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**Digital cellular telecommunications system (Phase 2+) (GSM);
Base Station System (BSS) equipment specification;
Radio aspects
(3GPP TS 51.021 version 14.8.0 Release 14)**

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Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	9
1 Scope	10
2 References	10
3 Definitions, abbreviations, frequency bands and channels.....	12
3.1 Definitions	12
3.2 Abbreviations	14
3.3 Frequency bands and channels	15
3.3.1 Frequency bands	15
3.3.2 Channels and channel numbering	15
4 General test conditions and declarations	16
4.1 Output power and determination of power class	16
4.2 Specified frequency range	17
4.3 Frequency hopping	17
4.4 RF power control.....	18
4.5 Downlink discontinuous transmission (DTX)	18
4.6 Test environments	18
4.6.1 Normal test environment	18
4.6.2 Extreme test environment	19
4.6.2.1 Extreme temperature	19
4.6.3 Vibration.....	19
4.6.4 Power supply	20
4.7 Acceptable uncertainty of measurement equipment	20
4.8 Interpretation of measurement results	24
4.9 Selection of configurations for testing.....	24
4.10 BTS Configurations.....	25
4.10.1 Receiver diversity	25
4.10.2 Duplexers.....	25
4.10.3 Power supply options.....	26
4.10.4 Ancillary RF amplifiers	26
4.10.5 BSS using antenna arrays	26
4.10.6 BTS supporting 8-PSK modulation	27
4.10.7 BTS supporting additional modulations in EGPRS2	28
4.10.8 Supported Symbol Rate.....	28
4.10.9 Support of RTTI and/or FANR	28
4.10.10 Multicarrier BTS.....	28
4.10.11 Support of EC-GSM-IoT	29
4.10.12 Support of Multilateration	30
5 Format and interpretation of tests.....	30
6 Transmitter	31
6.1 Static Layer 1 functions.....	31
6.1.1 Test purpose.....	31
6.1.2 Test case	31
6.1.3 Void	32
6.1.4 Conformance requirement	32
6.1.5 Requirement reference.....	32
6.2 Modulation accuracy	32
6.2.1 Test purpose.....	32
6.2.2 Test case	32
6.2.3 Void	33

6.2.4	Conformance requirement	33
6.2.5	Requirement reference	35
6.3	Mean transmitted RF carrier power and equivalent combined power	35
6.3.1	Test purpose	35
6.3.2	Test case	35
6.3.3	Void	36
6.3.4	Conformance requirement	36
6.3.5	Requirement reference	38
6.4	Transmitted RF carrier power versus time	38
6.4.1	Test purpose	38
6.4.2	Test case	38
6.4.3	Void	39
6.4.4	Conformance requirement	39
6.4.5	Requirement reference	43
6.5	Adjacent channel power	43
6.5.1	Spectrum due to modulation and wideband noise	43
6.5.1.1	Test purpose	43
6.5.1.2	Test case	43
6.5.1.3	Void	44
6.5.1.4	Conformance requirement	44
6.5.1.4.1	Normal BTS Minimum requirement	44
6.5.1.4.2	Multicarrier BTS Minimum requirement	45
6.5.1.4.3	Micro and Pico-BTS Minimum requirement	45
6.5.1.5	Requirement reference	47
6.5.2	Switching transients spectrum	47
6.5.2.1	Test purpose	47
6.5.2.2	Test case	47
6.5.2.3	Void	48
6.5.2.4	Conformance requirement	48
6.5.2.5	Requirement reference	49
6.6	Spurious emissions from the transmitter antenna connector	49
6.6.1	Conducted spurious emissions from the transmitter antenna connector, inside the BTS transmit band	49
6.6.1.1	Test Purpose	49
6.6.1.2	Test Case	49
6.6.1.3	Void	50
6.6.1.4	Conformance requirement	50
6.6.1.5	Requirement Reference	50
6.6.2	Conducted spurious emissions from the transmitter antenna connector, outside the BTS transmit band	50
6.6.2.1	Applicability (Phase 2)	50
6.6.2.1.1	Test Purpose	50
6.6.2.1.2	Test Case	50
6.6.2.1.3	Void	51
6.6.2.1.4	Conformance requirement	51
6.6.2.1.5	Requirement Reference	52
6.6.2.2	Applicability (Phase 2+)	52
6.6.2.2.1	Test Purpose	52
6.6.2.2.2	Test Case	52
6.6.2.2.3	Void	53
6.6.2.2.4	Conformance requirement	53
6.6.2.2.5	Requirement Reference	54
6.6.2.3	Applicability (Release 1999 and later releases GSM 400, GSM 900 and DCS 1800)	54
6.6.2.3.1	Test Purpose	54
6.6.2.3.2	Test Case	54
6.6.2.3.3	Void	55
6.6.2.3.4	Conformance requirement	55
6.6.2.3.5	Requirement Reference	55
6.6.2.4	Applicability (Release 4 and later releases GSM 700, GSM 850 and PCS 1900)	55
6.6.2.4.1	Test Purpose	55
6.6.2.4.2	Test Case	55
6.6.2.4.3	Void	56
6.6.2.4.4	Conformance requirement	56

