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**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Technical characteristics and methods of measurement  
for fixed and portable VHF equipment operating  
on 121,5 MHz and 123,1 MHz**

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**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

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Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
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## Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

<b>Proposed national transposition dates</b>	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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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).

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# 1 Scope

The present document specifies the minimum technical requirements for maritime two-way AM VHF radiotelephone apparatus for communications between ships in distress and rescuing aircraft. The standard incorporates relevant provisions of the ITU Radio Regulations [i.1], of IMO A.694 (17) [i.2] and MSC 80 (70) [i.3] and of Annex 10 to the ICAO Convention [i.4].

The maritime VHF equipment described in the present document is intended for communications on the aeronautical emergency frequencies 121,5 MHz and 123,1 MHz only.

The present document is applicable to portable and fixed installed equipment.

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## 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 reference 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 EN 300 225: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for survival craft portable VHF radiotelephone apparatus".
- [2] ISO 25862 (2009): "Ships and marine technology. Marine magnetic compasses, binnacles and azimuth reading devices".
- [3] CENELEC EN 60945 (2002): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".
- [4] ETSI TS 103 052 (V1.1.1) (03-2011): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiated measurement methods and general arrangements for test sites up to 100 GHz".

### 2.2 Informative references

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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] ITU Radio Regulations 2012.
- [i.2] IMO 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.3] IMO Resolution MSC.80(70): "Adoption of new Performance Standards for radiocommunication equipment".
- [i.4] ICAO Convention on International Civil Aviation, annex 10.

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

## 3 Symbols and abbreviations

### 3.1 Symbols

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

A3E	amplitude modulation with double sideband and full carrier
dBA	acoustic level in dB relative to $2 \times 10^{-5}$ Pa
dBd	antenna gain in dB relative to dipole radiation

### 3.2 Abbreviations

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

AM	Amplitude Modulation
emf	electro-motive force
ERP	Effective Radiated Power
EUT	Equipment Under Test
ICAO	International Civil Aviation Organisation
IMO	International Maritime Organisation
MSC	Maritime Safety Committee
pep	peak envelope power
RF	Radio Frequency
rms	root mean square
SINAD	Signal + Noise + Distortion/Noise + Distortion
VHF	Very High Frequency

## 4 General requirements

### 4.1 Construction

Portable equipment shall in one unit comprise at least transmitter, receiver, antenna, battery, operating controls including press-to-transmit switch, microphone and loudspeaker.

Equipment intended for fixed installations shall have an 50  $\Omega$  RF socket.

Portable equipment shall be of small size and light in weight.

Portable equipment shall include provision for the connection of external microphone and headset.

Portable equipment shall have a colour which distinguishes it from the portable VHF equipment specified in ETSI EN 300 225 [1].

The equipment shall be operational within 5 seconds of switching on.

Fixed installation equipment shall be so installed that access for inspection or maintenance shall be available.

### 4.2 Controls

The number of controls shall be the minimum necessary for simple operation.

The equipment shall be provided with an on-off switch and a visual indication that the equipment is switched on.

The equipment shall be provided with a manual volume control by which the audio output may be varied.

The press-to-transmit switch shall be non-locking and return to standby (receive) mode when released. The time necessary to change from transmission to reception, or vice versa, shall not exceed 0,3 seconds.

The equipment shall have a channel selector and shall clearly indicate which frequency the equipment is set to. The channel switching arrangement shall be such that the time necessary to change from one frequency to the other does not exceed 5 seconds. It shall not be possible to transmit during channel switching operations. Independent selection of transmitting and receiving frequencies shall not be possible. In the transmission mode, the output of the receiver shall be muted.

### 4.3 Operating frequencies

The equipment shall be capable of operating on the single frequency channels 121,5 MHz and 123,1 MHz only (aeronautical emergency frequencies), with manual control (simplex).

The equipment shall operate with class of emission A3E.

### 4.4 Labelling

The labels on the equipment shall be permanently fixed to the exterior of the equipment.

