature.....	413
9.4.2.2	Negotiated READY timer value	413
9.4.2.3	Allocated P-TMSI	414
9.4.2.4	MS identity.....	414
9.4.2.5	GMM cause.....	414
9.4.2.6	T3302 value.....	414
9.4.2.7	Cell Notification (A/Gb mode only)	414
9.4.2.8	Equivalent PLMNs.....	414
9.4.2.9	Network feature support.....	414
9.4.2.10	Emergency Number List	414
9.4.2.11	Requested MS Information	414
9.4.2.12	T3319 value.....	414
9.4.2.13	T3323 value.....	414
9.4.2.14	T3312 extended value	414
9.4.2.15	Additional network feature support.....	414
9.4.2.16	T3324 value.....	415
9.4.2.17	Extended DRX parameters.....	415
9.4.3	Attach complete	415
9.4.3.1	Inter RAT handover information.....	415
9.4.3.2	E-UTRAN inter RAT handover information	415
9.4.4	Attach reject.....	415
9.4.4.1	T3302 value.....	416
9.4.4.2	T3346 value.....	416
9.4.5	Detach request	416
9.4.5.1	Detach request (mobile terminated detach).....	416
9.4.5.1.1	GMM cause.....	417
9.4.5.2	Detach request (mobile originating detach)	417
9.4.5.2.1	P-TMSI.....	417
9.4.5.2.2	P-TMSI signature	417
9.4.6	Detach accept.....	418
9.4.6.1	Detach accept (mobile terminated detach)	418
9.4.6.2	Detach accept (mobile originating detach).....	418
9.4.7	P-TMSI reallocation command.....	418
9.4.7.1	P-TMSI signature.....	419
9.4.8	P-TMSI reallocation complete.....	419
9.4.9	Authentication and ciphering request	419
9.4.9.1	Authentication Parameter RAND.....	420
9.4.9.2	GPRS ciphering key sequence number	420
9.4.9.3	Authentication Parameter AUTN.....	420
9.4.9.4	Replayed MS network capability	420
9.4.9.5	Integrity protection algorithm	420
9.4.9.6	Message authentication code.....	420
9.4.10	Authentication and ciphering response.....	421
9.4.10.1	Authentication Response Parameter.....	421
9.4.10.2	IMEISV	421
9.4.10.3	Authentication Response Parameter (extension).....	421
9.4.10.4	Message authentication code.....	421
9.4.10a	Authentication and Ciphering Failure.....	421
9.4.10a.1	Authentication Failure parameter.....	422
9.4.11	Authentication and ciphering reject.....	422
9.4.12	Identity request	422

