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**Digital cellular telecommunications system (Phase 2+) (GSM);
GSM/EDGE Radio transmission and reception
(3GPP TS 45.005 version 18.0.0 Release 18)**

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Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	10
1 Scope	11
1.1 References	12
1.2 Abbreviations	13
1.3 Definitions	14
2 Frequency bands and channel arrangement.....	14
3 Reference configuration	17
4 Transmitter characteristics	18
4.1 Output power	18
4.1.1 Mobile Station	18
4.1.2 Base station	23
4.1.2.1 Additional requirements for PCS 1 900 and MXM 1900 Base stations	25
4.1.2.2 Additional requirements for GSM 850 and MXM 850 Base stations	25
4.1.2.3 Additional requirements for GSM 700 Base stations	25
4.1.2.4 Additional requirements for ER-GSM 900 Base stations	25
4.1.2.4.1 Uncoordinated deployment.....	26
4.1.2.4.2 Coordinated deployment.....	26
4.2 Output RF spectrum	26
4.2.1 Spectrum due to the modulation and wide band noise.....	26
4.2.1.1 General requirements for all types of Base stations and MS.....	26
4.2.1.2 Additional requirements for multicarrier BTS	27
4.2.1.3 Tables for spectrum requirements due to modulation and wideband noise.....	28
4.2.1.4 Exceptions for spectrum due to modulation and wideband noise	32
4.2.1.4.1 Mobile Stations and Base Transceiver Stations except multicarrier BTS	32
4.2.1.4.2 Multicarrier BTS	33
4.2.2 Spectrum due to switching transients	33
4.2.2.1 General requirements	33
a) Mobile Station:.....	34
b) Base transceiver station:.....	34
4.3 Spurious emissions	35
4.3.1 Principle of the specification	35
4.3.2 Base Transceiver Station	37
4.3.2.1 General requirements	37
4.3.2.2 Additional requirements for co-existence with GSM systems on other frequency bands	38
4.3.2.3 Additional requirements for co-existence with 3 G	39
4.3.3 Mobile Station	40
4.3.3.1 Mobile Station GSM 400, T-GSM 810, GSM 900, ER-GSM 900 and DCS 1 800	40
4.3.3.2 Mobile Station GSM 700, GSM 850 and PCS 1 900	41
4.4 Radio frequency tolerance.....	42
4.5 Output level dynamic operation	42
4.5.1 Base Transceiver Station	42
4.5.2 Mobile Station	42
4.6 Modulation accuracy	43
4.6.1 GMSK modulation.....	43
4.6.2 QPSK, AQPSK, 8-PSK, 16-QAM and 32-QAM modulations	43
4.6.2.1 RMS EVM	44
4.6.2.1.1 MS requirements	44
4.6.2.1.2 Requirements for BTS	44
4.6.2.2 Origin Offset Suppression.....	45
4.6.2.3 Peak EVM	45
4.6.2.4 95:th percentile.....	45

4.6.3	Phase and amplitude coherency when using blind physical layer transmissions	46
4.6.3.1	General	46
4.6.3.2	EC-GSM-IoT MS	46
4.6.3.3	BTS supporting EC-GSM-IoT	46
4.7	Intermodulation attenuation	46
4.7.1	Base transceiver station	46
4.7.2	Intra BTS intermodulation attenuation	46
4.7.2.1	GSM 400, GSM 900, ER-GSM 900, DCS 1800	47
4.7.2.1.1	Requirements for BTS except multicarrier BTS	47
4.7.2.1.2	Requirements for multicarrier BTS	47
4.7.2.2	MXM 850 and MXM 1900	47
4.7.2.3	GSM 700, GSM 850 and PCS 1900	48
a)	Requirements for BTS except multicarrier BTS	48
b)	Requirements for multicarrier BTS	48
c)	Additional requirements for all BTS	48
4.7.3	Void	48
4.7.4	Mobile PBX (GSM 900 only)	48
5	Receiver characteristics	49
5.1	Blocking characteristics	49
5.1.1	Definitions of applicable frequency ranges	49
5.1.2	Requirements for MS	51
5.1.3	Requirements for BTS	53
5.1.4	Signal levels of blocking signal	54
5.1.5	Micro- and pico-BTS	60
5.2	AM suppression characteristics	60
5.2.1	Requirements for MS	60
5.2.2	Requirements for BTS	61
5.3	Intermodulation characteristics	62
5.3.1	Requirements for MS	62
5.3.2	Requirements for BTS	62
5.4	Spurious emissions	63
6	Transmitter/receiver performance	63
6.1a	MS conditions	63
6.1b	BTS conditions	64
6.1	Nominal Error Rates (NER)	66
6.1.1	GMSK modulation	66
6.1.1.1	General performance requirements	66
6.1.1.2	Requirements for MS	66
6.1.1.3	Requirements for BTS	66
6.1.2	QPSK/8-PSK modulation	67
6.1.2.1	Requirements for MS	67
6.1.2.2	Requirements for BTS	68
6.1.3	16-QAM/32-QAM modulation	68
6.1.3.1	Requirements for MS	68
6.1.3.2	Requirements for BTS	69
6.2	Reference sensitivity level	69
6.2.1	Circuit-switched channels	69
6.2.1a	Reference performance in VAMOS mode	72
6.2.2	Packet-switched channels	73
6.2.3	Flexible Layer One	75
6.2.4	Repeated associated control channel performance	76
6.2.4a	Extended Coverage control channel and data channel performance for EC-GSM-IoT	76
6.2.5	Enhanced MS receiver performance	76
6.2.6	Additional performance conditions	77
6.3	Reference interference level	77
6.3.1	GMSK modulated speech channels and associated control channels	77
6.3.2	Co-channel reference interference performance	78
6.3.2.1	MS requirements	78
6.3.2.2	BTS requirements	78
6.3.3	Adjacent channel reference interference performance	79

