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Maritime low power VHF personal locating beacons employing Digital Selective Calling (DSC); Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

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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.7] 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.1].

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 adoption of this EN:	27 February 2017
Date of latest announcement of this EN (doa):	31 May 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2017
Date of withdrawal of any conflicting National Standard (dow):	30 November 2018

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 lays down the minimum requirements for low power maritime personal locating beacons employing DSC signalling according to ETSI EN 300 338-6 [1], on the VHF maritime mobile frequency band channel 70. Maritime personal locating beacons employing DSC signalling also include AIS with an integrated GNSS receiver to provide the locating function according to ETSI EN 303 098 [2]. The present document incorporates the relevant provisions of the International Telecommunication Union (ITU) radio regulations [i.4] included in Recommendation ITU-R M.493-14 [3]. The present document does not cover requirements for the integrated GNSS receiver providing the locating function.

LBT (Listen Before Talk) techniques are employed to improve spectrum efficiency.

For this application, both the radiated power and the length of time of operation are limited to enable the equipment to be sufficiently small and light to be worn comfortably at all times and to limit the operating range to a local area.

The present document also specifies technical characteristics, methods of measurement and required test results.

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.1] 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] ETSI EN 300 338-6 (V1.1.1) (02-2017): "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; Part 6: Class M DSC".

[2] ETSI EN 303 098 (V2.1.1) (05-2016): "Maritime low power personal locating devices employing AIS; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

[3] Recommendation ITU-R M.493-14 (09/2015): "Digital selective-calling system for use in the maritime mobile service".

[4] IMO Annex 11 - Resolution MSC.149 (77) - (adopted on 3 June 2003): "Adoption of the revised performance standards for survival craft portable two-way VHF radiotelephone apparatus".

[5] ETSI EN 301 025 (V2.2.1) (03-2017): "VHF radiotelephone equipment for general communications and associated equipment for Class "D" Digital Selective Calling (DSC); Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of Directive 2014/53/EU".

[6] 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.

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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] 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.2] ETSI TR 100 028-1 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".

[i.3] 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.4] ITU-R Radio Regulations (2016).

[i.5] ETSI TS 101 570-2 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Interoperability Testing for Maritime Digital Selective Calling (DSC) Radios; Part 2: Class A/B Test Descriptions".

[i.6] ETSI TS 101 570-3 (V1.1.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Interoperability Testing for Maritime Digital Selective Calling (DSC) Radios; Part 3: Class D Test Descriptions".

[i.7] 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:

acknowledged: automated procedure it indicates that the objective of the initial DSC message has been achieved

activation: initial triggering of the MOB device i.e. both parts of the two-step procedure are performed

active mode: activated mode, transmitting in an emergency situation

closed loop: individual transmission to own vessel

default: value selected or an action taken by the equipment software in the absence of any operator input

distress alert: name given to the single distress DSC message with the format symbol 112

distress DSC message: DSC message or acknowledgement containing the distress information

distress information: symbols within a DSC message describing a distress situation consisting of the MMSI of the vessel in distress, the nature of distress, the position of the vessel in distress, the UTC time of that position and the mode of subsequent communication

factory default: default value that is set by the manufacturer such that the field or behaviour is defined prior to any operator intervention

information characters: set of symbols in a DSC message that contains the items of interest for the recipient and is used to compute the ECC symbol that terminates the message

non distress DSC message: DSC messages or acknowledgements that do not have the format specifier or category of "distress"

open loop: transmitting to all ships (broadcast)

symbol (as part of the DSC sentence): 7 binary bits of a 10 bit DSC word that have the information content

test mode: self testing mode, an individual test call to own vessel

word (as part of the DSC sentence): used to describe the 10 binary bits that make up the coded entities of a transmitted DSC message

NOTE: The 10 bits consist of a 7 bit "symbol" that gives the information content and 3 bit error check that gives the number of 0 binary bits in the 7 bit symbol.