9.4.13	Identity response	423
9.4.14	Routing area update request	423
9.4.14.1	Old P-TMSI signature	426
9.4.14.2	Requested READY timer value	426
9.4.14.3	DRX parameter	426
9.4.14.4	TMSI status	426
9.4.14.5	P-TMSI (Iu mode only)	426
9.4.14.6	MS network capability	426
9.4.14.7	PDP context status	426
9.4.14.8	PS LCS Capability	426
9.4.14.9	MBMS context status	426
9.4.14.10	Additional mobile identity	426
9.4.14.11	Additional old routing area identification	426
9.4.14.12	UE network capability	426
9.4.14.13	Mobile station classmark 2	426
9.4.14.14	Mobile station classmark 3	427
9.4.14.15	Supported Codecs	427
9.4.14.16	Voice domain preference and UE's usage setting	427
9.4.14.17	P-TMSI type	427
9.4.14.18	Device properties	427
9.4.14.19	MS network feature support	427
9.4.14.20	Old location area identification	427
9.4.14.21	Additional update type	427
9.4.14.22	TMSI based NRI container	427
9.4.14.23	T3324 value	427
9.4.14.24	T3312 extended value	427
9.4.14.25	Extended DRX parameters	427
9.4.15	Routing area update accept	428
9.4.15.1	P-TMSI signature	429
9.4.15.2	Allocated P-TMSI	430
9.4.15.3	MS identity	430
9.4.15.4	List of Receive N-PDU Numbers	430
9.4.15.5	Negotiated READY timer value	430
9.4.15.6	GMM cause	430
9.4.15.7	T3302 value	430
9.4.15.8	Cell Notification (A/Gb mode only)	430
9.4.15.9	Equivalent PLMNs	430
9.4.15.10	PDP context status	430
9.4.15.11	Network feature support	430
9.4.15.12	Emergency Number List	431
9.4.15.13	MBMS context status	431
9.4.15.14	Requested MS Information	431
9.4.15.15	T3319 value	431
9.4.15.16	T3323 value	431
9.4.15.17	T3312 extended value	431
9.4.15.18	Additional network feature support	431
9.4.15.19	T3324 value	431
9.4.15.20	Extended DRX parameters	431
9.4.16	Routing area update complete	431
9.4.16.1	List of Receive N-PDU Numbers	432
9.4.16.2	Inter RAT handover information	432
9.4.16.3	E-UTRAN inter RAT handover information	432
9.4.17	Routing area update reject	432
9.4.17.1	T3302 value	433
9.4.17.2	T3346 value	433
9.4.18	GMM Status	433
9.4.19	GMM Information	434
9.4.19.1	Full name for network	434
9.4.19.2	Short name for network	434
9.4.19.3	Local time zone	434
9.4.19.4	Universal time and local time zone	434
9.4.19.5	LSA Identity	435

9.4.19.6	Network Daylight Saving Time	435
9.4.20	Service Request (Iu mode only).....	435
9.4.20.1	PDP context status	435
9.4.20.2	MBMS context status.....	435
9.4.20.3	Uplink data status.....	435
9.4.20.4	Device properties	435
9.4.21	Service Accept (Iu mode only)	436
9.4.21.1	PDP context status	436
9.4.21.2	MBMS context status.....	436
9.4.22	Service Reject (Iu mode only)	436
9.4.22.1	T3346 value.....	436
9.5	GPRS Session Management Messages.....	437
9.5.1	Activate PDP context request	437
9.5.1.1	Access point name.....	437
9.5.1.2	Protocol configuration options	437
9.5.1.3	Request type	437
9.5.1.4	Device properties	437
9.5.1.5	NBIFOM container	438
9.5.2	Activate PDP context accept.....	438
9.5.2.1	PDP address	438
9.5.2.2	Protocol configuration options	438
9.5.2.3	Packet Flow Identifier	439
9.5.2.4	SM cause	439
9.5.2.5	Connectivity type	439
9.5.2.6	WLAN offload indication	439
9.5.2.7	NBIFOM container	439
9.5.3	Activate PDP context reject.....	439
9.5.3.1	Protocol configuration options	440
9.5.3.2	Back-off timer value	440
9.5.3.3	Re-attempt indicator.....	440
9.5.3.4	NBIFOM container	440
9.5.4	Activate Secondary PDP Context Request	440
9.5.4.1	TFT	441
9.5.4.2	Protocol configuration options	441
9.5.4.3	Device properties	441
9.5.4.4	NBIFOM container	441
9.5.5	Activate Secondary PDP Context Accept.....	441
9.5.5.1	Packet Flow Identifier.....	441
9.5.5.2	Protocol configuration options	442
9.5.5.3	WLAN offload indication	442
9.5.5.4	NBIFOM container	442
9.5.6	Activate Secondary PDP Context Reject	442
9.5.6.1	Protocol configuration options	442
9.5.6.2	Back-off timer value	442
9.5.6.3	Re-attempt indicator.....	442
9.5.6.4	NBIFOM container	443
9.5.7	Request PDP context activation.....	443
9.5.7.1	Protocol configuration options	443
9.5.7.2	NBIFOM container	443
9.5.8	Request PDP context activation reject.....	443
9.5.8.1	Protocol configuration options	444
9.5.8.2	NBIFOM container	444
9.5.9	Modify PDP context request (Network to MS direction)	444
9.5.9.1	PDP address	445
9.5.9.2	Packet Flow Identifier	445
9.5.9.3	Protocol configuration options	445
9.5.9.4	TFT	445
9.5.9.5	WLAN offload indication	445
9.5.9.6	NBIFOM container	445
9.5.10	Modify PDP context request (MS to network direction)	445
9.5.10.1	Requested LLC SAPI.....	446
9.5.10.2	Requested new QoS	446

