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Report On

Type Approval Testing of the
Ocean Signal Limited EPIRB1 Pro + ARH1 Pro
In accordance with RTCM 11000.3

Document 75946431 Report 02 Issue 1 **December 2019**

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

REPORT ON

Type Approval Testing of the
Ocean Signal Limited
EPIRB1 Pro + ARH1 Pro

Document 75946431 Report 02 Issue 1

December 2019

PREPARED FOR

Ocean Signal Limited
Unit 4
Ocivan Way
Margate
Kent
CT9 4NN

PREPARED BY

Martin Hardy
Telecoms Test Engineer

APPROVED BY

Gareth Stephens
Authorised Signatory

Ryan Henley
Authorised Signatory

Andy Lawson
Authorised Signatory

DATED

19 December 2019

UKAS TESTING
0141

CONTENTS

SECTION 1

REPORT SUMMARY

Type Approval Testing of the
Ocean Signal Limited
EPIRB1 Pro + ARH1 Pro

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Type Approval Testing of the Ocean Signal Limited EPIRB1 Pro + ARH1 Pro to limited requirements of RTCM 11000.3.

Objective	To perform Type Approval Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Ocean Signal Limited
Model Number(s)	EPIRB1 Pro + ARH1 Pro
Serial Number(s)	Climatic tests and Compass Safe Distance: TSR003 EPIRB1 Pro TSR008 EPIRB1 Pro TSR001 FLOAT FREE HOUSING TSR006 FLOAT FREE HOUSING
Number of Samples Tested	2
Test Specification/Issue/Date	RTCM 11000.3
Related Specification/Issue/Date	IEC61097-2 Ed 3
Declared Product Equipment Category	Exposed
Date of Receipt of Test Samples	11 July 2019
Order Number Date	07999 25 July 2019
Start of Test	11 July 2019
Finish of Test	04 October 2019
Name of Engineer(s)	J Tuckwell M Hardy Z Latiff K Bryant I Bromley N Williams L Bull

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with RTCM 11000.3 is shown below. RTCM11000.3 requires testing to IEC 61097-2 Ed 3.0 with some deviations noted within the RTCM 11000.3 standard. The clauses below reference both IEC61097-2 and RTCM 11000.3 where applicable.

Section	IEC61097-2 Spec. Clause / RTCM 11000.3 Spec. Clause	Test Description	Result	Comments
2.1	A.1.1	Message Format and Homing Device Checks	Pass	-
2.2	A.1.2	Dry Heat (Storage test only)	Satisfactory	-
2.3	A.1.3	Damp Heat	Satisfactory	-
2.4	A.1.4 / A.6	Vibration	Satisfactory	-
2.5	A.1.5 / A.7	Ruggedness	Satisfactory	-
-	A.1.6	Drop on Hard Surface	Not tested	
-	A.1.7	Drop into Water (NUA)	Not tested	-
-	A.1.8	Thermal Shock	Not tested	-
-	A.1.9	Immersion	Not tested	
-	A.1.11	Battery Capacity and Low-Temperature Test	Not tested	-
-	A.1.12	(Limited) Cospas-Sarsat Type Approval Test Procedure	Not tested	-
-	A.1.13	Interference Test (Immunity to RF)	Not tested	-
-	A.1.13	Interference Test (Immunity to ESD)	Not tested	-
-	A.1.14	Conducted Interference (Conducted Emissions – DC Power)	Not tested	-
-	A.1.14	Conducted Interference (Immunity to Radio Frequency Common Mode – DC Power)	Not tested	-
-	A.1.14	Conducted Interference (Immunity to Radio Frequency Common Mode – Signal, Control and Telecommunications Port)	Not tested	-
-	A.1.14	Conducted Interference (Immunity to Fast Transient Bursts Common Mode – Signal, Control and Telecommunications Port)	Not tested	-
2.6	A.2.2 (5.2.1)	Automatic Release Mechanism and Automatic Activation Test for Class 1 and Class 2 Satellite EPIRBs (Float Free Tests)	Satisfactory	-
2.7	5.5.1.1	Test to prevent release when sea water washes over the unit (NUA)	Satisfactory	-
2.8	5.17.9	Solar Radiation	Waiver	See Annex A
2.9	5.17.10	Oil Resistance	Wavier	See Annex A
2.10	5.17.11	Corrosion	Wavier	See Annex A
2.11	5.20	Compass Safe Distance	-	See Section 2.10

