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Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for survival craft portable VHF radiotelephone apparatus

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Foreword

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

The present document defines the minimum technical characteristics required for portable VHF radio telephones operating in survival craft and optionally on board ships at sea, in certain frequency bands allocated to the Maritime Mobile Service (MMS). It also incorporates the requirements detailed in the Radio Regulations, International Convention for the Safety of Life at Sea SOLAS 1974 as amended [4] and the relevant recommendations of the International Maritime Organization.

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National transposition dates	
Date of adoption of this EN:	7 December 2015
Date of latest announcement of this EN (doa):	31 March 2016
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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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document states the minimum technical characteristics required for portable VHF radiotelephones operating in the bands between 156 MHz and 174 MHz allocated to the Maritime Mobile Services by the ITU Radio Regulations (see ITU Radio Regulations, Appendix 18 [1]) and suitable for use in survival craft and, optionally, on board ships at sea. The requirements detailed in the Radio Regulations, International Convention for the Safety Of Life At Sea SOLAS 1974 [4] and the International Maritime Organization Resolutions A.694(17) [i.4], MSC149 (77) [i.1] and A.809(19) [i.3] are incorporated in 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.

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] ITU Radio Regulations 2012.

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

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

[4] International Maritime Organisation: "International Convention for the Safety Of Life At Sea (SOLAS)".

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.

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

[i.1] International Maritime Organization Resolution MSC 149 (77): "Performance standards for survival craft two way VHF radiotelephone apparatus".

[i.2] ETSI EN 301 178: "Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands (for non-GMDSS applications only); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU".

[i.3] International Maritime Organization Resolution A.809(19): "Performance standards for survival craft two way VHF radiotelephone apparatus".

[i.4] International Maritime Organization Resolution A.694(17): "General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids".

[i.5] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

3 Definitions and abbreviations

3.1 Definitions

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

primary battery: non rechargeable battery which may be user replaceable

NOTE: See International Maritime Organization Resolution A.809(19) [i.3].

secondary battery: rechargeable battery

NOTE: See International Maritime Organization Resolution A.809(19) [i.3].

3.2 Abbreviations

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

ad	amplitude difference
DSC	Digital Selective Calling
emf	electro-motive force
ERP	Effective Radiated Power
fd	frequency difference
IF	Intermediate Frequency
MMS	Maritime Mobile Service
RF	Radio Frequency
rms	root mean square
SINAD	(Signal + Noise + Distortion)/(Noise + Distortion) ratio
SOLAS	International Convention for the Safety of Life at Sea
VHF	Very High Frequency

4 General requirements

4.1 Construction

The equipment shall be portable and capable of being used for on-scene communications between survival craft, between survival craft and ship and between survival craft and rescue unit. It may also be used for on-board communications when capable of operating on appropriate frequencies.

The equipment shall comprise at least:

- an integral transmitter/receiver including antenna and battery;
- an integral control unit including a press-to-transmit switch; and
- an internal microphone and loudspeaker.

The equipment shall be of either, highly visible yellow or orange colour, or marked with a surrounding highly visible yellow or orange marking strip, which shall be visible also during charging and storage, as applicable.

The mechanical and electrical construction and finish of the equipment shall conform in all respects to good engineering practice and the equipment shall be suitable for use on board ships and survival craft at sea.

All controls shall be of sufficient size to enable the usual control functions to be easily performed by a user wearing gloves for immersion suits, in accordance with SOLAS 1974 Chapter III, Regulation 32 [4]. The number of controls should be the minimum necessary for simple and satisfactory operation. With the possible exception of channel selection, it shall be possible to operate the equipment using only one hand.

Any parts of the equipment required to be checked during inspection or maintenance operations as laid down by the manufacturer, shall be readily accessible. Components shall be readily identifiable.

For the purpose of conformance testing in accordance with the present document, adequate technical and operational documentation shall be supplied with the equipment.

