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Report On

Limited Environmental Testing of the
SRT Marine System Solutions
Coast Station (AtoN) CS100
In accordance with IEC 60945

Document 75928171 Report 07 Issue 1 November 2014

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REPORT ON

Limited Environmental Testing of the
SRT Marine System Solutions
Coast Station (AtoN) CS100

Document 75928171 Report 07 Issue 1

November 2014

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DATED

28 November 2014

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CONTENTS

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SECTION 1

REPORT SUMMARY

Limited Environmental Testing of the
SRT Marine System Solutions
Coast Station (AtoN) CS100

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the SRT Marine System Solutions Coast Station (AtoN) CS100 to limited requirements of IEC 60945.

Objective	To perform environmental testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	SRT Marine Technology Ltd Wireless House Westfield Industrial Estate Midsomer Norton BATH BA3 3BS
Model Number(s)	CS100
IEC 60945 Equipment Class	Protected
Serial Number(s)	4
Number of Samples Tested	1
Test Specification/Issue/Date	IEC 60945: 2002
Date of Receipt of Test Samples	14 October 2014
Order Number Date	POR004904 07 October 2014
Start of Test	23 October 2014
Finish of Test	26 November 2014
Name of Engineer(s)	R Hampton S Mooney N Williams
Related Document(s)	IEC 62320-2: 2008

1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec. Clause	Test Description	Result	Comments
2.1	8.2	Dry Heat Test – Functional	Satisfactory	-
2.2	8.3	Damp Heat Test	Satisfactory	-
2.3	8.4.2.4	Low Temperature Test - Functional	Satisfactory	-
2.4	8.7	Vibration	Satisfactory	One observation noted. See section 2.4 for further details.

Satisfactory – No damage or detrimental effects were observed and performance assessments were reported as satisfactory.

1.3 DECLARATION OF BUILD STATUS

Manufacturer	SRT Marine System Solutions
Country of origin	UK
Technical Description	Coast Station
Model No	CS100
Part No	423-0002 (423-0001 Packaged product)
Serial No	Sample 1:4230002033940002 Sample 2:4230002033940012 Sample 3:4230002033940013 Sample 4:4230002033940008
Drawing Number	423-0002 (423-0001 Packaged product)
Build Status	Pre-Production
Software Issue	Application Software: 080201.01.00.01 Bootloader Software: 080100.01.04.02
Hardware Issue	Rev 3
FCC ID	UYW-4230002
IC ID	7075A-4230002
Highest Operating Frequency	162.5 MHz
Signature	
Date	08.10.14
D of B S Serial No	001

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.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a SRT Marine System Solutions Coast Station (AtoN) CS100 as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

1.5 DEVIATIONS FROM THE STANDARD

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

1.6 PERFORMANCE MONITORING

For each test the EUT was monitored with an AIS Class A, (not exposed to test conditions), both the EUT and the Class A were connected to laptops that logged the received data transmissions (using “Tera Term” software). These log files were assessed by the customer to confirm the validity of the data transmissions sent and received by the EUT.

1.7 MODIFICATIONS

No modifications were made to the samples under test during the test campaign.

1.8 REPORT MODIFICATION RECORD

Issue 1 – First Issue.

SECTION 2

TEST DETAILS

Limited Environmental Testing of the
SRT Marine System Solutions
Coast Station (AtoN) CS100

2.1 DRY HEAT TEST – FUNCTIONAL

2.1.1 Specification Reference

IEC 60945, Clause 8.2.2

2.1.2 Equipment Under Test and Modification State

SRT Marine System Solutions Coast Station CS100, S/N: 4 – Modification State 0

2.1.3 Date of Test

23 October 2014 – 24 October 2014
25 November 2014 – 26 November 2014

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

Functional Test

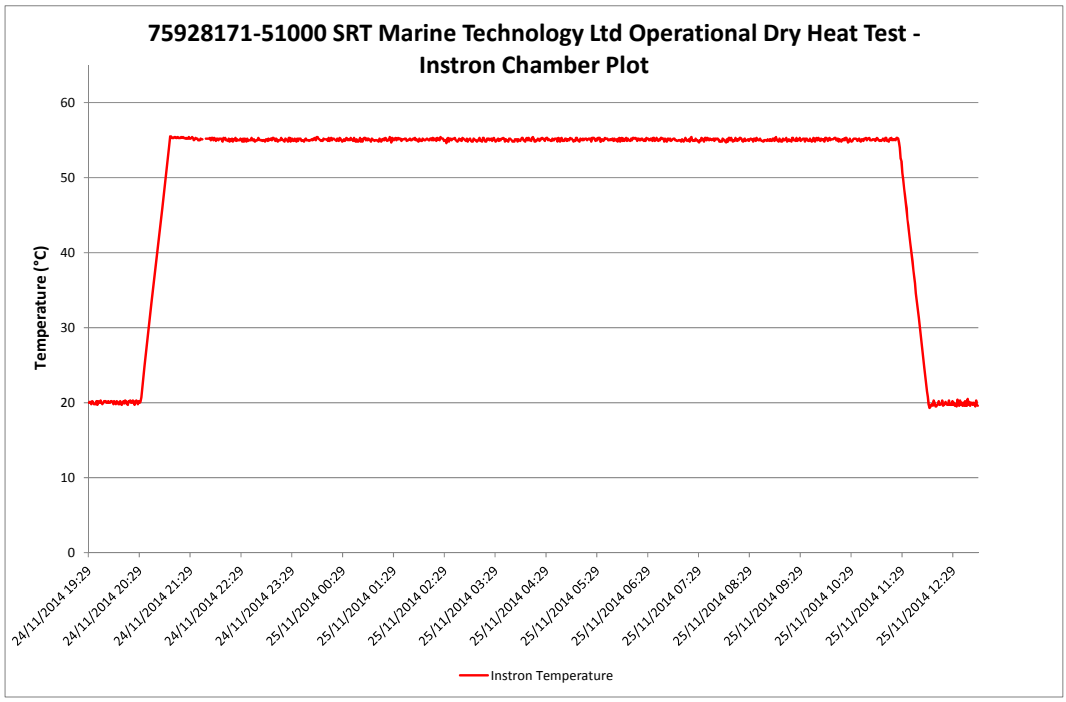
The EUT was placed in a climatic chamber at laboratory ambient conditions. With the EUT powered on, the chamber was raised to and maintained at +55°C for a period of 16.5 hours. The performance check was carried out during this period. On completion of the performance check the chamber was reduced to laboratory ambient conditions.

Test Setup Photo

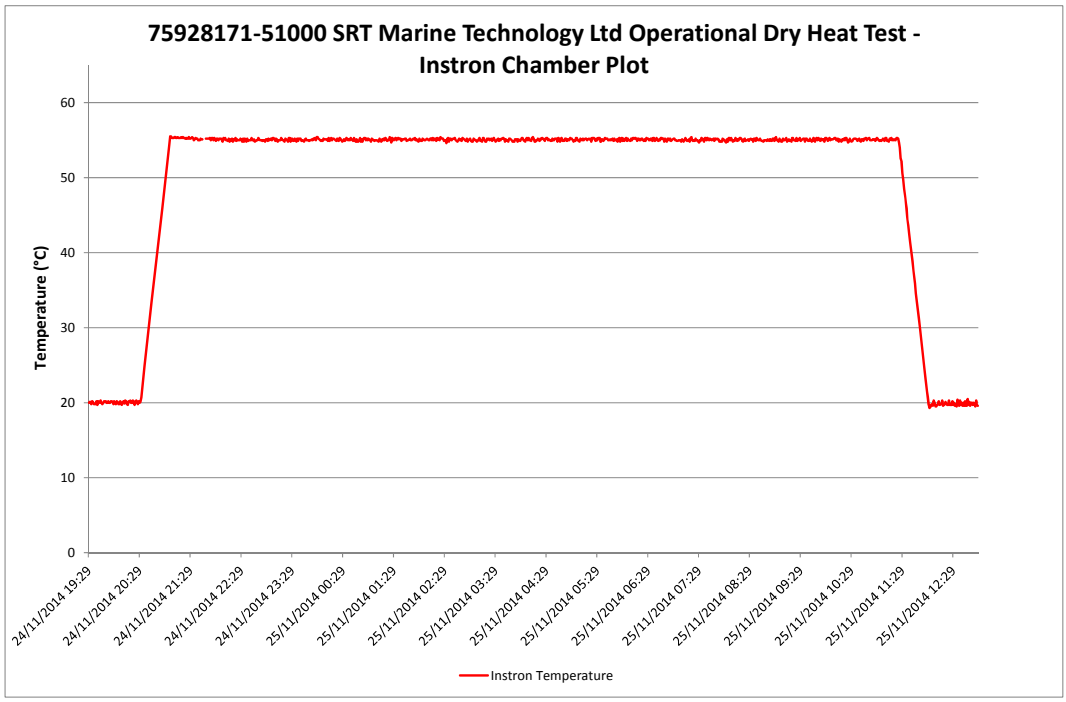
2.1.6 Test Results

The test was carried out satisfactorily.

Dry Heat Functional Chamber Plot



Dry Heat Functional Chamber Plot – Voltage and Freqneucy Variations



Performance Check

The transmitted and received messages between the EUT and Class A device were recorded via Tera Term. These log files were analysed by the Manufacturer, who advised that the EUT operated as intended during the logging period.

A performance check with voltage and frequency variations was also applied. The following conditions were applied:

Low voltage, low frequency: 90.0 V A.C. at 47.30 Hz
Low voltage, high frequency: 90.0 V A.C. at 63.00 Hz
High voltage, high frequency: 264.0 V A.C. at 63.00 Hz
High voltage, low frequency: 264.0 V A.C. at 47.44 Hz

The log files from the performance check with voltage and frequency variation were analysed by the Manufacturer, who advised that the EUT operated as intended during the logging period.

