Report On

Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio

COMMERCIAL-IN-CONFIDENCE

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REPORT ON

Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio

Document 75906328 Report 02 Issue 1

August 2009

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DATED

11 August 2009

11 August 2009

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SECTION 1

REPORT SUMMARY

Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Garmin International Inc VHF300AIS Fixed Mount Radio to the requirements of IEC 62238 in conjunction with IEC 60945.

Objective	To perform Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Garmin International
Model Number(s)	VHF300AIS
Declared Variants	VHF300i, VHF300 and VHF300iAIS
Serial Number(s)	01 02
Software Version	2.00
Hardware Version	1.00 or later
Number of Samples Tested	Two
Test Specification/Issue/Date	IEC 62238: 2003 IEC 60945: 2002
Incoming Release Date	Declaration of Build Status 21 April 2009
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	148862 25 March 2009
Start of Test	02 June 2009
Finish of Test	20 July 2009
Name of Engineer(s)	G Lawler A Guy S C Hartley A R Hubbard B Airs R A Blagg
Related Document(s)	CISPR 16-1: 1999 IEC 61000-4-6: 1996 IEC 61000-4-3: 1995 IEC 61000-4-4: 2004 IEC 61000-4-11: 1994 IEC 61000-4-2: 1995 EN 60945: 2002

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1.2 TEST HOUSE DECLARATION

We, TÜV Product Service Ltd of Octagon House, Concorde Way, Segensworth North, Fareham, Hampshire PO15 5RL, declare that the product :

Equipment :	VHF Fixed Mount Radio
Type/Model :	VHF300AIS
Model Variant:	VHF300i, VHF300 and VHF300iAIS
Serial Number:	01 02
Quantity :	Two

to which this declaration relates is in conformity with the following standard(s) or other normative document(s) :

IEC 62238
Clauses: 7.4, 7.5, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12, 8.13, 8.14, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 9.11, 9.12, 9.13, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9 and 10.10

and

IEC 60945
Clauses: Table 5; 9.2, Table 5; 9.3, Table 6; 10.3, Table 6; 10.4, Table 6; 10.8, Table 6; 10.9 and 11.2

This declaration applies only to the particular sample of the product tested.

Signature :		
	M Jenkins Authorised Signatory	**C Gould** Authorised Signatory
Date :	11 August 2009	11 August 2009

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1.3 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with IEC 62238 in conjunction with IEC 60945, is shown below.

Section	Spec Clause		Test Description	Mod State	Result	Comments
	62238	60945				
2.1	7.4	-	Vibration	0	Pass	
2.2	7.5	-	Dry Heat	0	Pass	
2.3	7.5	-	Damp Heat	0	Pass	
2.4	7.5	-	Low Temperature	0	Pass	
2.5	8.1	-	Frequency Error	0	Pass	
2.6	8.2	-	Carrier Power	0	Pass	
2.7	8.3	-	Frequency Deviation – Maximum Permissible Frequency Deviation	0	Pass	
2.8	8.3	-	Frequency Deviation – Reduction of Frequency Deviation at Modulation Frequencies Above 3kHz	0	Pass	
2.9	8.4	-	Sensitivity of the Modulator, Including the Microphone	0	Pass	
2.10	8.5	-	Audio Frequency Response	0	Pass	
2.11	8.6	-	Audio Frequency Harmonic Distortion of the Emission	0	Pass	
2.12	8.7	-	Adjacent Channel Power	0	Pass	
2.13	8.8	-	Conducted Spurious Emissions Conveyed to the Antenna	0	Pass	
2.14	8.9	-	Transient Frequency Behaviour of the Transmitter	0	Pass	
2.15	8.10	-	Residual Modulation of the Transmitter	0	Pass	
2.16	8.11	-	Frequency Error (DSC Signal)	0	Pass	
2.17	8.12	-	Modulation Index for DSC	0	Pass	
2.18	8.13	-	Modulation Rate for DSC	0	Pass	
2.19	8.14	-	Testing of Generated Call Sequences	0	Pass	

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2.20	9.1	-	Harmonic Distortion and Rated Audio Frequency Output Power	0	Pass	
2.21	9.2	-	Audio Frequency Response	0	Pass	
2.22	9.3	-	Maximum Usable Sensitivity	0	Pass	
2.23	9.4	-	Co-channel Rejection	0	Pass	
2.24	9.5	-	Adjacent Channel Selectivity	0	Pass	
2.25	9.6	-	Spurious Response Rejection	0	Pass	
2.26	9.7	-	Intermodulation Response	0	Pass	
2.27	9.8	-	Blocking or Desensitization	0	Pass	
2.28	9.9	-	Spurious Emissions	0	Pass	
2.29	9.10	-	Receiver Residual Noise Level	0	Pass	
2.30	9.11	-	Squelch Operation	0	Pass	
2.31	9.12	-	Squelch Hysteresis	0	Pass	
2.32	9.13	-	Multiple Watch Characteristics	0	Pass	
2.33	10.1	-	DSC Receiver Maximum Usable Sensitivity	0	Pass	
2.34	10.2	-	DSC Receiver Co-Channel rejection	0	Pass	
2.35	10.3	-	DSC Receiver Adjacent Channel Selectivity	0	Pass	
2.36	10.4	-	DSC Receiver Spurious Response and Blocking Immunity	0 and 1	Pass	
2.37	10.5	-	DSC Receiver Intermodulation Response	0	Pass	
2.38	10.6	-	DSC Receiver Dynamic Range	0	Pass	
2.39	10.7	-	DSC Receiver Spurious Emissions	0	Pass	
2.40	10.8	-	Verification of correct decoding of various types of DSC calls		Pass	
2.41	10.9	-	Reaction to VTS and AIS channel management DSC transmissions	0	Pass	
2.42	10.10	-	Simultaneous Reception	0	Pass	
	11	-	EMC (See Below)		-	

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Configuration 1 - Normal							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	62238	60945					
2.43	11.1.1	Table 5, 9.2	Conducted Emissions (DC Power Port)	Transmit	0	Pass	CISPR 16-1
				Receive	0	Pass	
	11.1.1	Table 5, 9.2	Conducted Emissions (AC Power Port)			N/A	CISPR 16-1
2.44	11.1.2	Table 5, 9.3	Enclosure Port Magnetic Emissions - Field Strength	Receive	0	Pass	CISPR 16-1
2.44	11.1.3	Table 5, 9.3	Radiated Emissions (Enclosure Port)	Receive	0	Pass	CISPR 16-1
	11.1.3	Table 6, 10.3	Immunity to Radio Frequency Common Mode (AC Power Port)			N/A	IEC 61000-4-6
2.46	11.1.3	Table 6, 10.3	Immunity to Radio Frequency Common Mode (DC Power Port)	Transmit	0	Pass	IEC 61000-4-6
				Receive	0	Pass	
2.47	11.1.3	Table 6, 10.3	Immunity to Radio Frequency Common Mode (Signal, Control and Telecommunications Port)	Transmit	0	Pass	IEC 61000-4-6
				Receive	0	Pass	
2.48	11.1.3	Table 6, 10.4	Immunity to Radio Frequency Electromagnetic Field (Enclosure Port)	Transmit	0	Pass	IEC 61000-4-3
				Receive	0	Pass	
	11.1.3	Table 6, 10.5	Immunity to Fast Transient Bursts Common Mode (AC Power Port)			N/A	IEC 61000-4-4
2.49	11.1.3	Table 6, 10.5	Immunity to Fast Transient Bursts Common Mode (Signal, Control and Telecommunications Port)	Transmit	0	Pass	IEC 61000-4-4
				Receive	0	Pass	
	11.1.3	Table 6, 10.6	Immunity to Surges (AC Power Port)			N/A	IEC 61000-4-5
	11.1.3	Table 6, 10.7	Immunity to Power Supply Short Term Variation (AC Power Ports)			N/A	IEC 61000-4-11
	11.1.3	Table 6, 10.8	Immunity to Interruptions (AC Power Port)			N/A	IEC 61000-4-11
2.50	11.1.3	Table 6, 10.8	Immunity to Interruptions (DC Power Port)	Transmit	0	Pass	IEC 61000-4-11
				Receive	0	Pass	
2.51	11.1.3	Table 6, 10.9	Immunity to Electrostatic Discharge (Enclosure Port)	Transmit	0	Pass	IEC 61000-4-2
				Receive	0	Pass	
2.52	11.1.3	11.2	Compass Safe Distance (Enclosure Port)	Transmit	0	Pass	EN 60945
				Receive	0	Pass	

N/A – Not Applicable

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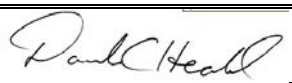
1.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	VHF Radio with or without AIS receiver (AIS version has receiver)
MANUFACTURER	Garmin International
TYPE	VHF300AIS (VHF300iAIS, VHF300 VHF300i are listed variants)
PART NUMBER	VHF300AIS
SERIAL NUMBER	TBD
HARDWARE VERSION	1.00 or later
SOFTWARE VERSION	2.00
TRANSMITTER OPERATING RANGE	156.025MHz to 157.425 MHz
RECEIVER OPERATING RANGE	156.025MHz to 163.275MHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	1st – 21.6MHz, 2nd – 450kHz
ITU DESIGNATION OF EMISSION	16K0G3EJN, 16K0G2BJN
HIGHEST INTERNALLY GENERATED FREQUENCY	163Mhz
OUTPUT POWER (W or dBm)	1W or 25W
FCC ID	IPH-GARVHF3
INDUSTRY CANADA ID	1792A-GARVHF3
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The VHF300AIS is a fixed mount Class D DSC VHF marine radio. For use on non SOLAS vessels

Signature 

Date 21 April 2009

D of B S Serial No 75906328/01

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV Product Service as to the accuracy of the information declared in this document by the manufacturer.

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1.5 APPLICATION FORM

APPLICANT'S DETAILS	
CATEGORY OF APPLICANT (please tick relevant box opposite)	(a) [X] MANUFACTURER (b) [ ] IMPORTER (c) [ ] DISTRIBUTOR (d) [ ] AGENT
If box (b), (c) or (d) is ticked complete details in box below with respect to the manufacturer	
COMPANY NAME :	Garmin International, Inc.
ADDRESS :	1200 E. 151st Street Olathe, KS 66062-3426 USA
NAME FOR CONTACT PURPOSES :	Al Sundoro
TELEPHONE NO : +1 913-440-5463	FAX NO : +1 913 397-8282 E-MAIL : engelhard.sundoro@garmin.com

MANUFACTURER'S DETAILS	
COMPANY NAME :	Kanematsu Corporation
ADDRESS :	2-1 Seavans N Bldg, Shibaura-1 Chome, Minato-ku, Tokyo, 105-8005, Japan
NAME FOR CONTACT PURPOSES :	Hiroyuki Takeda
TELEPHONE NO : +81-3-5440-8300	FAX NO : +81-3-5440-6515 E-MAIL : htakeda@kanematsu.co.jp

Product Service

TYPE DESIGNATION (1)
The type designation may be either a single alphanumeric code or an alphanumeric/code divided into two parts. Please fill in TYPE DESIGNATION AS A SINGLE ALPHANUMERIC CODE For EU/Australia/NZ/International **VHF 300i** AIS (**VHF300i** is a technical variant) For USA/Canada: VHF 300 AIS (VHF300 is a technical variant)

(1) This is the manufacturer's numeric or alphanumeric code or name that is specific to a particular equipment. It may contain information in coded form on the characteristics of the equipment e.g. frequency, power. The manufacturer is free to choose the form of the type designation.

(2) This is the number, code or trade name used by the manufacturer to describe a series or 'family' of equipment of substantially the same mechanical and electrical construction which will include a number of related equipments. This number is often referred to as the "model number".

(3) This is the manufacturer's identification number given to a specific equipment in the series or 'family' of equipments. It is often referred to as the "identification number".

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TYPE OF EQUIPMENT		
[ ]	Base Station	(Equipment fitted with an antenna socket for use with an external antenna, and intended for use in a fixed location).
[X]	Mobile Station	(Mobile equipment fitted with an antenna socket, for use with an external antenna, normally used in a vehicle or as a transportable station).
[ ]	Handportable	(fitted with an antenna socket)
[ ]		(without an external antenna socket integral antenna equipment, but fitted with a permanent internal or a temporary internal 50 ohm R.F. connector which allows access to the transmitter output and the receiver input)
[ ]	Other	

BASE STATION
Not Applicable
MOBILE STATION
[ ] Transmitter [ ] Receiver [X] Transceiver [ ] Remote Control Head
HANDPORTABLE
Not Applicable

TRANSMITTER TECHNICAL CHARACTERISTICS
TRANSMITTER FREQUENCY
Method of frequency generation [ ] CRYSTAL [X] SYNTHESIZER [ ] OTHER
TRANSMITTER CHANNEL SWITCHING FREQUENCY RANGE 156.025 MHz – 157.425 MHz (MHz Range) TRANSMITTER FREQUENCY ALIGNMENT RANGE (6) Not Applicable

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TRANSMITTER RF POWER CHARACTERISTICS	
MAXIMUM RATED TRANSMITTER OUTPUT POWER as stated by manufacturer 25 W AT TRANSMITTER RF OUTPUT CONNECTOR (as declared by manufacturer)	
Is transmitter intended for : Continuous duty [ ] Yes [X] No Intermittent duty [X] Yes [ ] No If intermittent state DUTY CYCLE 5% TX, 5% RX, 90% Idle	
Is transmitter output power variable?	
Yes [X]	No [ ]
[ ] continuously variable [X] stepped 25 dB per step 25 maximum RF output power (Watts) 1 minimum RF output power (Watts)	The power can be set for 1W or 25W

TRANSMITTER - MODULATION
[X] FREQUENCY (FM 5 kHz)
[ ] Phase

TRANSMITTER MODULATION INPUT CHARACTERISTICS			
Modulation input signal level for 60% of maximum deviation at at			
Microphone socket	12mV	Impedance	2k Ohms
Accessory socket	12mV	Impedance	2k Ohms
Other (4)	mV	Impedance	Ohms
Lowest audio modulation frequency transmitted by the equipment			
		Hz	

(4) For use where direct connection is provided for test purposes.

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RECEIVER TECHNICAL CHARACTERISTICS
RECEIVER - FREQUENCY
METHOD OF FREQUENCY GENERATION [ ] CRYSTAL [X] SYNTHESIZER [ ] OTHER INTERMEDIATE FREQUENCIES [X] 1st 21.6 MHz [X] 2nd 450 kHz [ ] 3rd Not Applicable
Is local oscillator injection frequency higher or lower than the receiver nominal frequency? [ ] Higher [X] Lower
RECEIVER CHANNEL SWITCHING FREQUENCY RANGE 156.025 MHz – 163.275 MHz (MHz Range) RECEIVER FREQUENCY ALIGNMENT RANGE Not Applicable

RECEIVER AUDIO (AF) CHARACTERISTICS			
MAXIMUM RATED AUDIO (AF) FREQUENCY OUTPUT POWER			
INTO LOUDSPEAKER	Watts		
TO LINE	Watts		
INTO EARPIECE	1 Watts		
BALANCED		[X]	NO
UNBALANCED		[X]	YES
Does connection carry DC voltage?		[X]	NO
If yes, state value		Not Applicable	
Normal Audio load impedance			
AT LOUDSPEAKER	4 ohms		
AT EARPIECE	24 ohms		
AT LINE OUTPUT	Not Applicable		
At audio accessory connection or facility socket (if fitted)			
Output	2 Watts		
Impedance	4 ohms		
Max input level at audio accessory socket			
	mV		
Impedance	ohms		

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TRANSMITTER AND RECEIVER CHARACTERISTICS
ITU DESIGNATION OR CLASS OF EMISSION 16K0G3EJN, 16K0G2BJN
CHANNEL SEPARATION 25kHz
State the maximum number of channels over which the equipment can operate 73 Channels

EXTREME TEMPERATURE RANGE over which equipment is to be type tested
[X] -15°C to +55°C

CONSTRUCTION OF EQUIPMENT
[X] Single unit (5)

(5) Unit means a physically separate item of the equipment.

AUTOMATIC EQUIPMENT SWITCH OFF
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated. [ ] Applies V Cut-off voltage [X] Does not apply

POWER SOURCE
12 DC Voltage (V) 6 DC Maximum Current (A) BATTERY Not Applicable

DUPLEX OPERATION (BASE STATION ONLY)
Not Applicable

COMMUNAL SITE OPERATION (1)
Not Applicable

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ALIGNMENT RANGE

The definition of the alignment range AR1 and AR2 are given in Sub Clauses 3.1.2 and 3.1.3 of the Standard. The applicant should ensure that the sample equipment(s) submitted are operational on the appropriate channel(s) as given in Sub Clauses 3.1.5 through to 3.1.11 and tick the appropriate box.

	3.1.5	One sample single channel equipment of category AR1	[ ]
or	3.1.6	Three samples of single channel equipments of category AR2	[ ]
or	3.1.7	One sample two channel equipment of category AR1	[ ]
or	3.1.8	Three samples of two channel equipment of category AR2	[ ]
or	3.1.9	One sample multichannel equipment of category AR1	[ ]
or	3.1.10	Three samples of multichannel equipment of category AR2	[ ]
or	3.1.11	One sample of multichannel equipment of category AR2 where the switching range equals the alignment range	[ ]

If more than one option of the equipment is being submitted with different Type Designations, one or three samples, as appropriate, of each version shall be submitted.