9.5.10.3	New TFT	446
9.5.10.4	Protocol configuration options	446
9.5.10.5	Device properties	446
9.5.10.6	NBIFOM container	446
9.5.11	Modify PDP context accept (MS to network direction).....	446
9.5.11.1	Protocol configuration options	447
9.5.11.2	NBIFOM container	447
9.5.12	Modify PDP context accept (Network to MS direction).....	447
9.5.12.1	Negotiated QoS	448
9.5.12.2	Negotiated LLC SAPI.....	448
9.5.12.3	New radio priority	448
9.5.12.4	Packet Flow Identifier	448
9.5.12.5	Protocol configuration options	448
9.5.12.6	WLAN offload indication	448
9.5.12.7	NBIFOM container	448
9.5.13	Modify PDP Context Reject	448
9.5.13.1	Protocol configuration options	449
9.5.13.2	Back-off timer value	449
9.5.13.3	Re-attempt indicator.....	449
9.5.13.4	NBIFOM container	449
9.5.14	Deactivate PDP context request.....	449
9.5.14.1	Tear down indicator	450
9.5.14.2	Protocol configuration options	450
9.5.14.3	MBMS protocol configuration options	450
9.5.14.4	T3396 value.....	450
9.5.14.5	WLAN offload indication	450
9.5.14.6	Void.....	450
9.5.15	Deactivate PDP context accept	450
9.5.15.1	Protocol configuration options	451
9.5.15.2	MBMS protocol configuration options	451
9.5.15.3	Void.....	451
9.5.15a	Request Secondary PDP Context Activation	451
9.5.15a.1	TFT	452
9.5.15a.2	Protocol configuration options	452
9.5.15a.3	WLAN offload indication	452
9.5.15a.4	NBIFOM container	452
9.5.15b	Request Secondary PDP Context Activation Reject.....	452
9.5.15b.1	Protocol configuration options	453
9.5.15b.2	NBIFOM container	453
9.5.16	Void	453
9.5.16a	Notification	453
9.5.17	Void	454
9.5.18	Void	454
9.5.19	Void	454
9.5.20	Void	454
9.5.21	SM Status.....	454
9.5.22	Activate MBMS Context Request	454
9.5.22.1	MBMS protocol configuration options	455
9.5.22.2	Device properties	455
9.5.23	Activate MBMS Context Accept	455
9.5.23.1	MBMS protocol configuration options	456
9.5.24	Activate MBMS Context Reject	456
9.5.24.1	MBMS protocol configuration options	456
9.5.24.2	Back-off timer value	456
9.5.24.3	Re-attempt indicator.....	456
9.5.25	Request MBMS Context Activation	456
9.5.25.1	Linked NSAPI.....	457
9.5.25.2	MBMS protocol configuration options	457
9.5.26	Request MBMS Context Activation Reject.....	457
9.5.26.1	MBMS protocol configuration options	457
10	General message format and information elements coding.....	458

