

ETSI TS 144 118 V13.0.0 (2016-01)



**Digital cellular telecommunications system (Phase 2+);
Mobile radio interface layer 3 specification;
Radio Resource Control (RRC) protocol;
Iu mode
(3GPP TS 44.118 version 13.0.0 Release 13)**



ReferenceRTS/TSGG-0244118vd00

KeywordsGSM

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

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.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.....	14
1 Scope	15
1.1 General	15
1.2 Scope of the Technical Specification	15
1.3 Application to the interface structures.....	15
1.4 Structure of layer 3 procedures.....	15
1.5 Test procedures	16
1.6 Applicability of implementations	16
2 References	16
3 Definitions, symbols and abbreviations	18
3.1 Definitions	18
3.2 Abbreviations	19
3.3 Random values	19
3.4 Specification Notations	20
4 RRC Functions and Services provided to upper layers	20
4.1 RRC Functions	20
4.2 RRC Services provided to upper layers.....	21
5 Services expected from lower layers	21
5.1 Services required from layer 2 and physical layers	21
5.2 Signalling Radio Bearers.....	21
6 RRC Protocol modes and states	21
6.1 General	21
6.2 Relation between Iu mode and A/Gb mode.....	22
6.2.1 Handover between Iu and A/Gb modes	22
6.2.2 Cell reselection between Iu and A/Gb mode	22
6.2a Relation between GERAN Iu mode RRC and UTRA RRC.....	22
6.2a.1 Handover between GERAN Iu mode and UTRAN	22
6.2a.2 Cell reselection between GERAN Iu mode and UTRAN	23
6.3 RR modes of operation.....	23
6.4 RRC modes and states.....	23
6.4.1 RRC-Idle Mode	23
6.4.1.1 General	23
6.4.1.2 Transition from RRC-Idle Mode to RRC-Connected mode.....	23
6.4.2 RRC-Connected mode: RRC-Cell_Shared state.....	24
6.4.2.1 General	24
6.4.2.2 Transition from RRC-Cell_Shared state to RRC-Idle Mode.....	24
6.4.2.3 Transition from RRC-Cell_Shared state to RRC-Cell_Dedicated state	24
6.4.2.4 Transition from RRC-Cell_Shared state to RRC-GRA_PCH state.....	24
6.4.2.5 Radio resource allocation tasks	24
6.4.2.6 RRC connection mobility tasks.....	24
6.4.2.7 MS measurements	25
6.4.3 RRC-Connected mode: RRC-Cell_Dedicated state.....	25
6.4.3.1 General	25
6.4.3.2 Transition from RRC-Cell_Dedicated state to RRC-Cell_Shared state	25
6.4.3.3 Transition from RRC-Cell_Dedicated state to RRC-Idle Mode.....	25
6.4.3.4 Transition from RRC-Cell_Dedicated state to RRC-GRA_PCH state.....	25
6.4.3.5 Radio resource allocation tasks	25
6.4.3.6 RRC connection mobility tasks.....	25