NUA: Not UKAS Accredited

1.3 DECLARATION OF BUILD

MAIN EUT			
MANUFACTURING DESCRIPTION	Cospas/Sarsat 406MHz EPIRB with Automatic Release Housing		
MANUFACTURER	Ocean Signal Ltd		
MODEL	EPIRB1 Pro + ARH1 Pro		
PART NUMBER	900S-03377 + 900S-03347		
HARDWARE VERSION	01.00		
SOFTWARE VERSION	01.00		
PSU VOLTAGE/FREQUENCY/CURRENT	9V		
HIGHEST INTERNALLY GENERATED FREQUENCY	406.04MHz		
FCC ID (if applicable)			
INDUSTRY CANADA ID (if applicable)			
TECHNICAL DESCRIPTION (a brief technical description of the intended use and operation)	Float free Cospas/Sarsat distress beacon		
COUNTRY OF ORIGIN			
RF CHARACTERISTICS (if applicable)			
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	121.5MHz & 406.04MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	N/A		
INTERMEDIATE FREQUENCIES	N/A		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	3K20A3X & 16K0G1D		
MODULATION TYPES: (i.e. GMSK, QPSK)	Swept tone AM & BPSK		
OUTPUT POWER (W or dBm)	25-100mW & 5W		
SEPARATE BATTERY/POWER SUPPLY (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
PSU VOLTAGE/FREQUENCY/CURRENT			
COUNTRY OF ORIGIN			
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
COUNTRY OF ORIGIN			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

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

Name: Wayne Card
Position held: Senior Engineer
Date: 19/09/19

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was an Ocean Signal Limited EPIRB1 Pro + ARH1 Pro as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

1.4.2 Equipment Category

As per IEC 60945 Clause 4.4, all parts of the EUT were declared by the manufacturer as exposed to the weather ("exposed").

1.5 DEVIATIONS

None.

1.6 PERFORMANCE MONITORING

Post-test performance checks were carried out in accordance with the relevant equipment standard, and included confirmation of the 121.5 homing transmitter and self-test transmission (captured via a beacon tester).

For the Vibration test the EUT was monitored to ensure no transmissions occurred during the test.

1.7 MODIFICATIONS

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied.	-	-

1.8 REPORT MODIFICATION RECORD

Issue 1 – First Issue

SECTION 2

TEST DETAILS

Type Approval Testing of the
Ocean Signal Limited
EPIRB1 Pro + ARH1 Pro

2.1 MESSAGE FORMAT AND HOMING DEVICE CHECKS

2.1.1 Specification Reference

RTCM 11000.3 ANNEX A / IEC 61097-2, clause A.1.1

2.1.2 Date of Test

03 September 2019

2.1.3 Test Equipment Used

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

2.1.4 Environmental Conditions

Ambient Temperature 24.5°C
Relative Humidity 34.5%

2.1.5 Test Results

Visual Inspection

Prior to the start of the testing schedule the EUT was visually inspected. No signs of damage were found.

Performance Check

A Performance Check was conducted to ensure that the EUT was functional before all upcoming tests.

