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Report On

FCC Testing of the
McMurdo Limited
SmartFind S5 AIS SART

COMMERCIAL-IN-CONFIDENCE

FCC ID: KLS-S5

Document 75907213 Report 03 Issue 1

March 2010



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

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McMurdo Limited
SmartFind S5 AIS SART

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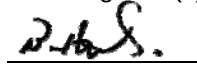
DATED

12 March 2010

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Part 2, 15B and 80. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);


B Airs


A R Hubbard





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SECTION 1

REPORT SUMMARY

FCC Testing of the
McMurdo Limited
SmartFind S5 AIS SART



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the McMurdo Limited SmartFind S5 AIS SART to the requirements of FCC CFR 47 Part 2, 15B and 80.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification for the series of tests carried out.
Manufacturer	McMurdo Limited
Model Number(s)	S5
Serial Number(s)	970 00 000 75902713–TUV0007
Software Version	1.1.60
Hardware Version	Issue 1
Number of Samples Tested	Three
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2008 FCC CFR 47 Part 15: 2008 FCC CFR 47 Part 80: 2008
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	PC0003713
Date	22 July 2009
Start of Test	29 October 2009
Finish of Test	06 November 2009
Name of Engineer(s)	B Airs A R Hubbard
Related Document(s)	ANSI 63.4: 2003



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 2, 15B and 80, is shown below.

Section	Spec Clause			Test Description	Mode	Mod State	Result	Base Standard
	Part 2	Part 15B	Part 80					
2.1	2.1055	-	80.209(a)	Frequency Stability Under Voltage Variations	Active	0	Pass	
					Idle		N/A	
2.2	2.1055	-	80.209(a)	Frequency Stability Under Temperature Variations	Active	0	Pass	
					Idle		N/A	
2.3	2.1051, 2.1053	-	80.211(f) (1)(2)	Emission Limitations – Emission Mask	Active	0	Pass	
					Idle		N/A	
2.4	2.1049	-	80.205(a)	Occupied Bandwidth	Active	0	Pass	
					Idle		N/A	
2.5	2.1046	-	80.215 (a)(5)	Transmitter Power – AIS Transmission	Active	0	Pass	
					Idle		N/A	
2.6	2.1047	-	80.213	Modulation Characteristics	Active	0	Pass	
					Idle		N/A	
2.7	-	15.109	-	Radiated Emissions	Active		N/A	
					Idle	0	Pass	

N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	OEM
MANUFACTURER	McMurdo Limited
TYPE	SmartFind S5 AIS SART
PART NUMBER	92-001-001A
SERIAL NUMBER	970 00 0001
HARDWARE VERSION	Issue 1
SOFTWARE VERSION	1.1.60
TRANSMITTER OPERATING RANGE	161.975MHz to 162.025MHz
RECEIVER OPERATING RANGE	Not applicable
COUNTRY OF ORIGIN	United Kingdom
INTERMEDIATE FREQUENCIES	Not applicable
ITU DESIGNATION OF EMISSION	16K0GXW
HIGHEST INTERNALLY GENERATED FREQUENCY	162.025MHz
OUTPUT POWER (W or dBm)	32.5 dBm nominal
FCC ID	KLS-S5
INDUSTRY CANADA ID	IC6913A-S5
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Used as part of the GMDSS, AIS SART has a unique ID code and will receive its position via an internal GPS module; this data is combined and transmitted using the international AIS channels (AIS 1 – 161.975MHz and AIS 2 – 162.025MHz) in the maritime VHF band.
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	OEM
MANUFACTURER	Varta micro battery or Panasonic
TYPE	CR 2/3 AH (Varta) / CR123A (Panasonic)
PART NUMBER	CR 2/3 AH
VOLTAGE	6v nominal
COUNTRY OF ORIGIN	Germany (Varta micro battery) or USA (Panasonic)

Signature

Neil Jordan

Date

19 December 2009

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.



Product Service

1.4 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	McMurdo Limited
ADDRESS :	Silver Point, Airport Service Road Hilsea, Portsmouth, PO2 5PB
NAME FOR CONTACT PURPOSES :	Neil Jordan
TELEPHONE NO: 02392 623934	FAX NO: 02392 623997 E-MAIL: neiljordan@mcmurdo.co.uk