6.4.3.7	MS measurements	26
6.4.4	RRC-Connected mode: RRC-GRA_PCH state	26
6.4.4.1	General	26
6.4.4.2	Transition from RRC-GRA_PCH state to RRC-Cell_Shared state.....	26
6.4.4.3	Transition from RRC-GRA_PCH state to RRC-Cell_Dedicated state.....	26
6.4.4.4	Radio resource allocation tasks	26
6.4.4.5	RRC connection mobility tasks.....	26
6.4.4.6	MS measurements	27
6.4.4.7	Transfer and update of system information.....	27
7	Radio Resource Control procedures	27
7.1	General	27
7.2	Change of channels in case of handover	27
7.2.1	Change of channel serving SRB1	27
7.2.2	Change of channel serving SRB2	27
7.2.3	Change of channel serving SRB3	28
7.2.4	Change of channel serving SRB4	28
7.3	System information broadcasting	28
7.3.1	General.....	28
7.3.2	Broadcast of Iu mode specific System Information.....	28
7.4	Paging procedure.....	30
7.4.1	General.....	30
7.4.2	Paging initiation in RRC-Idle mode, RRC-Cell_Shared or RRC-GRA_PCH state.....	30
7.4.2.1	General	30
7.4.2.2	Initiation.....	31
7.4.2.3	Reception of a PAGING INDICATION service primitive	32
7.4.3	Paging initiation in RRC-Cell_Dedicated state.....	32
7.4.3.1	General	33
7.4.3.2	Initiation.....	33
7.4.3.3	Reception of a DEDICATED PAGING REQUEST message by the MS.....	33
7.4.4	Abnormal cases.....	33
7.5	RRC Connection management procedures.....	34
7.5.1	RRC connection establishment	34
7.5.1.1	General	34
7.5.1.2	Initiation	34
7.5.1.3	RRC CONNECTION REQUEST message contents to set	35
7.5.1.4	Reception of an RRC CONNECTION REQUEST message by the GERAN	35
7.5.1.5	Cell re-selection or T300 timeout	35
7.5.1.6	Abortion of RRC connection establishment	36
7.5.1.7	Reception of an RRC CONNECTION SETUP message by the MS	36
7.5.1.8	Cell re-selection.....	37
7.5.1.9	Invalid RRC CONNECTION SETUP message	38
7.5.1.10	Reception of an RRC CONNECTION REJECT message by the MS	39
7.5.1.11	Invalid RRC CONNECTION REJECT message	39
7.5.2	RRC connection release	40
7.5.2.1	General	40
7.5.2.2	Initiation.....	40
7.5.2.3	Reception of an RRC CONNECTION RELEASE message by the MS	40
7.5.2.4	Invalid RRC CONNECTION RELEASE message.....	41
7.5.2.5	Cell re-selection or radio link failure	42
7.5.2.6	Reception of an RRC CONNECTION RELEASE COMPLETE message by GERAN	42
7.5.2.7	Unsuccessful transmission of the RRC CONNECTION RELEASE COMPLETE message, acknowledged mode transmission.....	42
7.5.2.8	Detection of loss of dedicated physical channel by GERAN in RRC-Cell_Dedicated state.....	43
7.5.2.9	Failure to receive RRC CONNECTION RELEASE COMPLETE message by GERAN.....	43
7.6	Transmission of MS capability information	43
7.6.1	General.....	43
7.6.2	Initiation.....	43
7.6.3	Reception of an MS CAPABILITY INFORMATION message by the GERAN	44
7.6.4	Reception of the MS CAPABILITY INFORMATION CONFIRM message by the MS	44
7.6.5	Invalid MS CAPABILITY INFORMATION CONFIRM message	45
7.6.6	T304 timeout.....	45

7.7	MS capability enquiry	46
7.7.1	General.....	46
7.7.2	Initiation.....	46
7.7.3	Reception of an MS CAPABILITY ENQUIRY message by the MS	46
7.7.4	Invalid MS CAPABILITY ENQUIRY message	46
7.8	RRC Connection mobility procedures.....	47
7.8.1	Cell and GRA Update procedures.....	47
7.8.1.1	General	48
7.8.1.2	Initiation.....	49
7.8.1.3	CELL UPDATE / GRA UPDATE message contents to set.....	52
7.8.1.4	Reception of an CELL UPDATE/GRA UPDATE message by the GERAN.....	53
7.8.1.5	Reception of the CELL UPDATE CONFIRM/GRA UPDATE CONFIRM message by the MS.....	54
7.8.1.6	Transmission of a response message to GERAN	58
7.8.1.7	Physical channel failure	62
7.8.1.8	Unsupported configuration by the MS	63
7.8.1.9	Invalid configuration.....	64
7.8.1.10	Incompatible simultaneous reconfiguration	66
7.8.1.10a	Security reconfiguration during Cell update procedure	67
7.8.1.11	Confirmation error of GRA ID list.....	67
7.8.1.12	Invalid CELL UPDATE CONFIRM/GRA UPDATE CONFIRM message	69
7.8.1.13	T302 expiry or cell reselection.....	70
7.8.1.14	T314 expiry	72
7.8.1.15	T315 expiry	73
7.8.1.16	Reception of the GERAN MOBILITY INFORMATION CONFIRM message by the GERAN	74
7.8.1.17	Inter-RAT cell reselection to GERAN <i>Iu mode</i>	74
7.8.1.17.1	General	74
7.8.1.17.2	Initiation	74
7.8.1.17.3	MS fails to complete an inter-RAT cell reselection	74
7.8.1.18	Inter-RAT cell reselection from GERAN <i>Iu mode</i>	75
7.8.1.18.1	General	75
7.8.1.18.2	Initiation	75
7.8.1.18.3	Successful cell reselection.....	75
7.8.1.18.4	MS fails to complete an inter-RAT cell reselection	75
7.8.2	GRA update	75
7.8.3	GERAN mobility information	76
7.8.3.1	General	76
7.8.3.2	Initiation.....	76
7.8.3.3	Reception of GERAN MOBILITY INFORMATION message by the MS	76
7.8.3.4	Reception of an GERAN MOBILITY INFORMATION CONFIRM message by the GERAN.....	79
7.8.3.5	Cell re-selection	79
7.8.3.6	Incompatible simultaneous security reconfiguration.....	80
7.8.3.7	Invalid GERAN MOBILITY INFORMATION message	80
7.8.4	Inter-mode handover from GERAN <i>Iu mode</i>	81
7.8.4.1	General	81
7.8.4.2	Initiation.....	81
7.8.4.3	Reception of a HANDOVER FROM GERAN <i>Iu</i> COMMAND message by the MS	81
7.8.4.4	Successful completion of the inter-mode handover	82
7.8.4.5	Unsuccessful completion of the inter-mode handover at the MS side	82
7.8.4.6	Invalid HANDOVER FROM GERAN <i>Iu</i> COMMAND message	82
7.8.4.7	Reception of an HANDOVER FAILURE message by GERAN in <i>Iu mode</i>	83
7.8.4.8	Unsupported configuration in HANDOVER FROM GERAN <i>Iu</i> COMMAND message	83
7.8.4.9	Reception of HANDOVER FROM GERAN <i>Iu</i> COMMAND message by MS in RRC- Cell_Shared state.....	84
7.9	Procedures for System Information transmission and Measurement reporting in RRC-Cell_Dedicated state	84
7.9.1	General.....	84
7.9.2	Measurement Report and Enhanced Measurement Report	85
7.9.2.2	Parameters for Measurements and Reporting.....	85
7.9.2.2.1	General	85
7.9.2.2.2	Deriving the 3G Neighbour Cell list from the 3G Neighbour Cell Description	85
7.9.2.2.3	Deriving the GSM Neighbour Cell list from the BSICs and the BCCH Allocation.....	86

