Product Service

Choose certainty.
Add value.

Report On

EMC Testing of the
McMurdo Limited
SmartFind S5 AIS-SART

COMMERCIAL-IN-CONFIDENCE

Document 75907213 Report 01 Issue 1 January 2010

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

REPORT ON

EMC Testing of the
McMurdo Limited
SmartFind S5 AIS-SART

Document 75907213 Report 01 Issue 1

January 2010

PREPARED FOR

McMurdo Limited
Silver Point
Airport Service Road
Hilsea
Portsmouth
PO3 5PB

PREPARED BY

G Lawler
EMC Engineer

APPROVED BY

C Gould
Authorised Signatory

DATED 21 January 2010

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

EMC 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 IEC 60945.

Objective	To perform Electromagnetic Compatibility (EMC) Qualification Approval 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)	SmartFind S5
Serial Number(s)	Not Serialised
Software Version	1.1.60
Hardware Version	Issue 1
Number of Samples Tested	2
Test Specification/Issue/Date	IEC 60945: 2002
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PC0003713 22 July 2009
Start of Test	26 October 2009
Finish of Test	02 November 2009
Name of Engineer(s)	S C Hartley G Lawler A Guy A R Hubbard
Related Document(s)	CISPR 16-1: 1999 IEC 61000-4-3: 1995 IEC 61000-4-2: 1995

Product Service

1.2 BRIEF SUMMARY OF RESULTS

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

Configuration 1 - As supplied						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
	Table 5, 9.2	Conducted Emissions (DC Power Port)	TX		N/A	CISPR 16-1
			RX		N/A	
	Table 5, 9.2	Conducted Emissions (AC Power Port)	TX		N/A	CISPR 16-1
			RX		N/A	
2.1	Table 5, 9.3	Magnetic Emissions (Enclosure Port)	TX		N/A	CISPR 16-1
			RX	0	Pass	
2.2	Table 5, 9.3	Radiated Emissions (Enclosure Port)	TX		N/A	CISPR 16-1
			RX	0	Pass	
	Table 6, 10.3	Immunity to Radio Frequency Common Mode (AC Power Port)	TX		N/A	IEC 61000-4-6
			RX		N/A	
	Table 6, 10.3	Immunity to Radio Frequency Common Mode (DC Power Port)	TX		N/A	IEC 61000-4-6
			RX		N/A	
	Table 6, 10.3	Immunity to Radio Frequency Common Mode (Signal, Control and Telecommunications Port)	TX		N/A	IEC 61000-4-6
			RX		N/A	
2.3	Table 6, 10.4 Table 6, 10.4	Immunity to Radio Frequency Electromagnetic Field (Enclosure Port)	TX	0	Pass	IEC 61000-4-3
			RX	0	Pass	
	Table 6, 10.5	Immunity to Fast Transient Bursts Common Mode (AC Power Port)	TX		N/A	IEC 61000-4-4
			RX		N/A	
	Table 6, 10.5	Immunity to Fast Transient Bursts Common Mode (Signal, Control and Telecommunications Port)	TX		N/A	IEC 61000-4-4
			RX		N/A	
	Table 6, 10.6	Immunity to Surges (AC Power Port)	TX		N/A	IEC 61000-4-5
			RX		N/A	
	Table 6, 10.7	Immunity to Power Supply Short Term Variation (AC Power Ports)	TX		N/A	IEC 61000-4-11
			RX		N/A	
	Table 6, 10.8	Immunity to Interruptions (AC Power Port)	TX		N/A	IEC 61000-4-11
			RX		N/A	
	Table 6, 10.8	Immunity to Interruptions (DC Power Port)	TX		N/A	IEC 61000-4-11
			RX		N/A	
2.4	Table 6, 10.9	Immunity to Electrostatic Discharge (Enclosure Port)	TX	0	Pass	IEC 61000-4-2
			RX	0	Pass	

N/A – Not Applicable

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	OEM
MANUFACTURER	McMurdo
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)	32dBm 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 microbattery or Panasonic
TYPE	Lithium Manganese Dioxide
PART NUMBER	CR2/3AH (Varta) or CR123A (Panasonic)
VOLTAGE	6v nominal
COUNTRY OF ORIGIN	Germany (Varta micro battery) or USA (Panasonic)

Signature Sent by email

Date 19/11/2009

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 PRODUCT INFORMATION

1.4.1 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

1.4.2 Test Configuration

Configuration 1: As supplied

The EUT was configured in accordance with IEC 60945.

