



SLOVENSKI STANDARD
SIST EN 303 039 V2.1.2:2016
01-december-2016

Storitev kopenskih mobilnih komunikacij - Specifikacija večkanalnega oddajnika za storitev PMR - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive 2014/53/EU

Land Mobile Service - Multichannel transmitter specification for the PMR Service - Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

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Contents

Intellectual Property Rights	6
Foreword.....	6
Modal verbs terminology.....	6
1 Scope	7
2 References	8
2.1 Normative references	8
2.2 Informative references.....	8
3 Definitions, symbols and abbreviations	9
3.1 Definitions.....	9
3.2 Symbols.....	11
3.3 Abbreviations	11
4 General and operational requirements.....	12
4.1 General	12
4.1.0 Environmental profile	12
4.1.1 Choice of model for testing	12
4.1.1.0 General.....	12
4.1.1.1 Auxiliary test equipment	12
4.1.1.2 Declarations by the manufacturer	13
4.2 Multi-Mode equipment.....	13
4.3 Testing of equipment that does not have an external 50 Ω RF connector (integral antenna equipment)	13
5 Test conditions, power sources and ambient temperatures	13
5.1 Normal and extreme test conditions	13
5.2 Test power source.....	13
5.3 Normal test conditions.....	14
5.3.1 Normal temperature and humidity	14
5.3.2 Normal test power source.....	14
5.3.2.1 Mains voltage.....	14
5.3.2.2 Regulated lead-acid battery power sources used on vehicles.....	14
5.3.2.3 Other power sources.....	14
5.4 Extreme test conditions	14
5.4.1 Extreme temperatures	14
5.4.2 Extreme test source voltages.....	14
5.4.2.1 Mains voltage	14
5.4.2.2 Regulated lead-acid battery power sources used on vehicles.....	15
5.4.2.3 Power sources using other types of batteries.....	15
5.4.2.4 Other power sources.....	15
5.5 Procedure for tests at extreme temperatures.....	15
5.5.0 Thermal balance.....	15
5.5.1 Procedure for equipment designed for continuous transmission.....	15
5.5.2 Procedure for equipment designed for intermittent transmission	15
6 General conditions of measurement	16
6.1 Test bandwidth	16
6.2 Test load (artificial antenna).....	16
6.3 Test signals (wanted and unwanted signals).....	16
6.3.0 General.....	16
6.3.1 Transmitter test signals for digital transmissions.....	16
6.3.2 Encoder for digital transmitter measurements	17
6.3.3 Transmitter test signals for analogue transmissions.....	17
6.3.3.0 General	17
6.3.3.1 Test signals for frequency modulated channels.....	17
6.3.3.2 Test signals for amplitude modulated channels.....	17
6.3.3.3 Transmitter effective radiated power test signal (C1)	17
6.4 Transceiver data interface for digital transmissions	17

