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Digitalni celiļ ni telekomunikacijski sistem (faza 2 in faza 2+) ï Specifikacija za opremo sistema baznih postaj (BSS) ï Radijski vidiki (GSM 11.21, razliļ ica 8.1.1, izdaja 1999)

Digital cellular telecommunications system (Phase 2 and Phase 2+) (GSM); Base Station System (BSS) equipment specification; Radio aspects (GSM 11.21 version 8.1.1 Release 1999)

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Special Mobile Group (SMG).

The present document specifies the Radio Frequency (RF) test methods and conformance requirements for GSM 400, GSM 900 and DCS 1800, PCS 1900, MXM 850 and MXM 1900 Base Station Systems (BSS)s within the Digital cellular telecommunications system (Phase 2+).

The contents of the present document may be subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document it will then be re-submitted for formal approval procedures by ETSI with an identifying change of release date and an increase in version number as follows:

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Version 8.x.y

where:

8 GSM Phase 2+ Release 1999.

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x the second digit is incremented for changes of substance, i.e. technical enhancements, corrections, updates, etc.;

y the third digit is incremented when editorial only changes have been incorporated in the specification.

NOTE: The present document contains both essential conformance requirements and complete conformance requirements. Essential conformance requirements are those requirements which may be deemed sufficient for radio type approval purposes, complete conformance requirements cover all conformance aspects.

National transposition dates	
Date of adoption of this EN:	21 July 2000
Date of latest announcement of this EN (doa):	31 October 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 April 2001
Date of withdrawal of any conflicting National Standard (dow):	30 April 2001

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1 Scope

The present document specifies the Radio Frequency (RF) test methods and conformance requirements for GSM 400, GSM 900 and DCS 1800, PCS 1900, 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.

For each test, two conformance requirements are specified:

- essential conformance requirements;
- complete conformance requirements.

Essential conformance requirements are those which are required:

a) to ensure compatibility between the radio channels in the same cell;

b) to ensure compatibility between cells, both co-ordinated and unco-ordinated;

c) to ensure compatibility with existing systems in the same or adjacent frequency bands;

d) to verify the important aspects of the transmission quality of the system.

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Essential conformance requirements are sufficient to verify the performance of the equipment for radio type approval purposes, in countries where this is applicable. For MXM 850, PCS 1900 and MXM 1900 only the complete conformance requirements are applicable.

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Complete conformance requirements may be tested to verify all aspects of the performance of a BSS. These 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 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.

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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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1999 document, references to GSM documents are for Release 1999 versions (version 8.x.y).

[1] GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] GSM 04.22 (ETS 300 946): "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] GSM 08.20: "Digital cellular telecommunications system (Phase 2); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[11] ETS 300 019-1: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment Part 1-0: Classification of environmental conditions Introduction".

[12] IEC 68-2: "Basic environmental testing procedures; Part 2: Tests".

[13] IEC 721: "Classification of environmental conditions".

[14] ETR 027: "Radio and Equipment Systems; methods of measurement for mobile radio equipment".

[15] ETR 028: "Radio and Equipment Systems; Uncertainties in the measurement of mobile radio equipment characteristics".

[16] ETS 300 113: "Radio Equipment and Systems; Land mobile service; Technical characteristics and test conditions for radio equipment intended for transmission of data (and speech) and having an antenna connector".

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[17] GSM 04.22 (ETS 300 563): "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".

[18] GSM 05.01: "Digital cellular telecommunications system (Phase 2+); Physical layer on the radio path; General description".

[19] GSM 05.02 (EN 300 908): "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[20] GSM 05.03 (EN 300 909): "Digital cellular telecommunications system (Phase 2+); Channel coding".

[21] GSM 05.04 (EN 300 959): "Digital cellular telecommunications system (Phase 2+); Modulation".

[22] GSM 05.05 (EN 300 910): "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[23] GSM 05.08 (ETS 300 911): "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[24] GSM 05.10 (ETS 300 912): "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".

3 Definitions, abbreviations, frequency bands and channels

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3.1 Definitions

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

8-PSK: modulation type as defined by GSM 05.04 (ETS 300 959) [21] clause 3.

Carrier Frequency: centre of the ARFCN under test.

GMSK: modulation type as defined by GSM 05.04 (ETS 300 959) [21] clause 2.

GSM: unless otherwise specified, references to GSM include GSM 400, GSM 900, DCS1800, PCS 1900, MXM 850 and MXM 1900.

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 GSM 05.05 (EN 300 910 [22]). In the present document, this also includes a BSS which incorporates a pico-BTS.

micro-BTS: as defined in GSM 05.05 (ETS 300 577 [7] and EN300 910 [22]). In the present document, this also includes a BSS which incorporates a micro-BTS.

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 GSM 05.05 (EN 300 910) [22] which is not a micro-BTS or Pico-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.

P-GSM: primary GSM 900 band.

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E-GSM: extended GSM 900 band (includes P-GSM band).

R-GSM: Railways GSM 900 band (includes P-GSM band and E-GSM band).

GSM 400: unless otherwise specified, references to GSM 400 include GSM 450 and GSM 480 band.

Relevant TX band (or relevant transmit band): transmit band defined in subclause 3.3.1 for the frequency band of BTS declared by the manufacturer.

Relevant RX band (or relevant receive band): receive band defined in subclause 3.3.1 for the frequency band of BTS declared by the manufacturer.

Operating band: transmit and receive operating bands together comprise the frequency band supported by the BSS; (see subclause 4.2).