EQUIPMENT INFORMATION	
<u>Equipment designator:</u>	
Model name/number	S5 AIS SART..... Identification number
<u>Supply Voltage:</u>	
☐ AC mains	State AC voltage V and AC frequency Hz
☐ DC (external)	State DC voltage V and DC current7mA average. A
☒ DC (internal)	State DC voltage ...6.0.. V and Battery type ...Li MnO2.....
<u>Frequency characteristics:</u>	
Frequency range	...161.975..... MHz to ...162.025..... MHz Channel spacingN/A.... (if channelized)
Designated test frequencies:	
Bottom:161.975... MHz	Middle: MHz Top: ...162.025..... MHz
<u>Power characteristics:</u>	
Maximum transmitter power1.8..... W	Minimum transmitter power W (if variable)
☐ Continuous transmission	
☒ Intermittent transmission	State duty cycle ...0.32%.....
If intermittent, can transmitter be set to continuous transmit test mode? No	
<u>Antenna characteristics:</u>	
☐ Antenna connector	State impedance ohm
☐ Temporary antenna connector	State impedance ohm
☒ Integral antenna	State gain0..... dBi
<u>Modulation characteristics:</u>	
☐ Amplitude	☒ Other
☐ Frequency	Details: ...GMSK.....
☐ Phase	
Can the transmitter operate un-modulated?	Yes
ITU Class of emission: 16K0GXW.....	
<u>Extreme conditions:</u> McMurdo Limited has assumed this with the AIS SART running, The stowage temperature for the device is -30C to +70C:	
Maximum temperature	...+55...°C Minimum temperature ...-20... °C
Maximum supply voltage	...6.0.....V Minimum supply voltage ...5.5.... V

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

Signature: Held on file at TÜV Product Service Ltd
 Name: Neil Jordan Position held: Engineering Manager
 Date: 01 October 2009

TÜV Product Service Ltd 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.



Product Service

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) was a McMurdo Limited SmartFind S5 AIS SART as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test



Product Service

1.5.2 Test Configuration

The EUT was configured in accordance with FCC CFR 47 Part 2, 15B and 80.

1.5.3 Modes of Operation

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

Mode 1 – Active

Mode 2 – Idle

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

1.5.4 Battery Voltages

The SmartFind S5 AIS SART is powered from an internal battery. In order to complete the testing at extreme voltages, as required by the standard, the battery voltage usage was accelerated to obtain a battery with an equivalent 92 hours of usage.

McMurdo Limited declared that in order to achieve a battery in a state nearing the end of its useful life (V min), a resistive load of 130 ohms could be placed across the battery terminals for 16 hours and that this condition would equate to 92 hours of battery use. This method was used for all of the tests that indicate Vmin was used.



Product Service

1.6 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 6V internal battery unless otherwise stated.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.7 DEVIATIONS FROM THE STANDARD

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

1.8 MODIFICATION RECORD

No modifications were made to the EUT during testing.



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
McMurdo Limited
SmartFind S5 AIS SART



Product Service

2.1 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 80, Clause 80.209(a)

2.1.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 970 00 000

2.1.3 Date of Test and Modification State

06 November 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 Test Procedure

The EUT was set to transmit an unmodulated carrier on channels AIS 1 and AIS 2 at maximum power. Using a frequency counter, the frequency error was measured and the result recorded.

2.1.6 Environmental Conditions

06 November 2009
Ambient Temperature 25°C
Relative Humidity 32%

2.1.7 Test Results

Test Conditions		Frequency Error (kHz)	
		AIS 1	AIS 2
		161.975 MHz	162.025 MHz
T _{nom} (22°C)	V _{nom} (6.0V)	-0.123	-0.037
	V _{min} (5.7 V)	-0.405	-0.263
	V _{max} (6.43V)	-0.174	-0.082
Maximum Frequency Error (Hz)		-405	-263
Measurement Uncertainty (Hz)		± 11	

Limit

± 1.61975kHz for AIS 1 and ± 1.62025 kHz for AIS 2 or 10ppm



Product Service

2.2 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 80, Clause 80.209(a)

2.2.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 970 00 000

2.2.3 Date of Test and Modification State

06 November 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 Test Procedure

The EUT was set to transmit an unmodulated carrier on channels AIS 1 and AIS 2 at maximum power. Using a frequency counter, the frequency error was measured and the result recorded. The temperature was adjusted between -20° and +55° in 10° steps.