7.9.2.2.4	Deriving the Neighbour Cell list from the GSM Neighbour Cell list and the 3G Neighbour Cell list	86
7.9.2.2.5	Real Time Differences	86
7.9.2.2.6	Report Priority Description	86
7.9.2.2.7	The 3G Cell Reselection list	87
7.9.2.2.8	CCN Support description	87
7.9.3	Extended measurement report	87
7.10	Handover to UTRAN procedure	87
7.10.1	General	87
7.10.2	Initiation	88
7.10.3	Reception of INTER SYSTEM TO UTRAN HANDOVER COMMAND message by the MS	88
7.10.4	Successful completion of the inter-RAT handover	88
7.10.5	Unsuccessful inter-rat handover at the MS side	88
7.10.6	Reception of an HANDOVER FAILURE message by GERAN in Iu mode	89
7.11	Handover to CDMA2000 procedure	89
7.11.1	General	89
7.11.2	Initiation	90
7.11.3	Reception of INTERSYSTEM TO CDMA2000 HANDOVER COMMAND message by the MS	90
7.11.4	Successful completion of the inter-RAT handover	90
7.11.5	Unsuccessful inter-rat handover at the MS side	90
7.11.6	Reception of an HANDOVER FAILURE message by GERAN in Iu mode	91
7.12	Mapping of user data substreams onto timeslots in a multislot configuration	91
7.13	Application Procedures	92
7.13.1	LCS transfer	92
7.13.1.1	General	92
7.13.1.2	Initiation of LCS transfer procedure in the GERAN	92
7.13.1.3	Reception of LCS DOWNLINK INFORMATION message by the MS	92
7.13.1.4	Transmission of a response message by the MS	93
7.13.1.5	Reception of a response message by the GERAN	93
7.13.1.6	Invalid LCS DOWNLINK INFORMATION message	93
7.14	Radio Bearer control procedures	94
7.14.1	Reconfiguration procedures	94
7.14.1.1	General	95
7.14.1.2	Initiation	95
7.14.1.3	Reception of RADIO BEARER SETUP or RADIO BEARER RECONFIGURATION or RADIO BEARER RELEASE message by the MS	96
7.14.1.4	Transmission of a response message by the MS, normal case	102
7.14.1.5	Reception of a response message by the GERAN, normal case	104
7.14.1.6	Unsupported configuration in the MS	105
7.14.1.7	Physical channel failure	106
7.14.1.8	Cell re-selection	107
7.14.1.9	Transmission of a response message by the MS, failure case	107
7.14.1.10	Reception of a response message by the GERAN, failure case	107
7.14.1.11	Invalid configuration	107
7.14.1.12	Incompatible simultaneous reconfiguration	108
7.14.1.12.1	Incompatible simultaneous security reconfiguration	108
7.14.1.12.2	Cell Update procedure during security reconfiguration	109
7.14.1.13	Invalid received message	109
7.14.1.14	Abnormal cases	110
7.14.2	MS initiated DTM procedures while in RRC-Cell_Dedicated-MAC-Dedicated state	112
7.14.2.1	General	112
7.14.2.2	Initiation of the DTM Request procedure by the MS	113
7.14.2.3	Reception of a GERAN Iu mode DTM REQUEST message by the GERAN	113
7.14.2.3.1	General	113
7.14.2.3.2	SBPSCH assignment	113
7.14.2.3.3	DTM Request rejection	113
7.14.2.3.4	Reception of a GERAN Iu mode DTM REJECT message by the MS, normal case	114
7.14.2.3.5	Invalid GERAN Iu mode DTM REJECT message	114
7.14.2.4	Abnormal cases	114
7.14.2.5	T3148 expiry	115
7.15	Signalling flow procedures	115
7.15.1	Signalling connection release procedure	115

