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# Report On

Type Approval Testing of the  
Vesper Marine  
VHF DSC Transceiver  
Model: Marlin POD  
In accordance with ITU-R M.493-13

Document 75943855 Report 14 Issue 1

May 2020



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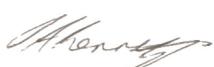
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22 May 2020



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## **SECTION 1**

### **REPORT SUMMARY**

Testing of the Vesper Marine  
VHF DSC Radio Transceiver  
Model: Marlin POD  
In accordance with ITU-R M.493-13



## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Vesper Marine, VHF DSC Radio Transceiver, model Marlin POD to the requirements of ITU-R M.493-13.

Objective	To review the EUT against the requirements of ITU-R M.493-13 requirements.
Manufacturer	Vesper Marine
Serial Number(s)	Cortex Pod - M1.0000006F Cortex Pod - M11.0000006C Cortex H1 -10000007 Cortex H1 – TUV H1-8
Number of Samples Tested	1
Test Specification/Issue/Date	ITU-R M.493-13 (10-2009)
Order Number	13976
Date	
Start of Test	02 December 2019
Finish of Test	20 May 2020
Name of Engineer(s)	Neil Rousell



## 1.2 PRODUCT INFORMATION

### 1.2.1 Technical Description

The Equipment Under Test (EUT) was a Vesper Marine, VHF DSC Radio Transceiver, model Marlin POD as shown in section 4.1. A full technical description can be found in the manufacturer's documentation.

## 1.3 DEVIATIONS

No deviations from the applicable test standard or test plan were made during the testing.

## 1.4 MODIFICATION RECORD

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: TSR0027, TSR0009, TSR0015 (75943820), TSR0032, TSR0033			
0	As supplied by the customer Software POD 0.1.21492 Software Remote 0.9.60 (VM-0.9.14)	Not Applicable	Not Applicable
1	Software updated POD 0.1.21494 Remote 0.9.60 (VM-0.9.94)	Manufacturer	18-10-2019
2	Software updated POD 0.6.21768 Remote 0.9.105	Manufacturer	13-11-2019
3	Software updated POD 0.6.21782 Remote 0.9.105	Manufacturer	15-11-2019
4	Software updated POD 0.7.21883 Remote 0.9.124	Manufacturer	16-12-2019



Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
5	New HW and SW updated POD 0.7.21963 Handset 0.9.136	Manufacturer / TUV-SUD	05-02-2020
6	Software updated POD 0.9.22036 Handset 0.9.138	TUV-SUD	24-02-2020
7	Software updated POD 0.10.22056 Handset 0.9.138	TUV-SUD	26-02-2020
8	Software updated POD 0.11.22073 Handset 0.9.143	TUV-SUD	05-03-2020
9	Software updated POD 0.12.22099 Handset 0.9.144	TUV-SUD	10-03-2020
10	Software updated POD 0.17.22149 Handset 0.9.155	TUV-SUD	23-03-2020
11	Software updated POD 0.17.22149 Handset 0.9.156	TUV-SUD	27-03-2020
12	Software updated POD 0.18.22197 Handset 0.9.158	TUV-SUD	08-04-2020
13	Software updated POD 0.21.22223 Handset 0.9.158	TUV-SUD	15-04-2020
14	Software updated POD 0.22.22255 Handset 0.9.164	TUV-SUD	28-04-2020
15	Software updated POD 0.27.22310 Handset 0.9.173	TUV-SUD	15-05-2020
16	Software updated POD 0.28.22326 Handset 0.9.174	TUV-SUD	20-05-2020

## 1.5 REPORT MODIFICATION RECORD

Issue 1 – First Issue



## 1.6 TERMINOLOGY

The following terms were interpreted as described by the definitions database on the ITU website as of 24 April 2020.

Term: Should

Definition: A term used to refer to behavior of an implementation that is encouraged to be followed under anticipated ordinary circumstances, but is not a mandatory requirement for conformance to this Recommendation International Standard.



## **SECTION 2**

### **TEST DETAILS**

Testing of the Vesper Marine  
VHF DSC Radio Transceiver  
Model: Marlin POD  
In accordance with ITU-R M.493-13



## **2.1 ITU-R M.493-13 INSPECTION**

### **2.1.1 Specification Reference**

ITU-R M.493-13, for clauses see table below.

### **2.1.2 Test Details**

See table below.



## Annex 1

Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1	General	-	-	-
1.1	-	The system is a synchronous system using characters composed from a ten-bit error-detecting code as listed in Table 1.	See clauses: 8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	These are general characteristics, if the DSC equipment did not conform to these characteristics, messages sent to the EUT would not be received and transmitted messages would not be decoded. In compliance with test cases 8.14 and 10.8 of IEC 62238
1.1.1	-	The first seven bits of the ten-bit code of Table 1 are information bits. Bits 8, 9 and 10 indicate, in the form of a binary number, the number of B elements that occur in the seven information bits, a Y element being a binary number 1 and a B element a binary number 0. For example, a BYY sequence for bits 8, 9 and 10 indicates $3(0 \times 4 + 1 \times 2 + 1 \times 1)$ B elements in the associated seven information bit sequence; and a YYB sequence indicates $6(1 \times 4 + 1 \times 2 + 0 \times 1)$ B elements in the associated seven information bit sequence. The order of transmission for the information bits is least significant bit first but for the check bits it is most significant bit first.	See clauses: 8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	These are general characteristics, if the DSC equipment did not conform to these characteristics, messages sent to the EUT would not be received and transmitted messages would not be decoded. In compliance with test cases 8.14 and 10.8 of IEC 62238
1.2	-	Time diversity is provided in the call sequence as follows:	-	-
1.2.1	-	Apart from the phasing characters, each character is transmitted twice in a time-spread mode; the first transmission (DX) of a specific character is followed by the transmission of four other characters before the re-transmission (RX) of that specific character takes place, allowing for a time-diversity reception interval of:  - 400 ms for HF and MF channels, and - 33 1/3 ms for VHF radio-telephone channels.	See clauses: 8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	These are general characteristics, if the DSC equipment did not conform to these characteristics, messages sent to the EUT would not be received and transmitted messages would not be decoded.  In compliance with test cases 8.14 and 10.8 of IEC 62238



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1.3	-	The classes of emission, frequency shifts and modulation rates are as follows:	-	-
1.3.1	-	F1B or J2B 170 Hz and modulation rate of 100 (bit/s) * (1 ± 30 * 10-6) for use on HF and MF DSC calling channels. When frequency-shift keying is effected by applying audio signals to the input of single-sideband transmitters (J2B), the centre of the audio-frequency spectrum offered to the transmitter is 1 700 Hz. When a DSC call is transmitted on HF and MF working channels for public correspondence, the class of emission is J2B. In this case, audio tones with frequencies 1700 Hz ± 85 Hz and modulation rate 100 (bit/s) * (1 ± 30 * 10-6) are used in order for the DSC call to be transmitted.	N/A	MF/HF Only.
1.3.2	-	Frequency modulation with a pre-emphasis of 6 dB/octave (phase modulation) with frequency-shift of the modulating sub-carrier for use on VHF channels:  – frequency-shift between 1 300 and 2 100 Hz; the sub-carrier being at 1 700 Hz; – the frequency tolerance of the 1 300 and 2 100 Hz tones is ±10 Hz; – the modulation rate is 1 200 (bit/s) * (1 ± 30 * 10-6); – the index of modulation is 2.0 ± 10%.	See clauses:  8.11 Frequency Error DSC signal  8.12 Modulation index for DSC  8.13 Modulation rate for DSC	IEC62238 applicable clauses listed., The frequency-shift requirement between 1300 and 2100 Hz is with subcarrier at 1700 Hz is fundamental to DSC operation and demonstrated compliance with clauses 8.14 and 10.8.
1.3.3	-	The radio-frequency tolerances of new designs of both transmitters and receivers in the MF and HF bands should be:  – coast station: ± 10 Hz, – ship station: ± 10 Hz, – receiver bandwidth: should not exceed 300 Hz.	N/A	MF/HF Only.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1.4	-	The higher frequency corresponds to the B-state and the lower frequency corresponds to the Y-state of the signal elements.	See clauses: 8.11 Frequency error of DSC signal 8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	In compliance with test cases, 8.11, 8.14 and 10.8 of IEC 62238
1.5	-	The information in the call is presented as a sequence of seven-bit combinations constituting a primary code.	See clauses: 8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	These are general characteristics, if the DSC equipment did not conform to these characteristics, messages sent to the EUT would not be received and transmitted messages would not be decoded. In compliance with test cases 8.14 and 10.8 of IEC 62238.
1.5.1	-	The seven information bits of the primary code express a symbol number from 00 to 127, as shown in Table A1-1, and where:  – the symbols from 00 to 99 are used to code two decimal figures according to Table A1-2; – the symbols from 100 to 127 are used to code service commands (see Table A1-3).	See clauses: 8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	These are general characteristics, if the DSC equipment did not conform to these characteristics, messages sent to the EUT would not be received and transmitted messages would not be decoded. In compliance with test cases 8.14 and 10.8 of IEC 62238.
1.6	-	Where the distress alert repetitions described in § 11 apply, the following conditions are considered necessary:	-	-