6.6.2.4.5	Requirement Reference	56
6.6.2.5	Applicability (Release 7 and later releases GSM 400, T-GSM 810, GSM 900 and DCS 1800).....	56
6.6.2.5.1	Test Purpose	56
6.6.2.5.2	Test Case	57
6.6.2.5.3	Void	58
6.6.2.5.4	Conformance requirement	58
6.6.2.5.5	Requirement Reference	59
6.6.2.5a	Applicability (Release 7 and later releases GSM 700, GSM 850 and PCS 1900)	59
6.6.2.5a.1	Test Purpose	59
6.6.2.5a.2	Test Case	59
6.6.2.5a.3	Void	59
6.6.2.5a.4	Conformance requirement	59
6.6.2.5a.5	Requirement Reference	60
6.6.2.6	Applicability (Release 8 and later releases GSM 400, T-GSM 810, GSM 900 and DCS 1800).....	60
6.6.2.6.1	Test Purpose	60
6.6.2.6.2	Test Case	60
6.6.2.6.3	Void	61
6.6.2.6.4	Conformance requirement	61
6.6.2.6.5	Requirement Reference	62
6.6.2.7	Applicability (Release 8 and later releases GSM 700, GSM 850 and PCS 1900)	62
6.6.2.7.1	Test Purpose	63
6.6.2.7.2	Test Case	63
6.6.2.7.3	Void	64
6.6.2.7.4	Conformance requirement	64
6.6.2.7.5	Requirement Reference	65
6.6.2.8	Applicability (Release 8 and later releases GSM 400, GSM 900 and DCS 1800).....	65
6.6.2.8.1	Test Purpose	65
6.6.2.8.2	Test Case	66
6.6.2.8.3	Void	67
6.6.2.8.4	Complete conformance	67
6.6.2.8.5	Requirement Reference	67
6.6.2.9	Applicability (Release 12 and later releases GSM 400, T-GSM 810, GSM 900, ER-GSM 900 and DCS 1800).....	67
6.6.2.9.1	Test Purpose	67
6.6.2.9.2	Test Case	67
6.6.2.9.3	Void	69
6.6.2.9.4	Conformance requirement	69
6.6.2.9.5	Requirement Reference	69
6.6.2.10	Applicability (Release 12 and later releases GSM 400, T-GSM 810, GSM 900 and DCS 1800).....	69
6.6.2.10.1	Test Purpose	70
6.6.2.10.2	Test Case	70
6.6.2.10.3	Void	71
6.6.2.10.4	Conformance requirement	71
6.6.2.10.5	Requirement Reference	72
6.6.2.11	Applicability (Release 12 and later releases GSM 400, GSM 900, ER-GSM 900 and DCS 1800).....	72
6.6.2.11.1	Test Purpose	72
6.6.2.11.2	Test Case	73
6.6.2.11.3	Void	74
6.6.2.11.4	Conformance requirement	74
6.6.2.11.5	Requirement Reference	74
6.7	Intermodulation attenuation (GSM 400, GSM 900, ER-GSM 900 and DCS 1800).....	74
6.7.1	Test purpose.....	74
6.7.2	Test case	74
6.7.3	Void	76
6.7.4	Conformance requirement	76
6.7.5	Requirement reference	78
6.8	Intra Base Station System intermodulation attenuation.....	78
6.8.1	Test purpose.....	78
6.8.2	Test case	78
6.8.3	Void	79
6.8.4	Conformance requirement	79
6.8.5	Requirement reference	79