CHANNEL IDENTIFICATION

Each equipment, whether one or more submitted for tests shall carry clear identification (such as a serial number), together with the frequencies associated with the channel identification displayed on the equipment.

Equipment Identification eg Serial Number	Channel No.	Transmit Nominal Freq MHz	Receive Nominal Freq MHz
Sample 1	60	156,025	160,625
	16	156,800	156,800
	88	157,425	157,425
Sample 2	60	156,025	160,625
	16	156,800	156,800
	88	157,425	157,425

OTHER ITEMS SUPPLIED		
Spare batteries e.g. (portable equipment)	[ ]	Yes
	[X]	No
Battery charging device	[ ]	Yes
	[X]	No
Special tools for dismantling equipment		
	[ ]	Yes
	[X]	No
Encoder	[ ]	Yes
	[X]	No
Test interface box (if applicable) or where appropriate the RF test fixture	[X]	Yes
	[ ]	No
Full documentation on equipment (Handbook and circuit diagrams)	[X]	Yes
	[ ]	No
Others	[ ]	Yes
	[ ]	No
If Yes, please specify :		

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DECLARATION		
Are the equipments submitted representative production models?	[ ]	Yes
	[X]	No
If not are the equipments pre-production models?	[X]	Yes
	[ ]	No
If pre-production equipments are submitted will the final production equipments be identical in all respects with the equipment tested	[X]	Yes
	[ ]	No
If no supply full details		
Will labelling of the equipment comply with the Requirements of appropriate standards ?	[X]	Yes
	[ ]	No
If no supply full details		

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature :

Name : David Heald

Position held : Engineer

Date : 21 April 2009

BABT formally certifies that the manufacturer's declaration as typed out in this report, is a true and accurate record of the original received from the applicant.

1.6 PRODUCT INFORMATION

1.6.1 Technical Description

The Equipment Under Test (EUT) was a Garmin International Inc VHF300AIS Fixed Mount Radio as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.

Equipment Under Test

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1.6.2 Test Configuration

The EUT was connected to 3 sets of Handset, Speaker and 10m Extension cables, which were connected to the H/S 1, H/S 2 and H/S 3 Ports respectively. Only H/S 1 Port ancillaries were fully exercised *(where audio distortion measurements were performed).*

A NMEA Cable was also connected to the NMEA Port, the other end of the cable was connected to a NMEA Termination bar.

The Antenna Port was connected to the relevant Drive/Monitoring equipment

Note: the DEMOD DSC Port was left un-connected, for all testing as directed by client.

For Tx and RX Mode EUT was operating on CH 16 (156.80MHz).

Configuration 1: Normal

The EUT was configured in accordance with IEC 62238 in conjunction with IEC 60945.

1.6.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened	TSR Number
DC Power Cable	2m	Power Cable	Multicore,	No	0026
NMEA Cable (with NMEA Termination Bar)	2m	NMEA Cable	Multicore,	No	N/A
Handset & Cable	0.6m (un-stretched)	to H/S 1 Port	Multicore	No	0017
Speaker & Cable	2 x 1.3m lengths	to H/S 1 Port	Multicore	No	0010
Extension Cable	10m	to H/S 1 Port	Multicore	No	0006
Handset & Cable	0.6m (un-stretched)	to H/S 2 Port	Multicore	No	0018
Speaker & Cable	2 x 1.3m lengths	to H/S 2 Port	Multicore	No	0012
Extension Cable	10m	to H/S 2 Port	Multicore	No	0004
Handset & Cable	0.6m (un-stretched)	to H/S 3 Port	Multicore	No	0016
Speaker & Cable	2 x 1.3m lengths	to H/S 3 Port	Multicore	No	0011
Extension Cable	10m	to H/S 3 Port	Multicore	No	0005

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1.6.4 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – Transmit (EUT transmitting on Channel 16)

Mode 2 – Receive

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

1.6.5 Monitoring of Performance

IEC 60945
For Continuous Phenomenea & Transient Type tests, monitored as per EN 301 843-1 & 843-2

Monitored using Modulation Analyser, Spectrum Analyser and an Audio Analyser.

1.6.6 Performance Criteria

IEC 60945
For Continuous Phenomenea tests monitored Sinad >20dB

For Transient Type tests, monitored as per EN 301 843-1 & 843-2

For Receive Mode During and after the test a performance check was performed, which ensured, no un-intentional Transmissions occurred. Sinad Level >20dB (during Continuous type tests) after the test for Transient Type tests.

For Transmit Mode during the test ensured EUT stayed in Transmit mode. After the test ensured the SINAD >20dB, Frequency and Power Output levels remained within ±1.5kHz of the Transmit Frequency and power level remained at maximum as it was prior to test.

1.7 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a 12V DC supply.

Test Results

EN 60945, Clause 5.3 states:

The measured test results shall be compared with the corresponding acceptable performance limits and the EUT shall pass the test only if the measured performance margin is favourable and greater than the measurement uncertainty. The test report shall show, for each test measurement, the test result, its associated measurement uncertainty, the acceptable performance limits, and the acceptable performance margin, as applicable.

The tests detailed in this report met the above test requirements.

1.8 DEVIATIONS FROM THE STANDARD

For Immunity to Fast Transients

The latest (2004) version of EN 61000-4-4, the base standard for Fast Transients was used, instead of the specified, 1995 version.

1.9 MODIFICATION RECORD

The table below details modifications made to the EUT during the test programme. 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	Not Applicable	Not Applicable
1	Radio modified by Garmin due to SRR failure on channel 70 DSC. A harmonic of 78.265 MHz within the DSC receiver was too high and causing problems. Harmonic was reduced.	Garmin	13 July 2009

Product Service

SECTION 2

TEST DETAILS

Testing of the
Garmin International Inc
VHF300AIS Fixed Mount Radio

2.1 VIBRATION

2.1.1 Specification Reference

IEC 62238, Clause 7.4

2.1.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No 1, No 2 and No 3

2.1.3 Date of Test and Modification State

14 May 2009 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Environmental Conditions

	14 May 2009
Ambient Temperature	23.5°C
Relative Humidity	40%

2.1.6 Test Results

S/N: No 1

Vibration Axis: Fore and Aft

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.188	21.58	30.39	-5.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.212	21.65	30.27	-5.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Vibration Axis: Lateral

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.171	21.58	30.39	-5.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.244	21.79	30.27	-5.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Vibration Axis: Vertical

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.139	21.37	30.49	-4.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.137	21.41	30.50	-4.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 2

Vibration Axis: Fore and Aft

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.030	21.87	30.57	-5.090
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.021	21.95	30.09	-5.090
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Vibration Axis: Lateral

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.048	21.95	30.57	-4.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
-0.004	21.76	29.98	-4.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Vibration Axis: Vertical

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.065	21.80	30.88	-5.090
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.071	21.83	30.71	-5.090
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 3

Vibration Axis: Fore and Aft

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.408	21.89	30.88	-5.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.598	21.77	30.49	-5.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Vibration Axis: Lateral

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.561	22.14	30.81	-5.090
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.639	22.21	30.57	-5.090
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Vibration Axis: Vertical

During Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.542	21.91	30.65	-4.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

After Vibration

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.662	22.02	30.49	-4.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

2.2 DRY HEAT

2.2.1 Specification Reference

IEC 62238, Clause 7.5

2.2.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No 1, No 2 and No 3

2.2.3 Date of Test and Modification State

26 May 2009 -Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Environmental Conditions

	26 May 2009
Ambient Temperature	24.5°C
Relative Humidity	39.8%

2.2.6 Test Results

S/N: No 1

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.367	19.87	32.31	-2.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 2

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.792	19.72	30.07	-2.690
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Product Service

S/N: No 3

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0..699	20.29	29.54	-2.490
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Limit Clause 7.3

Frequency Error	The frequency error shall be within ± 1.5kHz
Output Power	Between 6W and 25W
Maximum Usable Sensitivity	+ 6 dBµV
SINAD Ratio	≥ 20dB
Symbol Error Ratio	≤ 10^2

Product Service

2.3 DAMP HEAT

2.3.1 Specification Reference

IEC 62238, Clause 7.5

2.3.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No 1, No 2 and No 3

2.3.3 Date of Test and Modification State

27 May 2009 - Modification State 0

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Conditions

	27 May 2009
Ambient Temperature	22.9°C
Relative Humidity	33.5%

2.3.6 Test Results

S/N: No 1

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
-0.093	20.55	30.32	-3.890
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 2

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.030	20.55	29.63	-3.890
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 3

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.250	20.85	29.08	-3.490
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Limit Clause 7.3

Frequency Error	The frequency error shall be within ± 1.5kHz
Output Power	Between 6W and 25W
Maximum Usable Sensitivity	+ 6 dBµV
SINAD Ratio	≥ 20dB
Symbol Error Ratio	≤ 10^2

Product Service

2.4 LOW TEMPERATURE

2.4.1 Specification Reference

IEC 62238, Clause 7.5

2.4.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: No 1, No 2 and No 3

2.4.3 Date of Test and Modification State

28 and 29 May 2009 - Modification State 0

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Environmental Conditions

	28 May 2009	29 May 2009
Ambient Temperature	24.8°C	28°C
Relative Humidity	45.8%	42%

2.4.6 Test Results

Low Temperature (-15°C)

S/N: No 1

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.408	22.36	29.81	-5.990
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 2

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
-0.154	22.64	28.38	-6.490
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 3

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.712	22.84	28.28	-6.190
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Low Temperature (-20°C)

S/N: No 1

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
-0.151	22.67	28.99	-6.600
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 2

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
-0365	22.81	27.96	-6.700
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

S/N: No 3

Frequency Error ≤ 1.5 kHz	Output Power Between 6 – 25 W	SINAD Ratio ≥ 20 dB	Maximum Usable Sensitivity ≤+6 dBµV
+0.760	22.43	28.07	-6.300
Visual Inspection: Confirm no visible damage or deterioration		No Visible Damage	

Limit Clause 7.3

Frequency Error	The frequency error shall be within ± 1.5kHz
Output Power	Between 6W and 25W
Maximum Usable Sensitivity	+ 6 dBµV
SINAD Ratio	≥ 20dB
Symbol Error Ratio	≤ 10^2

Product Service

2.5 FREQUENCY ERROR

2.5.1 Specification Reference

IEC 62238, Clause 8.1

2.5.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.5.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Environmental Conditions

	16 June 2009
Ambient Temperature	23°C
Relative Humidity	42%

2.5.6 Test Results

12V DC Supply

TEST CONDITIONS		FREQUENCY ERROR (kHz)	
		156.800 MHz	
		Minimum Power	Maximum Power
T_{nom}(22°C)	V_{nom}(12.0 V DC)	+0.117	+0.045
T_{min}(-15°C)	V_{min}(10.8 V DC)	+0.498	+0.481
T_{max}(+55°C)	V_{max}(15.6 V DC)	+0.351	+0.345
Maximum freq. error (Hz)		+498	+481
Measurement uncertainty (Hz)		±11	

Limit Clause 4.2.1.2

Normal and extreme conditions	± 1.5 kHz

Product Service

2.6 CARRIER POWER

2.6.1 Specification Reference

IEC 62238, Clause 8.2

2.6.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.6.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Environmental Conditions

	16 June 2009
Ambient Temperature	23°C
Relative Humidity	42%

2.6.6 Test Results

Rated Output Power 1W/25W

Test Conditions		Transmitter Power (W)					
		156.025 MHz		156.800 MHz		160.025 MHz	
		Min	Max	Min	Max	Min	Max
T_{nom} (23°C)	V_{nom} (12.0V DC)	0.859	21.70	0.857	21.42	0.861	21.44
T_{min} (-15°C)	V_{min} (10.8 V DC)	-	-	0.800	20.84	-	-
T_{max} (+55°C)	V_{max} (15.6 V DC)	-	-	0.889	20.56	-	-
Variation in output power under normal test conditions (dB)		-0.66	-0.62	-0.67	-0.67	-0.65	-0.67
Variation in output power under extreme test conditions (dB)		-	-	-0.97	-0.85	-	-
Measurement uncertainty (dB)		± 0.45					

Confirm that the maximum continuous transmission time when checked on channel 16 does not exceed 6 minutes. YES (5 minutes)

Limit Clause 8.2.3

Under normal test conditions	With the output power switch set at maximum, shall remain between 6 W and 25 W and not differ by more than ± 1.5 dB from the rated power and never exceed 25 W. With the output power switch set to minimum, the carrier power shall remain between 0.1 W and 1 W

Under extreme test conditions	With the output power switch set at maximum, shall remain between 6 W and 25 W and be within + 2 dB, -3 dB of the rated power and never exceed 25 W. With the output switch set at minimum, shall remain between 0.1 W and 1W.
The maximum continuous transmission time shall not exceed 6 minutes.	

Product Service

2.7 FREQUENCY DEVIATION – MAXIMUM PERMISSIBLE FREQUENCY DEVIATION

2.7.1 Specification Reference

IEC 62238, Clause 8.3

2.7.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.7.3 Date of Test and Modification State

11 June 2009 - Modification State 0

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Environmental Conditions

	11 June 2009
Ambient Temperature	24°C
Relative Humidity	36%

2.7.6 Test Results

12.0 V DC Supply

Modulation Frequency (Hz)	Frequency Deviation (Hz)	
	156.800 MHz	
	Minimum Power	Maximum Power
100	+2.567	+3.533
200	-3.730	-3.717
300	-3.880	-3.861
400	+4.110	-4.120
500	+4.540	+4.530
1000	+4.910	+4.890
1500	+4.710	+4.710
2000	+4.810	+4.810
2500	+4.920	+4.910
3000	+4.550	+4.550
Maximum Deviation (kHz)	+4.920	+4.910
Measurement uncertainty (Hz)	± 88.5	

Limit Clause 8.3.3.2

Limit	± 5 kHz

2.8 FREQUENCY DEVIATION – REDUCTION OF FREQUENCY DEVIATION AT MODULATION FREQUENCIES ABOVE 3kHz

2.8.1 Specification Reference

IEC 62238, Clause 8.3

2.8.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.8.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.8.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.5 *Environmental* Conditions

	16 June 2009
Ambient Temperature	24°C
Relative Humidity	36%

2.8.6 Test Results

12.0 V DC Supply

Modulation Frequency (Hz)	Frequency Deviation			
	156.800 MHz			
	Minimum Power		Maximum Power	
	kHz	dB	kHz	dB
3000	+4.460	+3.13	+4.390	+3.12
4000	+1.984	-4.22	+1.974	-4.19
5000	+0.708	-13.96	+0.701	-13.94
6000	+0.318	-22.73	+0.311	-22.71
8000	+0.117	-35.87	+0.121	-35.57
10000	+0.111	-36.35	+0.114	-36.13
12000	+0.112	-37.12	+0.114	-36.55
15000	+0.110	-36.99	+0.112	-36.68
20000	+0.109	+37.34	+0.117	-36.51
25000	+0.112	-37.18	+0.118	-36.75
Maximum (kHz)	+4.460		+4.390	
Measurement uncertainty (Hz)	± 0.2			

Limit Clause 8.3.3.2 applies

For modulation frequencies between 3 kHz and 6 kHz the frequency deviation shall not exceed the frequency deviation with a modulation frequency of 3 kHz. For a modulation frequency of 6kHz, the frequency deviation shall not exceed ± 1.5 kHz. For modulation frequencies between 6 kHz and 25 kHz, the frequency deviation shall not exceed that given by a linear response of frequency deviation (in dB) against modulation frequency, starting a the point where the modulation frequency is 6 kHz and the frequency deviation is ± 1.5 kHz and inclined at 14 dB per octave, with the frequency deviation diminishing as the modulation frequency increases.

For all frequencies above 6.0 kHz the following table applies:

kHz	6.0	8.0	10.0	12.0	15.0	20.0	25.0
dB limit	≤ -6	≤ -11.81	≤ -16.32	≤ -20.00	≤ -24.51	≤ -30.32	≤ -34.82

Product Service

2.9 SENSITIVITY OF THE MODULATOR, INCLUDING THE MICROPHONE

2.9.1 Specification Reference

IEC 62238, Clause 8.4

2.9.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.9.3 Date of Test and Modification State

24 June 2009 - Modification State 1

2.9.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.5 Environmental Conditions

	24 June 2009
Ambient Temperature	23°C
Relative Humidity	48%

2.9.6 Test Results

12V DC Supply

Extender Mic

Frequency Deviation given by acoustic I/P signal at 1kHz at a level of 94 dBA (kHz)	156.800 MHz
	2.753
Measurement Uncertainty (dB)	± 1.0

Limit Clause 8.4.3

Limit	Between ± 2.5 kHz and ± 4.5 kHz

2.10 AUDIO FREQUENCY RESPONSE

2.10.1 Specification Reference

IEC 62238, Clause 8.5

2.10.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.10.3 Date of Test and Modification State

11 June 2009 - Modification State 0

2.10.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.10.5 Environmental Conditions

	11 June 2009
Ambient Temperature	25°C
Relative Humidity	34%

2.10.6 Test Results

12V DC Supply

Modulation Frequency (Hz)	Deviation (relative to 1 kHz) dB
	156.800 MHz
300	-10.70
400	-8.23
500	-6.21
600	-4.66
800	-2.07
1000	0
1500	+3.77
2000	+6.33
2500	+7.87
3000	+8.19
Measurement Uncertainty (dB)	± 27.2

Limit Clause 8.5.3

Limit	+ 1 dB and -3 dB of a 6dB/octave line passing through the reference point (see Figure 2)

Frequency (Hz)	Transmitter Frequency Response +1 to -3dB @ relative to 1kHz deviation (dB)
300	-9.45 to -13.45
400	-6.96 to -10.96
500	-5.02 to -9.02
600	-3.44 to -7.44
800	-0.94 to -4.94
1000	1 to -3
1500	4.52 to 0.52
2000	7.02 to 3.02
2500	8.95 to 4.95
3000	10.54 to 6.54

2.11 AUDIO FREQUENCY HARMONIC DISTORTION OF THE EMISSION

2.11.1 Specification Reference

IEC 62238, Clause 8.6

2.11.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.11.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.11.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.11.5 Environmental Conditions

	16 June 2009
Ambient Temperature	23°C
Relative Humidity	42%

2.11.6 Test Results

Power level at which the measurement was carried out 25W.