6.5	Impedance	17
6.6	PEP	18
6.7	Duplex equipment	18
6.8	Modes of operation of the transmitter	18
6.9	Measurement filter definition for digital transmissions	18
6.10	Test site and general arrangements for measurements involving the use of radiated fields	18
7	Technical characteristics of the transmitter	19
7.1	Transmitter output power (conducted)	19
7.1.0	General	19
7.1.1	Definitions	19
7.1.2	Method of measurement	19
7.1.3	Limits	19
7.2	Adjacent and alternate channel power	20
7.2.1	Definition	20
7.2.2	Method of measurement	21
7.2.3	Limits	23
7.3	Unwanted emissions	24
7.3.1	Definition	24
7.3.2	Method of measuring the power level	25
7.3.2.1	Measurement options	25
7.3.2.2	Method of measuring conducted spurious emissions (clause 7.3.2.1 a))	25
7.3.2.3	Method of measuring the effective radiated power (clause 7.3.2.1 b))	26
7.3.2.4	Method of measuring wideband noise	27
7.3.2.5	Method for measuring frequency conversion oscillator conducted spurious emissions	28
7.3.2.6	Method for measuring third order intermodulation products between wanted channels	29
7.3.3	Limits	29
7.3.3.1	Spurious emissions power	29
7.3.3.2	Wideband noise power	30
7.3.3.3	Frequency conversion oscillator spurious emission	31
7.3.3.4	Third order intermodulation product spurious emission	31
7.4	Intermodulation attenuation	32
7.4.0	Applicability	32
7.4.1	Definition	32
7.4.2	Method of measurement	32
7.4.3	Limits	33
7.5	Transient power measurements	33
7.5.1	Definition	33
7.5.2	Method of Measurement	33
7.5.3	Limits	34
8	Testing for compliance with technical requirements	34
8.1	Test conditions, power supply and ambient temperatures	34
8.2	Interpretation of the measurement results	35
Annex A (normative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	36
Annex B (normative):	Radiated measurement	37
B.1	Test sites and general arrangements for measurements involving the use of radiated fields	37
B.1.0	General	37
B.1.1	Anechoic chamber	37
B.1.2	Anechoic chamber with a conductive ground plane	38
B.1.3	Open Area Test Site (OATS)	39
B.1.4	Test antenna	40
B.1.5	Substitution antenna	40
B.1.6	Measuring antenna	41
B.2	Guidance on the use of radiation test sites	41
B.2.0	General	41
B.2.1	Verification of the test site	41
B.2.2	Preparation of the EUT	41

B.2.3	Power supplies to the EUT	41
B.2.4	Range length.....	41
B.2.5	Site preparation	42
B.3	Coupling of signals.....	43
B.3.0	General	43
B.3.1	Data signals	43
Annex C (normative): Specification for some particular measurement arrangements.....		44
C.1	Spectrum analyser specification.....	44
C.1.1	Adjacent and alternate channel power measurement.....	44
C.1.2	Unwanted emissions measurement.....	44
C.2	Integrating and power summing device	45
Annex D (informative): Change History		46
History		47

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[SIST EN 303 039 V2.1.2:2016](https://standards.iteh.ai/catalog/standards/sist/5e237b0c-14fc-47ef-80c1-f617cc5e1aa6/sist-en-303-039-v2-1-2-2016)

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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.4] 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.3].

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.

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National transposition dates	
Date of latest announcement of this EN (doa):	31 January 2016
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Date of withdrawal of any conflicting National Standard (dow):	31 July 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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1 Scope

The present document covers the technical requirements for multiple channel radio transmitters 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 3 GHz, with channel separations of < 10 kHz, 12,5 kHz, 20 kHz, 25 kHz, 50 kHz, 100 kHz and 150 kHz.

Table 1: Radiocommunications service frequency bands

Radiocommunications service frequency bands	
Transmit	30 MHz to 3 000 MHz

It applies to equipment for continuous and/or discontinuous transmission of data and/or digital speech and/or analogue speech and using constant envelope or non-constant envelope modulation.

The equipment comprises a transmitter capable of simultaneous amplification or transmission on two or more RF channels, or an amplifier which when operated with transmitter equipment provides simultaneous transmission on two or more RF channels. The types of equipment covered by the present document are as follows:

- base station (equipment fitted with an antenna connector, intended for use in a fixed location);
- mobile station (equipment fitted with an antenna connector, normally used in a vehicle or as a transportable);
- those hand portable stations:
 - a) fitted with an antenna connector; or
 - b) without an external antenna connector (integral antenna equipment), but fitted with a permanent internal or a temporary internal 50 Ω Radio Frequency (RF) connector which allows access to the transmitter output; and
- any equipment that may be used in combination with any of the above equipments when directly connected to those equipments for the amplification of the transmitter output signals of two or more individual equipments.