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1.6.1	-	The transmitter encoder must provide repetitive transmission of the call sequence in accordance with § 11; and	Clause 8.14	The distress call transmission was repeated 5 times. Compliance demonstrated in accordance with IEC 62238, clause 8.14.
1.6.2	-	The receiver decoder should provide maximum utilization of the received signal, including use of the error-check character and by using an iterative decoding process with adequate memory provision.	Clause 10.8	Clause 10.8 requires that the DSC equipment receives a range of call types and correctly decodes the information including where applicable position information; moreover, the equipment should, where applicable, be shown to switch channels.  If the ECC was incorrect when the distress alert was sent to the EUT, the message was not received.
1.7	-	When the transmission of a DSC distress alert is automatically repeated, ships' DSC equipment must be capable of automatically receiving a subsequent distress acknowledgement (see Recommendation ITU-R M.541).	Clause 10.8	Clause 10.8 requires the DSC equipment receives a "Distress signal" and a "All ships distress acknowledgement"  It was verified that the EUT received, alerted and displayed the distress alert acknowledgement from a previously sent distress alert.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
2	Technical format of a call sequence	-	-	-
2.1	-	The technical format of the call sequence is:  Dot pattern See 3, Phasing sequence See 3, Call content See tables 4.1 to 4.1.10.2, Closing sequence See 9, 10 and A1-1.	See clauses:  8.14 Testing of generated call sequences.  10.8 Verification of correct decoding of various types of DSC calls	The following call types were transmitted in accordance with IEC 62238 Clause 8.14: All ships safety All ships urgency Distress Group Routine Individual Routine Test  The characters comprising each call type were decoded and compared with the requirements of ITU-R M493-13 tables 4.1 to 4.10.2  The DSC test system was used to compile a series of DSC calls that were sent to the EUT. 62238 Clause 10.8:
2.2	-	Examples of typical call sequences and the construction of the transmission format are given in Figs A1-1 to A1-3.	See clauses:  8.14 Testing of generated call sequences.  10.8 Verification of correct decoding of various types of DSC calls	All ships distress acknowledgement All ships distress relay All ships safety All ships urgency Distress Group Routine Individual Routine  It was confirmed that the EUT responded with the appropriate audio sound and displayed the call category and where applicable, time and position information. Where required, the equipment was checked to see that it responded to channel change information. See 75943855 Report 11 (EN 300 338-3)
2.3	-	The flow charts illustrating the operation of the DSC system are shown in Figs A1-4 and A1-5.	See clauses:  8.14 Testing of generated call sequences.  10.8 Verification of correct decoding of various types of DSC calls	
Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3	Dot pattern and phasing	-	-	-
3.1	-	The phasing sequence provides information to the receiver to permit correct bit phasing and unambiguous determination of the positions of the characters within a call sequence (see Note 1).	See clauses:  8.14 Testing of generated call sequences.	The following call types were transmitted in accordance with IEC 62238 Clause 8.14.-  All ships safety All ships urgency



		NOTE 1 – Acquisition of character synchronization should be achieved by means of character recognition rather than, for example, by recognizing a change in the dot pattern, in order to reduce false synchronization caused by a bit error in the dot pattern.	10.8 Verification of correct decoding of various types of DSC calls	Distress with GPS input Group Routine Individual Routine
3.2	-	The phasing sequence consists of specific characters in the DX and RX positions transmitted alternatively. Six DX characters are transmitted.		The characters comprising each call type were decoded and compared with the call ITU-R M493-13 tables 4.1 to 4.10.2, the phasing characters were verified as per Annex 1, figure 1.  A DSC test system was used to compile a series of DSC calls that were sent to the EUT. IEC 62238 Clause 10.8-
3.2.1	-	The phasing character in the DX position is symbol No. 125 of Table A1-1.		All ships distress acknowledgement All ships distress relay All ships safety All ships urgency Distress Group Routine Individual Routine
3.2.2	-	The phasing characters in the RX position specify the start of the information sequence (i.e. the format specifier) and consist of the symbol Nos. 111, 110, 109, 108, 107, 106, 105 and 104 of Table A1-1, consecutively.		
3.3	-	Phasing is considered to be achieved when two DXs and one RX, or two RXs and one DX, or three RXs in the appropriate DX or RX positions, respectively, are successfully received. These three phasing characters may be detected in either consecutive or non-consecutive positions but in both cases all bits of the phasing sequence should be examined for a correct 3-character pattern. A call should be rejected only if a correct pattern is not found anywhere within the phasing sequence.		It was confirmed that the EUT responded with the appropriate audio sound and displayed the call category and where applicable, time and position information. Where required, the equipment was checked to see that it responded to channel change information. See 75943855 Report 11 (EN 300 338-3)  A call was rejected if a correct pattern was not found within the phasing sequence.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.4	-	To provide appropriate conditions for earlier bit synchronization and to allow for scanning methods to monitor several HF and MF frequencies by ship stations, the phasing sequence should be preceded by a dot pattern (i.e. alternating B-Y or Y-B sequence bit synchronization signals) with duration of:	N/A	MF/HF
3.4.1	200 bits	At HF and MF for: – distress alerts; – distress acknowledgements; – distress alert relays addressed to a geographic area; – distress alert relay acknowledgements addressed to all ships; – all calls addressed to a ship station other than those specified in § 3.4.2.	N/A	MF/HF
3.4.2	20 bits	At HF and MF for: – all acknowledgements to individual calls having format specifiers 120 and 123; – all calling to coast stations. At VHF for all calls.	N/A	MF/HF



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
4	Format specifier	-	-	-
4.1	-	<p>The format specifier characters which are transmitted twice in both the DX and RX positions (see Fig. A1-1) are:</p> <ul style="list-style-type: none"><li>– symbol No. 112 for a “distress” alert; or</li><li>– symbol No. 116 for an “all ships” call; or</li><li>– symbol No. 114 for a selective call to a group of ships having a common interest (e.g. belonging to one particular country, or to a single ship owner, etc.); or</li><li>– symbol No. 120 for a selective call to a particular individual station; or</li><li>– symbol No. 102 for a selective call to a group of ships in a particular geographic area; or</li><li>– symbol No. 123 for a selective call to a particular individual station using the semi-automatic/automatic service.</li></ul>	Clause 10.8	<p>Format specifiers tested: 112 Distress 114 Group Routine 116 All ships safety/Urgency 120 Individual Routine</p> <p>It was confirmed that the EUT responded with the appropriate audio sound and displayed the call category and where applicable, time and position information. Where required, the equipment was checked to see that it responded to channel change information.</p> <p>In addition to the clause 10.8 requirement it was checked the equipment received the following symbols:</p> <p>Symbol 102, group of ships in a particular geographic area</p> <p>Semi-Automatic/Automatic Services was not supported.</p> <p>The EUT was set up to send the described calls. It was confirmed that the symbol numbers were correct and appeared twice in both the DX and RX positions.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
4.2	-	<p>It is considered that receiver decoders must detect the format specifier character twice for "distress" alerts and "all ships" calls to effectively eliminate false alerting. For other calls, the address characters provide additional protection against false alerting and, therefore, single detection of the format specifier character is considered satisfactory (see Table A1-3).</p>	Clause 8.14	<p>The DSC test system was used to send distress and all ships calls without the format identifier transmitted twice. The EUT did not respond.</p> <p>For other calls, errors in both the DX and RX for a specific symbol resulted in no response at the EUT.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5	Address	-	-	-
5.1	-	"Distress" alerts and "all ships" calls do not have addresses since these calls are implicitly addressed to all stations (ship stations and coast stations).	Clause 8.14	Clause 8.14  It was confirmed that "Distress" alerts and "all ships" calls did not contain a destination address.
5.2	-	<p>For a selective call directed to an individual ship, to a coast station or to a group of stations having a common interest, the address consists of the characters corresponding to the station's maritime identity as defined in Recommendation ITU-R M.585. The sequence consists of characters coded in accordance with Table A1-2 (see Note 1).</p> <p>NOTE 1 – According to RR Article 19, maritime mobile service identities are formed of a series of nine digits, consisting of three digits of the maritime identification digits (MID) and six more digits.</p> <p>These identities are included in the address and self-identification parts of the call sequence and are transmitted as five characters C5C4C3C2C1, comprising the ten digits of:</p> <p>(X1, X2) (X3, X4) (X5, X6) (X7, X8) and (X9, X10) respectively, whereas digit X10 is always the digit 0 unless the equipment is also designed in accordance with Recommendation ITU-R M.1080.</p> <p>Example: MID X4 X5 X6 X7 X8 X9 being the ship station identity is transmitted by the DSC equipment as: (M, I) (D, X4) (X5, X6) (X7, X8) (X9, 0)</p>	Clause 8.14	Clause 8.14  The MMSI was transmitted as five characters (10 digits).



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.3	-	<p>For a selective call directed to a group of ships in a particular geographic area a numerical geographic coordinates address consisting of ten digits (i.e. 5 characters), is constructed as follows (see Fig. 6 and Note 1):</p> <p>NOTE 1 – In order to comply with commonly accepted practice, the order of entry and read-out should be: first latitude and then longitude.</p> <p>1 the designated geographic area will be a rectangle in Mercator projection;</p> <p>2 the upper left-hand (i.e. North-West) corner of the rectangle is the reference point for the area;</p> <p>3 the first digit indicates the azimuth sector in which the reference point is located, as follows:</p> <ul style="list-style-type: none"><li>– quadrant NE is indicated by the digit “0”,</li><li>– quadrant NW is indicated by the digit “1”,</li><li>– quadrant SE is indicated by the digit “2”,</li><li>– quadrant SW is indicated by the digit “3”;</li></ul> <p>4 the second and third digits indicate the latitude of the reference point in tens and units of degrees;</p> <p>5 the fourth, fifth and sixth digits indicate the longitude of the reference point in hundreds, tens and units of degrees;</p> <p>6 the seventh and eighth digits indicate the vertical (i.e. North-to-South) side of the rectangle, <math>\Delta\varphi</math>, in tens and units of degrees;</p> <p>7 the ninth and tenth digits indicate the horizontal (i.e. West-to-East) side of the rectangle, <math>\Delta\lambda</math>, in tens and units of degrees.</p>	Clause 10.8	<p>The DSC test rack was used to send calls with position information, it was checked that the equipment under test did successfully receive and decode the position information. Where the EUT resided within the DSC geographic area call. The EUT correctly received geographic area calls.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
6	Category	-	-	-
6.1	-	The "category" information is coded as shown in Table 3 and defines the degree of priority of the call sequence.	Clause 8.14	Category information from the EUT was coded as per Table A1-3.
6.2	-	For a "distress" alert the priority is defined by the format specifier and no category information is included in the call sequence.	Clause 8.14	Format specifier 112 with no category information was received as per table A1-4.1
6.2.1	-	For distress alert relays, distress alert relay acknowledgements and distress acknowledgements the category is distress.	Clause 8.14	Format specifier 102, 114, 116 and 120 with category 112 was received as per table A1-4.3
6.3	-	For safety related calls, the "category" information specifies:	Clause 8.14	-
6.3.1	-	Urgency; or	Clause 8.14	Format specifier 116, 120 with category 110 was received as per table A1-4.5, A1-4.7. Format specifier 116 with category 110 was sent as per table A1-4.5,
6.3.2	-	safety	Clause 8.14	Format specifier 116, 120 with category 108 was received as per table A1-4.5, A1-4.7 Format specifier 116 with category 108 was sent as per table A1-4.5
6.4	-	For other calls, the "category" information specifies:	Clause 8.14	-
6.4.1	-	routine	Clause 8.14	Format specifier 114 with category 100 was sent and received as per table A1-4.8