Test Conditions		Modulation Frequencies (Hz)	Audio Frequency Harmonic Distortion (%)
			156.800 MHz
T_{nom} (23°C)	V_{nom} (12.0 V DC)	300	1.85
		500	1.17
		1000	1.19
T_{min} (-15°C)	V_{min} (10.8 V DC)	1000	1.60
T_{max} (+55°C)	V_{max} (15.6 V DC)	1000	1.55
Measurement Uncertainty (dB)			± 1.0

Limit Clause 8.6.3

Under normal and extreme test conditions	≤ 10%

Power level at which the measurement was carried out 1W.

Test Conditions		Modulation Frequencies (Hz)	Audio Frequency Harmonic Distortion (%)
			156.800 MHz
T_{nom} (23°C)	V_{nom} (12.0 V DC)	300	1.84
		500	1.17
		1000	1.18
T_{min} (-15°C)	V_{min} (10.8 V DC)	1000	1.678
T_{max} (+55°C)	V_{max} (15.6 V DC)	1000	1.528
Measurement Uncertainty (dB)			± 1.0

Limit Clause 8.6.3

Under normal and extreme test conditions	≤ 10%

2.12 ADJACENT CHANNEL POWER

2.12.1 Specification Reference

IEC 62238, Clause 8.7

2.12.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.12.3 Date of Test and Modification State

11 June 2009 - Modification State 0

2.12.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.12.5 Environmental Conditions

	11 June 2009
Ambient Temperature	25°C
Relative Humidity	37%

2.12.6 Test Results

12.0 V DC Supply

Power level at which the measurement was carried out 25W.

Measurement Offset	Adjacent Channel Power (dBc)	
	156.800 MHz	
	Unmodulated	Modulated
+ 25 kHz	-88.72	-88.08
- 25 kHz	-88.56	-87.49
Measurement uncertainty (dB)	± 3.0	

Limit Clause 8.7.3

The adjacent channel power shall not exceed a value of 70 dB below the carrier power of the transmitter without any need to be below 0.2 µW.

2.13 CONDUCTED SPURIOUS EMISSIONS CONVEYED TO THE ANTENNA

2.13.1 Specification Reference

IEC 62238, Clause 8.8

2.13.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.13.3 Date of Test and Modification State

10 June 2009 - Modification State 0

2.13.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.13.5 Environmental Conditions

	10 June 2009
Ambient Temperature	25°C
Relative Humidity	39%

2.13.6 Test Results

12.0 V DC Supply

Frequency of Spurious Emissions (MHz)	Spurious Emission Level (µW)
	156.800 MHz
Measurement uncertainty (dB)	± 3.45

Limit Clause 8.8.3

Frequency Range	9 kHz to 2 GHz
Transmitter Operating	≤ 0.25 µW(-36.0 dBm)

Remarks

No emissions were detected at a level greater than 10dB below the limit.

2.14 TRANSIENT FREQUENCY BEHAVIOUR OF THE TRANSMITTER

2.14.1 Specification Reference

IEC 62238, Clause 8.9

2.14.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.14.3 Date of Test and Modification State

11 June 2009 - Modification State 0

2.14.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.14.5 Environmental Conditions

	11 June 2009
Ambient Temperature	25°C
Relative Humidity	43%

2.14.6 Test Results

12 V DC Supply

Transient Periods	Frequency Difference (kHz)
	156.800 MHz
t1	11.025
t2	2.875
t3	14.125
Measurement uncertainty (kHz)	± 0.2

Confirm that during the periods t1 and t3 the frequency difference does not exceed 25 kHz

YES

Confirm that during the period t2 the frequency difference does not exceed 12.5 kHz

YES

Confirm that after the period t2 and before the start of t3 the frequency difference is within ±1.5 kHz

YES

Limit Clause 8.9.3

Transient Periods	
t1 (ms)	5.0
t2 (ms)	20.0
t3 (ms)	5.0

2.15 RESIDUAL MODULATION OF THE TRANSMITTER

2.15.1 Specification Reference

IEC 62238, Clause 8.10

2.15.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.15.3 Date of Test and Modification State

11 June 2009 - Modification State 0

2.15.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.15.5 Environmental Conditions

	11 June 2009
Ambient Temperature	25°C
Relative Humidity	33%

2.15.6 Test Results

Power level at which the measurement was carried out 25W.

Residual Modulation (dB)	156.800 MHz
	-43.24
Measurement Uncertainty (dB)	± 1.0

Limit Clause 8.10.3

Limit	≤ -40 dB

Product Service

2.16 FREQUENCY ERROR (DSC SIGNAL)

2.16.1 Specification Reference

IEC 62238, Clause 8.11

2.16.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.16.3 Date of Test and Modification State

22 June 2009 - Modification State 0

2.16.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.16.5 Environmental Conditions

	22 June 2009
Ambient Temperature	24°C
Relative Humidity	44%

2.16.6 Test Results

12V DC Supply

TEST CONDITIONS		FREQUENCY ERROR (Hz)	
		$f_{B\text{-state}}$	$f_{Y\text{-state}}$
T_{nom}(21°C)	V_{nom}(12.0 V DC)	+2.478	+1.224
T_{min}(-15°C)	V_{min}(10.8 V DC)	+2.539	+1.252
T_{max}(+55°C)	V_{max}(15.6 V DC)	+2.447	+1.154
Maximum Frequency Error (Hz)		+2.539	+1.252
Measurement uncertainty (Hz)		±0.15	

Limit Clause 8.11.3

Normal and extreme conditions	The measured frequency from the demodulator at any time for the B-state shall be within 2100 Hz ±10 Hz and for the Y-state within 1300 Hz ±10 Hz.

2.17 MODULATION INDEX FOR DSC

2.17.1 Specification Reference

IEC 62238, Clause 8.12

2.17.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.17.3 Date of Test and Modification State

18 June 2009 - Modification State 0

2.17.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.17.5 Environmental Conditions

	18 June 2009
Ambient Temperature	24°C
Relative Humidity	41%

2.17.6 Test Results

Test Conditions		Modulation Index	
		B State	Y State
T_{nom} (21°C)	V_{nom} (12.0V DC)	1.936	2.129
Measurement uncertainty (Hz)		± 46	

Limit Clause 8.12.3

The modulation index shall be 2.0, ± 10%.

Product Service

2.18 MODULATION RATE FOR DSC

2.18.1 Specification Reference

IEC 62238, Clause 8.13

2.18.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.18.3 Date of Test and Modification State

18 June 2009 - Modification State 0

2.18.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.18.5 Environmental Conditions

	18 June 2009
Ambient Temperature	24°C
Relative Humidity	42%

2.18.6 Test Results

FM Demodulator Output (Hz)	600.001
Corresponding Modulation Rate (Baud)	1200.002
Measurement uncertainty (Hz)	± 0.0001

Limit Clause 8.13.3

The frequency shall be 600 Hz ± 30 ppm corresponding to a modulation rate of 1200 baud.

2.19 TESTING OF GENERATED CALL SEQUENCES

2.19.1 Specification Reference

IEC 62238, Clause 8.14

2.19.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.19.3 Date of Test and Modification State

06 July 2009 - Modification State 0

2.19.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.19.5 Environmental Conditions

	06 July 2009
Ambient Temperature	24°C
Relative Humidity	51%

2.19.6 Test Results

Call Sent	Received Without Errors	Telecommand 1	Telecommand 2
Distress	✓	100	126
All Ships Urgency	✓	100	126
All Ships Safety	✓	100	126
Individual Routine	✓	100	126
Group Routine	✓	100	126

Note - The following types of distress calls were successfully transmitted:

i) Undefined
ii) Abandoning
iii) Collision
iv) Grounding
iv) Listing
vi) Sinking
vii) Adrift
viii) Fire
ix) Piracy
x) Overboard
xi) EPIRB – Not Applicable
xii) Flooding

Confirm that after transmission of a DSC call the transmitter retuned to the original channel. YES Confirm that in the case of a distress call the transmitter tunes to channel 16, automatically selecting maximum power. YES

Limit Clause 8.14.3

The requirement of ITU-R Recommendation M.493.11 [5] regarding message composition an d content shall be met.

Product Service

2.20 HARMONIC DISTORTION AND RATED AUDIO FREQUENCY OUTPUT POWER

2.20.1 Specification Reference

IEC 62238, Clause 9.1

2.20.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.20.3 Date of Test and Modification State

12 June and 03 July 2009 - Modification State 0

2.20.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.20.5 Environmental Conditions

	12 June 2009	03 July 2009
Ambient Temperature	25°C	23°C
Relative Humidity	37%	30%

2.20.6 Test Results

Measurement performed at loudspeaker

F_n = 156.800 MHz				Audio Frequency Output Power (W)	Harmonic Distortion (%)
Test Conditions		Test Signal Level (dBµV)	F_{mod} (Hz)	F_n	F_n
T_{nom} (25°C)	V_{nom} (12V DC)	60	300	2.004	9.61
			500	2.001	5.93
			1000	2.002	4.51
		100	300	2.005	8.98
			500	2.003	4.52
			1000	2.006	3.10
Measurement Uncertainty (dB)				± 1.0	

Measurement performed at extender handset

F_n = 156.800 MHz				Audio Frequency Output Power (W)	Harmonic Distortion (%)
Test Conditions		Test Signal Level (dBµV)	F_{mod} (Hz)	F_n	F_n
T_{nom} (25°C)	V_{nom} (12V DC)	60	300	1.092	2.438
			500	1.075	1.848
			1000	1.000	1.674
		100	300	1.088	2.724
			500	1.075	1.781
			1000	1.009	2.109
Measurement Uncertainty (dB)				± 1.0	

Limit Clause 9.1.3

Under normal and extreme test conditions	The rated audio frequency output power shall be at least: - 2 W in a loudspeaker - 1 mW in the handset earphone The harmonic distortion shall not exceed 10 %

Product Service

2.21 AUDIO FREQUENCY RESPONSE

2.21.1 Specification Reference

IEC 62238, Clause 9.2

2.21.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.21.3 Date of Test and Modification State

15 June 2009 - Modification State 0

2.21.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.21.5 Environmental Conditions

	15 June 2009
Ambient Temperature	34°C
Relative Humidity	42%

2.21.6 Test Results

12 V DC Supply

Modulation Frequency (Hz)	Relative Audio Power (dB)		
	156.800 MHz		
	F_{nom}	- 1.5 kHz	+ 1.5 kHz
300	+8.56	+8.52	+8.65
400	+6.64	+6.61	+6.73
500	+5.07	+5.04	+5.16
600	+3.78	+3.75	+3.84
800	+1.67	+1.67	+1.72
1000 (ref)	0	0	0
1200	-1.37	-1.30	-1.38
1500	-3.07	-2.92	-3.18
2000	-5.39	-5.06	-5.56
2500	-7.45	-6.91	-7.59
3000	-9.45	-8.68	-9.52
Measurement Uncertainty (dB)	± 2.0		

Limit Clause 9.2.3

The response shall not deviate by more than +1 dB or -3dB from a characteristic giving the output level as a function of the audio frequency, decreasing by 6 dB per octave and passing through the measured point at 1 kHz.

2.22 MAXIMUM USABLE SENSITIVITY

2.22.1 Specification Reference

IEC 62238, Clause 9.3

2.22.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.22.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.22.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.22.5 Environmental Conditions

	16 June 2009
Ambient Temperature	23°C
Relative Humidity	39%

2.22.6 Test Results

12 V DC Supply

TEST CONDITIONS		Receiver Sensitivity (dBµV)		
			156.800 MHz	
T_{nom}(23°C)	V_{nom}(12.0 V DC)		-1.8	
T_{min}(-15°C)	V_{min}(10.8 V DC)		-2.7	
T_{max}(+55°C)	V_{max}(15.6 V DC)		-0.1	
Measurement uncertainty (dB)		±1.8		

Limit Clause 9.3.3

Under normal test conditions	≤+6.0dBµV
Under extreme test conditions	≤+12.0dBµV

Product Service

2.23 CO-CHANNEL REJECTION

2.23.1 Specification Reference

IEC 62238, Clause 9.4

2.23.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.23.3 Date of Test and Modification State

12 June 2009 - Modification State 0

2.23.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.23.5 Environmental Conditions

	12 June 2009
Ambient Temperature	24°C
Relative Humidity	36%

2.23.6 Test Results

12 V DC Supply

Frequency of Unwanted Signal	Rejection Ratio (dB)
	156.800 MHz
F+3000 Hz	-8.4
F (nom)	-8.4
f-300 Hz	-8.1
Measurement Uncertainty (dB)	± 2.6

Limit Clause 9.4.3

Under Normal Conditions	Shall be between -10dB and 0.0dB

Product Service

2.24 ADJACENT CHANNEL SELECTIVITY

2.24.1 Specification Reference

IEC 62238, Clause 9.5

2.24.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.24.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.24.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.24.5 Environmental Conditions

	16 June 2009
Ambient Temperature	23°C
Relative Humidity	39%

2.24.6 Test Results

12 V DC Supply

TEST CONDITIONS		UNWANTED SIGNAL RELATIVE TO WANTED SIGNAL RATIO (dB)	
		156.800 MHz	
		+1Ch	-1Ch
T_{nom}(23°C)	V_{nom}(12 V)	81.00	81.70
T_{min}(-15°C)	V_{min}(10.8 V)	81.60	81.20
T_{max}(+55°C)	V_{max}(15.6 V)	81.50	81.20
Measurement uncertainty (dB)		±2.6	

Limit Clause 9.5.3

Under normal test conditions	≥ 70.0dB
Under extreme test conditions	≥ 60.0dB

2.25 SPURIOUS RESPONSE REJECTION

2.25.1 Specification Reference

IEC 62238, Clause 9.6

2.25.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.25.3 Date of Test and Modification State

15 June 2009 - Modification State 4

2.25.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.25.5 Environmental Conditions

	15 June 2009
Ambient Temperature	34°C
Relative Humidity	41%

2.25.6 Test Results

12 V DC Supply

Spurious Responses	Rejection Ratio (dB)
	156.800 MHz
Measurement Uncertainty (dB)	± 2.6

Limit Clause 9.6.3

Limit	≥70.0 dB

Remarks

No responses were detected at a level greater than 10dB below the limit.

Product Service

2.26 RECEIVER INTERMODULATION RESPONSE

2.26.1 Specification Reference

IEC 62238, Clause 9.7

2.26.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.26.3 Date of Test and Modification State

12 June 2009 - Modification State 1

2.26.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.26.5 Environmental Conditions

	12 June 2009
Ambient Temperature	24°C
Relative Humidity	36%

2.26.6 Test Results

12 V DC Supply

Frequency Increments of Unwanted Signals	Ratio (dB)
	156.800 MHz
+50/100 kHz	75.30
-50/100 kHz	74.80
Measurement Uncertainty (dB)	± 1.7

Limit Clause 9.7.3

Limit	≥ 68.0 dB

2.27 BLOCKING AND DESENSITISATION

2.27.1 Specification Reference

IEC 62238, Clause 9.8

2.27.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.27.3 Date of Test and Modification State

12 June 2009 - Modification State 1

2.27.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.27.5 Environmental Conditions

	12 June 2009
Ambient Temperature	25°C
Relative Humidity	36%

2.27.6 Test Results

12 V DC Supply

Frequency of Unwanted Signal	Blocking Level (dB)
	156.800 MHz
Nominal + 10 MHz	100.9
+ 5 MHz	100.5
+ 2 MHz	99.1
+ 1 MHz	96.4
- 1 MHz	96.4
- 2 MHz	99.1
- 5 MHz	100.5
- 10 MHz	100.9
Measurement Uncertainty (dB)	± 2.6

Limit Clause 9.7.3

Limit	≥ 90 dBµV

Product Service

2.28 SPURIOUS EMISSIONS

2.28.1 Specification Reference

IEC 62238, Clause 9.9

2.28.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.28.3 Date of Test and Modification State

10 June 2009 - Modification State 0

2.28.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.28.5 Environmental Conditions

	10 June 2009
Ambient Temperature	25°C
Relative Humidity	39%

2.28.6 Test Results

12 V DC Supply

Frequency of Spurious Emissions	Spurious Emission Level (nW)
	156.800 MHz
Measurement Uncertainty (dB)	± 2.0

Limit Clause 9.9.3

Frequency Range	9 kHz to 2 GHz
Limit	≤ 2.0 nW (-57.0 dBm)

Remarks

No emissions were detected at a level greater than 10 dB below the limit.

