

9`Y\_fca U[ bYfbUnXfi y`^j cgh]b`nUXYj Yj`nj Yn]`n`fUX]`g\_`ja `gdY\_fca `fØFAŁĚ  
FUX]ch`Yz`bg\_]`cXXU`b\_]`]b`gdfY`Ya b\_]`nU`dca cfg\_c`a cV]`bc`glcf]h`j ž\_]`  
cVfUhi`^c`j`dUgc]`j`J<: `ĚHM`b]`bY`\_UfU`hf]gh\_]`Y]b`a Yf]`bY`a YtcXY

Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiotelephone transmitters and receivers for the maritime mobile service operating in VHF bands; Technical characteristics and methods of measurement

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

<https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003>

**Ta slovenski standard je istoveten z: EN 301 925 Version 1.1.1**

### **ICS:**

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
47.020.70	Navigacijska in krmilna oprema	Navigation and control equipment

**SIST EN 301 925 V1.1.1:2003**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 301 925 V1.1.1:2003](https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003>

# ETSI EN 301 925 V1.1.1 (2002-09)

---

*European Standard (Telecommunications series)*

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Radiotelephone transmitters and receivers for  
the maritime mobile service operating in VHF bands;  
Technical characteristics and methods of measurement**

---

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 301 925 V1.1.1:2003](https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003)

<https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003>



## Reference

---

DEN/ERM-RP01-024

## Keywords

---

EMC, GMDSS, maritime, radio, telephony, VHF**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

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 301 925 V1.1.1:2003

<https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f704-33641f-1019-2024-v1-1-1-2003>  
**Important notice**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, send your comment to:

[editor@etsi.fr](mailto:editor@etsi.fr)

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2002.  
All rights reserved.

**DECT™**, **PLUGTESTS™** and **UMTS™** are Trade Marks of ETSI registered for the benefit of its Members.  
**TIPHON™** and the **TIPHON logo** are Trade Marks currently being registered by ETSI for the benefit of its Members.  
**3GPP™** is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

# Contents

Intellectual Property Rights .....	9
Foreword.....	9
1 Scope .....	10
2 References .....	10
3 Definitions, symbols and abbreviations .....	12
3.1 Definitions .....	12
3.2 Symbols.....	13
3.3 Abbreviations .....	13
4 General requirements .....	14
4.1 Construction .....	14
4.2 Controls and indicators.....	14
4.3 Handset and loudspeaker.....	15
4.4 Safety precautions .....	15
4.5 Labelling.....	16
4.6 Warm up.....	16
5 Technical requirements .....	16
5.1 Switching time.....	16
5.2 Class of emission and modulation characteristics .....	16
5.3 Multiple watch facilities.....	16
5.3.1 Additional performance standards .....	16
5.3.2 Scanning characteristics.....	17
5.4 DSC controller interfaces .....	17
5.4.1 Interface requirements .....	17
5.4.2 Signal interfaces.....	17
5.4.3 Operational interfaces .....	17
5.5 Voyage data recorder interface.....	18
6 Test conditions, power sources and ambient temperatures .....	18
6.1 Test conditions .....	18
6.2 Test power source.....	18
6.3 Normal test conditions.....	18
6.3.1 Normal temperature and humidity .....	18
6.3.2 Normal power source voltage .....	18
6.3.2.1 Mains powered equipment .....	18
6.3.2.2 Battery powered equipment .....	18
6.3.2.3 Other power sources.....	19
6.4 Extreme test conditions .....	19
6.4.1 Extreme temperatures .....	19
6.4.2 Extreme values of power source voltage .....	19
6.4.2.1 Mains powered equipment .....	19
6.4.2.2 Battery powered equipment .....	19
6.4.2.3 Other power sources.....	19
6.5 Procedure for tests at extreme temperatures.....	19
7 General conditions of measurement .....	19
7.1 Sequence of testing.....	19
7.2 Test channels .....	20
7.3 Squelch.....	20
7.4 Arrangements for test signals applied to the receiver input.....	20
7.5 Normal test modulation of the receiver wanted signal .....	20
7.6 Arrangements for monitoring the receiver output .....	20
7.7 Arrangements for test signals applied to the transmitter input .....	20
7.8 Normal test modulation of the transmitter.....	21
7.9 Arrangements for monitoring the transmitter output.....	21