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
7	Self-identification	-	-	-
7.1	-	The maritime mobile service identity (MMSI) assigned to the calling station, coded as indicated in s 5.2 and its Note 1, is used for self-identification.	Clause 8.14	The EUT correctly identified itself with its programmed MMSI.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8	Messages	The messages that are included in a call sequence contain the following message elements, which are listed in the order in which they would appear in each message. All message formats are explicitly defined in Tables 4.1 through 4.10.2:	-	-
8.1	-	For a "distress" alert (see Table 4.1) the distress information is contained in four messages in the following order:	-	-
8.1.1	Message 1	8.1.1 Message 1 is the "nature of distress" message, coded as shown in Table 3, i.e.:  8.1.1.1 fire, explosion; 8.1.1.2 flooding; 8.1.1.3 collision; 8.1.1.4 grounding; 8.1.1.5 listing, in danger of capsizing; 8.1.1.6 sinking; 8.1.1.7 disabled and adrift; 8.1.1.8 undesignated; 8.1.1.9 abandoning ship; 8.1.1.10 piracy/armed robbery attack; 8.1.1.11 man overboard; 8.1.1.12 emergency position-indicating radiobeacon (EPIRB) emission.	-	<p>The nature of distress types available on the EUT was found to comply</p> <p>Each "nature of distress" message was sent from the EUT to the DSC test system and checked for compliance to table 3.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.1.2	Message 2	<p>Message 2 is the “distress coordinates” message, consisting of ten digits indicating the location of the vessel in distress, coded on the principles described in Table 2, in pairs starting from the first and second digits (see Note 1 to § 5.3):</p> <p>8.1.2.1 The first digit indicates the quadrant in which the incident has occurred, as follows:</p> <p>8.1.2.1.1 quadrant NE is indicated by the digit “0”</p> <p>8.1.2.1.2 quadrant NW is indicated by the digit “1”</p> <p>8.1.2.1.3 quadrant SE is indicated by the digit “2”</p> <p>8.1.2.1.4 quadrant SW is indicated by the digit “3”</p> <p>8.1.2.2 The next four figures indicate the latitude in degrees and minutes.</p> <p>8.1.2.3 The next five figures indicate the longitude in degrees and minutes.</p> <p>8.1.2.4 If “distress coordinates” cannot be included, or if the position information has not been updated for 23½h, the 10 digits following the “nature of distress” should be automatically transmitted as the digit 9 repeated 10 times.</p>	-	<p>A distress signal containing position and time information was transmitted from the EUT to the DSC test system.</p> <p>The DSC test system successfully decoded the distress call and position and time information.</p> <p>It was verified that the EUT could decode position information correctly:</p> <p>It was checked that with no position update that after 23½h the equipment transmitted the digit 9 10 times.</p> <p>It was checked that if the EUT does not specify position information, the EUT sends digit 9 repeated 10 times:</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.1.3	Message 3	<p>Message 3 is the time indication coordinated universal time (UTC) when the coordinates were valid consisting of four digits coded on the principles described in Table 2, in pairs starting from the first and second digits.</p> <p>8.1.3.1 The first two digits indicate the time in hours.</p> <p>8.1.3.2 The third and fourth digits indicate the part of the hours in minutes.</p> <p>8.1.3.3 If the time cannot be included the four time indicating digits should be transmitted automatically as "8.8.8.8"</p>	-	<p>It was checked that the UTC time information was successfully transmitted by the EUT and decoded by the DSC test system.</p> <p>The EUT received and correctly decoded a UTC sent by the DSC test system.</p> <p>Where no time information was available in the EUT, 88 88 is coded in the time information field.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.1.4	Message 4	Message 4 is a single character to indicate the type of communication (telephone or FEC teleprinter) which is preferred by the station in distress for subsequent exchange of distress traffic. This character is coded as shown in Table 3 first telecommand.	-	<p>It was checked that message 4, subsequent communication was successfully transmitted by the EUT and decoded by the DSC test system.</p> <p>The EUT transmitted 100 as its first telecommand.</p> <p>It was checked that message 4 could be successfully received by the EUT.</p>
8.2	Distress alert relay, distress alert relay acknowledgement, distress acknowledgement	For a distress relay, distress relay acknowledgement, distress acknowledgement (see Tables 4.2, 4.3 and 4.4) the distress information is contained in five messages in the following order:	-	-
8.2.1 and 8.2.2	Message 0 Message 1	8.2.1 Message 0 is the "MMSI" of the vessel in distress.  8.2.2 Message 1 is the "nature of distress" message, coded as shown in Table 3, i.e.:  8.2.2.1 fire, explosion; 8.2.2.2 flooding; 8.2.2.3 collision; 8.2.2.4 grounding; 8.2.2.5 listing, in danger of capsizing; 8.2.2.6 sinking; 8.2.2.7 disabled and adrift; 8.2.2.8 undesignated distress; 8.2.2.9 abandoning ship; 8.2.2.10 piracy/armed robbery attack; 8.2.2.11 man overboard; 8.2.2.12 emergency position-indicating radiobeacon (EPIRB) emission.	-	<p>It was checked that the EUT could receive distress relay, distress relay acknowledgement and distress acknowledgement calls.</p> <p>The MMSI of the vessel in distress was displayed.</p> <p>The EUT correctly decoded and displayed the received Nature of Distress.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.2.3	Message 2	<p>Message 2 is the “distress coordinates” message, consisting of ten digits indicating the location of the vessel in distress, coded on the principles described in Table 2, in pairs starting from the first and second digits (see Note 1 to § 5.3):</p> <p>8.2.3.1 The first digit indicates the quadrant in which the incident has occurred, as follows:</p> <p>8.2.3.1.1 quadrant NE is indicated by the digit “0”</p> <p>8.2.3.1.2 quadrant NW is indicated by the digit “1”</p> <p>8.2.3.1.3 quadrant SE is indicated by the digit “2”</p> <p>8.2.3.1.4 quadrant SW is indicated by the digit “3”</p> <p>8.2.3.2 The next four figures indicate the latitude in degrees and minutes.</p> <p>8.2.3.3 The next five figures indicate the longitude in degrees and minutes.</p> <p>8.2.3.4 If “distress coordinates” cannot be included, or if the position information has not been updated for 23 ½ h, the 10 digits following the “nature of distress” should be automatically transmitted as the digit 9 repeated 10 times.</p>	-	<p>It was verified that the EUT could decode the received position information correctly.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.2.4	Message 3	<p>Message 3 is the time indication coordinated universal time (UTC) when the coordinates were valid consisting of four digits coded on the principles described in Table 2, in pairs starting from the first and second digits.</p> <p>8.2.4.1 The first two digits indicate the time in hours.</p> <p>8.2.4.2 The third and fourth digits indicate the part of the hours in minutes.</p> <p>8.2.4.3 If the time cannot be included the four time indicating digits should be transmitted automatically as "8 8 8".</p> <p>8.2.5 Message 4 is a single character to indicate the type of communication (telephone or FEC teleprinter) which is preferred by the station in distress for subsequent exchange of distress traffic. This character is coded as shown in Table 3 first telecommand.</p>	-	<p>It was verified that the EUT could decode the received UTC and type of communication information correctly.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.3	Other types of calls	For other types of calls (see Table 4.5 through 4.10.2 and Figs. 2 and 3) messages are included in the following order:	-	-
8.3.1	Message 1	<p>8.3.1 Message 1 is the "telecommand" information and consists of 2 characters (first and second telecommand) coded as shown in Table 3:</p> <p>8.3.1.1 If no information additional to that conveyed by the first telecommand character is required, then the second telecommand signal should be symbol No. 126 (no information) (see Table 3);</p> <p>8.3.1.2 If no telecommand information is used, symbol No. 126 is transmitted twice.</p> <p>8.3.1.3 If the telecommand 1 is "F3E/G3E duplex TP" (symbol 101) in a request, which can be complied with, the telecommand 1 "F3E/G3E all modes TP" (symbol 100) should be used in the acknowledgement.</p>	Clause 8.14 and 10.8	<p>The structure of DSC calls sent and received by the EUT were checked and found to be in accordance with tables 3 and 5.</p> <p>It was not possible to compose a message on the EUT that had no telecommand information.</p> <p>The EUT did not support acknowledgement of F3E/G3E duplex TP calls.</p>
8.3.2	Message 2	8.3.2 Message 2 may contain two "channel or frequency message" elements, each of which basically consists of three characters, "character 1", "character 2" and "character 3", indicating the proposed working frequency (in the F1B/J2B mode the assigned frequency should be used) in multiples of 100 Hz or the channel number (coded in accordance with Table 5) or the ship's position. The first frequency element (the Rx field) in the call indicates the called station receive frequency and the second frequency element (the Tx field) indicates the called station transmit frequency. In acknowledgements the Rx and Tx fields indicate the receive and transmit frequency of the acknowledging station respectively (see also Fig. 2 and Note 1).	Clause 8.14 and 10.8	Message 2 contains channel information. Frequency information is used for MF/HF only. Coding/decoding was checked with calls to and from the EUT.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.3	Other types of calls	8.3	Other types of calls	8.3
8.3.2.1	Frequency information	The frequency (in the F1B/J2B mode the assigned frequency should be used) in multiples of 100 Hz or 10 Hz (see NOTE 2 above) may only be indicated as such when the frequency is below 30 MHz. The three characters provide for the required six decimal digits. Character 1 represents the units (U) and tens (T) of 100 Hz, character 2 the hundreds (H) and thousands (M) and character 3 the tens of thousands (TM) and hundreds of thousands (HM) of 100 Hz. For MF/HF DSC, use frequency selection mode, vice channel selection mode, to ensure international interoperability. Also, when using seven-digit frequencies, the four characters provide for the required seven decimal digits. Character 0 represents the units (U1) and tens (T1) of 10 Hz, character 1 the units (U) and tens (T) of 1 kHz, character 2 the hundreds (H) and thousands (M) and character 3 the tens of thousands (TM) of 1 kHz. However note that this four characters information is only for use of seven-digit frequencies in the F1B/J2B, i.e. it does not affect the messages for the J3E TP mode and for the F1B/J2B mode using six-digit frequencies to ensure interoperability.	-	N/A – MF/HF only.
8.3.2.2	Channel information	-	-	-
8.3.2.2.1	HF and MF channels	If the HM digit is 3, this indicates that the number represented by the digits TM, M, H, T, U, T1 and U1 is the HF/MF working channel number (either single frequency or two frequency channels). This mode should only be used for decoding received calls, to ensure interoperability with older equipment.	-	N/A – MF/HF only.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.3.2.2.2	VHF Channels	If the HM digit is 9, this indicates that the number represented by the values of the digits M, H, T and U is the VHF working channel number. If the M digit is 1, this indicates that the ship stations transmitting frequency is being used as a simplex channel frequency for both ship and coast stations. If the M digit is 2, this indicates that the coast stations transmitting frequency is being used as a simplex channel frequency for both ship and coast stations.	10.8	<p>The channel information of transmitted and received DSC messages were checked, and confirmed to be in accordance with annex 1, table 5.</p> <p>Calls sent from the EUT used symbol 00 indicating M = 0, (frequencies being used are in accordance with RR Appendix 18 for both single and two frequency channels).</p>
8.3.2.3	Ship's position information	<p>For MF/HF calls, message 2 may contain the ship's position, consisting of the digit 5 repeated two times and ten digits (five characters) indicating this position, coded in accordance with § 8.1.2 (see Table 1-6).</p> <p>For position requests message 2 consists of 6 no information symbols (symbol No. 126). In acknowledgements to a call requesting ship's position (see Fig. 1-3d)) message 2 consists of twelve digits (six symbols), the first of which should be coded in accordance with § 8.1.2 followed by one symbol No. 126.</p>	N/A	<p>This is N/A as the equipment is VHF class D.</p> <p>However, the equipment does receive position information and transmit ships information.</p> <p>Position requests were verified for containing six 126 symbols.</p> <p>The EUT acknowledged position requests with 6 position symbols, the 6<sup>th</sup> being 126.</p> <p>This feature was implemented by the manufacturer as it is a mandatory requirement for ITU-R M.493-14 and for compatibility with previous models.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.3.3	Message 3	<p>Message 3 follows message 2 in this case and contains the time (UTC) when the coordinates were valid, coded as indicated in § 8.1.3.</p> <p>Message 3 follows message 2 when using the DSC system for calls initiated by ship stations requiring a semi-automatic or automatic connection (see Table 1-4.10.1 and 1-4.10.2) and contains the public switched network number (e.g. telephone number). In this case the format specifier used is symbol No. 123.</p> <p>This number is coded by up to nine symbols in a manner similar to that shown in Table 1-2, except that the first character transmitted should be either symbol No. 105 or No. 106 to indicate whether the network number contains an odd or even number of significant digits. As an example, the number 0012345 would be coded as symbol numbers 105 00 01 23 45 whereas the number 00123456 should be coded as symbol numbers 106 00 12 34 56.</p>	-	<p>The DSC test system was used to send an individual safety position request to the EUT. The EUT correctly responded with UTC time in the message 3 position.</p> <p>Semi-auto sequences were not supported.</p> <p>Requirement was considered optional and therefore this feature was not implemented by the EUT.</p>
8.4	Distress alert relay	<p>For "distress alert relay" including shore-to-ship alerts, "distress alert relay acknowledgement" and "distress acknowledgement" calls, the message formats are indicated in Tables 1-4.3, 1-4.4 and 1-4.2 respectively.</p> <p>When sending a distress alert on behalf of another ship which is unable to send its own alert, and where the identity of the station in distress is unknown, the distress alert relay call should contain the symbol No. 126 transmitted five times for the "identification of the station in distress".</p>	Clause 8.14 ad 10.8	<p>RX:</p> <p>Distress ack</p> <p>Distress relay</p> <p>Distress relay ack, all ships individual (EUT does not display nature of distress)</p> <p>EUT does not support DROBOSE call transmission types</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.5	Test calls	Test calls on the distress and safety frequencies for MF and HF and VHF channel 70 may be conducted using the test call sequence in Table 1-4.7.	Clause 8.14 and 10.8	<p>The equipment had a specific menu to send "test calls".</p> <p>The EUT can send test calls and receive acknowledgements in accordance with table 4.7. The EUT can receive test calls and send ack in accordance with table 4.7.</p>
