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Radio telephone transmitters and receivers for the maritime mobile service operating in the VHF bands used on inland waterways; Harmonised Standard for access to radio spectrum and for features for emergency services

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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 tables A.1 and A.2 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:	15 November 2018
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2019
Date of withdrawal of any conflicting National Standard (dow):	31 August 2019

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 specifies technical characteristics and methods of measurements for VHF radio transmitters and receivers operating on board ships in frequency bands allocated to the maritime mobile service, used on inland waterways as defined by Regional Agreements or responsible Administrations.

The present document applies to VHF transmitters and receivers fitted with a 50 Ω external antenna socket or connector for use on board ships on inland waterways and operating in the bands between 156 MHz and 174 MHz allocated to the maritime mobile service by the ITU Radio Regulations [1], Appendix 18.

For countries where the Automatic Transmitter Identification System (ATIS) is mandatory, the requirements of annex B apply as well.

NOTE: The relationship between the present document and essential requirements of article 3.2 and article 3.3(g) of Directive 2014/53/EU [i.3] is given in annex A.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://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] ITU Radio Regulations (2016).

[2] Recommendation ITU-T E.161 (2001): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".

[3] ISO 25862:2009: "Ships and marine technology - Marine magnetic compasses, binnacles and azimuth reading devices".

[4] Recommendation ITU-T O.41 (1994): "Psophometer for use on telephone-type circuits".

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] Recommendation ITU-R M.493-14 (2015): "Digital selective-calling system for use in the maritime mobile service".

[i.2] ETSI TR 100 028-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".

[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.

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

[i.6] Recommendation ITU-R SM.332-4: "Selectivity of receivers".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the ITU Radio Regulations [1] apply.

3.2 Symbols

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

dBA Relative to 2×10^{-5} Pa

3.3 Abbreviations

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

ad amplitude difference
AIS Automatic Identification System
ATIS Automatic Transmitter Identification System
CSP Channel Spacing
DSC Digital Selective Calling
DX first transmission
ECC Error Correcting Code
emf electromotive force
fd frequency difference
FM Frequency Modulation
MID Maritime Identification Digit
RBW Resolution Bandwidth
RF Radio Frequency
rms root mean square
RX re-transmission
SINAD Signal + Noise + Distortion/Noise + Distortion
VHF Very High Frequency

4 General and operational requirements

4.0 Conformance

Compliance shall be established by simple inspection of the equipment and its technical documentation.

4.1 Construction

All controls shall be of sufficient size to enable the usual control functions to be easily performed and the number of controls should be the minimum necessary for simple and satisfactory operation.

For the purpose of conformance testing, relevant technical documentation shall be supplied with the equipment.

The VHF maritime mobile service uses both single-frequency and two-frequency channels. For two-frequency channels the Radio Regulations require a separation of 4,6 MHz between the transmitting frequency and the receiving frequency.

The equipment shall be capable of operating on single frequency and two-frequency channels with manual control (simplex). It may also be capable of operating on two-frequency channels without manual control (duplex).

No scanning or multiple watch facilities shall be implemented.

The equipment shall be able to operate on appropriate channels defined in the ITU Radio Regulations [1], Appendix 18.

Additional VHF channels outside those defined by the ITU Radio Regulations [1], Appendix 18 may also be provided, but means shall be provided to block any or all of these additional channels, as may be required by the licence before installation on board vessels. It shall not be possible for the user to unblock any blocked channels.

The equipment shall be so designed that use of channel 70 for purposes other than DSC is prevented, and that use of channels AIS1 and AIS2 for purposes other than AIS is prevented.

The possibility to apply automatic power reduction to any of these channels shall be available. It shall not be possible for the user to change the programmed settings of these channels.

The output power shall be automatically limited to a value between 0,5 W and 1 W on the following channels:

- 6, 8, 10, 11, 12, 13, 14, 15, 17, 71, 72, 74, 75, 76 and 77.

