

ETSI TS 145 008 V15.4.0 (2019-07)



Digital cellular telecommunications system (Phase 2+) (GSM); GSM/EDGE Radio subsystem link control (3GPP TS 45.008 version 15.4.0 Release 15)

Standard Preview
Full standard available at: <https://standards.iteh.ai/catalog/standards/etsi/145-008-v15-4-0-2019-07>
4309-8fc0-ce9ed44df138/etsi-ts-145-008-v15-4-0-2019-07



Reference

RTS/TSGR-0645008vf40

Keywords

GSM

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 prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

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.

© ETSI 2019.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables 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.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Legal Notice

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. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 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
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	8
1 Scope	9
1.1 References	9
1.2 Abbreviations	11
1.3 Definitions	11
1.4 Restrictions	11
2 General	12
3 Handover	13
3.1 Overall process	13
3.2 MS measurement procedure	13
3.3 BSS measurement procedure.....	13
3.4 Strategy	14
4 RF power control.....	14
4.1 Overall process	14
4.2 MS implementation	14
4.2.1 General.....	14
4.2.2 (EC-)RACH	15
4.2.2.1 Random access procedure when EC operation is not enabled	15
4.2.2.2 Random access procedure when EC operation is enabled	16
4.3 MS power control range	17
4.4 BSS implementation.....	17
4.4.1 VAMOS subchannel power control for BSS in downlink	17
4.5 BSS power control range.....	18
4.6 Strategy	18
4.7 Timing	18
4.7.1 Normal Power Control.....	18
4.7.2 Fast Power Control	18
4.7.3 Enhanced Power Control	19
4.8 Dedicated channels used for a voice group call or voice broadcast.....	19
5 Radio link failure.....	19
5.1 Criterion	19
5.2 MS procedure	20
5.3 BSS procedure	20
6 Idle mode tasks.....	20
6.1 Introduction	20
6.2 Measurements for normal cell selection	22
6.3 Measurements for stored list cell selection.....	23
6.4 Criteria for cell selection and reselection	23
6.4.1 C1 path loss criterion	23
6.4.2 C2 reselection criterion	24
6.4.3 C4 criteria	26
6.4.4 Disabling of EC operation	26
6.5 Downlink signalling failure.....	26
6.6 Measurements for Cell Reselection.....	27
6.6.0 General.....	27
6.6.1 Monitoring of received signal level and BCCH data	27
6.6.1.1 Applicability.....	27
6.6.1.2 Monitoring of received signal level	27
6.6.1.3 Monitoring of BCCH data and BSIC decoding.....	28

6.6.1.4	Determination of available PLMNs	28
6.6.1.5	Requirements for synchronization and reading of BCCH data	28
6.6.1a	Reduced Monitoring of received signal level and (EC-)BCCH data	28
6.6.1a.1	General	28
6.6.1a.2	Monitoring of the serving cell	29
6.6.1a.3	Criteria for triggering measurements for cell re-selection	30
6.6.1a.4	Monitoring of non-serving cells	30
6.6.2	Path loss criteria and timings for cell re-selection	31
6.6.3	Cell reselection algorithm for SoLSA	31
6.6.4	Measurements on cells of other radio access technologies	32
6.6.5	Algorithm for cell re-selection from GSM to UTRAN based on cell ranking	36
6.6.6	Algorithm for inter-RAT cell re-selection based on priority information	37
6.6.7	Cell selection and re-selection to CSG cells and hybrid cells	40
6.6.7.1	Cell re-selection to CSG cells	40
6.6.7.1a	Cell re-selection to hybrid cells	41
6.6.7.2	Manual CSG ID selection	41
6.7	Release of TCH, SDCCH and DBPSCH	41
6.7.1	Normal case	41
6.7.2	Call re-establishment	42
6.8	Abnormal cases and emergency calls	42
6.9	RLA_EC signal level and SLA measurements	43
6.9.1	General	43
6.9.2	Physical parameters	43
6.9.3	Statistical parameter	43
6.9.4	Accuracy requirements	44
6.9.5	Void	44
6.9a	RLA_GC signal level measurements	44
6.9a.1	General	44
6.9a.2	Physical parameter	44
6.9a.3	Statistical parameter	44
6.9a.4	Accuracy requirements	44
6.10	Coverage class selection for EC-GSM-IoT	45
6.10.1	General	45
6.10.2	Downlink coverage class selection	45
6.10.3	Uplink coverage class selection	45
6.10.4	Coverage class adaptation for EC-CCCH	46
6.10.5	Downlink coverage class update	46
7	Network pre-requisites	47
7.1	BCCH carriers	47
7.2	Identification of surrounding BSS	48
7.2.1	General	48
7.2.2	Identification of surrounding BSS for handover measurements	49
7.3	Handover measurements on other radio access technologies	50
7.4	Handover measurements on UTRAN CSG cells and hybrid cells	54
8	Radio link measurements	54
8.1	Signal level	55
8.1.1	General	55
8.1.2	Physical parameter	55
8.1.3	Statistical parameters	56
8.1.4	Range of parameter	56
8.1.5	Measurement quantity for other radio access technologies	57
8.1.5.1	UTRAN FDD	57
8.1.5.2	UTRAN TDD	57
8.1.5.3	cdma2000	57
8.1.5.4	E-UTRAN FDD	57
8.1.5.5	E-UTRAN TDD	58
8.2	Signal quality	59
8.2.1	General	59
8.2.2	Physical parameter	59
8.2.3	Statistical parameters	59