3.2 Symbols

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

dB	decibel
P_{Norm}	conducted power measured under normal conditions
P_{-20}	conducted power measured at the lower extreme temperature
P_{+55}	conducted power measured at the upper extreme temperature

3.3 Abbreviations

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

CIRM	Comite International Radio-Maritime
CSP	Channel SPacing
DSC	Digital Selective Calling
EN	European Norm
ERP	Effective Radiated Power
EUT	Equipment Under Test
FSK	Frequency Shift Keying
GNSS	Global Navigation Satellite System
ID	Identity
IMO	International Maritime Organization
LBT	Listen Before Talk
MMSI	Maritime Mobile Service Identity
MOB	Man Over-Board
MSC	Maritime Safety Committee
RBW	Reference BandWidth
RF	Radio Frequency
SINAD	(Signal+Noise+Distortion) to (Noise + Distortion)
UTC	Coordinated Universal Time
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio

4 General requirements

4.1 Construction

4.1.1 General

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

In all respects, the mechanical and electrical design and the construction and finish of the equipment shall conform with 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 that 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 nominal levels of: magnetic influences, handling, stowage and transit, whilst still providing a simple means of operation in an emergency.

The equipment shall be portable, lightweight, compact and be designed as one integral unit. The locating beacon 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 locating beacon 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.

The locating beacon shall be watertight.

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

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

4.1.2 Categories of equipment

Two categories are defined:

- Category 1 locating beacons shall have sufficient positive buoyancy to float in fresh water.
- Category 2 locating beacons intended to be incorporated into or attached to a buoyancy aid are not required to float.

Category 1 beacons that can float free may have a lanyard to attach them to a person or life vest. Where a lanyard is employed it shall meet the requirements of IMO MSC 149(77) [4], paragraph 2.3.11. The user manual or instructions shall include necessary information to allow the user to properly attach the locating beacon lanyard.

The user manual or instructions for Category 2 beacons shall include necessary information to allow the user to fit or attach the locating beacon to a buoyancy aid.

4.2 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. The second mechanical action may be replaced by an immersion sensor. Where the second action is replaced by an immersion sensor then the first action shall be an arm function thus to ensure the beacon is armed for automatic activation when submerged.

It shall only be possible to activate the equipment after a seal or other mechanical restraint has been removed from the first mechanical action. For beacons without an arm function it shall not be possible to reattach a removed seal or restrain. After activation it shall be simple to de-activate the equipment and the means to deactivate the equipment shall be clearly marked.

The switch that operates any test facility (see clause 4.1) shall be so designed that it returns automatically to the off-position when released.

4.3 Indicators

4.3.1 General

The equipment shall be provided with visual and, with the exception of intrinsically safe MOB devices, audible indications that show the operation of the MOB device.

4.3.2 Audible indicators

The audible indicator shall clearly distinguish the following:

1) Initial activation of the locating beacon.

2) Immediately prior to the locating beacon transmitting.

4.3.3 Visual indicators

The visual indicator shall be sufficiently bright to be seen in bright sunlight and clearly distinguish the following states:

i) The locating beacon has been activated and is transmitting in active mode.

ii) The locating beacon has GNSS position lock and is transmitting in active mode.

iii) The locating beacon is undergoing test and is transmitting in test mode.

iv) The locating beacon has completed a test or has been deactivated locally.

v) The locating beacon cannot complete a test because it has not been properly programmed with own vessel MMSI.

vi) The locating beacon cannot complete a test because it could not obtain a GNSS position.

vii) The locating beacon has received a DSC acknowledgement and the DSC transmitter has been deactivated remotely.

4.4 Self ID

The locating beacon shall have a freeform number identity (self ID) to distinguish it from other DSC devices.

The self ID for a personal locating beacon is 972xxyyyy, where xx = manufacturer ID 01 to 99; yyyy = the sequence number 0000 to 9999 allocated by the manufacturer. Manufacturers IDs are issued by CIRM (www.cirm.org). Manufacturers shall only use manufacturer IDs that have been issued to them by CIRM, except for training and conformance testing purposes where the ID xx=00 can be used.

After being programmed by the manufacturer, it shall not be possible for the user to change the self ID of the locating beacon.

The self ID shall be held in non-volatile memory.