

Australian/New Zealand Standard™

**Portable Very High Frequency (VHF)
radiotelephone equipment for the
maritime mobile service operating
in the VHF bands (for non-GMDSS
applications only)**



AS/NZS ETSI EN 301 178:2018

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- Australian Industry Group
- Australian Maritime Safety Authority
- Australian Volunteer Coast Guard Association
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- Consumer Electronics Suppliers Association
- Electromagnetic Technical Evaluation Committee
- Ministry of Business, Innovation and Employment (NZ)
- Telecommunications Users Association of New Zealand
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Originated as AS/NZS 4415:1996.
Jointly revised and redesignated as AS/NZS 4415.1:2003 and AS/NZS 4415.2:2003.
Jointly revised, amalgamated and redesignated as AS/NZS ETSI EN 301 178:2018.

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee RC-004, Radio Communications Equipment — Maritime and Safety of Life, to supersede AS/NZS 4415.1:2003, *Radiotelephone transmitters and receivers for the maritime mobile service operating in the VHF bands — Technical characteristics and methods of measurement, Part 1: Shipborne equipment and limited coast stations (including DSC) (IEC 61097-7:1996, MOD)* and AS/NZS 4415.2:2003, *Radiotelephone transmitters and receivers for the maritime mobile service operating in the VHF bands — Technical characteristics and methods of measurement, Part 2: Major coast stations, limited coast stations, ship stations and hand-held stations (non DSC) (ETS 300 162:1998, MOD)*.

The objective of this Standard is to specify the minimum technical characteristics and methods of measurement required for portable Very High Frequency (VHF) radiotelephones not providing maritime distress and safety communications functions (i.e. not forming part of the Global Maritime Distress and Safety System (GMDSS)) operating in certain frequency bands allocated to the maritime mobile service using either 25 kHz or 25 kHz and 12.5 kHz channels.

This Standard also specifies technical characteristics, methods of measurement and required test results.

This Standard will be published as part of a set of Standards which include the following:

- (a) AS/NZS ETSI EN 301 025, *VHF radiotelephone equipment for general communications and associated equipment for Class “D” Digital Selective Calling (DSC)*.
- (b) AS/NZS ETSI EN 301 178, *Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands (for non-GMDSS applications only)* (this Standard).
- (c) AS/NZS ETSI EN 302 885, *Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated hand-held class H DSC*.

On publication of this set of Standards, AS/NZS 4415.1:2003 and AS/NZS 4415.2:2003 will be superseded in full.

This Standard is identical with, and has been reproduced from, ETSI EN 301 178 V2.2.2 (2017-04), *Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands (for non-GMDSS applications only)*.

As this Standard is reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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Foreword

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

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.5] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.2].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

National transposition dates	
Date of latest announcement of this EN (doa):	31 July 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2018
Date of withdrawal of any conflicting National Standard (dow):	31 January 2019

Modal verbs terminology

In the present document **"shall"**, **"shall not"**, **"should"**, **"should not"**, **"may"**, **"need not"**, **"will"**, **"will not"**, **"can"** and **"cannot"** are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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

1 Scope

The present document specifies technical characteristics and methods of measurements for equipment:

- 1) portable Very High Frequency (VHF) transceivers operating with 25 kHz channels;
- 2) portable Very High Frequency (VHF) transceivers operating with both 25 kHz and 12,5 kHz channels.

These radiotelephones are not providing maritime distress and safety communications functions (i.e. not forming part of the Global Maritime Distress and Safety System (GMDSS)) operating in certain frequency bands allocated to the maritime mobile service using either 25 kHz or 25 kHz and 12,5 kHz channels.

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.2] under the conditions identified in annex A.