2.2.6 Environmental Conditions

	06 November 2009
Ambient Temperature	25°C
Relative Humidity	33%



2.2.7 Test Results

Temperature Intervals	Frequency Error (kHz)	
	AIS 1	AIS 2
	161.975 MHz	162.025 MHz
-20	-0.017	+0.036
-10	-0.077	+0.046
0	-0.217	+0.012
+10	-0.097	-0.027
+20	-0.138	-0.050
+30	-0.153	-0.064
+40	-0.171	-0.125
+50	-0.147	-0.169
+55	-0.137	-0.205
Maximum Frequency Error (Hz)	-217	-205
Measurement Uncertainty (Hz)	± 11	

Limit:

$\pm 1.61975\text{kHz}$ for AIS 1 and $\pm 1.62025\text{ kHz}$ for AIS 2 or 10ppm



Product Service

2.3 EMISSION LIMITATIONS (EMISSION MASK)

2.3.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 and 2.1053
FCC CFR 47 Part 80, Clause 80.211(f)(1)(2)

2.3.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 970 00 000

2.3.3 Date of Test and Modification State

06 November 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 Test Procedure

The EUT transmitting on full power was then connected to a Spectrum Analyser via a 30dB of attenuation. The modulated carrier was checked for channels AIS 1 and AIS 2 against the emission mask.

The Path Loss was recorded and the worst case loss was entered as a Reference Level Offset.

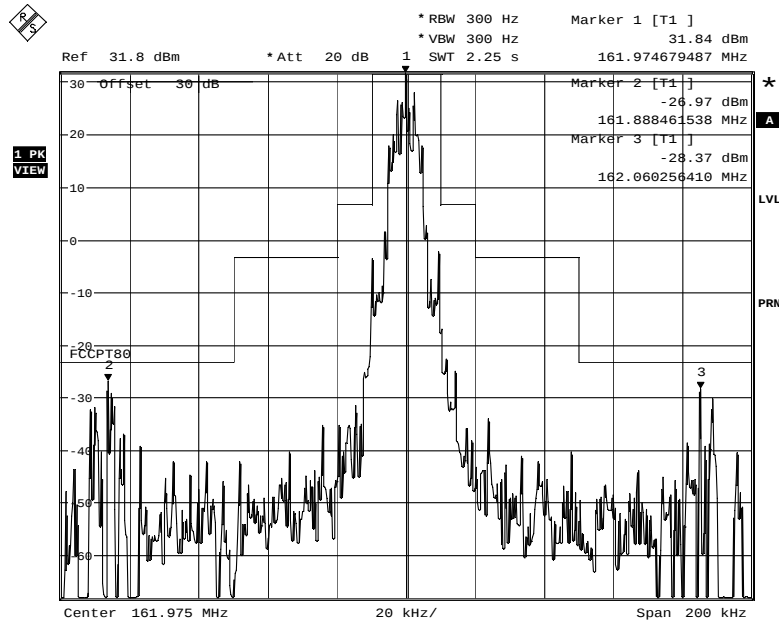
2.3.6 Environmental Conditions

	06 November 2009
Ambient Temperature	23°C
Relative Humidity	34%



2.3.7 Test Results

AIS 1 Frequency 161.975 MHz

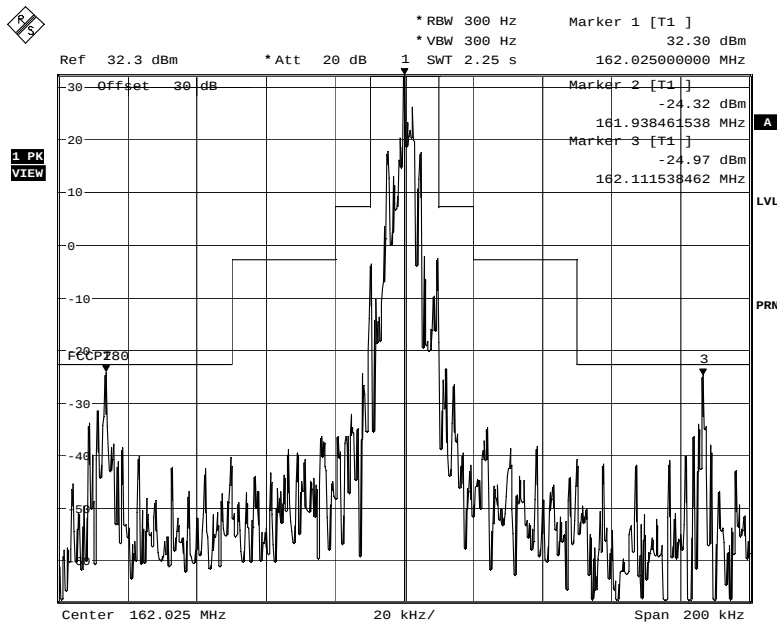


Date: 6.NOV.2009 14:59:55

Note: The emission mask applied was for 80.211 (f) (1) (2): this was a more stringent mask than the emission mask for 80.211 (d) (1) (2). 80.211 (f) (2): "On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorised bandwidth: At least 35 dB". 80.211 (d) (2): "On any frequency removed from the assigned frequency by more than 100 percent of the authorised bandwidth: At least 30 dB". By complying with 80.211 (f) (2), which is the worst case, this ensures compliance with 80.211 (d) (2).



