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# Report On

Type Approval Testing of the  
Uniden America Corporation  
Fixed Mount Marine VHF with DSC  
Model: VHF490  
In accordance with ITU-R M.493-13

Document 75938884 Report 03 Issue 1

November 2017



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**REPORT ON** Radio Testing of the Uniden America Corporation  
Fixed Mount Marine VHF with DSC  
Model: VHF490  
In accordance with ITU-R M.493-13  
  
Document 75938884 Report 03 Issue 1  
  
November 2017

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**DATED** 17 November 2017



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## **SECTION 1**

### **REPORT SUMMARY**

Testing of the Uniden America Corporation  
Marine Fixed Mount VHF with DSC  
Model: VHF490  
In accordance with ITU-R M.493-13



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of Radio Testing of the Uniden America Corporation, marine fixed mount radio, model VHF490 to the requirements of ITU-R M.493-13.

Objective	To review of the EUT against the requirements of ITU-R M.493-13 requirements.
Manufacturer	Uniden America Corporation
Serial Number(s)	VT655ZV T/A Sample No 2 VT655ZV T/A Sample No 4
Number of Samples Tested	Two
Test Specification/Issue/Date	ITU-R M.493-13 (10-2009)
Order Number	72127187 (75940410)
Date	21 September 2017
Start of Test	03 <sup>rd</sup> October 2017
Finish of Test	06 <sup>th</sup> November 2017
Name of Engineer(s)	Malcolm Musgrave Dan Ralley



1.2 DECLARATION OF BUILD

MAIN EUT	
MANUFACTURING DESCRIPTION	Marine Fixed Mount VHF with DSC
MANUFACTURER	Undien America Corporation
MODEL NAME/NUMBER	VHF490
PART NUMBER	NA
SERIAL NUMBER	NA
HARDWARE VERSION	EPP
SOFTWARE VERSION	1.00.01
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	156.050MHz to 161.600MHz
RECEIVER FREQUENCY OPERATING RANGE (MHz)	156.050MHz to 162.550MHz
COUNTRY OF ORIGIN	Vietnam
INTERMEDIATE FREQUENCIES	± 50kHz and ± 100kHz
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	G3E , G2B
MODULATION TYPES: (i.e. GMSK, QPSK)	FM , FSK
HIGHEST INTERNALLY GENERATED FREQUENCY	161.600MHz
OUTPUT POWER (W or dBm)	25W and 1W
FCC ID	AMWUT655
INDUSTRY CANADA ID	513C-UT655D
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	See Owner's Manual
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	NA
MANUFACTURER	NA
TYPE	NA
PART NUMBER	NA
VOLTAGE	NA
COUNTRY OF ORIGIN	NA
MODULES (if applicable)	
MANUFACTURING DESCRIPTION	NA
MANUFACTURER	NA
TYPE	NA
POWER	NA
FCC ID	NA
COUNTRY OF ORIGIN	NA
INDUSTRY CANADA ID	NA
EMISSION DESIGNATOR	NA
DHSS/FHSS/COMBINED OR OTHER	NA
ANCILLARIES (if applicable)	
MANUFACTURING DESCRIPTION	NA
MANUFACTURER	NA
TYPE	NA
PART NUMBER	NA
SERIAL NUMBER	NA
COUNTRY OF ORIGIN	NA

I hereby declare that that the information supplied is correct and complete.

Name: Tetsuro Otake  
Date: 6, June 2017

Position held: Senior Engineering Director



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### 1.3 PRODUCT INFORMATION

#### 1.3.1 Technical Description

The Equipment Under Test (EUT) was a Uniden America Corporation , marine fixed mount VHF with DSC, model VHF490 as shown in section 4.1. A full technical description can be found in the manufacturer's documentation.

### 1.4 DEVIATIONS

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

### 1.5 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
0	As supplied by the customer	N/A	N/A

### 1.6 REPORT MODIFICATION RECORD

Issue 1 – First Issue

### 1.7 TERMINOLOGY

The following terms were interpreted as described by the definitions database on the ITU website as of 3<sup>rd</sup> October 2017.

Term: Should

Definition: A term used to refer to behaviour 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.



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## **SECTION 2**

### **TEST DETAILS**

Testing of the Uniden America Corporation  
Marine Fixed Mount VHF with DSC  
Model: VHF490  
In accordance with ITU-R M.493-13





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## **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	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	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:	-	-