The equipment shall not be unduly affected by sea water, oil, or exposure to sunlight.

The equipment shall be of small size and light weight (not more than 1,5 litres and 1,5 kg).

The equipment shall have provisions for its attachment to the clothing of the user and also be provided with a wrist or neck strap. For safety reasons, the strap should include a suitable weak link to prevent the bearer from being ensnared.

The manufacturer shall provide evidence on the method of attaching the equipment to the user's clothing, including the immersion suit specified in SOLAS 1974 Chapter III, Regulation 32 [4]. The manufacturer shall supply documentary proof of compliance with this requirement.

4.2 Frequencies and power

The equipment shall operate only on single-frequency channels for voice communications with manual control (simplex).

The equipment shall provide for transmission and reception of signals on channel 16 and at least one other single frequency channel from those specified in Appendix 18 of the Radio Regulations [1], (with the exception of the DSC calling channel 70 and AIS1 and AIS2).

NOTE: Preference shall be given to simplex channels where analogue voice is the priority mode.

Independent selection of transmitting and receiving frequencies shall not be possible.

After switch on the equipment shall be operational within 5 seconds and meet the requirements of the present document within 1 minute.

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

4.3 Controls

The equipment shall have a channel selector and shall indicate the designator of the channel at which the equipment is set, as given in Appendix 18 of the Radio Regulations [1].

It shall be possible to determine that channel 16 has been selected in all ambient light conditions.

The equipment shall have the following additional controls:

- on/off switch for the equipment with a visual indication that the equipment is switched on;
- a manual non-locking push to talk switch to operate the transmitter;
- a switch for reducing the power to not exceed 1 watt ERP; if the transmitter ERP is greater than 1 watt;
- an audio-frequency volume control;
- a squelch control;
- a carrier power detector giving a visual indication that the carrier is being produced.

The user shall not have access to any control which may impair the technical characteristics of the equipment if wrongly set.

4.4 Switching time

The channel switching arrangements 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 seconds.

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

4.5 Safety precautions

Means shall be incorporated to prevent damage to the equipment due to reversal of polarity of the battery power supply.

The equipment shall be designed to be free of sharp projections which could damage survival craft.

The manufacturer shall declare the survival craft compass safe distance according to ISO 25862 [3].

The equipment shall not be damaged by the effects of an open circuit or a short circuit of the antenna.

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.

The equipment shall be designed to operate satisfactorily to the requirements of the present document with a channel separation of 25 kHz.

The frequency deviation corresponding to 100 % modulation shall approach ±5 kHz as nearly as practicable.

4.7 Battery

The equipment shall operate with primary batteries.

Primary batteries shall have a shelf life of at least two years.

Primary batteries shall have a colour and marking as described in clause 4.1.

The capacity of the primary battery shall be sufficient to operate the equipment continuously for at least eight hours at any temperature condition (see clauses 5.3.1 and 5.4.1) with a 1:9 transmit to receive duty cycle at the highest rated transmit power.

This duty cycle is defined as:

- 6 s transmit at full RF output power without modulation, 6 s reception with an RF input signal at the nominal frequency of the receiver at a level of +60 dBµV using normal test modulation (see clause 6.4); and
- the audio volume control of the receiver set at maximum followed by 48 s reception without input signal and the squelch control operational (muted).

Provisions shall be made for replacing the battery easily without the use of special tools and without degrading the performance of the equipment (particularly water tightness after re-assembly).

If the equipment is capable of operating with secondary batteries then:

- Such secondary batteries shall not have the same colour or marking as the primary batteries.
- Other performance standard will be applicable, for example ETSI EN 301 178 [i.2].

4.8 Labelling

All controls and indicators shall be clearly labelled.

The equipment shall be clearly labelled with brief instructions for operation.

The equipment shall be clearly marked on the exterior with identification of the manufacturer, type designation, serial number and the compass safe distance.

The type and designation of the battery used and the expiry date of any primary battery shall be clearly labelled.