7.10	DSC encoder/decoder.....	21
7.11	Standard test signals for DSC.....	21
7.12	Determination of symbol error ratio in the output of the receiver.....	21
7.13	Interpretation of the measurement results .....	21
8	Performance checks.....	22
8.1	Performance checks - introduction.....	22
8.2	Performance check - transmitter frequency error .....	22
8.3	Performance check - transmitter carrier power .....	22
8.4	Performance check - transmitter audio frequency harmonic distortion.....	23
8.5	Performance check - receiver sensitivity.....	23
9	Environmental tests .....	23
9.1	Procedure.....	23
9.2	Vibration test.....	23
9.2.1	Definition.....	23
9.2.2	Method of measurement .....	23
9.2.3	Requirement.....	24
9.3	Temperature tests .....	24
9.3.1	Introduction.....	24
9.3.2	General Procedure.....	24
9.3.3	Dry heat .....	24
9.3.3.1	Definition .....	24
9.3.3.2	Method of measurement.....	24
9.3.3.3	Requirement .....	24
9.3.4	Damp heat.....	25
9.3.4.1	Definition .....	25
9.3.4.2	Method of measurement.....	25
9.3.4.3	Requirement .....	25
9.3.5	Low temperature cycle.....	25
9.3.5.1	Definition .....	25
9.3.5.2	Method of measurement.....	25
9.3.5.3	Requirement .....	25
10	Emissions tests .....	26
10.1	General conditions for emissions tests .....	26
10.2	Conducted emissions from power ports .....	26
10.2.1	Definition.....	26
10.2.2	Test method .....	26
10.2.3	Limits.....	27
10.3	Radiated emissions from the enclosure port.....	27
11	Immunity tests .....	28
11.1	General conditions for immunity tests.....	28
11.1.1	Introduction.....	28
11.1.2	Performance assessment .....	28
11.1.3	Ancillary equipment .....	28
11.1.4	Test configuration.....	28
11.1.5	Arrangements for test signals.....	29
11.1.5.1	General arrangements.....	29
11.1.5.2	Arrangements for test signals applied to the transmitter input.....	29
11.1.5.3	Arrangements for monitoring the transmitter output.....	29
11.1.5.4	Arrangements for test signals applied to the receiver input .....	29
11.1.5.5	Arrangements for monitoring the receiver output .....	29
11.1.6	Exclusion bands .....	30
11.1.6.1	Definition .....	30
11.1.6.2	Transmitter exclusion band for immunity tests .....	30
11.1.6.3	Receiver exclusion band for immunity tests .....	30
11.1.7	Assessment of receiver responses .....	30
11.2	Performance criteria .....	30
11.2.1	Categories .....	30
11.2.2	Performance criteria A for continuous phenomena .....	31
11.2.3	Performance criteria B for transient phenomena .....	31

11.2.4	Performance criteria C for power supply failure.....	31
11.2.5	Immunity performance check .....	31
11.3	Electrostatic discharge immunity (ESD) .....	31
11.3.1	Definition.....	31
11.3.2	Test method .....	32
11.3.3	Performance criteria.....	32
11.4	RF electromagnetic fields in the frequency range 80 MHz to 2 GHz .....	32
11.4.1	Definition.....	32
11.4.2	Test method .....	32
11.4.3	Performance criteria.....	33
11.5	Fast transient, common mode.....	33
11.5.1	Definition.....	33
11.5.2	Test method .....	33
11.5.3	Performance criteria.....	33
11.6	Conducted disturbances on power ports (RF common mode).....	33
11.6.1	Definition.....	33
11.6.2	Test method .....	34
11.6.3	Performance criteria.....	35
11.7	Power supply short term variations .....	35
11.7.1	Definition.....	35
11.7.2	Test method .....	35
11.7.3	Performance criteria.....	35
11.8	Power supply failure.....	35
11.8.1	Definition.....	35
11.8.2	Test method .....	36
11.8.3	Performance criteria.....	36
11.9	Surge .....	36
11.9.1	Definition.....	36
11.9.2	Test method .....	36
11.9.3	Performance criteria.....	36
12	Cabinet radiation and antenna port spurious emissions.....	37
12.1	Conducted spurious emissions conveyed to the antenna.....	37
12.1.1	Definition.....	37
12.1.2	Method of measurement .....	37
12.1.3	Limit .....	37
12.2	Cabinet radiation .....	38
12.2.1	Definition.....	38
12.2.2	Method of measurement .....	38
12.2.3	Limits.....	39
13	Transmitter .....	39
13.1	General conditions.....	39
13.2	Frequency error .....	39
13.2.1	Definition.....	39
13.2.2	Method of measurement .....	39
13.2.3	Limits.....	40
13.3	Carrier power.....	40
13.3.1	Definitions .....	40
13.3.2	Method of measurement .....	40
13.3.3	Limits.....	40
13.3.3.1	General .....	40
13.3.3.2	Normal test conditions .....	40
13.3.3.3	Extreme test conditions .....	40
13.4	Frequency deviation .....	40
13.4.1	Definition.....	40
13.4.2	Maximum permissible frequency deviation.....	41
13.4.2.1	Method of measurement.....	41
13.4.2.2	Limits .....	41
13.4.3	Reduction of frequency deviation at modulation frequencies above 3 kHz.....	41
13.4.3.1	Method of measurement.....	41
13.4.3.2	Limits .....	41