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
1.2.1	-	<p>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:</p> <ul style="list-style-type: none"> <li>- 400 ms for HF and MF channels, and</li> <li>- 33 ⅓ ms for VHF radio-telephone channels.</li> </ul>	<p>See clauses:-</p> <p>8.14 Testing of generated call sequences.</p> <p>10.8 Verification of correct decoding of various types of DSC calls</p>	In compliance with test cases 8.14 and 10.8 of IEC 62238
1.3	-	The classes of emission, frequency shifts and modulation rates are as follows:	-	-
1.3.1	-	<p>F1B or J2B 170 Hz and modulation rate of 100 (bit/s) * (1 ± 30 * 10<sup>-6</sup>) 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<sup>-6</sup>) are used in order for the DSC call to be transmitted.</p>	N/A	MF/HF Only.
1.3.2	-	<p>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:</p> <ul style="list-style-type: none"> <li>– frequency-shift between 1 300 and 2 100 Hz; the sub-carrier being at 1 700 Hz;</li> <li>– the frequency tolerance of the 1 300 and 2 100 Hz tones is ±10 Hz;</li> <li>– the modulation rate is 1 200 (bit/s) * (1 ± 30 * 10<sup>-6</sup>);</li> <li>– the index of modulation is 2.0 ± 10%.</li> </ul>	<p>See clauses</p> <p>8.11 Frequency Error DSC signal</p> <p>8.12 Modulation index for DSC</p> <p>8.13 Modulation rate for DSC</p>	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.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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: $\pm 10$ Hz, – ship station: $\pm 10$ Hz, – receiver bandwidth: should not exceed 300 Hz.	N/A	MF/HF Only.
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.	8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	In compliance with test cases 8.14 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).	8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	In compliance with test cases 8.14 and 10.8 of IEC 62238
1.6	-	Where the distress alert repetitions described in § 11 apply, the following conditions are considered necessary:	-	-
1.6.1	-	The transmitter encoder must provide repetitive transmission of the call sequence in accordance with § 11; and	Clause 8.14	It can be seen that for a distress call the transmission was repeated 5 times. Compliance demonstrated in accordance with IEC 62238, clause 8.4.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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, where applicable, was shown to switch channels. If the ECC is incorrect when the distress alert is sent to the EUT, the message is 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" The EUT sent a distress alert to the DSC tester, the DSC tester then responded, after all 5 messages are sent, with an acknowledgement, it was verified that the EUT received, alerted and displayed the distress alert from the DSC tester.



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.	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 <b>62238 Clause 8.14.-</b> All ships safety All ships urgency Distress with GPS input
2.2	-	Examples of typical call sequences and the construction of the transmission format are given in Figs A1-1 to A1-3.	8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	Group Routine Individual Routine The characters comprising each call type were decoded using a dedicated DSC test rack and compared with the requirements of ITU-R M.493-13 tables 4.1 to 4.10.2
2.3	-	The flow charts illustrating the operation of the DSC system are shown in Figs A1-4 and A1-5.	8.14 Testing of generated call sequences. 10.8 Verification of correct decoding of various types of DSC calls	The DSC test rack was used to compile a series of DSC calls that were sent to the equipment under test. <b>62238 Clause 10.8-</b> All ships distress acknowledgement All ships distress relay All ships safety All ships urgency Distress Group Routine Individual Routine Individual Safety Individual Urgency  It was confirmed that the equipment under test responded with the appropriate audio sound and that display gave indication of 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.



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). 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.	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 <b>62238 Clause 8.14.-</b> All ships safety All ships urgency Distress with GPS input Group Routine Individual Routine The characters comprising each call type were decoded using a dedicated DSC test rack and compared with the call ITU-R M.493-13 tables 4.1 to 4.10.2, the phasing characters were verified as per Annex 1, figure 1.
3.2	-	The phasing sequence consists of specific characters in the DX and RX positions transmitted alternatively. Six DX characters are transmitted.		
3.2.1	-	The phasing character in the DX position is symbol No. 125 of Table A1-1.		The DSC test rack was used to compile a series of DSC calls that were sent to the equipment under test.
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.		<b>62238 Clause 10.8-</b> All ships distress acknowledgement All ships distress relay All ships safety All ships urgency Distress Group Routine Individual Routine Individual Safety Individual Urgency
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 equipment under test responded with the appropriate audio sound and that display gave indication of 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.



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 only.
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 only.
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 only.





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>	Clauses 8.14 and 10.8	<p>Format specifiers tested:</p> <p>112 Distress 114 Group Routine 116 All ships safety/Urgency 120 Individual Routine</p> <p>It was confirmed that the equipment under test responded with the appropriate audio sound and that display gave indication of the call category and where applicable time and position information. Where required the equipment was check 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>The equipment does not support AIS channels, the equipment did not receive:</p> <p>Symbol 123, selective call to individual station using semi-automatic/automatic service.</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. Geographic area N/A for VHF class D.</p> <p>The EUT cannot send calls with the format specifier set to '123'</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
4.2	-	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).	Clause 8.14	<p>The DSC rack was programmed to send a correctly format Distress call and All ships call, these calls were received correctly by the equipment under test. The DSC rack then sent the same calls without the format identifiers being transmitted twice. It was confirmed that the equipment did not respond, i.e. false alert.</p> <p>For other calls, errors in either the DX or RX sequence results in a non-erroneous message received at the EUT. Errors in both the DX and RX for a specific symbol result in no response at the EUT.</p>
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	<p>Clause 8.14</p> <p>The DSC test rack was used to decode all characters transmitted by the equipment under test. It was confirmed that "Distress" alerts and "all ships" calls did not contain addresses.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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)</p> <p>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	<p>Clause 8.14</p> <p>The DSC rack was used to check character structure of an all ships call. It checked that the MMSI transmitted was 5 Characters and 10 digits.</p>



