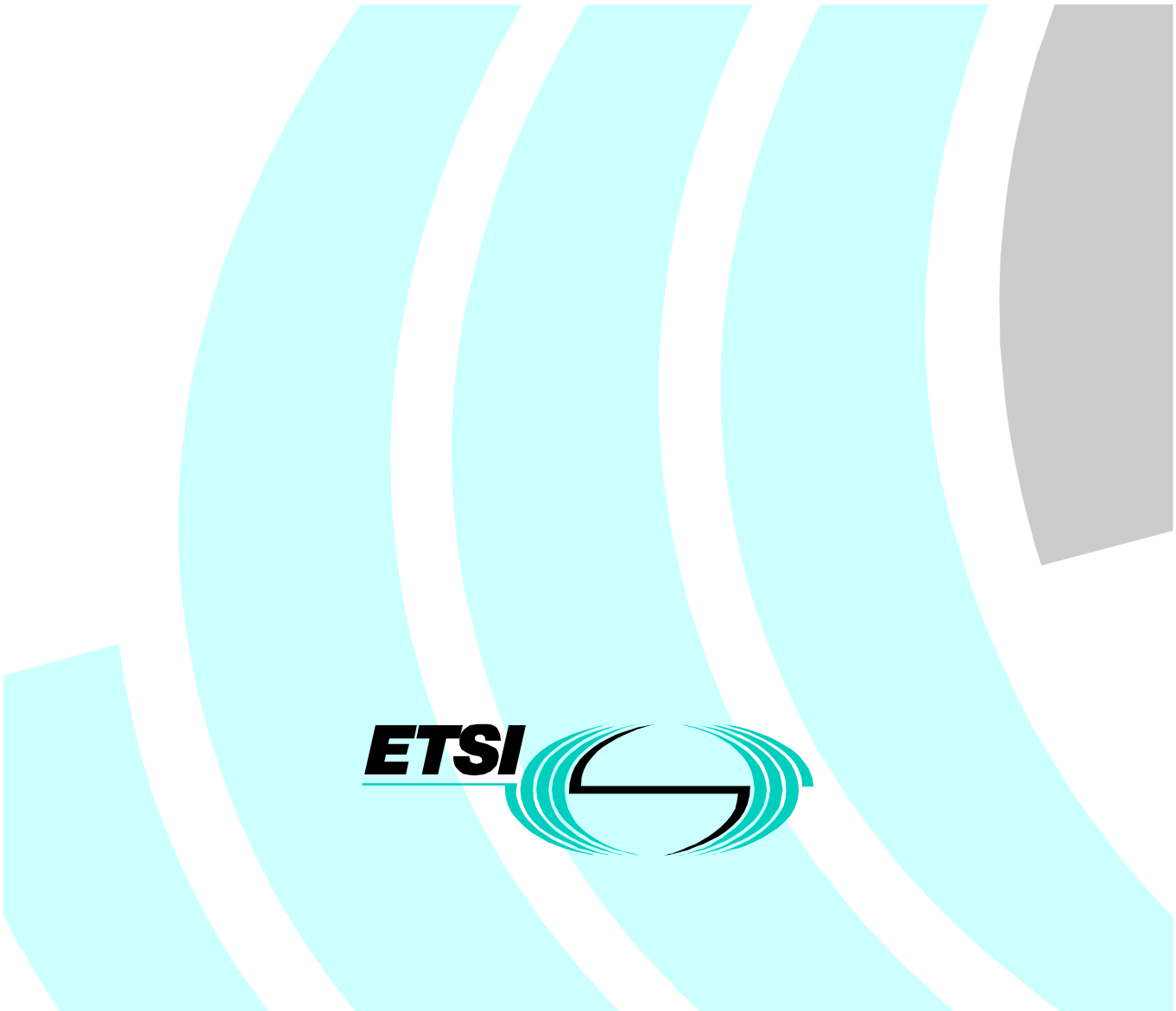
ETSI EN 300 152-3 V1.1.1 (2001-05)

Candidate Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime Emergency Position Indicating Radio Beacons (EPIRBs) intended for use on the frequency 121,5 MHz or the frequencies 121,5 MHz and 243 MHz for homing purposes only; Part 3: Harmonized EN covering essential requirements of article 3.3 (e) of the R&TTE Directive



Reference
REN/ERM-RP01-036-3

Keywords
radio, maritime, EPIRB, SAR, testing, regulation

ETSI

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

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

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

The present document is part 3 of a multi-part deliverable covering the Maritime Emergency Position Indicating Radio Beacons (EPIRBs) intended for use on the frequency 121,5 MHz or the frequencies 121,5 MHz and 243 MHz for homing purposes only, as identified below:

Part 1: "Technical characteristics and methods of measurement";

Part 2: "Harmonized EN under article 3.2 of the R&TTE Directive";

Part 3: "Harmonized EN covering essential requirements of article 3.3 (e) of the R&TTE Directive".

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations and following the Commission Decision 2000/638/EC of 22 September 2000.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [1] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

National transposition dates	
Date of adoption of this EN:	27 April 2001
Date of latest announcement of this EN (doa):	31 July 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2002
Date of withdrawal of any conflicting National Standard (dow):	31 January 2003

Introduction

The present document is part of a set of standards designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive [1]. Each standard is a module in the structure. The modular structure is shown in figure 1.