1.4.3 EUT Cable / Port Identification

The EUT was tested stand alone. There were no interconnecting cables.

1.4.4 Modes of Operation

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

Mode 1 - TX

Mode 2 – RX / Idle

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

1.4.5 Monitoring of Performance

IEC 60945 2002-08

Transmit Mode

Monitored the Red LED (when Active) using CCTV, where necessary, monitored the Transmitted carrier via Spectrum Analyser (in time domain mode), whilst also monitoring the decoded GNSS data on the HyperTerminal program, and ensuring that all Message 1 & 14 data was continuous and correct.

This method was used as per IEC61097-14 clause 5.2.1 whilst also ensuring that 8 x sets of bursts occur every 2 sec with approx 46sec time in between.

The data displayed on HyperTerminal is as follows:-

2 x short messages = Message 14 (Message 14 data comes through once every four sets of bursts) all longer messages are = Message 1.

Examples are below
AIVDM,1,1,,B,1>M46PfP0105j9JM6j7tt?vd0L00,0*69
AIVDM,1,1,,A,>>M46Pe<59B04=@UHD0,2*3C
AIVDM,1,1,,B,>>M46Pe<59B04=@UHD0,2*3F
AIVDM,1,1,,A,1>M46PfP0105j9JM6j7tt?vd0L00,0*6A

Idle Mode

The EUT was de-activated, and a Spectrum Analyser was utilised, to ensure that no un-intentional Transmissions occurred.

Product Service

1.4.6 Performance Criteria

IEC 60945

Transmit Mode

The EUT shall continue to operate as intended prior to, during and after the test.
No degradation in performance or received data is allowed. The EUT is to remain continuously Transmitting.

Idle Mode

The EUT shall continue to operate as intended prior to, during and after the test.
No un-intentional Transmissions shall occur.

Product Service

1.5 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 its own internal battery.

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.

1.6 DEVIATIONS FROM THE STANDARD

Section 2.2, Immunity to Radio Frequency Electromagnetic Field (Enclosure port)
All six faces of the EUT have not been subjected to the applied RF Field for the following reasons;

1. The EUT was physically small (Vertically long, narrow and cylindrical in shape) so any deviation in applied field strength across the EUTs enclosure was considered negligible.

2. The EUT is deemed to always be used in a Vertical orientation, as per instructions on the side of the EUT and also contained within the operating Manual, therefore testing of the EUT was performed in 120° steps, encompassing the Front of the EUT, the Rear Right Side of the EUT and the Rear Left Side of the EUT.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Product Service

SECTION 2

TEST DETAILS

EMC Testing of the McMurdo Limited
SmartFind S5 AIS-SART

2.1 MAGNETIC EMISSIONS (ENCLOSURE PORT)

2.1.1 Specification Reference

IEC 60945. Table 5, 9.3

2.1.2 Equipment Under Test

SmartFind S5 AIS-SART, S/N: Not Serialised

2.1.3 Date of Test and Modification State

02 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 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