10.1	Overview	458
10.2	Protocol Discriminator	458
10.3	Skip indicator and transaction identifier.....	458
10.3.1	Skip indicator.....	458
10.3.2	Transaction identifier.....	460
10.4	Message Type.....	460
10.5	Other information elements	463
10.5.1	Common information elements.....	464
10.5.1.1	Cell identity.....	464
10.5.1.2	Ciphering Key Sequence Number.....	465
10.5.1.3	Location Area Identification	465
10.5.1.4	Mobile Identity.....	467
10.5.1.5	Mobile Station Classmark 1	472
10.5.1.6	Mobile Station Classmark 2	475
10.5.1.7	Mobile Station Classmark 3	478
10.5.1.8	Spare Half Octet.....	494
10.5.1.9	Descriptive group or broadcast call reference	494
10.5.1.10	Group Cipher Key Number	495
10.5.1.10a	PD and SAPI \$(CCBS)\$	496
10.5.1.11	Priority Level	497
10.5.1.12	Core Network System Information (Iu mode only)	497
10.5.1.12.1	CN Common GSM-MAP NAS system information	497
10.5.1.12.2	CS domain specific system information	498
10.5.1.12.3	PS domain specific system information	498
10.5.1.13	PLMN list.....	499
10.5.1.14	NAS container for PS HO	500
10.5.1.15	MS network feature support.....	501
10.5.2	Radio Resource management information elements.....	502
10.5.3	Mobility management information elements.	502
10.5.3.1	Authentication parameter RAND.....	502
10.5.3.1.1	Authentication Parameter AUTN (UMTS and EPS authentication challenge)	502
10.5.3.2	Authentication Response parameter.....	503
10.5.3.2.1	Authentication Response Parameter (extension) (UMTS authentication challenge only).....	504
10.5.3.2.2	Authentication Failure parameter (UMTS and EPS authentication challenge)	504
10.5.3.3	CM service type	505
10.5.3.4	Identity type	505
10.5.3.5	Location updating type.....	506
10.5.3.5a	Network Name	506
10.5.3.6	Reject cause.....	508
10.5.3.7	Follow-on Proceed	509
10.5.3.8	Time Zone	509
10.5.3.9	Time Zone and Time.....	510
10.5.3.10	CTS permission.....	511
10.5.3.11	LSA Identifier	512
10.5.3.12	Daylight Saving Time	512
10.5.3.13	Emergency Number List	513
10.5.3.14	Additional update parameters.....	514
10.5.3.15	Void.....	514
10.5.3.16	MM Timer.....	514
10.5.4	Call control information elements	515
10.5.4.1	Extensions of codesets	515
10.5.4.2	Locking shift procedure	516
10.5.4.3	Non-locking shift procedure.....	516
10.5.4.4	Auxiliary states	517
10.5.4.4a	Backup bearer capability.....	518
10.5.4.4a.1	Static conditions for the backup bearer capability IE contents	527
10.5.4.5	Bearer capability	527
10.5.4.5.1	Static conditions for the bearer capability IE contents	542
10.5.4.5a	Call Control Capabilities.....	542
10.5.4.6	Call state.....	543
10.5.4.7	Called party BCD number.....	544
10.5.4.8	Called party subaddress.....	546