All controls and indicators shall be clearly labelled.

The labelling shall at least comprise the following information:

- text containing the words: "Only for emergency communications with aircraft";
- brief operating instructions;
- type designation of the equipment and serial number;
- expiry date for any primary batteries;
- compass safe distance, according to ISO 25862 [2].

### 4.5 Power source

For portable equipment, the source of energy shall be a primary battery that may be replaceable by the user without the use of special tools and without degrading the performance of the equipment. In addition, provisions may be made to operate the equipment using an external source of electrical energy.

Fixed radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the installation from an alternative source of electrical energy. Alternatively, the source of energy may be a primary battery integrated in the equipment and may be replaceable by the user.

Primary batteries shall have a shelf life of at least 2 years.

Provisions shall be made for protecting the equipment from damage due to accidental reversal of the polarity of the battery or of any external power supply.

The capacity of the primary battery shall be sufficient to operate the equipment continuously for at least 8 hours at normal temperature condition (see clause 5.4.1) with the duty cycle defined in clause 5.1.

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## 5 Test conditions, power sources and ambient temperatures

### 5.1 Determination of the lower extreme test voltage

When determining the capacity of the primary battery, the battery voltage shall be measured at the end of a duration test. During this duration test, when activated, the transmitter should be modulated to give maximum output power (pep at 100 % modulation). The equipment shall be operated with the following duty cycle:

- 6 seconds transmission without modulation followed by 6 seconds reception with an RF input signal at the nominal frequency of the receiver at a level of +60 dB $\mu$ V using normal test modulation (clause 6.4) with the audio volume control set to give minimum 200 mW output power followed by 48 seconds reception without input signal under muted condition (operational squelch condition).



The lower extreme test voltage is the voltage of the battery at the end of this duration test measured with the transmitter activated.

## 5.2 Normal and extreme test conditions

Testing of the equipment shall be made under normal test conditions and also, where stated, under extreme test conditions.

## 5.3 Test power source

During testing, the equipment shall be supplied from a test power source capable of producing normal and extreme test voltages as specified in clauses 5.4.2 and 5.5.2. The test power source shall only be used in measurements where its effect on the test results is negligible. The power source voltage shall be measured at the input terminals of the equipment.

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

## 5.4 Normal test conditions

### 5.4.1 Normal temperature and humidity

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

- Temperature  $+15\text{ }^{\circ}\text{C}$  to  $+35\text{ }^{\circ}\text{C}$ ;
- Relative humidity 20 % to 75 %.

### 5.4.2 Normal power source

For portable equipment, the normal test voltage shall be the nominal voltage of the battery as declared by the manufacturer.

For fixed installation equipment, the normal test voltage shall be that declared by the manufacturer. If the normal power source is ac, then the frequency of the test voltage shall be  $50\text{ Hz} \pm 1\text{ Hz}$ .

## 5.5 Extreme test conditions

### 5.5.1 Extreme temperatures

#### 5.5.1.1 Upper extreme temperature

Tests at the upper extreme temperature shall be made at a temperature of  $+55\text{ }^{\circ}\text{C}$ .

#### 5.5.1.2 Lower extreme temperature

Tests at the lower extreme temperature shall be made at a temperature of  $-20\text{ }^{\circ}\text{C}$ .

### 5.5.2 Extreme test power supply values

#### 5.5.2.1 Upper extreme test voltage

For portable equipment, the upper extreme test voltage shall be determined in each case and should be the voltage corresponding to the voltage that the battery gives at the upper extreme temperature at the beginning of the battery test cycle with a load equal to that of the equipment in the standby condition.

For fixed installation equipment, the upper extreme test voltage shall be:

- ac powered equipment: the nominal mains voltage  $+10\%$ . The frequency shall be  $50\text{ Hz} \pm 5\text{ Hz}$ .
- dc powered equipment: the nominal dc voltage  $+30\%$ .