7.15.1.1	General	115
7.15.1.2	Initiation of SIGNALLING CONNECTION RELEASE by the GERAN	115
7.15.1.3	Reception of SIGNALLING CONNECTION RELEASE by the MS	115
7.15.1.4	Invalid SIGNALLING CONNECTION RELEASE message	116
7.15.1.5	Invalid configuration	116
7.15.2	Signalling connection release indication procedure	117
7.15.2.1	General	117
7.15.2.2	Initiation	117
7.15.2.2a	RLC re-establishment, inter-mode handover or inter-RAT change	117
7.15.2.3	Reception of SIGNALLING CONNECTION RELEASE INDICATION by the GERAN	118
7.16	Security mode control	118
7.16.1	Security mode control	118
7.16.1.1	General	118
7.16.1.2	Initiation	118
7.16.1.2.1	Ciphering configuration change	118
7.16.1.2.2	Integrity protection configuration change	119
7.16.1.2.3	Reception of SECURITY MODE COMMAND message by the MS	121
7.16.1.2.3.1	New ciphering and integrity protection keys	125
7.16.1.2.4	Incompatible simultaneous security reconfiguration	126
7.16.1.2.5	Cell Update procedure during security reconfiguration	127
7.16.1.2.6	Invalid configuration	128
7.16.1.2.7	Reception of SECURITY MODE COMPLETE message by the GERAN	128
7.16.1.2.8	Invalid SECURITY MODE COMMAND message	130
7.17	Delivery of Non-Access stratum messages	131
7.17.1	Initial Direct transfer	131
7.17.1.1	General	131
7.17.1.2	Initiation of Initial direct transfer procedure in the MS	131
7.17.1.3	RLC re-establishment, inter-mode handover or inter-RAT change	132
7.17.1.4	Abortion of signalling connection establishment	132
7.17.1.5	Reception of INITIAL DIRECT TRANSFER message by the GERAN	133
7.17.2	Downlink Direct transfer	133
7.17.2.1	General	133
7.17.2.2	Initiation of downlink direct transfer procedure in the GERAN	133
7.17.2.3	Reception of a DOWNLINK DIRECT TRANSFER message by the MS	134
7.17.2.4	No signalling connection exists	134
7.17.2.5	Invalid DOWNLINK DIRECT TRANSFER message	134
7.17.3	Uplink Direct transfer	135
7.17.3.1	General	135
7.17.3.2	Initiation of uplink direct transfer procedure in the MS	135
7.17.3.3	RLC re-establishment, inter-mode handover or inter-RAT change	135
7.17.3.4	Reception of UPLINK DIRECT TRANSFER message by the GERAN	136
7.18	General procedures	136
7.18.1	Selection of initial MS identity	136
7.18.2	Actions when entering RRC-Idle mode from RRC-Connected mode	136
7.18.2a	Actions when entering GERAN <i>A/Gb mode</i> or CDMA2000 from GERAN <i>Iu mode</i> , RRC- Connected mode	137
7.18.3	Maintenance of Hyper Frame Numbers	138
7.18.4	START value calculation	139
7.18.5	Integrity protection	139
7.18.5.0	General	139
7.18.5.1	Integrity protection in downlink	140
7.18.5.2	Integrity protection in uplink	141
7.18.5.3	Calculation of message authentication code	142
7.18.6	Physical channel establishment	142
7.18.6.0	General	142
7.18.6.1	Finely synchronized cell case	143
7.18.6.2	Non synchronized cell case	143
7.18.6.3	Pseudo-synchronized cell case	144
7.18.6.4	Pre-synchronized cell case	144
7.18.7	(void)	145
7.18.8	Link failure and Radio link failure criteria and actions upon link or radio link failure	145
7.18.9	Unsupported configuration	145