6.9	Intra Base Station System intermodulation attenuation, MXM 850 and MXM 1900	80
6.9.1	Test purpose.....	80
6.9.2	Test cases	80
6.9.2.1	200 kHz carriers-only.....	80
6.9.2.2	200 kHz and ANSI-136 30 kHz carriers	80
6.9.3	Void	80
6.9.4	Conformance requirement	80
6.9.5	Requirement reference	81
6.10	Intra Base Station System intermodulation attenuation, PCS 1900, GSM 850 and GSM 700.....	81
6.10.1	Test purpose.....	81
6.10.2	Test case	81
6.10.3	Void	82
6.10.4	Conformance requirement	82
6.10.5	Requirement reference	82
6.11	Intermodulation attenuation (GSM 700, GSM 850, MXM 850, PCS 1900 and MXM 1900)	82
6.11.1	Test purpose.....	82
6.11.2	Test case	83
6.11.3	Void	84
6.11.4	Conformance requirement	84
6.11.5	Requirement reference	85
6.12	Wideband noise and intra BSS intermodulation attenuation in multicarrier operation	86
6.12.1	Test purpose.....	86
6.12.2	Test case	86
6.12.3	Void	88
6.12.4	Conformance requirement	88
6.12.5	Requirement reference	90
7	Receivers	90
7.1	Static Layer 1 receiver functions (nominal error ratios).....	90
7.1.1	Test Purpose.....	90
7.1.2	Test Case.....	91
7.1.3	Void	94
7.1.4	Conformance requirement	94
7.1.5	Requirement Reference	95
7.2	Erroneous Frame Indication Performance	95
7.2.1	Test Purpose.....	95
7.2.2	Test Case.....	95
7.2.3	Void	96
7.2.4	Conformance requirement	96
7.2.5	Requirement reference	96
7.3	Static Reference Sensitivity Level.....	97
7.3.1	Test Purpose.....	97
7.3.2	Test Case.....	97
7.3.3	Void	104
7.3.4	Conformance requirement	104
7.3.5	Requirements Reference	108
7.4	Multipath Reference Sensitivity Level.....	108
7.4.1	Test Purpose.....	108
7.4.2	Test Case.....	108
7.4.3	Void	123
7.4.4	Conformance requirement	123
7.4.5	Requirement Reference.....	133
7.5	Reference interference level	133
7.5.1	Test Purpose.....	133
7.5.2	Test Case.....	133
7.5.3	Void	154
7.5.4	Conformance requirement	154
7.5.5	Requirements Reference	171
7.6	Blocking Characteristics.....	171
7.6.1	Test Purpose.....	171
7.6.2	Test Case.....	171
7.6.3	Void	179