iTech STANDARD PREVIEW  
(standards.itech.ai)

13.5	Sensitivity of the modulator including the microphone .....	42
13.5.1	Definition .....	42
13.5.2	Method of measurement .....	42
13.5.3	Limits .....	42
13.6	Audio frequency response .....	42
13.6.1	Definition .....	42
13.6.2	Method of measurement .....	42
13.6.3	Limits .....	43
13.7	Audio frequency harmonic distortion of the emission .....	43
13.7.1	Definition .....	43
13.7.2	Method of measurement .....	43
13.7.3	Limits .....	44
13.8	Adjacent channel power .....	44
13.8.1	Definition .....	44
13.8.2	Method of measurement .....	44
13.8.3	Limits .....	44
13.9	Residual modulation of the transmitter .....	44
13.9.1	Definition .....	44
13.9.2	Method of measurement .....	45
13.9.3	Limit .....	45
13.10	Modulator attack time .....	45
13.10.1	Definition .....	45
13.10.2	Method of measurement .....	45
13.10.3	Limit .....	45
13.11	Transient frequency behaviour of the transmitter .....	46
13.11.1	Definition .....	46
13.11.2	Method of measurement .....	46
13.11.3	Limits .....	47
13.12	DSC audio input characteristics .....	49
13.12.1	Definition .....	49
13.12.2	Method of measurement .....	49
13.12.3	Limits .....	49
13.13	DSC audio input limitation .....	49
13.13.1	Definition .....	49
13.13.2	Method of measurement .....	49
13.13.3	Limit .....	49
13.14	Testing of generated DSC call sequences .....	49
13.14.1	Definition .....	49
13.14.2	Method of measurement .....	50
13.14.3	Requirement .....	50
14	Receiver .....	50
14.1	Harmonic distortion and rated audio output power .....	50
14.1.1	Definition .....	50
14.1.2	Methods of measurement .....	50
14.1.3	Limits .....	51
14.2	Audio frequency response .....	51
14.2.1	Definition .....	51
14.2.2	Method of measurement .....	51
14.2.3	Limits .....	51
14.3	Maximum usable sensitivity .....	52
14.3.1	Definition .....	52
14.3.2	Method of measurement .....	52
14.3.3	Limits .....	53
14.4	Amplitude characteristic of the receiver .....	53
14.4.1	Definition .....	53
14.4.2	Method of measurement .....	53
14.4.3	Limits .....	53
14.5	Co-channel rejection .....	53
14.5.1	Definition .....	53
14.5.2	Method of measurement .....	53
14.5.3	Limit .....	54