9	End of sequence	The "end of sequence" (EOS) character is transmitted three times in the DX position and once in the RX position (see Fig. 1-1b)). It is one of the three unique characters corresponding to symbol Nos. 117, 122 and 127	Clause 8.14, 10.8	The equipment was tested by transmitting various calls, to check the "end of sequence" (EOS) character as follows: Distress EOS 127, Individual Routine EOS 117, Individual Routine Acknowledgement EOS 122.
10	Error-check character	-	-	-
10.1	-	The error-check character (ECC) is the final character transmitted and it serves to check the entire sequence for the presence of errors which are undetected by the ten-unit error-detecting code and the time diversity employed.	Clause 8.14 and 10.8	The EUT was connected to a DSC test system, which was used to fully decode all characters in the DSC transmission and to detail all the characters to be transmitted to the equipment. It was checked that the error-check character (ECC) was the final character transmitted.
10.2	-	The seven information bits of the ECC shall be equal to the least significant bit of the modulo-2 sums of the corresponding bits of all information characters (i.e. even vertical parity). The format specifier and the EOS characters are considered to be information characters. The phasing characters and the retransmission (RX) characters shall not be considered to be information characters. Only one format specifier character and one EOS character should be used in constructing the ECC. The ECC shall also be sent in the DX and RX positions.	8.14	The ECC sent by the EUT was checked for validity against its information characters.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
10.3	-	Automatic acknowledgement transmissions should not start unless the ECC is received and decoded correctly. A received ECC which does not match that calculated from the received information characters may be ignored if this was due to an error detected in the ten-unit error-detecting code of the information characters which was correctable by use of the time diversity code.	Clause 5.3.2, 8.14 and 10.8	The DSC test system sent a correctly formatted call to the equipment which responded with an acknowledgement. The call from the rack was then modified making it invalid. In this case the equipment did not acknowledge the call.
10.4	-	The receiver decoder should provide maximum utilization of the received signal, including use of the error-check character.	Clause 8.14 and 10.8	The equipment was connected to a DSC test system, a distress call including expansion sequence was sent to the equipment. The extended position data was sent and the full position and time was shown on the equipment (EUT) display. If the ECC is sent with errors the EUT does not receive the message.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
11	Distress alert attempt	-	-	-
11.1	-	Distress alerts may be transmitted as a single frequency or a multi-frequency call attempt preceded by a dot pattern. MF/HF equipment should be capable of using both single and multi-frequency call attempts. Where a distress alert attempt contains more than one consecutive distress alert on the same frequency (see Recommendation ITU-R M.541), these consecutive alerts should be transmitted with no gap between the end of one call and the start of the dot pattern of the following call to enable bit synchronization to be maintained (see Fig. 1-1c)). Multi-frequency call attempts should always include at least the MF and HF 8 MHz band DSC distress and safety frequencies.	Clause 4.5.3	MF/HF not supported.  For VHF, it was verified that the unit transmits on a single frequency only, Channel 70; 156.525 MHz  It was checked and verified that the EUT sent 5 consecutive alerts with no gap between the messages.
11.2	-	A distress alert should be activated only by means of a dedicated distress button which should be clearly identified and be protected against inadvertent operation. For a fixed station the protection should be a spring loaded lid or cover. For a handheld VHF the protection should be a cover or a lid which should be rapidly self-closing when unattended. The initiation of a distress alert should at least require two independent actions.	Clause 4.5.3	Inspection of the equipment shows there is a two stage process to send a distress alert. <ol style="list-style-type: none"><li>1. The spring-loaded cover marked "distress" and red in colour must be lifted to expose the distress button.</li><li>2. The distress button must be depressed for 3 seconds to send the distress alert. The equipment's menu gives the user the option to select "nature of distress" for the call. The default is "undesignated"</li></ol>
11.3	-	Calls with format specifier "distress" or category "distress", "urgency" and "safety" should be initiated manually only. This applies also for ships equipped for automatic DSC operation. For automatic repetition of distress alerts see Recommendation ITU-R M.541.	Clause 4.5.3	Distress, urgency and safety calls could only be initiated by the user manually pressing buttons.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
11.4	-	<p>Immediately following a distress alert a DSC expansion message giving enhanced position resolution according to Recommendation ITU-R M.821 should be transmitted in the following manner.</p> <p>For a single frequency distress alert attempt the expansion message should be transmitted immediately after the last of five consecutive distress alerts.</p> <p>For a multi-frequency distress alert attempt the expansion message should be transmitted immediately after each distress alert.</p>	Clause 4.5.3	The EUT automatically transmitted the distress alert 5 times. The last of the 5 alerts included the expansion message which provided more accurate position information.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12	Shipborne human machine interface	-	-	-
12.1	Shipborne aural alarm	<p>Shipborne alarms should start softly and increase in volume if not silenced by the operator. This will give the operator the opportunity to acknowledge the alarm without interrupting the ship's current communications. It should be possible for the operator to disable all audible alarms except those of category (see 6) distress and urgency.</p> <p>Distress and urgency calls should have a distinctive two tone alarm. The alarm should consist of two substantially sinusoidal audio-frequency tones, transmitted alternately. One tone should have a frequency of 2200 Hz and the other a frequency of 1300 Hz. The duration of each tone should be 250 ms.</p> <p>Distress calls and urgency calls should activate an alarm. For HF and MF distress calls, the alarm should activate only when a distress alert, distress acknowledgement, or a distress alert relay is received and the distress position is within 500 NM (926 km) of the receiving vessel's position, or if the distress position is in the polar areas (latitude greater than 70°N or 70°S). The alarm should also activate when the call is received and the distance between the vessel in distress and the receiving vessel cannot be determined.</p>	-	<p>The audio alarm starts at a low level and increased in volume for distress, urgency, safety and routine received calls. It was possible to acknowledge the alarm and silence it before the volume increased.</p> <p>The audio frequency and duration of the two tone alarm was checked and found to be in compliance.</p> <p>All audible alarms could be disabled once the alarm had sounded from an incoming call.</p> <p>It was not possible to disable the distress and urgency audible alarms in the EUT.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12.1	Shipborne aural alarm	<p>NOTE 1 – Disabling of aural alarm does not affect handling of call.</p> <p>For geographic area calls, the alarm appropriate to the category should activate when the receiving station's position is within the area specified by the call or the receiving station's position is not known. The alarm should not be activated where duplicate distress alert relay calls are received within one hour. A duplicate distress alert relay call is one having format specifier all ships or geographic area that contains identical message information, as defined in § 8.1 and an identical distress MMSI.</p>	-	The geographic area or all ships – distress alert relay calls were verified that, for duplicates sent within one hour, the EUT alarm does not activate.
12.2	Inactivity timer	During normal operation, the equipment should include an inactivity timer to return the DSC system display to default or standby mode if the operator is in a menu where DSC call reception is disabled and does not make any selections or changes for 10 min.	-	A 10 min inactivity timer was set as default on the EUT.
12.3	Display	The information on the display should be visible in all shipboard lighting conditions. It should have the means to display, in plain language, the information contained in the received call. For Class A/B DSC equipment, the display should have a minimum of 160 characters in two or more lines.	Clause 4.6	<p>The display was checked under various artificial light conditions available in the test environment. The display was clearly legible under all conditions.</p> <p>The display brightness was adjustable and a "night mode" was also provided.</p> <p>The EUT was a class D therefore the 160 character requirement was not applicable.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12.4	MMSI	<p>DSC equipment should not transmit any DSC call until own ship's MMSI allocated to the ship by the relevant administration has been configured and stored in the DSC equipment. Once stored, it should not be possible for the user to change the MMSI without advice from the manufacturer.</p> <p>The DSC equipment should display own ship's MMSI on start-up unless the MMSI has not been configured. If the MMSI has not been configured, the equipment will display a warning that the unit will not transmit any DSC calls until own ship's MMSI is entered. The equipment should stay in this state until the operator confirms he has read the display and input own ship's MMSI.</p> <p>The MMSI should be readily displayed on the HMI when the DSC equipment is on.</p>	-	<p>The EUT was powered up without an MMSI, the user was warned that an MMSI had not be configured. DSC calls were not possible until an MMSI was configured.</p> <p>The EUT did not display the configured MMSI on start-up but continually displayed its own MMSI when powered on and in standby. The MMSI was not editable by the user without advice from the manufacturer.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12.5	Disabling of DSC automatic channel switching function on VHF	<p>Automatic switching to a subsequent communication channel on receipt of a DSC call may be implemented on VHF equipment. Prior to an automatic switch to the proposed frequency or channel, the user should accept the change, which should be carried out after the acknowledgment.</p> <p>Automatic switching to a subsequent communication channel on receipt of a DSC call might in some cases disrupt important ongoing communications. Where such capability exists, a means for disabling that function should therefore be provided for all calls other than individual station calls of category distress or urgency. The DSC equipment should provide visual indication that the automatic switching function is disabled.</p>	-	<p>The EUT provided an option to configure auto channel change.</p> <p>The user was prompted to accept or pause auto channel change if configured.</p>
12.6	Data interface	DSC equipment should be provided with facilities for exchange of data from shipborne navigational equipment or systems, or other shipborne equipment as necessary in accordance with IEC 61162 series for purposes including automatic position updating.	-	The EUT provided an NMEA output for positional data. This was not tested under the scope of this report.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12.7	Position updating	<p>DSC equipment should accept valid IEC 61162 position information including the time at which the position was determined, from an external source utilizing the data interface described in § 12.6, for automatic update of own ship's DSC position.</p> <p>The DSC equipment may also be provided with an internal electronic position fixing device. In which case, the DSC equipment should automatically switch to the internal source if the external IEC 61162 position information is not valid or not available.</p> <p>If the automatic position update is not available, a displayed and audible reminder to manually update the position should occur before the position information is 4 hours old. The displayed reminder should remain until position updating has been carried out. Any position information not updated for more than 23½ hours should automatically be erased.</p> <p>Own ship's DSC position information and the source of that information (external, internal, or manually entered) should be displayed on the DSC equipment.</p>	-	<p>The EUT has an internal GPS receiver and did not accept external positional information over the 61162 interface.</p> <p>The EUT provided an alarm and a displayed reminder if the position information was not updated for 4 hrs.</p> <p>Positional information that was not updated for more than 23.5 hrs was erased.</p> <p>The source of the positional information was displayed as a satellite symbol on the EUT.</p>
12.8	Geographic area entry	DSC equipment should be provided with means for transforming a geographical area specified by the user as a centre point and a range to the corresponding Mercator area call format specified in § 5.3. The centre point should default to the ships position information and the range should default to 500 NM (926 km). The transformation of the entered range and centre-point should result in the minimum rectangular area that encompasses the entered data.	-	N/A - sending of Geographic calls were not supported for Class D VHF radios.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12.9	Medical transport and neutral ships and aircraft	The capability of using second telecommands "Ships and aircraft of States not parties to an armed conflict" and "Medical Transports" should not be available by default but only after changing relevant parameters in the setup menu.	-	N/A According to ITU-R M.493-13, annex 1, table 4.5: Urgency and safety all ships, the medical and "ships and aircraft" telecommand options were not supported for a VHF class D.