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AIS 2 Frequency 162.025 MHz

Date: 6. NOV. 2009 15:06:20

Note: The emission mask applied was for 80.211 (f) (1) (2): this was a more stringent mask than the emission mask for 80.211 (d) (1) (2). 80.211 (f) (2): "On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorised bandwidth: At least 35 dB". 80.211 (d) (2): On any frequency removed from the assigned frequency by more than 100 percent of the authorised bandwidth: At least 30 dB". By complying with 80.211 (f) (2), which is the worst case, this ensures compliance with 80.211 (d) (2).

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	Limit dBm	Margin dB	Result
324.046	Vertical	124	240	-17.80	-13.00	-4.80	Pass
485.927	Vertical	125	60	-28.15	-13.00	-15.15	Pass
647.892	Vertical	200	300	-25.54	-13.00	-12.24	Pass
809.881	Vertical	151	300	-17.13	-13.00	-4.13	Pass
971.850	Vertical	200	330	-24.09	-13.00	-11.09	Pass
1457.769	Vertical	124	300	-25.59	-13.00	-12.59	Pass
1943.673	Horizontal	124	270	-26.03	-13.00	-13.03	Pass

Limit

On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB

On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB.



Product Service

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049
FCC CFR 47 Part 80, Clause 80.205(a)

2.4.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 970 00 000

2.4.3 Date of Test and Modification State

05 November 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 Test Procedure

The EUT has been tested with an emission designator of: 16K0GXW.

The Modulation Analyser was then replaced with a Spectrum Analyser and the 99% Bandwidth was measured. The measurements were performed on channels AIS 1 and AIS 2 on maximum power levels.

2.4.6 Environmental Conditions

	05 November 2009
Ambient Temperature	23°C
Relative Humidity	30%

2.4.7 Test Results

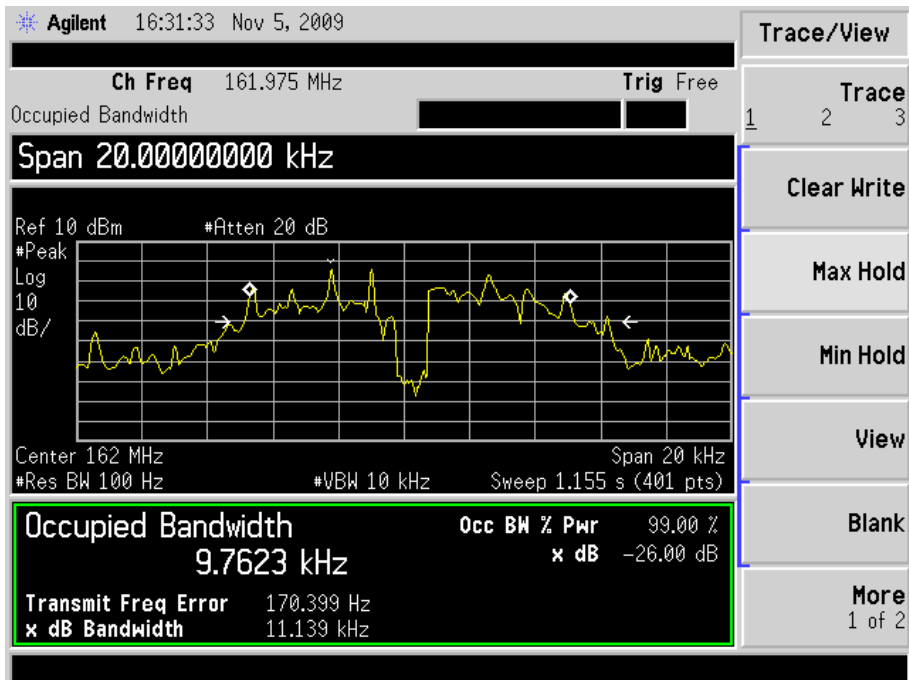
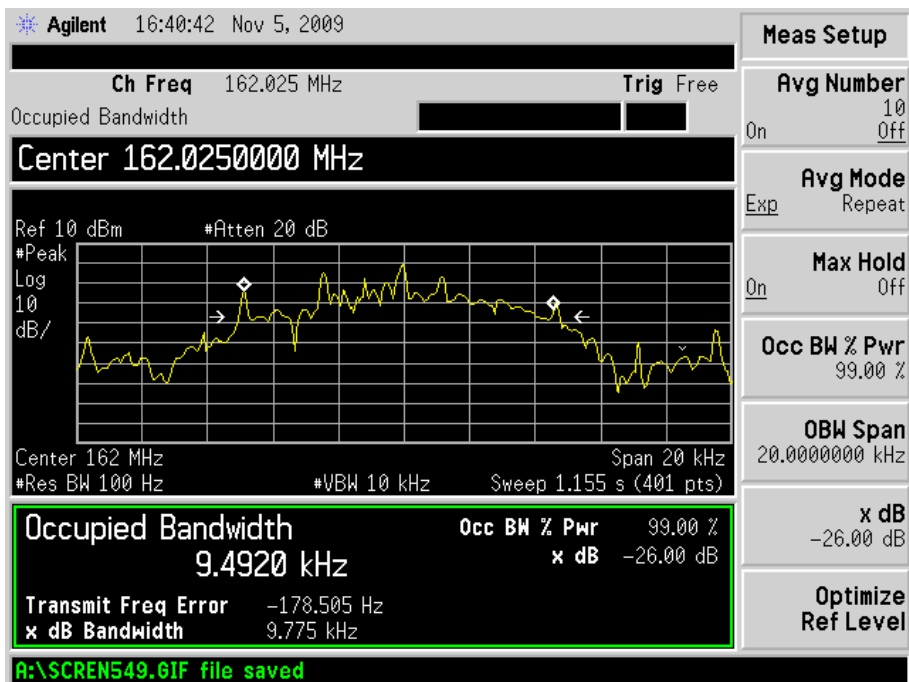
Channel Number/Frequency	Result (kHz)	Authorised Bandwidth (kHz)
AIS 1 / 161.975MHz	9.762	20
AIS 2 / 162.025MHz	9.462	20