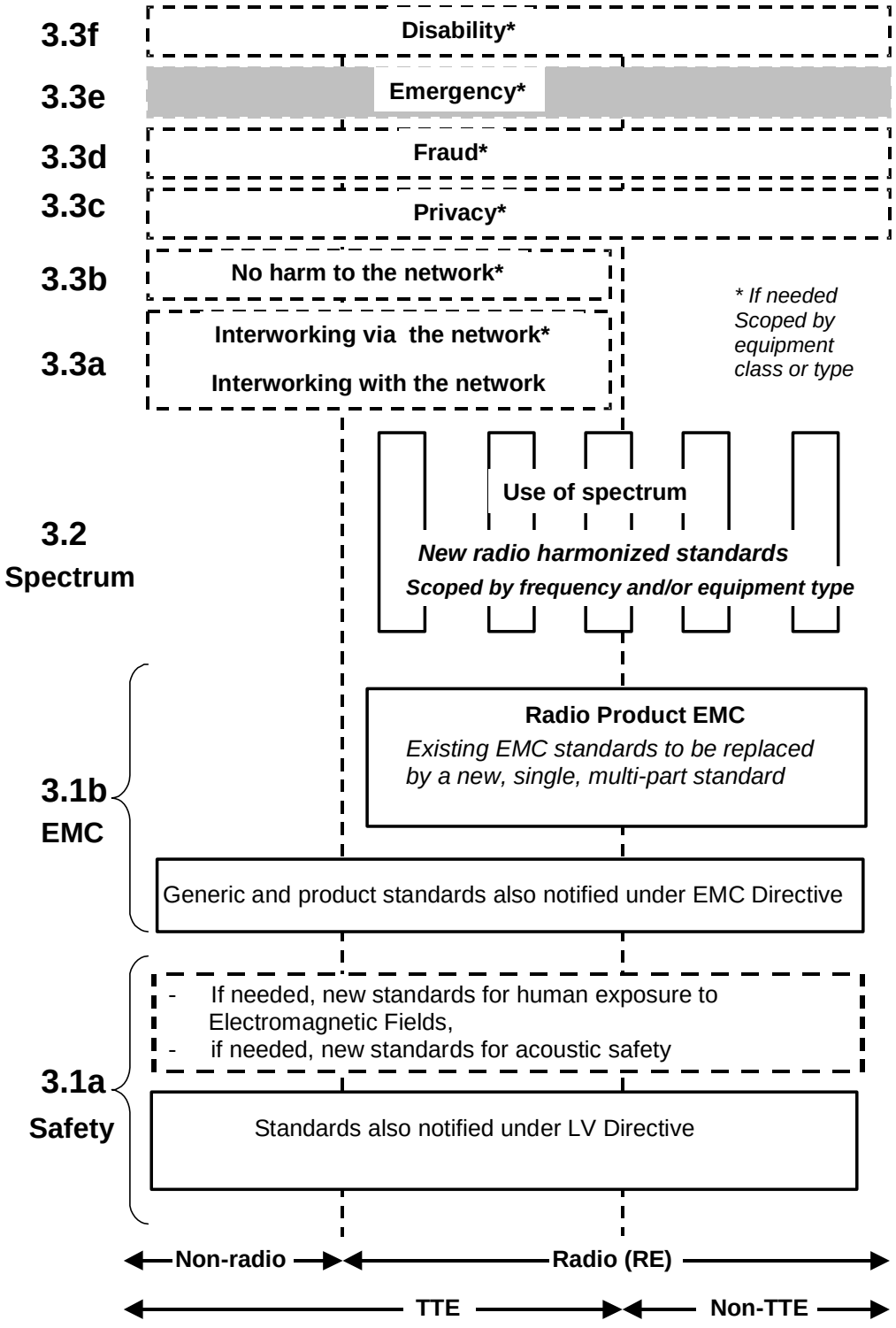


Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]

The left hand edge of the figure 1 shows the different clauses of article 3 of the R&TTE Directive [1].

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of the present document essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum by radio equipment. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1b the diagram shows the new single multi-part product EMC standard for radio, and the existing collection of generic and product standards currently used under the EMC Directive [2]. The parts of this new standard will become available in the second half of 2000, and the existing separate product EMC standards will be used until it is available.

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive [3] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

The bottom of the figure shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both. A radio spectrum standard will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive [1] is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive [1] may be covered in a set of standards.

The modularity principle has been taken because:

- it minimizes the number of standards needed. Because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment;
- it provides scope for standards to be added:
  - under article 3.2 when new frequency bands are agreed; or
  - under article 3.3 should the Commission take the necessary decisions

  without requiring alteration of standards that are already published;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

1 Scope

The present document applies to Maritime Emergency Position Indicating Radio Beacons (EPIRBs) intended for use on the frequency 121,5 MHz or the frequencies 121,5 MHz and 243 MHz for homing purposes only.

The present document is intended to cover the provisions of Directive 1999/5/EC [1] (R&TTE Directive) article 3.3 (e), which states that radio equipment within the scope of the present document shall be so constructed that: "it supports certain features ensuring access to emergency services".

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 R&TTE Directive [1] will apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site http://www.newapproach.org/.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[2] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).

[3] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

[4] ETSI ETR 028: "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".

[5] ETSI EN 300 152-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime Emergency Position Indicating Radio Beacons (EPIRBs) intended for use on the frequency 121,5 MHz or the frequencies 121,5 MHz and 243 MHz for homing purposes only; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [1], and the following terms and definitions apply.

environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

supplier: entity referred to in the R&TTE Directive [1] responsible for the placing on the market of an equipment within the scope of the Directive

EPIRB station: station in the mobile service, the emissions of which are intended to facilitate search and rescue operations

homing device: 121,5 MHz / 243 MHz beacon primarily intended for transmitting homing signals

3.2 Abbreviations

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

EMC	Electro-Magnetic Compatibility
EPIRB	Emergency Position Indicating Radio Beacon
LV	Low Voltage
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be determined by the environmental class of the equipment. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the required operational environmental profile.

4.2 General, operational and technical requirements

4.2.1 General and operational requirements

4.2.1.1 Construction

In all respects, the mechanical and electrical design and the construction and finish of the equipment shall conform to good engineering practice.

The equipment shall be designed to minimize the risk of internal and external damage during use or stowage.

The exterior of the equipment shall have no sharp edges or projections which could easily damage inflatable rafts or injure personnel.

The general construction and method of operation shall provide a high degree of proof against inadvertent operation due to magnetic influences, handling, stowage and transit, whilst still providing a simple means of operation in an emergency.

The equipment shall be portable, lightweight, and compact and be designed as one integral unit. The Emergency Position-Indicating Radiobeacon (EPIRB) shall derive its energy from a battery forming a part of the equipment and incorporate a permanently attached antenna which may be either fixed length or extendible.

The EPIRB may be fitted with a test facility by which the functioning of the transmitter and battery can be easily tested without the use of any external equipment.

The equipment shall be capable of being used by an unskilled person and only be capable of manual activation and deactivation.

The EPIRB shall be watertight and buoyant.

A substantial part of the equipment shall be of highly visible yellow or orange color to assist visual location.

The equipment shall not be unduly affected by sea water or oil and shall be resistant to deterioration by prolonged exposure to sunlight.

Necessary operating instructions shall be provided with the equipment.

4.2.1.2 Controls

The equipment shall be initially activated by the use of two simple, but independent mechanical actions, neither of which on its own shall activate the equipment. For equipment relating solely to man-overboard location applications, the second mechanical action may be replaced by an immersion sensor.

The equipment shall not be capable of automatic activation, except in the case of the second operation for man-overboard devices only.

Initial activation shall break a seal which shall not be replaceable by the user. This seal shall not be broken when using the test facility.

After activation it shall be simple to de-activate the equipment.

The switch, which operates any test facility (clause 4.2.1.1), shall be so designed that it returns automatically to the off-position when released.

4.2.1.3 Indicators

The equipment shall be provided with a visual indication that signals are being emitted.