8.2.3.1	RXQUAL	59
8.2.3.2	MEAN_BEP and CV_BEP	60
8.2.4	Range of parameter RXQUAL	61
8.2.5	Range of parameters MEAN_BEP and CV_BEP	62
8.3	Aspects of discontinuous transmission (DTX)	66
8.4	Measurement reporting	67
8.4.1	Measurement reporting for the MS	67
8.4.1a	Measurement reporting for the MS in FPC mode	69
8.4.1b	Measurement reporting for the MS in EPC mode	69
8.4.2	Measurement reporting for the MS on a SDCCH	70
8.4.3	Additional cell reporting requirements for multi band MS	70
8.4.4	Common aspects for the MS on a TCH, a SDCCH or a DBPSCH	71
8.4.5	Measurement reporting for the BSS	71
8.4.6	Extended measurement reporting	72
8.4.7	Additional cell reporting requirements for multi-RAT MS	72
8.4.8	Enhanced Measurement Reporting	74
8.4.8.1	Reporting Priority	74
8.4.8.2	Measurement Reporting	75
8.4.8.3	NBR_RCVD_BLOCKS for FLO	76
8.4.9	Requirements for measurement and reporting of CSG cells and hybrid cells	76
8.5	Absolute MS-BTS distance	77
8.5.1	General	77
8.5.2	Physical parameter	77
9	Control parameters	78
10	GPRS mode tasks	90
10.1	Cell Re-selection	90
10.1.0	General	90
10.1.1	Monitoring the received signal level and PBCCH data	91
10.1.1.0	General	91
10.1.1.1	Packet idle mode or MAC-Idle state	92
10.1.1.2	Packet transfer mode or MAC-Shared state	92
10.1.1.2a	Broadcast/multicast receive mode	93
10.1.1.3	Monitoring cells of other radio access technologies	94
10.1.2	Cell Re-selection Criteria	98
10.1.3	Cell Re-selection Algorithm	99
10.1.3.1	Abnormal cell reselection	100
10.1.3.2	Algorithm for cell re-selection from GSM to UTRAN based on cell ranking	101
10.1.3.3	Algorithm for inter-RAT cell re-selection based on priority information	102
10.1.3.4	Cell selection and re-selection to CSG cells and hybrid cells	102
10.1.4	Network controlled Cell re-selection	102
10.1.4.1	Measurement reporting	103
10.1.4.2	Cell re-selection command	108
10.1.4.3	Exceptional cases	108
10.1a	Measurement and Reporting of CSG Cells and hybrid cells	108
10.2	RF Power Control	109
10.2.1	MS output power	109
10.2.2	BTS output power	110
10.2.3	Measurements at MS side	111
10.2.3.1	Deriving the C value	111
10.2.3.1.1	Packet idle mode or MAC-Idle state	111
10.2.3.1.2	Packet transfer mode or MAC-Shared state	112
10.2.3.1.2.1	MS that have not enabled EC operation	112
10.2.3.1.2.2	MS that have enabled EC operation	114
10.2.3.2	Derivation of Channel Quality Report	114
10.2.3.2.1	Packet transfer mode or MAC-Shared state	115
10.2.3.2.2	Void	118
10.2.3.2.3	Measurement reporting	118
10.2.3.2.4	Measurement reporting - additional requirements for downlink dual carrier	119
10.2.3.2.5	Measurement reporting - additional requirements for downlink multi carrier	120
10.2.3.3	Range of parameters MEAN_BEP and CV_BEP for EGPRS2	120

