SLOVENSKI STANDARD
SIST EN 300 390 V2.1.1:2016

01-junij-2016

Storitev kopenskih mobilnih komunikacij - Radijska oprema, namenjena predvsem za prenos podatkov (in govora), ki uporablja vgrajeno anteno - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive 2014/53/EU

Land Mobile Service - Radio equipment intended for the transmission of data (and speech) and using an integral antenna - Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

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Land Mobile Service;
Radio equipment intended for the transmission of data (and speech) and using an integral antenna;
Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.3] 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.2].

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:	21 March 2016
Date of latest announcement of this EN (doa):	30 June 2016
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2016
Date of withdrawal of any conflicting National Standard (dow):	31 December 2017

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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1 Scope

The present document covers the technical requirements for radio transmitters and receivers used in stations in the Private Mobile Radio (PMR) service.

It applies to use in the land mobile service, operating on radio frequencies between 30 MHz and 1 GHz, with channel separations of 12,5 kHz, 20 kHz and 25 kHz, intended for data or speech and data.

Table 1: Radiocommunications service frequency bands

	Radiocommunications service frequency bands
Transmit	30 MHz to 1 000 MHz
Receive	30 MHz to 1 000 MHz

It applies to equipment for continuous and/or discontinuous transmission.

The equipment comprises a transmitter and associated encoder and modulator and/or a receiver and associated demodulator and decoder.

The present document also applies to combined analogue and digital radio equipment using an integral antenna and intended for the transmission of data and/or speech.

The present document is complementary to ETSI EN 300 113 [i.5], which covers radio equipment with an internal or external RF connector.

In the cases of:

- combined full bandwidth analogue/full bandwidth digital equipment, if the analogue part of the equipment has already been measured according to ETSI EN 300 296 [6];
- equipment which has already been measured according to the present document, and is remeasured with an add-on device, using another type of modulation without affecting any other characteristics of the equipment;

only some of the requirements of the present document apply. These requirements are given in clause 4.8.

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] Void.

[2] Void.

[3] ANSI C63.5 (2006): "American National Standard for Calibration of Antennas Used for Radiated Emission Measurements in Electro Magnetic Interference".

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

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

[6] ETSI EN 300 296 (V2.1.1) (03-2016): "Land Mobile Service; Radio equipment using integral antennas intended primarily for analogue speech; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

[7] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".

2.2 Informative references

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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] ETSI TR 102 273 (V1.2.1) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties".

[i.2] 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.

NOTE: Article 3.2 and article 10.8.

[i.3] 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.

[i.4] ETSI EN 300 793 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Presentation of equipment for type testing".

[i.5] ETSI EN 300 113 (V2.1.0): "Land Mobile Service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

adjacent channels: channel offset from the wanted channel by the channel spacing (see figure 1)

alternate channels: two channels offset from the wanted channel by double the channel spacing (see figure 1)

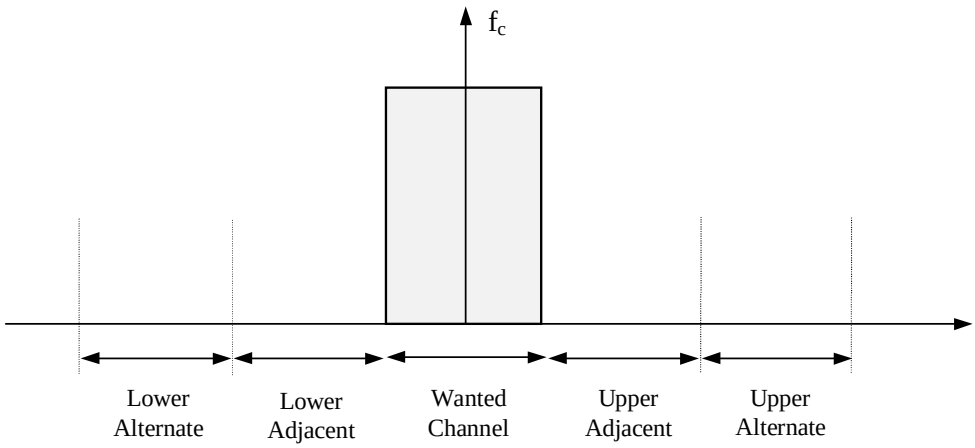

Figure 1: Adjacent and alternate channel definitions

bit: binary digit

block: smallest quantity of information sent over the radio channel. A constant number of useful bits are always sent together with the corresponding redundancy bits