4.2.1.4 Labelling

The equipment shall be provided with a label, or labels, permanently affixed to the exterior of the equipment, containing the following information:

- frequency or frequencies of operation of the equipment;
- serial number of the equipment;
- type designation of the equipment;
- adequate instructions to enable the equipment to be activated and de-activated;
- the type of battery as specified by the manufacturer of the EPIRB;
- a warning to the effect that the EPIRB should not be operated except in an emergency;
- the date on which the battery will need to be replaced. Simple means shall be provided for changing this date when the battery is replaced.

4.2.1.5 Power source

4.2.1.5.1 Battery requirements

The battery provided as a power source shall be a primary battery and have sufficient capacity to operate the equipment for an uninterrupted period of at least 24 hours, or for man-overboard devices only, at least 6 hours, under all temperature conditions, (clause 5.1.4 and 5.1.5), within the requirements of the present document.

The type of battery and designation specified by the manufacturer for use in the equipment shall be clearly and indelibly marked on the equipment.

The battery shall be clearly and durably marked with the expiry date.

4.2.1.5.2 Safety precautions

Provisions shall be made for protecting the equipment from damage due to the accidental reversal of polarity of the battery.

4.3 Environmental requirements

4.3.1 Vibration test

4.3.1.1 Definition

This test determines the ability of equipment to withstand vibration without resulting in mechanical weakness or degradation in performance.

4.3.1.2 Requirement

The equipment shall meet the requirements of the performance check. There shall be no harmful deterioration of the equipment visible.

4.3.1.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2 Temperature tests

4.3.2.1 Definition

The immunity against the effects of temperature is the ability of the equipment to maintain the specified mechanical and electrical performance after the following tests have been carried out. The maximum rate of raising or reducing the temperature of the chamber in which the equipment is being tested shall be 1°C/minute.

4.3.2.2 Dry heat

4.3.2.2.1 Definition

This test determines the ability of equipment to be operated at high ambient temperatures and operate through temperature changes.

4.3.2.2.2 Requirement

The equipment shall meet the requirements of the performance check.

4.3.2.2.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.3 Damp heat

4.3.2.3.1 Definition

This test determines the ability of equipment to be operated under conditions of high humidity.

4.3.2.3.2 Requirement

The equipment shall meet the requirements of the performance check.

4.3.2.3.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.4 Low temperature

4.3.2.4.1 Definition

This test determines the ability of equipment to be operated at low temperatures. It also allows equipment to demonstrate an ability to start up at low ambient temperatures.

4.3.2.4.2 Requirement

The equipment shall meet the requirements of the performance check.

4.3.2.4.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.5 Drop test

4.3.2.5.1 Definition

The immunity against the effects of dropping is the ability of the equipment to maintain the specified mechanical and electrical performance after being subjected to a series of drops on a hard wooden test surface.

4.3.2.5.2 Requirements

Inspection for mechanical damage, both internal and external, shall be carried out after completion of tests. Any damage shall not impair the operation of the equipment. In particular, parts like knobs, switches and the antenna shall operate in the normal manner. The act of dropping shall not cause the equipment to operate.

4.3.2.5.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.6 Corrosion test

4.3.2.6.1 Definition

The immunity against the effects of corrosion is the ability of the equipment to maintain the specified mechanical and electrical performance after the following test has been carried out.

4.3.2.6.2 Requirements

There shall be no undue deterioration or corrosion of the metal parts, finishes, material, or component parts visible to the naked eye.

In the case of hermetically sealed equipment there shall be no evidence of moisture penetration.

4.3.2.6.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.7 Thermal shock test

4.3.2.7.1 Definition

The immunity against the effects of thermal shock is the ability of the equipment to maintain the specified mechanical and electrical performance after the following test has been carried out.

4.3.2.7.2 Requirements

No damage shall be visible to the naked eye and the equipment shall not show any sign of significant external damage or harmful penetration of water.

4.3.2.7.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.8 Buoyancy test

4.3.2.8.1 Definition

Buoyancy, expressed as a percentage, is its buoyant force divided by its gravity force.

4.3.2.8.2 Requirements

The value of buoyancy shall be at least 5 %.

4.3.2.8.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.9 Solar radiation test

4.3.2.9.1 Definition

The immunity against the effects of continuous solar radiation is the ability of the equipment to maintain the specified mechanical and electrical performance after the following test has been carried out.

4.3.2.9.2 Requirements

The requirements of the performance check shall be met. No damage shall be visible to the naked eye and the equipment shall not show any sign of significant external damage or harmful penetration of water.

4.3.2.9.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.10 Oil resistance test

4.3.2.10.1 Definition

The immunity against the effects of immersion in mineral oil is the ability of the equipment to maintain the specified mechanical and electrical performance after the following test has been carried out.

4.3.2.10.2 Requirements

No sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities of the EPIRB, including labelling, shall be visible to the naked eye.

4.3.2.10.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.3.2.11 Protection of the transmitter

4.3.2.11.1 Definition

When operating, the EPIRB transmitter shall not be damaged due to antenna mismatching.

4.3.2.11.2 Requirement

The equipment shall meet the requirements of the performance check.

4.3.2.11.3 Conformance

Relevant environmental tests as defined within clause 5.3.1 shall be carried out.

4.4 Conformance requirements

4.4.1 Modulation characteristics

4.4.1.1 Depth of modulation

4.4.1.1.1 Definition

The depth of modulation is calculated from the formula: $\frac{A-B}{A+B} \times 100\,\%$.

Where A and B are respectively the maximum and minimum value of the modulation envelope in figure 2, clause 5.3.1.1.

4.4.1.1.2 Limits

The depth of modulation shall be at least 85 %.

4.4.1.1.3 Conformance

Conformance tests defined within clause 5.3.1.1 shall be carried out.

4.4.1.2 Modulation duty-cycle

4.4.1.2.1 Definition

The modulation duty cycle is the ratio: $\frac{t_1}{t_2} \times 100$ % where t_1 is the duration of the positive half cycle of the audio modulation measured at the half amplitude points of the modulation envelope, and t_2 is the period of the fundamental of the audio modulation, in figure 2, clause 5.3.1.1.

4.4.1.2.2 Limits

The modulation duty cycle shall be between 33 % and 55 %.

4.4.1.2.3 Conformance

Conformance tests defined within clause 5.3.1.1 shall be carried out.

4.4.1.3 Sweep characteristics

4.4.1.3.1 Definitions

4.4.1.3.1.1 Sweep range

The audio sweep range is defined by the upper and lower frequencies with which the carrier is amplitude modulated.

4.4.1.3.1.2 Sweep repetition rate

The sweep repetition rate is defined as the rate at which the audio sweep is repeated.

4.4.1.3.2 Limits

The sweep shall be downwards (high frequency to low frequency).