2.2 DAMP HEAT TEST

2.2.1 Specification Reference

IEC 60945, Clause 8.3

2.2.2 Equipment Under Test and Modification State

SRT Marine System Solutions Coast Station CS100, S/N: 4 – Modification State 0

2.2.3 Date of Test

26 October 2014 – 27 October 2014

2.2.4 Test Equipment Used

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

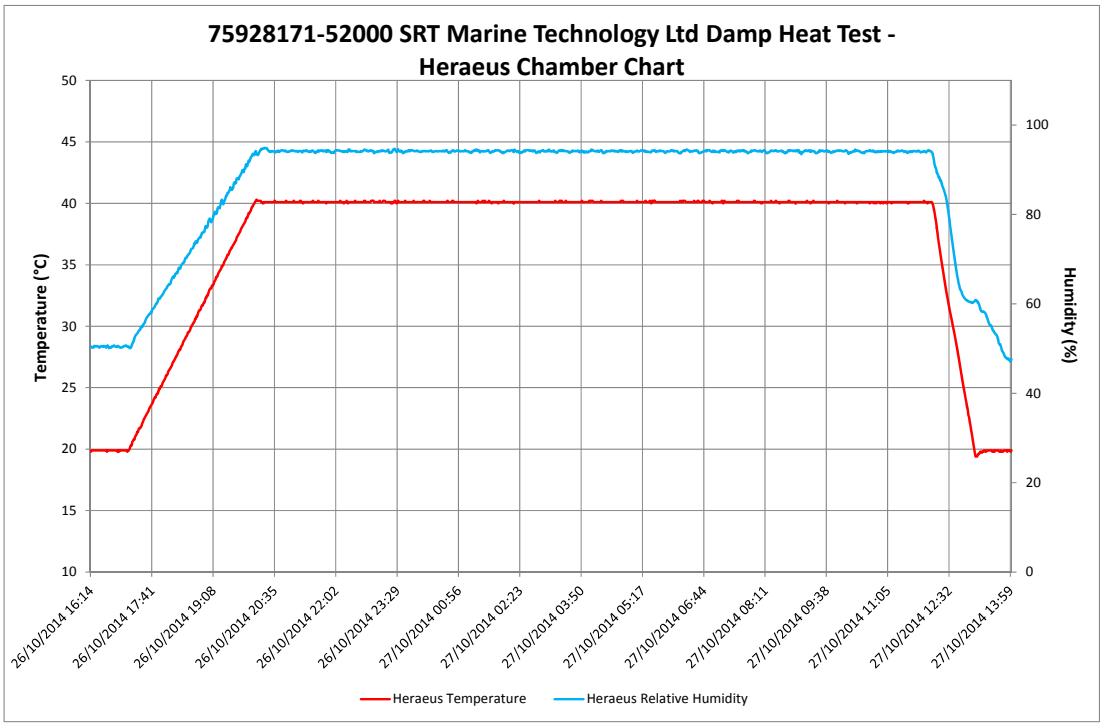
2.2.5 Test Method

The EUT was placed in a climatic chamber at laboratory ambient conditions. With the EUT powered off, the temperature was increased to +40 °C and the relative humidity increased to 93 % over a period of 3 hours. These conditions remained for 15.5 hours, during this time the EUT was powered on for at least 2 hours and subjected to a performance check.

See section 2.1 for test setup photograph.

2.2.6 Test Results

The test was carried out satisfactorily.



Damp Heat Chamber Plot

Performance Check

The transmitted and received messages between the EUT and Class A device were recorded via Tera Term. These log files were analysed by the Manufacturer, who advised that the EUT operated as intended during the logging period.

2.3 LOW TEMPERATURE TEST – FUNCTIONAL

2.3.1 Specification Reference

IEC 60945, Clause 8.4.2.4

2.3.2 Equipment Under Test and Modification State

SRT Marine System Solutions Coast Station CS100, S/N: 4 – Modification State 0

2.3.3 Date of Test

27 October 2014 – 28 October 2014
26 November 2014 – 27 November 2014

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

Functional Test

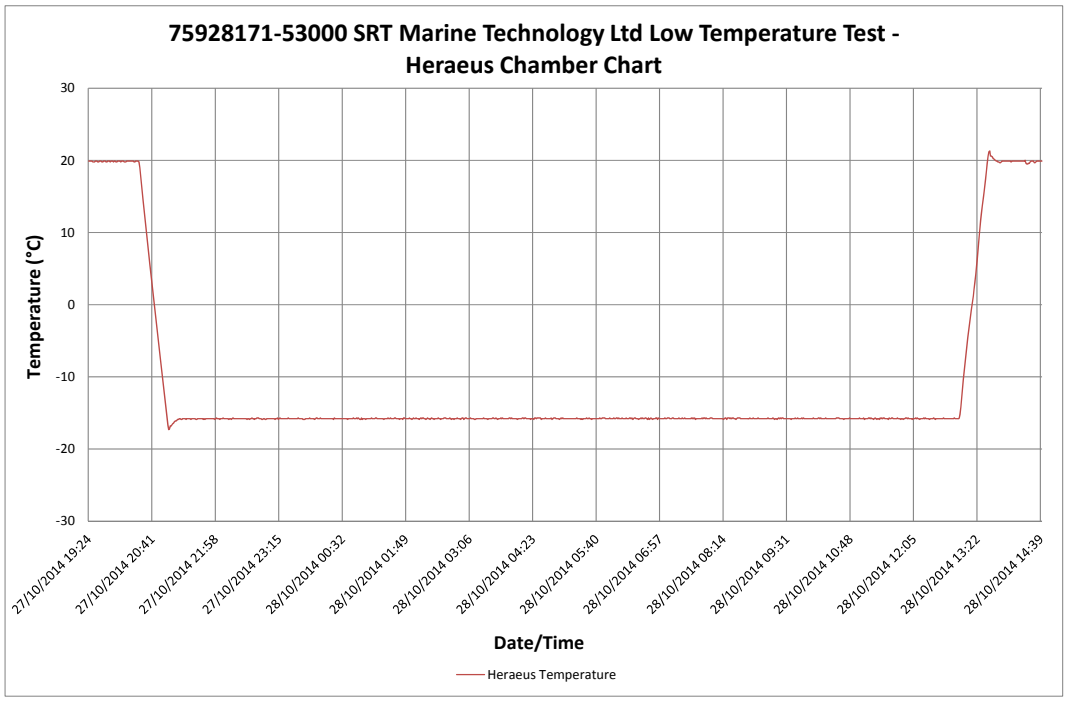
The EUT (powered off) was placed in a climatic chamber at laboratory ambient conditions. The temperature was then reduced to -15 °C and remained for 11.5 hours, during this time the EUT was activated for 2 hours and subjected to a performance check.

See section 2.1 for test setup photograph.

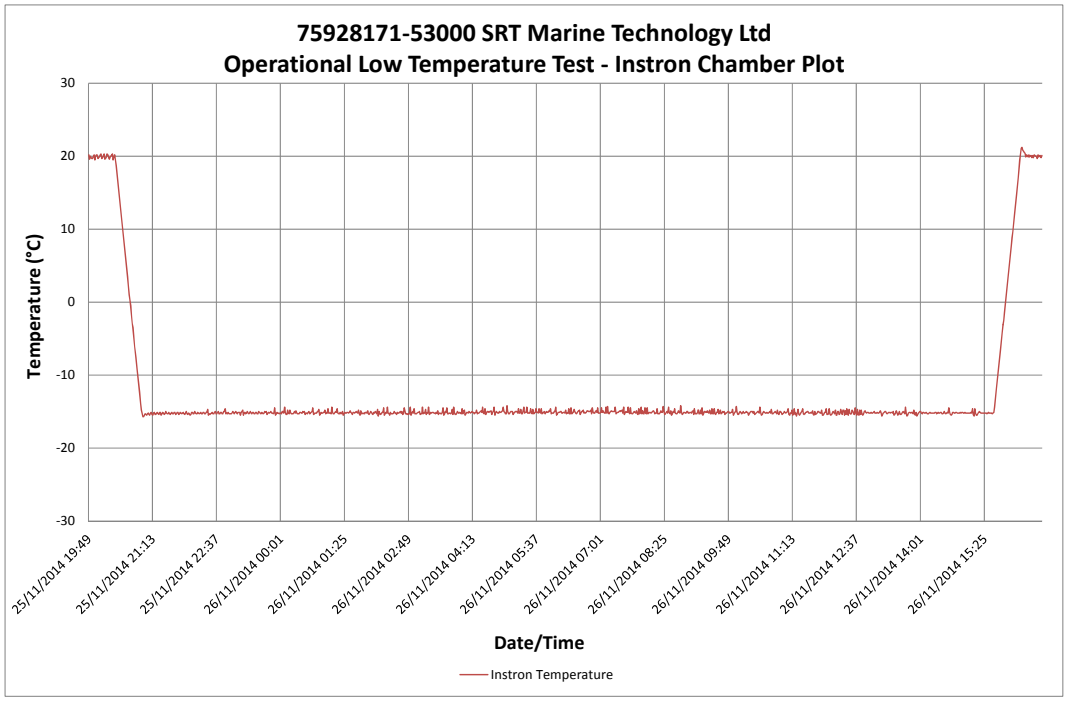
2.3.6 Test Results

The test was carried out satisfactorily.

Low Temperature Chamber Plot



Dry Heat Functional Chamber Plot – Voltage and Freqneucy Variations



Performance Check

The transmitted and received messages between the EUT and Class A device were recorded via Tera Term. These log files were analysed by the Manufacturer, who advised that the EUT operated as intended during the logging period.

A performance check with voltage and frequency variations was also applied. The following conditions were applied:

High voltage, high frequency: 264.1 V A.C. at 63.21 Hz
High voltage, low frequency: 264.1 V A.C. at 47.36 Hz
High voltage, low frequency: 89.9 V A.C. at 47.36 Hz
High voltage, high frequency: 90.0 V A.C. at 63.37 Hz

The log files from the performance check with voltage and frequency variation were analysed by the Manufacturer, who advised that the EUT operated as intended during the logging period.