14.6	Adjacent channel selectivity .....	54
14.6.1	Definition .....	54
14.6.2	Method of measurement .....	54
14.6.3	Limits .....	54
14.7	Spurious response rejection .....	54
14.7.1	Definition .....	54
14.7.2	Method of measurement .....	55
14.7.2.1	Introduction to the method of measurement .....	55
14.7.2.2	Method of search over the "limited frequency range" .....	55
14.7.2.3	Method of measurement .....	56
14.7.3	Limit .....	56
14.8	Intermodulation response .....	56
14.8.1	Definition .....	56
14.8.2	Method of measurement .....	56
14.8.3	Limit .....	56
14.9	Blocking or desensitization .....	57
14.9.1	Definition .....	57
14.9.2	Method of measurement .....	57
14.9.3	Limit .....	57
14.10	Receiver noise and hum level .....	57
14.10.1	Definition .....	57
14.10.2	Method of measurement .....	57
14.10.3	Limit .....	57
14.11	Squelch operation .....	58
14.11.1	Description .....	58
14.11.2	Squelch audio muting .....	58
14.11.2.1	Definition .....	58
14.11.2.2	Method of measurement .....	58
14.11.2.3	Limits .....	58
14.11.3	Squelch operating level .....	58
14.11.3.1	Definition .....	58
14.11.3.2	Method of measurement .....	58
14.11.3.3	Limits .....	58
14.11.4	Squelch hysteresis .....	59
14.11.4.1	Definition .....	59
14.11.4.2	Method of measurement .....	59
14.11.4.3	Limit .....	59
14.12	Multiple watch characteristics .....	59
14.12.1	Definitions .....	59
14.12.2	Method of measurement .....	59
14.12.3	Limits .....	60
14.13	DSC audio output characteristic .....	60
14.13.1	Definition .....	60
14.13.2	Methods of measurement .....	60
14.13.3	Limit .....	60
14.14	DSC maximum usable sensitivity .....	60
14.14.1	Definition .....	60
14.14.2	Method of measurement .....	60
14.14.3	Limits .....	60
14.15	DSC co-channel rejection .....	61
14.15.1	Definition .....	61
14.15.2	Method of measurement .....	61
14.15.3	Limits .....	61
14.16	DSC Adjacent channel selectivity .....	61
14.16.1	Definition .....	61
14.16.2	Method of measurement .....	61
14.16.3	Limits .....	61
14.17	DSC dynamic range .....	62
14.17.1	Definition .....	62
14.17.2	Method of measurement .....	62
14.17.3	Limit .....	62
14.18	DSC intermodulation response .....	62

14.18.1	Definition.....	62
14.18.2	Method of measurement .....	62
14.18.3	Limits.....	62
14.19	Verification of correct decoding of various types of DSC calls .....	62
14.19.1	Definition.....	62
14.19.2	Method of measurement .....	63
14.19.3	Requirement.....	63
15	Duplex operation .....	63
15.1	Introduction .....	63
15.2	Receiver desensitization with simultaneous transmission and reception.....	63
15.2.1	Definition.....	63
15.2.2	Method of measurement .....	63
15.2.3	Limits.....	64
15.3	Duplex transceiver internal mixing .....	64
15.3.1	Definition.....	64
15.3.2	Method of measurement .....	64
15.3.3	Limits.....	64
<b>Annex A (normative): Measuring receiver for adjacent channel power measurement.....</b>		<b>65</b>
A.1	General description of power measuring receiver.....	65
A.2	IF filter.....	65
A.3	Attenuation indicator.....	66
A.4	RMS value indicator.....	66
A.5	Oscillator and amplifier.....	66
<b>Annex B (normative): Protocol for the EN 61162-1 commands Frequency Set Information (FSI) .....</b>		<b>67</b>
B.1	Frequency Set Information (FSI) .....	67
<b>Annex C (normative): Radiated measurements .....</b>		<b>68</b>
C.1	Test sites and general arrangements for measurements involving the use of radiated fields .....	68
C.1.1	Outdoor test site .....	68
C.1.2	Test antenna.....	69
C.1.3	Substitution antenna .....	69
C.1.4	Optional additional indoor site .....	69
C.2	Guidance on the use of radiation test sites .....	70
C.2.1	Measuring distance.....	70
C.2.2	Test antenna.....	70
C.2.3	Substitution antenna .....	70
C.2.4	Artificial antenna.....	71
C.2.5	Auxiliary cables.....	71
C.2.6	Acoustic measuring arrangement .....	71
C.3	Further optional alternative indoor test site using an anechoic chamber .....	71
C.3.1	Example of the construction of a shielded anechoic chamber .....	72
C.3.2	Influence of parasitic reflections in anechoic chambers.....	72
C.3.3	Calibration of the shielded anechoic chamber.....	73
History .....		75

---

## 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://webapp.etsi.org/IPR/home.asp>).

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

<b>National transposition dates</b>	
Date of adoption of this EN:	20 September 2002
Date of latest announcement of this EN (doa):	31 December 2002
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 2003
Date of withdrawal of any conflicting National Standard (dow):	30 June 2003