The highest frequency shall not exceed 1 600 Hz.

The lowest frequency shall be greater than 300 Hz.

The total swept range shall be at least 700 Hz.

The sweep repetition rate shall be between 2 Hz and 4 Hz.

4.4.1.3.3 Conformance

Conformance tests defined within clause 5.3.1.2 shall be carried out.

4.4.2 Spectral carrier power ratio

4.4.2.1 Definition

The spectral carrier power ratio is the ratio of the total power of the emission to the power centred on the carrier in a specified bandwidth, both measurements taken under normal modulated conditions.

4.4.2.2 Limits

The spectral carrier power ratio shall be less than 5,2 dB for both 121,5 MHz and 243,0 MHz.

4.4.2.3 Conformance

Conformance tests defined within clause 5.3.2 shall be carried out.

4.4.3 Maximum Effective Radiated Peak Envelope Power (ERPEP)

4.4.3.1 Definition

The maximum ERPEP is defined as the ERPEP in the direction of maximum field strength under specific conditions of measurement.

The peak envelope power is the average power supplied to the antenna transmission line by a transmitter during one radio cycle at the crest of the modulation envelope taken under normal operating conditions.

4.4.3.2 Limits

The limits shall be applicable under normal test conditions and under extreme test conditions.

The ERPEP shall be at least 75 mW.

For man-overboard devices only, the ERPEP shall be at least 25 mW.

4.4.3.3 Conformance

Conformance tests defined within clause 5.3.3 shall be carried out.

5 Testing for compliance with technical requirements

5.1 Test conditions, power supply and ambient temperatures

5.1.1 Test frequencies

For the purpose of conformity testing, the EPIRB shall be provided with the frequencies specified by the administration of the country in which the test is carried out. In the case of EPIRBs fitted with 121,5 MHz and 243 MHz, two frequencies are applicable and unless otherwise stated, tests shall be carried out on both frequencies.

5.1.2 Test fixture

The test fixture is a radio frequency coupling device with an integral antenna equipment for coupling the integral antenna to a 50 Ω radio frequency terminal at the working frequencies of the equipment under test. This allows certain measurements to be performed using the conducted measurement methods. Only relative measurements shall be performed and only those at or near frequencies for which the test fixture has been calibrated.

The test fixture normally shall be provided by the manufacturer.

The performance characteristics of the test fixture shall conform to the following basic parameters:

a) the coupling loss shall not be greater than 30 dB;

b) a coupling loss variation over the frequency range used in the measurement which does not exceed 2 dB;

c) circuitry associated with the Radio Frequency (RF) coupling shall contain no active or non-linear devices;

d) the VSWR at the 50 Ω socket shall not be greater than 1,5 over the frequency range of the measurements;

e) the coupling loss shall be independent of the position of the test fixture and be unaffected by the proximity of surrounding objects or people. The coupling loss shall be reproducible when the equipment under test is removed and replaced;

f) the coupling loss shall remain substantially constant when the environmental conditions are varied.

Any connections provided on the equipment in order to facilitate relative measurements shall not affect the performance of the equipment, neither in the test fixture nor when making measurements involving the use of radiated fields.

The characteristics and calibration shall be included in the test report.

5.1.3 Test conditions power sources and ambient temperatures

5.1.3.1 Normal and extreme test conditions

Conformity testing shall be carried out under normal test conditions (clause 5.1.4) and also where stated under extreme test conditions (clauses 5.1.5 and 5.1.6 applied simultaneously).

5.1.3.2 Test power source

Where stated, the battery of the equipment shall be replaced by a test power source capable of producing normal (clause 5.1.4.2) and extreme test voltages as specified in clause 5.1.6.

5.1.4 Normal test conditions

5.1.4.1 Normal temperature and humidity

Normal temperature and humidity conditions for tests shall be any convenient combination of temperature and humidity, within the following ranges:

- Temperature: +15°C to +35°C.
- Relative humidity: 20 % to 75 %.

5.1.4.2 Normal test voltage

The normal test voltage shall be determined in each case and shall be the voltage corresponding to the voltage which a fresh battery gives at normal temperature and humidity at a load equal to that of the equipment when activated.

5.1.5 Extreme test conditions

5.1.5.1 Extreme temperatures

For tests at extreme temperatures, measurements shall be made in accordance with the procedure specified in clause 5.1.5.2 at the lower and upper temperatures of -20°C and +55°C respectively except when installed within other equipment subject to more stringent temperature requirements, in which case the more stringent requirements shall apply.

5.1.5.2 Procedure for tests at extreme temperatures

The equipment shall be switched off during the temperature stabilization period.

Before tests are carried out, the equipment shall have obtained thermal balance in the test chamber and have been activated for a period of 5 minutes.

The location of the equipment under test in the climatic chamber shall not substantially influence the power output or the power consumption of the equipment under test.

5.1.6 Extreme test voltages

5.1.6.1 Upper extreme test voltage

The upper extreme test voltage shall be determined in each case and shall be the voltage corresponding to the voltage which a fresh battery gives at the upper extreme temperature with a load equal to that of the equipment when activated.

5.1.6.2 Lower extreme test voltage

The lower extreme test voltage shall be determined in each case. The equipment fitted with a primary battery shall be placed in a climatic chamber and cooled to -20°C allowing a stabilization period of 2 hours. The equipment shall then be activated for a period of 24 hours, or 6 hours in the case of a man-overboard device. After this period the battery voltage shall be measured. This voltage shall be taken as the lower extreme test voltage and shall be measured before disconnecting the battery.

5.1.7 Substitution antenna

Variations in the measuring results may occur with the use of different types of substitution antenna at the lower frequencies below about 80 MHz.

Where a shortened dipole antenna is used at these frequencies, details of the type of antenna used should be included with the results of the tests carried out on the site. Correction factors shall be taken into account when shortened dipole antennas are used.

5.1.8 Test antenna

Different types of test antenna may be used, since performing substitution measurements reduces the effect of the errors on the measuring results.

Height variation of the test antenna over a range of 1 m to 4 m is essential in order to find the point at which the radiation is a maximum.

Height variation of the test antenna may not be necessary at the lower frequencies below about 100 MHz.

5.2 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether an equipment meets the requirements of the present document;
- the value of the measurement uncertainty for the measurement of each parameter shall be included in the test report;
- the recorded value of the measurement uncertainty shall be, for each measurement, equal to or lower than the figures in table 1.

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with ETR 028 [4] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterising the actual measurement uncertainties are normal (Gaussian)).

Table 1 is based on such expansion factors.