2.1.6 Environmental Conditions

	02 November 2009
Ambient Temperature	21.8°C
Relative Humidity	28%
Atmospheric Pressure	997mbar

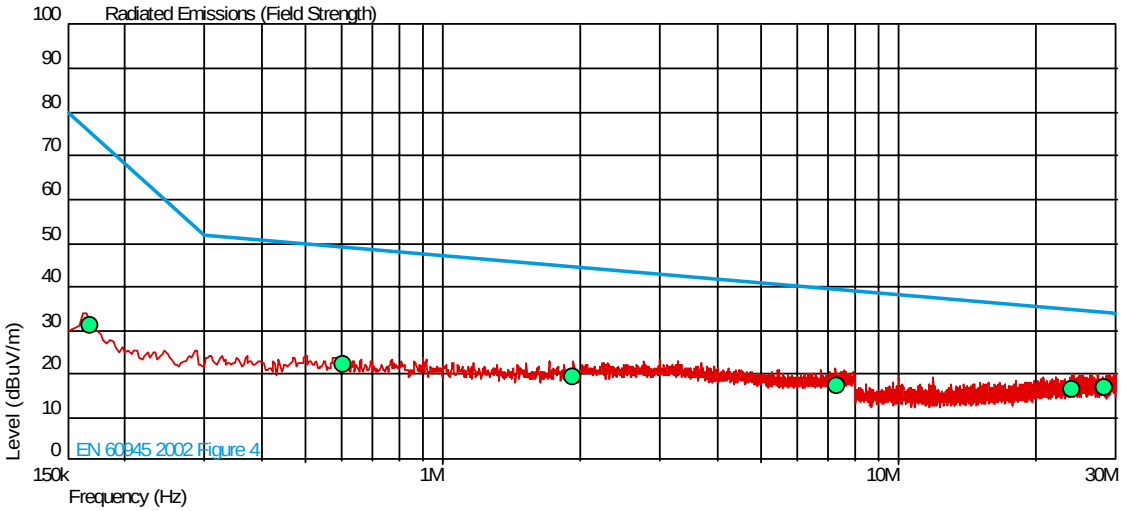
Product Service

2.1.7 Test Results

For the period of test the EUT met the requirements of IEC 60945 for Magnetic 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
0.168	31.0	75.3	-44.3	139	1.00	Vertical
0.604	22.2	49.3	-27.0	121	1.00	Vertical
1.932	19.5	44.7	-25.2	7	1.00	Vertical
7.297	17.1	39.5	-22.4	302	1.00	Horizontal
23.886	16.5	34.9	-18.4	245	1.00	Vertical
28.328	16.7	34.2	-17.5	269	1.00	Vertical

2.2 RADIATED EMISSIONS (ENCLOSURE PORT)

2.2.1 Specification Reference

IEC 60945. Table 5, 9.3

2.2.2 Equipment Under Test

SmartFind S5 AIS-SART, S/N: Not Serialised

2.2.3 Date of Test and Modification State

26 October to 02 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 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

2.2.6 Environmental Conditions

	26 October 2009	02 November 2009
Ambient Temperature	22°C	21.8°C
Relative Humidity	35%	28%
Atmospheric Pressure	1013mbar	997mbar

Product Service

2.2.7 Test Results

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

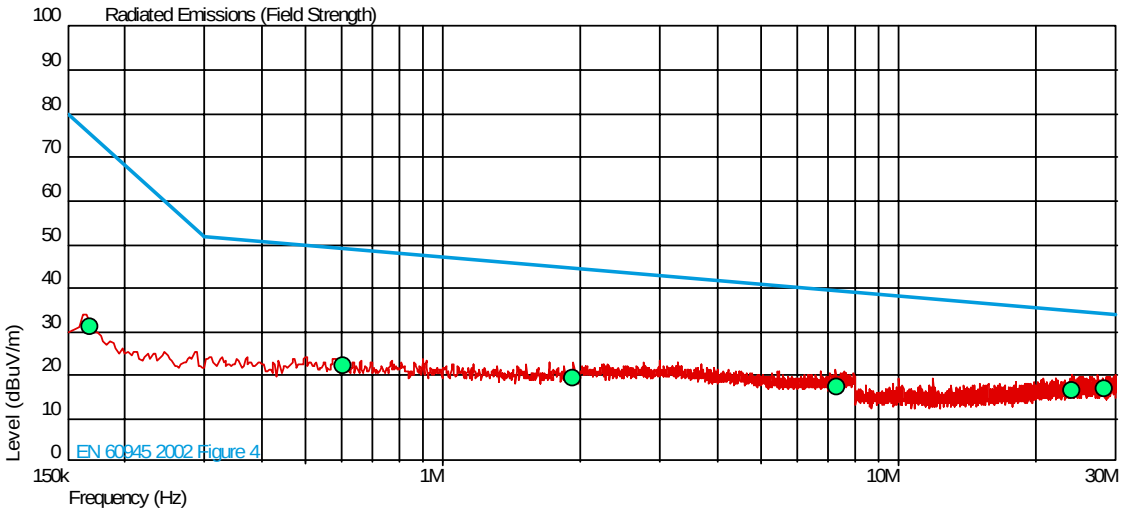
The test results are shown below.