[SIST EN 301 925 V1.1.1:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003>

## 1 Scope

The present document specifies the minimum requirements for shipborne radio transmitters and receivers for fixed installations operating in the VHF frequency bands between 156 MHz and 174 MHz allocated to the maritime mobile service, capable of Radiotelephony and Digital Selective Calling communications within the Global Maritime Distress and Safety System. The present document incorporates the requirements of the relevant resolutions of the International Maritime Organization (IMO) and is primarily intended to specify equipment suitable for fitting to ships subject to the SOLAS Convention [1] and complying with the European Marine Equipment Directive [2].

The EMC parameters defined in the clauses of the present document covering emission tests and immunity tests (see clauses 10 and 11) have been selected to ensure an adequate level of compatibility for apparatus in marine environments. Should the EMC requirements in this standard conflict with those of EN 60945 [17], then the requirements of this standard shall take precedence.

Compliance to the EMC requirements of the present document does not signify compliance to any safety requirements. However, it is the responsibility of the assessor of the equipment to record in their test report any observations regarding the test sample becoming dangerous or unsafe as a result of the application of the tests called for herein.

The present document does not address the testing of ancillary equipment on a stand-alone basis, i.e. separately from the radio equipment with which it is to be used.

## 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.

- SIST EN 301 925 V1.1.1:2003  
<https://standards.globalspec.com/stdn/6e876c37-dc15-42d8-937c-b5a336f7049f/sist-en-301-925-v1-1-1-2003>
- [1] IMO SOLAS 1974: "International Convention for the Safety of Life at Sea" (Consolidated Edition 2001 incorporating all amendments in effect on 1 January 2001).
- [2] Council Directive 96/98/EC of 20 December 1996 on marine equipment (as amended by Commission Directive 98/85/EC) (the European Marine Equipment Directive).
- [3] IMO Resolution A.803(19) (as amended by MSC.68(68)): "Performance Standards for Shipborne VHF Radio Installations capable of Voice Communications and Digital Selective Calling".
- [4] IMO Resolution A.524(13): "Performance Standards for VHF Multiple Watch Facilities".
- [5] ITU Radio Regulations (1998).
- [6] ITU Radio Regulations Appendix S18 (1998): "Table of transmitting frequencies in the VHF maritime mobile band".
- [7] ITU-R Recommendation M.489-2 (1995): "Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz".
- [8] ITU-R Recommendation M.493-10 (2000): "Digital selective-calling system for use in the maritime mobile service".
- [9] ITU-R Recommendation M.541-8 (1997): "Operational procedures for the use of digital selective-calling equipment in the maritime mobile service".
- [10] ITU-R Recommendation SM.329-8 (2000): "Spurious emissions".
- [11] ITU-R Recommendation SM.332-4 (1978): "Selectivity of receivers".

- [12] ITU-T Recommendation E.161 (1995): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".
- [13] ITU-T Recommendation O.41 (1994): "Psophometer for use on telephone-type circuits".
- [14] CISPR 16-1 (1999): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus".
- [15] ETSI ETR 028 (Edition 2): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [16] ETSI EN 300 338 (V1.2.1): "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Technical characteristics and methods of measurement for equipment for generation, transmission and reception of Digital Selective Calling (DSC) in the maritime MF, MF/HF and/or VHF mobile service".
- [17] EN 60945 (2002): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results".
- [18] IEC 61000-4-2 (2001): "Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test".
- [19] IEC 61000-4-3 (2002): "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".
- [20] EN 61000-4-4 (1995) amended by Am1 (2001): "Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test".
- [21] IEC 61000-4-5 (2001): "Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test".
- [22] IEC 61000-4-6 (2001): "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields".  
<https://standards.iteh.ai/catalog/standards/sist/6e876c37-dc15-42d8-937c-03a55b170471/sist-en-301-925-v1-1-1-2003>
- [23] IEC 61000-4-11 (Ed.1.1) (2001): "Electromagnetic compatibility (EMC) - Part 4-11: Testing and measuring techniques - Voltage dips, short interruptions and voltage variations immunity tests".
- [24] EN 61162-1 (2000): "Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners".
- [25] IEC 60050-161 (1990): "International Electrotechnical Vocabulary. Chapter 161: Electromagnetic compatibility".