## Annex 2

ITU-R M.493-13, Annex 2 details the equipment classes and is for information only.

## Annex 3

Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1	General	The user interface for operation of the DSC equipment should be so designed that it will be easy for the operator onboard the ship to operate the equipment and to compose and initiate the types of DSC messages provided for by the equipment. The equipment software should allow the operator to only compose the types of DSC messages which are specified in Tables 4.1-4.11. These tables indicate which DSC messages are applicable for each class of DSC equipment, messages defined in Tables 1-4.10.1 (Semi/auto VHF (optional)) and 1-4.10.2 (Semi/auto MF/HF (optional)) should not be selectable from the top level menu.	Clause 8.14	The operator was able to easily compose and initiate the following calls: Distress All ships urgency and safety Test call Group routine Individual routine The operator was not able to compose semi/auto calls.
2	Definitions	-	-	For information only.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3	Controls	-	-	-
3.1	Dedicated distress button	<p>Dedicated distress button to initiate the sending of the distress alert attempt. This button should have at least two independent actions. Lifting of the protective lid is considered the first action. Pressing the distress button is considered as the second independent action. This button should be red in colour and marked "DISTRESS". Where a non-transparent protective lid or cover is used, it should also be marked "DISTRESS". The cover should be protected against inadvertent operation with a spring loaded lid or cover permanently attached to the equipment by e.g. hinges. It should not be necessary for the user to remove seals or to break the lid or cover in order to operate the distress button. This button should be used only for this purpose and it should be able to perform this function at all times. Use of the button without any previous operator actions to compose the alert should initiate the default distress alert attempt. The "default distress alert attempt" consists of "undesignated" for the nature of distress, radiotelephony for the communication mode, and on HF the transmission of the attempt uses the multi-frequency method including all six bands.</p> <p>The distress button should have priority over all DSC procedures.</p>	Clause 4.5.3	<p>From section 11.2</p> <p>Inspection of the equipment showed there was a two stage process to sending a distress alert.</p> <ol style="list-style-type: none"><li>1. The spring-loaded cover marked "distress" and red in colour must be lifted to expose the distress button.</li><li>2. The distress button must be depressed for 3 seconds to send the distress alert. The EUT call menu gave the user the option to select "nature of distress" for the call.</li></ol> <p>The default distress category was "undesignated"</p> <p>F3E/G3E simplex for the subsequent communications.</p> <p>Distress button activation had priority over all other DSC procedures.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2	-	<p>The following controls, buttons or functions should be provided and visible at the top level while the equipment is in standby:</p> <p>Distress function for composing distress alert attempts other than the default distress alert attempt where the operator is able to:</p> <ul style="list-style-type: none"><li>– select the nature of distress (the factory default should be undesignated distress);</li><li>– on HF select the communication mode (the factory default should be telephone);</li><li>– on HF select the method and frequencies of transmission (the factory default should be the multi-frequency method on all six bands);</li><li>– check the content of the position and time of position information and to manually enter this information if not correct;</li></ul> <p>prior to initiating the sending of the distress alert attempt with the dedicated distress button.</p> <p>Call function for composing non-distress DSC messages.</p> <p>Distress alert relay on behalf of someone else function for composing and relaying the occurrence of a distress event obtained by non-DSC means.</p>	-	<p>The default distress was undesignated.</p> <p>In addition to the dedicated distress button there was a menu where it was possible to select the nature of distress and manually modify the position information.</p> <p>The EUT allowed transmitting and receiving calls in accordance with tables 4.1 to 4.9.</p> <p>The user could compose DSC calls by pressing the call button and navigating the displayed DSC call list.</p> <p>The user could check the position information and manually enter if required.</p> <p>Sending a distress alert relay on behalf of someone else was not applicable for a VHF class D.</p>
3.3	-	<p>The following controls, buttons or functions should be provided and be visible as noted:</p> <p>Cancel/esc/exit/or equivalent for returning to a previous menu level from any state of the equipment.</p> <p>Enter/accept/next/touch/press or equivalent for Accepting a menu item; or Going to the next step.</p>	-	<p>A back button and exit function were available for cancel and exit of procedures (return to previous state)</p> <p>The user could select menu options and functions by tapping touch screen selection.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
4	Display of messages in plain language	<p>The headings and content of messages should be shown in plain language, for example:</p> <ul style="list-style-type: none"><li>– “Radiotelephone” instead of J3E;</li><li>– “busy” instead of “telecommand 2: 102”.</li></ul>	-	The EUT displayed the headings and content of messages using plain language