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, □□, 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, □□, 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	Distress, safety, urgency and routine categories were exercised and demonstrated in conformance with IEC 62238 clause 8.14
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	Demonstrated in conformance with IEC 62238 clause 8.14
6.2.1	-	For distress alert relays, distress alert relay acknowledgements and distress acknowledgements the category is distress.	Clause 8.14	The DSC Rack was used to check that the correct distress character was included.
6.3	-	For safety related calls, the "category" information specifies:	-	-
6.3.1	-	Urgency; or	Clause 8.14	The DSC Rack was used to check that the correct urgency character was included
6.3.2	-	safety	Clause 8.14	The DSC Rack was used to check that the correct safety character was included
6.4	-	For other calls, the "category" information specifies:	-	-
6.4.1	-	routine	Clause 8.14	The DSC Rack was used to check that the correct routine character was included
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	An individual routine call was made from the equipment to the DSC test rack; which showed that the equipment had correctly identified itself with its 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	<p>8.1.1 Message 1 is the “nature of distress” message, coded as shown in Table 3, i.e.:</p> <ul style="list-style-type: none"> <li>8.1.1.1 fire, explosion;</li> <li>8.1.1.2 flooding;</li> <li>8.1.1.3 collision;</li> <li>8.1.1.4 grounding;</li> <li>8.1.1.5 listing, in danger of capsizing;</li> <li>8.1.1.6 sinking;</li> <li>8.1.1.7 disabled and adrift;</li> <li>8.1.1.8 undesignated;</li> <li>8.1.1.9 abandoning ship;</li> <li>8.1.1.10 piracy/armed robbery attack;</li> <li>8.1.1.11 man overboard;</li> <li>8.1.1.12 emergency position-indicating radiobeacon (EPIRB) emission.</li> </ul>	-	<p>The equipment’s menu was checked for “nature of distress”. It was found to comply with the order and scope of the listing. The equipment was then set to send each of the “nature of distress” messages in turn and the DSC rack used to check that the correct “nature of distress” had been sent from the equipment.</p> <p>The equipment sends all the “nature of distress” characters except EPIRB which is not applicable.</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 equipment under test to the DSC test rack.</p> <p>The DSC test rack successfully decoded the distress call and position and time information.</p> <p>It was checked that with no position update that after 23½h the equipment transmitted the digit 9 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>	-	It was checked that the UTC time information was successfully transmitted by the equipment under test and decoded by the DSC test rack.
8.1.4	Message 4	<p>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 equipment under test and decoded by the DSC test rack.





Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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	<p>8.2.1 Message 0 is the "MMSI" of the vessel in distress.</p> <p>8.2.2 Message 1 is the "nature of distress" message, coded as shown in Table 3, i.e.:</p> <p>8.2.2.1 fire, explosion;</p> <p>8.2.2.2 flooding;</p> <p>8.2.2.3 collision;</p> <p>8.2.2.4 grounding;</p> <p>8.2.2.5 listing, in danger of capsizing;</p> <p>8.2.2.6 sinking;</p> <p>8.2.2.7 disabled and adrift;</p> <p>8.2.2.8 undesignated distress;</p> <p>8.2.2.9 abandoning ship;</p> <p>8.2.2.10 piracy/armed robbery attack;</p> <p>8.2.2.11 man overboard;</p> <p>8.2.2.12 emergency position-indicating radiobeacon (EPIRB) emission.</p>	-	<p>It was checked that the equipment could receive the distress relay, distress relay acknowledgement, distress acknowledgement calls.</p> <p>When the equipment receives an "individual distress relay" the user is prompted to send an automated "distress alert relay" acknowledgement.</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>A GPS simulator provided an input to the equipment. A distress call was then instigated by the equipment. The call was decoded by the DSC test rack. It was checked that the positioning information was correctly received.</p> <p>Where the equipment did not have a GPS input and it was more than 23.5 hrs since the last manual position input; then the equipment sent the character 9 repeated 10 times.</p> <p>When the equipment receives a distress relay or distress relay ack, the EUT correctly displays position information including enhanced position resolution. The EUT does not display position information for distress acknowledgement.</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 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>A GPS simulator provided an input to the equipment. A distress call was then instigated by the equipment. The call was decoded by the DSC test rack. It was checked that the UTC information was successfully decoded.</p> <p>For receiving these messages, the EUT does not display time information. The time information is stored in the DSC logs.</p> <p>Where the time was not set on the equipment it was checked that the digit 8888 was decoded.</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 equipment was checked and found to be in accordance with tables 3 and 5.</p> <p>Able and unable to comply acknowledgements were sent from the EUT. The format symbols were 120, not 123. Semi-auto routines are not supported by the EUT.</p>



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Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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	As 8.3.1



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
8.3.2.1	Frequency information	<p>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.</p>	-	<p>The frequency information of transmitted and received DSC messages were checked, and confirmed to be in accordance with annex 1, table 5.</p>
8.3.2.2	Channel information	-	-	-



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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.
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>EUT sending of semi/auto call sequences – when attempting to send able/unable to comply. The format symbol is 120, not 123, therefore semi-auto routines are not supported.</p> <p>For EUT receiving and decoding, the decoding requirements have been verified and can be found in Document 75938884 Report 01.</p>



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Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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).</p> <p>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. 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>





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 rack 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 are not supported.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 and 10.8	<p>RX: Distress ack Distress relay Distress relay ack, all ships individual (EUT does not display nature of distress) – verified.</p> <p>Tx: Distress relay ack – verified. The DSC test rack was used to send a distress relay and the EUT could successfully send and ack in accordance with table 4.4</p>
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 has a specific menu to send “test calls”. 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 and 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.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 rack, 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.	Clause 8.14	The ECC sent by the EUT was checked for validity against its information characters.
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 rack 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 rack, a distress call including expansion sequence was sent to the equipment. The position data sent was 22 deg 34.1111' N 123 deg 44.1111'W, The equipment decoded the position as 22 deg 34.111' N 123 deg 44.111'W, in effect the equipment does decode the full DSC transmission including the expansion sequence, however the display does not show the least significant character of position data.