10.5.4.9	Calling party BCD number	547
10.5.4.10	Calling party subaddress	548
10.5.4.11	Cause.....	549
10.5.4.11a	CLIR suppression.....	554
10.5.4.11b	CLIR invocation.....	555
10.5.4.12	Congestion level.....	555
10.5.4.13	Connected number	555
10.5.4.14	Connected subaddress	556
10.5.4.15	Facility	556
10.5.4.16	High layer compatibility	557
10.5.4.16.1	Static conditions for the high layer compatibility IE contents.....	558
10.5.4.17	Keypad facility	558
10.5.4.18	Low layer compatibility	558
10.5.4.19	More data	558
10.5.4.20	Notification indicator	559
10.5.4.21	Progress indicator.....	559
10.5.4.21a	Recall type \$(CCBS)\$	560
10.5.4.21b	Redirecting party BCD number	561
10.5.4.21c	Redirecting party subaddress	561
10.5.4.22	Repeat indicator	562
10.5.4.22a	Reverse call setup direction.....	562
10.5.4.22b	SETUP Container \$(CCBS)\$	563
10.5.4.23	Signal	563
10.5.4.24	SS Version Indicator	564
10.5.4.25	User-user	564
10.5.4.26	Alerting Pattern \$(NIA)\$	565
10.5.4.27	Allowed actions \$(CCBS)\$.....	566
10.5.4.28	Stream Identifier	567
10.5.4.29	Network Call Control Capabilities	567
10.5.4.30	Cause of No CLI	568
10.5.4.31	Void.....	568
10.5.4.32	Supported codec list	568
10.5.4.33	Service category	569
10.5.4.34	Redial	570
10.5.4.35	Network-initiated Service Upgrade indicator.....	570
10.5.5	GPRS mobility management information elements.....	571
10.5.5.0	Additional update type	571
10.5.5.1	Attach result	571
10.5.5.2	Attach type	571
10.5.5.3	Ciphering algorithm	572
10.5.5.3a	Integrity protection algorithm	573
10.5.5.4	TMSI status	573
10.5.5.5	Detach type	574
10.5.5.6	DRX parameter	574
10.5.5.7	Force to standby	576
10.5.5.8	P-TMSI signature	577
10.5.5.8a	P-TMSI signature 2	577
10.5.5.9	Identity type 2	578
10.5.5.10	IMEISV request	578
10.5.5.11	Receive N-PDU Numbers list	579
10.5.5.12	MS network capability	580
10.5.5.12a	MS Radio Access capability	584
10.5.5.13	Spare	603
10.5.5.14	GMM cause	603
10.5.5.15	Routing area identification	604
10.5.5.15a	Routing area identification 2	606
10.5.5.16	Spare	606
10.5.5.17	Update result	606
10.5.5.18	Update type	607
10.5.5.19	A&C reference number	608
10.5.5.20	Service type.....	608
10.5.5.21	Cell Notification.....	609

10.5.5.22	PS LCS Capability	609
10.5.5.23	Network feature support.....	610
10.5.5.23A	Additional network feature support.....	611
10.5.5.24	Inter RAT information container.....	612
10.5.5.25	Requested MS information	612
10.5.5.26	UE network capability.....	613
10.5.5.27	E-UTRAN inter RAT information container	613
10.5.5.28	Voice domain preference and UE's usage setting.....	613
10.5.5.29	P-TMSI type.....	614
10.5.5.30	Location Area Identification 2	615
10.5.5.31	Network resource identifier container	615
10.5.5.32	Extended DRX parameters.....	616
10.5.5.33	Message authentication code.....	620
10.5.6	Session management information elements	621
10.5.6.1	Access point name.....	621
10.5.6.2	Network service access point identifier.....	621
10.5.6.3	Protocol configuration options	622
10.5.6.3.1	General	622
10.5.6.3.2	APN rate control parameters	630
10.5.6.4	Packet data protocol address	631
10.5.6.5	Quality of service	633
10.5.6.5A	Re-attempt indicator	643
10.5.6.6	SM cause	644
10.5.6.6A	SM cause 2	645
10.5.6.7	Linked TI	646
10.5.6.8	Spare	646
10.5.6.9	LLC service access point identifier	646
10.5.6.10	Tear down indicator	647
10.5.6.11	Packet Flow Identifier	647
10.5.6.12	Traffic Flow Template	648
10.5.6.13	Temporary Mobile Group Identity (TMGI).....	655
10.5.6.14	MBMS bearer capabilities.....	655
10.5.6.15	MBMS protocol configuration options	656
10.5.6.16	Enhanced network service access point identifier.....	657
10.5.6.17	Request type.....	657
10.5.6.18	Notification indicator	658
10.5.6.19	Connectivity type	659
10.5.6.20	WLAN offload acceptability.....	659
10.5.6.21	NBIFOM container	660
10.5.7	GPRS Common information elements.....	660
10.5.7.1	PDP context status	660
10.5.7.2	Radio priority	661
10.5.7.3	GPRS Timer	662
10.5.7.4	GPRS Timer 2.....	662
10.5.7.4a	GPRS Timer 3.....	663
10.5.7.5	Radio priority 2	663
10.5.7.6	MBMS context status.....	664
10.5.7.7	Uplink data status.....	664
10.5.7.8	Device properties	665
11	List of system parameters.....	666
11.1	Timers and counters for radio resource management.....	666
11.2	Timers of mobility management	666
11.2.1	Timer T3240 and Timer T3241	669
11.2.2	Timers of GPRS mobility management	670
11.2.3	Timers of GPRS session management.....	681
11.3	Timers of circuit-switched call control.....	686
Annex A (informative):	Example of subaddress information element coding	688
Annex B (normative):	Compatibility checking.....	689
B.1	Introduction	689