Table 1: Maximum measurement uncertainty

Parameter	Maximum uncertainty
Conducted RF power variations using a test fixture	±0,75 dB
Modulation depth	±5 %
Modulation duty cycle	±5 %
Spectral carrier power ratio	±0,75 dB
Audio frequency	±5 %
Sweep repetition rate	±5 %

5.2.1 Environmental tests

5.2.1.1 Introduction

Environmental tests shall be carried out before tests are performed on the same equipment with respect to the other requirements of the present document.

5.2.1.2 Procedure

Unless otherwise stated, the EUT shall be connected to an electrical power source during the periods for which it is specified that electrical tests shall be carried out. These tests shall be performed using the normal test voltage (clause 5.1.4.2).

5.2.1.3 Performance check

The term performance check as used in the present document shall be taken to mean:

- a visual inspection of the equipment;
- a check of the frequency error: the carrier frequency 121,5 MHz shall be measured with the equipment placed in the test fixture (clause 5.1.2). The frequency error shall not exceed ±3,5 kHz;
- a check of the maximum effective radiated peak envelope power: the output power shall be measured with the equipment placed in the test fixture (clause 5.1.2). The measured power corrected with the reference factor (clause 5.3.3.2) shall be at least 75 mW, and in the case of man-overboard devices only, shall be at least 25 mW.

The performance check shall be carried out only under normal test conditions unless otherwise stated.

5.2.1.4 Vibration test

The EUT, complete with any shock and vibration absorbers with which it is provided, shall be clamped to the vibration table by its normal means of support and in its normal attitude. Provision may be made to reduce or nullify any adverse effect on equipment performance which could be caused by the presence of an electromagnetic field due to the vibration unit.

The equipment shall be subjected to sinusoidal vertical vibration at all frequencies between:

- 5 Hz and 13,2 Hz with an excursion of ±1 mm ± 10 % (7 m/s^2 maximum acceleration at 13,2 Hz);
- 13,2 Hz and 100 Hz with a constant maximum acceleration of 7 m/s^2.

The frequency sweep rate shall be slow enough to allow the detection of resonances in any part of the equipment.

A resonance search shall be carried out throughout the test. If any resonance of the equipment had $Q \geq 5$ measured relative to the base of the vibration table, the equipment shall be subjected to a further vibration endurance test at each resonant frequency at the vibration level specified in the test with a duration of 2 hours. If resonances occur only with $Q < 5$, the further endurance test shall be carried out at one single observed resonant frequency. If no resonance occurs, the endurance test shall be carried out at a frequency of 30 Hz.

The performance check shall be carried out at the end of each 2-hour endurance test period.

The procedure shall be repeated with vibration in each of two mutually perpendicular directions in the horizontal plane.

After conducting the vibration tests, the equipment shall be inspected for any mechanical deterioration.

The results obtained shall be compared to the limits in clause 4.3.1.2 in order to prove compliance with the requirement.

5.2.1.5 Temperature tests

5.2.1.5.1 Dry heat

The EUT shall be placed in a chamber at normal room temperature and relative humidity. The EUT and, if appropriate, any climatic control devices with which it is provided shall then be switched on. The temperature shall then be raised to and maintained at +55°C (±3°C). At the end of the period of 10 hours to 16 hours at +55°C (±3°C), the EUT shall be subjected to a performance check. The temperature of the chamber shall be maintained at +55°C (±3°C) during the whole of the performance check period. At the end of the test, the EUT shall be returned to normal environmental conditions or to those at the start of the next test.

The results obtained shall be compared to the limits in clause 4.3.2.2.2 in order to prove compliance with the requirement.

5.2.1.5.2 Damp heat

The EUT shall be placed in a chamber at normal room temperature and relative humidity. The temperature shall then be raised to +40°C (±2°C), and the relative humidity raised to 93 % (±3 %) over a period of 3 hours ± 0,5 hours. These conditions shall be maintained for a period of 10 hours to 16 hours. Any climatic control devices provided in the EUT may be switched on at the conclusion of this period.

The EUT shall be switched on 30 minutes later, or after such period as agreed with the manufacturer, and shall be kept operational for at least 2 hours during which period the EUT shall be subjected to the performance check. The temperature and relative humidity of the chamber shall be maintained as specified during the whole test period.

At the end of the test period and with the EUT still in the chamber, the chamber shall be brought to room temperature in not less than 1 hour. At the end of the test the EUT shall be returned to normal environmental conditions or to those required at the start of the next test.

The results obtained shall be compared to the limits in clause 4.3.2.3.2 in order to prove compliance with the requirement.

5.2.1.6 Low temperature

The EUT shall be placed in a chamber at normal room temperature and relative humidity. The temperature shall then be reduced to, and be maintained at, -15°C (±3°C) for a period of 10 hours to 16 hours. Any climatic control devices provided in the EUT may be switched on at the conclusion of this period. The EUT shall be switched on 30 minutes later, or after such period as agreed by the manufacturer, and shall be kept operational for at least 2 hours during which period the EUT shall be subjected to a performance check. The temperature of the chamber shall be maintained at -15°C (±3°C) during the whole of the test period. At the end of the test the EUT shall be returned to normal environmental conditions or to those required at the start of the next test.

The results obtained shall be compared to the limits in clause 4.3.2.4.2 in order to prove compliance with the requirement.

5.2.1.7 Drop test

5.2.1.7.1 Test conditions

During the test, the equipment shall be fitted with a suitable set of batteries and antenna but it shall be switched off. The test shall be carried out under normal temperature and humidity conditions as detailed in clause 5.1.4.1.

The hard wooden test surface shall consist of a piece of solid hard wood with a minimum thickness of 15 cm and a mass of at least 30 kilograms.

The height of the lowest part of the equipment under test, relative to the test surface at the moment of release, shall be 1 m.

Equipment shall be subjected to this test in the configuration as it is normally used in operational circumstances.

5.2.1.7.2 Method of measurement

The test shall consist of six drops, once on each face. After the drops have been completed the equipment shall be inspected visually for signs of damage.

The results obtained shall be compared to the limits in clause 4.3.2.5.2 in order to prove compliance with the requirement.

5.2.1.8 Corrosion test

5.2.1.8.1 Applicability

This test need not be carried out if the manufacturer produces sufficient evidence that the components, materials etc. maintain their specified mechanical and electrical performance against the effects of corrosion.

5.2.1.8.2 Method of measurement

The equipment shall be placed in a chamber fitted with apparatus capable of spraying in the form of fine mist, such as would be produced by a spray gun, salt solution to the formula in table 2.

Table 2: Salt solution formula

sodium chloride	26,5	g	±10 %
magnesium chloride	2,5	g	±10 %
magnesium sulphate	3,3	g	±10 %
calcium chloride	1,1	g	±10 %
potassium chloride	0,73	g	±10 %
sodium bicarbonate	0,20	g	±10 %
sodium bromide	0,28	g	±10 %
plus distilled water to make the solution up to 1 l.			

