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Global System for Mobile communications (GSM); Harmonized EN for Base Station Equipment covering the essential requirements of article 3.2 of the R&TTE Directive

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REN/MSG-0017

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Foreword

This Harmonized European Standard (EN) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

The update to version 12.1.1 of the present document includes the following major changes:

- Inclusion of BTS equipment supporting operation in the ER-GSM 900 band.

The present document has been produced by ETSI in response to mandate M/284 issued from the European Commission under Directive 98/34/EC [i.1] as amended by Directive 98/48/EC [i.5].

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.2].

The requirements relevant to Directive 1999/5/EC [i.2] are summarized in annex A.

National transposition dates	
Date of adoption of this EN:	24 February 2015
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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).

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Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.2]. The modular structure is shown in EG 201 399 [i.3].

1 Scope

The present document applies to the following radio equipment type:

1) GSM base stations.

Table 1-1: GSM Base Station System frequency bands

GSM band	Direction of transmission	GSM Base Station System relevant frequency bands
P-GSM 900	Transmit	935 MHz to 960 MHz
	Receive	890 MHz to 915 MHz
E-GSM 900	Transmit	925 MHz to 960 MHz
	Receive	880 MHz to 915 MHz
R-GSM 900	Transmit	921 MHz to 960 MHz
	Receive	876 MHz to 915 MHz
ER-GSM 900	Transmit	918 MHz to 960 MHz
	Receive	873 MHz to 915 MHz
DCS 1 800	Transmit	1 805 MHz to 1 880 MHz
	Receive	1 710 MHz to 1 785 MHz
GSM 450	Transmit	460,4 MHz to 467,6 MHz
	Receive	450,4 MHz to 457,6 MHz
GSM 480	Transmit	488,8 MHz to 496 MHz
	Receive	478,8 MHz to 486 MHz

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (R&TTE Directive), Article 3.2, which states that "….. radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In regards to interference to systems operating in adjacent bands guidance for single carrier BTS and multicarrier BTS is provided in ECC Report 146 [i.4].

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [i.2] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site http://www.newapproach.org.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TR 121 905 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905 version 12.0.0 Release 12)".

[2] ETSI TS 151 021 (V12.2.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Radio aspects (3GPP TS 51.021 version 12.2.0 Release 12)".

[3] ETSI TS 145 002 (V12.2.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path (3GPP TS 45.002 version 12.2.0 Release 12)".

[4] ETSI TS 145 004 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Modulation (3GPP TS 45.004 version 12.0.0 Release 12)".

[5] ETSI TS 145 005 (V12.3.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Radio Transmission and reception (3GPP TS 45.005 version 12.3.0 Release 12)".

[6] Void.

[7] ETSI TS 145 010 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization (3GPP TS 45.010 version 12.0.0 Release 12)".

[8] Void.

[9] Void.

[10] ETSI EN 300 019-1-0 (V2.1.2) (09-2003): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-0: Classification of environmental conditions; Introduction".

[11] ETSI EN 300 019-1-3 (V2.4.1) (04-2014): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weatherprotected locations".

[12] ETSI EN 300 019-1-4 (V2.2.1) (04-2014): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weatherprotected locations".

[13] Void.

[14] Void.

[15] ETSI TS 124 022 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Radio Link Protocol (RLP) for circuit switched bearer and teleservices (3GPP TS 24.022 version 12.0.0 Release 12)".

[16] ETSI TS 148 020 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface (3GPP TS 48.020 version 12.0.0 Release 12)".

[17] Recommendation ITU-T O.153 (10-1992): "Basic Parameters for the measurement of error performance at bit rates below the primary rate".

[18] Recommendation ITU-R SM.329-12 (09-2012): "Unwanted emissions in the spurious domain".

[19] Void.

[20] Void.

[21] Void.

[22] ETSI EN 300 019-2-3 (V2.3.1) (04-2013): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-3: Specification of environmental tests; Stationary use at weatherprotected locations".

[23] ETSI EN 300 019-2-4 (V2.3.1) (08-2013): "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 2-4: Specification of environmental tests; Stationary use at non-weatherprotected locations".

[24] IEC EN 60721-1 (ed.2.2, 10-2002): "Classification of environmental conditions: Part 1: Environmental parameters and their severities".

[25] IEC EN 60721-2-1 (ed.2.0, 06-2013): "Classification of environmental conditions - Part 2-1: Environmental conditions appearing in nature - Temperature and humidity".