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5	Transmission of DSC messages	-	-	-
5.1	DSC message composition features	<p>The facilities for choosing and composing DSC messages should be so arranged that it is possible for the operator quickly and precisely to:</p> <p>compose the content of the DSC message;</p> <p>review and correct, if needed, the content before transmitting the DSC message.</p>	-	<p>The equipment had a defined menu structure for composing DSC messages in accordance with tables 4.1 to 4.10. In the case of a "Distress" call there was a dedicated button as described in annex 3 clause 3.1.</p> <p>At the final stage of composition, the operator could review and modify some content of the DSC message prior to transmission.</p>
5.2	Operational guidance to the operator	<p>The operator should only be able to compose the types of DSC messages which are specified in Tables 4.1 through 4.11.</p> <p>The equipment should automatically propose the next step for composing the DSC message, for example, when pressing the enter/accept/next/touch/press button or equivalent, if not visible from the context or on the display.</p>	Clause 8.14	<p>The EUT only allowed the composition of the DSC message types specified in Tables 4.1 through 4.11. for class D equipment.</p> <p>The EUT guided and helped compose DSC messages, where appropriate.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.3	Defaults	<p>Where options for the items in the DSC message exist (see Annex 1, Tables 4.1-4.11), the factory default values should be as follows:</p> <p>After the operator selects the option to compose a non-distress DSC message:</p> <ul style="list-style-type: none"><li>– if the operator has the option to select a format (destination address) the default format should be “individual (120)”;</li><li>– if the format (destination address) is either individual (120), a group of ships (114), or a semi-automatic phone call (123), the default MMSI should be some internal indicator that the MMSI is invalid and needs to be entered before transmission can occur;</li><li>– if the format (destination address) is an area (102), the default area should be a circle of radius 500 nautical miles centred on the ship;</li><li>– if the operator has the option to select a category (priority) the default category should be “routine” unless the routine priority is not allowed (such as in an area or all-ships DSC message) in which case it should be “safety”;</li></ul>	8.14	<p>The equipment was in conformance with tables 4.1 to 4.10, further verified in annex 1:</p> <p>Additional comments:</p> <p>From the DSC call menu:</p> <p>Individual call defaults '120'</p> <p>In the MMSI entry screen (when applicable to the message type: individual or group), the user cannot proceed without entering a valid MMSI.</p> <p>Channel selection was done prior to DSC call composition.</p> <p>All other parameters were entered automatically.</p> <p>If the operator composed a similar DSC call, at a later time, the default parameters were available, not the settings of the previous call.</p> <p>Geographic calls are not supported for Class D DSC radios.</p> <p>Where the operator had the option to select a category priority (All Ships Call), the default was Safety.</p> <p>In all other cases for non-distress calls, there was no option to change the category from Routine.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.3	Defaults	<ul style="list-style-type: none"><li>– if the operator has the option to select the type of subsequent communication the default value should be radiotelephony;</li><li>– if the operator has the option to select a frequency or channel for the subsequent communication the default value should be a non-distress frequency or channel consistent with the means of subsequent communication and on MF/HF in the same band as the DSC message transmission;</li><li>– on MF/HF if the operator has the option to select the frequency of the DSC transmission, default value should be 2 177 kHz;</li><li>– on MF if the operator has the option to select the frequency of the DSC transmission, default value should be 2 177 kHz;</li><li>– on HF if the operator has the option to select the frequency of the DSC transmission, default value should be in the 8 MHz band;</li><li>– all other parameters, for example the position, self ID, time of position, and end of sequence character, should be automatically entered by the equipment;</li><li>– the category should not be “remembered” when the call composition option is selected at a later time but should be reset to the factory default; this requirement does not mean the equipment is unable to provide the operator with the option to send pre-composed, customized DSC messages with a single action;</li></ul>	8.14	<p>Customised or pre-set DSC calls were not available.</p> <p>The EUT could send a distress alert relay.</p> <p>Where the option to select a subsequent channel was provided, channel 70 was not available.</p> <p>The operator did not have the option to change the subsequent type of communication.</p> <p>MF/HF was not applicable</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.3	Defaults	<p>– for example, if there is only a single “call” button, menu selection, or equivalent for initiating a non-distress DSC message, the default DSC message should have format “individual” and category “routine”.</p> <p>After the operator selects the option to compose a distress alert relay on behalf of someone else (DROBOSE):</p> <ul style="list-style-type: none"><li>– if the operator has the option to select a format (destination address) the default format should be “individual (120)”;</li><li>– if the format (destination address) is individual (120), the default MMSI should be some internal indicator that the MMSI is invalid and needs to be entered before transmission can occur;</li><li>– if the format (destination address) is an area (102), the default area should be a circle of radius 500 nautical miles centred on the ship;</li></ul>	8.14	DROBOSE was N/A for Class D VHF.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.3	Defaults	<ul style="list-style-type: none"><li>– the default nature of distress should be “undesignated (107)”; </li><li>– the default MMSI for the vessel in distress should be “unknown (five 126 s)”; </li><li>– the default position and time of position should be unknown; </li><li>– the default means of subsequent communication should be radiotelephony; </li><li>– on MF/HF the default band of the DSC transmission should be on the 2 MHz band;– on MF the default band of the DSC transmission should be on the 2 MHz band; </li><li>– on HF the default band of the DSC transmission should be on the 8 MHz band; </li><li>– all other parameters, for example the, self- ID, the distress alert relay telecommand 1 parameter, the category (distress), and end of sequence character should be automatically entered by the equipment; </li><li>– the format, MMSI of the vessel in distress, the nature of distress, the position and time of position should not be “remembered” when the DROBOSE composition option is selected at a later time but should be reset to the defaults. </li></ul>	8.14	See above (same section).



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.4	Other items	<p>If the called station is a ship station or a group of ship stations the equipment should request input of a channel number (frequency in case of MF). The equipment should assist the operator by suggesting a suitable inter-ship channel; on VHF for example channel 6.</p> <p>Automated HF subsequent communication channel selection for non-distress DSC messages. There is a simplex set and duplex set (contains the distress channels) for HF for both voice (3000 Hz) and data (500 Hz) communication modes. Selection of the appropriate channel from these sets should follow the following steps:</p> <ul style="list-style-type: none"><li>– The band of the communication channel should be the band of the DSC message.</li><li>– The telecommand 1 parameter determines the choice of voice or data channels.</li><li>– DSC messages directed to a coast station (i.e. MMSI commencing 00) should let the coast station decide.</li><li>– All other DSC messages should select a channel from the simplex frequencies.</li></ul> <p>Use of the distress channels should be avoided and for routine communications use of the distress channels should not be allowed.</p>	-	<p>The equipment is in conformance with tables 4.1 to 4.10.</p> <p>After input of a group or individual MMSI, the EUT defaulted to the inter-ship channel list, with CH 06 highlighted as the default.</p> <p>If the operator entered a coast station MMSI, the EUT did not provide a channel selection.</p> <p>Non-distress individual/group calls, the default channel selection menu were inter-ship non-distress channels. The operator could override this and choose from the full selection of available channels.</p> <p>The selection of the distress channel was not available for routine communications.</p>