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
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 two stage process to send a distress alert. <ul 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 around 5 seconds to send the distress alert. The equipment's menu gives the user the option to select "nature of distress" for the call.</li> </ul>
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	It was checked using the DSC test rack that "distress", "urgency" and "safety" could only be initialised by the user manually pressing buttons.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
11.4	-	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. For a single frequency distress alert attempt the expansion message should be transmitted immediately after the last of five consecutive distress alerts. For a multi-frequency distress alert attempt the expansion message should be transmitted immediately after each distress alert.	Clause 4.5.3	A distress alert was sent by the equipment to the DSC test rack. The equipment automatically transmitted the alert 5 times. The last of the 5 alerts included the expansion message which was decoded by the DSC rack giving a more accurate position.
12	Shipborne human machine interface	-	-	-
12.1	Shipborne aural alarm	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. 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. 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. NOTE 1 – Disabling of aural alarm does not affect handling of call.	-	The ships audio alarm starts at a low level and increases in volume; it is possible to acknowledge the alarm and silence it before the volume increases.  The audio frequency of the two tone alarm was checked with an audio analyser and found to be 1300 Hz and 2200 Hz which is in accordance with the ITU standard.  The duration of each tone was measured using a digital storage oscilloscope and found to be 250 ms.  All audible alarms can be disabled once the alarm has sounded from an incoming sequence.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
12.1	Shipborne aural alarm	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.	-	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.	-	The equipment sub menu was accessed, the unit was then left with no user intervention and it was checked that the unit returned to its default setting within 10 min. The equipment returned to the default screen in about 23s.
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	The display was checked in darkness, under artificial light and under daylight. The display was clearly legible under all conditions.  Note that the equipment is fitted with a 10 contrast adjustment, however leaving this on the middle setting was fine for all the lighting conditions.  The equipment is class D therefore the 160 character requirement is not applicable.



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 equipment was powered up without an MMSI, the equipment warns the user that no MMSI has been entered and that no DSC call is possible until MMSI is entered. There were multiple attempts to send DSC calls, however the equipment did not allow this.</p> <p>An MMSI was then entered into the unit and it was checked that it was possible to send and receive DSC calls. Once the DSC number is entered it is displayed clearly each time the equipment is powered up.</p>
12.5	Disabling of DSC automatic channel switching function on VHF	<p>Automatic switching to a subsequent communications 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 acknowledgement.</p> <p>Automatic switching to a subsequent communications 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>There is an option to configure "auto channel switch" as on or off.</p> <p>With auto channel switch off: and the equipment set to CH19, a routine individual call was sent to the equipment requesting CH23. The message "Routine CH23" was displayed, however the equipment remained on CH19 and had to be manually switched to CH23.</p> <p>With auto channel switch on: and the equipment set to CH19, a routine individual call was sent to the equipment requesting CH23. The equipment automatically changed to CH23 and the user was prompted with two options, able to comply or unable to comply. Which sent an appropriate DSC response.</p>



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 equipment has a NMEA input, the functioning of the NMEA input was checked using simulated NMEA data, a distress call was instigated by the equipment and it was checked that the position information was included in the distress call.
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 equipment accepts NMEA input, it does not have an inbuilt GPS receiver. A position was entered manually, it was checked that after 4 hrs the equipment displayed the message "input position".</p> <p>Where the equipment did not have a GPS input and it was more than 23.5 hrs since the last manual position input; then position information was erased.</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.	-	<p>Operation check:</p> <p>The EUT was sent a distress relay, set to a geographical location of which the EUT resided (based on EUT position information). It was verified that the EUT correctly received this distress relay.</p> <p>The EUT does not respond to the above if it is &gt;500 NM outside of the EUTs defined position.</p>





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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.	-	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 are not supported for a VHF class D. The EUT DSC call menu was checked for this option against all ships safety/urgency calls and the "medical" and "ships and aircraft" options are not available.



Product Service

## 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	From the "Call" menu, the operator is able to compose and initiate: Distress All ships urgency and safety Test call and ack Group routine Individual routine The operator is not able to compose semi/auto routines.
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 shows there is two stage process to sending a distress alert.</p> <ol style="list-style-type: none"> <li>3. The spring-loaded cover marked "distress" and red in colour must be lifted to expose the distress button.</li> <li>4. The distress button must be depressed for around 5 seconds to send the distress alert. The equipment's menu gives the user the option to select "nature of distress" for the call.</li> </ol> <p>It was checked that the default distress category is "undesignated"</p> <p>F3E/G3E simplex for the subsequent communications.</p> <p>Distress alert has top priority over all other DSC sequences.</p>



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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>In addition to the dedicated distress button there is a menu where it is possible to select the nature of distress. Position information may be entered manually via the front panel or via NMEA input.</p> <p>The operator can press the distress button once to bring up the list of nature of distress options prior to sending the alert (by push and hold of the distress button)</p> <p>The equipment allows for transmitting and receiving calls in accordance with tables 4.1 to 4.10</p> <p>Sending distress alert relay N/A for 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</p> <p>Going to the next step.</p>	-	<p>The equipment's display uses the following terms to navigate the menus. "Back(CLR)" "Forward(ENT)" "Select(ENT)" up and down keys are used to make the appropriate selection.</p>