7.18.10	Invalid RLC/MAC control message notification	145
7.18.11	Actions related to Radio Bearer mapping	145
7.18.12	Network response times for DBPSCH allocation	146
7.19	Generic actions on receipt and absence of an information element.....	146
7.19.1	CN information info.....	146
7.19.2	Signalling connection release indication.....	146
7.19.3	GERAN mobility information elements	147
7.19.3.1	GRA identity.....	147
7.19.3.2	Mapping info.....	148
7.19.4	MS information elements.....	148
7.19.4.1	Activation time.....	148
7.19.4.2	DRX parameters.....	148
7.19.4.2.1	CN domain specific DRX cycle length coefficients	148
7.19.4.2.2	GERAN DRX cycle length coefficient.....	148
7.19.4.2.3	Paging Group.....	149
7.19.4.3	Generic state transition rules depending on received information elements	149
7.19.4.4	Ciphering mode info	150
7.19.4.5	Integrity protection mode info.....	153
7.19.4.5.1	General	153
7.19.4.5.2	Initialization of Integrity ProtectionThe MS shall:.....	153
7.19.4.5.3	Integrity Protection Re-configuration for SBSS Relocation.....	154
7.19.4.5.4	Integrity Protection modification in case of new keys or initialisation of signalling connection ..	155
7.19.4.6	Integrity check info	156
7.19.4.7	New G-RNTI.....	156
7.19.4.8	RRC Transaction Identifier	156
7.19.4.9	Capability Update Requirement	159
7.19.5	Radio bearer information elements.....	160
7.19.5.1	Signalling RB information to setup list.....	160
7.19.5.2	RAB Information for Setup.....	160
7.19.5.3	RAB Information to Reconfigure.....	161
7.19.5.4	RB information to setup	161
7.19.5.5	RB information to be affected.....	163
7.19.5.6	RB information to reconfigure	163
7.19.5.7	RB Information to Release.....	164
7.19.5.8	RB with PDCP Information	164
7.19.5.9	(void).....	164
7.19.5.9a	RB Mapping Info	164
7.19.5.10	RLC Info	165
7.19.5.11	PDCP Info.....	165
7.19.5.11a	PDCP context relocation info.....	166
7.19.5.12	PDCP SN Info.....	166
7.19.5.13	NAS Synchronisation Indicator	166
7.19.5.14	Physical Channel Configuration.....	166
7.19.6	Physical channel parameters	167
7.19.6.1	DBPSCH Description.....	167
7.19.6.2	SBPSCH parameters	172
7.19.7	Transport channel information elements.....	173
7.19.7.1	Transport Format Set.....	173
7.19.7.2	Transport format combination set	174
7.19.7.3	(void).....	175
7.19.7.4	Added or Reconfigured UL TrCH information.....	175
7.19.7.5	Added or Reconfigured DL TrCH information.....	175
7.19.7.6	Deleted UL TrCH information.....	175
7.19.7.7	Deleted DL TrCH information.....	175
7.19.7.8	UL TrCH information common for all transport channels.....	175
7.19.7.9	DL TrCH information common for all transport channels.....	175
7.19.7.10	TFCS Reconfiguration/Addition Information	176
7.19.7.11	TFCS Removal Information.....	176
7.19.7.12	TFCS Explicit Configuration	177
8	Handling of unknown, unforeseen, and erroneous protocol data	177
8.1	General	177

8.2	CSN.1 violation or encoding error	177
8.3	Unknown or unforeseen message type	178
8.4	Unsolicited received message.....	178
8.5	Unexpected critical message extension	179
8.6	Message with error label: "Content part error".....	179
8.7	Unknown or unforeseen information element value, mandatory information element	180
8.8	Unexpected non-critical message extension.....	180
8.9	Message with error label: "Message escape".....	181
8.10	Handling of errors in nested information elements	181
8.11	Unknown or unforeseen information element value, optional information element coded in ASN1	182
9	Message functional definitions and contents.....	182
9.1	General	182
9.1.1	Introduction.....	182
9.1.2	Repetitions of Structure, IE or field:.....	183
9.1.3	Message format and error labels	183
9.1.3.1	General	183
9.1.3.2	Message extension for new protocol version in RRC	184
9.1.3.2.1	Non-Critical extension.....	184
9.1.3.2.2	Critical extension.....	185
9.1.3.2.3	Extension of IE"s.....	186
9.1.3.2.4	'Message escape' error label.....	186
9.2	Messages for Radio Resources management.....	186
9.2.1	General.....	186
9.2.1.1	References	187
9.2.1.2	Downlink RRC messages.....	189
9.2.1.3	Uplink RRC messages.....	190
9.2.1.3.1	Message definitions	190
9.2.1.3.1.1	PDU definitions	197
9.2.2	CELL UPDATE.....	198
9.2.3	CELL UPDATE CONFIRM.....	199
9.2.4	DEDICATED PAGING REQUEST.....	203
9.2.5	DOWNLINK DIRECT TRANSFER.....	203
9.2.6	EXTENDED MEASUREMENT ORDER	204
9.2.7	EXTENDED MEASUREMENT REPORT.....	204
9.2.7a	ENHANCED MEASUREMENT REPORT	205
9.2.8	GERAN MOBILITY INFORMATION	205
9.2.9	GERAN MOBILITY INFORMATION CONFIRM	206
9.2.10	GERAN MOBILITY INFORMATION FAILURE.....	207
9.2.11	GRA UPDATE	208
9.2.12	GRA UPDATE CONFIRM	208
9.2.13	(void)	209
9.2.14	HANDOVER COMPLETE.....	209
9.2.15	HANDOVER FAILURE	210
9.2.16	HANDOVER FROM GERAN Iu COMMAND.....	210
9.2.17	INITIAL DIRECT TRANSFER	211
9.2.18	INTER SYSTEM TO CDMA2000 HANDOVER COMMAND	212
9.2.19	INTER SYSTEM TO UTRAN HANDOVER COMMAND	214
9.2.20	LCS DOWNLINK INFORMATION	215
9.2.21	LCS UPLINK INFORMATION.....	215
9.2.22	MEASUREMENT INFORMATION	216
9.2.23	MEASUREMENT REPORT.....	216
9.2.24	MS CAPABILITY ENQUIRY	216
9.2.25	MS CAPABILITY INFORMATION	217
9.2.26	MS CAPABILITY INFORMATION CONFIRM	218
9.2.27	(void)	219
9.2.28	RADIO BEARER RECONFIGURATION	219
9.2.29	RADIO BEARER RECONFIGURATION COMPLETE	222
9.2.30	RADIO BEARER RECONFIGURATION FAILURE	224
9.2.31	RADIO BEARER RELEASE.....	224
9.2.32	RADIO BEARER RELEASE COMPLETE.....	227
9.2.33	RADIO BEARER RELEASE FAILURE.....	229