It shall not be possible to transmit while any frequency synthesizer used within the transmitter is out of lock.

It shall not be possible to transmit during channel switching operations.

Where equipment is capable of operating in modes other than just inland waterways then:

- when operating in "inland waterways" mode, all the requirements of the present document apply;
- when operating in other modes, the equipment shall comply with the requirements of the applicable standard for that mode of operation.

4.2 Controls and indicators

The equipment shall have a channel selector and shall indicate the designator, as shown in the ITU Radio Regulations [1], Appendix 18, of the channel at which the installation is set. The channel designator shall be legible irrespective of the external lighting conditions.

Channel 16 shall be distinctively marked. Selection of channel 16, shall be preferably by readily accessible means (e.g. a distinctively marked key). Selection of channel 16 by any means shall automatically set the transmitter output power to maximum. This power level may subsequently be reduced by manual user control if required.

Where an input panel on the equipment for entering the digits 0 - 9 is provided, this shall conform to Recommendation ITU-T E.161 [2].

The equipment shall have the following additional controls and indicators:

- an on/off switch for the entire installation with a visual indication that the installation is in operation;
- a manual non-locking push-to-talk switch to operate the transmitter with a visual indication that the transmitter is activated and facilities to limit the transmission time to a maximum of 5 minutes. A short audible alarm and a visual indication may be provided to show when the transmission will be automatically terminated within the next 10 s. It shall be possible to reoperate the push to talk switch and reactivate the transmitter after a 10 s period;

- a manual switch for reducing the transmitter output power to a value between 0,5 W and 1 W;
- an audio frequency power volume control not affecting the audio level of the handset;
- a squelch control;
- a control for reducing the brightness of the equipment illumination to zero;
- an output power detector giving a visual indication that the carrier is being produced.

The equipment shall also meet the following requirements:

- the user shall not have access to any control which, if wrongly set, might impair the technical characteristics of the equipment;
- if the accessible controls are located on a separate console and if there are two or more control consoles, one of the consoles shall have priority over the others. If there are two or more control consoles, the operation of one console shall be indicated on the other consoles.

4.3 Handset and loudspeaker

The equipment shall be fitted with an integral loudspeaker and/or a socket for an external loudspeaker and shall have the facility to be fitted with a telephone handset or a microphone.

During transmission in simplex operation the receiver output shall be muted.

During transmission in duplex operation, only the handset shall be operative. Measures shall be taken to ensure correct operation when duplex is used and precautions shall be taken to prevent harmful electrical or acoustic feedback which might produce oscillations.

4.4 Switching time

The channel switching arrangement shall be such that the time necessary to change over from using one of the channels to using any other channel does not exceed 5 s.

The time necessary to change over from transmission to reception or vice versa, shall not exceed 0,3 s.

4.5 Safety precautions

Measures shall be taken to protect the equipment against the effects of overcurrent or overvoltage.

Measures shall be taken to prevent damage to the equipment if the electrical power source produces transient voltage variations and to prevent any damage that might arise from an accidental reversal of polarity of the electrical power source.

Means shall be provided for earthing exposed metallic parts of the equipment.

All components and wiring in which the dc or ac voltage (other than radio-frequency voltage) produce, singly or in combination, peak voltages in excess of 50 V shall be protected against any accidental access and shall be automatically isolated from all electrical power sources if the protective covers are removed. Alternatively, the equipment shall be constructed in such a way as to prevent access to components operating at such voltages unless an appropriate tool is used such as a nut-spanner or screwdriver. Conspicuous warning labels shall be affixed both inside the equipment and on the protective covers.

No damage to the equipment shall occur when the antenna port is placed on open circuit or short circuit for a period of at least 5 minutes in each case.

In order to provide protection against damage due to the build-up of static voltages at the antenna port, there shall be a dc path from the antenna port to chassis not exceeding 100 kΩ.