2.4 VIBRATION

2.4.1 Specification Reference

IEC 60945, Clause 8.4.2.4

2.4.2 Equipment Under Test and Modification State

SRT Marine System Solutions Coast Station CS100, S/N: 4 – Modification State 0

2.4.3 Date of Test

30 October 2014 - 31 October 2014

2.4.4 Test Equipment Used

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

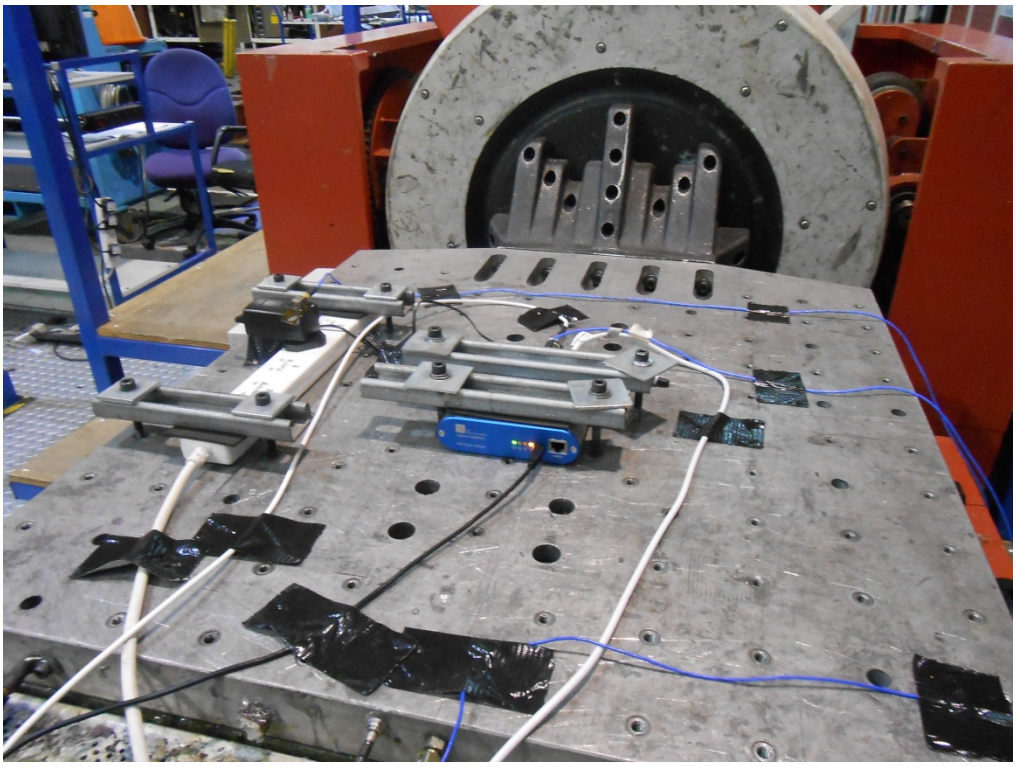
2.4.5 Test Method

The EUT was fixed to the vibration table and was subject to the following vibration profiles:

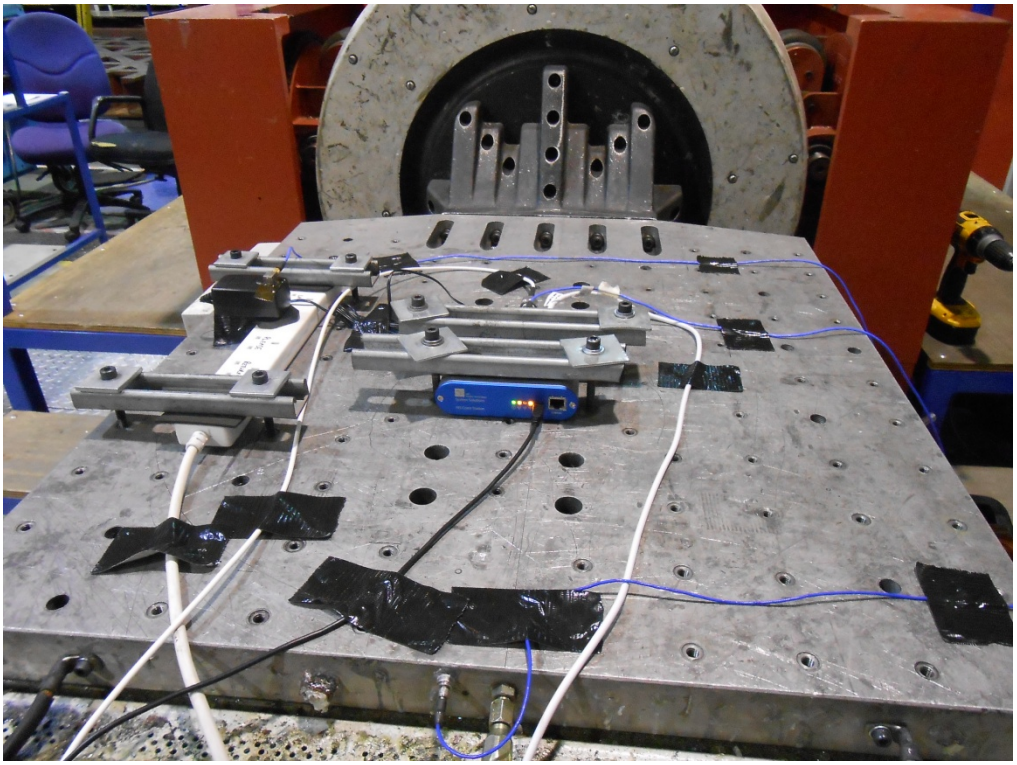
– 5 Hz and up to 13.2 Hz with an excursion of ±1 mm (7 m/s² maximum acceleration at 13.2 Hz);
– above 13.2 Hz and up to 100 Hz with a constant maximum acceleration of 7 m/s².

One sweep was performed at a rate of 0.5 octaves / minute.

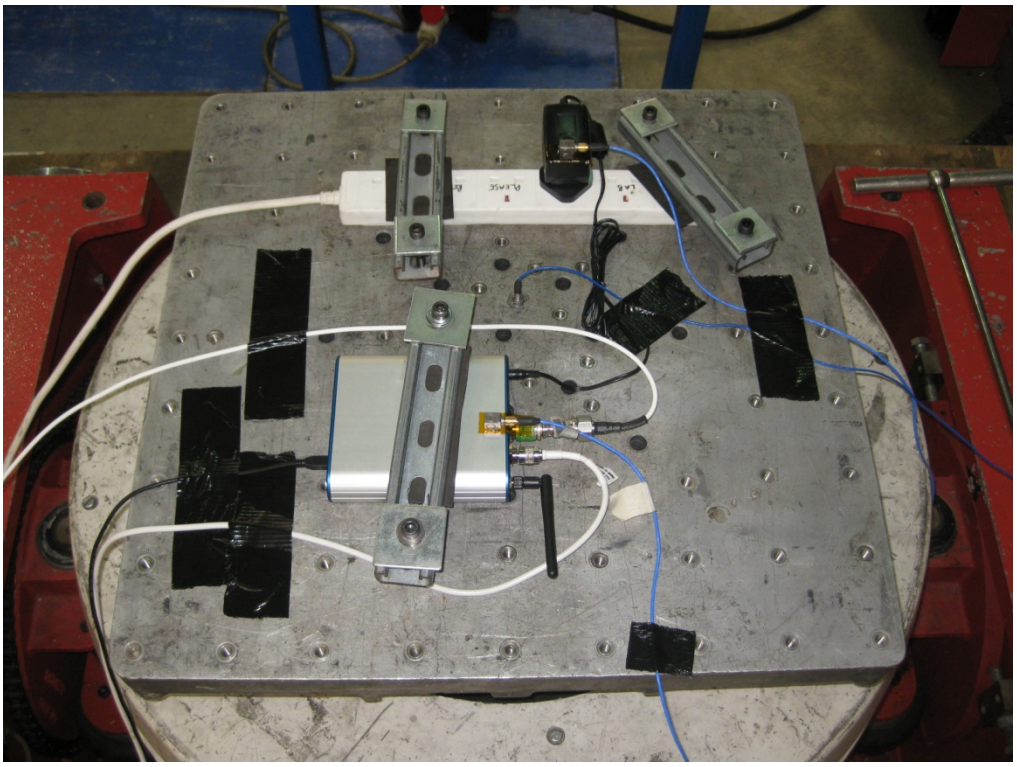
Where a resonance is detected the EUT should be subject to a 2 hour endurance test at that resonance. If no resonance is detected the EUT should be subjected to 2 hour endurance run at 30 Hz as required by the relevant standard. The test should be repeated in each axis.



Vibration Test Setup (X Axis)



Vibration Test Setup (Y Axis)



Vibration Test Setup (Z Axis)

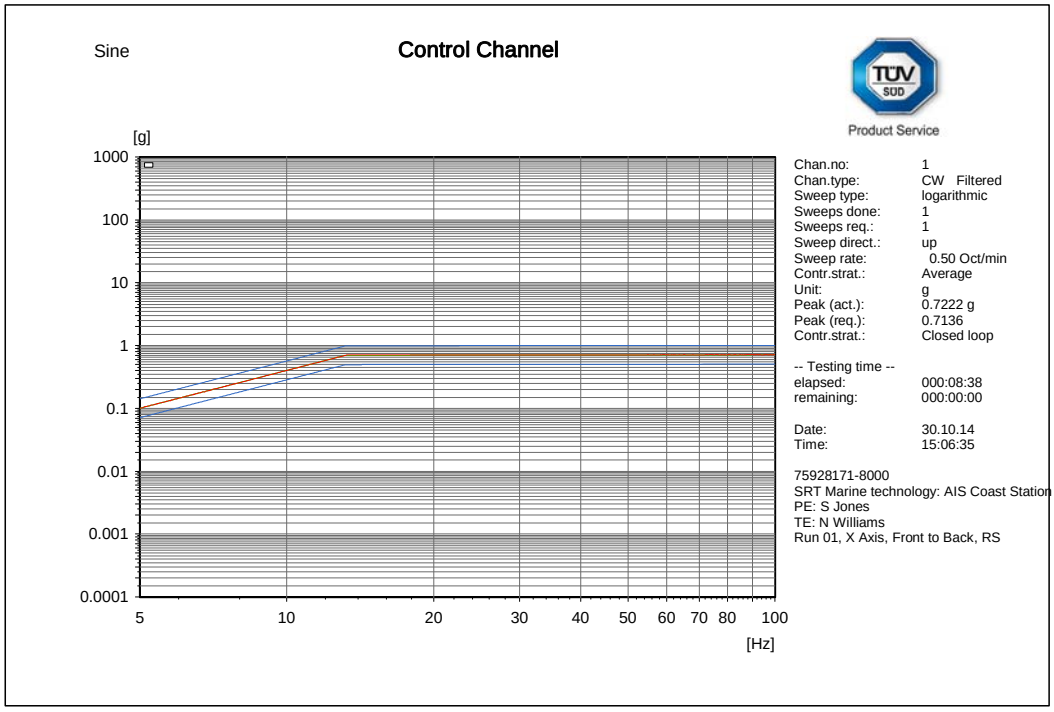
Vibration Test Setup including Support Equipment (Z Axis)