Circuit switched logical channels: all the standard GSM logical channels, including traffic channels (TCH), common control channels (RACH) and dedicated control channels (SDCCH, SACCH).

Packet switched logical channels: all the General Packet Radio Services (GPRS) packet data logical channels, including packet traffic channels (PDTCH and PACCH) and packet common control channels (PRACH).

3.2 Abbreviations

Unless otherwise stated, abbreviations used in the present document shall have the meaning given in GSM 01.04 (ETR 350) [1].

B "Bottom"; the lowest frequency on which a test is performed.

M "Middle"; a frequency in the middle portion of the operating band of the BSS on which a test is performed.

T "Top"; the highest frequency on which a test is performed.

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3.3 Frequency bands and channels

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3.3.1 Frequency bands

The frequency bands for the Base Station System are given in table 1.

Table 1: Frequency bands for GSM Base Station Systems

	TX:	RX:
P-GSM900	935-960 MHz	890-915 MHz
DCS1800	1 805-1 880 MHz	1 710-1 785 MHz
E-GSM900	925-960 MHz	880-915 MHz
R-GSM900	921-960 MHz	876-915 MHz
GSM 450	460,4-467,6 MHz	450,4-457,6 MHz
GSM 480	488,8-496 MHz	478.8-486 MHz
MXM 850	869-894 MHz	824-849 MHz
GSM 1900 and MXM 1900	1 930-1 990 MHz	1 850-1 910 MHz

NOTE: It is up to the operator to choose any subset of these bands (or the complete band) on a location basis within a frequency band assigned to the operator by the authority responsible for frequency management issues.

3.3.2 Channels and channel numbering

The channel numbers (ARFCN) for the carrier frequencies (RF channels) within the frequency bands defined above (as defined in GSM 05.05 (EN 300 910) [22]), are given in table 2. Fl(n) is the frequency of the centre of the RF channel n in the lower band (=RX) and Fu(n) the corresponding frequency in the upper band (=TX).

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Table 2: Channel Numbering: Frequencies are in MHz

P-GSM900	Fl(n)=890+0,2*n	1<=n<=124	Fu(n)=Fl(n)+45
E-GSM900	Fl(n)=890+0,2*n Fl(n)=890+0,2*(n-1 024)	0 <=n<=124 975<=n<=1023	Fu(n)=Fl(n)+45
R-GSM900	Fl(n)=890+0,2*n Fl(n)=890+0,2*(n-1 024)	0 <=n<=124 955<=n<=1023	Fu(n)=Fl(n)+45
DCS1800	Fl(n)=1 710,2+0,2*(n-512)	512<=n<=885	Fu(n)=Fl(n)+95
PCS 1900 and MXM 1900	Fl(n) = 1 850,2 + 0,2*(n-512)	512 ≤ n ≤ 810	Fu(n) = Fl(n) + 80
GSM 450	Fl(n) = 450,6 + 0,2*(n-259)	259 ≤ n ≤ 293	Fu(n) = Fl(n) + 10
GSM 480	Fl(n) = 479 + 0,2*(n-306)	306 ≤ n ≤ 340	Fu(n) = Fl(n) + 10
MXM 850	Fl(n) = 824,2 + 0,2*(n-128)	128 ≤ n ≤ 251	Fu(n) = Fl(n) + 45

4 General test conditions and declarations

The requirements of this clause apply to all tests in the present document, when applicable.

The general conditions during the tests should be according to the relevant parts of ETR 027 [14] (methods of measurement for mobile radio equipment) with the exceptions and additions defined in the individual tests.

Many of the tests in the present document measure a parameter relative to a value which is not fully specified in the GSM specifications. For these tests, the conformance requirement is determined relative to a nominal value specified by the manufacturer.

Certain functions of a BTS are optional in the GSM specifications.

When specified in a test, the manufacturer shall declare the nominal value of a parameter, or whether an option is supported.

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4.1 Output power and determination of power class

The manufacturer shall declare the rated maximum power per TRX at GMSK modulation. For a micro or pico-BTS, this shall be specified at the antenna connector. For a normal BTS, it shall be stated whether this is specified at the input to the combiner or at the antenna connector of the BSS.

For a micro-BTS, the class of the micro-BTS shall be determined from the declared maximum power, according to table 3. Where applicable, the manufacturer shall declare whether the BTS meets the requirements of a micro or pico-BTS.

For a BTS supporting 8-PSK, the manufacturer shall declare the output power capability at 8-PSK modulation. The class of a micro-BTS or a pico-BTS is defined by the highest output power capability for either modulation.

Table 3: Micro and pico-BTS Power Classes

TRX power class	GSM 900 and MXM 850 micro and pico-BTS Maximum output power	DCS1800, PCS 1900 and MXM 1900 micro and pico-BTS Maximum output power
M1	(>19)-24 dBm	(>27)-32 dBm
M2	(>14)-19 dBm	(>22)-27 dBm
M3	(>9)-14 dBm	(>17)-22 dBm
P1	(>13)-20 dBm	(>16)-23 dBm

NOTE: For a normal BTS, the TRX power class can be determined from the manufacturers declared output power per TRX measured at the input to the combiner, according to the tables of TRX power classes in EN 300 910 [22]. The test requirements for a normal BTS do not vary in this [EN] with TRX power classes. The definition of TRX power class only relates to the declared power per TRX and does not impose any requirement on the measured output power of the BTS.