2.29 RECEIVER RESIDUAL NOISE LEVEL

2.29.1 Specification Reference

IEC 62238, Clause 9.10

2.29.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.29.3 Date of Test and Modification State

15 June 2009 - Modification State 1

2.29.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.29.5 Environmental Conditions

	15 June 2009
Ambient Temperature	24°C
Relative Humidity	40%

2.29.6 Test Results

12 V DC Supply

Channel	Noise and Hum Level (dB)
Channel 16	-52.61
Measurement Uncertainty (dB)	± 1.8

Limit Clause 9.10.3

Limit	≤ - 40 dB

Product Service

2.30 SQUELCH OPERATION

2.30.1 Specification Reference

IEC 62238, Clause 9.11

2.30.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.30.3 Date of Test and Modification State

15 June 2009 - Modification State 1

2.30.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.30.5 Environmental Conditions

	15 June 2009
Ambient Temperature	24°C
Relative Humidity	41%

2.30.6 Test Results

12 V DC Supply

Channel	Clause 9.11.2 a)	Clause 9.11.2 b)	Clause 9.11.2 b)	Clause 9.11.2 c)
	≤ - 40 dB	≤+6 dBµV emf	≥ 20 dB	≤ +6 dBµV emf
156.800 MHz	-56.10	+5.5	26.02	N/A
Measurement Uncertainty (dB)	±0.4	±2.1	±0.4	±2.1

Limit Clause 9.11.3

Limit	Clause 9.11.2 a)	Clause 9.11.2 b)	Clause 9.11.2 b)	Clause 9.112 c)
	≤ - 40 dB	≤+6 dBµV emf	≥ 20 dB	≤ +6 dBµV emf

Product Service

2.31 SQUELCH HYSTERESIS

2.31.1 Specification Reference

IEC 62238, Clause 9.12

2.31.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.31.3 Date of Test and Modification State

15 June 2009 - Modification State 1

2.31.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.31.5 Environmental Conditions

	15 June 2009
Ambient Temperature	24°C
Relative Humidity	39%

2.31.6 Test Results

12 V DC Supply

Channel	Input Level (dBµV)		Difference (dB)
	Squelch Open	Squelch Closed	
156.800 MHz	+5.0	+1.1	3.7
Measurement Uncertainty (dB)		± 1.8	

Limit Clause 9.12.3

Limit	Squelch Hysteresis shall be between 3 dB and 6 dB

2.32 MULTIPLE WATCH CHARACTERISTICS

2.32.1 Specification Reference

IEC 62238, Clause 9.13

2.32.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.32.3 Date of Test and Modification State

23 June 2009 - Modification State 0

2.32.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.32.5 Environmental Conditions

	23 June 2009
Ambient Temperature	24°C
Relative Humidity	44%

2.32.6 Test Results

		Scanning Time (s)	Dwell on priority (ms)	Dwell on Additional (s)
Ambient (+21°C)	12.0V DC	1.576	132.3	1.443
High Temperature (+55°C)	10.8V DC	1.564	124.3	1.441
Low Temperature (-15°C)	15.6V DC	1.582	135.6	1.436

Limit Clause 9.13.3

Scanning Period	≤ 2 s
Dwell Time (Priority Channel)	≤ 150 ms
Dwell Time (Priority Channel)	Between 850 ms and 2 s

Product Service

2.33 DSC RECEIVER MAXIMUM USABLE SENSITIVITY

2.33.1 Specification Reference

IEC 62238, Clause 10.1

2.33.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.33.3 Date of Test and Modification State

23 June 2009 - Modification State 0

2.33.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.33.5 Environmental Conditions

	23 June 2009
Ambient Temperature	24°C
Relative Humidity	40%

2.33.6 Test Results

TEST CONDITIONS		Input Level (dBµV)	Bit Error Ratio		
			f - 1.5 kHz	156.800 MHz	f + 1.5 kHz
T_{nom}(24°C)	V_{nom}(12.0 V DC)	0	0.002	0.0004	0.0004
T_{min}(-15°C)	V_{min}(10.8 V DC)	6	-	0.0000	-
T_{max}(+55°C)	V_{max}(15.6 V DC)	6	-	0.0000	-

Limit Clause 10.1.3

The bit error ratio shall be equal to or less than 10^{-2}

2.34 DSC RECEIVER CO-CHANNEL REJECTION

2.34.1 Specification Reference

IEC 62238, Clause 10.2

2.34.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.34.3 Date of Test and Modification State

22 June 2009 - Modification State 3

2.34.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.34.5 Environmental Conditions

	22 June 2009
Ambient Temperature	24°C
Relative Humidity	44%

2.34.6 Test Results

12 V DC Supply

Frequency of Unwanted Signal	Bit Error Ratio
	156.525 MHz
F+3000 Hz	0.002
F (nom)	0.004
f-3000 Hz	0.004
Measurement Uncertainty (dB)	± 2.6

Limit Clause 10.2.3

Under Normal Conditions	The bit error ratio shall be equal to or less than 10^{-2}

2.35 DSC RECEIVER ADJACENT CHANNEL SELECTIVITY

2.35.1 Specification Reference

IEC 62238, Clause 10.3

2.35.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.35.3 Date of Test and Modification State

23 June 2009 - Modification State 0

2.35.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.35.5 Environmental Conditions

	23 June 2009
Ambient Temperature	24°C
Relative Humidity	40%

2.35.6 Test Results

12.0 V DC Supply

Measurement Offset		Bit Error Ratio	
		156.525 MHz	
		+25 kHz	-25kHz
T_{nom}(24°C)	V_{nom}(12.0 V DC)	0.0009	0.0009
T_{min}(-15°C)	V_{min}(10.8 V DC)	0.0000	0.0000
T_{max}(+55°C)	V_{max}(15.6 V DC)	0.0000	0.0000
Measurement uncertainty (dB)		± 2.6	

Limit Clause 8.7.3

Under normal conditions	The bit error ratio shall be less than 10^{-2}
Under extreme conditions	The bit error ratio shall be less than 10^{-2}

2.36 DSC RECEIVER SPURIOUS RESPONSE AND BLOCKING IMMUNITY

2.36.1 Specification Reference

IEC 62238, Clause 10.4

2.36.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.36.3 Date of Test and Modification State

22 June 2009 - Modification State 0
14 July 2009 - Modification State 1

2.36.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.36.5 Environmental Conditions

	22 June 2009	14 July 2009
Ambient Temperature	24°C	26°C
Relative Humidity	44%	47%

2.36.6 Test Results

12.0 V DC Supply

Spurious Responses (MHz)	BIT ERROR RATE		
		156.525 MHz	
Measurement uncertainty (dB)	± 2.0		

Limit Clause 10.4.3

The bit error ratio shall be equal to or less than 10^{-2}

Remarks

No spurious responses were detected.

2.37 DSC RECIVER INTERMODULATION RESPONSE

2.37.1 Specification Reference

IEC 62238, Clause 10.5

2.37.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.37.3 Date of Test and Modification State

22 June 2009 - Modification State 0

2.37.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.37.5 Environmental Conditions

	22 June 2009
Ambient Temperature	24°C
Relative Humidity	44%

2.37.6 Test Results

12.0 V DC Supply

FREQUENCY INCREMENTS OF UNWANTED SIGNALS	BIT ERROR RATE		
		156.525 MHz	
+ 50/100 kHz		0	
- 50/100 kHz		0	
Measurement uncertainty (Hz)	± 1.7		

Limit Clause 10.5.3

The BER shall not exceed 10^{-2}

Product Service

2.38 DSC RECEIVER DYNAMIC RANGE

2.38.1 Specification Reference

IEC 62238, Clause 10.6

2.38.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.38.3 Date of Test and Modification State

22 June 2009 - Modification State 0

2.38.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.38.5 Environmental Conditions

	22 June 2009
Ambient Temperature	24°C
Relative Humidity	44%

2.38.6 Test Results

Test Conditions		Bit Error Ratio	
		156.525 MHz	
		+100 dBµV	0 dBµV
T_{nom} (24°C)	V_{nom} (12 V DC)	0.0006	0.0006
Measurement Uncertainty (dB)		± 2.0	

Limit Clause 10.6.3

The bit error ratio shall be less than 10^{-2}

2.39 DSC RECEIVER SPURIOUS EMISSIONS

2.39.1 Specification Reference

IEC 62238, Clause 10.7

2.39.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.39.3 Date of Test and Modification State

10 June 2009 - Modification State 0

2.39.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.39.5 Environmental Conditions

	10 June 2009
Ambient Temperature	25°C
Relative Humidity	39%

2.39.6 Test Results

12.0 V DC Supply

Frequency of Spurious Emissions (MHz)	BIT ERROR RATE (nW)		
		156.525 MHz	
Measurement uncertainty (dB)	± 2.0		

Limit Clause 10.7.3

Frequency Range	9 kHz to 2 GHz
Limit	≤2.0 nW (-57.0 dBm)

Remarks

No emissions were detected at a level greater than 10 dB below the limit.

Product Service

2.40 VERIFICATION OF CORRECT DECODING OF VARIOUS TYPES OF DSC CALLS

2.40.1 Specification Reference

IEC 62238, Clause 10.8

2.40.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.40.3 Date of Test and Modification State

20 July 2009 - Modification State 1

2.40.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.40.5 Environmental Conditions

	20 July 2009
Ambient Temperature	22.9°C
Relative Humidity	48.7%

2.40.6 Test Results

	Received	Telecommand 1	Telecommand 2
Distress	✓	100	None
All Ships Distress Ack	✓	110	126
All Ships Distress Relay	✓	112	126
All Ships Urgency	✓	100	126
All Ships Safety	✓	100	126
Individual Urgency	✓	100	126
Individual Safety	✓	100	126
Individual Routine	✓	100	126
Group Routine	✓	100	126

Confirm that the decoded call sequences at the output of the receiver have been examined for correct technical format, including error check characteristics. YES

Errors found: NO

Confirm that the checks have been made to ensure accordance between printer output and display:

Errors found: NO

It has been verified that the equipment is capable of switching to a channel identified in the DSC call: YES

Limit Clause 10.8.3

The requirement of ITU-R Recommendation M.493.11 [5] regarding message composition and content shall be met.

2.41 REACTION TO VTS AND AIS CHANNEL MANAGEMENT DSC TRANSMISSIONS

2.41.1 Specification Reference

IEC 62238, Clause 10.9

2.41.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.41.3 Date of Test and Modification State

02 July 2009 - Modification State 0

2.41.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.41.5 Environmental Conditions

	02 July 2009
Ambient Temperature	22°C
Relative Humidity	53%

2.41.6 Test Results

	Confirm
Not sound an alarm	Yes
Not display a message (An accurate informative display is permissible but not required)	Yes
Not transmit a response	Yes
Not suggest a transmitted response	Yes
Not lock up	Yes
Not require operator intervention	Yes

Limit Clause 10.9.3

The equipment shall not sound an alarm, display a message (an accurate, informative display is permissible but not required), transmit a response or suggest a transmitted response, lock up, or require operator intervention.

Product Service

2.42 SIMULTANEOUS RECEPTION

2.42.1 Specification Reference

IEC 62238, Clause 10.10

2.42.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 01

2.42.3 Date of Test and Modification State

30 June 2009 - Modification State 0

2.42.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.42.5 Environmental Conditions

	30 June 2009
Ambient Temperature	25°C
Relative Humidity	48%

2.42.6 Test Results

Channel	SINAD (dB) No DSC Signal	SINAD (dB) DSC Signal Applied	BIT ERROR RATE
CH 16	36.38	36.38	0
Measurement Uncertainty (dB)			± 1.8

Limit Clause 10.10.3

SINAD Ratio (dB)	≥ 20 dB in presence of DSC Signal
Bit Error Rate	≤ 10^{-2}

Product Service

2.43 CONDUCTED EMISSIONS (DC POWER PORT)

2.43.1 Specification Reference

IEC 62238, Clause 11.1.1
IEC 60945, Table 5, 9.2

2.43.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.43.3 Date of Test and Modification State

07 June 2009 - Modification State 0

2.43.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.43.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of CISPR 16-1.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.43.6 Environmental Conditions

	07 June 2009
Ambient Temperature	20.1°C
Relative Humidity	35%
Atmospheric Pressure	997mbar

Product Service

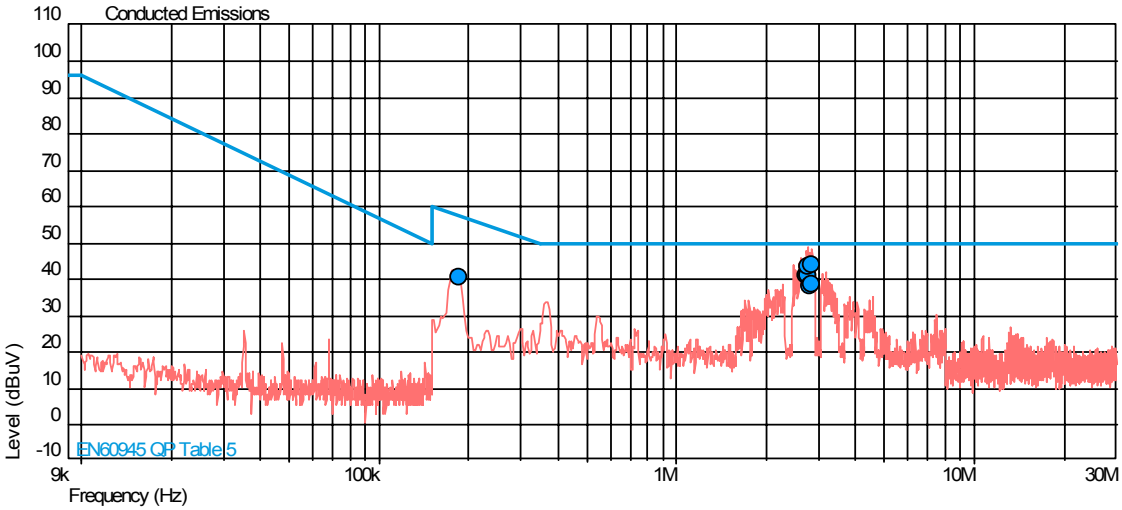
2.43.7 Test Results

For the period of test the EUT met the requirements of IEC 62238 in conjunction with IEC 60945 for Conducted Emissions (DC Power Port).

The test results are shown below.