2.4.6 Test Results

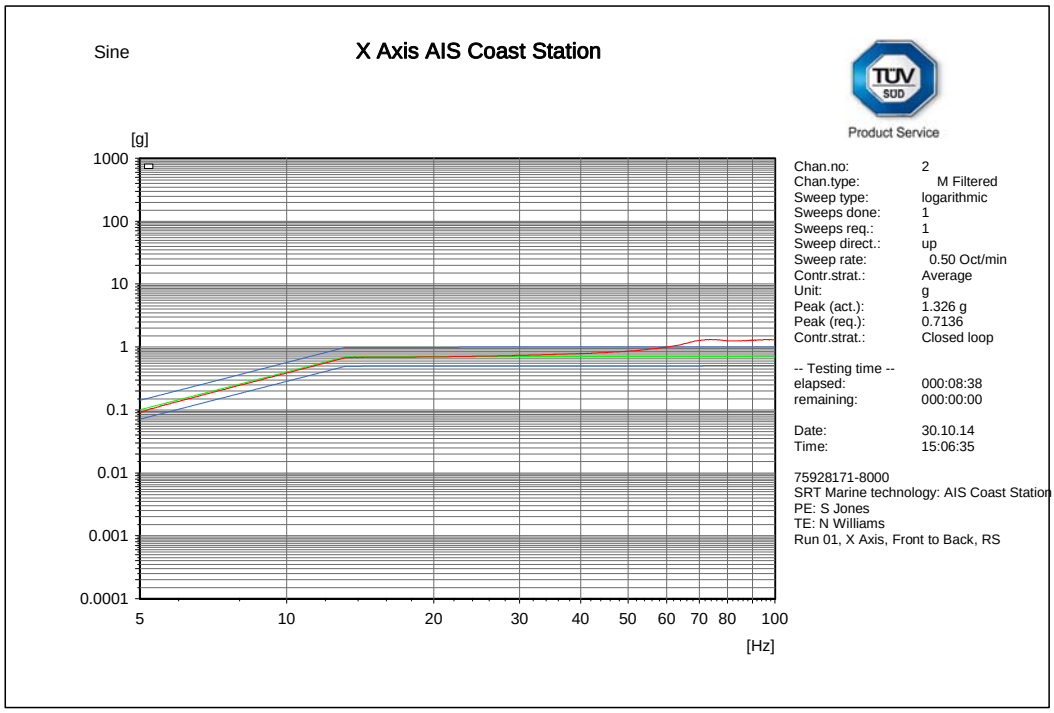
The test was carried out satisfactorily.

It was observed that that the Wi-Fi dropped-out during the vertical axis but this happened previously without any conditions applied so was not considered related to the vibration test. Serial communications continued as normal. The Manufacturer advised the following:

> *We have studied the vibration log, the drop out appears to be Wi-Fi network dropping out for 51 mins…. During this period it continued to be received on the Class A so the Coast station was operating correctly… It's unclear what the cause for these 51 mins was and we agree it's not related to the vibration tests... but we are satisfied that the Coast station otherwise operated as expected..*



X (Front to Back) Axis Resonance Search – Control



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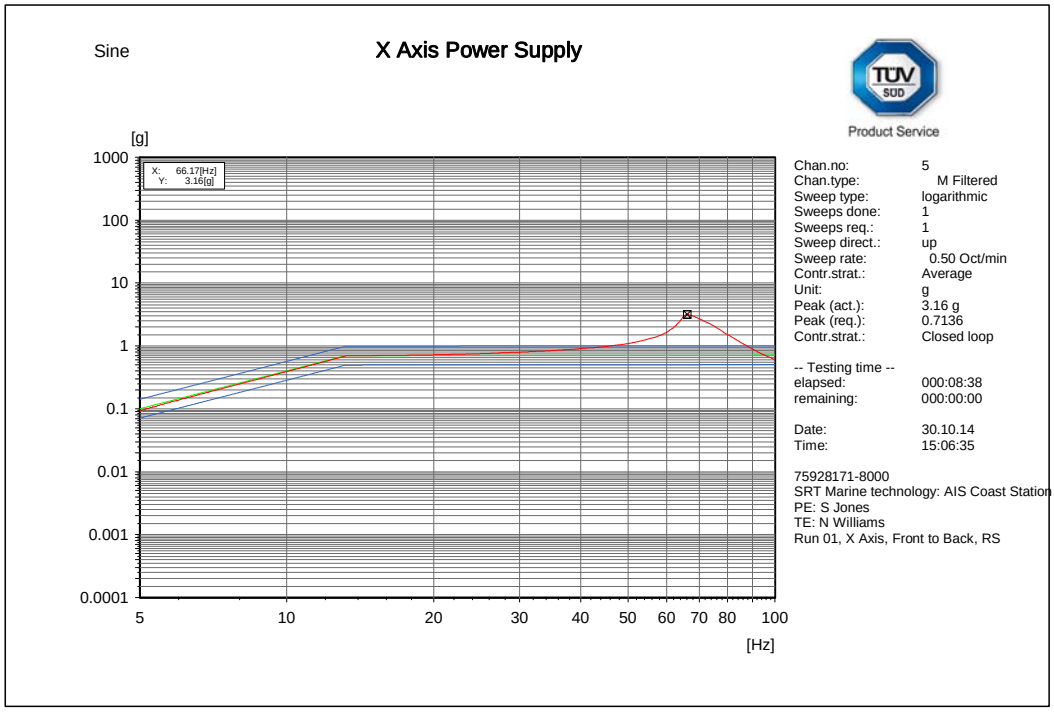
X (Front to Back) Axis Resonance Search – EUT



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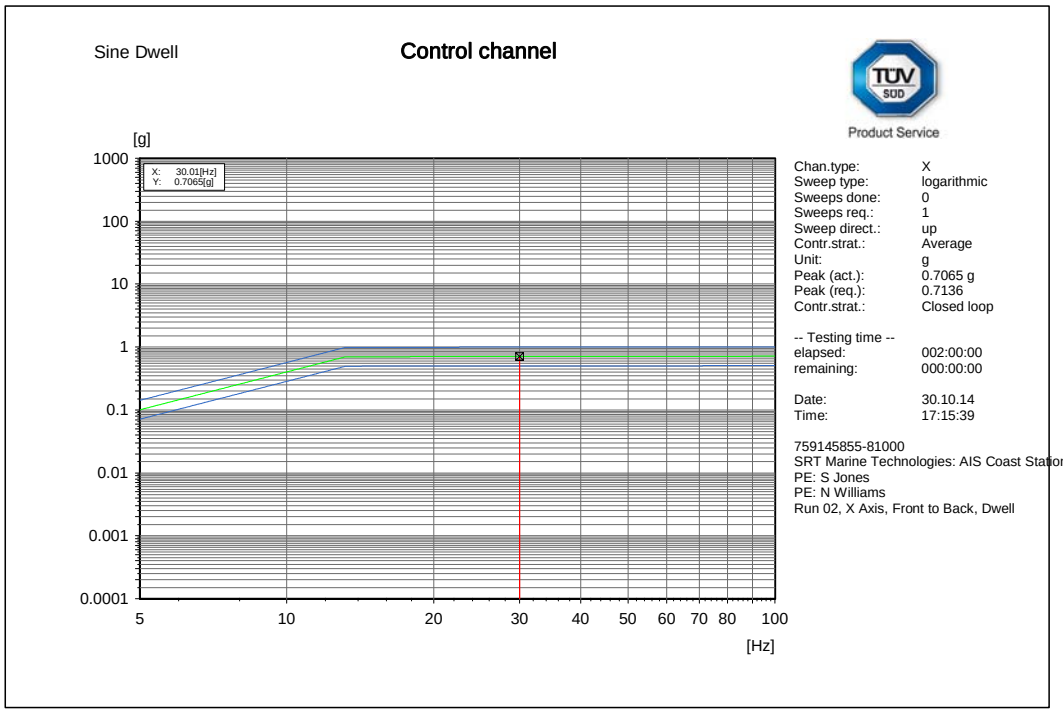
X (Front to Back) Axis Resonance Search – EUT Power Supply



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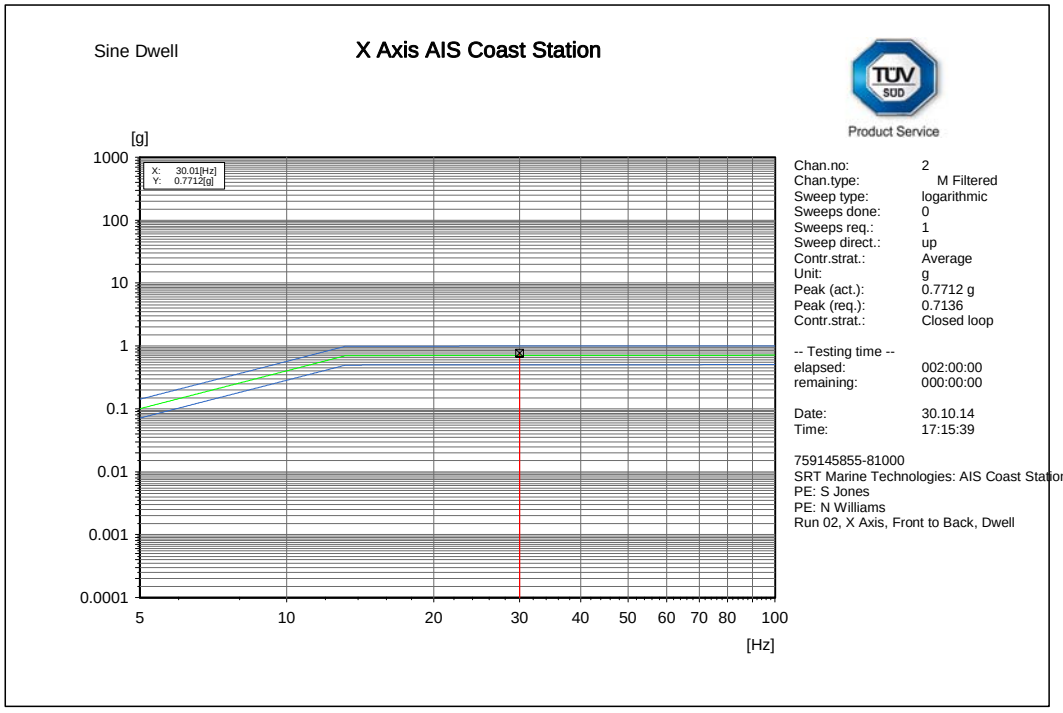
X (Front to Back) Axis Endurance Run – Control