Alternatively a 5 % sodium chloride (NaCl) solution may be used. The salt used for the test shall be high quality sodium chloride (NaCl) containing, when dry, not more than 0,1 % sodium iodide and not more than 0,3 % of total impurities.

Salt solution concentration shall be 5 % (±1 %) by weight. The solution shall be prepared by dissolving 5 parts ± 1 by weight of salt in 95 parts by weight of distilled or de-mineralized water.

The pH value of the solution shall be between 6,5 and 7,2 at temperature of 20°C (±2°C). The pH value shall be maintained within this range during conditioning. For this purpose, diluted hydrochloric acid or sodium hydroxide may be used to adjust the pH value, provided that the concentration of NaCl remains within the prescribed limits. The pH value shall be measured when preparing each new batch of solution.

The spraying apparatus shall be such that the products of corrosion cannot mix with the salt solution contained within the spray reservoir.

The equipment shall be sprayed simultaneously on all its external surfaces with the salt solution for a period of 1 hour. This spraying shall be carried out 4 times with a storage period of 7 days; at 40°C (±2°C) after each spraying. The relative humidity during storage shall be maintained between 90 % and 95 %.

At the end of the total period the equipment shall be examined visually.

The results obtained shall be compared to the limits in clause 4.3.2.6.2 in order to prove compliance with the requirement.

5.2.1.9 Thermal shock test

The equipment shall be placed in an atmosphere of +65°C (±3°C) for 1 hour. It shall then be immersed in water at +20°C (±3°C) to a depth of 10 cm, measured from the highest point of the equipment to the surface of the water, for a period of 1 hour. A visual inspection shall be carried out for any signs of physical damage or ingress of water.

The results obtained shall be compared to the limits in clause 4.3.2.7.2 in order to prove compliance with the requirement.

5.2.1.10 Buoyancy test

The EPIRB shall be submerged in calm fresh water.

One of the following methods of measurement shall be used:

- the buoyant force shall be measured when the EPIRB is totally submerged in fresh water. The buoyant force shall be then divided by the measured gravity force. The result shall be recorded; or

- the buoyancy may be calculated by dividing the volume of the unit above the waterline by the total volume of the EPIRB. The result shall be recorded.

The results obtained shall be compared to the limits in clause 4.3.2.8.2 in order to prove compliance with the requirement.

5.2.1.11 Solar radiation test

5.2.1.11.1 Applicability

This test need not be carried out if the manufacturer produces sufficient evidence that the components, materials etc. maintain their specified mechanical and electrical performance against the effects of continuous solar radiation.

5.2.1.11.2 Method of measurement

The equipment shall be placed on a suitable support and exposed continuously to a simulated solar radiation source, as shown in table 3, for 80 hours.

The intensity at the test point, which shall also include any radiation reflected from the test enclosure, shall be 1 120 W/m^2 ± 10 % with a spectral distribution given in table 3 below.

Table 3: Spectral distribution

Spectral Region	Ultra-violet B	Ultra-violet A	Visible			Infra-red
Bandwidth {μm}	0,28 to 0,32	0,32 to 0,40	0,40 to 0,52	0,52 to 0,64	0,64 to 0,78	0,78 to 3,00
Radiance {W/m^2}	5	63	200	186	174	492
Tolerance {%}	±35	±25	±10	±10	±10	±10
NOTE: Radiation shorter than 0,30 μm reaching the earth's surface is insignificant.						

The results obtained shall be compared to the limits in clause 4.3.2.9.2 in order to prove compliance with the requirement.

5.2.1.12 Oil resistance test

5.2.1.12.1 Applicability

This test need not be carried out if the manufacturer produces sufficient evidence that the components, materials etc. maintain their specified mechanical and electrical performance against the effects of corrosion.

5.2.1.12.2 Method of measurement

The equipment shall be immersed horizontally for a period of 24 hours under a 100 mm head of mineral oil as specified below at normal room temperature.

- aniline point: 120°C;
- flash point: minimum 240°C;
- viscosity: 10 - 25 cST at 99°C.

The following oils may be used:

- ASTM Oil No. 1;
- ASTM Oil No. 5;
- ISO Oil No. 1.

A visual inspection of the equipment for signs of damage shall be carried out. The results obtained shall be compared to the limits in clause 4.3.2.10.2 in order to prove compliance with the requirement.

5.2.1.13 Protection of the transmitter

With the transmitter operating, the equipment shall be completely immersed in water for a period of 5 minutes. For equipment fitted with an extendible antenna, the test shall be carried out with the antenna fully extended, and repeated with the antenna fully retracted under normal test conditions.

The results obtained shall be compared to the limits in clause 4.3.2.11.2 in order to prove compliance with the requirement.

5.3 Essential radio test suites

5.3.1 Modulation characteristic

5.3.1.1 Depth of modulation and modulation duty-cycle

The depth of modulation and the modulation duty cycle shall be measured with the EPIRB placed in the test fixture (see clause 5.1.2). The emission is suitably applied to the input of a storage oscilloscope. A display of the type shown in figure 2 can be obtained on the storage oscilloscope. The modulation duty cycle and the depth of modulation are calculated as depicted in figure 2.

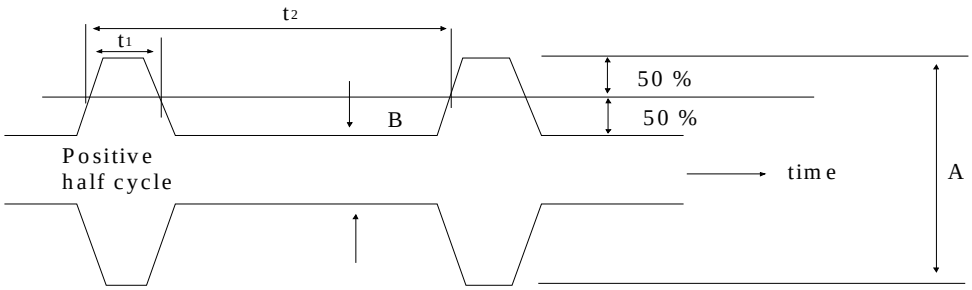


Figure 2: Modulation Characteristics

Modulation depth: $\frac{A-B}{A+B} \times 100\ \%$

Modulation duty cycle: $\frac{t_1}{t_2} \times 100\ \%$

NOTE: Low modulation duty cycle may occur by over-modulation.

The results obtained shall be compared to the limits in clause 4.4.1.1.2 (depth of modulation) and 4.4.1.2.2 (modulation duty cycle) in order to prove compliance with the requirement.