Types of equipment not covered by the present document are as follows:

- hand portable equipment without an external or internal RF connector and without the possibility of having a temporary internal 50 Ω RF connector is not covered by the present document;
- any equipment using passive combining solutions where each transmitter connected to the passive combining system transmits on a single channel, as detailed in ETSI EG 200 053 [i.2], clause H.3.

These specifications apply to the transmitter or transmitter amplifier only. If a receiver is fitted to the same equipment, the receiver specifications in the relevant specification (references [i.5] to [i.12]) also apply.

These specifications do not necessarily include all the characteristics that may be required by a user of equipment, nor do they necessarily represent the optimum performance achievable.

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 Radio Equipment Directive [i.3] may apply to equipment within the scope of the present document.

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.

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

- [1] Recommendation ITU-T O.153 (10-1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [2] Void.
- [3] ETSI TR 102 273 (V1.2.1) (12-2001) (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".
- [4] ANSI C63.5 (2006): "American National Standard for Electromagnetic Compatibility-Radiated Emission Measurements in Electromagnetic Interference (EMI) Control-Calibration of Antennas (9 kHz to 40 GHz)".

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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] CEPT/ERC/REC 74-01 (2011): "Unwanted Emissions in the Spurious domain".
- [i.2] ETSI EG 200 053: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio site engineering for radio equipment and systems".
- [i.3] 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.4] 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.5] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

- [i.6] ETSI EN 302 561: "Land Mobile Service; Radio equipment using constant or non-constant envelope modulation operating in a channel bandwidth of 25 kHz, 50 kHz, 100 kHz or 150 kHz; Harmonised EN covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.7] ETSI EN 300 086: "Land Mobile Service; Radio equipment with an internal or external RF connector intended primarily for analogue speech; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.8] ETSI EN 300 113: "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".
- [i.9] ETSI EN 300 296: "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".
- [i.10] ETSI EN 300 341: "Land Mobile Service; Radio equipment using an integral antenna transmitting signals to initiate a specific response in the receiver; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.11] ETSI EN 300 390: "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 Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.12] ETSI EN 301 166: "Land mobile service; Radio equipment for analogue and/or digital communication (speech and/or data) and operating on narrow band channels and having an antenna connector; Harmonised Standard covering essential requirements of article 3.2 of the Directive 2014/53/EU".
- [i.13] ETSI TR 100 028 (V1.4.1) (2001) (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.14] ETSI TR 100 028-2 (V1.4.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

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

bit: binary digit

block: smallest quantity of information that is sent over the radio channel

NOTE: A constant number of useful bits are always sent together with the corresponding redundancy bits.

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

channel: width of a single frequency band which is just sufficient to ensure the transmission of all necessary information at the rate and with the quality required under specified conditions to one or more receivers

conducted measurements: measurements which are made using direct 50 Ω connection to the equipment under test

data transmission systems: systems which transmit and/or receive data and/or digitized voice

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

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

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

necessary bandwidth: width of the frequency band covering the envelope of the transmitted channels, which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions for all transmitted channels

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

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

receive band: frequency band which is used by one or more receivers paired with the transmitter

spurious emissions: unwanted emissions in the spurious domain

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

testing laboratory: laboratory that performs tests

transmit band of the equipment: maximum frequency range (declared by the manufacturer) over which the transmitter can be operated without reprogramming or realignment

useful part of the burst: For digital modulation the period of time between the centre of the first modulation symbol and centre of the last modulation symbol of an individual transmission; for analogue modulation the period of time over which modulation is present or as defined by the power vs. time profile in figure 1.