Configuration 1 - Mode 1

No Transmit Mode Test is applicable when testing to of IEC 60945, therefore No table of results is presented.

Configuration 1 - Mode 2

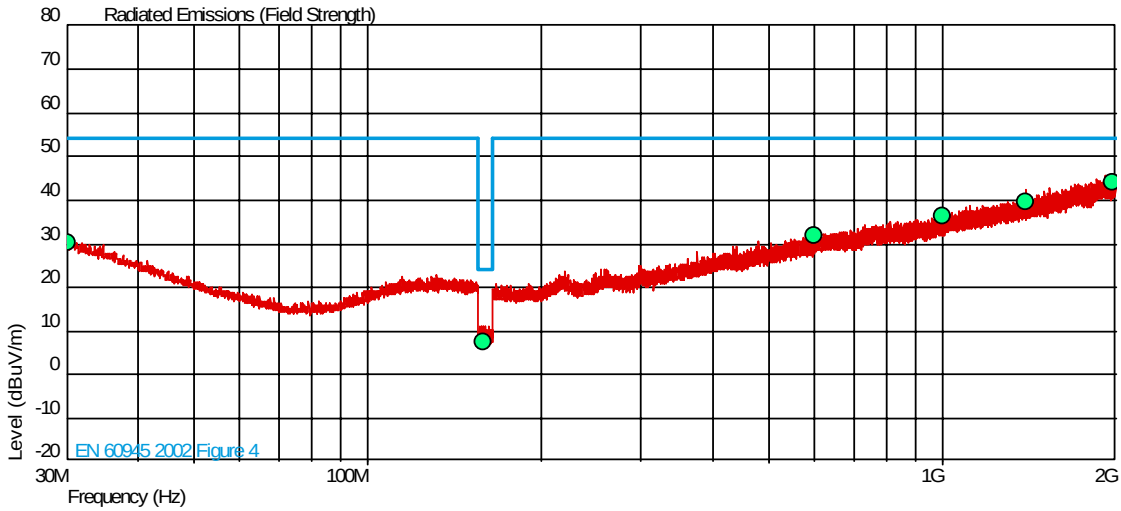
150kHz to 30MHz



Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
0.168	31.0	75.3	-44.3	139	1.00	Vertical
0.604	22.2	49.3	-27.0	121	1.00	Vertical
1.932	19.5	44.7	-25.2	7	1.00	Vertical
7.297	17.1	39.5	-22.4	302	1.00	Horizontal
23.886	16.5	34.9	-18.4	245	1.00	Vertical
28.328	16.7	34.2	-17.5	269	1.00	Vertical

No EUT emissions were detected above the measurement system noise floor, the table above contains details of the Noise Floor Measurements.

30MHz to 2GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.040	30.1	54.0	-23.9	0	1.00	Horizontal
159.730	7.6	24.0	-16.4	0	1.00	Vertical
600.350	31.9	54.0	-22.1	0	1.00	Horizontal
1000.500	36.5	54.0	-17.5	180	1.00	Vertical
1399.552	39.7	54.0	-14.3	180	1.00	Horizontal
1971.568	44.2	54.0	-9.8	180	1.00	Vertical

No EUT emissions were detected above the measurement system noise floor, the table above contains details of the Noise Floor Measurements.

Product Service

2.3 IMMUNITY TO RADIO FREQUENCY ELECTROMAGNETIC FIELD (ENCLOSURE PORT)

2.3.1 Specification Reference

IEC 60945. Table 6, 10.4

2.3.2 Equipment Under Test

SmartFind S5 AIS-SART, S/N: Not Serialised

2.3.3 Date of Test and Modification State

27 to 28 October 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 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:

Deviation from the Standard

All six faces of the EUT have not been subjected to the applied RF Field for the following reasons;

1. The EUT was physically small (Vertically long & narrow in shape and cylindrical) so any deviation in applied field strength across the EUTs enclosure was considered negligible.

2. The EUT is deemed to always be used in a Vertical orientation, as per instructions on the side of the EUT and also contained within the operating Manual, therefore testing of the EUT was performed in 120° steps, encompassing the Front of the EUT, the Rear Right Side of the EUT and the Rear Left Side of the EUT.