Configuration 1 - Mode 1

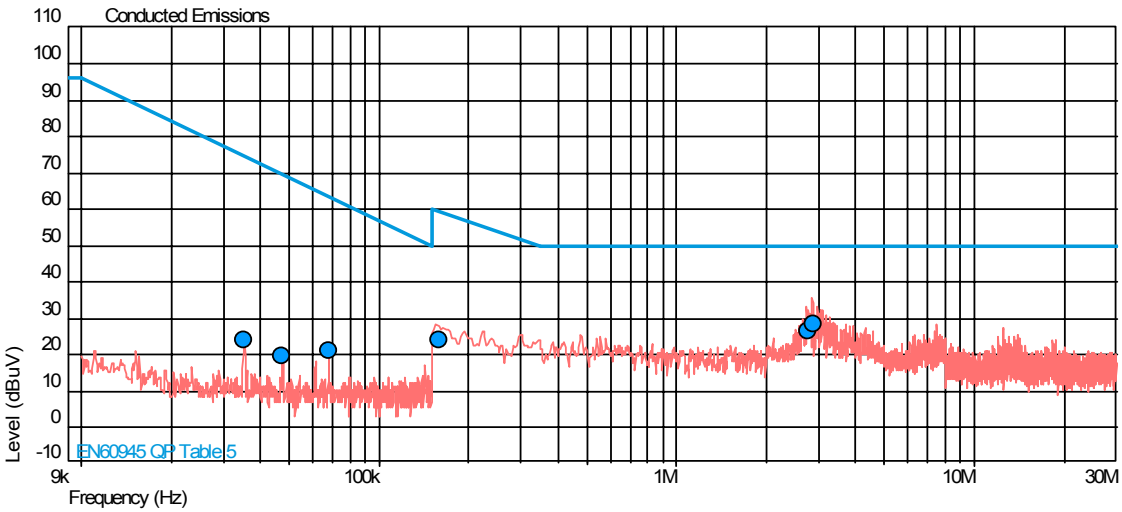
Positive Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)
0.186	40.5	57.5	-16.9
2.734	41.1	50.0	-8.9
2.752	40.8	50.0	-9.2
2.754	41.0	50.0	-9.0
2.769	43.3	50.0	-6.7
2.812	38.1	50.0	-11.9
2.829	38.7	50.0	-11.3
2.856	44.1	50.0	-5.9

Product Service

Negative Line

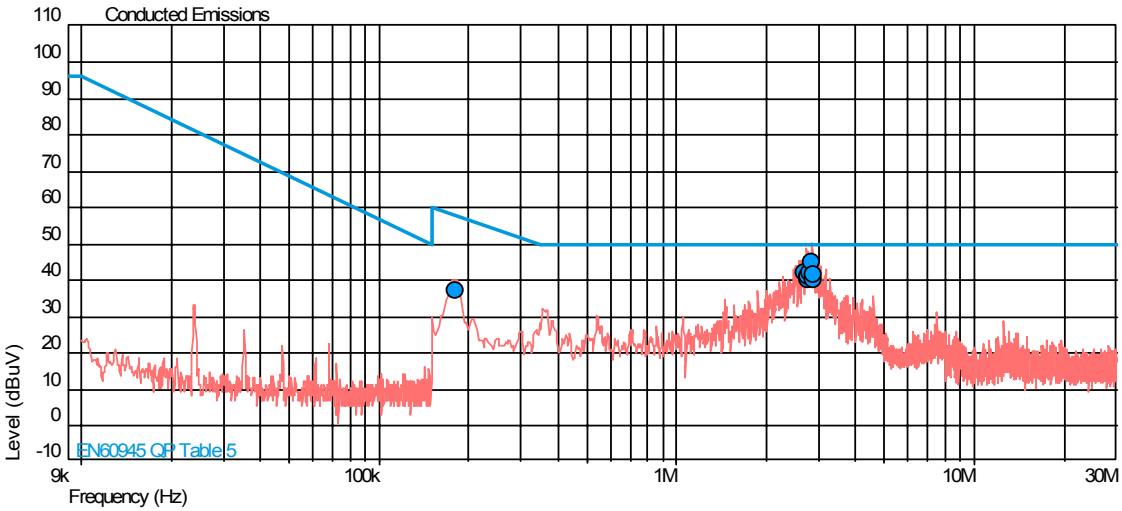


Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)
0.035	24.0	74.6	-50.6
0.047	19.5	69.6	-50.1
0.068	21.0	63.5	-42.5
0.159	23.8	59.3	-35.5
2.754	26.5	50.0	-23.5
2.870	28.4	50.0	-21.6

Product Service

Configuration 1 - Mode 2

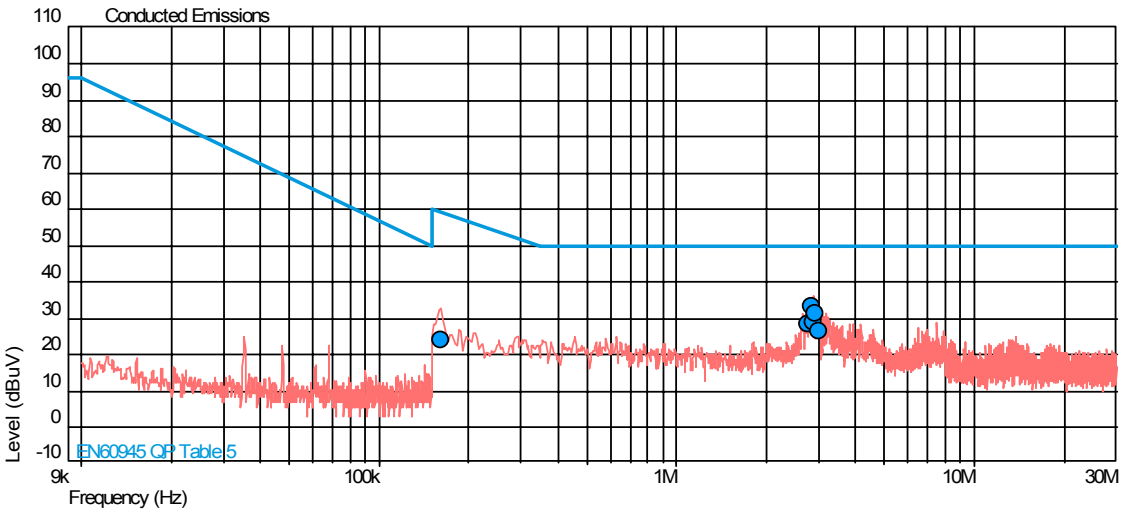
Positive Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)
0.181	37.1	57.8	-20.7
2.697	42.1	50.0	-7.9
2.754	41.0	50.0	-9.0
2.763	40.2	50.0	-9.8
2.770	41.0	50.0	-9.0
2.807	41.8	50.0	-8.2
2.860	45.1	50.0	-4.9
2.874	40.2	50.0	-9.8
2.886	41.6	50.0	-8.4

Product Service

Negative Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)
0.163	23.7	59.0	-35.3
2.757	28.2	50.0	-21.8
2.858	33.0	50.0	-17.0
2.871	28.9	50.0	-21.1
2.929	31.2	50.0	-18.8
2.992	26.2	50.0	-23.8

2.44 ENCLOSURE PORT MAGNETIC EMISSIONS - FIELD STRENGTH

2.44.1 Specification Reference

IEC 62238, Clause 11.1.2
IEC 60945, Table 5, 9.3

2.44.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.44.3 Date of Test and Modification State

08 June 2009 - Modification State 0

2.44.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.44.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of CISPR 16-1.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.44.6 Environmental Conditions

	08 June 2009
Ambient Temperature	20.1°C
Relative Humidity	35%
Atmospheric Pressure	997mbar

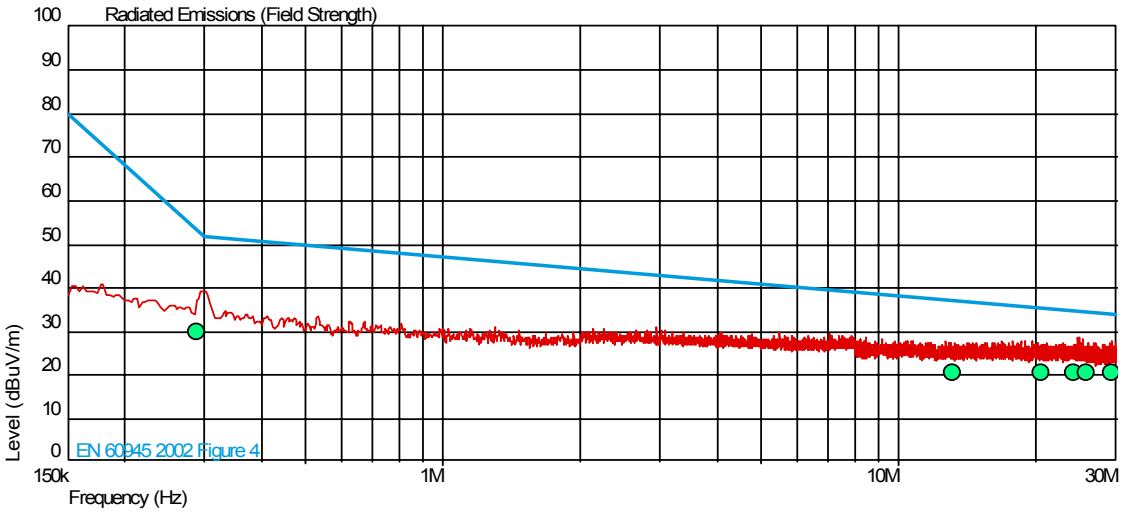
Product Service

2.44.7 Test Results

For the period of test the EUT met the requirements of IEC 62238 in conjunction with IEC 60945 for Enclosure Port Magnetic Emissions - Field Strength.

The test results are shown below.

Configuration 1 - Mode 2



Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
0.288	30.0	53.7	-23.6	244	1.00	Face On
13.164	20.5	37.2	-16.7	163	1.00	Edge On
20.506	20.5	35.5	-14.9	205	1.00	Face On
24.290	20.7	34.8	-14.1	357	1.00	Face On
25.720	20.5	34.6	-14.1	360	1.00	Edge On
29.296	20.5	34.1	-13.6	73	1.00	Edge On

Product Service

2.45 RADIATED EMISSIONS (ENCLOSURE PORT)

2.45.1 Specification Reference

IEC 62238, Clause 11.1.2
IEC 60945, Table 5, 9.3

2.45.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.45.3 Date of Test and Modification State

06 June 2009 - Modification State 0

2.45.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.45.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of CISPR 16-1.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.45.6 Environmental Conditions

	06 June 2009
Ambient Temperature	19°C
Relative Humidity	38%
Atmospheric Pressure	996mbar

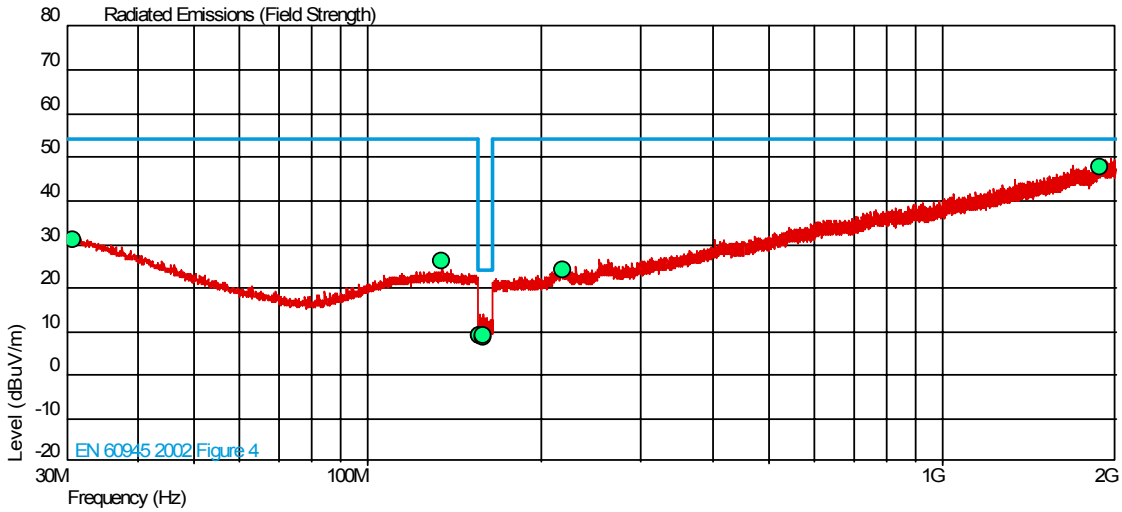
Product Service

2.45.7 Test Results

For the period of test the EUT met the requirements of IEC 62238 in conjunction with IEC 60945 for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 2



Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.679	30.9	54.0	-23.1	340	1.00	Vertical
135.202	26.1	54.0	-27.9	182	2.53	Vertical
156.946	8.9	24.0	-15.1	76	3.92	Vertical
158.788	8.9	24.0	-15.1	154	2.82	Vertical
218.957	24.3	54.0	-29.7	167	1.00	Vertical
1883.515	47.8	54.0	-6.2	127	1.00	Vertical

2.46 IMMUNITY TO RADIO FREQUENCY COMMON MODE (DC POWER PORT)

2.46.1 Specification Reference

IEC 62238, Clause 11.1.3
IEC 60945, Table 6, 10.3

2.46.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.46.3 Date of Test and Modification State

05 to 06 June 2009 - Modification State 0

2.46.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.46.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of IEC 61000-4-6.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.46.6 Environmental Conditions

	05 June 2009	06 June 2009
Ambient Temperature	20°C	19°C
Relative Humidity	35%	37%
Atmospheric Pressure	1006mbar	1010mbar

Product Service

2.46.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of IEC 62238 in conjunction with IEC 60945 for Immunity to Radio Frequency Common Mode (DC Power Port).

The applied test levels are shown below.

Configuration 1 - Mode 1

Cable Under Test		DC Power Port
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		M2 CDN, Injected via EM Clamp (multi-core cable)
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		3 Seconds
Test Level		3Vrms (+ 2dB MU)
Frequency Range		150kHz-80MHz
Result		Pass

Cables Under Test		DC Power Port
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		M2 CDN, Injected via EM Clamp (multi-core cable)
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		5 Seconds at each Spot Frequency
Test Level		10Vrms (+ 2dB MU)
Spot Frequencies		2MHz, 3MHz, 4MHz, 6.2MHz, 8.2MHz, 12.6MHz 16.5MHz, 18.8MHz, 22MHz and 25MHz
Result		Pass

Product Service

Configuration 1 - Mode 2

Cables Under Test		DC Power Port
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		M2 CDN, Injected via EM Clamp (multi-core cable)
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		3 Seconds
Test Level		3Vrms (+ 2dB MU)
Frequency Range		150kHz-80MHz
Result		Pass

Cable Under Test		DC Power Port
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		M2 CDN, Injected via EM Clamp (multi-core cable)
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		5 Seconds at each Spot Frequency
Test Level		10Vrms (+ 2dB MU)
Spot Frequencies		2MHz, 3MHz, 4MHz, 6.2MHz, 8.2MHz, 12.6MHz , 16.5MHz, 18.8MHz, 22MHz and 25MHz
Result		Pass

2.47 IMMUNITY TO RADIO FREQUENCY COMMON MODE (SIGNAL, CONTROL AND TELECOMMUNICATIONS PORT)

2.47.1 Specification Reference

IEC 62238, Clause 11.1.3
IEC 60945, Table 6, 10.3

2.47.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.47.3 Date of Test and Modification State

05 June 2009 - Modification State 0

2.47.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.47.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of IEC 61000-4-6.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.47.6 Environmental Conditions

	05 June 2009
Ambient Temperature	20°C
Relative Humidity	35%
Atmospheric Pressure	1018mbar

Product Service

2.47.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of IEC 62238 in conjunction with IEC 60945 for Immunity to Radio Frequency Common Mode (Signal, Control and Telecommunications Port).

The applied test levels are shown below.

Configuration 1 - Mode 1

Cables Under Test		H/S 1 Cable Port, at Radio. Handset (H/S1) Cable, at Handset . Speaker (H/S1) Cables, at Speaker. NMEA Cable, at Radio.
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		EM Clamp
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		3 Seconds
Test Level		3Vrms (+ 2dB MU)
Frequency Range		150kHz-80MHz
Result		Pass

Cables Under Test		H/S 1 Cable Port, at Radio. Handset (H/S1) Cable, at Handset . Speaker (H/S1) Cables, at Speaker. NMEA Cable, at Radio.
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		EM Clamp
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		5 Seconds at each Spot Frequency
Test Level		10Vrms (+ 2dB MU)
Spot Frequencies		2MHz, 3MHz, 4MHz, 6.2MHz, 8.2MHz, 12.6MHz 16.5MHz, 18.8MHz, 22MHz and 25MHz
Result		Pass

Product Service

Configuration 1 - Mode 2

Cables Under Test		H/S 1 Cable Port, at Radio. Handset (H/S1) Cable, at Handset . Speaker (H/S1) Cables, at Speaker. NMEA Cable, at Radio.
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		EM Clamp
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		3 Seconds
Test Level		3Vrms (+ 2dB MU)
Frequency Range		150kHz-80MHz
Result		Pass

Cables Under Test		H/S 1 Cable Port, at Radio. Handset (H/S1) Cable, at Handset . Speaker (H/S1) Cables, at Speaker. NMEA Cable, at Radio.
Amplitude Modulation	Frequency	400Hz
	Depth	80%
Coupling Method		EM Clamp
Stepped Frequency Increments		1% with respect to last momentary frequency
Dwell Time		5 Seconds at each Spot Frequency
Test Level		10Vrms (+ 2dB MU)
Spot Frequencies		2MHz, 3MHz, 4MHz, 6.2MHz, 8.2MHz, 12.6MHz, 16.5MHz, 18.8MHz, 22MHz and 25MHz
Result		Pass

Product Service

2.48 IMMUNITY TO RADIO FREQUENCY ELECTROMAGNETIC FIELD (ENCLOSURE PORT)

2.48.1 Specification Reference

IEC 62238, Clause 11.1.3
IEC 60945, Table 6, 10.4

2.48.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.48.3 Date of Test and Modification State

02 June 2009 - Modification State 0

2.48.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.48.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of IEC 61000-4-3.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.48.6 Environmental Conditions

	02 June 2009
Ambient Temperature	20°C
Relative Humidity	40%
Atmospheric Pressure	1021mbar

Product Service

2.48.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of IEC 62238 in conjunction with IEC 60945 for Immunity to Radio Frequency Electromagnetic Field (Enclosure Port).

The applied test levels are shown below.

Configuration 1 - Mode 1

Amplitude Modulation	Frequency	400Hz											
	Depth	80%											
Stepped Frequency Increments		1% with respect to last momentary frequency											
Dwell Time		3 Seconds: 80MHz to 1GHz 9 Seconds: 1GHz to 2GHz											
Frequency Range (MHz)		80 – 2000		80 – 2000		80 – 2000		80 – 2000		80 – 2000		80 – 2000	
Field Strength (V/m)		10+MU (12)		10+MU (12)		10+MU (12)		10+MU (12)		10+MU (12)		10+MU (12)	
Orientation of EUT		Front		Right Side		Rear		Left Side		Bottom Inc all cabling		Top Side	
Antenna Polarisation (V – Vertical, H – Horizontal)		V	H	V	H	V	H	V	H	V	H	V	H
Result (P – Pass, F – Fail)		P	P	P	P	P	P	P	P	P	P	P	P
Observation No.			1										

Observation Number	Description
1	Horizontal sinad 1 to 2GHz was close to limit with approx 2dB margin.