6.3.3.1	Normal symbol rate used	79
6.3.3.1.1	MS requirements	79
6.3.3.1.2	BTS requirements	80
6.3.3.2	Higher symbol rate used	80
6.3.3.2.1	MS requirements	80
6.3.3.2.2	BTS requirements	81
6.3.4	Reference interference performance – signal levels	81
6.3.5	Additional reference interference performance requirements and conditions	82
6.4	Erroneous frame indication performance	84
6.5	Random access and paging performance at high input levels	85
6.6	Frequency hopping performance under interference conditions	86
6.7	Incremental Redundancy Performance for EGPRS and EGPRS2 MS	86

Annex A (informative): Spectrum characteristics (spectrum due to the modulation).....203

Annex B (normative): Transmitted power level versus time211

Annex C (normative): Propagation conditions.....217

C.1	Simple wideband propagation model	217
C.2	Doppler spectrum types	217
C.3	Propagation models	218
C.3.1	Typical case for rural area (RAx): (6 tap setting)	218
C.3.2	Typical case for hilly terrain (HTx): (12 tap setting)	218
C.3.3	Typical case for urban area (TUx): (12 tap setting)	219
C.3.4	Profile for equalization test (EQx): (6 tap setting)	219
C.3.5	Typical case for very small cells (TLx): (2 tap setting)	219

Annex D (normative): Environmental conditions220

D.1	General	220
D.2	Environmental requirements for the MSs	220
D.2.1	Temperature (GSM 400, GSM 900, ER-GSM 900 and DCS 1 800)	220
D.2.1.1	Environmental Conditions (PCS 1 900, GSM 850 and GSM 700)	220
D.2.2	Voltage	220
D.2.3	Vibration (GSM 400, GSM 900, ER-GSM 900 and DCS 1 800)	221
D.2.3.1	Vibration (PCS 1 900, GSM 850 and GSM 700)	221
D.3	Environmental requirements for the BSS equipment	221
D.3.1	Environmental requirements for the BSS equipment	222

Annex E (normative): Repeater characteristics223

E.1	Introduction	223
E.2	Spurious emissions	223
E.3	Intermodulation products	224
E.4	Out of band gain	224
E.5	Frequency error and modulation accuracy	224
E.5.1	Frequency error	224
E.5.2	Modulation accuracy at GMSK modulation	224
E.5.3	Modulation accuracy at 8-PSK, 16-QAM, 32-QAM, QPSK and AQPSK modulation	224

Annex F (normative): Antenna Feeder Loss Compensator Characteristics (GSM 400, GSM 900 and DCS 1800).....226

F.1	Introduction	226
F.2	Transmitting path	226
F.2.1	Maximum output power	226
F.2.2	Gain	227