9.2.34	RADIO BEARER SETUP	229
9.2.35	RADIO BEARER SETUP COMPLETE	232
9.2.36	RADIO BEARER SETUP FAILURE	233
9.2.37	RRC CONNECTION REJECT	234
9.2.38	RRC CONNECTION RELEASE	235
9.2.39	RRC CONNECTION RELEASE COMPLETE	236
9.2.40	RRC CONNECTION REQUEST	236
9.2.41	RRC CONNECTION SETUP	237
9.2.42	RRC CONNECTION SETUP COMPLETE	238
9.2.43	RRC STATUS	239
9.2.44	RRC FAILURE INFO	239
9.2.45	SECURITY MODE COMMAND	240
9.2.46	SECURITY MODE COMPLETE	241
9.2.47	SECURITY MODE FAILURE	241
9.2.48	SIGNALLING CONNECTION RELEASE	242
9.2.49	SIGNALLING CONNECTION RELEASE INDICATION	242
9.2.50	(void)	243
9.2.51	SYSTEM INFORMATION 5	243
9.2.52	SYSTEM INFORMATION 5bis	243
9.2.53	SYSTEM INFORMATION 5ter	243
9.2.54	SYSTEM INFORMATION 6	244
9.2.55	(void)	244
9.2.56	UPLINK DIRECT TRANSFER	244
9.2.57	GERAN Iu mode DTM REQUEST	245
9.2.58	GERAN Iu mode DTM REJECT	245
9.3	Information Elements	246
9.3.1	Activation Time	246
9.3.2	BA List Pref	246
9.3.3	BA Range	246
9.3.4	Capability Update Requirement	247
9.3.5	CDMA2000 MS security capability	247
9.3.6	Cell Channel Description	247
9.3.7	Cell Description	248
9.3.8	Cell Update Cause	248
9.3.9	Channel Description	248
9.3.10	Channel Description 2	249
9.3.11	Channel Mode	249
9.3.12	Channel Mode 2	249
9.3.13	Ciphering Algorithm	250
9.3.14	Ciphering Mode Info	250
9.3.15	CN Domain Identity	251
9.3.16	CN Domain Specific DRX Cycle Length Coefficient	251
9.3.17	CN Information Info	251
9.3.18	CN Information Info Full	252
9.3.19	DBPSCH Description	253
9.3.20	Dynamic ARFCN Mapping	257
9.3.21	Establishment Cause	257
9.3.22	Expiration Time Factor	258
9.3.23	Extension	258
9.3.24	Failure Cause	258
9.3.25	Failure Cause and Error Information	259
9.3.26	Frequency Channel Sequence	259
9.3.27	Frequency List	260
9.3.28	Frequency Short List	260
9.3.29	GERAN DRX Cycle Length Coefficient	260
9.3.30	GRA Identity	261
9.3.31	GRA Update Cause	261
9.3.32	G-RNTI	261
9.3.33	GSM MS Security Capability	262
9.3.34	Handover Reference	262
9.3.35	Initial MS Identity	262
9.3.36	Integrity Check Info	263