Configuration 1 - Mode 1
- Mode 2

2.3.6 Environmental Conditions

	27 October 2009	28 October 2009
Ambient Temperature	20°C	23.0°C
Relative Humidity	45%	37%
Atmospheric Pressure	1015mbar	1012mbar

Product Service

2.3.7 Test Results

For the period of test the EUT continued to operate as intended and therefore met the requirements of 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: 80 to 1000MHz 9 Seconds: 1GHz to 2GHz					
Frequency Range (MHz)		80 – 1000		80 – 1000		80 – 1000	
Field Strength (V/m)		10 + MU		10 + MU		10 + MU	
Frequency Range (GHz)		1.0 – 2.0		1.0 – 2.0		1.0 – 2.0	
Field Strength (V/m)		10 + MU		10 + MU		10 + MU	
Orientation of EUT		Front		Right Rear		Left Rear	
Antenna Polarisation (V – Vertical, H – Horizontal)		V	H	V	H	V	H
Result		Pass	Pass	Pass	Pass	Pass	Pass

Configuration 1 - Mode 2

Amplitude Modulation	Frequency	400Hz					
	Depth	80%					
Stepped Frequency Increments		1% with respect to last momentary frequency					
Dwell Time		3 Seconds: 80 to 1000MHz 9 Seconds: 1GHz to 2GHz					
Frequency Range (MHz)		80 – 1000		80 – 1000		80 – 1000	
Field Strength (V/m)		10 + MU		10 + MU		10 + MU	
Frequency Range (GHz)		1.0 – 2.0		1.0 – 2.0		1.0 – 2.0	
Field Strength (V/m)		10 + MU		10 + MU		10 + MU	
Orientation of EUT		Front		Right Rear		Left Rear	
Antenna Polarisation (V – Vertical, H – Horizontal)		V	H	V	H	V	H
Result		Pass	Pass	Pass	Pass	Pass	Pass

2.4 IMMUNITY TO ELECTROSTATIC DISCHARGE (ENCLOSURE PORT)

2.4.1 Specification Reference

IEC 60945. Table 6, 10.9

2.4.2 Equipment Under Test

SmartFind S5 AIS-SART, S/N: Not Serialised

2.4.3 Date of Test and Modification State

28 October 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 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

2.4.6 Environmental Conditions

	28 October 2009
Ambient Temperature	24°C
Relative Humidity	50%
Atmospheric Pressure	1010mbar

Product Service

2.4.7 Test Results

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

The applied test levels are shown below.

Configuration 1 - Mode 1

		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
A	Test Button	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
B	Active LED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
C	On Button	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
D	All other Areas of Front Fascia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
E	All Areas of Enclosure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
F	Lanyard Loop	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
G	3 x Underside Screws	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
H	All Areas of Mounting Pole	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A