F.2.3	Burst transmission characteristics	227
F.2.4	Phase error	227
F.2.5	Frequency error	228
F.2.6	Group delay	228
F.2.7	Spurious emissions	228
F.2.8	VSWR	229
F.2.9	Stability	229
F.3	Receiving path	229
F.3.1	Gain	229
F.3.2	Noise figure	229
F.3.3	Group delay	229
F.3.4	Intermodulation performance	229
F.3.5	VSWR	229
F.3.6	Stability	229
F.4	Guidelines (informative)	229
Annex G (normative):	Calculation of Error Vector Magnitude	231
Annex H (normative):	Requirements on Location Measurement Unit	233
H.1	TOA LMU Requirements	233
H.1.1	Void	233
H.1.2	LMU characteristics	233
H.1.2.1	Blocking characteristics	233
H.1.2.2	AM suppression characteristics	233
H.1.2.3	Intermodulation characteristics	234
H.1.2.4	Spurious emissions	234
H.1.3	Time-of-Arrival Measurement Performance	234
H.1.3.1	Sensitivity Performance	234
H.1.3.2	Interference Performance	235
H.1.3.3	Multipath Performance	236
H.1.4	Radio Interface Timing Measurement Performance	236
H.2	E-OTD LMU Requirements	236
H.2.1	LMU Characteristics	236
H.2.1.1	Blocking characteristics	237
H.2.1.2	AM suppression characteristics	237
H.2.1.3	Intermodulation characteristics	237
H.2.2	Sensitivity and Interference Performance	237
H.2.2.1	Sensitivity Performance	237
H.2.2.2	Interference Performance	238
H.2.2.3	Multipath Performance	238
Annex I (normative):	E-OTD Mobile Station Requirements	240
I.1	Introduction	240
I.2	Sensitivity and Interference Performance	240
I.2.1	Sensitivity Performance	240
I.2.2	Interference Performance	241
I.2.3	Multipath Performance	241
Annex J (informative):	Guidance on the Usage of Dynamic ARFCN Mapping	242
J.1	Introduction	242
J.2	Dynamic allocation of GSM 400, GSM 800, GSM 900, ER-GSM 900, DCS 1800 and PCS 1900 ARFCNs	242
J.3	Controlling changes in dynamic mapping	242
Annex K (normative):	Reference TFCs for FLO	244
Annex L (normative):	Reference Test Scenarios for DARP	246

Annex M (normative):	Minimum Performance Requirements for Assisted Global Positioning System (A-GPS)	248
M.1	General	248
M.1.1	Abbreviations	248
M.1.2	Measurement parameters.....	248
M.1.2.1	MS based A-GPS measurement parameters	248
M.1.2.2	MS assisted A-GPS measurement parameters	248
M.1.3	Response time	248
M.1.4	Time assistance	248
M.1.4.1	Use of fine time assistance.....	249
M.1.4.2	2D position error.....	249
M.2	A-GPS minimum performance requirements.....	249
M.2.1	Sensitivity.....	249
M.2.1.1	Coarse time assistance	249
M.2.1.1.1	Minimum Requirements (Coarse time assistance).....	250
M.2.1.2	Fine time assistance	250
M.2.1.2.1	Minimum Requirements (Fine time assistance).....	250
M.2.2	Nominal Accuracy.....	250
M.2.2.1	Minimum requirements (nominal accuracy).....	251
M.2.3	Dynamic Range	251
M.2.3.1	Minimum requirements (dynamic range)	251
M.2.4	Multi-Path scenario	251
M.2.4.1	Minimum Requirements (multi-path scenario).....	252
M.2.5	Moving scenario and periodic location	252
M.2.5.1	Minimum Requirements (moving scenario and periodic location).....	253
M.3	Test conditions	253
M.3.1	General	253
M.3.1.1	Parameter values.....	253
M.3.1.2	Time assistance	254
M.3.1.3	GPS Reference Time	254
M.3.1.4	Reference and MS locations	254
M.3.1.5	Satellite constellation and assistance data.....	254
M.3.1.6	Atmospheric delays.....	254
M.3.1.7	GSM Frequency and frequency error.....	255
M.3.1.8	Information elements	255
M.3.1.9	GPS signals	255
M.3.1.10	RESET MS POSITIONING STORED INFORMATION Message	255
M.4	Propagation Conditions	255
M.4.1	Static propagation conditions	255
M.4.2	Multi-path Case G1	255
M.5	Measurement sequence chart.....	256
M.5.1	General	256
M.5.2	MS Based A-GPS Measurement Sequence Chart	256
M.5.3	MS Assisted A-GPS Measurement Sequence Chart	257
M.6	Assistance data required for testing.....	258
M.6.1	Introduction	258
M.6.2	Information elements required for MS-based.....	258
M.6.3	Information elements available for MS-assisted	259
M.7	Converting MS-assisted measurement reports into position estimates	260
M.7.1	Introduction	260
M.7.2	MS measurement reports.....	260
M.7.3	Weighted Least Squares (WLS) position solution.....	261
Annex N (normative):	Reference Test Scenarios for DARP Phase II (MSRD).....	263
N.1	Interferer configurations.....	263
N.2	Correlation and antenna gain imbalance	264