Summary of Performance Check Results

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message 406 MHz Frequency 121 MHz Presence	FFFE2F8C9EF9C0637FDFF83D15B783E0F66C 406.039987 P

EPIRB1 Pro (TSR008) with NEW FLOAT FREE HOUSING (TSR006)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message 406 MHz Frequency 121 MHz Presence	FFFE2F8C9EF9C0637FDFF83D15B783E0F66C 406.039979 P

2.2 DRY HEAT TESTS

2.2.1 Specification Reference

RTCM 11000.3 ANNEX A / IEC 61097-2, clause A.1.2

2.2.2 Equipment Under Test and Modification State

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001) - Modification State 0
EPIRB1 Pro (TSR008) with NEW FLOAT FREE HOUSING (TSR006) - Modification State 0

2.2.3 Date of Test

04 – 05 September 2019

2.2.1 Test Equipment Used

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

2.2.2 Environmental Conditions

Ambient Temperature: 23.7 – 24.2°C
Relative Humidity: 36.1 – 38.3%

2.2.3 Test Setup

Storage Test

2.2.4 Test Method

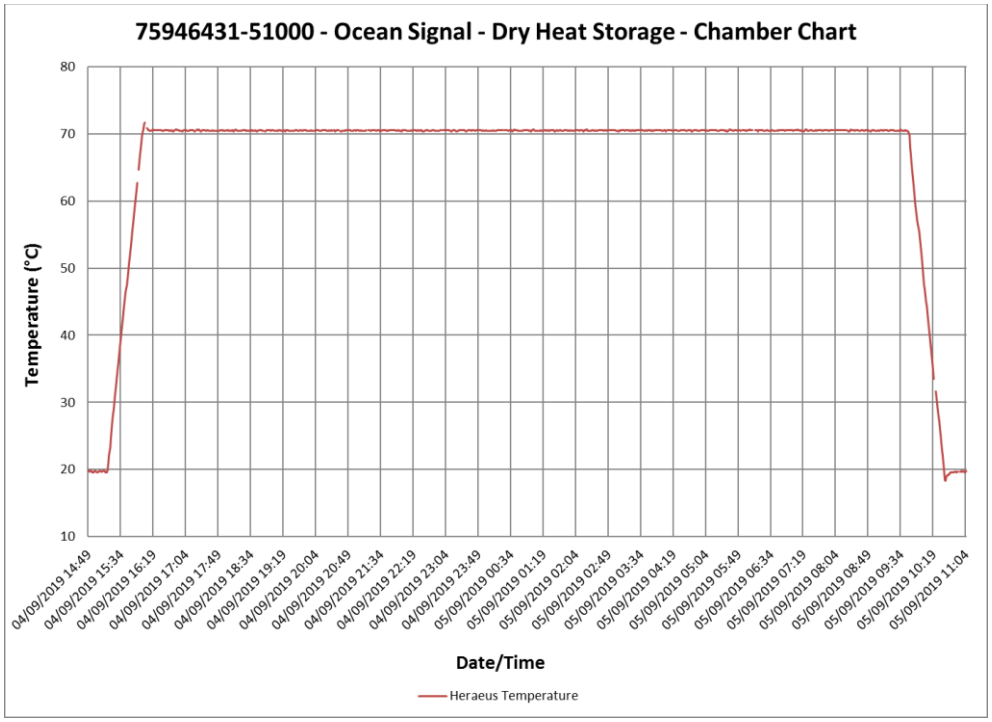
Storage Test

The EUT was placed in a climatic chamber where the temperature was increased from laboratory ambient temperature to +70°C. After 16 hours, the temperature was returned to ambient conditions. The EUT was subjected to a performance check at the end of the test.

2.2.5 Test Results

Storage Test

Temperature Plot



Performance Check

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message 406 MHz Frequency 121 MHz Presence	FFFE2F8C9EF9C06332E02BC44E379C8051C4* 406.039993 P

* The EUT picked up ambient GPS signals during the activation period, resulting in a non-default Hex message.

EPIRB1 Pro (TSR008) with NEW FLOAT FREE HOUSING (TSR006)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message	FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
406 MHz Frequency	406.039990
121 MHz Presence	P

2.3 DAMP HEAT TEST

2.3.1 Specification Reference

RTCM 11000.3 ANNEX A / IEC 61097-2, clause A.1.3

2.3.2 Equipment Under Test and Modification State

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001) - Modification State 0
EPIRB1 Pro (TSR008) with NEW FLOAT FREE HOUSING (TSR006) - Modification State 0