Configuration 1 - Mode 2

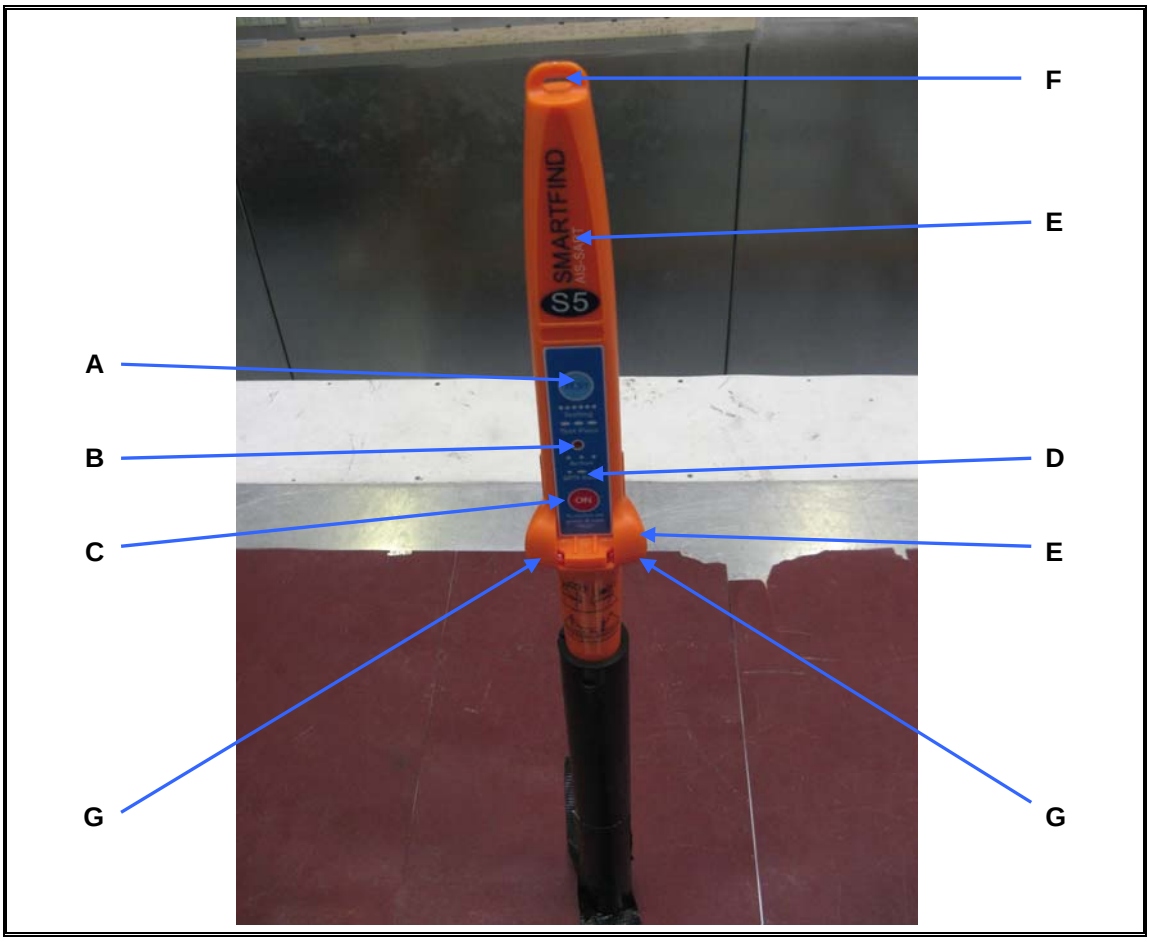
		Contact Discharges								Air Discharge							
		2		4		6		8		2		4		8		15	
Test Points		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Horizontal Coupling Plane		✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vertical Coupling Plane		✓	✓	✓	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	Test Button	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
B	Active LED	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
C	On Button	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
D	All other Areas of Front Fascia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
E	All Areas of Enclosure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
F	Lanyard Loop	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A
G	3 x Underside Screws	✓*	✓*	✓*	✓*	✓*	✓*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
H	All Areas of Mounting Pole	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.