## Annex 4

Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1	General	<p>The equipment software should allow the operator to only compose the types of DSC messages which are specified in Tables A1-4.1-A1-4.11. These tables indicate which DSC messages are applicable for each class of DSC equipment.</p> <p>Automated procedures are the incorporation of ITU-R recommended DSC operational procedures into equipment software.</p> <p>The equipment should initiate (start) one of five automated procedures whenever the equipment becomes engaged in a new communication event. Four of these automated procedures handle events initiated by sent and received DSC messages and the fifth automated procedure handles radiotelephony established by non-DSC means. One of these five automated procedures is initiated by:</p> <ul style="list-style-type: none"><li>a) sending a distress alert,</li><li>b) receiving a DSC message containing distress information,</li><li>c) sending an individually addressed distress alert relay containing distress information,</li><li>d) sending distress alert relay on behalf of someone else,</li><li>e) sending a DSC message containing no distress information,</li><li>f) receiving a DSC message containing no distress information,</li><li>g) engaging in traffic initiated by non-DSC means.</li></ul>	-	Information only. No requirement.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1	General (continued)	Once initiated by any of the events listed in a)-g), the automated procedure should handle all the tasks required to satisfy the objectives of the initiating event. These tasks should include the handling of any subsequent DSC messages that may be pertinent (relevant) to the objectives of the automated procedure and appropriately updating the automated procedure, providing the operator with any possible options, and keeping the operator informed of the progress until either the operator terminates the automated procedure or conditions warrant that the automated procedure self terminates. Automated procedures should be able to be run in parallel. Whereas all DSC automated procedures continuously monitor the watch receiver only one active automated procedure has control of the transmitter and general receiver. The reception of any DSC message not pertinent to an automated procedure should not disrupt that procedure but should be appropriately allocated to the appropriate ongoing automated procedure or initiate a new automated procedure.	-	The EUT could handle only a single automated procedure at a time. Received DSC calls not pertinent to the current procedure could either be accepted or rejected by the operator depending on the priority of the received call.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
2	Definitions	-		For information only.
3	Tasks of automated procedures	-	-	-
3.1	Tasks common to all automated procedures handling digital selective calling messages	-	-	-
3.1.1	Handling alarms	<p>The sounding of any alarm should simultaneously display the reason for the alarm and the means to silence it.</p> <p>Alarms should sound appropriate to the automated procedure when a received DSC message either initiates or acknowledges the automated procedure with the two-tone alarm being reserved for the initiation of the received distress procedure, and the urgency alarm being reserved for the initiation of the received non-distress procedure when the category of the initiating DSC message is "urgency".</p> <p>Only the first occurrence of a received DSC message should sound the alarms.</p> <p>All received DSC messages that do not sound an alarm as specified in § 3.1.1 should sound a brief, self-terminating alarm to inform the operator of the reception.</p>	<p>-</p> <p>-</p> <p>-</p> <p>-</p>	<p>The EUT displayed the call type whilst simultaneously sounding the corresponding alarm. The alarm could be silenced by touching the EUT display.</p> <p>Alarm sounds where checked for received DSC calls as follows; Distress, All ships Urgency, All ships Safety, Individual Routine.</p> <p>In each case the appropriate audio alarm was sounded.</p> <p>Only the first instance of a received call sounded the audible alarm on the EUT.</p> <p>Received DSC calls not pertinent to the current procedure and of lower priority sounded a self terminating alarm to inform the operator.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.1.2	Displaying stages of the automated procedure	The automated procedure should display the stages and/or activity in order to indicate the progress of the procedure.	-	The EUT displayed the current stage of the automated procedure.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.1.3	Tuning the radio	Tuning of the general receiver and transmitter for reception or transmission of required acknowledgments, repeat transmissions, distress alert relays, or subsequent communications should be handled automatically.	-	The EUT automatically tuned its receiver and transmitter as required or initiated by the current procedure.
		Any automated tuning action that could potentially disrupt ongoing subsequent communications should provide the operator with at least a 10 s warning. The operator should then be provided with the opportunity to pause the action. In the absence of operator intervention the automated action should proceed.	-	If automated tuning was enabled, the EUT provided a 10 s audio/visual warning. The operator could pause or accept the automated tuning. If no action was taken by the operator, the automated tuning would proceed.
3.1.4	Displaying operator options	Options should only be provided at those times the option is appropriate	-	The relevant options were provided at appropriate times.
3.1.5	Handling DSC messages not pertinent to the active procedure	The received DSC message is either allocated to the correct automated procedure running in the background on hold or initiates a new automated procedure on hold.	-	The EUT could only handle a single automated procedure. Multiple procedure handling was not supported.
3.1.6	Displaying warnings	Warnings should be displayed when the operator attempts to do anything that does not follow the guidelines given by ITU and IMO. The operator should have the option to go back to the stage of the automated procedure where the action was taken that caused the warning.	-	The EUT menu structure was such that only ITU structured calls could be made and received. Other activities such as entering position and time manually also follow the ITU structure.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.1.7	Handling digital selective calling messages containing errors	3.1.7.1 A DSC message with errors is pertinent to an automated procedure if the set of information characters in the DSC message is identical as defined in the "definitions" section to the set of information characters normally used to determine pertinence.	-	Information only
		3.1.7.2 Automated procedures initiated by DSC messages with critical errors should sound the same alarm they would sound if the DSC message were received error free but the alarm should self-terminate.	-	The EUT did not support correction of critical errors.
		3.1.7.3 Automated procedures are encouraged to utilize subsequent DSC messages pertinent to the automated procedure to reduce the number of receive errors in the set of information characters that are important to the automated procedure. In no case should the reception of subsequent DSC messages increase the number of errors in the set of information characters important to the automated procedure.	-	This was not supported by the EUT. Subsequent DSC messages with errors were ignored by the EUT.
		3.1.7.4 No automated procedure should allow the transmission of further DSC messages with errors.	-	An automated procedure received with errors could only be terminated on the EUT.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.1.7	Handling digital selective calling messages containing errors	3.1.7.5 If critical errors prevent an automated procedure from setting up an operator option or performing any automated action, that option should be disabled or that action not performed.	-	The only operator option provided for a message received with critical errors was to ignore the message.
		3.1.7.6 Automated procedures should not be considered acknowledged until all the critical errors in the set of acknowledgement information characters have been received correctly or corrected by repeat reception.	-	See above. 3.1.7.3.
		3.1.7.7 Information that is normally displayed that contains errors should be displayed to the full extent possible; for example, digits in the MMSI or position information that are received correctly should be displayed in their correct positions and those that are not should be indicated by some special error symbol.	-	MMSI and position data that was not correctly received was displayed as question marks "?" to indicate missing / erroneous data.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.1.8	Transmission of DSC messages	Transmission of DSC messages should use a prioritized wait scheme. If the channel is not free, and the DSC message is a distress alert, the alert should be transmitted as soon as the channel becomes free or after 10 s on MF or HF or 1 s on VHF, whichever occurs first. For all other DSC messages, the automated procedure should wait for the channel to become free and then delay transmission of the DSC message for a specified wait time. Distress DSC messages (except for alerts), urgency, safety, routine and test DSC messages should wait one, two, three, and four "fixed" units of time plus a random addition described below, respectively, before attempting to transmit. Transmission occurs if and only if the channel is still free after this wait time has elapsed, otherwise the process is repeated. The fixed "unit" of time should be 100 ms on MF and HF and 50 ms on VHF. The randomly generated component should be some positive integer with resolution in milliseconds between zero and the fixed interval. On MF/HF the channel is considered free if the receiver hardware or DSP software is unable to recognize the DSC tones.	-	<p>DSC message transmission began immediately if the channel was free.</p> <p>If the channel was not free:</p> <p>Distress alerts were transmitted after 1 s</p> <p>Non-distress messages were not transmitted until after the channel became free, "Channel busy..." was displayed until the channel became free.</p> <p>When the channel became free the message was delayed by the appropriate prioritised wait for the message type.</p> <p>Distress self-cancel 50-100ms</p> <p>Urgency 100-200ms</p> <p>Safety 150-300ms</p> <p>Routine 200-400ms</p> <p>Test 200-400ms</p>
3.1.9	Automated termination	Automated procedures should have an automated termination timer whose factory default values can be changed by the operator. It should be possible to disable this timer. Unacknowledged sending distress automated procedures should not have a termination timer, however after acknowledgement a termination timer is optional.	-	The EUT had a non-distress call and received distress call time out options. The operator could change the default values or disable the timer.
		At least 10 s prior to automatic termination, a warning with a discrete aural alarm should be displayed giving the operator the opportunity to stop the termination.	-	The EUT provided an audible/visual warning 10s prior to automatic termination.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2	Tasks specific to certain automated procedures	-	-	-
3.2.1	Tasks of automated procedures initiated by receiving non-distress digital selective calling messages	-	-	-
3.2.1.1	Display of elapsed time	The elapsed time since receiving the initiating DSC message should be displayed or after any requested acknowledgment has been sent, the elapsed time since sending the acknowledgement should be displayed.	-	The EUT displayed the elapsed time since receipt of a DSC message and sending of any acknowledgement.
		Sending repeat acknowledgments should not affect the time display.	-	The EUT only displayed elapsed time of the initial acknowledgement and was not affected by repeat acknowledgements.
3.2.1.2	Handling acknowledgments	3.2.1.2.2 All individually addressed DSC messages with subsequent communications should be automatically acknowledged as a default. In this case the alarm should sound after the acknowledgement is sent.	-	The DSC test system was used to send an individual routine message to the EUT. The alarm sounded immediately and the user was prompted to manually reply with able or unable to comply.
		3.2.1.2.3 Acknowledgement options should only be made available to the operator when the received DSC message requests an acknowledgement.	-	The EUT only provided acknowledgement options when required.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.2	Tasks of automated procedures initiated by sending a non-distress DSC message	-	-	-
3.2.2.1	Display of elapsed time	The elapsed time since sending the initial DSC message should be displayed or after the automated procedure has received a requested acknowledgement, the elapsed time since acknowledgement should be displayed. Receiving repeat acknowledgements should not affect the time display.	-	<p>The EUT displayed the elapsed time once a DSC message was sent.</p> <p>The EUT displayed elapsed time since receiving an acknowledgement to a sent DSC message.</p> <p>The elapsed time from receiving the initial acknowledgement was only displayed and not affected by repeat acknowledgements.</p>
3.2.2.2	Resending the initial DSC message	<p>3.2.2.2.1 If no acknowledgement is requested the option to resend the initial DSC message should remain available until the procedure is terminated.</p> <p>3.2.2.2.2 If an acknowledgement is requested the option to resend the initial DSC message should remain available until the acknowledgement has been received.</p>	-	<p>If the initial DSC message did not request an acknowledgement, the operator had the option to resend the initial DSC message until the procedure was terminated.</p> <p>If the initial DSC message requested an acknowledgement, the resend option was available until an acknowledgement had been received.</p>
3.2.2.3	Handling the reception of a delayed acknowledgement	If an acknowledgement appropriate to this automated procedure is received but the operator has terminated the automated procedure prematurely, the appropriate automated procedure should be reconstructed based on the acknowledgement and the operator informed of the situation.	-	If the EUT received an acknowledgement from a previously terminated procedure, the operator was informed that this was a "Finished call answered by" and the appropriate automated procedure was reconstructed from the information in the acknowledgement.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3	Tasks of automated procedures initiated by receiving a distress DSC message or sending a distress relay on behalf of someone else.	-	-	-
3.2.3.1	Display of elapsed time	The elapsed time since receiving the initial DSC message should be displayed or after the automated procedure has been acknowledged, the elapsed time since acknowledgement should be displayed. Receiving repeat acknowledgments should not affect the time display.	-	The elapsed time since receiving the initial distress message or since acknowledgement was displayed. Receiving repeated acknowledgements had no effect to the displayed elapsed time.
3.2.3.2	Determining operator options	On HF the operator should have the option to set the general receiver and transmitter to any one of the six distress frequencies of subsequent communication.	-	N/A - HF Only
		The option to send a distress alert relay should always be available until the automated procedure is terminated.	-	N/A - EUT was a class D VHF.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3.2.3	Distress alert acknowledgments and distress alert relay acknowledgement options	These options should not be made available until a DSC message has been received that can respond to the acknowledgement.	-	N/A - The EUT was class D, hence, a distress acknowledgement or distress relay message could not be sent.
		These options should be available immediately after reception of the appropriate DSC messages and not wait until certain conditions for their use, such as time limits, are fulfilled.	-	
		Once these options are available, they should remain available until the automated procedure is terminated.	-	N/A – but available options were available until the procedure was terminated.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3.3	DSC message composition	The automated procedure should automatically compose distress alert relays, distress alert acknowledgments and distress alert relay acknowledgments based upon the received DSC messages.	-	N/A - The EUT was class D, hence, a distress acknowledgement or distress relay message could not be sent.
		The distress information should be taken from the distress DSC message which has the latest UTC time stamp.	-	N/A - The EUT was class D, hence, a distress acknowledgement or distress relay message could not be sent.
		Distress alert acknowledgements and distress alert relay acknowledgements should require no data entry by the operator except on HF where the frequency of the DSC message may be selected.	-	N/A - The EUT was class D, hence, a distress acknowledgement or distress relay message could not be sent.
		Relays should only allow the entry of the addressing mode (format) and destination address and on HF, the mode of subsequent communication and the frequency of the DSC message.	N/A	N/A - HF Only.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3.3	DSC message composition	On HF the automated procedure should indicate those frequencies on which DSC messages pertinent to the automated procedure have been received as the preferred choices, however the operator should be allowed to choose any of the six distress frequencies.	N/A	N/A - HF Only.
3.2.3.4	Tuning of the radio after acknowledgment on HF	The automated tuning should cease upon reception or sending of a distress alert acknowledgement or a distress alert relay acknowledgement addressed to multiple stations. However, the operator should be provided with sufficient information to manually tune to the working frequencies of the most recently received DSC message.	N/A	N/A - HF Only.
3.2.3.5	Handling individually addressed relays	The sending or receiving of individually addressed relays should initiate their own automated procedure separate from the automated procedure that may be handling distress DSC messages concerning the same distress event.	-	The EUT was a VHF class D that could only receive a distress or distress relay. Received distress messages concerning the same distress event ie the same distress MMSI did not initiate their own automated procedure from the one currently active. The operator was informed that a message had been received and the message was saved to the DSC log.
		The option to send a distress alert acknowledgement should never be available during this automated procedure.	-	N/A - The EUT was class D, hence, a distress acknowledgement message could not be sent.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3.6	Handling DSC messages with critical errors	If the subsequent communication parameter of the distress information is received in error, radiotelephone should be assumed and an indication that the parameter was received in error should be made known to the operator.	-	The EUT could only support RT calls. If the subsequent communication parameter of the received distress message was in error the message was received as normal but with a message stating "Data error, assuming VHF communications". If the parameter was set to 126 (no information) the message was received. The operator was not informed.
3.2.3.7	Handling the self-addressed distress alert acknowledgement	If the MMSI of the sender of a distress alert acknowledgement is the same as the MMSI of the vessel in distress, the automated procedure should recognize the message as an attempt to cancel the distress alert and inform the operator accordingly.	-	The DSC tester sent a distress alert and then a self-MMSI distress ack. The EUT correctly informed the user that the distress alert is cancelled.
3.2.3.8	Extended digital selective calling sentences	The automated procedure should be able to successfully receive and decode single frequency alert attempts that have extended sentence information at the end of some or all of the individual alerts.	-	The EUT can successfully receive distress alerts with enhanced position resolution, and display this extra information.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3.9	MF/HF only scanning for distress digital selective calling messages	The received distress automated procedure should scan all six distress DSC channels if not already doing so.	N/A	N/A - MF/HF Only.
3.2.4	Tasks of automated procedures initiated by sending a distress alert attempt	-	-	-
3.2.4.1	Display of elapsed time	The time remaining to the sending of the next distress alert attempt should be displayed prior to acknowledgment by DSC.	-	The EUT displayed the time to sending a subsequent distress alert.
		The elapsed time since acknowledgement should be displayed after acknowledgment by DSC. Receiving repeat acknowledgments should not affect the time display.	-	The EUT displayed the elapsed time since receiving the initial acknowledgement. Repeated acknowledgements did not restart the timer.