Limit

The nominal authorised channel bandwidth is 20kHz



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AIS1: Frequency 161.975 MHzAIS 2: Frequency 162.025 MHz



Product Service

2.5 TRANSMITTER POWER – AIS TRANSMISSION

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 80, Clause 80.215(a)(5)

2.5.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 970 00 000

2.5.3 Date of Test and Modification State

05 November 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 Test Procedure

The EUT was connected via a 30dB attenuator to a Spectrum analyser. The path loss between the EUT and the Spectrum Analyser was measured on a Network Analyser and recorded. The measurement was noted and offset by the path loss value.

The Carrier Power was measured in a modulated state at maximum power on channels AIS 1 and AIS 2.

2.5.6 Environmental Conditions

	05 November 2009
Ambient Temperature	25°C
Relative Humidity	31%



2.5.7 Test Results

Conducted

Frequency (MHz)	Result (dBm) Unmodulated	Result (W) Modulated	Result (W) Unmodulated	Result (dBm) Modulated
AIS 1 / 161.975 MHz	-	2.173	-	+33.37
AIS 2 / 162.025 MHz	-	2.070	-	+33.16

Radiated

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	Limit dBm	Margin dB	Result
161.974	Vertical	275	150	+33.31	+34.78	-1.47	Pass
162.026	Vertical	275	150	+33.03	+34.78	-1.75	Pass

Limit

< 3.006 W or < 34.78 dBm



Product Service

2.6 MODULATION CHARACTERISTICS

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047
FCC CFR 47 Part 80, Clause 80.213

2.6.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 970 00 000

2.6.3 Date of Test and Modification State

05 November 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 Test Procedure

The EUT was connected to a spectrum analyser via a 30dB Attenuator Using the FM demodulation function various test signals were analysed and the peak deviation recorded. Testing was performed on the bottom channel at a declared power level.