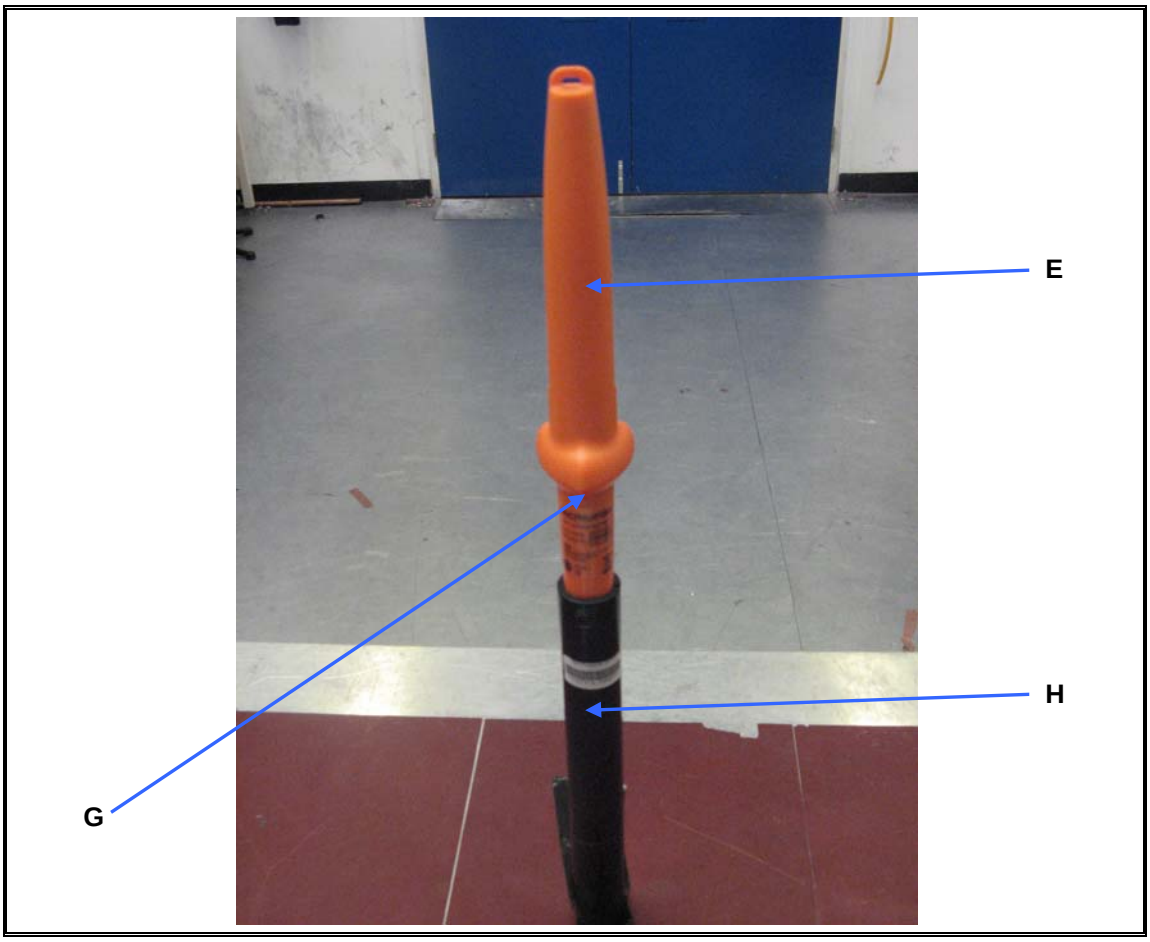
Product Service

ESD TEST POINTS – CONFIGURATION 1



Product Service

ESD TEST POINTS – CONFIGURATION 1



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 2.4 EMC - Electrostatic Discharges					
Spectrum Analyser	Hewlett Packard	8562A	14	12	15-Jul-2010
ESD Simulator	Schaffner	NSG 435+SL 171-504	552	12	20-Apr-2010
Multimeter	Iso-tech	IDM101	2423	12	11-Sep-2010
Section 2.1 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	1-Sep-2010
Section 2.1 EMC - Radiated Emissions					
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
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	1-Sep-2010
Section 2.2 EMC - Radiated Immunity					
Spectrum Analyser	Hewlett Packard	8562A	14	12	15-Jul-2010
Directional Coupler	Amp Research	DC6180	283	-	TU
Colour TV Monitor	Panasonic	WV-CP220-B	320	-	TU
Antenna	Schaffner	CBL6143	322	-	TU
Attenuator 20dB 5W	Marconi	56534-904H	377	12	29-Apr-2010
Termination (50 ohm)	Meca	405-1	548	12	11-Aug-2010
Power Meter	Rohde & Schwarz	NRVD	748	-	TU
Screened Room (2)	Rainford	Rainford	1542	-	TU
CW TWT (1-2.5GHz)	Thorn	PTC6341	2069	-	TU
Amplifier (250W, 80MHz - 1GHz)	Amp Research	250W1000A	3029	24	24-Oct-2010
Thermal Power Sensor, 0 - 18GHz, 1uW to 100mW	Rohde & Schwarz	NRV-Z51	3498	-	TU
Signal Generator, 9kHz to 6GHz	Rohde & Schwarz	SMB 100A	3500	12	1-Jun-2010