9.3.37	Integrity Protection Activation Info	264
9.3.38	Integrity Protection Algorithm.....	264
9.3.39	Integrity Protection Mode Info	265
9.3.40	(void)	265
9.3.41	Intra Domain NAS Node Selector	265
9.3.42	Mobile Allocation	266
9.3.43	Mobile Time Difference	266
9.3.44	MS GERAN A/Gb mode Radio Access Capability	266
9.3.45	MS GERAN Iu mode Radio Access Capability	267
9.3.46	MS GERAN Iu mode RLC Capability	268
9.3.47	MS RF Capability GSM	269
9.3.48	MS Multi-Mode and Multi-RAT Capability.....	272
9.3.49	MS Measurement Capability	273
9.3.50	MS Positioning Capability.....	273
9.3.51	MS Timers and Constants in RRC-Connected mode.....	274
9.3.52	MultiRate Configuration.....	275
9.3.53	Multislot Allocation.....	275
9.3.54	NAS Message	276
9.3.55	NAS Synchronization Info.....	276
9.3.56	NAS System Information GSM-MAP.....	276
9.3.57	Paging Cause	277
9.3.58	Paging Record Type Identifier.....	277
9.3.59	PDCP Capability.....	278
9.3.60	PDCP Info.....	279
9.3.61	PDCP SN Info.....	282
9.3.62	Physical Channel Configuration	283
9.3.63	PLMN Identity.....	283
9.3.64	Power Command	284
9.3.65	Power Command and Access Type	284
9.3.66	(void)	284
9.3.67	(void)	284
9.3.68	(void)	284
9.3.69	Protocol Error Cause.....	284
9.3.70	Protocol Error Indicator	285
9.3.71	Protocol Error Information	285
9.3.72	RAB Identity.....	285
9.3.73	RAB Info	286
9.3.74	RAB Info Post.....	286
9.3.75	RAB Information for Setup	287
9.3.76	RAB Information to Reconfigure	287
9.3.77	RB Activation Time Info	287
9.3.78	RB COUNT-C Information	288
9.3.79	RB COUNT-C MSB Information.....	289
9.3.80	RB Identity.....	289
9.3.81	RB Information to Be Affected.....	289
9.3.82	RB Information to Reconfigure	290
9.3.83	RB Information to Release	290
9.3.84	RB Information to Setup.....	291
9.3.85	RB Timer Indicator.....	291
9.3.86	RB with PDCP Information.....	292
9.3.87	(void)	292
9.3.88	Re-Establishment timer.....	292
9.3.89	Rejection Cause	292
9.3.90	Release Cause	293
9.3.91	RLC Info.....	293
9.3.92	RLC HFN IE.....	294
9.3.93	RPLMN Information.....	295
9.3.94	RRC Cause.....	295
9.3.95	RRC Packet Downlink Assignment.....	296
9.3.95a	RRC Packet Downlink Assignment 2.....	298
9.3.96	RRC Packet Uplink Assignment.....	298
9.3.96a	RRC Packet Uplink Assignment 2.....	301

9.3.97	RRC State Indicator	303
9.3.98	RRC Transaction Identifier	303
9.3.99	SBPSCCH Description	303
9.3.100	Security Capability	304
9.3.101	Signalling RB Information To Setup	305
9.3.102	START	306
9.3.103	Starting Time	306
9.3.104	Synchronization Indication	306
9.3.105	Time Difference	306
9.3.106	Timing Advance	307
9.3.107	Transmission RLC Discard	307
9.3.108	UE UTRAN Radio Access Capability	307
9.3.108a	UE UTRAN Predefined Configuration Status Information	308
9.3.109	UE UTRAN Radio Access Capability Extension	308
9.3.110	UE CDMA2000 Radio Access Capability	309
9.3.111	UTRAN Freq List	309
9.3.112	Wait Time	309
9.3.113	Iu mode Channel Request Description	310
9.3.114	Wait Indication	310
9.3.115	(void)	310
9.3.116	PDCP Context Relocation Info	310
9.3.117	RB mapping info	311
9.3.118	Interleaving	312
9.3.119	Mode	313
9.3.120	Modulation	313
9.3.121	Added or Reconfigured DL TrCH information	313
9.3.122	Added or Reconfigured UL TrCH information	314
9.3.123	Deleted DL TrCH information	314
9.3.124	Deleted UL TrCH information	315
9.3.125	DL TrCH Information Common For All Transport Channels	315
9.3.126	Semi-static Transport Format Information	316
9.3.127	TFCS Explicit Configuration	316
9.3.128	TFCS Reconfiguration/Addition Information	317
9.3.129	TFCS Removal Information	318
9.3.130	Transport Channel Identity	318
9.3.131	TFC	318
9.3.132	Transport Format Combination Set	318
9.3.133	Transport Format Set	319
9.3.134	UL TrCH Information Common For All Transport Channels	319
9.3a	Information element definitions	319
9.4	Multiplicity values and type constraint values	323
9.4a	Constant definitions	324
10	Protocol timers, counters, other parameters and default configurations	325
10.1	Timers for MS	325
10.1a	Timers on the network side	325
10.2	Counters for MS	326
10.3	MS constants and parameters	326
10.3a	Network constants and parameters	326
10.4	MS variables	326
10.4.0	General	326
10.4.1	CELL_UPDATE_STARTED	328
10.4.2	CIPHERING_STATUS	328
10.4.3	ESTABLISHED_SIGNALLING_CONNECTIONS	329
10.4.4	ESTABLISHMENT_CAUSE	329
10.4.5	ESTABLISHED_RABS	330
10.4.6	FAILURE_CAUSE	331
10.4.7	FAILURE_INDICATOR	331
10.4.8	GRA_IDENTITY	331
10.4.9	G_RNTI	332
10.4.10	INITIAL_MS_IDENTITY	332
10.4.11	INCOMPATIBLE_SECURITY_RECONFIGURATION	332