The information in any volatile memory device shall be protected from interruptions in the power supply of up to 60 s duration.

4.6 Class of emission and modulation characteristics

The equipment shall use phase modulation, G3E (frequency modulation with a pre-emphasis of 6 dB/octave) for speech, and G2B for ATIS.

The equipment shall be designed to operate with a channel separation of 25 kHz.

The frequency deviation (G3E) corresponding to 100 % modulation shall be 5 kHz as nearly as practicable.

4.7 Labelling

All controls, instruments, indicators and ports shall be clearly labelled.

Details of the power supply from which the equipment is intended to operate shall be clearly indicated on the equipment.

The compass safe distance as defined in ISO 25862 [3] (Method B) shall be stated on the equipment or in the technical manual.

4.8 Warm up

After being switched on the equipment shall be operational within 1 minute.

5 Test conditions, power sources and ambient temperatures

5.1 Normal and extreme test conditions

Conformance tests shall be made under normal test conditions and also, where stated, under extreme test conditions (clauses 5.4.1 and 5.4.2 applied simultaneously).

5.2 Test power source

During conformance testing, the equipment shall be supplied from a test power source capable of producing normal and extreme test voltages as specified in clauses 5.3.2 and 5.4.2.

The internal impedance of the test power source shall be low enough for its effect on the test results to be negligible. For the purpose of testing the power source voltage shall be measured at the power input port of the equipment.

During testing, the power source voltages shall be maintained within a tolerance of ±3 % relative to the voltage level at the beginning of each test.

5.3 Normal test conditions

5.3.1 Normal temperature and humidity

The normal temperature and humidity conditions for tests shall be a combination of temperature and humidity within the following ranges:

- temperature: +15 °C to +35 °C;
- relative humidity: 20 % to 75 %.

5.3.2 Normal power sources

5.3.2.1 Mains voltage and frequency

The normal test voltage for equipment to be connected to the ac mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage or any of the declared voltages for which the equipment is indicated as having been designed. The frequency of the test voltage shall be 50 Hz ± 1 Hz.

5.3.2.2 Battery power source

Where the equipment is designed to operate from a battery, the normal test voltage shall be the nominal voltage of the battery.

5.3.2.3 Other power sources

For operation from other power sources the normal test voltage shall be that declared by the manufacturer.

5.4 Extreme test conditions

5.4.1 Extreme temperatures

For tests at extreme temperatures, measurements shall be made in accordance with clause 5.5, at a lower temperature of -15 °C ± 3 °C and an upper temperature of +55 °C ± 3 °C.

5.4.2 Extreme values of test power sources

5.4.2.1 Mains voltage

The extreme test voltages for equipment to be connected to the ac mains shall be the nominal mains voltage ±10 %.

5.4.2.2 Battery power source

Where the equipment is designed to operate from a battery, the extreme test voltages shall be 1,3 and 0,9 times the nominal voltage of the battery (12 V, 24 V, etc.).

5.4.2.3 Other power sources

For operation from other power sources the extreme test voltages shall be agreed between the testing authority and the equipment manufacturer.

5.5 Procedure for tests at extreme temperatures

The equipment shall be placed in the test chamber at normal temperature. The maximum rate of raising or reducing the temperature of the chamber shall be 1 °C/minute. The equipment shall be switched off during the temperature stabilizing periods.

Before conducting tests at extreme temperatures, the equipment in the test chamber shall have reached thermal equilibrium and be subjected to the extreme temperature for a period of 10 hours to 16 hours.

For tests at the lower extreme temperature, the equipment shall then be switched on to standby or receive condition for one minute, after which the equipment shall meet the requirements of the present document.

For tests at the higher extreme temperature, the equipment shall then be switched on in the high power transmit condition for half an hour, after which the equipment shall meet the requirements of the present document.

The temperature of the chamber shall be maintained at the extreme temperatures for the whole duration of the performance test.