7.6.4	Conformance requirement	179
7.6.5	Requirements reference	181
7.7	Intermodulation characteristics	181
7.7.1	Test Purpose.....	181
7.7.2	Test Case.....	181
7.7.3	Void	183
7.7.4	Conformance requirement	183
7.7.5	Requirement Reference.....	183
7.8	AM suppression.....	184
7.8.1	Test Purpose.....	184
7.8.2	Test Case.....	184
7.8.3	Void	186
7.8.4	Conformance requirement	186
7.8.5	Requirement Reference.....	186
7.9	Spurious emissions from the receiver antenna connector.....	187
7.9.1	Test Purpose.....	187
7.9.2	Test Case.....	187
7.9.3	Void	188
7.9.4	Conformance requirement	188
7.9.5	Requirement Reference.....	188
8	Radiated spurious emissions	188
8.1	Test Purpose	188
8.2	Test Case	188
8.3	Void.....	190
8.4	Conformance requirement.....	190
8.5	Requirement reference	191
9	Radio link management.....	191
9.1	General	191
9.2	Synchronization.....	191
9.2.1	Timing Tolerance.....	191
9.2.1.1	Test purpose	191
9.2.1.2	Test case.....	192
9.2.1.3	Void.....	192
9.2.1.4	Conformance requirement.....	192
9.2.1.5	Requirement reference	192
9.3	Frame structure.....	192
9.3.1	BCCH Multiframe	193
9.3.1.1	Test purpose	193
9.3.1.2	Test case.....	193
9.3.1.2a	Test case for EC-GSM-IoT	193
9.3.1.3	Void.....	193
9.3.1.4	Conformance requirement.....	193
9.3.1.5	Requirement reference	193
9.3.2	TDMA-frame structure	193
9.3.2.1	Test purpose	193
9.3.2.2	Test case.....	194
9.3.2.3	Void.....	194
9.3.2.4	Conformance requirement.....	194
9.3.2.5	Requirement reference	194
9.4	Radio link measurements	194
9.4.1	Signal Strength.....	195
9.4.1.1	Measurement Accuracy.....	195
9.4.1.1.1	Test purpose	195
9.4.1.1.2	Test case	195
9.4.1.1.3	Void.....	195
9.4.1.1.4	Conformance requirement	195
9.4.1.1.5	Requirement reference.....	197
9.4.1.2	Selectivity of signal strength measurements	197
9.4.1.2.1	Test purpose	197
9.4.1.2.2	Test case	197

9.4.1.2.3	Void.....	198
9.4.1.2.4	Conformance requirement	198
9.4.1.2.5	Requirement reference.....	198
9.4.2	Signal quality.....	198
9.4.2.1	Test purpose	198
9.4.2.2	Test case.....	198
9.4.2.3	Void.....	199
9.4.2.4	Conformance requirement.....	199
9.4.2.5	Requirement reference	200
9.4.3	Idle channel signal level	200
9.4.3.1	Test purpose	200
9.4.3.2	Test case.....	200
9.4.3.3	Void.....	200
9.4.3.4	Conformance requirement.....	201
9.4.3.5	Requirement reference	201
9.5	Adaptive frame alignment	201
9.5.1	Test purpose.....	201
9.5.2	Test case	201
9.5.3	Void.....	202
9.5.4	Conformance requirement	202
9.5.5	Requirement reference.....	203
Annex A (informative): Testing of statistical parameters.....		204
A.1	General theoretical methodology	204
A.2	Detailed theoretical methodology	206
A.3	Limitations and corrections to the theoretical methodology	207
A.3.1	Independent errors.....	207
A.3.2	Gaussian distribution.....	207
A.3.3	Stationary random processes	207
A.3.4	Low error ratios.....	208
A.3.5	Total corrections.....	208
A.4	Alternative experimental methodology	208
A.5	Detailed definition of error events.....	209
Annex B (informative): Description of special test equipment.....		210
B.1	Base Station System Test Equipment (BSSTE)	210
B.1.1	Fading and multipath propagation simulator.....	210
B.2	Measurement set ups for TX intermodulation.....	210
B.2.1	Test set-up for Intermodulation Attenuation (6.7.).....	210
B.2.1.1	RX-Band.....	211
B.2.1.2	Outside RX Band.....	211
B.2.2	Test set-up for Intra BSS Intermodulation Attenuation (6.8.)	212
B.2.2.1	RX-Band.....	212
B.2.2.2	TX-Band	212
Annex C (informative): Number of samples needed for statistical testing.....		213
C.1	GSM 900; Number of samples for testing.....	213
C.2	DCS 1800; Number of Samples for Testing.....	233
Annex D (informative): Change history		254
History		262

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1 Scope

The present document specifies the Radio Frequency (RF) test methods and conformance requirements for GSM 400, GSM 700, T-GSM 810, GSM 900, ER-GSM 900 and DCS 1800, PCS 1900, GSM 850, MXM 850 and MXM 1900 Base Station Systems (BSS)s. These have been derived from, and are consistent with, the core GSM specifications specified in the requirements reference subclause of each test with the exception that requirements expressed as a reference to regulatory documents (e.g. FCC) have not been included in the present document.