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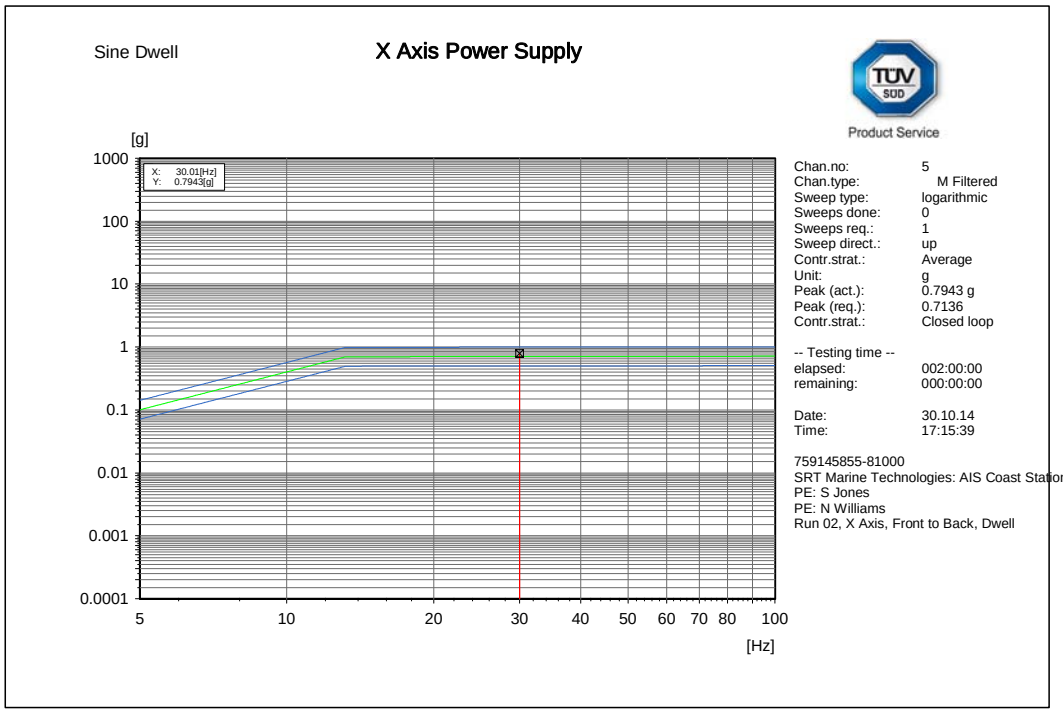
X (Front to Back) Axis Endurance Run – EUT



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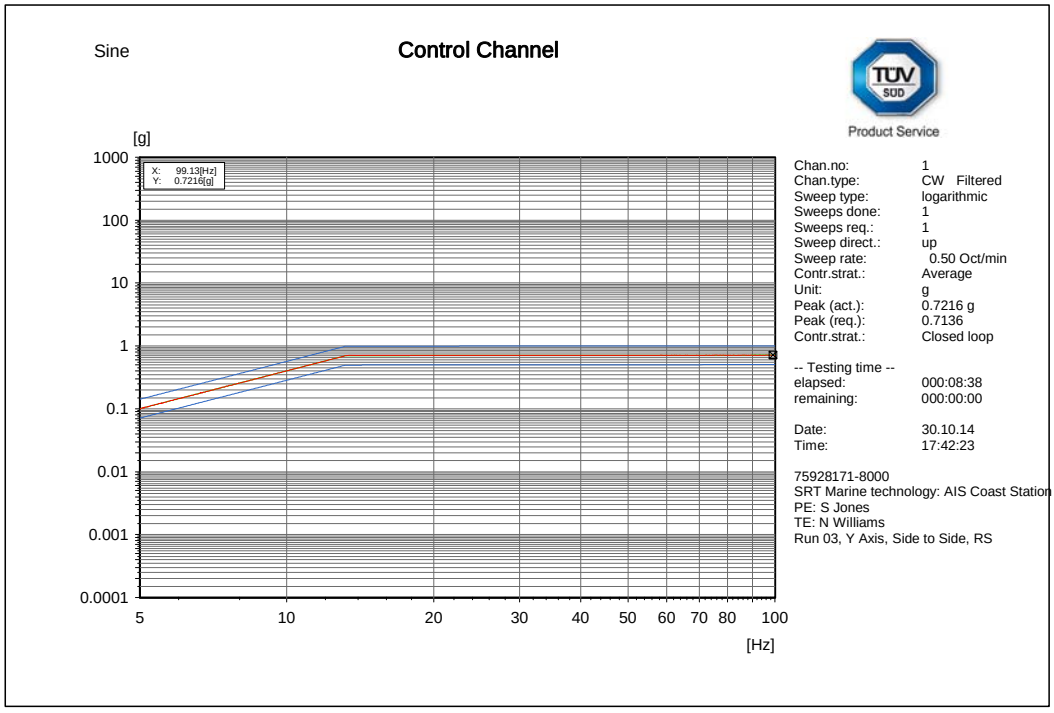
X (Front to Back) Axis Endurance Run – EUT Power Supply



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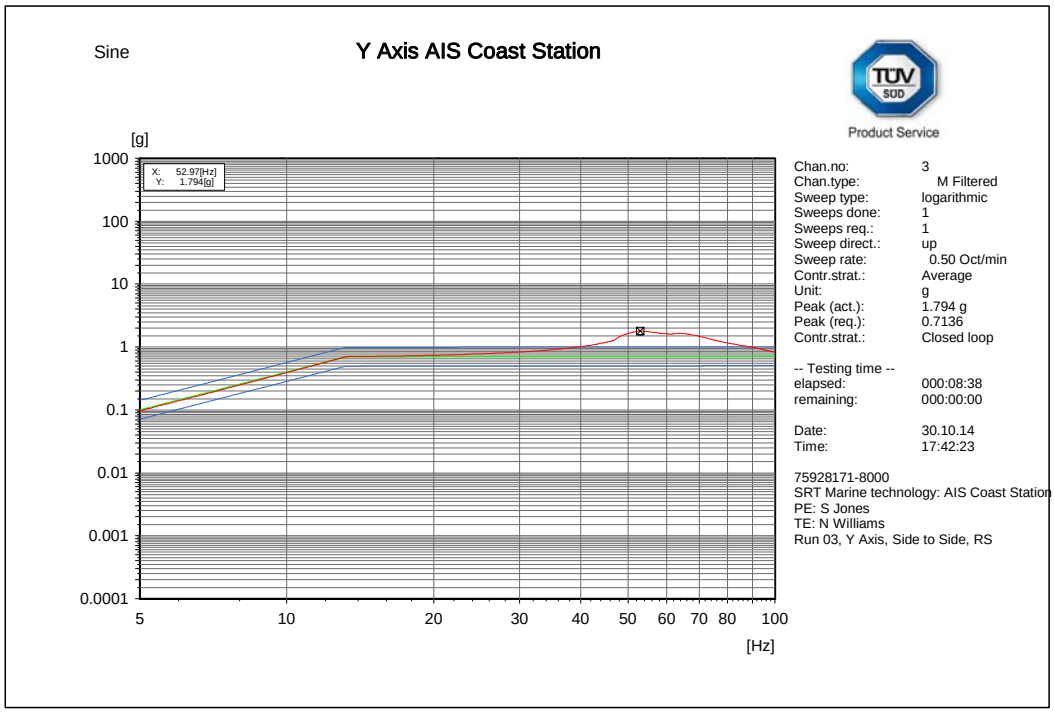
Y (Side to Side) Axis Resonance Search – Control



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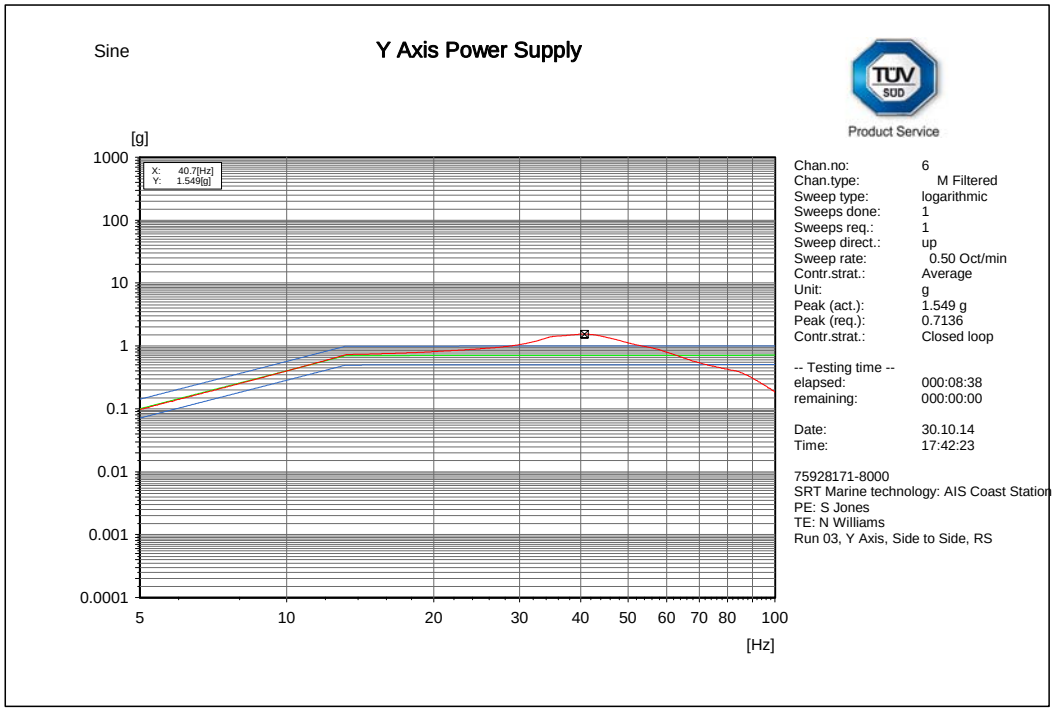
Y (Side to Side) Axis Resonance Search – EUT