B.2	Calling side compatibility checking	689
B.2.1	Compatibility checking of the CM SERVICE REQUEST message	689
B.2.2	Compatibility/Subscription checking of the SETUP message	689
B.3	Called side compatibility checking	689
B.3.1	Compatibility checking with addressing information.....	690
B.3.2	Network-to-MS compatibility checking.....	690
B.3.3	User-to-User compatibility checking.....	690
B.4	High layer compatibility checking	690
Annex C (normative): Low layer information coding principles.....		691
C.1	Purpose	691
C.2	Principles.....	691
C.2.1	Definition of types of information.....	691
C.2.2	Examination by network	691
C.2.3	Location of type I information	692
C.2.4	Location of types II and III information	692
C.2.5	Relationship between bearer capability and low layer compatibility information elements	692
Annex D (informative): Examples of bearer capability information element coding		693
D.1	Coding for speech for a full rate support only mobile station	693
D.1.1	Mobile station to network direction	693
D.1.2	Network to mobile station direction	693
D.2	An example of a coding for modem access with V22-bis, 2,4 kbit/s, 8 bit no parity.....	694
D.2.1	Mobile station to network direction, data compression allowed	694
D.2.2	Network to mobile station direction, data compression possible	695
D.3	An example of a coding for group 3 facsimile (9,6 kbit/s, transparent).....	696
D.3.1	Mobile station to network direction	696
D.3.2	Network to mobile station direction	697
Annex E (informative): Comparison between call control procedures specified in 3GPP TS 24.008 and ITU-T Recommendation Q.931		698
Annex F (informative): A/Gb mode specific cause values for radio resource management		702
Annex G (informative): 3GPP specific cause values for mobility management.....		703
G.1	Causes related to MS identification.....	703
G.2	Cause related to subscription options.....	703
G.3	Causes related to PLMN specific network failures and congestion/Authentication Failures.....	704
G.4	Causes related to nature of request.....	704
G.5	Causes related to invalid messages	705
G.6	Additional cause codes for GMM	705
Annex H (informative): 3GPP specific cause values for call control.....		707
H.1	Normal class.....	707
H.1.1	Cause No. 1 "unassigned (unallocated) number"	707
H.1.2	Cause No. 3 "no route to destination"	707
H.1.3	Cause No. 6 "channel unacceptable"	707
H.1.4	Cause No. 8 "operator determined barring"	707
H.1.5	Cause No.16 "normal call clearing"	707
H.1.6	Cause No.17 "user busy"	707
H.1.7	Cause No. 18 "no user responding"	707
H.1.8	Cause No. 19 "user alerting, no answer"	707
H.1.9	Cause No. 21 "call rejected"	708