2.6.6 Environmental Conditions

	05 November 2009
Ambient Temperature	25°C
Relative Humidity	31%

2.6.7 Test Results

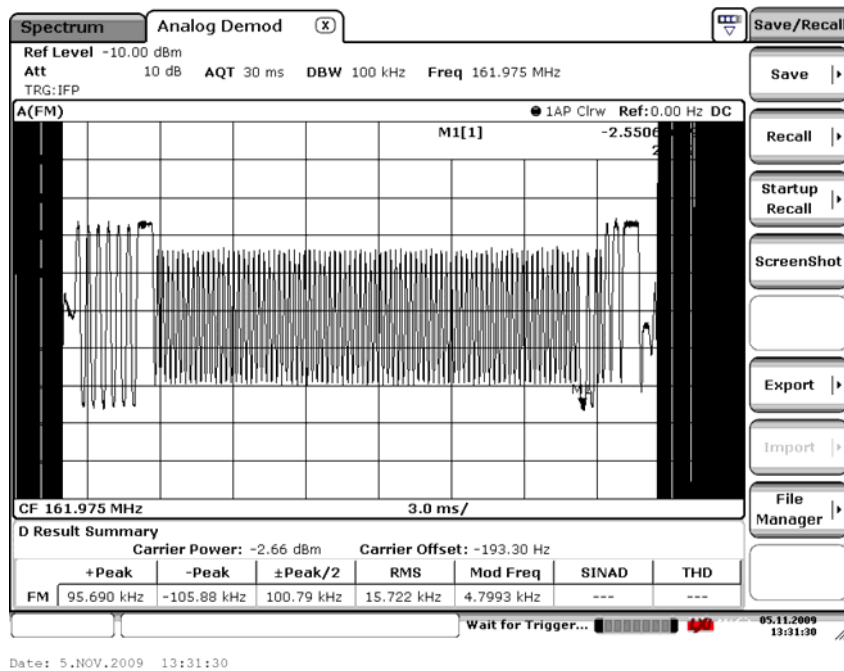
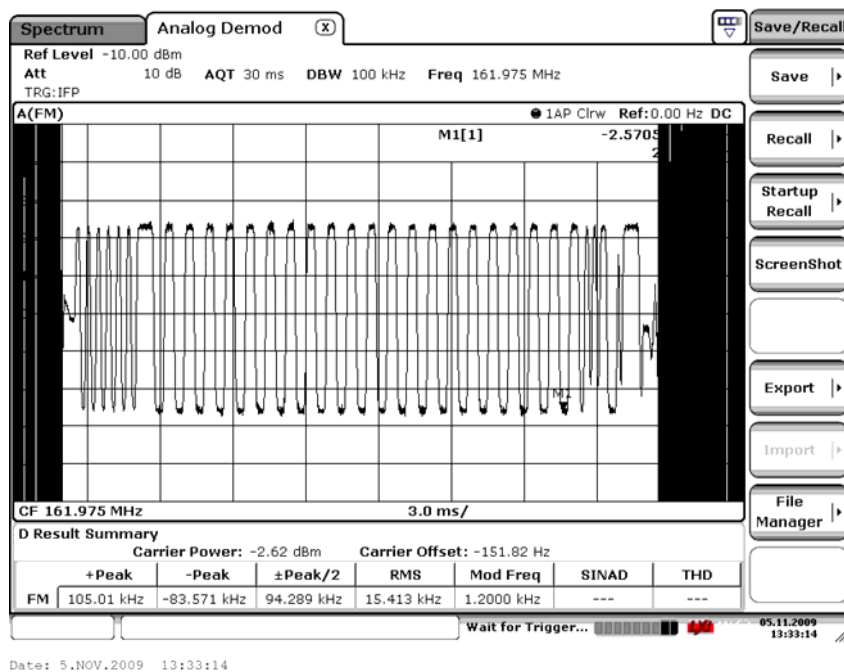
Test signal	Peak Frequency (kHz)
10101010	2.55
11110000	-2.57
Psuedo Random	-2.56

Limit

Ship and coast station transmitters operating in the 156–162 MHz and 216–220 bands must be capable of proper operation with a frequency deviation that does not exceed ± 5 kHz.