constant envelope angle modulation: either phase modulation (G3) or frequency modulation (F3)

integral antenna: antenna designed to be connected to the equipment without the use of a 50 Ω external connector and considered to be part of the equipment

NOTE: An integral antenna may be fitted internally or externally to the equipment.

message: user data to be transferred in one or more packets in a session

packet: one block or a contiguous stream of blocks sent by one (logical) transmitter to one particular receiver or one particular group of receivers

session: set of inter-related exchanges of packets occupying one or several windows or parts thereof (if applicable)

NOTE: It corresponds to a complete interactive procedure for interchanging data between users, comprising initiation, data transmission and termination procedures. The session can be short (e.g. two packets) or long (e.g. one full page of text).

switching range (sr): maximum frequency range, as specified by the supplier, over which the receiver or the transmitter can be operated within the alignment range without reprogramming or realignment

transmission (physical): one or several packets transmitted between power on and power off of a particular transmitter

window: set of inter-related transmissions resulting from the action of the "initiating transmitter", and limited in time by an appropriate access protocol and corresponding occupation rules

Types of measurements:

conducted measurements: measurements which are made using a direct RF connection to the equipment under test

radiated measurements: measurements which involve the absolute measurement of a radiated field

Types of station:

base station: equipment fitted with an antenna connector, for use with an external antenna and intended for use in a fixed location

mobile station: mobile equipment fitted with an antenna connector, for use with an external antenna, normally used in a vehicle or as a transportable station

handportable station: equipment either fitted with an antenna connector or an integral antenna, or both, normally used on a stand-alone basis, to be carried on a person or held in the hand

3.2 Symbols

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

Ω	ohm
dB	decibel
dBm	dB relative to 1 mW
D-M0, D-M1	signals defined in clause 6.1.1

NOTE: The symbols relating to transients and timings are defined in clause 7.7.1.

3.3 Abbreviations

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

CSP	Channel Separation
CW	Continues Wave
dBc	dB relative to the carrier power
DC	Direct Current
EC	European Commission
emf	electro-motive force
EUT	Equipment Under Test
FSK	Frequency Shift Keying
IF	Intermediate Frequency
OATS	Open Area Test Site
PLL	Phase Locked Loop
PMR	Private Mobile Radio
RBW	Resolution Bandwidth
RF	Radio Frequency
Rx	Receiver
sr	switching range
Tx	Transmitter
VSWR	Voltage Standing Wave Ratio

4 General and operational requirements

4.1 General

4.1.1 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, but as a minimum, shall be that specified in the test conditions contained in the present document.

4.1.2 Choice of model for testing

4.1.2.0 General

Stand-alone equipment shall be complete with any ancillary equipment needed for testing.

If an equipment has several optional features, considered not to affect the RF parameters, then the tests need only be performed on the equipment configured with the combination of features considered to be the most complex.

The performance of the equipment to be tested shall be representative of the performance of the corresponding production model.

Guidance on the presentation of equipment is also given in ETSI EN 300 793 [i.4].

4.1.2.1 Auxiliary test equipment

All necessary test signal sources, setting up instructions and other product information shall be made available with the equipment to be tested.

4.1.2.2 Declarations by the supplier

All necessary setting up instructions and other product information shall be made available with the equipment to be tested, in accordance with article 10.8 of Directive 2014/53/EU [i.2].

Equipment may be designed to fulfil the requirements of one or more ENs.