H.1.10	Cause No. 22 "number changed"	708
H.1.10a	Cause No. 24 "call rejected due to feature at the destination"	708
H.1.11	Cause No. 25 "pre-emption"	708
H.1.12	Cause No. 26 "non-selected user clearing"	708
H.1.13	Cause No. 27 "destination out of order"	708
H.1.14	Cause No. 28 "invalid number format (incomplete number)"	708
H.1.15	Cause No. 29 "facility rejected"	708
H.1.16	Cause No. 30 "response to STATUS ENQUIRY"	708
H.1.17	Cause No. 31 "normal, unspecified"	708
H.2	Resource unavailable class	709
H.2.1	Cause No. 34 "no circuit/channel available"	709
H.2.2	Cause No. 38 "network out of order"	709
H.2.3	Cause No. 41 "temporary failure"	709
H.2.4	Cause No. 42 "switching equipment congestion"	709
H.2.5	Cause No. 43 "access information discarded"	709
H.2.6	Cause No. 44 "requested circuit/channel not available"	709
H.2.7	Cause No. 47 "resource unavailable, unspecified"	709
H.3	Service or option not available class	709
H.3.1	Cause No. 49 "quality of service unavailable"	709
H.3.2	Cause No. 50 "Requested facility not subscribed"	709
H.3.3	Cause No. 55 "Incoming calls barred within the CUG"	710
H.3.4	Cause No. 57 "bearer capability not authorized"	710
H.3.5	Cause No. 58 "bearer capability not presently available"	710
H.3.6	Cause No. 63 "service or option not available, unspecified"	710
H.3.7	Cause No. 68 "ACM equal to or greater than ACMmax"	710
H.4	Service or option not implemented class	710
H.4.1	Cause No. 65 "bearer service not implemented"	710
H.4.2	Cause No. 69 "Requested facility not implemented"	710
H.4.3	Cause No. 70 "only restricted digital information bearer capability is available"	710
H.4.4	Cause No. 79 "service or option not implemented, unspecified"	710
H.5	Invalid message (e.g., parameter out of range) class	711
H.5.1	Cause No. 81 "invalid transaction identifier value"	711
H.5.2	Cause No. 87 "user not member of CUG"	711
H.5.3	Cause No. 88 "incompatible destination"	711
H.5.4	Cause No. 91 "invalid transit network selection"	711
H.5.5	Cause No. 95 "semantically incorrect message"	711
H.6	Protocol error (e.g., unknown message) class	711
H.6.1	Cause No. 96 "invalid mandatory information"	711
H.6.2	Cause No. 97 "message type non-existent or not implemented"	711
H.6.3	Cause No. 98 "message type not compatible with protocol state"	711
H.6.4	Cause No. 99 "information element non-existent or not implemented"	712
H.6.5	Cause No. 100 "conditional IE error"	712
H.6.6	Cause No. 101 "message not compatible with protocol state"	712
H.6.7	Cause No. 102 "recovery on timer expiry"	712
H.6.8	Cause No. 111 "protocol error, unspecified"	712
H.7	Interworking class	712
H.7.1	Cause No. 127 "interworking, unspecified"	712
Annex I (informative):	GPRS specific cause values for GPRS Session Management.....	713
I.1	Causes related to nature of request	713
I.2	Causes related to invalid messages	715
I.3	Void	716
Annex J (informative):	Algorithm to encode frequency list information elements	717
Annex K (informative):	Default Codings of Information Elements	718

K.1	Common information elements.....	718
K.2	Radio Resource management information elements.....	718
K.3	Mobility management information elements.....	718
K.4	Call control information elements.....	719
Annex L (normative):	Establishment cause (Iu mode only).....	721
L.1	Mapping of NAS procedure to RRC establishment cause(Iu mode only).....	721
Annex M (normative):	Additional Requirements for backward compatibility with PCS 1900 for NA revision 0 ME.....	725
Annex N (normative):	Ranking of reject causes for Location Registration (MM and GMM) in a shared network	726
Annex O (normative):	3GPP capability exchange protocol.....	728
O.1	Scope.....	728
O.2	User-user protocol contents.....	728
O.3	Information element identifier.....	728
O.4	Information elements.....	729
O.4.1	Personal ME identifier.....	729
O.4.2	Radio environment capability.....	730
O.4.3	UE capability version.....	730
O.4.4	IM Status	731
O.5	Handling of unknown, unforeseen, and erroneous protocol data.....	732
O.5.1	General	732
O.5.2	Not supported IEs, unknown IEs	732
O.5.3	Repeated IEs.....	732
O.5.4	Syntactically incorrect IEs.....	733
O.5.5	Semantically incorrect IEs.....	733
Annex P (normative):	Mobility management for IMS voice termination	734
P.1	Introduction	734
P.2	Activation of mobility management for IMS voice termination	734
P.3	Inter-system change between A/Gb mode and Iu mode.....	734
P.4	Inter-system change between A/Gb mode and S1 mode.....	735
P.5	Inter-system change between Iu mode and S1 mode	735
Annex Q (normative):	Application specific Congestion control for Data Communication (ACDC) (Iu mode only)	736
Annex R (informative):	Change History	737
History		772