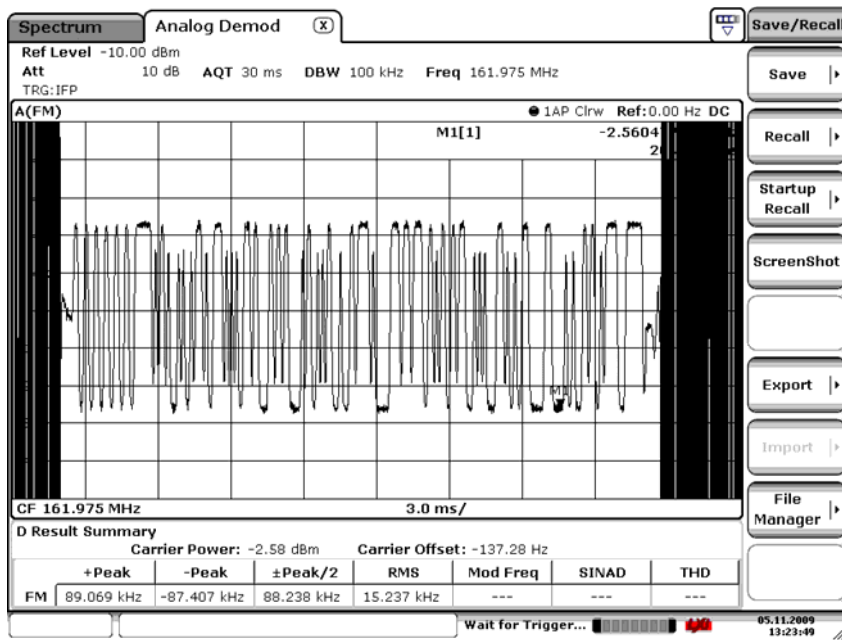


Product Service

1010101011110000



Product Service

Pseudo Random

Date: 5.NOV.2009 13:23:49



Product Service

2.7 RADIATED EMISSIONS**2.7.1 Specification Reference**

FCC CFR 47 Part 15B, Clause 15.109

2.7.2 Equipment Under Test

SmartFind S5 AIS SART, S/N: 75902713–TUV0007

2.7.3 Date of Test and Modification State

29 October 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 Test Procedure

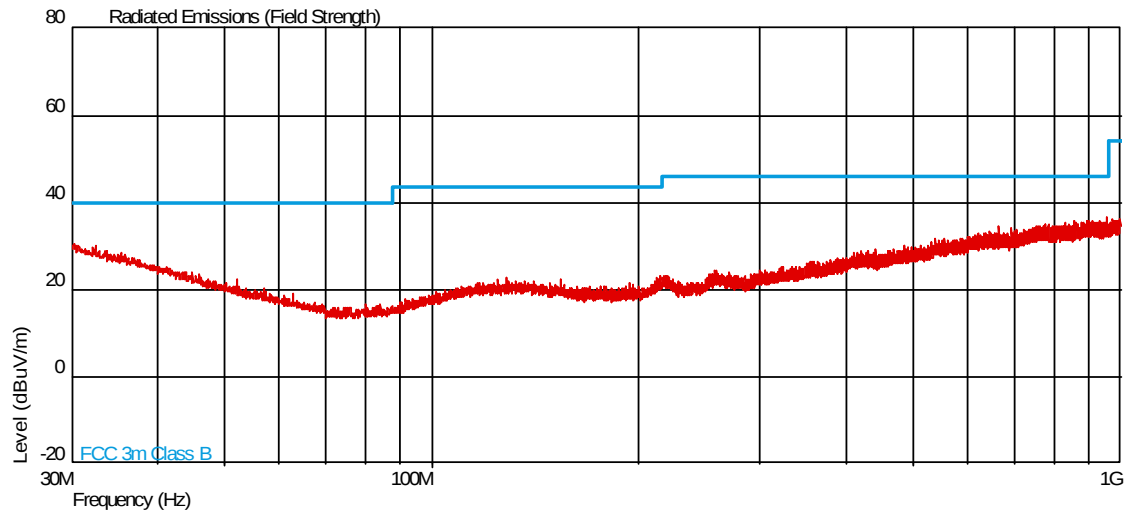
The test was applied in accordance with the test method requirements of ANSI C63.4.

2.7.6 Environmental Conditions

	29 October 2009
Ambient Temperature	22°C
Relative Humidity	32%
Atmospheric Pressure	1018mbar

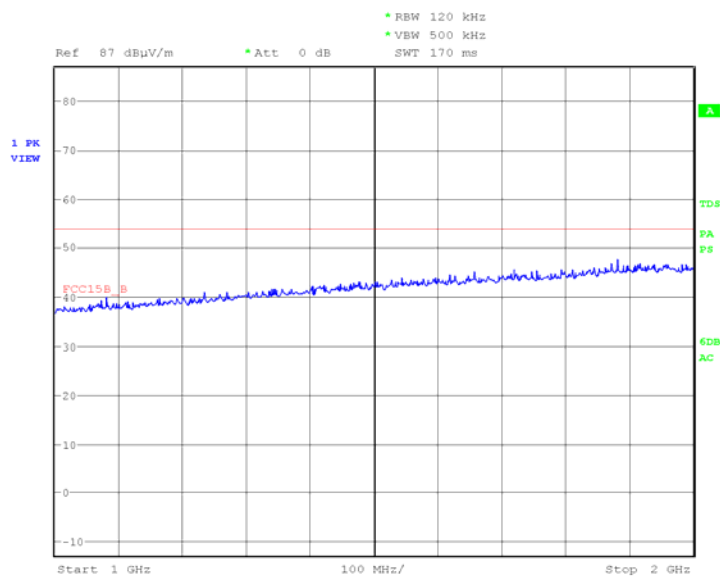


2.7.7 Test Results



No emissions were detected within 10dB of the limit.