2 References

2.1 Normative references

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

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- | | |
|-----|--|
| [1] | ITU Radio Regulations (2016), appendix 18: "Table of transmitting frequencies in the VHF maritime mobile band". |
| [2] | Recommendation ITU-T E.161 (2001): "Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network". |
| [3] | Recommendation ITU-R M.493-14 (2015): "Digital selective-calling system for use in the maritime mobile service". |
| [4] | Recommendation ITU-R M.541-10 (2015): "Operational procedures for the use of digital selective-calling equipment in the maritime mobile service". |
| [5] | ETSI EN 300 225 (V1.5.1) (12-2015): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics and methods of measurement for survival craft portable VHF radiotelephone apparatus". |
| [6] | Recommendation ITU-T O.41 (10-1994): "Psophometer for use on telephone-type circuits". |
| [7] | Recommendation ITU-R M.1084-5 (03-2012): "Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service". |
| [8] | 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

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

- [i.1] Recommendation ITU-R SM.332-4: "Selectivity of receivers".
- [i.2] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.3] ETSI TR 100 028 (all parts) (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.4] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.5] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.

3 Definitions, symbols and abbreviations

3.1 Definitions

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

block: to inhibit a function by making it inaccessible from the user interface

detachable antenna: antenna fixed to the equipment by means of an antenna connector and detachable by the user

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

integral antenna: antenna that is permanently fixed to the equipment and not detachable by the user

modulation index: ratio between the frequency deviation and the modulation frequency

performance check: check of:

- the transmitter carrier power and frequency
- receiver sensitivity

3.2 Symbols

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

dBA Relative to 2×10^{-5} Pa

3.3 Abbreviations

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

ad	amplitude difference
AIS	Automatic Identification System
DSC	Digital Selective Calling
emf	electromotive force
EUT	Equipment Under Test
fd	frequency difference
GMDSS	Global Maritime Distress and Safety System
IF	Intermediate Frequency
MPFD	Maximum Permissible Frequency Deviation
RBW	Reference Bandwidth
RF	Radio Frequency
rms	root mean square
SINAD	(Signal + Noise + Distortion)/(Noise + Distortion)
VHF	Very High Frequency

4 General and operational requirements

4.1 Construction

The manufacturer shall declare that compliance to the requirements of clause 4 is achieved and shall provide relevant documentation.

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

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

All parts of the equipment to be checked during inspection or maintenance operations shall be readily accessible. The components shall be readily identifiable.

Technical documentation shall be supplied with the equipment.

The VHF maritime mobile service uses both single-frequency and two-frequency channels. For two-frequency channels there shall be a separation of 4,6 MHz between the transmitting frequency and the receiving frequency (see Radio Regulations, appendix 18 [1]).

The equipment, which can consist of more than one unit, shall be capable of operating on single frequency and two-frequency channels with manual control (simplex).

The equipment shall be of a colour which distinguishes it from the portable VHF equipment specified in clause 4.1 of ETSI EN 300 225 [5].

The equipment shall be able to operate on appropriate channels defined in ITU Radio Regulations, appendix 18 [1], noting in particular footnotes m) and e).

Additional VHF channels for maritime use outside those defined by appendix 18 to the ITU Radio Regulations [1] may also be provided where permitted by relevant administrations. These channels shall be clearly identified for use as relating to the relevant administration(s) and accessed through a positive action(s) for enabling use of these channel(s) but means shall be provided to block any or all of these additional channels if required by the relevant administration(s).

If 12,5 kHz channels are implemented in the equipment it shall be in accordance with Annex 4 of Recommendation ITU-R M.1084-5 [7].

The equipment shall be so designed that use of channel 70 for purposes other than DSC is prevented (see Recommendations ITU-R M.493-14 [3] and M.541-10 [4]), and that use of channels AIS1 and AIS2 for purposes other than AIS is prevented.

Scan or multiple watch may be provided but means shall be provided to block or unblock these functions.

If the equipment is fitted with an auxiliary antenna connector, simultaneous connection of both the auxiliary antenna and the normal antenna shall be prevented.