Configuration 1 - Mode 2

Amplitude Modulation	Frequency	400Hz										
	Depth	80%										
Stepped Frequency Increments		1% with respect to last momentary frequency										
Dwell Time		3 Seconds: 80MHz to 1GHz 9 Seconds: 1GHz to 2GHz										
Frequency Range (MHz)		80 – 2000		80 – 2000		80 – 2000		80 – 2000		80 – 2000		80 – 2000
Field Strength (V/m)		10+MU (12)		10+MU (12)		10+MU (12)		10+MU (12)		10+MU (12)		10+MU (12)
Orientation of EUT		Front		Right Side		Rear		Left Side		Bottom Inc all cabling		Top Side
Antenna Polarisation (V – Vertical, H – Horizontal)		V	H	V	H	V	H	V	H	V	H	V	H
Result (P – Pass, F – Fail)		P	P	P	P	P	P	P	P	P	P	P	P

2.49 IMMUNITY TO FAST TRANSIENT BURSTS COMMON MODE (SIGNAL, CONTROL AND TELECOMMUNICATIONS PORT)

2.49.1 Specification Reference

IEC 62238, Clause 11.1.2
IEC 60945, Table 6, 10.5

2.49.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.49.3 Date of Test and Modification State

09 June 2009 - Modification State 0

2.49.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.49.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of EN 61000-4-4.

The test was performed with the EUT in the following configurations and modes of operation:

Deviation from the standard.
The latest (2004) version of EN 61000-4-4, the base standard for Fast Transients was used, instead of the specified, 1995 version.

Configuration 1 - Mode 1
- Mode 2

2.49.6 Environmental Conditions

	09 June 2009
Ambient Temperature	24°C
Relative Humidity	37%
Atmospheric Pressure	999mbar

Product Service

2.49.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of IEC 62238 in conjunction with IEC 60945 for Immunity to Fast Transient Bursts Common Mode (Signal, Control and Telecommunications Port).

The applied test levels are shown below.

Configuration 1 - Mode 1

Cables Under Test	Test Level (±kV)	Repetition Rate (kHz)	Test Duration (seconds)	Test Method	Result
H/S 1 Cable Port, at Radio	0.5	5	180	Clamp	Pass
H/S 1 Cable Port, at Radio	1.0	5	180	Clamp	Pass
Handset (H/S1) Cable, at Handset	0.5	5	180	Clamp	Pass
Handset (H/S1) Cable, at Handset	1.0	5	180	Clamp	Pass
Speaker (H/S1) Cables, at Speaker	0.5	5	180	Clamp	Pass
Speaker (H/S1) Cables, at Speaker	1.0	5	180	Clamp	Pass
NMEA Cable, at Radio	0.5	5	180	Clamp	Pass
NMEA Cable, at Radio	1.0	5	180	Clamp	Pass

Product Service

Configuration 1 - Mode 2

Cables Under Test	Test Level (±kV)	Repetition Rate (kHz)	Test Duration (seconds)	Test Method	Result	Observation No.
H/S 1 Cable Port, at Radio	0.5	5	180	Clamp	Pass	
H/S 1 Cable Port, at Radio	1.0	5	180	Clamp	Pass	
Handset (H/S1) Cable, at Handset	0.5	5	180	Clamp	Pass	
Handset (H/S1) Cable, at Handset	1.0	5	180	Clamp	Pass	1
Speaker (H/S1) Cables, at Speaker	0.5	5	180	Clamp	Pass	
Speaker (H/S1) Cables, at Speaker	1.0	5	180	Clamp	Pass	1
NMEA Cable, at Radio	0.5	5	180	Clamp	Pass	
NMEA Cable, at Radio	1.0	5	180	Clamp	Pass	

Observation Number	Description
1	FTB crackles did breakthrough on the audio speaker, however the 1kHz tone was still audible, to a satisfactory level. Prior to and after the test audio remained totally un-degraded. Acceptable under Performance Criterion B.

Product Service

2.50 IMMUNITY TO INTERRUPTIONS (DC POWER PORT)

2.50.1 Specification Reference

IEC 62238, Clause 11.1.2
IEC 60945, Table 6, 10.8

2.50.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.50.3 Date of Test and Modification State

12 June 2009 - Modification State 0

2.50.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.50.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of IEC 61000-4-11.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.50.6 Environmental Conditions

	12 June 2009
Ambient Temperature	19°C
Relative Humidity	41%
Atmospheric Pressure	1016mbar

Product Service

2.50.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of IEC 62238 in conjunction with IEC 60945 for Immunity to Interruptions (DC Power Port).

The applied test levels are shown below.

Configuration 1 - Mode 1

Description of Test	Result
DC Power Port Interruptions - 100% of Vnom for a duration of 60 seconds, repeated 3 times.	Pass

Configuration 1 - Mode 2

Description of Test	Result
DC Power Port Interruptions - 100% of Vnom for a duration of 60 seconds, repeated 3 times.	Pass

2.51 IMMUNITY TO ELECTROSTATIC DISCHARGE (ENCLOSURE PORT)

2.51.1 Specification Reference

IEC 62238, Clause 11.1.2
IEC 60945, Table 6, 10.9

2.51.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.51.3 Date of Test and Modification State

12 June 2009 - Modification State 0

2.51.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.51.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of IEC 61000-4-2.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.51.6 Environmental Conditions

	12 June 2009
Ambient Temperature	21°C
Relative Humidity	43%
Atmospheric Pressure	1017mbar

Product Service

2.51.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of IEC 62238 in conjunction with IEC 60945 for Immunity to Electrostatic Discharge (Enclosure Port).

The applied test levels are shown below.

As the Test Points and results for Modes 1 and 2 are idential only one set of results and photographs are presented below

Configuration 1 - Mode 1 and 2

		Contact Discharges								Air Discharge							
		2		4		6		8		2		4		8		15	
Test Points		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Horizontal Coupling Plane		✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vertical Coupling Plane		✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Transceiver Unit																
A	Enclosure	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	Antenna port	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	All input/output ports	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
	Speaker 1																
D1	Enclosure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
E1	Volume control knob	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
	Microphone 1																
F1	Screen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
G1	Control buttons (front)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
H1	Control buttons (sides)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
I1	Speaker/mic area	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
J1	Enclosure seams	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
K1	Rear mounting bracket	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Speaker 2																
D2	Enclosure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
E2	Volume control knob	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
	Microphone 2															N/A	N/A
F2	Screen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
G2	Control buttons (front)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
H2	Control buttons (sides)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
I2	Speaker/mic area	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
J2	Enclosure seams	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
K2	Rear mounting bracket	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Speaker 3																
D3	Enclosure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
E3	Volume control knob	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A

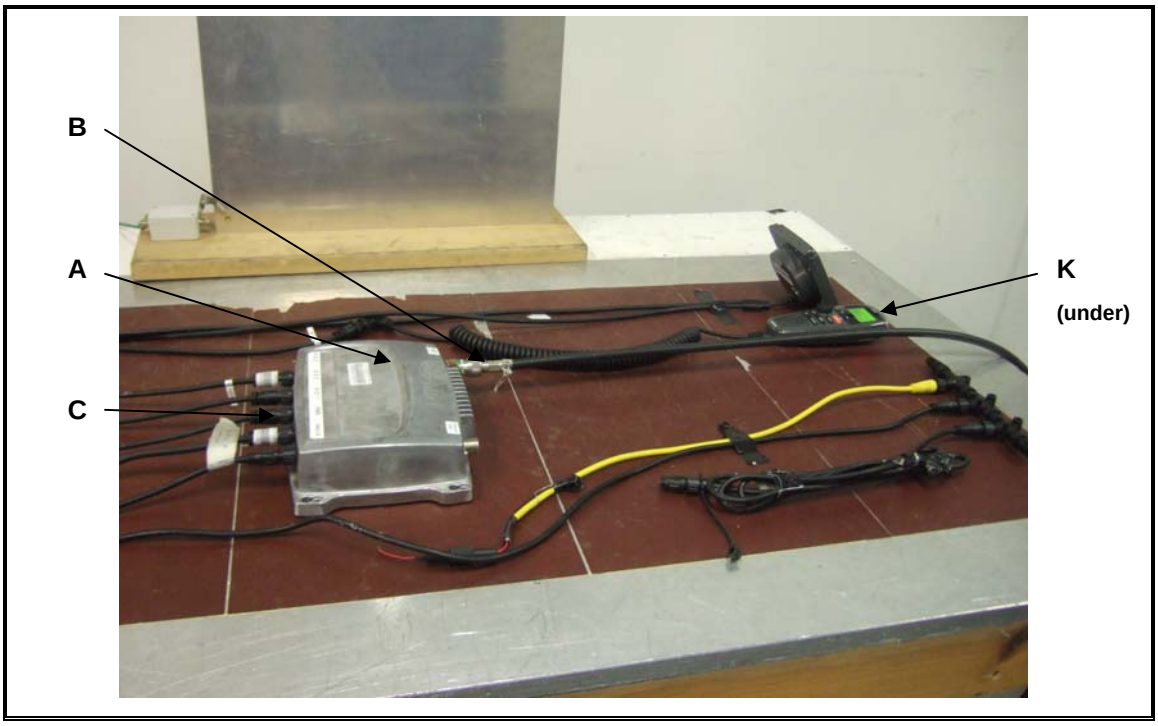
		Contact Discharges								Air Discharge							
		2		4		6		8		2		4		8		15	
Test Points		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
	Microphone 3																
F3	Screen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
G3	Control buttons (front)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
H3	Control buttons (sides)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
I3	Speaker/mic area	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
J3	Enclosure seams	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
K3	Rear mounting bracket	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	NMEA cable																
L	Connector block	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A

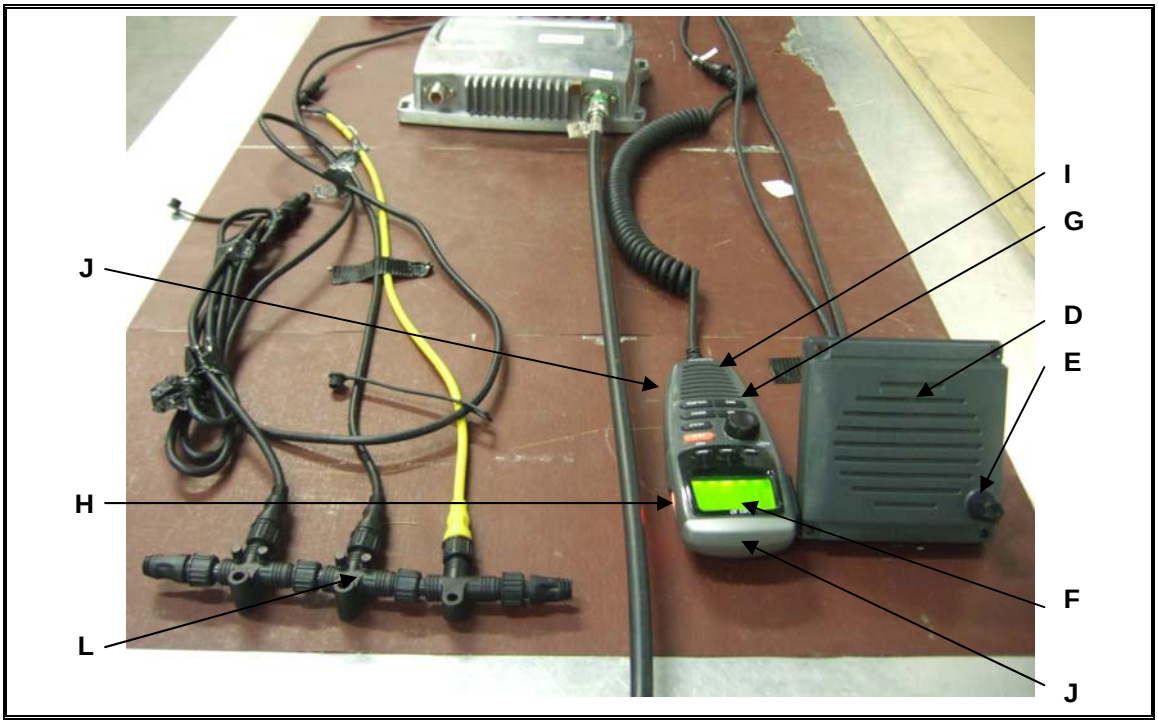
Key to Results

✓ The EUT's performance was not impaired at this test point when the ESD pulse was applied.
✓* No discharge occurred at this test point when the ESD pulse was applied.
N/A Test not applicable as defined in the specification.

Product Service

ESD TEST POINTS – CONFIGURATION MODE 1 and 2





Extension Speaker/mic were tested individually and set out as above for each component in turn.

2.52 COMPASS SAFE DISTANCE (ENCLOSURE PORT)

2.52.1 Specification Reference

IEC 60945, Clause 11.2

2.52.2 Equipment Under Test

VHF300AIS Fixed Mount Radio, S/N: 02

2.52.3 Date of Test and Modification State

16 June 2009 - Modification State 0

2.52.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.52.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of EN 60945.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2

2.52.6 Environmental Conditions

	16 June 2009
Ambient Temperature	24°C
Relative Humidity	37%
Atmospheric Pressure	1017mbar

Product Service

2.52.7 Test Results

For the period of test the EUT met the requirements of IEC 60945 for Compass Safe Distance (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1 and 2

Radio

Orientation of the EUT	Un-powered State		Normalised		Transmit Powered Up		Receive Powered Up	
	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection
Front	32	21	40	25	37	18	40	26
Top	42	29	45	29	45	32	45	30
Left Hand Side	31	22	41	23	33	23	38	23
Right Hand Side	17 (0.1°)	17 (0.1°)	17 (0.1°)	17 (0.1°)	17	17 (0.26°)	17 (0.1°)	17 (0.1°)
Underside	47	31	41	28	37	28	41	28
Rear	32	23	33	24	27	21	33	24

Standard Compass safe distance	500mm
Emergency Compass safe distance	350mm

Handset

Orientation of the EUT	Un-powered State		Normalised		Transmit Powered Up		Receive Powered Up	
	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection
Front	55	39	50	39	50	39	50	39
Top	31	17 (0.5°)	31	17 (0.5°)	31	17 (0.6°)	31	17 (0.6°)
Left Hand Side	17	17 (0.26°)	17 (0.1°)	17 (0.1°)	17 (0.1°)	17 (0.1°)	17 (0.1°)	17 (0.1°)
Right Hand Side	27	19	25	21	25	20	25	20
Underside	36	28	36	27	34	29	34	29
Rear	59	39	71	38	65	42	65	42

Standard Compass safe distance	750mm
Emergency Compass safe distance	450mm

Product Service

Speaker

Orientation of the EUT	Un-powered State		Normalised		Transmit Powered Up		Receive Powered Up	
	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection	Distance From Compass (cm) at 0.26° deflection	Distance From Compass (cm) at 0.87° deflection
Front	48	35	42	34	45	36	45	36
Top	21	17 (0.5°)	17	17 (0.26°)	17	17 (0.26°)	17	17 (0.26°)
Left Hand Side	26	17	28	19	28	17	28	17
Right Hand Side	17 (No deflection)	17 (No deflection)	17 (No deflection)	17 (No deflection)	17 (No deflection)	17 (No deflection)	17 (No deflection)	17 (No deflection)
Underside	27	18	30	19	27	19	27	19
Rear	47	31	50	34	50	32	50	32

Standard Compass safe distance	500mm
Emergency Compass safe distance	400mm

17cm is the closest distance that the EUT can be positioned relative to the centre of the compass (Distance limited by diametor of the compass)