TU – Traceability Unscheduled

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

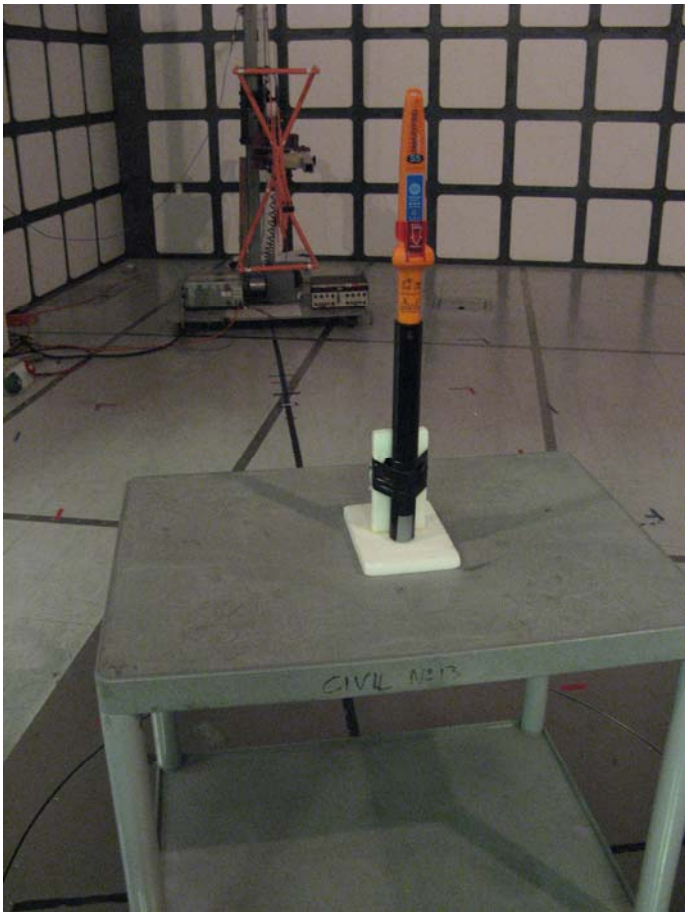
PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

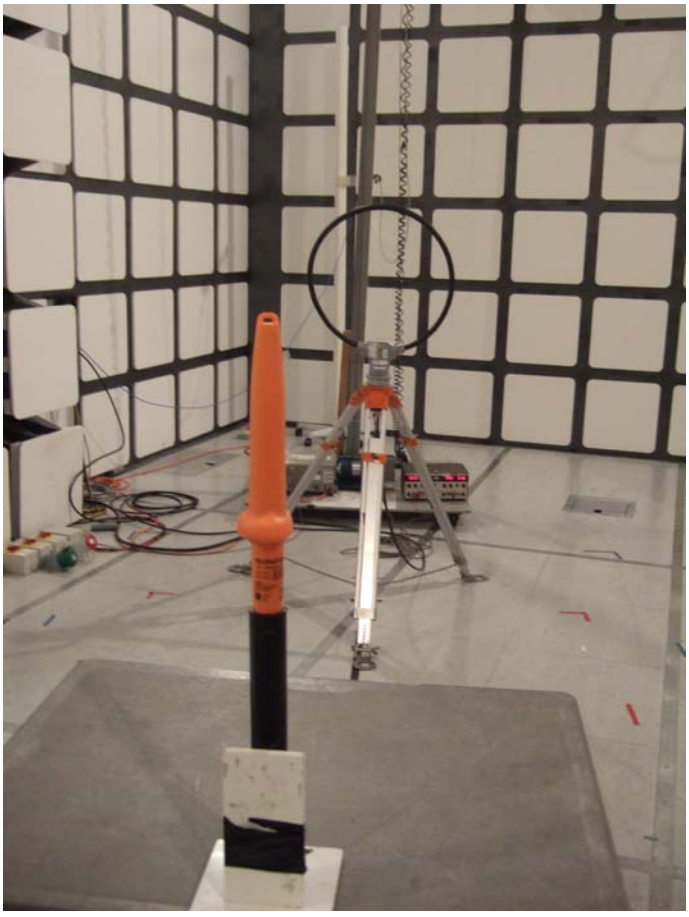
SmartFind S5 AIS-SART

SmartFind S5 AIS-SART with mounting pole

4.2 TEST SET UP PHOTOGRAPHS



Radiated Emissions (Enclosure Port)



Magnetic Emissions (Enclosure Port

Immunity to Radio Frequency Electromagnetic Field (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).