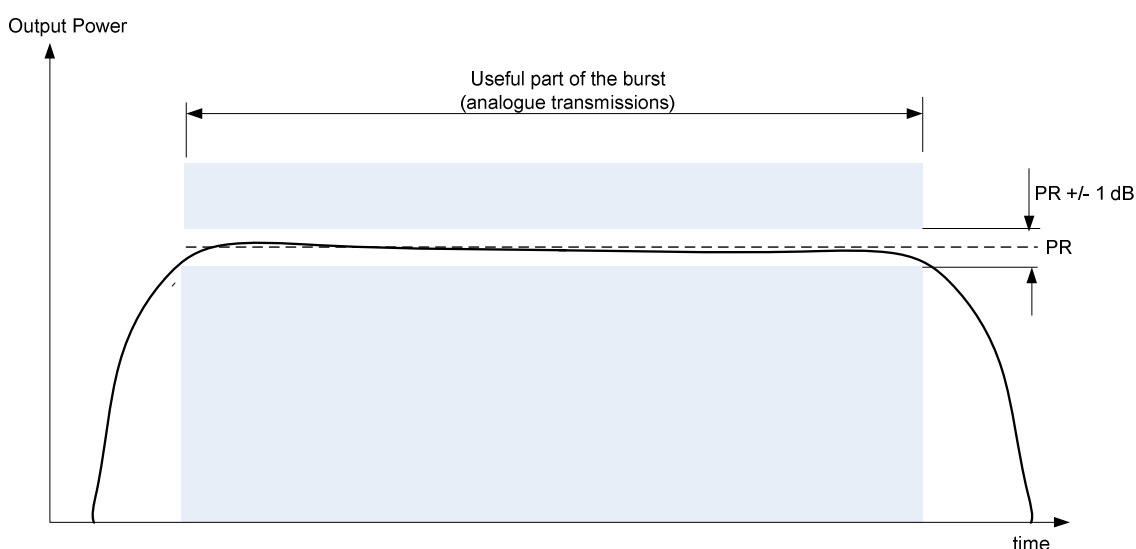


Figure 1: Useful part of the burst shown for analogue transmissions (constant envelope)

wanted bandwidth of a channel: bandwidth required for any single channel within the necessary bandwidth of the transmitter which is necessary to ensure the transmission of information at the rate and with the quality required under specified conditions for that channel only

3.2 Symbols

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

A1, A2, B1, M1, M2, etc.	names of test signals defined in clause 6.3
α	filter rolloff factor
$B_{\text{high}1}$	centre frequency of out-of-band domain at higher frequency than transmitter centre frequency
$B_{\text{high}2}$	highest frequency of out-of-band domain
$B_{\text{low}1}$	centre frequency of out-of-band domain at lower frequency than transmitter centre frequency
$B_{\text{low}2}$	lowest frequency of out-of-band domain
B_N	necessary bandwidth
BW	bandwidth of a channel
dB	decibel
dBm	dB relative to 1 mW
dB μ V	dB relative to 1 μ V
f_c	transmitter centre frequency
f_{ch}	channel centre frequency
f_{high}	highest frequency of transmitter necessary bandwidth
f_{LO}	Local Oscillator frequency
f_{low}	lowest frequency of transmitter necessary bandwidth
f_{rb}	the frequency offset corresponding to the near edge of the receive band
I_i	Intermodulation product generated between two wanted channels
PR	rms power of a single channel
PRX	the value of power PR for the channel with the greatest value of PR
PX	maximum power of transmitter
T_{min}	minimum extreme test Temperature
T_{max}	maximum extreme test Temperature
V_{min}	minimum extreme test Voltage
V_{max}	maximum extreme test Voltage
λ	wavelength

3.3 Abbreviations

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

ac	alternating current
BW	BandWidth
CSP	Channel SeParation
CW	Continuous Wave
dBc	decibels relative to the transmitter power
DC	Direct Current
EUT	Equipment Under Test
GMSK	Gaussian Minimum Shift Keying
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
MBW	Measurement BandWidth
OATS	Open Area Test Site
OOB	Out-Of-Band
PEP	Peak Envelope Power
PMR	Private Mobile Radio
RF	Radio Frequency
rms	root mean square
sr	switching range
Tx	Transmitter
VSWR	Voltage Standing Wave Ratio