N.3	Testing MSRD terminal conformance to legacy requirements	265
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Annex O (normative): Minimum Performance Requirements for Assisted Galileo and Additional Navigation Satellite Systems (A-GANSS)267

O.1	General	267
O.1.1	Abbreviations	267
O.1.2	Measurement parameters.....	267
O.1.2.1	MS based A-GANSS measurement parameters.....	267
O.1.2.2	MS assisted A-GANSS measurement parameters	267
O.1.3	Response time	267
O.1.4	Time assistance	268
O.1.4.1	Use of fine time assistance.....	268
O.1.5	Error definitions	268
O.1.6	Mobile stations supporting multiple constellations	268
O.1.7	Mobile stations supporting multiple signals	268
O.2	A-GANSS minimum performance requirements	269
O.2.1	Sensitivity.....	269
O.2.1.1	Coarse time assistance	269
O.2.1.1.1	Minimum Requirements (Coarse time assistance).....	270
O.2.1.2	Fine time assistance	270
O.2.1.2.1	Minimum Requirements (Fine time assistance)	270
O.2.2	Nominal Accuracy.....	271
O.2.2.1	Minimum requirements (nominal accuracy)	271
O.2.3	Dynamic Range	272
O.2.3.1	Minimum requirements (dynamic range)	272
O.2.4	Multi-Path scenario	272
O.2.4.1	Minimum Requirements (multi-path scenario).....	273
O.2.5	Moving scenario and periodic location	273
O.2.5.1	Minimum Requirements (moving scenario and periodic location).....	274
O.3	Test conditions	275
O.3.1	General	275
O.3.1.1	Parameter values.....	275
O.3.1.2	Time assistance	275
O.3.1.3	GANSS Reference Time.....	275
O.3.1.4	Reference and MS locations	276
O.3.1.5	Satellite constellation and assistance data.....	276
O.3.1.6	Atmospheric delays.....	276
O.3.1.7	Sensors.....	276
O.3.1.8	Information elements	276
O.3.1.9	GNSS signals	276
O.3.1.10	RESET MS POSITIONING STORED INFORMATION Message	276
O.3.2	GNSS System Time Offsets	277
O.4	Propagation Conditions	277
O.4.1	Static propagation conditions	277
O.4.2	Multi-path case	277
O.5	Measurement sequence chart.....	278
O.5.1	General	278
O.5.2	TTFF Measurement Sequence Chart.....	278
O.6	Assistance data required for testing.....	280
O.6.1	GPS assistance data	280
O.6.2	GANSS assistance data	280
O.7	Converting MS-assisted measurement reports into position estimates	283
O.7.1	Introduction	283
O.7.2	MS measurement reports.....	283
O.7.3	Weighted Least Squares (WLS) position solution.....	284

Annex P (normative): Minimum receiver performance requirements for MSR BS287

P.1	Reference Sensitivity and interference performance.....	287
P.2	Other receiver characteristics	287
P.2.1	Blocking characteristics	287
P.2.2	Intermodulation characteristics	287
P.2.3	AM suppression.....	288
Annex Q (normative):	Reference Test Scenarios for Voice services over Adaptive Multi-user channels on One Slot (VAMOS)	289
Q.1	Interferer configurations in downlink.....	289
Q.2	Interferer configurations in uplink	290
Q.3	Sensitivity test configuration in downlink.....	291
Q.4	Sensitivity test configuration in uplink.....	291
Q.5	Time and frequency offset in uplink	291
Q.6	VAMOS DTX scenario in downlink.....	291
Q.7	Correlation and antenna gain imbalance for VAMOS III MS.....	292
Annex R (normative):	Reference Test Scenarios for Overlaid CDMA.....	293
R.1	Frequency offset in uplink.....	293
Annex S (normative):	Normalized coherency error	294
Annex T (normative):	Calculation of the equivalent combined power	295
Annex U (informative):	Change history	296
History		306

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1 Scope

The present document defines the requirements for the transceiver of the pan-European digital cellular telecommunications systems GSM.