10.4.12	INTEGRITY_PROTECTION_ACTIVATION_INFO.....	332
10.4.13	INTEGRITY_PROTECTION_INFO	333
10.4.14	INVALID_CONFIGURATION	334
10.4.14a	LATEST_CONFIGURED_CN_DOMAIN.....	334
10.4.15	MS_CAPABILITY_REQUESTED.....	335
10.4.16	MS_CAPABILITY_TRANSFERRED.....	335
10.4.17	ORDERED_RECONFIGURATION.....	336
10.4.18	PDCP_SN_INFO.....	336
10.4.19	PROTOCOL_ERROR_INDICATOR	336
10.4.20	PROTOCOL_ERROR_INFORMATION	337
10.4.21	PROTOCOL_ERROR_REJECT	337
10.4.22	RB_TIMER_INDICATOR.....	337
10.4.23	RB_UPLINK_CIPHERING_ACTIVATION_TIME_INFO.....	338
10.4.24	START_THRESHOLD	338
10.4.25	START_VALUE_TO_TRANSMIT.....	338
10.4.26	TRANSACTIONS	339
10.4.27	TIMERS_AND_CONSTANTS.....	339
10.4.28	UNSUPPORTED_CONFIGURATION	339
10.4.29	SECURITY_MODIFICATION.....	340
11	Specific functions.....	341
11.1	Provision and reception of RRC information between network nodes.....	341
11.1.1	General.....	341
11.1.2	General error handling for RRC messages exchanged between network nodes	341
11.1.3	RRC Information to target GERAN Iu mode BSS	342
11.1.4	RRC information, target BSS to source BSS	343
11.1.5	RRC messages exchanged between network nodes.....	343
11.1.5.0	RADIO BEARER RECONFIGURATION.....	343
11.1.5.1	INTER RAT or MODE HANDOVER INFO WITH MS CAPABILITIES.....	343
11.1.5.2	SBSS RELOCATION INFO.....	344
11.1.5.3	RFC 3095 CONTEXT INFO	348
11.2	Provision and reception of RRC security information between network nodes	349
11.2.1	General.....	349
11.2.2	RRC Security Information, from GERAN-A/Gb to GERAN-Iu.....	349
11.2.3	RRC Security Information, from GERAN Iu mode/UTRAN to GERAN Iu mode.....	350
11.2.4	RRC Security Information, from GERAN Iu to UTRAN.....	352
11.3	HFN mapping rules for radio bearer using non-transparent mode RLC.....	352
11.4	Calculated Transport Format Combination	352
11.5	Signalling TFC	353
Annex A (informative):	Change History	354
History		355

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.

1 Scope

1.1 General

The present document specifies the procedures used at the radio interface (Reference Point Um, see 3GPP TS 24.002) for Radio Resource management. The Radio Resource Control Protocol (RRC) is specified. RRC is the Radio Resource control plane protocol for Radio Resource management that is used when a mobile station is operating in Iu mode.

Notation "Reserved sub-clause number" is used to indicate which sub-clauses of the specification were moved from this part of the standard to the other part when this standard was split between RAN and CN parts.

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

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.

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.

1.2 Scope of the Technical Specification

The procedures currently described in the present document are for radio resource management for circuit switched and GPRS services.

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

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

3GPP TS 44.012 contains functional description of short message cell broadcast.

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

3GPP TS 44.071 contains functional descriptions and procedures for support of location services.

3GPP TS 24.008 contains the procedures for CN protocols.

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

1.3 Application to the interface structures

The layer 3 procedures apply to the interface structures defined in 3GPP TS 44.003. They use the functions and services provided by layer 2 defined in 3GPP TS 44.005 and 3GPP TS 44.006. 3GPP TS 24.007 gives the general description of layer 3 including procedures, messages format and error handling.

1.4 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.