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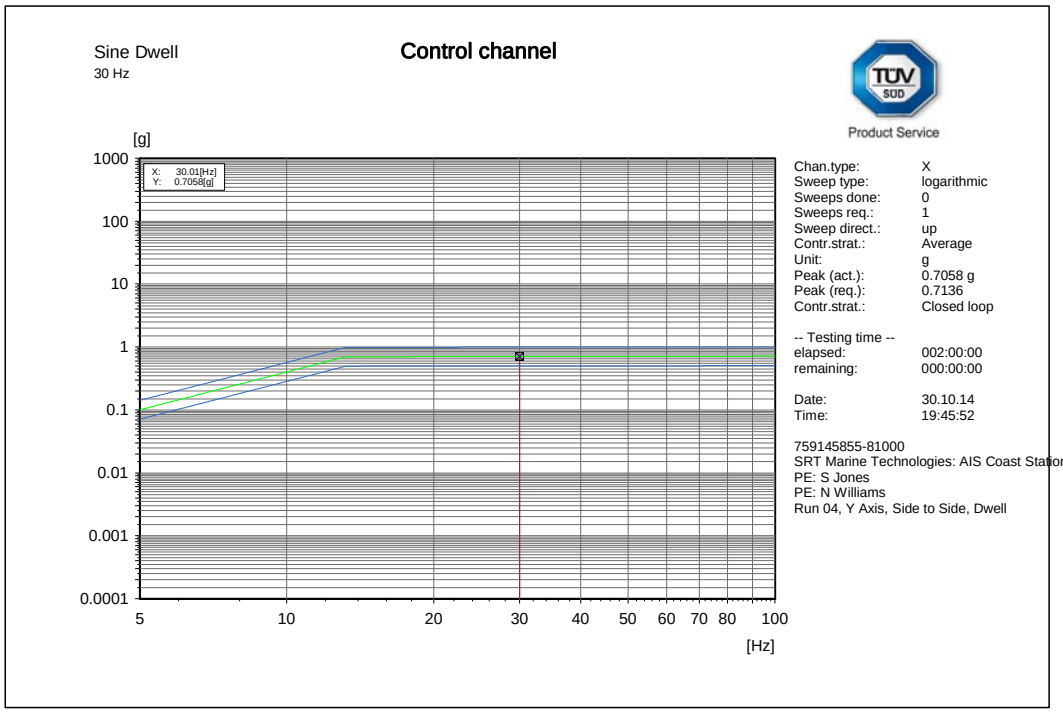
Y (Side to Side) Axis Resonance Search – Power Supply



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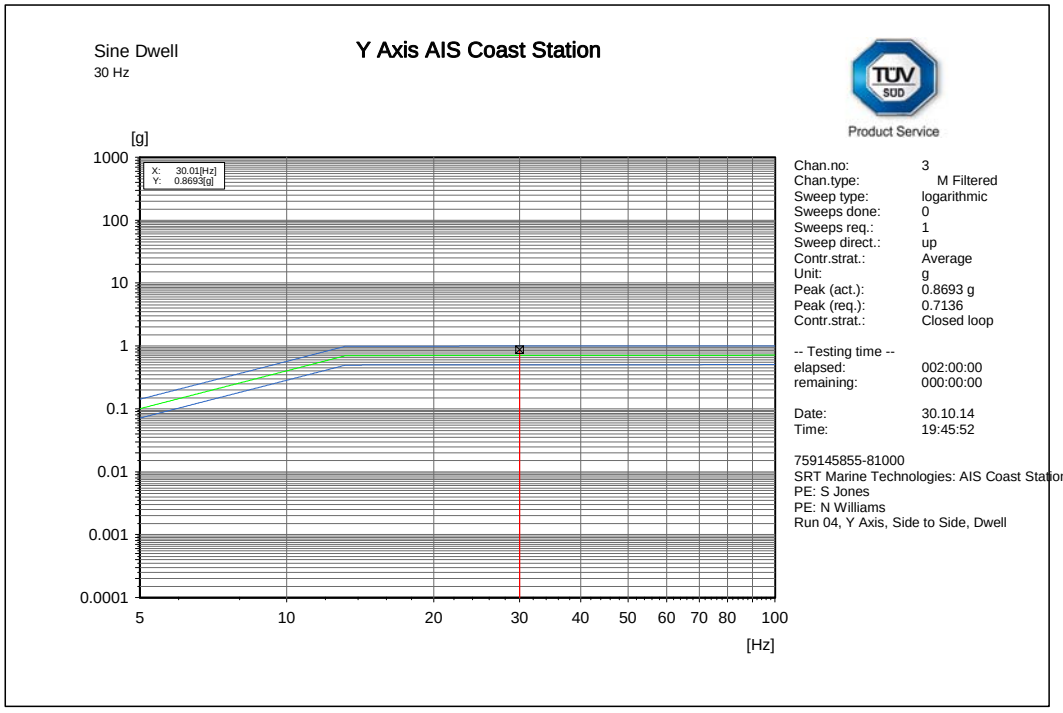
Y (Side to Side) Axis Endurance Run – Control



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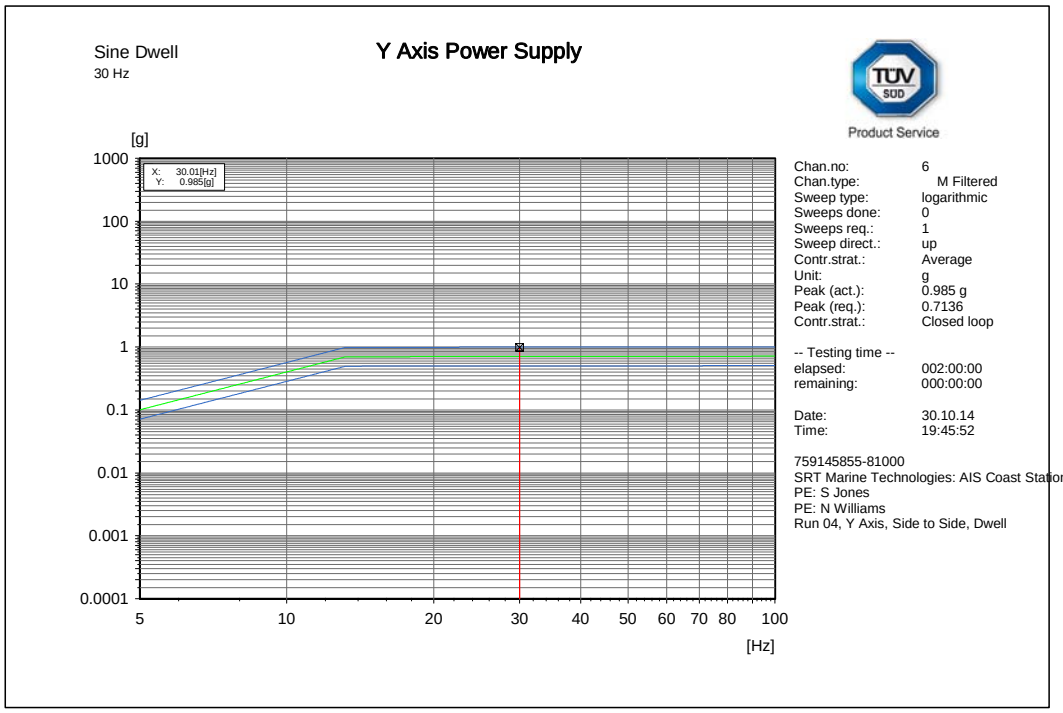
Y (Side to Side) Axis Endurance Run – EUT



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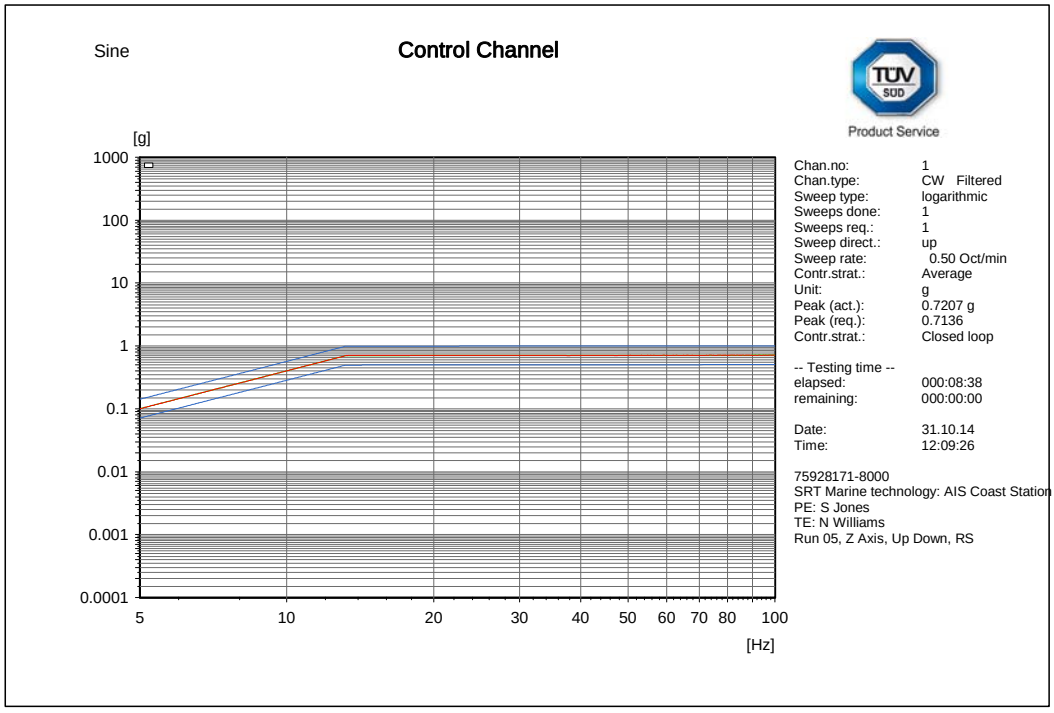
Y (Side to Side) Axis Endurance Run – Power Supply