Requirements are defined for two categories of parameters:

- those that are required to provide compatibility between the radio channels, connected either to separate or common antennas, that are used in the system. This category also includes parameters providing compatibility with existing systems in the same or adjacent frequency bands;
- those that define the transmission quality of the system.

The present document defines RF characteristics for the Mobile Station (MS) and Base Station System (BSS). The BSS will contain Base Transceiver Stations (BTS), which can be normal BTS, micro-BTS or pico-BTS. The precise measurement methods are specified in 3GPP TS 51.010 and 3GPP TS 51.021.

Unless otherwise stated, the requirements defined in this EN apply to the full range of environmental conditions specified for the equipment (see annex D).

In the present document some relaxations are introduced for GSM 400 MSs, GSM 900 MSs, GSM 700 MSs and GSM 850 MSs which pertain to power class 4, 5 or 6 (see subclause 4.1.1). In the present document these Mobile Stations are referred to as "small MS".

In the present document some relaxations to receiver requirements are introduced for a MS indicating support for Downlink Multi Carrier (DLMC), see 3GPP TS 24.008, when in DLMC configuration. DLMC configurations are specified for only GSM 850, GSM 900, DCS 1800 and PCS 1900.

MSs may operate on more than one of the frequency bands specified in clause 2. These MSs are referred to as "Multi band MSs" in this EN. Multi band MSs shall meet all requirements for each of the bands supported. The relaxation on GSM 400 MSs, GSM 900 MSs, GSM 700 MSs and GSM 850 MSs for a "small MS" are also valid for a multi band MS if it complies with the definition of a small MS.

The RF characteristics of repeaters are defined in annex E of this EN. Annexes D and E are the only clauses of this EN applicable to repeaters. Annex E does not apply to the MS or BSS. The precise measurement methods for repeaters are specified in 3GPP TS 51.026 [35].

The present document also includes specification information for mixed mode operation at 850 MHz and 1900 MHz (MXM 850 and MXM 1900). 850 MHz and 1900 MHz mixed-mode is defined as a network that deploys both 30 kHz RF carriers and 200 kHz RF carriers in geographic regions where the Federal Communications Commission (FCC) regulations are applied or adopted.

The requirements for a MS in a mixed-mode system, MXM 850 and MXM 1900, correspond to the requirements for GSM 850 MS and PCS 1900 MS respectively.

Annex M defines the minimum performance requirements for A-GPS for MSs that support A-GPS. Annex M does not apply to the BSS.

The present document also includes specific requirements for multicarrier BTS, wherever explicitly stated in the text, that apply for all classes of multicarrier BTS (Wide Area, Medium Range and Local Area) if nothing else is stated. All other requirements designated for BTS and normal BTS apply if not otherwise stated. The multicarrier BTS classes have relaxed requirements in the areas of Tx spurious emissions, intermodulation attenuation and, when multicarrier receiver is included, Rx blocking. Usage of multicarrier BTSs in some geographical regions might be subject to regulatory restrictions to protect other radio systems operating in bands of adjacent frequency assignments, in particular for all safety related applications like railway applications. In areas where such systems coexist with multicarrier BTSs, the received interference power originating from multicarrier BTSs might have to be limited.

The document also includes entry points in some tables for the multicarrier BTS requirements to which TS 37.104 [33] for Multi-Standard Radio Base Stations (MSR BS) is referring to as specific GSM/EDGE single-RAT requirements not covered by the general requirements. These entry points are marked with ^{M)} and, as described in a note in each applicable table, identify the relevant column(s) that are applicable as MSR BS requirements. In general the requirements for multicarrier BTS equipped with multicarrier receiver also apply to Multi-Standard Radio Base Stations. The GSM requirements for Multi-Standard Radio Base Stations are defined for GSM 850, GSM 900, DCS 1800 and PCS 1900 only. Requirements for other frequency bands and MXM base stations are excluded. Annex P defines the minimum performance

for the receiver in MSR BS.

For equipment not declared as MSR BS the ^{M)} indications can be ignored.

The present document defines requirements for the usage of the ER-GSM band. The national implementation might be subject to regulatory coordination agreements to avoid system impacts (RF scenarios for ER-GSM introduction are given in 3GPP TR 45.050).

The present document defines requirements for supporting a low-complexity, low data throughput service in environments experiencing high propagation attenuation as indoors in basements etc. This service, based on EGPRS, with extended coverage is called EC-GSM-IoT. For EC-GSM-IoT, in case no specific requirement is explicitly stated, the requirements for EGPRS apply.