1GHz to 2GHz



Date: 29.OCT.2009 15:02:27



Product Service

SECTION 3

TEST EQUIPMENT USED



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 and 2.2 Radio (Tx) - Frequency Characteristics					
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Attenuator 20dB/2W	Weinschel	Model 2	379	12	25-Nov-2009
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Digital Temperature Indicator	Fluke	51	2267	12	23-Jun-2010
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	23-Apr-2010
Section 2.3 Radio (Tx) - Emission Mask					
Attenuator 20dB/2W	Weinschel	Model 2	379	12	25-Nov-2009
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	28-Nov-2009
Section 2.4 Radio (Tx) - Occupied Bandwidth					
Attenuator 20dB/2W	Weinschel	Model 2	379	12	25-Nov-2009
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	23-Apr-2010
Signal Generator, 9kHz to 3GHz	Rohde & Schwarz	SMA 100A	3494	12	22-Dec-2009
Section 2.5 Radio (Tx) - Modulation Characteristics					
Signal Generator	Rohde & Schwarz	SMX	115	12	24-Jun-2010
Attenuator 20dB/2W	Weinschel	Model 2	379	12	25-Nov-2009
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
Spectrum Analyser	Rohde & Schwarz	FSQ	3545	12	4-May-2010
Section 2.6 Radio (Tx) - Power Characteristics					
Counter	Hewlett Packard	53181A	159	12	26-May-2010
Attenuator 20dB/2W	Weinschel	Model 2	379	12	25-Nov-2009
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Attenuator (10dB, 10W)	Texscan	HFP-50N	468	12	24-Jun-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Digital Temperature Indicator	Fluke	51	2267	12	23-Jun-2010
Hygrometer	Rotronic	I-1000	3220	12	17-Apr-2010
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	23-Apr-2010
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	28-Nov-2009
Signal Generator, 9kHz to 3GHz	Rohde & Schwarz	SMA 100A	3494	12	22-Dec-2009



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.7 EMC - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	12-Oct-2010
Antenna (Bilog)	Schaffner	CBL6143	287	24	21-Jan-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	1610	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	1-Sep-2010

TU – Traceability Unscheduled

OP Mon – Output monitored using calibrated equipment



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 10⁶.

* In accordance with CISPR 16-4

† In accordance with UKAS Lab 34



Product Service

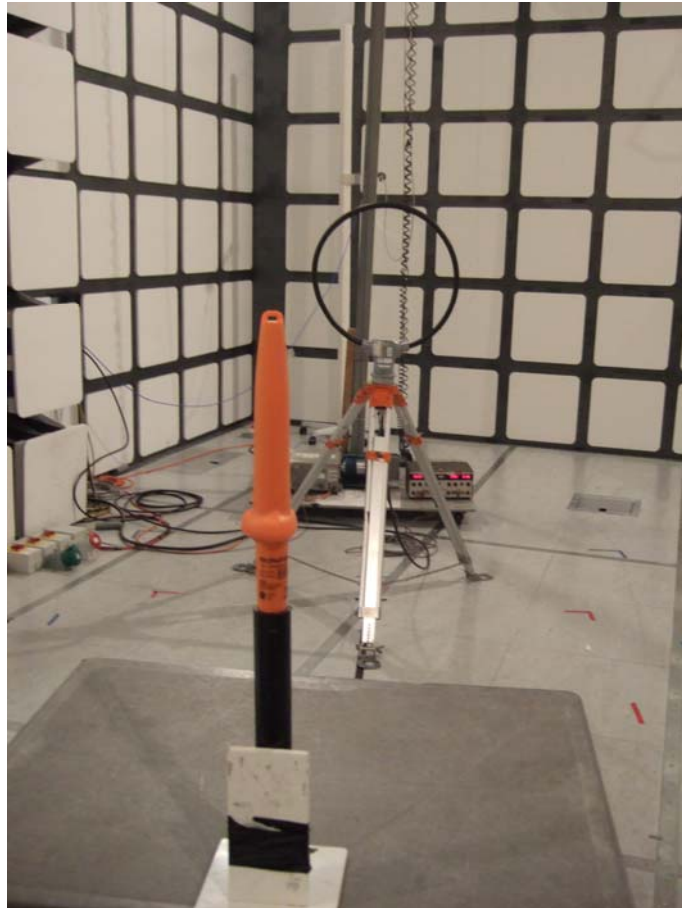
SECTION 4

PHOTOGRAPHS



Product Service

4.1 TEST SET UP PHOTOGRAPHS



Radiated Emissions (Enclosure Port)



Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

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
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