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

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

**ancillary equipment:** equipment (apparatus) used in connection with a transmitter or receiver is considered to be an ancillary equipment if:

- the equipment is intended for use in conjunction with a transmitter or receiver to provide additional operational or control features to the radio equipment (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide user functions independently of the radio equipment; and
- the radio equipment to which it is connected is capable of providing some intended operation, such as transmitting or receiving, without the ancillary equipment (i.e. it is not a sub-unit of the radio equipment essential to the basic functions of the radio equipment).

**continuous phenomena (continuous disturbance):** electromagnetic disturbance, the effects of which on a particular device or equipment cannot be resolved into a succession of distinct effects (see IEC 60050-161)

**duplex operation:** operating method in which transmission is possible simultaneously in both directions of a telecommunications channel

**effective radiated power:** product of the power supplied to the antenna and its gain relative to a half-wave dipole (see ITU Radio Regulations)

**enclosure port:** physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

NOTE: In the case of integral antenna equipment, this port is inseparable from the antenna port.

**G3E:** phase-modulation (frequency modulation with a pre-emphasis of 6 dB/octave) for speech operation

**G2B:** phase-modulation (frequency modulation with a pre-emphasis of 6 dB/octave) for Digital Selective Calling (DSC) operation

NOTE: The carrier is modulated by a sub-carrier which is FSK modulated by digital data.

**integral antenna:** antenna designed to be connected directly to the equipment with or without the use of an external connector and considered to be part of the equipment

NOTE: An integral antenna may be fitted internally or externally to the equipment.

**mobile equipment:** marine receiver, transmitter or transmitter/receiver (transceiver) intended for installation and use onboard ships, and powered by the ship's supply

**modulation index:** ratio between the frequency deviation and the frequency of the modulating audio signal

**operating frequency range:** range(s) of continuous radio frequencies covered by the Equipment Under Test without any change of units

**performance check:** check of the transmitter frequency error, carrier power, audio frequency harmonic distortion of emission (see clauses 8.2, 8.3 and 8.4 of EN 301 925); and receiver sensitivity (see clause 8.5 of EN 301 925)

**port:** particular interface of the specified equipment (apparatus), with the electromagnetic environment

NOTE: For example, any connection point on an equipment intended for connection of cables to or from that equipment is considered as a port (see figure 1).

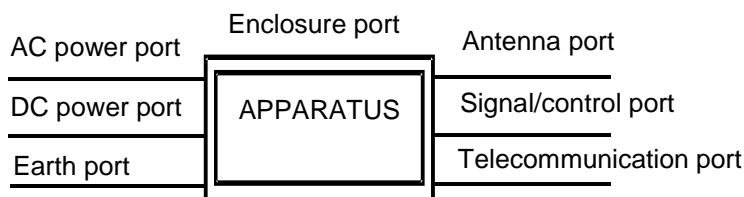


Figure 1: EUT Ports for EMC purposes

**Q ratio:** ratio of an observed magnitude of acceleration at the equipment to the magnitude of acceleration at the base of the vibration table

**radio communications equipment:** marine communications equipment which includes one or more radio transmitters or receivers or parts thereof, for use in a mobile application onboard ship

NOTE: Such equipment may be operated with ancillary equipment but, if so, is not dependent upon it for basic functionality.

**semi-duplex operation:** operating method in which simplex operation is used at one end of the circuit and duplex operation at the other

**simplex:** operating method in which transmission is made possible alternately in each direction of a telecommunications channel, for example, by means of manual control

**spurious emission:** emission on a frequency, or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information

NOTE: Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions (see ITU Radio Regulations [5]).

**switching range:** maximum frequency range over which the receiver or the transmitter can be operated without reprogramming or realignment

**transient phenomena:** pertaining to or designating a phenomena or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest (see IEC 60050-161)

## 3.2 Symbols

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

dBa	sound pressure relative to $2 \times 10^{-5}$ Pa
dBd	antenna gain relative to a half-wave dipole
$\lambda$	wavelength
Q	mechanical resonance

## 3.3 Abbreviations

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

AC	Alternating Current
DC	Direct Current
DSC	Digital Selective Calling
EMC	ElectroMagnetic Compatibility
emf	electromotive force
ESD	Electrostatic Discharge
EUT	Equipment Under Test