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 Vibration					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	20-Jun-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Multimeter	White Gold	WG022	190	12	11-Sep-2009
Attenuator 10dB 75W	Bird	8308-100	386	12	5-Jun-2009
Attenuator (10dB/100W)	Bird	8343-100	495	12	8-Sep-2009
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Hygrometer	Rotronic	A1	2760	12	3-Jul-2009
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	30-May-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Section 2.2 Climatic - High Temperature					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	20-Jun-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Multimeter	White Gold	WG022	190	12	11-Sep-2009
Attenuator 10dB 75W	Bird	8308-100	386	12	5-Jun-2009
Attenuator (10dB/100W)	Bird	8343-100	495	12	8-Sep-2009
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Montford 8F3	Montford	8FT CUBED	2127	12	29-Apr-2010
Hygrometer	Rotronic	A1	2760	12	3-Jul-2009
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	30-May-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Section 2.3 Climatic - Humidity					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	20-Jun-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Multimeter	White Gold	WG022	190	12	11-Sep-2009
Attenuator 10dB 75W	Bird	8308-100	386	12	5-Jun-2009
Attenuator (10dB/100W)	Bird	8343-100	495	12	8-Sep-2009
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Montford 8F3	Montford	8FT CUBED	2127	12	29-Apr-2010
Hygrometer	Rotronic	A1	2760	12	3-Jul-2009
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	30-May-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 Climatic - Low Temperature					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	20-Jun-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Multimeter	White Gold	WG022	190	12	11-Sep-2009
Attenuator 10dB 75W	Bird	8308-100	386	12	5-Jun-2009
Multimeter	Fluke	75 Mk3	455	12	16-Dec-2009
Attenuator (10dB/100W)	Bird	8343-100	495	12	8-Sep-2009
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Montford 8F3	Montford	8FT CUBED	2127	12	29-Apr-2010
Thermohygrometer	Rotronic	A1	2749	12	21-Jul-2009
Hygrometer	Rotronic	A1	2760	12	3-Jul-2009
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	30-May-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Section 2.5 Radio (Tx) -Frequency Characteristics					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	22-Jul-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.6 Radio (Tx) - Power Characteristics					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Peak Power Analyser	Hewlett Packard	8990A	107	12	2-Feb-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.7 and 2.8 Radio (Tx) - Frequency Deviation					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Sensor Module	Hewlett Packard	11722A	1333	12	11-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Modulation Analyser	Hewlett Packard	8901B	3292	12	21-Nov-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Section 2.9 Radio (Rx) - Sensitivity of the Modulation, Including the Microphone					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Amplifier (Power)	Bruel & Kjaer	2706	135	-	TU
Amplifier (Measuring)	Bruel & Kjaer	2609	139	12	TU
Artificial Mouth	Bruel & Kjaer	BRUEL	140	-	TU
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Sound Level Calibrator	Bruel & Kjaer	4231	2881	12	7-Jul-2009
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.10 Radio (Tx) - Audio Frequency Response					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Sensor Module	Hewlett Packard	11722A	1333	12	11-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Modulation Analyser	Hewlett Packard	8901B	3292	12	21-Nov-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Section 2.11 Radio (Tx) - Audio Frequency Harmonic Distortion of the Emission					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.12 Radio (Tx) - Adjacent Channel Power					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.13 Radio (Tx) - Conducted Spurious Emissions					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	18-Jun-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
High Pass Filter	Mini-Circuits	NHP-300	1640	12	12-Aug-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Filter (Hi Pass)	Mini-Circuits	NHP-800	2835	12	12-Nov-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	21-Apr-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.14 Radio (Tx) Transient Frequency Behaviour					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Modulation Analyser	Rohde & Schwarz	FAM	119	-	TU
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Oscilloscope	Lecroy	9370	2832	12	3-Oct-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Section 2.15 Radio (Tx) - Residual Modulation of the Transmitter					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Sensor Module	Hewlett Packard	11722A	1333	12	11-Nov-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Modulation Analyser	Hewlett Packard	8901B	3292	12	21-Nov-2009
Attenuator (20dB, 150W)	Narda	769-20	3367	12	19-May-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Section 2.16 Radio (Tx) - DSC - Frequency Error					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.17 Radio (Tx) - DSC - Modulation Index					
Modulation Analyser	Hewlett Packard	8901B	45	12	9-Jul-2010
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.18 Radio (Tx) - DSC - Modulation Rate					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Modulation Analyser	Hewlett Packard	8901B	555	12	20-Nov-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
Sensor Module	Hewlett Packard	11722A	3293	12	11-Nov-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.19 and 2.40 Radio (Rx) - Testing of Generated Call Sequences					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Modem (VHF DSC)	ICS	PLT02249	120	12	1-Oct-2009
Multimeter	Iso-tech	1DM-101	466	12	23-Jan-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (20dB, 20W)	Weinschel	1	3032	12	10-Jul-2010
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	22-Sep-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Section 2.20 Radio (Rx) - Harmonic Distortion and Rated Audio Frequency Output Power					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
AF Load (16ohm)	ASL (TUV)	16ohm	427	12	3-Sep-2009
AF Load (8ohm)	ASL (TUV)	8ohm	428	12	3-Sep-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.21 Radio (Rx) - Audio Frequency Response					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Section 2.23 Radio (Rx) - Co Channel Rejection					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.24 Radio (Rx) - Adjacent Channel Selectivity					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Section 2.25 Radio (Rx) - Spurious Response Rejection					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
High Pass Filter	Mini-Circuits	NHP-300	1640	12	12-Aug-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Tunable Notch Filter	Wainwright	WRCD 130.0/170.0-0.05/50-5EEK	3412	-	TU
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.26 Radio (Rx) - Intermodulation Response Rejection					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Signal Generator	Rohde & Schwarz	SMY 01	49	12	20-Jun-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.27 Radio (Rx) – Blocking and Desensitisation					
Signal Generator	Rohde & Schwarz	SMY 01	49	12	20-Jun-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.28 and 2.39 Radio (Rx) - Conducted Emissions					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	21-Apr-2010
Attenuator (10dB, 150W)	Narda	769-10	3368	12	19-May-2010
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	4-May-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.29 Radio (Rx) - Residual Noise Level					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Section 2.30 Radio (Rx) – Squelch Operation					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.31 Radio (Rx) Squelch Hysteresis					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.32 Radio (Rx) - Multiple Watch Characteristics					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Cystal Detector (Pos O/P)	ASL (TUV)	RAB1	479	-	TU
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
1GHz Digital Oscilloscope	Lecroy	9370M	612	12	30-Sep-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	25-Sep-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
Section 2.33 Radio (Rx) - DSC - Maximum Usable Sensitivity					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Section 2.34 Radio (Rx) - DSC - Co Channel Rejection					
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.35 Radio (Rx) - DSC - Adjacent Channel Selectivity					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Section 2.36 Radio (Rx) - DSC – Spurious Response and Blocking Immunity					
Modulation Analyser	Hewlett Packard	8901B	45	12	9-Jul-2010
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.36 Radio (Rx) - DSC - Intermodulation Rejection					
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.22 Radio (Rx) - Sensitivity					
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	115	12	23-Jun-2009
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.38 Radio (Rx) - Dynamic Range					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Signal Generator	Hewlett Packard	8644A	199	12	29-Jul-2009
Power Divider	Weinschel	1506A	604	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Thermocouple Thermometer	Fluke	51	3173	12	3-Jul-2009
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Section 2.41 Radio - Reaction to VTS and AIS Channel Management DSC Transmissions					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Modulation Analyser	Hewlett Packard	8901B	45	12	8-Jul-2009
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Modem (VHF DSC)	ICS	PLT02249	120	12	1-Oct-2009
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	12	9-Jun-2010
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.42 Radio (Rx) - Simultaneous Reception					
Signal Generator	Rohde & Schwarz	SMG	42	12	22-Jun-2010
Signal Generator	Rohde & Schwarz	SMX	43	12	14-May-2010
Digital Time Analyser	Marconi	2850-BS	80	6	TU
DSC Decoder/Encoder	TUV	DSC TPOO1	81	6	TU
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	3-Sep-2009
Audio Analyser	Hewlett Packard	8903B	1881	12	2-Oct-2009
Multimeter	Iso-tech	IDM101	2424	12	3-Sep-2009
Sensor	Hewlett Packard	11722A	2787	12	22-Aug-2009
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
DSC Pre-Emphasis Unit for VHF Modem	TUV	RAB 200701	3314	12	1-Oct-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.43 EMC - Conducted Emissions					
Transient Limiter	Hewlett Packard	11947A	15	12	30-Sep-2009
3 Phase Artificial Mains Network (LISN)	Rohde & Schwarz	ESH2-Z5	16	12	11-Mar-2010
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009
Section 2.44 EMC - Magnetic Emissions					
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	333	24	10-Jul-2010
Antenna (Dish/Tripod/Adaptor, 1GHz-18GHz)	Rohde & Schwarz	AC-008	334	-	TU
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009
Section 2.45 EMC - Radiated Emissions					
Transient Limiter	Hewlett Packard	11947A	15	12	30-Sep-2009
3 Phase Artificial Mains Network (LISN)	Rohde & Schwarz	ESH2-Z5	16	12	11-Mar-2010
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	6-Sep-2009
Attenuator (30dB, 200W)	Bird	8322	562	12	15-Jan-2010
Audio Analyser	Hewlett Packard	8903B	576	12	27-May-2010
Modulation Analyser	Hewlett Packard	8901B	773	12	18-May-2010
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.46 and 2.47 EMC - Conducted Immunity					
Spectrum Analyser	Hewlett Packard	8562A	14	12	11-Jul-2009
Load	Diamond Antenna	DL-30N	220	12	4-Sep-2009
8dB Attenuator (2 x 4dB)	Schaffner	INA 2070-1	221	12	8-Jul-2009
Coupling and Decoupling Network	Schaffner	M216	224	12	23-Jul-2009
Amplifier (Acoustic Power)	Bruel & Kjaer	2706	249	-	TU
Head Simulator	B T Teleprove		254	-	TU
Amplifier (Measuring)	Bruel & Kjaer	2636	270	-	TU
Modulation Analyser	Hewlett Packard	8901B	557	12	20-Nov-2009
Attenuator (30dB, 200W)	Bird	8322	561	12	23-Jan-2010
Attenuator 6dB	Advance	10023-6/MF	1539	12	21-Oct-2009
Screened Room (1)	Rainford	Rainford	1541	-	TU
2 Channel Variable Audio Filter	Kemo	Benchmaster VBF813	1663	12	13-May-2010
Audio Analyser	Hewlett Packard	8903B	2212	12	16-Dec-2009
EMI RF Generator	Schaffner	NSG2070-400	2215	12	14-Jul-2009
Antenna (Log Periodic)	EMCO	3146	2273	12	10-Nov-2009
EM Clamp	Teseq	KEMZ 801S	3373	-	6-Jun-2009
Calibration Fixture	Teseq	CAL 801	3374	-	10-Jun-2009
Calibration Fixture	Teseq	CAL 801	3375	-	10-Jun-2009
Signal Generator, 9kHz to 6GHz	Rohde & Schwarz	SMB 100A	3499	12	22-May-2010
Section 2.48 EMC - Radiated Immunity					
Spectrum Analyser	Hewlett Packard	8562A	14	12	11-Jul-2009
Amplifier (Acoustic Power)	Bruel & Kjaer	2706	249	-	TU
Head Simulator	B T Teleprove		254	-	TU
Amplifier (Measuring)	Bruel & Kjaer	2636	270	-	TU
Load (50ohm, 30W)	Weinschel	50T-054	276	-	TU
Antenna (Bilog)	Schaffner	CBL6143	316	-	TU
Modulation Analyser	Hewlett Packard	8901B	557	12	20-Nov-2009
Attenuator (30dB, 200W)	Bird	8322	561	12	23-Jan-2010
Power Meter	Rohde & Schwarz	NRVD	747	-	TU
Screened Room (1)	Rainford	Rainford	1541	-	TU
2 Channel Variable Audio Filter	Kemo	Benchmaster VBF813	1663	12	13-May-2010
Signal Generator	Marconi	2031	1845	12	21-Oct-2009
CW TWT (1-2.5GHz)	Thorn	PTC6341	2069	-	TU
Laser Powered Electric Field Sensor	Dare Development	RadiSense IV	2148	12	23-Jan-2010
Audio Analyser	Hewlett Packard	8903B	2212	12	16-Dec-2009
Directional Coupler	Amp Research	DC6180	2763	-	TU
RF Power Amplifier	Amp Research	250W1000A	2844	12	TU
Thermal Power Sensor, 0 - 18GHz, 1uW to 100mW	Rohde & Schwarz	NRV-Z51	3496	-	TU
Signal Generator, 9kHz to 6GHz	Rohde & Schwarz	SMB 100A	3499	12	22-May-2010

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.49 EMC - Fast Transient Bursts					
Spectrum Analyser	Hewlett Packard	8562A	14	12	11-Jul-2009
Immunity Test Set	Schaffner	BEST EMC V2.7	295	12	22-Aug-2009
Capacitive Coupling Clamp	Omiran	EFTC 105	298	-	TU
Modulation Analyser	Hewlett Packard	8901B	557	12	20-Nov-2009
Attenuator (30dB, 200W)	Bird	8322	562	12	15-Jan-2010
Audio Analyser	Hewlett Packard	8903B	576	12	27-May-2010
Sound Level Calibrator	Bruel & Kjaer	4230	2171	-	TU
Signal Generator, 9kHz to 6GHz	Rohde & Schwarz	SMB 100A	3499	12	22-May-2010
Section 2.50 EMC - Voltage Dips, Interruptions and Variations					
Harmonics & Flicker System	Schaffner	1000-1	2764	12	22-Oct-2009
AC Power Source (5kVA)	Schaffner	NSG1007	2765	12	22-Oct-2009
Section 2.51 EMC - Electrostatic Discharges					
Spectrum Analyser	Hewlett Packard	8562A	14	12	11-Jul-2009
Signal Generator	Rohde & Schwarz	SMY 01	118	12	24-Jun-2009
ESD Simulator	Schaffner	NSG 435+SL 171-504	552	12	20-Apr-2010
Modulation Analyser	Hewlett Packard	8901B	557	12	20-Nov-2009
Attenuator (30dB, 200W)	Bird	8322	562	12	15-Jan-2010
Audio Analyser	Hewlett Packard	8903B	576	12	27-May-2010
Section 2.52 EMC - Compass Safe Distance					
Power Supply Unit	Hewlett Packard	6267B	109	-	TU
Load (50ohm/30W)	Weinschel	50T-054	285	12	19-Sep-2009
Sussex Helmholtz Coil	Various	88771	327	-	TU
Attenuator (10dB)	Weinschel	47-10-34	481	12	25-Mar-2010
Magnetometer	Bartington	MAG01	671	36	3-Sep-2011
Multimeter	Iso-tech	IDM101	2423	12	3-Sep-2009
Marine Binacle Compass with Azimuth Circle	Cassens & Plath	Type 11	3331	24	TU
Compass Verification Unit	TUV	CVU	3579	-	TU

TU – Traceability Unscheduled
OP MON – Output Monitored with Calibrated Equipment

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
DC Input Ripple Immunity	Current Voltage	0.45% 0.91%
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4
† In accordance with UKAS Lab 34