[26] IEC EN 60721-2-4 (ed.1.1, 10-2002): "Classification of environmental conditions - Part 2-4: Environmental conditions appearing in nature - Solar radiation and temperature".

[27] IEC EN 60721-3-0 (ed.1.1, 10-2002): "Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Introduction".

[28] ETSI EN 301 908-1 (V6.2.1) (04-2013): "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 1: Introduction and common requirements".

[29] ETSI EN 301 908-18 (V7.1.2) (07-2014): "IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 18: E-UTRA, UTRA and GSM/EDGE Multi-Standard Radio (MSR) Base Station (BS)".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

[i.2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".

[i.4] ECC Report 146: "Compatibility between GSM MCBTS and other services (TRR, RSBN/PRMG, HC-SDMA, GSM-R, DME, MIDS, DECT) operating in the 900 and 1800 MHz frequency bands", 6th July 2010.

[i.5] Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations.

[i.6] ETSI TS 144 060 (V12.2.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol (3GPP TS 44.060 version 12.2.0 Release 12)".

[i.7] CEPT/ERC/Recommendation 74-01E (01-2011): "Unwanted emissions in the spurious domain".

[i.8] ETSI TR 100 028 (all parts) (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[i.9] ETSI TS 145 001 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Physical layer on the radio path; General description (3GPP TS 45.001 version 12.0.0 Release 12)".

[i.10] ETSI TR 145 050 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Background for Radio Frequency (RF) requirements (3GPP TR 45.050 version 12.0.0 Release 12)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 121 905 [1] and the following apply:

8-PSK: Modulation type as defined in TS 145 004 [4], clause 3.

16-QAM: Modulation type as defined in TS 145 004 [4], clause 4 for EGPRS2-A and clause 5 for EGRPS2-B.

32-QAM: Modulation type as defined in TS 145 004 [4], clause 4 for EGPRS2-A and clause 5 for EGRPS2-B.

ancillary RF amplifier: piece of equipment, which when connected by RF coaxial cables to the BTS, has the primary function to provide amplification between the transmit and/or receive antenna connector of a BTS and an antenna without requiring any control signal to fulfil its amplifying function

AQPSK: Modulation type as defined in TS 145 004 [4], clause 6.

base station RF bandwidth: instantaneous bandwidth in which a BTS belonging to a multicarrier BTS class transmits or transmits and receives multiple carriers simultaneously

Base Station System Test Equipment (BSSTE): See annex B in TS 151 021 [2].

BSS: BTS or integrated BSS

NOTE: 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.

carrier frequency: centre of the ARFCN under test

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

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

ECSD: any subset of the E-TCH traffic channels and related control channels

EGPRS: any subset of the packet traffic channels PDTCH/MCS-1 to MCS-9 and related control channels

EGPRS2: any of EGPRS2-A and EGPRS2-B

EGPRS2-A: packet traffic channels utilizing any subset of the packet traffic channels MCS-1 to 6 and PDTCH/UAS-7 to UAS-11 in uplink, together with MCS-1 to 4 and PDTCH/DAS-5 to DAS-12 in downlink, and related control channels

NOTE: In addition, MCS-7 and MCS-8 may be used in downlink when either the USF or the PAN or both are addressed to one or more EGPRS mobile stations.

EGPRS2-B: packet traffic channels utilizing any subset of the packet traffic channels MCS-1 to 4 and PDTCH/UBS-5 to UBS-12 in uplink, together with MCS-1 to 4 and PDTCH/DBS-5 to DBS-12 in downlink, and related control channels

NOTE: In addition, MCS-6 to MCS-9, DAS-5, DAS-6, DAS-8, DAS-9, DAS-10 pad, DAS-11, and DAS-12pad may be used in downlink under the conditions specified in TS 144 060 [i.6].

enclosure port: physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

ER-GSM 900: extended Railway GSM 900 band (includes R-GSM band)

GMSK: Modulation type as defined by TS 145 004 [4], clause 2.