10.2.4	Measurements at BSS side.....	124
10.2a	Packet-switched Handover	124
10.3	Measurement requirements	124
10.4	Control parameters	124
11	CTS mode tasks.....	132
11.1	CTS idle mode tasks.....	132
11.1.1	CTS cell selection.....	133
11.1.1.1	Synchronization and measurements for CTS cell selection	133
11.1.1.2	Initial sychronization of CTS-MS	133
11.1.2	Criterion for CTS cell selection	133
11.1.3	Monitoring of CTSBCH and CTSPCH.....	134
11.1.3.1	Monitoring of received signal level	134
11.1.3.2	Downlink beacon failure	134
11.1.3.3	Downlink paging failure	134
11.1.4	Procedures with reporting to the CTS-FP	134
11.1.4.1	AFA monitoring	135
11.1.4.2	BCCH detection	135
11.1.4.3	Observed Frequency Offset (OFO) measurement.....	135
11.2	Intra-cell handover	135
11.2.1	Overall process	135
11.2.2	CTS-MS measurement procedure.....	136
11.2.3	CTS-FP measurement procedure	136
11.2.4	Strategy	136
11.3	RF power control.....	136
11.3.1	Overall process	136
11.3.2	CTS-MS implementation.....	136
11.3.3	CTS-MS power control range.....	137
11.3.4	CTS-FP implementation	137
11.3.5	CTS-FP power control range	137
11.3.6	Strategy	137
11.3.7	Timing	137
11.4	Radio link failure.....	137
11.4.1	Criterion.....	137
11.4.2	CTS-MS procedure	137
11.4.3	CTS-FP procedure	138
11.5	Radio link measurements	138
11.5.1	Signal strength	138
11.5.1.1	General	138
11.5.1.2	Physical parameter	138
11.5.1.3	Statistical parameters	138
11.5.1.4	Range of parameter	139
11.5.2	Signal quality	139
11.5.2.1	General	139
11.5.2.2	Physical parameter	139
11.5.2.3	Statistical parameters	139
11.5.2.4	Range of parameter	139
11.5.3	Aspects of discontinuous transmission (DTX)	139
11.5.4	Measurement reporting for the CTS-MS on a TCH.....	139
11.6	Control of CTS-FP service range	140
11.7	Control parameters	140
12	COMPACT Mode Tasks	142
12.1	Introduction	142
12.2	Network Pre-requisites	142
12.2.1	CPBCCCH carriers.....	142
12.3	COMPACT Idle Mode Tasks.....	142
12.3.1	Introduction.....	142
12.3.2	Measurements for COMPACT Cell Selection.....	142
12.3.3	Measurements for COMPACT Stored List Cell Selection	143
12.3.4	Criteria for COMPACT Cell Selection.....	143
12.3.5	Downlink Signalling Failure.....	143

12.4	COMPACT Cell Reselection	143
12.4.1	Monitoring the received signal level and CPBCCCH data.....	144
12.4.1.1	Packet idle mode or MAC-Idle state	144
12.4.1.2	Packet transfer mode or MAC-Shared state	144
12.4.2	COMPACT cell reselection criteria.....	145
12.4.3	COMPACT cell reselection algorithm.....	145
12.4.4	Network controlled Cell reselection	145
12.4.5	COMPACT cell reselection measurement opportunities	145
Annex A (informative): Definition of a basic GSM or DCS 1 800 handover and RF power control algorithm		146
A.1	Scope	146
A.2	Functional requirement.....	146
A.3	BSS pre-processing and threshold comparisons.....	147
A.3.1	Measurement averaging process.....	147
A.3.2	Threshold comparison process	148
A.3.2.1	RF power control process	148
A.3.2.2	Handover Process	149
A.4	BSS decision algorithm.....	150
A.4.1	Internal intracell handover according to radio criteria: (Interference problems).....	150
A.4.2	Internal handover according to other criteria.....	151
A.4.3	General considerations	151
A.5	Channel allocation.....	151
A.6	Handover decision algorithm in the MSC.....	152
Annex B (informative): Power Control Procedures.....		154
B.1	Open loop control.....	154
B.2	Closed loop control	155
B.3	Quality based control.....	155
B.4	BTS power control	156
B.5	Example.....	156
B.6	Interworking between normal and fast power control for ECSD.....	157
B.7	Interworking between normal and enhanced power control (EPC)	158
Annex C (informative): Example Interference Measurement Algorithm		160
Annex D (informative): Example Selection of Modulation and Coding Schemes based on Link Quality Reports.....		161
Annex E (informative): Change history		162
History		174

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.

PREVIEW
iTech STANDARD
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/baf74528-5ee8-4309-8fe0-ce9ed44df138/etsi-ts-145-008-v15.4.0-2019-07>

1 Scope

The present document specifies the Radio sub-system link control implemented in the Mobile Station (MS), Base Station System (BSS) and Mobile Switching Centre (MSC) of the digital cellular telecommunications systems GSM.