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4	Display of messages in plain language	The headings and content of messages should be shown in plain language, for example: – “Radiotelephone” instead of J3E; – “busy” instead of “telecommand 2: 102”.	-	The display of messages on the equipment was checked by using the equipment’s menu structure to compose DSC messages and input GPS position. The display was also checked when receiving DSC messages according IEC62238 Clause 8,14/10.8. In all cases the equipment uses plain English language.
5	Transmission of DSC messages	-	-	-
5.1	DSC message composition features	The facilities for choosing and composing DSC messages should be so arranged that it is possible for the operator quickly and precisely to: compose the content of the DSC message; review and correct, if needed, the content before transmitting the DSC message.	-	The equipment has 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 is a dedicated button as described in annex 3 clause 3.1.  At the final stage of composition, the operator can review the DSC message prior to transmission.
5.2	Operational guidance to the operator	The operator should only be able to compose the types of DSC messages which are specified in Tables 4.1 through 4.11.  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.	Clause 8.14	The equipment’s menu was used to make a series of DSC calls in accordance with clause 8.14 of IEC 62238. the menu structure of the equipment only allows calls defined in tables 4.1 through 4.10 to be composed.  The sequence for message composition is as follows: The operator starts by selecting the desired channel from the standby screen – call menu – DSC call – MMSI – review and send.  At any stage, the user can go back or cancel with the ‘CLR’ soft key. Or forward with the ‘ENT’ soft key.



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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> <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> </ul>	-	<p>The equipment is 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: 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. Channel selection is done prior to DSC call composition. All other parameters are entered automatically.</p> <p>If the operator composes a similar DSC call, at a later time, the default parameters are available, not the settings of the previous call.</p> <p>Customised or pre-set DSC calls are not available.</p> <p>EUT cannot send distress alert relay.</p> <p>VHF only</p>



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5.3	Defaults	<ul style="list-style-type: none"> <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> <li>– 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”. After the operator selects the option to compose a distress alert relay on behalf of someone else (DROBOSE):               <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> <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> </ul> </li> </ul>		



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
5.3	Defaults	<ul style="list-style-type: none"> <li>– on MF/HF the default band of the DSC transmission should be on the 2 MHz band;</li> <li>– 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>		
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>The EUT does not provide channel recommendations as part of DSC message composition.</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. 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> <p>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</p>	-	Information only. No requirement.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
-	-	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.	-	-
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	The sounding of any alarm should simultaneously display the reason for the alarm and the means to silence it.	-	The equipment's display shows the call type whilst simultaneously sounding the corresponding alarm along with an option to silence the alarm.
3.1.1	-	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".	-	Alarm sounds were checked for received DSC calls as follows; Distress, All ships Urgency, All ships Safety, Individual Routine.  In each case the appropriate audio alarm was sounded.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.1.1	Handling alarms	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".	-	Alarm sounds were checked for received DSC calls as follows; Distress, All ships Urgency, All ships Safety, Individual Routine.  In each case the appropriate audio alarm was sounded.
		Only the first occurrence of a received DSC message should sound the alarms.	-	It was confirmed that only the first instance of a distress call sounded the audible alarm on the equipment.
		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.	-	All DSC messages sound an alarm.
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 equipment displays information on automatic call acknowledgement.



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.	-	A routine call was sent to the EUT with ARQ 23, the equipment's audible alarm sounded in reception of the signal. The user was prompted to respond with able to comply or unable to comply. The equipment automatically switched to CH23
		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.	-	The equipment's menu structure is such that it is possible to enable or disable automatic channel switching for non-distress sequences.  The EUT is class D VHF only and therefore any automated tuning procedure happens instantly, therefore, no warning is necessary.
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 equipment's menu structure is such that only ITU structured calls can 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
3.1.7.1	Handling digital selective calling messages containing errors	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.	-	The equipment does not support automatic operation. Test with errors in the ECC only – sent to the EUT The DSC Tester was used to send various messages with correct information symbols and with errors in the ECC: Geographical area distress – no response from EUT Group urgency – no response from EUT Group routine – no response from EUT All ships distress relay – no response from EUT. Individual safety – no response from EUT Distress – no response from EUT
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.	-	A routine individual call was sent to the EUT. With errors in both the DX and RX for the MMSI. There was no response from the EUT. For errors in either the DX or RX side, the message was received, however the message was still received with the same alarm, but did not self-cancel or notify the user of a problem.  A condition where the DSC message's information characters are received in error, displayed and alerted to the operator, does not exist. Only conditions where the EUT can decode the message error free or are unable to decode the message sound an alarm on the EUT.
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.	-	The equipment does not support automatic operation.  Errors based on above (occurring in the DX and RX) result in no response from EUT. If the same message is sent without errors, the EUT successfully decodes the message. If there is an error in either the DX or RX side, the EUT successfully receives and decodes the message.
3.1.7.4	-	No automated procedure should allow the transmission of further DSC messages with errors.	-	The equipment does not support automatic operation. It is not possible to configure illegal parameters on the EUT.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 equipment does not support automatic operation.  With errors introduced into the information symbols, the EUT either receives the message without errors, or no message is received at all. For example, errors in either the DX or RX sequence results in a non-erroneous message received at the EUT. Errors in both the DX and RX for a specific symbol result in no response at the EUT.
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.	-	The equipment does not support automatic operation.
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.	-	With errors introduced into the MMSI or channel information symbols (DX or RX side) of the messages that are successfully received by the EUT, the information is presented to the user without any missing or 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.	-	A Distress alert message was transmitted while the channel was still busy:  The EUT notified the user that the channel was busy before proceeding to transmit. The random delay before transmission, once the channel is clear, was measured using a digital storage oscilloscope.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 does not present any features or configurable options in relation to automated termination. The EUT does not terminate any automated procedures.
		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 does not present any features or configurable options in relation to automated termination. The EUT does not terminate any automated procedures.
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 DSC tester sent an individual routine message to the EUT. No time display was given on the EUT. The EUT automatically tuned to the requested channel.
		Sending repeat acknowledgments should not affect the time display.	-	No time display was given on the EUT.





Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 tester was used to send an individual routine message to the EUT. The alarm sounded immediately and the user is prompted to manually reply with able or unable to comply.
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.	-	The EUT does not display elapsed time.  This requirement was not considered mandatory as the requirement only states the EUT 'should' display the elapsed time, see section 1.7 of the present document for further details.
3.2.2.2	Resending the initial DSC message	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. 3.2.2.2.2 If an acknowledgement is requested the option to resend the initial DSC message should remain available until the acknowledgment has been received.	-	The EUT cannot be configured to request an ack.  This requirement was not considered mandatory as the requirement only states the EUT 'should' display the elapsed time, see section 1.7 of the present document for further details.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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.	-	<p>A routine individual call was sent by the EUT to the DSC test rack. The DSC test rack acknowledged the call and the EUT presented this alert on screen.</p> <p>The EUT does not appear to have the facility to terminate, prematurely, any procedure that has been initiated by sending a non-distress DSC message. Once the individual call DSC message was sent, the EUT returns to the standby screen.</p>
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.	-	<p>The EUT does not provide an elapsed time display upon receipt of a distress message. The EUT automatically switches to the distress channel (CH16).</p> <p>This requirement was not considered mandatory as the requirement only states the EUT 'should' display the elapsed time, see section 1.7 of the present document for further details.</p>
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.	-	HF only.
		The option to send a distress alert relay should always be available until the automated procedure is terminated.	-	EUT is class D VHF, which does not have the ability to send distress relays.



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.	-	Upon receipt of a distress alert message, the EUT produces a two tone alarm increasing in volume. Upon receipt of a distress alert, the EUT switches to CH16. The EUT is class D so a distress ack or distress relay cannot 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.	-	The EUT remains on these settings after a distress alert is received and if the distress is cancelled.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.3.3	Digital selective calling 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.	-	The unit was connected to a DSC test rack, it was checked that the equipment composed correctly structured messages in accordance with tables 4.1 to 4.10.
		The distress information should be taken from the distress DSC message which has the latest UTC time stamp.	-	It was verified that, by using a dedicated DSC test rack to send a distress message to the EUT, the EUT does not show the timestamp, only the position and MMSI of the ship in distress.  This requirement was not considered mandatory as the requirement only states the EUT 'should' display the elapsed time, see section 1.7 of the present document for further details.
		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.	-	Class D VHF, only needs to receive the distress acknowledgements and distress relays. No data entry is needed on the equipment. For distress alert relay ack, the user is only asked to send the ack.
		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	HF only.
		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	HF only.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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 acknowledgment 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	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.	-	EUT is VHF class D, only Rx for distress relay. The EUT will execute the described routine when a distress call is received. If a relay message, of the same nature (regarding the same MMSI in distress) is received, the EUT then initiates the receipt of the relay, puts this on screen and restarts the alarm. The user can check these alerts in the DSC log screen. If a relay has been sent first, and a subsequent distress (of the same nature and MMSI) is received, the EUT prioritises the distress message and presents this immediately on screen to the user, the two tone alarm also restarts accordingly.
		The option to send a distress alert acknowledgement should never be available during this automated procedure.	-	For a VHF class D it is not possible to send a distress alert ack.
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.	-	RX distress alert: the DSC tester sent two messages, one message has the subsequent communication symbol modified to '101', the second to '99'. For both messages the ECC was recalculated. The user is not informed that an error is received. The EUT switches to CH16. If the subsequent communication and ECC symbols are in error, nothing is received.
3.2.3.7	Handling the self-addressed distress alert acknowledgement	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 DSC test rack sent a distress alert and then a self-MMSI distress ack. The EUT correctly informed the user that the distress alert is cancelled.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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.
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	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.	-	<p>The EUT does not display elapsed time. After sending a distress alert, the EUT shows on the display:            "Distress            Acknowledged            Waiting"            With the user option to cancel.</p> <p>This requirement was not considered mandatory as the requirement only states the EUT 'should' display the elapsed time, see section 1.7 of the present document for further details.</p>
		The elapsed time since acknowledgement should be displayed after acknowledgment by DSC. Receiving repeat acknowledgments should not affect the time display.	-	<p>The EUT does not display elapsed time.</p> <p>This requirement was not considered mandatory as the requirement only states the EUT 'should' display the elapsed time, see section 1.7 of the present document for further details.</p>



Clause	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.	-	A repeat distress alert is sent immediately after 3.5 min.
		The automatic resending of the distress alert attempt should automatically terminate after acknowledgement by DSC.	-	The EUT does not re-transmit a distress alert once an ack is received.
		Resent distress alert attempts should contain updated position and time of position information.	-	From the call log screen, the user can see the latest time and position information of recent distress alerts.
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 user can use the distress button to send another distress, if the distress alert has not already been ack'd.
		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	HF only.
		The option to pause the countdown to the next distress alert attempt should be available prior to acknowledgement by DSC.	-	There is no applicable countdown and therefore no pause option on the EUT once a distress alert is sent
		The option to cancel the distress alert should be available prior to acknowledgement by DSC.	-	The user has the option to cancel the distress alert.
		The option to terminate the procedure should only be available after acknowledgment by DSC.	-	The user has the option to cancel the distress before the ack is received. Once an ack is received, the user can exit the distress screen.