The present document is applicable to BSS meeting the requirements of either GSM Phase 2 or GSM Phase 2+. Unless otherwise stated, all tests are applicable to BSS meeting Phase 2 and/or Phase 2+ GSM requirements, because the requirements of the Phase 2 and Phase 2+ core GSM specifications which are referenced in the test are consistent. Most differences between Phase 2 and Phase 2+ requirements represent Phase 2+ features which are optional for the BSS to support.

Conformance requirements may be tested to verify all aspects of the performance of a BSS. These minimum requirements are intended to be used by manufacturers and operators to allow conformance and acceptance testing to be performed in a consistent manner; the tests to be performed should be agreed between the parties.

In some tests there are separate requirements for micro-BTS and BTS. If there is no separate requirement for a micro-BTS, the requirements for the BTS apply to a micro-BTS.

In Rel-7, higher symbol rate is introduced for EGPRS2-B. EGPRS2-A and all other channels use normal symbol rate. For definition of normal and higher symbol rate see 3GPP TS 45.004. All tests and requirements apply to both symbol rates except otherwise stated in the test.

In some tests there are separate requirements for multicarrier BTS, that apply for all classes of multicarrier BTS (Wide Area, Medium Range and Local Area, cf. [22]) unless otherwise stated. If there is no separate requirement for a multicarrier BTS class, the requirement designated for BTS and normal BTS apply to that multicarrier BTS class.

In Rel-12, BTS operating in the ER-GSM 900 band is introduced. In some tests there are separate requirements for BTS operating in the ER-GSM 900 band. If there is no separate requirement, the requirements for normal BTS apply.

In Rel-13, BTS support of a low-complexity, low data throughput service in environments experiencing high propagation attenuation as indoors in basements etc. is introduced. This service, based on EGPRS, with extended coverage is called EC-GSM-IoT. The requirements for EGPRS apply in case no specific requirement is explicitly stated for EC-GSM-IoT.

In the present document, the reference point for RF connections (except for the measurement of mean transmitted RF carrier power) is the antenna connector, as defined by the manufacturer. The present document does not apply to repeaters or RF devices which may be connected to an antenna connector of a BSS, except as specified in subclause 4.10.

2 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.
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[1] 3GPP TR 21.905: " Vocabulary for 3GPP Specifications "

[2] GSM 04.22: "Digital cellular telecommunications system (Phase 2+); Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