5.3.1.2 Sweep characteristic

The sweep range and repetition rate shall be measured with the EPIRB placed in the test fixture (clause 5.1.2). The emission shall be applied to the input of a suitable analyser. If a spectrum analyser is used, it shall be tuned to the emission centre frequency and with the following settings:

- Resolution bandwidth: 30 kHz;
- Frequency span: 0 Hz;
- Vertical scale : Linear.

The reference line shall be set as close to full scale deflection as practicable. The video output of the spectrum analyser shall be applied to the input of a digital storage oscilloscope. The oscilloscope shall have deep memory capability (in the order of 50 K samples) such that a complete sweep cycle can be captured without losing waveform detail.

The results obtained shall be compared to the limits in clause 4.4.1.3.2 in order to prove compliance with the requirement.

5.3.2 Spectral carrier power ratio

The measurement shall be performed under normal test conditions with the EPIRB placed in the test fixture (clause 5.1.2).

To determine the total power, the emission is suitably applied to the input of a spectrum analyser with the following preferred settings:

- Resolution bandwidth: 10 kHz;
- Video filter: off;
- Scan time: 100 ms/division (div);
- Centre frequency: Carrier frequency as measured in EN 300 152-2 [5], clause 4.2.1.

The total power is determined by noting the power measured from the amplitude reading on the spectrum analyser expressed in logarithmic form and adding it to the modulation duty cycle previously measured and converted to a figure in dB, i.e. $10 \log_{10}$ (spectrum analyser power) $+10 \log_{10} (t_1/t_2)$ using relevant units. (For the definition of t_1 and t_2 see figure 2).

To determine the power in the specified bandwidth, the preferred spectrum analyser settings are as follows:

- Resolution bandwidth: 60 Hz for 121,5 MHz EPIRB, 120 Hz for 243,0 MHz EPIRB;
- Video filter: off;
- Scan time: 10 sec/div;
- Centre frequency: Carrier frequency as measured in EN 300 152-2 [5], clause 4.2.1.

The power in the specified bandwidth is determined from the amplitude reading on the spectrum analyser.

The difference between the total power and the power in the specified bandwidth in dB is the spectral carrier power ratio.

The results obtained shall be compared to the limits in clause 4.4.2 in order to prove compliance with the requirement.

5.3.3 Maximum Effective Radiated Peak Envelope Power (ERPEP)

5.3.3.1 Method of measurement under normal test conditions

On either either an outdoor test site or an anechoic chamber.

The standard position for equipment which is not intended to be worn on a person, including hand-held equipment, shall be on a non conducting support, height 1,5 m, capable of rotating about a vertical axis through the equipment. The standard position of the equipment shall be the following:

a) for equipment with an internal antenna, it shall be placed in the position closest to normal use as declared by the manufacturer;

b) for equipment with a rigid external antenna, the antenna shall be vertical;

c) for equipment with a non-rigid external antenna, the antenna shall be extended vertically upwards by a non-conducting support.

Equipment, which is intended to be worn on a person, shall be tested using a salty man as support.

The simulated man comprises a rotatable acrylic tube filled with salt (NaCl) water with acrylic caps at both ends, placed on the ground.

The preferred dimensions of the container are:

- height: 1,7 m;
- outside diameter: 305 mm;
- sidewall thickness: 4,8 mm.

The container shall be filled with a salt (NaCl) solution of 1,49 g per litre of distilled water (σ = 0,26 S/m, ε = 77).

The equipment shall be fixed to the surface of the simulated man, at the appropriate height for the equipment.

NOTE: A description of the salty simulated man and a means of reducing the weight of such man are described in ETR 273 (see Annex C).

The equipment shall then be activated.

The receiver shall be tuned to the transmitter carrier frequency. The test antenna (see clause 5.1.8) shall be orientated for vertical polarization. The test antenna (see clause 5.1.8) shall be raised or lowered through the specified range of heights until a maximum signal level is detected on the measuring receiver.

The transmitter shall be rotated through 360° around a vertical axis in order to find the direction of the maximum signal.

The maximum signal level detected by the measuring receiver shall be noted.

The transmitter shall be replaced by a substitution antenna as defined in clause 5.1.7.

The substitution antenna shall be connected to a calibrated signal generator.

The frequency of the calibrated signal generator shall be adjusted to the transmit carrier frequency.

The input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver, if necessary.

The test antenna (see clause 5.1.8) shall be raised or lowered through the specified range of heights to ensure that the maximum signal is received.

The input signal to the substitution antenna (see clause 5.1.7) shall be adjusted to the level that produces a level detected by the measuring receiver that is equal to the level noted to that detected from the equipment under test corrected for the change in input attenuator setting of the measuring receiver.

The maximum ERPEP is equal to the power supplied by the signal generator, increased by the gain of the substitution antenna (see clause 5.1.7) and corrected for the change in the attenuator.

The results obtained shall be compared to the limits in clause 4.4.3 in order to prove compliance with the requirement.

5.3.3.2 Method of measurement under extreme test conditions

The equipment shall be placed in the test fixture connected to the artificial load with a means of measuring the power delivered to the load. The equipment shall be operated from the test power source (clause 5.1.3.2).

The measurement shall be made under normal test conditions initially with the equipment on the support in the appropriate position for equipment intended to be worn or not (see clause 5.3.3.1) to enable a reference measurement to be made. This enables a reference factor to be determined. The measurement shall be repeated with the test fixture placed in the chamber under extreme test conditions (clause 5.1.5).

The results obtained shall be compared to the limits in clause 4.4.3 in order to prove compliance with the requirement.

Annex A (normative): The EN Requirements Table (EN-RT)

The EN Requirements Table (EN-RT) serves a number of purposes, as follows:

- it provides a tabular summary of all the requirements;
- it shows the status of each EN-R, whether it is essential to implement in all circumstances (Mandatory), or whether the requirement is dependent on the supplier having chosen to support a particular optional service or functionality (Optional). In particular it enables the EN-Rs associated with a particular optional service or functionality to be grouped and identified;
- when completed in respect of a particular equipment it provides a means to undertake the static assessment of conformity with the EN.

Table A.1: EN Requirements Table (EN-RT)

EN Reference		EN 300 152-3				Comment
No.	**Reference**	**EN-R** (note)	**Status**			
1	4.2	General, operational and technical requirements	M			
2	4.3.1	Vibration	M			
3	4.3.2.2.2	Dry heat	M			
4	4.3.2.3.2	Damp heat	M			
5	4.3.2.4.2	Low temperature	M			
6	4.3.2.5	Drop	M			
7	4.3.2.6	Corrosion	M			
8	4.3.2.7	Thermal shock	M			
9	4.3.2.8	Buoyancy	M			
10	4.3.2.9	Solar radiation	M			
11	4.3.2.10	Oil resistance	M			
12	4.3.2.11	Protection of transmitter	M			
13	4.4.1.1	Depth of modulation	M			
14	4.4.1.2	Modulation duty-cycle	M			
15	4.4.1.3	Sweep characteristic	M			
16	4.4.2	Spectral carrier power ratio	M			
17	4.4.3	Maximum Effective Radiated Peak Envelope Power (ERPEP)	M			
NOTE: These EN-Rs are justified under article 3.3 e) of the R&TTE Directive.						