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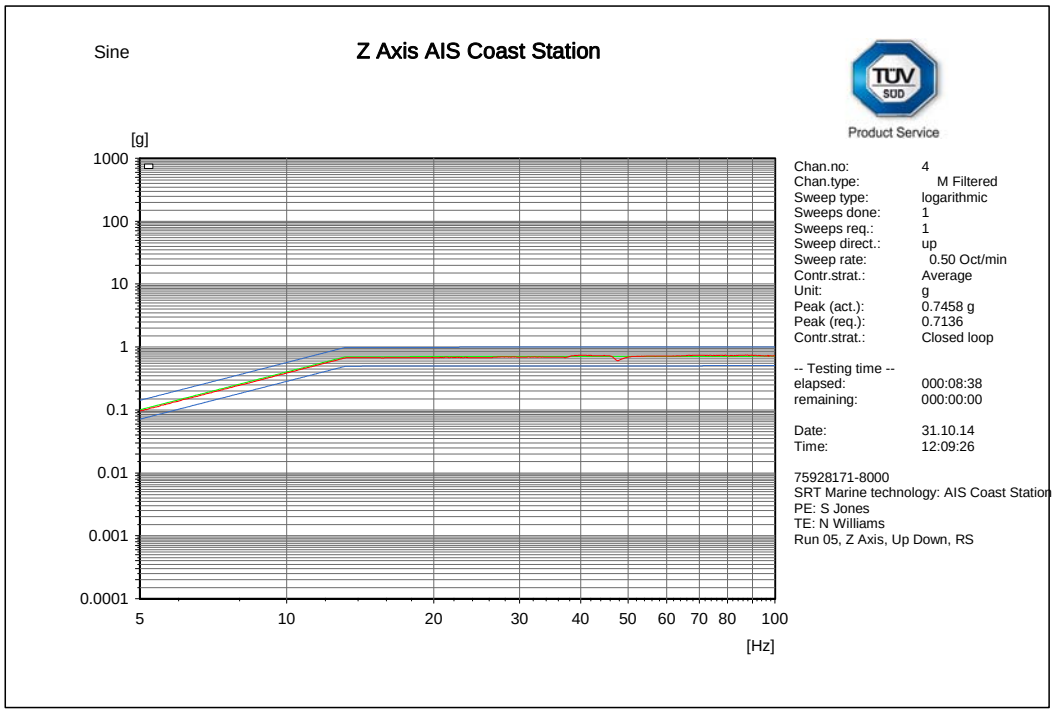
Z (Up and Down) Axis Resonance Search – Control



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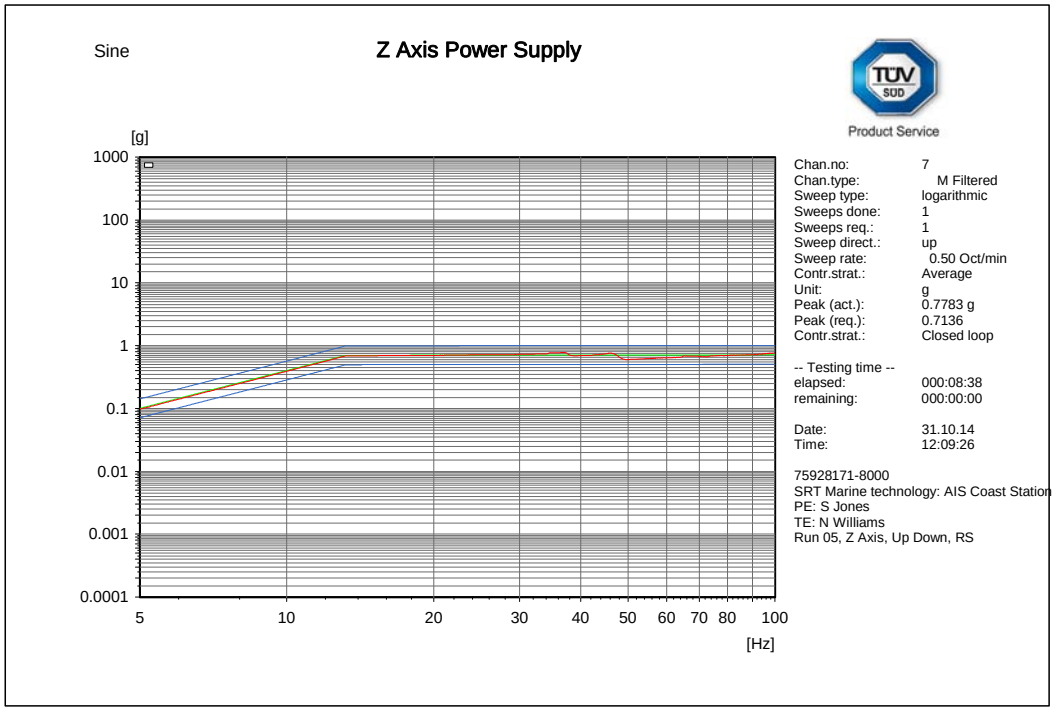
Z (Up and Down) Axis Resonance Search – EUT



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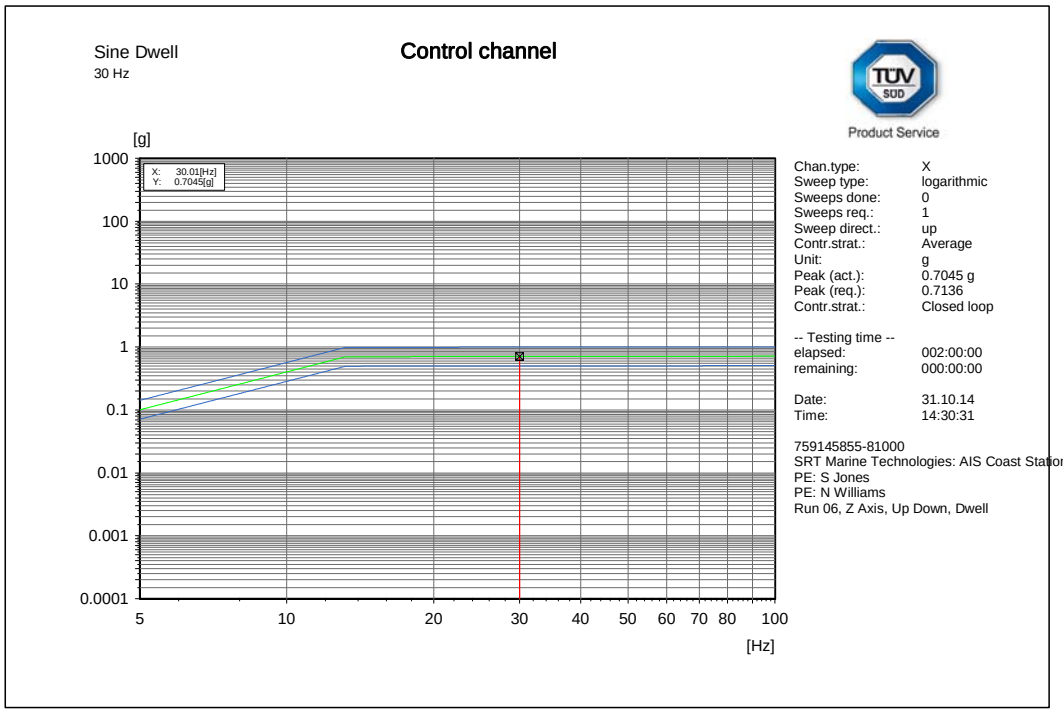
Z (Up and Down) Axis Resonance Search – Power Supply



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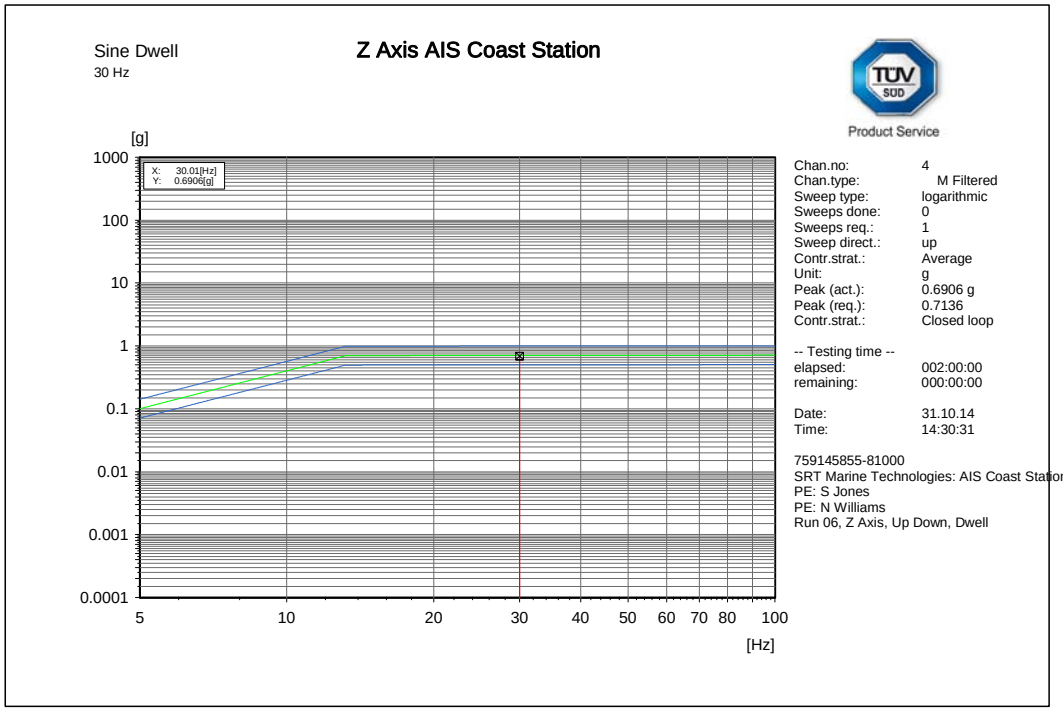
Z (Up and Down) Axis Endurance Run – Control