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.	-	The distress cancel procedure consists of the cancel operation. The cancel operation consists of a DSC cancel (a self-addressed distress alert acknowledgement) followed by a voice cancel on CH16. After a distress alert was sent, the EUT transmits a self-addressed ack to cancel the alert and allows for telephony on CH16.
3.2.4.4.1		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.	-	When the cancel button is pressed, the EUT sends a self-addressed ack and returns to CH16. No procedure information is presented to the user.
3.2.4.4.2		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.	-	Selection of the cancellation option during the sending of a distress alert attempt shall stop the transmission as soon as possible but only after any ongoing distress alert within the distress alert attempt is completed. DR: The user is not presented with the option to cancel until the distress alert transmission is completed.
3.2.4.4.3		The operator options during the cancel procedure should be to terminate the cancel procedure and to start the cancel operation.	-	The radio shall prompt the operator to confirm that a distress cancel is requested. When the cancel button is pressed, the cancellation message is immediately sent. No option to re-transmit is provided.





Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.4.4.4	-	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 is selected, the EUT immediately transmits the cancellation, closes the distress alert and returns to the standby screen.
3.2.4.4.5	-	The status of the cancel procedure should be displayed.	-	The EUT shows the cancellation being transmitted and then returns to the standby screen
3.2.4.4.6	-	The operator should be provided with the appropriate text for the voice cancel at the time of the voice cancel.	-	The operator shall be prompted to make the voice cancellation. No voice cancel instructions are provided to the user.
3.2.4.4.7	-	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	MF/HF only.



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Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.2.4.4.8	Special considerations for MF/HF	The status of each of the bands should be displayed;	N/A	MF/HF only.
		Once one band is cancelled the option to end the cancel procedure should not be available until ALL utilized bands are cancelled;	N/A	MF/HF only.
		When the cancel procedure is completed, the sending distress automated procedure should be considered acknowledged and the fact that a cancel was performed should be displayed.	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	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,	-	The equipment does not support automated procedures.
		– the ability to be terminated at the discretion of the operator,	-	The EUT feature(s) that can be associated to automated procedures, in context, are tuning the transmitter and receiver to the applicable channel selected. Therefore, there is no applicable termination option.
		– the ability to select the channels for the communications, and	-	The operator can change channels using the up/down soft keys. The operator can also select the desired comms channel from a list when composing a DSC call. The EUT automatically tunes the transmitter and receiver as per the channel selection.  For example, on radiotelephone CH24, a signal generator was used to send a tone to the EUT on 161.800 MHz. It was confirmed that the tone could be heard from the EUT.  The EUT was connected to a frequency counter, the transmitter was activated on channel 24, it was confirmed that the transmit frequency was 157.200 MHz



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,	-	If the EUT is communicating (or engaged) on a communications channel, the EUT notifies the operator of an incoming DSC sequence. The EUT immediately switches to the channel relevant to the received DSC call sequence.  There are no non-DSC automated procedures in where a hold function is 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 EUT was tuned to CH8. It was verified that non-distress and distress DSC messages were received while CH8 was busy.
		be able to be terminated by the operator.	-	The automated procedures relevant to this section include tuning the transmitter and receiver to the selected channel. This does not require termination options. The EUT can handle incoming DSC messages while engaged.
3.3	Tasks concerning multiple automated procedures	-	-	The equipment does not support automated procedures.



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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:	-	The DSC test rack was used to send multiple routine individual calls from different MMSIs (more than 7). Each call, whether a call is being received or the EUT is in standby, is stored in the DSC log. Upon receipt of a subsequent call (while another is ongoing), the EUT produces a brief tone to notify the user that another call has arrived, this call is stored in the DSC log.
		- warn the operator that the equipment cannot handle another automated procedure and that one automated procedure should be terminated,	-	
		- prevent the operator from initiating any new automated procedures except for the sending of a distress alert and,	-	
		- 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,	-	
		- the automatic and immediate termination should be based upon age and priority.	-	
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 procedure is sent from the EUT, the EUT immediately cancels the current activity.
3.3.3	Operator options	The operator should be able to freely navigate between the automated procedures except when engaged in an unacknowledged sending distress automated procedure.	-	Procedures for sending or receiving DSC call sequences are handled sequentially, one at a time. Messages are stored in the DSC log. e.g. if a distress call is received and an individual routine is subsequently received, the most recent message is displayed and alerted to the operator, regardless of sender MMSI.
		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.	-	



Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
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.	-	Position and test acks can be set to automatically send from the system settings menu. Once the message is received, the EUT responds and goes back to standby. However, because DSC call sequences are handled sequentially, other DSC call sequences are cancelled; prioritising the most recent DSC call sequence.  However, for distress and urgency calls, the audible alarm will still sound during the auto reply/ack to the test and position DSC sequences. The user has the option to cancel the alarm at any time.
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,	-	EUT cannot send relay (distress) messages.
		– send a non-individually addressed relay,	-	EUT cannot send relay (distress) messages.
		– send a distress alert acknowledgement (requires coast station permission),	-	EUT cannot send distress ack.
		– send an all stations (116 format) distress relay acknowledgement (should be sent by coast station only),	-	The EUT prompts the user, in addition to an audible alarm, to send an ack.
		– send an acknowledgement to a DSC message containing no distress information that is not individually addressed,	-	No such message exists in table 4.1 to 4.9. EUT cannot compose messages in table 4.10 All ships distress relay with incorrect nature of distress symbol – no notification or response from EUT Individual routine, urgency and safety sent with incorrect MMSI – no response from EUT. Otherwise, the EUT does not have the capability to send such acknowledgements.
		– cancel a distress alert,	-	The user is given the option to cancel the distress alert, pressing cancel immediately sends a cancel ack, no prior warnings to the user are given.



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Clause	Title	Requirement	IEC 62238 First Ed Equivalent	Comments
3.4	Warnings	– send any DSC message after the objective of the automated procedure has been obtained,	-	If the user wants to send a message after the auto-channel procedure has completed. There is no given warning.
		– terminate the automated procedure before the objective has been reached,	-	There are no applicable procedures that can be cancelled before their completion.
		– terminate the automated procedure if engaged in subsequent communications.	-	N/A.



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### **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
Signal Generator	Rohde & Schwarz	SMX	115	12	12-Jul-2018
Modem (MF/HF/VHF DSC)	ICS	PLT02249	120	12	3-Aug-2018
Counter	Hewlett Packard	53181A	159	12	26-May-2018
Termination (50ohm)	Diamond Antenna	DL-30N	219	12	13-Dec-2017
Crystal Detector (Pos O/P)	ASL (TUV)	RAB1	479	-	TU
Attenuator: 10dB/20W	Narda	766-10	480	12	14-Dec-2017
Combiner (20MHz - 2GHz)	Anzac	DS-808-4	492	-	TU
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	12-Mar-2018
Power Attenuator (30dB)	Rohde & Schwarz	RBU	2746	12	TU
Attenuator (30dB, 25W)	Weinschel	46-30-34	2776	12	16-Feb-2018
Hygrometer	Rotronic	I-1000	3220	12	30-Aug-2018
Communications Receiver, AM, FM,& WFM	ICOM	IC-R5	3330	-	O/P Mon
'N' - 'N' RF Cable (2m)	Rhophase	NPS-1803-2000-NPS	3698	12	12-Oct-2017
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	26-Jan-2018
Combiner/Splitter	Weinschel	1506A	3877	12	5-Apr-2018
Combiner/Splitter	Weinschel	1506A	3878	12	13-Jun-2018
2 Metre SMA Type Cable	Rhophase	3PS-1801A-2000-3PS	4111	12	6-Nov-2016
Oscilloscope	Agilent Technologies	DSO9104A	4142	12	19-Jun-2018
DSC Pre-emphasis Unit	TUV SUD Product Service	n/a	4369	12	3-Aug-2018
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	12-Mar-2018
4 Channel PSU	Rohde & Schwarz	HMP4040	4736	-	TU

TU – Traceability Unscheduled

OP MON – Output Monitored with Calibrated Equipment



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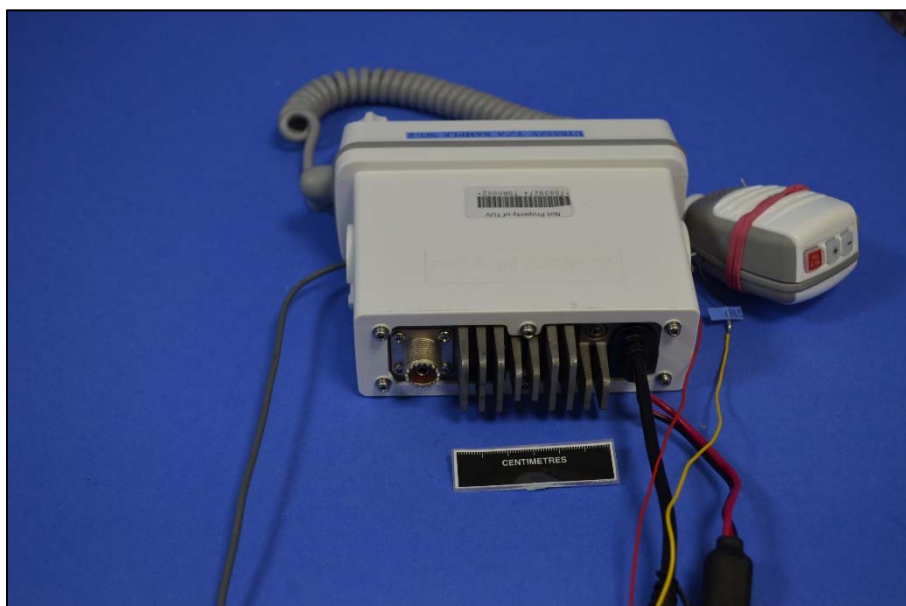
## **SECTION 4**

### **PHOTOGRAPHS**

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



Front View



Rear View



Product Service

## **SECTION 5**

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



Product Service

## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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TÜV SÜD Product Service