Key to columns:

No Table entry number;

Reference Clause reference number of conformance requirement within the present document;

EN-R Title of conformance requirement within the present document;

Status Status of the entry as follows:

- M Mandatory, shall be implemented under all circumstances;
- O Optional, may be provided, but if provided shall be implemented in accordance with the requirements;
- O.n this status is used for mutually exclusive or selectable options among a set. The integer "n" shall refer to a unique group of options within the EN-RT. A footnote to the EN-RT shall explicitly state what the requirement is for each numbered group. For example, "It is mandatory to support at least one of these options", or, "It is mandatory to support exactly one of these options".

Comments To be completed as required.

Annex B (informative): The EN title in the official languages

Language	EN title
Danish	Elektromagnetisk kompatibilitet og Radiospektrum Anliggender (ERM);Maritimt nødradioanlæg til lokalisering (EPIRBs) beregnet til brug på frekvensen 121,5 MHz eller på frekvenserne 121,5 MHz og 243 MHz udelukkende til vejvisningsformål. Del 3: Harmoniseret EN, som dækker de væsentlige krav i R&TTE direktivets artikel 3.3e
Dutch	Elektromagnetische compatibiliteit en radiospectrum zaken (ERM);Maritieme Emergency Position Indicating Radio Beacons (EPIRBs) bedoeld voor gebruik op 121,5 MHz of 121,5 MHz en 243 MHz tbv het lokaliseren van schepen nood; Deel 3: Geharmoniseerde EN welke invulling geeft aan de wezenlijke vereisten, neergelegd in artikel 3.3e va de R&TTE Directive
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime Emergency Position Indicating Radio Beacons (EPIRBs) intended for use on the frequency 121,5 MHz or the frequencies 121,5 MHz and 243 MHz for homing purposes only; Part 3: Harmonized EN under article 3.3e of the R&TTE Directive
Finnish	Sähkömagneettinen yhteensopivuus ja radiospektriasiat (ERM); Merenkulun hätäradiomajakat (EPIRB), jotka toimivat taajuudella 121,5 MHz tai taajuuksilla 121,5 ja 243 MHz vain kohtiajotarkoituksiin; Osa 3: Harmonisoitu EN R&TTE - direktiivin artiklan 3.3e olennaisten vaatimusten mukaisesti
French	CEM et spectre radioélectrique (ERM) - Balises radiodioélectriques maritimes d'indication de position en cas d'urgence (EPIRB) destinées à fonctionner à 121,5 MHz ou à 121,5 MHz et 243 MHz pour des besoins de localisation uniquement - Partie 3: EN harmonisée couvrant les exigences essentielles de l'article 3.3e de la Directive R&TTE
German	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM); Seenotfunkbaken zur Kennzeichnung der Notposition (EPIRBs) für die Zielanfahrt für die Nutzung auf den Frequenzen 121,5 MHz oder 121,5 MHz und 243 MHz; Teil 3: Harmonisierte Europäische Norm (EN) mit wesentlichen Anforderungen nach R&TTE-Richtlinie Artikel 3.3e
Greek	Ηλεκτρομαγνητική συμβατότητα και θέματα ραδιοφάσματος (ERM) - Θαλάσσιοι θεσιδεικτικοί ραδιοφάροι έκτακτης ανάγκης (EPIRB) που προορίζονται για χρήση στη συχνότητα 121,5 MHz ή στις συχνότητες 121,5 MHz και 243 MHz μόνο για σκοπούς παλιννόστησης, Μέρος 3: Εναρμονισμένο ΕΝ για την κάλυψη των ουσιωδών απαιτήσεων του αρθρου 3.3e της Οδηγίας
Icelandic	
Italian	Compatibilità elettromagnetica e Questioni relative allo spettro delle radiofrequenze (ERM); segnalatori radio marittimi di posizione d'emergenza (EPIRBs) intesi per l'uso nella frequenza 121,5 MHz o nelle frequenze 121,5 MHz e 243 MHz per il solo uso locale. Part 3: Norma Europea armonizzata per l'articolo 3.3e della direttiva R&TTE
Portuguese	Assuntos de Espectro Radioeléctrico e Compatibilidade Electromagnética (ERM);Rádio Balizas Marítimas de Emergência para Sinalização de Posição (EPIRB), operando na frequência de 121,5 MHz ou nas frequências de 121,5 MHz e 243 MHz, apenas para fins de encaminhamento; Parte 3: EN harmonizada cobrindo os requisitos essenciais no âmbito do Artigo
Spanish	Compatibilidad electromagnética y cuestiones de espectro de radiofrecuencia (ERM);Balizas Radio indicando posiciones marítimas de emergencia (EPIRBs) con uso previsto en bandas de frecuencias de 121,5 MHz o en frecuencias entre 121,5 MHz y 243 MHz para usos exclusivos de localización de blanco; Parte 3: EN armonizada cubriendo los requisitos esenciales según el artículo 3.3e de la directiva de R&TTE
Swedish	Elektromagnetisk kompatibilitet och radio-spektrumfrågor (ERM); Maritima nöd- och lägesindikerande radiofyrar (EPIRBs) avsedda att användas på frekvensen 121,5 MHz eller på frekvenserna 121,5 MHz och 243 MHz för endast sökningsändamål; Del 3: Harmoniserad EN enligt artikel 3.3e i R&TTE-direktivet

Annex C (informative): Bibliography

- ETSI EN 300 152-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime Emergency Position Indicating Radio Beacons (EPIRBs) intended for use on the frequency 121,5 MHz or the frequencies 121,5 MHz and 243 MHz for homing purposes only; Part 1: Technical characteristics and methods of measurement".

- ETSI ETR 273: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement of radiated methods of measurement (using test sites) and evaluation of the corresponding measurement uncertainties".

- Commission Decision 2000/638/EC of 22 September 2000 on the application of Article 3(3)(e) of Directive 1999/5/EC to marine radio communication equipment intended to be fitted to seagoing non-SOLAS vessels and which is intended to participate in the global maritime distress and safety system (GMDSS) and not covered by Council Directive 96/98/EC on marine equipment.

History

Document history			
V1.1.1	December 2000	One-step Approval Procedure	OAP 20010427: 2000-12-27 to 2001-04-27
V1.1.1	May 2001	Publication	