4.2 Mechanical and electrical design

4.2.1 General

The equipment should be designed, constructed and manufactured in accordance with good engineering practice, and with the aim of minimizing harmful interference to other equipment and services.

4.2.2 Controls

Those controls, which if maladjusted, might increase the interfering potentialities of the equipment shall not be accessible for adjustment by the user.

4.2.3 Transmitter shut-off facility

When a timer for an automatic shut-off facility is operative, at the moment of the time-out the transmitter shall automatically be switched off (the re-activation of the transmitter shall reset the timer).

A shut-off facility shall be inoperative for the duration of the measurements unless it has to remain operative to protect the equipment. If the shut-off facility is left operative the status of the equipment shall be indicated.

4.3 Marking

The equipment shall be marked in a visible place. This marking should be legible, tamperproof and durable.

The marking shall be in accordance with EC Directives and/or CEPT decisions or recommendations as appropriate.

4.4 Testing using bit streams or messages

The supplier may elect to have the equipment tested using bit streams or messages. It should be noted that the methods of measurement using messages are usually more time consuming.

4.5 Measuring continuous mode equipment

In the case of measurements performed on equipment designed to operate only in continuous mode, requirements such as "equipment shall be set in continuous mode" shall be interpreted as "equipment shall be used in its normal transmission mode (in this case, the continuous mode)".

4.6 Measuring discontinuous mode equipment

When it is specified that the transmission shall be continuous for the duration of the measurement(s), the transmitter under test shall be set to operate in continuous mode. If this is not possible, the measurements shall be carried out in a period shorter than the duration of the transmitted burst. It may be necessary to extend the duration of the burst.

When measurements are made in discontinuous mode, the reported values can be average values. This averaging shall be made using a set of measurements, each of these measurements being made during a burst or a part of it.

4.7 Constant and non-constant envelope modulation

Constant envelope angle modulation systems can be measured following the measurement procedure either for constant envelope angle modulation equipment or for non-constant envelope modulation equipment.

Non-constant envelope modulation systems shall always be measured following the measurement procedure for non-constant envelope modulation equipment.

NOTE: Both modulation types may be continuous or non-continuous.

In both cases, the type of measurement procedure used shall be reported in the test report.

4.8 Combined full bandwidth analogue speech/full bandwidth digital equipment

Equipment may be designed to fulfil the requirements of one or more standards.

In the case of combined full bandwidth analogue speech/full bandwidth digital equipment, if the analogue part of the equipment has already been measured according to ETSI EN 300 296 [6], only the following additional tests shall be performed:

- 7.3 Adjacent channel power.
- 7.4 Unwanted emissions in the spurious domain.
- 7.5 Transmitter attack time (if applicable).
- 7.6 Transmitter release time (if applicable).
- 7.7 Transient behaviour of the transmitter.
- 8.1 Average usable sensitivity (field strength, data or messages).
- 8.2 Error behaviour at high input levels.
- 8.3 Co-channel rejection.
- 8.4 Adjacent channel selectivity.
- 8.8 Spurious radiations.

More precisely, the measurement of the spurious emissions should be performed when equipment, previously measured to ETSI EN 300 296 [6], is being measured to the present document with an add-on data unit. If the equipment has been originally combined for analogue and digital operation, the measurement of the spurious emissions need not to be performed again if the data port(s) (and the data circuits/modules) were active while making this measurement for the test ETSI EN 300 296 [6].

In the case where equipment has already been measured according to the present document and is to be measured again with an add-on data unit using another type of modulation without affecting any other characteristic of the equipment, only the following additional tests shall be performed:

- 7.3 Adjacent channel power.
- 7.4 Unwanted emissions in the spurious domain.
- 8.1 Maximum usable sensitivity (data or messages, conducted).
- 8.1 Average usable sensitivity(field strength, data or messages).
- 8.2 Error behaviour at high input levels.
- 8.3 Co-channel rejection.
- 8.4 Adjacent channel selectivity.