-	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.4.2	Resending of the distress alert attempt	The unacknowledged distress alert attempt should be automatically resent after a 3.5 to 4.5 min wait.	-	If unacknowledged, a distress alert is automatically resent after a random period of between 3.5 min and 4.5 min.
		The automatic resending of the distress alert attempt should automatically terminate after acknowledgement by DSC.	-	On receiving an acknowledgement, the EUT terminates the automatic resending of the distress alert.
		Resent distress alert attempts should contain updated position and time of position information.	-	Distress alerts were resent with updated position and time information.
3.2.4.3	Determining operator options	The option to manually resend the distress alert attempt at any time should remain available until the distress alert has been acknowledged by DSC.	-	The operator can manually resend the distress alert attempts any time, prior to receiving an acknowledgement, by pressing and holding the dedicated distress button.
		On HF the operator should have the option to change the frequencies of the distress alert attempt and the option to select between the single frequency or multi-frequency method.	N/A	N/A - HF Only
		The option to pause the countdown to the next distress alert attempt should be available prior to acknowledgement by DSC.	-	The operator had the option to pause the countdown to the next automated distress alert, prior to receiving an acknowledgement.
		The option to cancel the distress alert should be available prior to acknowledgement by DSC.	-	The operator had the option to cancel the distress alert, prior to receiving an acknowledgement.
		The option to terminate the procedure should only be available after acknowledgment by DSC.	-	The operator only had the option to end the distress alert, after receiving an acknowledgement.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.4.4	The distress alert cancel procedure	The cancel procedure consists of the cancel operation on all bands utilized by the distress alert attempts (on VHF and MF there is only one cancel operation whereas on MF/HF there may be up to six). The cancel operation consists of a DSC cancel message (a self-addressed distress alert acknowledgement) followed by a voice cancel on the corresponding frequency of subsequent communication. The phrase "voice cancel" refers to the part of the cancel done over the subsequent communication frequencies whether it is by radiotelephony or on MF and MF/HF by data.	-	After sending a distress alert and prior to acknowledgement, the operator had the option to cancel the distress alert. When the cancel was selected the EUT sent a self-addressed acknowledgement. The operator was then presented with instructions for voice cancel via radiotelephony on channel 16.
		Upon selection of the cancel option the sending distress automated procedure should provide an explanation of the cancel procedure to the operator and provide the option to either continue or return and not do the cancel.	-	On selecting cancel, the operator was presented with a brief explanation of the cancel procedure and had to confirm this distress cancel. If this was not confirmed, the operator was returned to the distress automated procedure.
		If the operator selects to proceed with the cancel procedure the sending distress automated procedure should pause the countdown to the next automated sending of the distress alert attempt and wait (if necessary) until any alert within an attempt is transmitted to completion before allowing the operator to initiate the first cancel operation.	-	The automated resend of the next distress was stopped once the operator had selected to proceed with the distress cancel. The operator was not presented with the option to cancel until the distress alert transmission had completed.
		The operator options during the cancel procedure should be to terminate the cancel procedure and to start the cancel operation.	-	The operator could only cancel the distress procedure or start a cancel of the distress procedure.



N/A	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.4.4	The distress alert cancel procedure	If the cancel procedure is terminated before the first cancel operation is started, the sending distress automated procedure should resume from where it left off. However, once the cancel operation is started, the option to terminate the cancel procedure should not be available until the cancel procedure is completed.	-	Once the cancel option was confirmed, the EUT immediately sends the cancellation message, displays the voice cancel message and terminates the procedure. If the cancel was not confirmed the distress automated procedure would resume.
		The status of the cancel procedure should be displayed.	-	The EUT showed the status of the cancel procedure when sending the self-addressed acknowledgement as "calling".
		The operator should be provided with the appropriate text for the voice cancel at the time of the voice cancel.	-	The operator was provided with voice cancel instructions at the appropriate time.
		The cancel operation should be able to be repeated on any band but a warning should be provided that the cancel has already been done on this band	N/A	N/A - MF/HF Only.
		Special considerations for MF/HF	N/A	N/A - MF/HF Only
3.2.4.5	MF/HF only scanning for distress alert acknowledgements	The sending distress automated procedure should scan all six distress DSC channels if not already doing so.	N/A	N/A - MF/HF Only



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.5	Radiotelephone communications automated procedure	The equipment should also be provided with a communications function for radiotelephony that is compatible with the DSC automated procedures described in this Annex. This automated procedure should have:	-	-
		– the ability to switch between being active or being on hold at the discretion of the operator,	-	N/A – the option to switch between being on hold or active was not provided.
		– the ability to be terminated at the discretion of the operator,	-	The operator had the option to terminate any procedure
		– the ability to select the channels for the communications, and	-	When appropriate, the operator had the option to select a channel for communication.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.6	Other non-digital selective calling automated procedures	Any other non-DSC functionality that is included in the equipment should:	-	-
		be able to be activated or placed on hold at the discretion of the operator,	-	The operator could choose to accept or reject any changes to the EUT operating frequency. There were no non-DSC automated procedures where a hold function was applicable.
		never control the watch receiver such that DSC automated procedures, either active or on hold, are unable to receive DSC messages on the watch receiver,	-	The watch receiver constantly monitored channel 70 for DSC communications.
		be able to be terminated by the operator.	-	The automated procedures relevant to this section included tuning the transmitter and receiver to the selected channel. This did not require termination options. The EUT could handle incoming DSC messages while engaged.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.3	Tasks concerning multiple automated procedures	-	-	-
3.3.1	Number of simultaneous automated procedures	Facilities should be provided to handle a minimum of seven simultaneous automated procedures including a reserve of one. The initiation of the reserve automated procedure should:	-	N/A - The EUT did not support the handling of multiple simultaneous procedures.
		– warn the operator that the equipment cannot handle another automated procedure and that one automated procedure should be terminated,	-	N/A - The EUT did not support the handling of multiple simultaneous procedures.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.3.1	Number of simultaneous automated procedures	– prevent the operator from initiating any new automated procedures except for the sending of a distress alert and,	-	N/A - The EUT did not support the handling of multiple simultaneous procedures.
		– warn the operator that the reception of an additional DSC message that would initiate an automated procedure if the equipment were in standby will result in the automatic and immediate termination of an inactive automated procedure where,	-	N/A - The EUT did not support the handling of multiple simultaneous procedures.
		– the automatic and immediate termination should be based upon age and priority.	-	N/A - The EUT did not support the handling of multiple simultaneous procedures.
3.3.2	Sending distress automated procedure	When initiating a sending distress automated procedure, automatic immediate termination of all other automated procedures (if any) is encouraged but not required.	-	When a distress alert procedure was initiated on the EUT, any currently active procedure was immediately terminated.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.3.3	Operator options	When the operator makes any one of the automated procedures on hold active, the automated procedure that was active (if any) should automatically go on hold.	-	N/A - The EUT did not support the handling of multiple simultaneous procedures.
3.3.4	Unacknowledged poll, test, or position request automated procedures received on hold	If any of these automated procedures is set to automatically acknowledge, it should automatically acknowledge and self-terminate as soon as all remaining automated procedures are on hold.	-	The EUT automatically terminated the procedure when automatic acknowledgement of position request and test calls was configured.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.4	Warnings	Warnings should be provided when the operator attempts to do the following:	-	-
		– send a relay before three minutes have elapsed since the automated procedure started,	-	N/A – EUT was class D VHF radio
		– send a non-individually addressed relay,	-	N/A – EUT was class D VHF radio
		– send a distress alert acknowledgement (requires coast station permission),	-	N/A – EUT was class D VHF radio
		– send an all stations (116 format) distress relay acknowledgement (should be sent by coast station only),	-	N/A – EUT was class D VHF radio
		– send an acknowledgement to a DSC message containing no distress information that is not individually addressed,	-	N/A – EUT was class D VHF radio



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.4	Warnings	– cancel a distress alert,	-	See annex 4, clause 3.2.4.4
		– send any DSC message after the objective of the automated procedure has been obtained,	-	N/A - Once the objective had been obtained, for example an acknowledgement to a DSC message, the option to resend the message was not available.
		– terminate the automated procedure before the objective has been reached,	-	The operator was asked to confirm the termination of an automated procedure.
		– terminate the automated procedure if engaged in subsequent communications.	-	If engaged in a communications automated procedure, a warning was provided if a change of channel was requested by a received DSC message.



## **SECTION 3**

### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Hygrometer	RS	A1	2138	12	05-03-2020
Hygrometer	rotronic	Hygropalm	5004	12	02-10-2020
Frequency standard	Spectracom	1200-0408-0601	4393	12	16-04-2020
Rubidium standard	Rohde & Schwarz	XSRM	1316	12	16-04-2020
Modulation analyser	Hewlett Packard	8901B	3292	12	05-02-2020
Modulation analyser	Hewlett Packard	8901B	0773	12	28-06-2020
Power supply	Rohde & Schwarz	HMP2020	101883	-	OP/Mon
DMM	Fluke	179	4007	12	14-09-2019
DMM	Fluke	79	3057	12	19-08-2020
Stopwatch	Windows app	V1.5.7.1000	-	-	TU
Oscilloscope	Agilent	DSO9104A	4142	12	19-07-2019
Oscilloscope	Agilent	DSO9104A	4142	12	22-08-2020
Digital calliper	Mitutoyo	CD15-APX	5055	12	02-08-2019
Signal generator	R&S	SMY01	0118	12	11-12-2019
Signal generator	R&S	SMY01	0042	12	07-02-2021
DSC encoder/decoder	TUV	-	0081	-	OP/Mon
DSC Pre-emphasis unit	TUV	-	4369	12	12-08-2020
GPS simulator	Spirent	STR4500	3056	12	16-10-2020
Attenuator	Narda	789-20	3367	12	17-07-2020
Attenuator	Narda	789-30	3369	12	17-07-2020
Directional coupler	Narda	30428-10	4472	12	13-03-2021
Attenuator	Texscan	HFP-50N	0475	12	23-04-2020
Power splitter	Weinschel	1506A	0607	12	23-04-2020
VHF radio	ICOM	IC-R5	3330	-	OP/Mon

TU – Traceability Unscheduled

OP MON – Output Monitored with Calibrated Equipment



## **SECTION 4**

### **PHOTOGRAPHS**



#### 4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



POD Front View



POD Rear View



Handset Front View



Handset Rear View



## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



## 5.1 DISCLAIMERS AND COPYRIGHT

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