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Digital cellular telecommunications system (Phase 2+);
Base Station System (BSS) equipment specification;
Radio aspects
(3GPP TS 51.021 version 13.0.0 Release 13)

3GPP A GLOBAL INITIATIVE
GSM® GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Contents

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:

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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 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.
- 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] 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)'.

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.

MXM: mixed Mode system. 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) or similar regulations are applied. In the present document MXM 850 and MXM 1900 are defined.

normal BTS: any BTS or BSS as defined by 3GPP TS 05.05 and 3GPP TS 45.005 which is not a micro-BTS, pico-BTS or multicarrier BTS.

BSSTE: base Station System Test Equipment; see annex B.

manufacturer: in the present document, a reference to a manufacturer shall also apply to an agent of the manufacturer.