- [3] GSM 05.01: "Digital cellular telecommunications system (Phase 2); Physical layer on the radio path; General description".
- [4] GSM 05.02 (ETS 300 574): "Digital cellular telecommunications system (Phase 2); Multiplexing and multiple access on the radio path".
- [5] GSM 05.03 (ETS 300 575): "Digital cellular telecommunications system (Phase 2); Channel coding".
- [6] GSM 05.04 (ETS 300 576): "Digital cellular telecommunications system (Phase 2); Modulation".
- [7] GSM 05.05 (ETS 300 577): "Digital cellular telecommunications system (Phase 2); Radio transmission and reception".
- [8] GSM 05.08 (ETS 300 578): "Digital cellular telecommunications system (Phase 2); Radio subsystem link control".
- [9] GSM 05.10 (ETS 300 579): "Digital cellular telecommunications system (Phase 2); Radio subsystem synchronization".
- [10] 3GPP TS 08.20: "Digital cellular telecommunications system (Phase 2); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".
- [11] ETSI EN 300 019-1: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-0: Classification of environmental conditions Introduction".
- [12] IEC 60 068-2: "Basic environmental testing procedures; Part 2: Tests".
- [13] IEC 60 721: "Classification of environmental conditions".
- [14] ETSI ETR 027: "Radio and Equipment Systems; methods of measurement for mobile radio equipment".
- [15] ETSI ETR 028: "Radio and Equipment Systems; Uncertainties in the measurement of mobile radio equipment characteristics".
- [16] ITU-R Rec. SM.329-7: "Spurious emissions"
- [17] 3GPP TS 05.05: " Digital cellular telecommunications system (Phase 2+); Radio transmission and reception ".
- [18] 3GPP TS 45.001: "Physical layer on the radio path; General description".
- [19] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [20] 3GPP TS 45.003: "Channel coding".
- [21] 3GPP TS 45.004: "Modulation".
- [22] 3GPP TS 45.005: "Radio transmission and reception".
- [23] 3GPP TS 45.008: "Radio subsystem link control".
- [24] 3GPP TS 45.010: "Radio subsystem synchronization".
- [25] TIA/EIA-136-C: "TDMA Third Generation Wireless".
- [26] 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".
- [27] 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".
- [28] IEC 60 721-3-3 "Stationary use at weather protected locations".

- [29] IEC 60 721-3-4 "Stationary use at non weather protected locations".
- [30] 3GPP TS 24.022 "Radio Link Protocol (RLP) for circuit switched bearer and teleservices".
- [31] 3GPP TS 48.020 "Rate adaption on the Base Station System - Mobile services Switching Centre (BSS - MSC) interface".
- [32] 3GPP TS 25.113 "Base Station (BS) and repeater ElectroMagnetic Compatibility (EMC)".
- [33] 3GPP TS 36.113 "E-UTRA - Base Station (BS) and repeater ElectroMagnetic Compatibility (EMC)".
- [34] 3GPP TS 43.059 "Functional stage 2 description of Location Services (LCS) in GERAN".
- [35] 3GPP TS 49.031 "Base Station System Application Part LCS Extension (BSSAP-LE)".
- [36] 3GPP TS 44.018 " Mobile radio interface layer 3 specification; GSM/EDGE Radio Resource Control (RRC) protocol".
- [37] 3GPP TS 45.010 "Radio subsystem synchronization".

3 Definitions, abbreviations, frequency bands and channels

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

8-PSK: modulation type as defined 3GPP TS 45.004 clause 3.

Carrier Frequency: centre of the ARFCN under test.

GMSK: modulation type as defined by 3GPP TS 45.004 clause 2.

GSM: unless otherwise specified, references to GSM include GSM 400, GSM 700, T-GSM 810, GSM 850, GSM 900, ER-GSM 900, DCS 1800, PCS 1900, MXM 850 and MXM 1900.

GSM 900: unless otherwise specified, references to GSM 900 include P-GSM, E-GSM and R-GSM.

BSS: in the present document, the term BSS (or base station subsystem) applies to both a BTS and integrated BSS. If a separate BSC is required to perform tests on a BTS, the BSC may be regarded as test equipment and the environmental conditions of the BSC need not be controlled.

pico-BTS: as defined in 3GPP TS 45.005. In the present document, this also includes a BSS which incorporates a pico-BTS.

micro-BTS: as defined in 3GPP TS 05.05 and 3GPP TS 45.005. In the present document, this also includes a BSS which incorporates a micro-BTS.

Multicarrier BTS: defined as BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active components simultaneously.

Wide Area (WA) multicarrier BTS: defined as a class of multicarrier BTS, characterized by requirements derived from macro cell scenarios. The class has either multicarrier transmitter only, or both multicarrier transmitter and receiver.

Medium Range (MR) multicarrier BTS: defined as a class of multicarrier BTS, characterized by requirements derived from micro cell scenarios. The class has both multicarrier transmitter and multicarrier receiver.

Local Area (LA) multicarrier BTS: defined as a class of multicarrier BTS, characterized by requirements derived from pico cell scenarios. The class has both multicarrier transmitter and multicarrier receiver.