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

The present document includes references to features which are not part of the Phase 2+ Release 96 of the GSM Technical specifications. All subclauses which were changed as a result of these features contain a marker (see table below) relevant to the particular feature.

The following table lists all features that were introduced after GSM Release 96.

Feature	Designator
BA Range IE handling	\$(impr-BA-range-handling)\$
Advanced Speech Call Item	\$(ASCI)\$
Call Completion Busy Subscriber	\$(CCBS)\$
Mobile Assisted Frequency Allocation	\$(MAFA)\$
Network Indication of Alerting in MS	\$(NIA)\$

1 Scope

The present document specifies the procedures used at the radio interface core network protocols within the 3rd generation mobile telecommunications system and the digital cellular telecommunications system.

It specifies the procedures used at the radio interface (Reference Point Um or Uu, see 3GPP TS 24.002 [15] or 3GPP TS 23.002 [127]) for Call Control (CC), Mobility Management (MM), and Session Management (SM).

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

These procedures are defined in terms of messages exchanged over the control channels of the radio interface. The control channels are described in 3GPP TS 44.003 [16] and 3GPP TS 25.301 [128].

The structured functions and procedures of this protocol and the relationship with other layers and entities are described in general terms in 3GPP TS 24.007 [20].

The present document specifies functions, procedures and information which apply to GERAN Iu mode. However, functionality related to GERAN Iu mode is neither maintained nor enhanced.

1.1 Scope of the Technical Specification

The procedures currently described in this TS are for the call control of circuit-switched connections, session management for GPRS services, mobility management and radio resource management for circuit-switched and GPRS services.

3GPP TS 24.010 [21] contains functional procedures for support of supplementary services.

3GPP TS 24.011 [22] contains functional procedures for support of point-to-point short message services.

3GPP TS 24.012 [23] contains functional description of short message - cell broadcast.

3GPP TS 44.060 [76] contains procedures for radio link control and medium access control (RLC/MAC) of packet data physical channels.

3GPP TS 44.071 [23a] contains functional descriptions and procedures for support of location services.

NOTE: "layer 3" includes the functions and protocols described in the present document. The terms "data link layer" and "layer 2" are used interchangeably to refer to the layer immediately below layer 3.

1.2 Application to the interface structures

The procedures defined in the present document apply to the interface structures defined in 3GPP TS 44.003 [16] and 3GPP TS 25.301 [128]. They use the functions and services provided by lower layers defined in 3GPP TS 44.005 [18] and 3GPP TS 44.006 [19] or 3GPP TS 25.331 [23c], 3GPP TS 25.322 [19b] and 3GPP TS 25.321 [19a].

3GPP TS 24.007 [20] gives the general description of layer 3 (A/Gb mode) and Non Access Stratum (Iu mode and S1 mode) including procedures, messages format and error handling.

1.3 Structure of layer 3 procedures

A building block method is used to describe the layer 3 procedures.

The basic building blocks are "elementary procedures" provided by the protocol control entities of the three sublayers, i.e. radio resource management, mobility management and connection management sublayer.

Complete layer 3 transactions consist of specific sequences of elementary procedures. The term "structured procedure" is used for these sequences.