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Globalni sistem mobilnih komunikacij (GSM) - Ponavljalniki GSM - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive 2014/53/EU

Global System for Mobile communications (GSM) - GSM Repeaters - Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

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Contents

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Foreword

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

For non EU countries the present document may be used for regulatory (Type Approval) purposes.

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.5] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

National transposition dates	
Date of adoption of this EN:	6 April 2016
Date of latest announcement of this EN (doa):	31 July 2016
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2017
Date of withdrawal of any conflicting National Standard (dow):	31 January 2018

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 a revision of ETSI EN 300 609-4. The present document is part of a set of standards developed by ETSI that are designed to fit in a modular structure to cover radio equipment within the scope of the Directive 2014/53/EU [i.1]. The present document is produced following the guidance in ETSI EG 203 336 [i.2] as applicable.

1 Scope

The present document applies to the following radio equipment types:

1) Repeaters for GSM.

This radio equipment type is capable of operating in all or any part of the frequency bands given in table 1-1.

Table 1-1: GSM Repeater frequency bands

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

NOTE 1: In some circumstances, for instance when an operator (or more than one operator who co-ordinate the use of repeaters), is not allocated a complete band as defined in table 1-1, it may be necessary to restrict the frequency range of operations of repeaters. In these circumstances, the test of "Gain outside pass band" in annex C may be used to verify the performance of the repeater.

NOTE 2: A repeater is designed to operate in one or several pass bands within the MS and BTS relevant transmit bands.

The present document covers requirements for GSM Repeaters for 3GPP Release 8, 9, 10, 11 and 12.

The present document contains requirements to demonstrate that radio equipment both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.

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 TS 151 026 (V12.0.0) (10-2014): "Digital cellular telecommunications system (Phase 2+); Base Station System (BSS) equipment specification; Part 4: Repeaters (3GPP TS 51.026 version 12.0.0 Release 12)".

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

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 2014/53/EU of the European parliament and of the council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

[i.2] ETSI EG 203 336 (V1.1.1) (08-2015): " Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

[i.3] 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.4] ETSI TS 145 005 (V12.5.0) (04-2015): "Digital cellular telecommunications system (Phase 2+); Radio Transmission and reception (3GPP TS 45.005 version 12.5.0 Release 12)".

[i.5] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

3 Definitions and abbreviations

3.1 Definitions

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

broadband repeater: repeater which is designed for operation on any combination of ARFCNs (up to a specified maximum number) within the relevant band of the repeater

channelized repeater: repeater which is designed for operation on a specified subset of ARFCNs within the operating band of the repeater

NOTE: The subset of ARFCNs may be determined during the manufacture of the repeater, or may be programmable.

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

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

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

P-GSM: primary GSM 900 band

pass band: frequency range that the Repeater operates in with operational configuration

NOTE: This frequency range can correspond to one or several consecutive nominal channels. If they are not consecutive each subset of channels have to be considered as an individual pass band. The Repeater can have one or several pass bands.

relevant band: frequency band of GSM Repeater declared by the manufacturer according to the designations in table 1-1

repeater: bi-directional Radio Frequency (RF) amplifier which can amplify and transmit a received Mobile Station (MS) signal in the GSM MS transmit band, simultaneously it can amplify and transmit a radiated or conducted received Base Transceiver Station (BTS) RF signal in the GSM BTS transmit band

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

repeater system using frequency shift: repeater system consisting of two different elements, a master unit close to the BTS and at least one remote unit close to the area to be covered

NOTE: The master unit amplifies the channels from the BTS and shifts them to different GSM channels. In the remote unit the shifted channels from the master unit will be transferred back to the original channels and amplified. This is valid for the downlink signals as well as for the uplink signals.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ARFCN	Absolute Radio Frequency Channel Number
BSS	Base Station System
BTS	Base Transceiver Station
CW	Continuous Wave
DCS	Digital Cellular System
DUT	Device Under Test
EFTA	European Free Trade Association
ER-GSM	Extended Railways GSM
GSM	General System for Mobile communications
GSM-R	GSM Railway
MS	Mobile Station
RF	Radio Frequency
RMS	Root Mean Square
RSS	Root Sum of the Squares

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

For guidance on how a supplier can declare the environmental profile see annex B.

4.2 Conformance requirements

4.2.0 Introduction

To meet the essential requirement under article 3.2 of Directive 2014/53/EU [i.1] for Repeater four essential parameters have been identified. Table 4.2.0-1 provides a cross reference between these four essential parameters and the corresponding seven technical requirements for equipment within the scope of the present document.

Table 4.2.0-1: Essential parameters, corresponding technical requirements and test suites

Essential parameters	Corresponding technical requirements	Corresponding test suites
Transmitter and receiver unwanted emissions in the spurious domain	4.2.1 Conducted spurious emissions	5.3.1
Radiated emissions	4.2.2 Radiated spurious emissions	5.3.2
Transmitter spectrum mask	4.2.3 Intermodulation attenuation	5.3.3
Transmitter unwanted emissions in the out of band domain		
Receiver radio-frequency intermodulation		
Receiver adjacent signal selectivity	4.2.4 Out of band gain	5.3.4
Transmitter frequency stability	4.2.5 Frequency error	5.3.5

NOTE: Some of the essential parameters of the ETSI EG 203 336 [i.2] are not included into the present document since those requirements are not applicable for repeater equipment.

4.2.1 Conducted spurious emissions

4.2.1.1 Definition

This test measures the conducted spurious emissions at the antenna ports.

4.2.1.2 Limit

This requirement applies to all antenna ports of the repeater, at maximum gain, and with the following input signals:

- without any RF input signal;
- with a continuous sinusoidal RF signal at a level which will result, when measured, in the maximum rated RF output power per channel, as declared by the manufacturer RF input signal.

The measured power shall not exceed:

- -36 dBm (250 nW) in the frequency band 9 kHz to 1 GHz;
- -30 dBm (1 µW) in the frequency band 1 GHz to 12,75 GHz.

Table 4.2.1.2-1: Measurement bandwidth for spurious emissions

Band	Frequency offset	Measurement bandwidth
	(offset from carrier)	
In the relevant BTS transmit Band or MS transmit band	≥ 100 kHz	3 kHz
100 kHz to 50 MHz	-	10 kHz
50 MHz to 500 MHz outside the relevant transmit band	(offset from edge of the relevant transmit band)	
	> 0 MHz	10 kHz
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
Above 500 MHz outside the relevant transmit band	(offset from edge of the relevant transmit band)	
	> 0 MHz	10 kHz
	≥ 2 MHz	30 kHz
	≥ 5 MHz	100 kHz
	≥ 10 MHz	300 kHz
	≥ 20 MHz	1 MHz
	≥ 30 MHz	3 MHz