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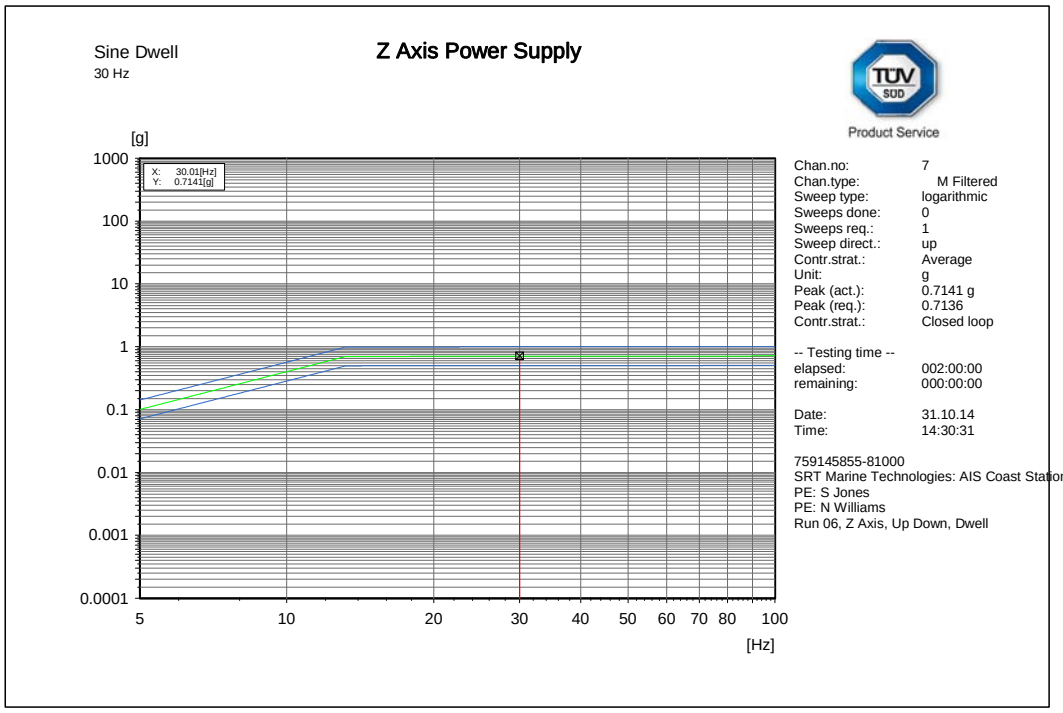
Z (Up and Down) Axis Endurance Run – EUT



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Z (Up and Down) Axis Endurance Run – Power Supply

2.5 COMPASS SAFE DISTANCE

2.5.1 Specification Reference

IEC 60945, Clause 11.2

2.5.2 Equipment Under Test and Modification State

SRT Marine System Solutions Coast Station CS100, S/N: 4230001033940002 – Modification State 0

2.5.3 Test Equipment Used

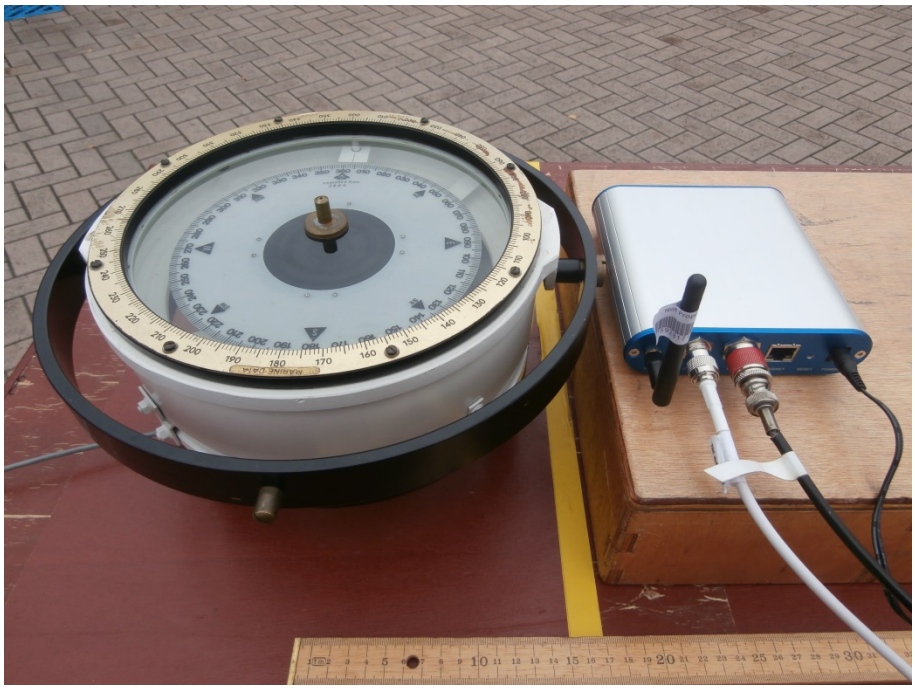
The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.4 Test Method and Operating Modes

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

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

- Unpowered
- Normalised
- Powered



Compass Safe Distance Test Setup

2.5.5 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.

Standard Compass safe distance (mm)	200
Emergency Compass safe distance (mm)	200

Horizontal maximum flux density, Magnetic North (H)	H	19.9
Standard compass deviation limit (degrees)	5.4/H = A	A = 0.3
Emergency compass deviation limit (degrees)	18/H = B	B = 0.9

Orientation of the EUT	Un-powered State		Normalised		Powered Up	
	Distance From Compass Centre (mm) at A° deflection	Distance From Compass Centre (mm) at B° deflection	Distance From Compass Centre (mm) at A° deflection	Distance From Compass Centre (mm) at B° deflection	Distance From Compass Centre (mm) at A° deflection	Distance From Compass Centre (mm) at B° deflection
Front	170	170	170	170	170	170
Top	170	170	170	170	170	170
Left Hand Side	170	170	170	170	170	170
Right Hand Side	170	170	170	170	170	170
Underside	170	170	170	170	170	170
Rear	170	170	170	170	170	170

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 Climatic - High Temperature (Functional)					
True RMS Multimeter	Fluke	79 Series III	411	12	31-Jul-2015
Attenuator: 10dB/20W	Narda	766-10	480	12	2-Dec-2014
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Temperature Chamber	Instron	906	2128	12	24-Oct-2015
Chamber	Heraeus	HC 4033	2174	12	20-May-2015
Cable (2m, N(m) - N(m))	Reynolds	269-0088-2000	2410	-	O/P Mon
Programmable Power Supply	Iso-tech	IPS 2010	2435	-	O/P Mon
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
Termination (50ohm)	Diamond Antenna	DL-30N	3102	12	8-Oct-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	12	4-Jun-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	4-Jun-2015
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	12	29-Apr-2015
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	3-Dec-2014
GPS Antenna	ACC	PA175-S	4228	-	TU
Section 2.2 Climatic – Damp Heat					
Chamber	Heraeus	HC 4033	2174	12	20-May-2015
Cable (2m, N(m) - N(m))	Reynolds	269-0088-2000	2410	-	O/P Mon
Programmable Power Supply	Iso-tech	IPS 2010	2435	-	O/P Mon
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
Termination (50ohm)	Diamond Antenna	DL-30N	3102	12	8-Oct-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	12	4-Jun-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	4-Jun-2015
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	12	29-Apr-2015
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	3-Dec-2014
GPS Antenna	ACC	PA175-S	4228	-	TU
Section 2.3 Climatic - Low Temperature					
True RMS Multimeter	Fluke	79 Series III	411	12	31-Jul-2015
Attenuator: 10dB/20W	Narda	766-10	480	12	2-Dec-2014
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2015
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Temperature Chamber	Instron	906	2128	12	24-Oct-2015
Cable (2m, N(m) - N(m))	Reynolds	269-0088-2000	2410	-	O/P Mon
Programmable Power Supply	Iso-tech	IPS 2010	2435	-	O/P Mon
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
Termination (50ohm)	Diamond Antenna	DL-30N	3102	12	8-Oct-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	12	4-Jun-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	4-Jun-2015
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	12	29-Apr-2015
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	3-Dec-2014
GPS Antenna	ACC	PA175-S	4228	-	TU
Section 2.5 EMC - Compass Safe Distance					
Sussex Helmholtz Coil	Various	88771	327	-	TU
Magnetometer	Bartington	MAG01	671	36	14-Nov-2014
Power Supply	Hewlett Packard	6269B	733	-	TU
Compass Verification Unit	TUV SUD Product Service	CVU	3579	-	TU
Marine Binacle Compass with Repeater Display	Cassens & Plath	Compass: Type 11	3834	-	TU

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 Vibration - Sine					
Cable (2m, N(m) - N(m))	Reynolds	269-0088-2000	2410	-	O/P Mon
Programmable Power Supply	Iso-tech	IPS 2010	2435	-	O/P Mon
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
Termination (50ohm)	Diamond Antenna	DL-30N	3102	12	8-Oct-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	12	4-Jun-2015
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	4-Jun-2015
Vibration System	Ling Dynamic Systems	875	3170	6	19-Mar-2015
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	12	29-Apr-2015
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	3-Dec-2014
Isotron Accelerometer	Endevco	256-10	3390	6	12-Feb-2015
Charge Amplifier	Endevco	133	3480	12	16-May-2015
Vibration & Shock Controller	m + p International	VibPilot VP8	3730	12	2-Nov-2014
GPS Antenna	ACC	PA175-S	4228	-	TU
Triaxial accelerometer	Meggitt	66A50	4346	6	14-Feb-2015
Triaxial accelerometer	Meggitt	66A50	4353	6	10-Jan-2015

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

SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Front View

Rear View

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).