Unless otherwise specified, references to GSM also include operation in any supported band (see TS 45.005).

1.1 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- | | |
|------|--|
| [1] | 3GPP TR 21.905: "Vocabulary for 3GPP Specifications". |
| [2] | 3GPP TS 23.003: "Numbering, addressing and identification". |
| [3] | 3GPP TS 23.009: "Handover procedures". |
| [4] | 3GPP TS 23.122: "NAS Functions related to Mobile Station (MS) in idle mode". |
| [5] | 3GPP TS 25.101: "UE Radio transmission and reception (FDD)". |
| [6] | 3GPP TS 25.123: "Requirements for support of Radio Resource Management (TDD)". |
| [7] | 3GPP TS 25.133: "Requirements for support of Radio Resource Management (FDD)". |
| [8] | 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode". |
| [9] | 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification". |
| [10] | 3GPP TS 26.093: "AMR Speech Codec; Source Controlled Rate operation". |
| [11] | 3GPP TS 43.022: "Functions related to Mobile Station (MS) in idle mode and group receive mode". |
| [12] | 3GPP TS 43.064: "Overall description of the GPRS Radio Interface; Stage 2". |
| [13] | 3GPP TS 43.246: "Multimedia Broadcast Multicast Service (MBMS) in the GERAN; Stage 2". |
| [14] | 3GPP TS 43.068: "Voice Group Call Service (VGCS); Stage 2". |
| [15] | 3GPP TS 44.004: "Layer 1; General requirements". |
| [16] | 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification". |
| [17] | 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol". |
| [18] | 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), Phase 1; CTS radio interface layer 3 specification". |
| [19] | 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control (RLC) / Medium Access Control (MAC) protocol". |
| [20] | Void. |

- [21] Void.
- [22] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [23] 3GPP TS 45.003: "Channel coding"
- [24] 3GPP TS 45.005: "Radio transmission and reception".
- [25] 3GPP TS 45.010: "Radio subsystem synchronization".
- [26] 3GPP TS 45.056: "CTS-FP radio subsystem".
- [27] 3GPP TR 45.902: "Flexible Layer One".
- [28] 3GPP TS 46.011: "Full rate speech; Substitution and muting of lost frames for full rate speech channels".
- [29] 3GPP TS 46.012: "Full rate speech; Comfort noise aspect for full rate speech traffic channels".
- [30] 3GPP TS 46.031: "Full rate speech; Discontinuous Transmission (DTX) for full rate speech traffic channels".
- [31] 3GPP TS 48.008: "Mobile-services Switching Centre - Base Station System (MSC - BSS) interface, Layer 3 specification".
- [32] 3GPP TS 48.058: "Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 3 specification".
- [33] 3GPP TS 51.010: "Mobile Station (MS) conformity specification".
- [34] 3GPP TS 51.011: "Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".
- [35] TIA/EIA/IS-2000-5-A: "Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems".
- [36] TIA/EIA/IS-833: "Multi-Carrier Specification for Spread Spectrum Systems on GSM MAP (MC-MAP) (Lower Layers Air Interface)".
- [37] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception".
- [38] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".
- [39] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".
- [40] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".
- [41] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol Specification".
- [42] 3GPP TS 31.102: "Characteristics of the Universal Subscriber Identity Module (USIM) application".
- [43] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".
- [44] 3GPP TS 22.268: "Public Warning System (PWS) requirements; Stage 1".
- [45] 3GPP TS 23.251: "Network sharing; Architecture and functional description".
- [46] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols - Stage 3".

- [47] 3GPP TS 25.306: "UE Radio Access capabilities".
- [48] 3GPP TR 45.926: "Solutions for GSM/EDGE BTS Energy Saving".

1.2 Abbreviations

Abbreviations used in the present document are listed in 3GPP TR 21.905.

UFPS Unique Frequency Parameter Set

1.3 Definitions

In addition to those below, abbreviations used in the present document are listed in 3GPP TR 21.905 [1].

Acceptable cell: see definition in 3GPP TS 43.022 [11].

Coverage Class: see definition in 3GPP TS 43.064 [12].

CSG Whitelist: A list provided by NAS containing all the CSG identities and their PLMN IDs of the CSGs to which the subscriber belongs, see 3GPP TS 23.122 [4].

NOTE: This list is known as "Allowed CSG List" in Rel-8 specifications.

CSG cell: The definition of CSG cell for UTRAN is given in 3GPP TS 25.304 [8]; the definition of CSG cell for E-UTRAN is given in 3GPP TS 36.304 [40].