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".
- [1A] 3GPP TS 25.144: "User Equipment (UE) and Mobile Station (MS) Over the Air Performance Requirements".
- [1B] 3GPP TS 34.114: "User Equipment (UE) / Mobile Station (MS) Over The Air (OTA) antenna performance; Conformance testing".
- [2] 3GPP TR 43.030: "Radio network planning aspects".
- [3] 3GPP TS 43.052: "GSM Cordless Telephony System (CTS); Lower layers of the CTS radio interface; Stage 2".
- [4] 3GPP TS 43.059: "Functional Stage 2 description of Location Services in GERAN".
- [5] 3GPP TS 43.064: "General Packet Radio Service (GPRS); GPRS Radio Interface Stage 2".
- [6] 3GPP TS 44.014: "Individual equipment type requirements and interworking; Special conformance testing functions".
- [7] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".
- [7A] 3GPP TS 44.031: "Mobile Station (MS) - Serving Mobile Location Centre (SMLC) Radio Resource LCS Protocol (RRLP)".
- [8] 3GPP TS 44.071: "Mobile radio interface layer 3 Location Services (LCS) specification".
- [9] 3GPP TS 45.001: "Physical layer on the radio path General description".
- [10] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [11] 3GPP TS 45.003: "Channel coding".
- [12] 3GPP TS 45.004: "Modulation".
- [13] 3GPP TS 45.008: "Radio subsystem link control".
- [14] 3GPP TS 45.010: "Radio subsystem synchronization".
- [15] 3GPP TS 45.050: "Background for Radio Frequency (RF) requirements".

- [16] 3GPP TS 51.010: "Mobile Station (MS) conformity specification".
- [17] 3GPP TS 51.011: "Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".
- [18] 3GPP TS 51.021: "Base Station System (BSS) equipment specification; Radio aspects".
- [19] ITU-T Recommendation O.153: "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [20] ETSI EN 300 019-1-3: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions Stationary use at weather protected locations".
- [21] ETSI EN 300 019-1-4: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions Stationary use at non-weather protected locations".
- [22] FCC Title 47 CFR Part 24: "Personal Communication Services", Subpart E "Broadband services".
- [23] ITU-T Recommendation O.151 (1992): "Error performance measuring equipment operating at the primary rate and above".
- [24] TIA/EIA-136-C: "TDMA Third Generation Wireless".
- [25] IEC publication 68-2-1: "Environmental Testing; Part 2; Tests – Test A: Cold".
- [26] IEC publication 68-2-2: "Basic Environmental Testing Procedures; Part 2; Tests - Tests B: Dry heat".
- [27] IEC publication 68-2-36: "Basic Environmental Testing Procedures; Part 2: Tests; Test Fdb: Random vibration wide band – Reproducibility Medium".
- [28] FCC Title 47 CFR Part 22: "Public Mobile Services".
- [29] FCC Title 47 CFR Part 27: "Miscellaneous Wireless Services". Subpart C "Technical Standards".
- [30] ICD-GPS 200, Navstar GPS Space Segment/Navigation User Interfaces, Rev. C.
- [31] P. Axelrad, R.G. Brown, "GPS Navigation Algorithms", in Chapter 9 of "Global Positioning System: Theory and Applications", Volume 1, B.W. Parkinson, J.J. Spilker (Ed.), Am. Inst. of Aeronautics and Astronautics Inc., 1996.
- [32] S.K. Gupta, "Test and Evaluation Procedures for the GPS User Equipment", ION-GPS Red Book, Volume 1, p. 119.
- [33] 3GPP TS 37.104: "Multi-Standard (MSR) Base Station (BS) radio transmission and reception".
- [34] ITU-R SM.329: "Unwanted emissions in the spurious domain".
- [35] 3GPP TS 51.026: "Base Station System (BSS) equipment specification; Part 4: Repeaters".
- [36] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".
- [37] 3GPP TS 25.101: "User Equipment (UE) radio transmission and reception (FDD)".
- [38] 3GPP TS 44.060: "Radio Link Control/ Medium Access Control (RLC/MAC) protocol"

1.2 Abbreviations

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

In addition to abbreviations in 3GPP TR 21.905, the following abbreviations are applied:

CC	Coverage Class
EDAB	Extended Dual slot Access Burst
ESAB	Extended Synchronization Access Burst