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

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

4.2 Controls and indicators

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

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

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

The equipment shall have the following additional controls and indicators:

- on/off switch for the equipment with a visual indication that the equipment is in operation;
- a manual, non-locking push to talk switch to operate the transmitter with a visual indication that the transmitter is activated and facilities to limit the transmission time to a maximum of 5 minutes. A short audible alarm and a visual indication may be provided to show when the transmission will be automatically terminated within the next 10 s. It shall be possible to reoperate the push to talk switch and reactivate the transmitter after a 10 s period;
- a switch for reducing transmitter output power to no more than 1 W where the RF output power is more than 1 W;
- an audio frequency power volume control;
- a squelch control;
- a visual indication that the transmitter is activated.

The equipment shall also meet the following requirements:

- the user shall not have access to any control which, if wrongly set, might impair the technical characteristics of the equipment.

4.3 Microphone and loudspeaker

The equipment shall be fitted with an integral microphone and an integral loudspeaker.

During transmission the receiver output shall be muted.

4.4 Safety precautions

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

Measures shall be taken to prevent damage to the equipment that might arise from an accidental reversal of polarity of the electrical power source.

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

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

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

4.5 Labelling

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

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

The equipment shall be clearly and indelibly marked on the exterior with the text: "Not intended for distress and safety purposes".

The compass safe distance shall be stated on the equipment.

5 Technical requirements specifications

5.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the manufacturer, but as a minimum, shall be that specified in the test conditions contained in the present document. The equipment shall comply with all the technical requirements of the present document which are identified as applicable in annex A at all times when operating within the boundary limits of the declared operational environmental profile.

5.2 Conformance requirements

5.2.1 Switching time

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

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

5.2.2 Class of emission and modulation characteristics

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

6 General conditions of measurement

6.1 Arrangements for RF connections to the equipment

6.1.1 RF connections to integral antenna equipment

For equipment without an antenna connector, the manufacturer shall prepare the equipment with a temporary 50 Ω connector to be used as the RF input/output port.

6.1.2 RF connection to equipment with a detachable antenna

Equipment having an antenna connector shall be tested using the antenna connector as the RF input/output port.

In the case where equipment has more than one antenna connector, the connector normally used to connect the portable antenna to the equipment shall be used.

6.2 Arrangements for test signals applied to the receiver input

Test signal sources shall be connected to the receiver input in such a way that the impedance presented to the receiver input is 50 Ω , irrespective of whether one or more test signals are applied to the receiver simultaneously.

The levels of the test signals shall be expressed in terms of the emf at the terminals to be connected to the receiver.

The nominal frequency of the receiver is the carrier frequency of the selected channel.

6.3 Squelch

Unless otherwise specified, the receiver squelch facility shall be made inoperative for the duration of the conformance tests.

6.4 Normal test modulation

For normal test modulation, the modulation frequency shall be:

- 25 kHz channels: 1 kHz and the frequency deviation shall be ± 3 kHz.
- 12,5 kHz channels: 1 kHz and the frequency deviation shall be $\pm 1,5$ kHz.

6.5 Artificial antenna

When tests are carried out with an artificial antenna, this shall be a non-reactive, non-radiating 50 Ω load.

6.6 Arrangements for test signals applied to the transmitter input

All tests on the transmitter shall be carried out with the output power switch set at its maximum except where otherwise stated in clause 8.

For the purpose of the present document, the audio frequency modulating signal applied to the transmitter shall be produced by a signal generator applied to the connection terminals replacing the microphone transducer.

6.7 Test channels

Conformance tests for 25 kHz channel operation shall be made on channel 16.

Conformance tests for 12,5 kHz channel operation shall be made on channel 276.

6.8 Test conditions, power sources and ambient temperatures

6.8.1 Normal and extreme test conditions

Conformance tests shall be performed under normal test conditions (clause 6.9) and also, where stated, under extreme test conditions (clauses 6.10.1 and 6.10.2 applied simultaneously).