EC-GSM-IoT: Extended Coverage GSM for Internet of Things.

EC-GSM-IoT cell: A cell supporting EC-GSM-IoT.

EC operation: See definition in 3GPP TS 43.064 [12].

Hybrid cell: The definition of hybrid cell for UTRAN is given in 3GPP TS 25.304 [8]; the definition of hybrid cell for E-UTRAN is given in 3GPP TS 36.304 [40].

Network sharing: network sharing is an optional feature that allows different core network operators to connect to the same shared radio access network (see 3GPP TS 23.251 [45]). When network sharing is in use within a given cell, the network broadcasts within system information the PLMN identities of the PLMNs sharing the cell. A mobile station supporting network sharing uses this information for its PLMN (re)selection processes and indicates the selected PLMN to the BSS.

Power Efficient Operation (PEO): see definition in 3GPP TS 43.064 [12].

Suitable cell: see definition in 3GPP TS 43.022 [11].

Timeslot number (TN): timing of timeslots within a TDMA frame.

Unique Frequency Parameter Set: defined by a single ARFCN or a MA. In case of a radio frequency channel assigned a frequency parameter set consisting of a single ARFCN, the UFPS is defined by that ARFCN. In case of a radio frequency channel assigned a frequency parameter set consisting of a MA, MAIO and HSN, that radio frequency channel belong to the same UFPS as other radio frequency channels assigned the same MA.

1.4 Restrictions

Independently of what is stated elsewhere in this and other 3GPP specifications, mobile station support for PBCCH and PCCCH is optional for A/Gb-mode of operation. The network shall never enable PBCCH and PCCCH.

2 General

The radio sub-system link control aspects that are addressed are as follows:

- Handover;
- RF Power control in *A/Gb mode*, including fast power control for E-TCH and enhanced power control for TCH and O-TCH;
- RF Power control in *Iu mode*, including fast power control for E-TCH and enhanced power control for DBPSCH (in MAC-Dedicated and MAC-DTM states);
- Radio link Failure;
- Cell selection and re-selection in Idle mode, in Group Receive mode, in GPRS mode, in broadcast/multicast receive mode and in EC operation and PEO (see 3GPP TS 43.022);
- Coverage class selection in EC operation;
- CTS mode tasks.

NOTE: A distinction is made between *A/Gb mode* and *Iu mode* only when necessary. Procedures and mechanisms described in this TS apply to both modes of operation unless otherwise stated. In *Iu mode*, unless otherwise stated, DBPSCH covers TCH, PDTCH and FLO.

Handover is required to maintain a call in progress as a MS engaged in a point-to-point call or with access to the uplink of a channel used for a voice group call passes from one cell coverage area to another and may also be employed to meet network management requirements, e.g. relief of congestion.

Handover may occur during a call from one TCH or multiple TCHs (in the case of multislot configuration) to another TCH or multiple TCHs. It may also occur from DCCH to DCCH or from DCCH to one or multiple TCH(s), e.g. during the initial signalling period at call set-up. Additionally in *Iu mode*, handover may occur in MAC-Dedicated and MAC-DTM states:

- on PDTCH or multiple PDTCHs (in the case of multislot configuration) on DBPSCH(s) to another PDTCH or multiple PDTCHs on DBPSCH(s);
- for FLO, from one DBPSCH or multiple DBPSCHs (in the case of multislot configuration) to another DBPSCH or multiple DBPSCHs.

The handover may be either from channel(s) on one cell to other channel(s) on a surrounding cell, or between channels on the same cell which are carried on the same frequency band. Examples are given of handover strategies, however, these will be determined in detail by the network operator.

For a multiband MS, the handover described is also allowed between any channels on different cells which are carried on different frequency bands, e.g. between a GSM 900/TCH and a DCS 1 800/TCH. Handover between two co-located cells, carried on different frequency bands, is considered as inter-cell handover irrespective of the handover procedures used.

For a multi-RAT MS, i.e. an MS supporting multiple radio access technologies, handover is allowed between GSM and other radio access technologies.

NOTE: At handover, the MS will normally not be able to verify the PLMN of the target cell and will thus assume that the same system information apply after the handover unless the network provides new system information.

Adaptive control of the RF transmit power from an MS and optionally from the BSS is implemented in order to optimize the uplink and downlink performance and minimize the effects of co-channel interference in the system.

The criteria for determining radio link failure are specified in order to ensure that calls which fail either from loss of radio coverage or unacceptable interference are satisfactorily handled by the network. Radio link failure may result in either re-establishment or release of the call in progress. For channels used for a voice group call, a radio uplink failure results in the freeing up of the uplink.