Product Service

SECTION 4

PHOTOGRAPHS

Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

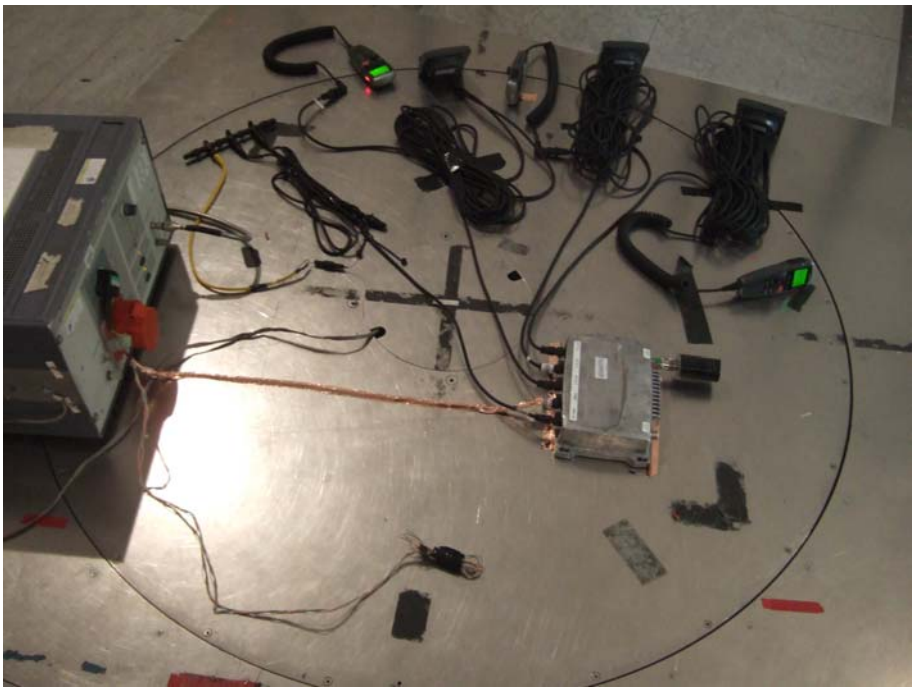
Front View

Rear View

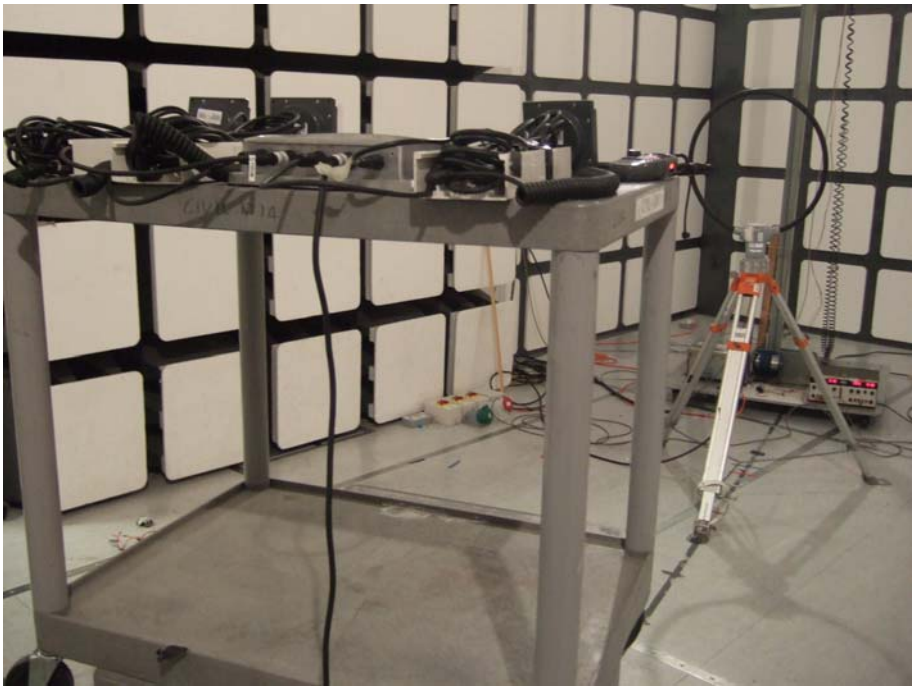
View of Radio Microphone

Front View

4.2 TEST SET UP PHOTOGRAPHS



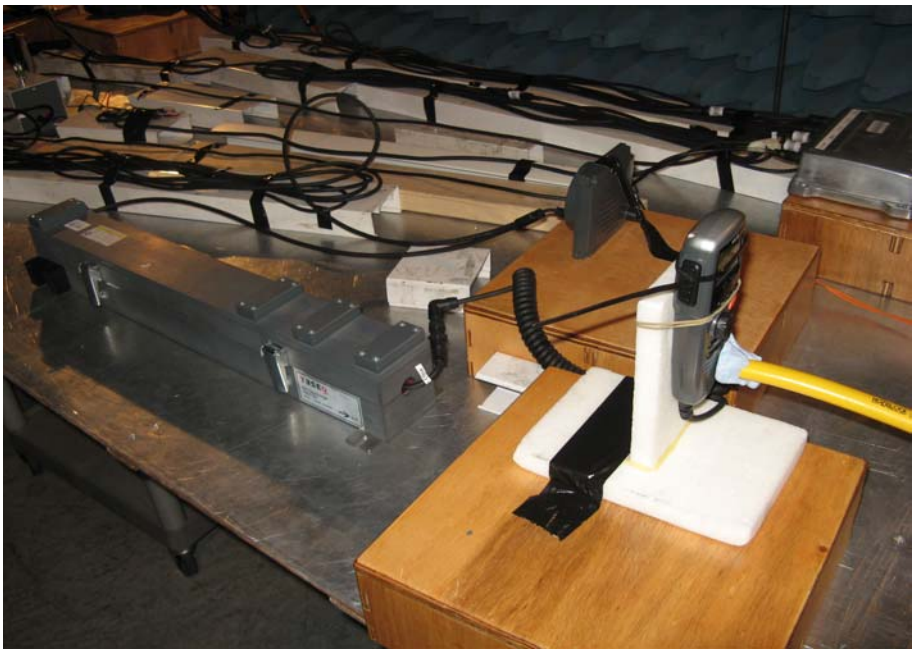
Conducted Emissions (DC Power Port)



Enclosure Port Magnetic Emissions Field Strength

Radiated Emissions (Enclosure Port)

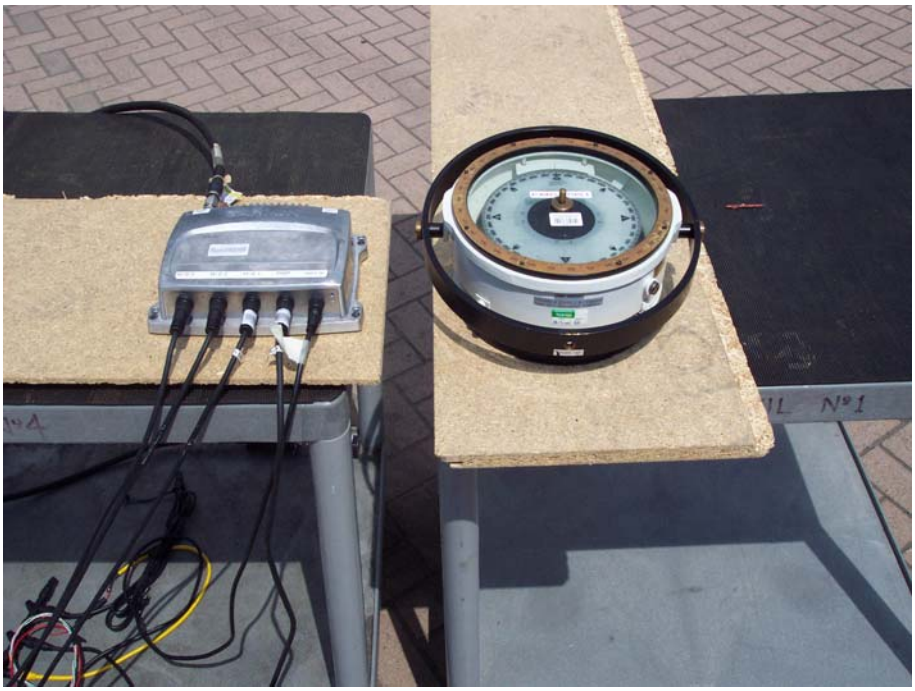
Immunity to Radio Frequency Common Mode (DC Power Port)



Immunity to Radio Frequency Common Mode (Signal, Control and Telecommunications Port)

Immunity to Radio Frequency Electromagnetic Field (Enclosure Port)

Immunity to Fast Transient Bursts Common Mode (Signal, Control and Telecommunications Port)



Compass Safe Distance (Enclosure Port)

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

Product Service

ANNEX A

Clause 4/5 Statement

Product Service

Clause 4. IEC 62238	Satisfactory
Construction. 4.3	**Yes/No**
Is there Good engineering practice in respect to mechanical and electrical Construction	Yes
Is the Equipment suitable for use aboard vessels	Yes
Are the Number of controls suitable for simple and satisfactory operation	Yes
Does size of controls enable easy operation	Yes
Are detailed operating instructions provided	Yes
Is unit Capable of operating on single and two frequency channels with manual control (Simplex)	Yes
Can unit Operate on all channels of Appendix 18 of the Radio Regulations	Yes
Is unblocking of blocked channels impossible by user	Yes
are any Additional Channels outside of Appendix 18 capable of being blocked to user	Yes
Is use of Channel 70 only possible for DSC	Yes
Is transmitter inhibited during channel switching operations	Yes
Does the unit indicate an incompatible working channel request	Yes
Controls and Indicators 4.4	
If more than one control unit is provided is priority assigned to unit installed in the navigating position	Yes
Are Control units provided with an indication showing whether the equipment is in operation	Yes
Are controls impairing technical characteristic not accessible by user	Yes
Is a Distress button provided and is the default an undesignated distress message	Yes
Is a call button provided and is the initial display of which an individual call	Yes
Is a Cancel button provided	Yes
Is a Enter/Accept/OK button provided	Yes
Are Means provided to easily enter an MMSI, call and manual position information	Yes
Is an Alpha-Numeric Display provided	Yes
Is an On/Off switch for the entire installation with visual indication that installation is operational	Yes
Is a Manual non-locking PPT switch provided	Yes
Is there a Transmit activation indication	Yes
Are Means provided to limit the maximum transmission time to 5 minutes	Yes
Is there a Switch for reducing transmitter power to no more than 1W with visual indication that Low Power is selected	Yes
Is Transmission of DSC always at full power	Yes
Does Volume control adjust A/F output	Yes
Is there a Squelch Control	Yes
Is there a Dimmer to reduce illumination to zero except distress indicator	Yes
Are there Controls for multiple watch facilities	Yes
Is the Channel designator as per Appendix 18 of the Radio Regulation	Yes
Are all electronic displays including the Channel designator legible irrespective of the external lighting conditions	Yes
Is Selection of channel 16 by a distinctively marked key	Yes
On Initial selection of Channel 16 is high power automatically selected	Yes
Where automatic switching of a channel on receipt of a DSC call except distress, urgency or individual call exists is a means of disabling this provided.	Yes
Facilities for coding and decoding of DSC 4.5.1	
Is there Quick and precise entering of call by the user	Yes
Does Call function permits selection of INDIVIDUAL, ALL SHIPS URGENCY, ALL SHIPS SAFETY.GROUP CALL or OTHER	Yes
Are stored received calls Retrievable	Yes
Housekeeping function of the equipment	
Can Manual or Directory-individual call can be selected	Yes
has Directory facility for 10 entries with programmable MMSI	Yes
Manual calls 4.5.2	
Does Manual call facility permits entry of MMSI	Yes
If calling a Coast Station is operator requested to input further information	Yes
When calling ship is operator required to input Channel number	Yes
Does Equipment assists operator by suggesting suitable intership channel	Yes
Distress Calls 4.5.3	

Product Service

Is Transmission of distress call only by a dedicated distress button	Yes
Is Distress button red and marked DISTRESS	Yes
is The distress button protected from inadvertent operation by a spring loaded cover	Yes
if a non transparent cover is used is it also marked DISTRESS	Yes
does Distress alert requires two independent actions	Yes
If distress alert is activated is there a visual indication and is an acoustic alarm is activated	Yes
Is there is a time delay of over 3 seconds and less than 5 seconds between initiation and activation	Yes
Are facilities available to select nature of distress before initiation	Yes
Is default of nature of distress an undesignated distress	Yes
Does initiation of distress call have priority over all other operations	Yes
Is Channel 70 selected at full power automatically	Yes
It is possible to discontinue transmission of distress call	Yes
Are distress calls transmitted 5 times, in succession without interval	Yes
Does each call of 5 successive calls includes dot pattern	Yes
After distress call does equipment switch to channel 16 with full power automatically	Yes
All Ships calls 4.5.4	
Is transmission of all ships urgency and safety calls only allowed by deliberate action	Yes
After transmission does equipment switch to channel 16 with full power automatically	Yes
Incoming Calls 4.5.6	
Is there a facility to convert incoming calls to visual form in plain language	Yes
Can unit store 10 DSC calls until read manually	Yes
Does VHF automatically switch to channel identified in incoming call	Yes
In the case if an incoming distress and Urgency call VHF does the unit switch to Channel 16 and select full power automatically (if so enabled)	Yes
Is a visual indication that a channel change is requested provided	Yes
Other calls 4.5.6	Yes
Is there a means for disabling automatic response to polling or position reporting calls provided	Yes
DSC Display 4.6	
Does display shows function currently available	Yes
Is operator prompted when an incorrect operation is attempted	Yes
Does display shows last entered position	Yes
Is display of geographical position and time readily available	Yes
Is display capable of continuously displaying complete enhanced position in accordance with ITU-RM821.	Yes
Is there a visual indication of user entered information of contents of call	Yes
Is there manual correction of user entered information of content of call	Yes
Is there an Indication of unread incoming messages in memory	Yes
is there an Indication that distress alert is in automatic retransmit mode	Yes
Can DSC display when located on transceiver unit be easily read from 85cm	Yes
If DSC display is located on handset can it be easily read from 40cm	Yes
Handset and loudspeaker 4.7	
Is a telephone handset or microphone provided	Yes
Is there an Integral loudspeaker (miniature speaker located in hand set)	Yes
Is there a socket for external speaker	Yes
Are acoustic alarms relayed to external loudspeaker/s	Yes
Is unit muted during simplex	Yes
Safety 4.8	**********
Is there protection against the effects of excessive current and over voltage	Yes
Is there protection of damage due to transient voltages	Yes
Is there protection against damage due to reversal of power supply polarity	Yes
Are exposed metal parts earthed	Yes
Is there protection against accidental access to voltages greater than 50 volts	Yes
Is there protection against open circuit antenna when keyed at full power for 5 minutes	Yes
Is there protection against short circuit antenna when keyed at full power for 5 minutes	Yes
Is the DC path from antenna terminal to chassis less than 100 K Ohms	Yes

Product Service

Is the information in programmable memory devices and the vessels identity and information inherent to the DSC process stored in non-volatile memory devices	Yes
Labelling 4.9	
Are controls, instruments, indicators and terminals clearly labelled	Yes
Are details of power supply clearly indicated	Yes
Is there Identification of manufacturer, type designation and serial number	Yes
Is compass safe distance noted in manual or equipment as described in IEC60945	Yes
Warm up 4.10	
After switch on is the equipment operational in less than 5 seconds	Yes
Switching time 5.1	
Is the time required to switch channels less than 5 seconds	Yes
Is time taken to go from Transmit to receive less than 0.3 of a second	Yes
Is time taken to go from Receive to Transmit less than 0.3 of a second	Yes
Classes of Emission and modulation 5.2	
Is G3E used for speech	Yes
Is G2B used for DSC	Yes
Is the channel separation 25 KHz	Yes
Are other channel spacing's allowed if permitted by appropriate national Administrations ITU R M.1084-4	No
Facilities for DSC transmission and reception 5.3	
Is there facility to code and transmit DSC on channel 70	Yes
Is there facility to decode and convert receive calls to visual form in plain language	Yes
Is DSC watch keeping designed for continuous operation except during transmitter operation when it is muted	Yes
Decoding 5.3.2	
Does decoding use parity, diversity and error checks as detailed in ITU-R M .493-10	Yes
Free Channel Transmission 5.3.3	
Is there automatic delay of transmission until Channels 70 is free	Yes
Is there no delay of distress calls made if Channel 70 is not free	Yes
Automatic Acknowledgement 5.3.4	
Is it not possible to automatically transmit acknowledgements to routine calls	Yes
Automatic Retransmission of Distress Calls 4.3.5	
Does re-transmission of Distress calls occur after a random delay 3.5 to 4.5 minutes	Yes
After each distress call attempt does the equipment automatically retune to channel 16 at maximum power	Yes
Do these re transmissions continue until acknowledgement received or manually cancelled	Yes
Does this manual operation not interrupt any distress call attempt in progress	Yes
It is possible for Distress call re-attempt by manual intervention at any time	Yes
Is A visual indication provided that distress alert is in automatic retransmit mode	Yes
Is an audible indication heard during retransmission	Yes
Ship Identity-MMSI and Group MMSI 5.4	
Is there permanent storage of MMSI number and automatic insertion in call	Yes
Is it impossible for the user to change to MMSI	Yes
is it impossible to transmit a DSC call until MMSI has been programmed	Yes
is vessels MMSI displayed at power-up or by a simple action of the operator	Yes
Is storing of operator programmable group MMSI numbers possible	Yes
When programming group MMSI with 8 digits is only leading 0 inserted automatically	Yes
Entry of position Information 5.5	
Is there provision for manual entry of position with valid time	Yes
Is there provision for automatic entry and encoding of position and time conforming to IEC 1162-1	Yes
No connection or failure within external units disables the DSC equipment	Yes
Does failure of data stream initiates an error message on the display	Yes
Does failure of data stream prompts operator every 4 hours to manually enter position and time	Yes
If position not updated for 23.5 hours does position and time set to default to repeated digit 9	Yes
Distress and urgency alarms 5.6.1	

Product Service

Are there provision of specific visual and acoustic alarms activated by specified Distress or category distress and urgency.	Yes
Alarm circuits cannot be disabled	Yes
Is the alarm tone for safety and routine call different than those used for Distress and Urgency	Yes
The alarms are not activated where duplicate distress relay calls are received within 1 hour	Yes
Other alarms 5.6.2	**********
Are visual and non disableable acoustic alarms activated on receipt of calls other than distress or urgency	Yes
Cancellation of alarms 5.6.3	
Is it possible to manually cancel alarms	Yes
Is it possible for automatic cancellation after 2 minutes	Yes
Acoustic Alarm power 5.6.4	
Is it initially clearly distinguishable and not interfere with communication	Yes
if not cancelled within 10 secs does the acoustic power of the alarm rises to 80 dB at a distance of one metre	Yes
Multiple Watch 5.7	
Is there Provision of multiple watch on traffic channels	Yes
Does DSC Operation takes precedence	Yes
Scanning Provisions 5.7.2	
Is there provision for automatic scanning of a priority channel and one additional channel	Yes
Are there facilities for automatic sequential change of the additional channel	Yes
Is the priority channel sampled during reception on the additional channel but not visa versa	Yes
Is there manual control to switch on and off the scanning facility;	Yes
Is this automatically switched off during any communication	Yes
Is selection of the additional channel and selection of the priority channel, if unblocked, possible on control unit	Yes
Is the priority channel 16 if selection of priority is blocked	Yes
Is there Indication of both channels during scanning	Yes
Is transmitter inhibited during scanning with automatic return to selected additional channel when scan switched off	Yes
Is there a single manual control to switch equipment for operation on the priority channel	Yes
Is there an Indication of the selected additional channel on the control unit as the operational channel	Yes
Scanning Characteristics 5.7.3	
Is the sampling of the priority channel not more than 2 seconds	Yes
Does The receiver remains on the priority channel if a signal is detected thereon and remains there for its duration	Yes
Is scanning continuous if a signal is detected on the additional channel	Yes
Is Interruption of the additional channel is not greater than 150 m.s.	Yes
Does the receiver function correctly during scanning	Yes
With no signal on the priority channel is dwell time on the additional channel more than 850 milli seconds	Yes
Is there an indication of the channels on which a signal is being received.	Yes
5.8 built-in test	
is there a built in test facility for DSC processor	Yes

Clause 4/5. Statement for Garmin 300i & 300iAIS

Engelhard Sondors
Product Line Manager 07/23/09

For Garmin International. Dated