GPRS: any subset of the packet traffic channels PDTCH/CS-1 to CS-4 and related control channels

GSM: unless otherwise specified, references to GSM include GSM 400, GSM 900, ER-GSM 900 and DCS 1 800

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

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

GSM-R: GSM Railway communication, operated in the R-GSM or ER-GSM band, respectively

Local Area (LA) multicarrier BTS: class of multicarrier BTS with both multicarrier transmitter and multicarrier receiver, characterized by requirements derived from pico cell scenarios

manufacturer: in the present document, a reference to a manufacturer also applies to an agent of the manufacturer

maximum base station RF bandwidth: maximum bandwidth in which a BTS belonging to a multicarrier BTS class transmits or transmits and receives multiple carriers simultaneously

maximum transmit filter bandwidth: maximum bandwidth of the duplexer or the transmit filter used in a BTS belonging to a multicarrier BTS class transmitting carriers simultaneously

Medium Range (MR) multicarrier BTS: class of multicarrier BTS with both multicarrier transmitter and multicarrier receiver, characterized by requirements derived from micro cell scenarios

micro-BTS: low-power BTS with performance requirements defined in TS 145 005 [5]

NOTE: In the present document, this also includes a BSS which incorporates a micro-BTS.

minimum carrier frequency spacing: minimum spacing between the centre frequencies of simultaneously transmitted or received GSM carriers of a BTS belonging to a multicarrier BTS class

NOTE: The minimum carrier frequency spacing is 600 kHz.

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

multicarrier BTS equipped with multicarrier receiver: subgroup of multicarrier BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active components simultaneously, in both multicarrier transmitter and multicarrier receiver

normal BTS: any BTS or BSS as defined by TS 145 005 [5] which is not a micro-BTS, pico-BTS or multicarrier BTS

operating band: transmit and receive operating bands together comprise the frequency band supported by the BSS

NOTE: As defined in clause B.1.2.

P-GSM: primary GSM 900 band

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)

pico-BTS: low-power BTs with performance requirements defined in TS 145 005 [5]

NOTE: In the present document, this also includes a BSS which incorporates a pico-BTS.

port: particular interface, of the specified equipment (apparatus), with the electromagnetic environment

QPSK: modulation type as defined TS 145 004 clause 5 [4], used in EGPRS2-B

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

radio digital unit: equipment which contains base band and functionality for controlling radio unit

radio equipment: equipment which contains radio digital unit and radio unit

radio unit: equipment which contains transmitter and receiver

relevant RX band (or relevant receive band): receive band for the frequency band of BTS declared by the manufacturer

NOTE: As defined in clause 1.

relevant TX band (or relevant transmit band): transmit band for the frequency band of BTS declared by the manufacturer

NOTE: As defined in clause 1.

SCPIR_UL: As defined in TS 145 005 [5], clause 1.3.

sub-block: contiguous allocated block of spectrum for use by the same Base Station

NOTE: There may be multiple instances of sub-blocks within an RF bandwidth.

sub-block bandwidth: bandwidth of one sub-block

sub-block gap: frequency gap between two consecutive sub-blocks within an RF bandwidth, where the RF requirements in the gap are based on co-existence for un-coordinated operation

VAMOS mode: As defined in TS 145 001 [i.9], clause 13.1.

VAMOS sub-channel: As defined in TS 145 001 [i.9], clause 13.1.

Wide Area (WA) multicarrier BTS: class of multicarrier BTS with either multicarrier transmitter only, or both multicarrier transmitter and receiver, characterized by requirements derived from macro cell scenarios

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 121 905 [1] and the following apply:

AM	Amplitude Modulation
AMR	Adaptive Multi-Rate
AQPSK	Adaptive Quadrature Phase Shift Keying
ARFCN	Absolute Radio Frequency Channel Number
B	Bottom
BCCH	Broadcast Control Channel
BER	Bit Error Ratio
BLER	BLock Error Ratio
BS	Base Station
BSC	Base Station Controller
BSS	Base Station System
BSSTE	Base Station System Test Equipment
BTS	Base Transceiver Station
BTTI	Basic Transmission Time Interval
BW	Bandwidth
DAS	EGPRS2 Downlink Level A modulation and coding Scheme
DBS	EGPRS2 Downlink Level B modulation and coding Scheme
DC	Direct Current
DCS	Digital Cellular System
DTX	Discontinuous Transmission
ECSD	Enhanced Circuit Switched Data
EGPRS	Enhanced GPRS
EGPRS2	Enhanced GPRS phase 2
E-TCH	Enhanced Traffic CHannel
FACCH	Fast Associated Control CHannel
FANR	Fast Ack/Nack Reporting
FER	Frame Erasure Ratio
FS	Full rate Speech
GMSK	Gaussian Minimum Shift Keying
GPRS	General Packet Radio Service
GSM-R	GSM Railway
IM	InterModulation