2.3.3 Date of Test

08 – 09 September 2019

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 Environmental Conditions

Ambient Temperature: 22.0 – 23.4 °C
Relative Humidity: 39.1 – 46.2 %

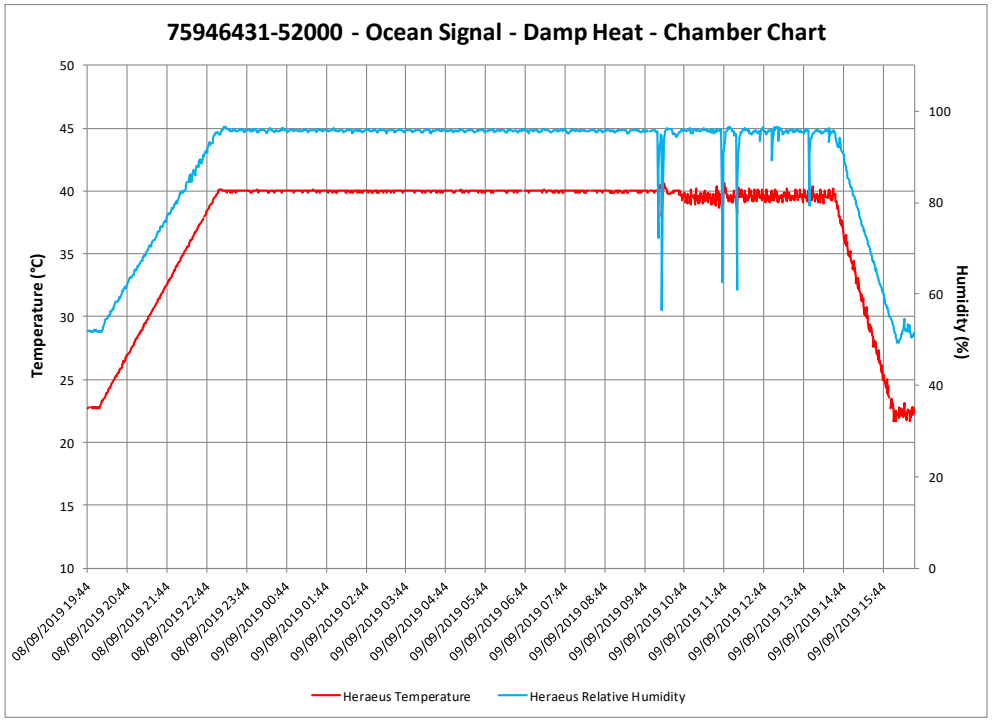
2.3.6 Test Setup

2.3.7 Test Method

The EUT was placed in a climatic chamber where the temperature was increased from laboratory ambient to +40°C and the relative humidity increased to 95%. After 10 hours, the EUT's were activated for at least 2 hours. During this period the EUT's were subjected to a performance check.

2.3.8 Test Results

Temperature Plot



Note: The variations in temperature and humidity towards the end of the plot above are due to the chamber door being opened briefly to activate/deactivate the EUT. The temperature and humidity inside the chamber were allowed to stabilise before measurements were made.

Performance Check

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message 406 MHz Frequency 121 MHz Presence	FFFE2F8C9EF9C06332E02BC44E379CC049D7* 406.039987 P

EPIRB1 Pro (TSR008) with NEW FLOAT FREE HOUSING (TSR006)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message 406 MHz Frequency 121 MHz Presence	FFFE2F8C9EF9C06332E02BC44E379C8051C4* 406.039962 P

* The EUT picked up ambient GPS signals during the activation period, resulting in a non-default Hex message.

2.4 VIBRATION TESTS

2.4.1 Specification Reference

RTCM 11000.3 ANNEX A (A.6) / IEC 61097-2, clause A.1.4

2.4.2 Equipment Under Test and Modification State

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001) - Modification State 0

2.4.3 Date of Test

13 – 14 September 2019

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

Ambient Temperature 23.0 – 25.8°C
Relative Humidity 40.8 - 46.2%

2.4.6 Test Setup

2.4.7 Test Method

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

Resonance Sweep

– 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.

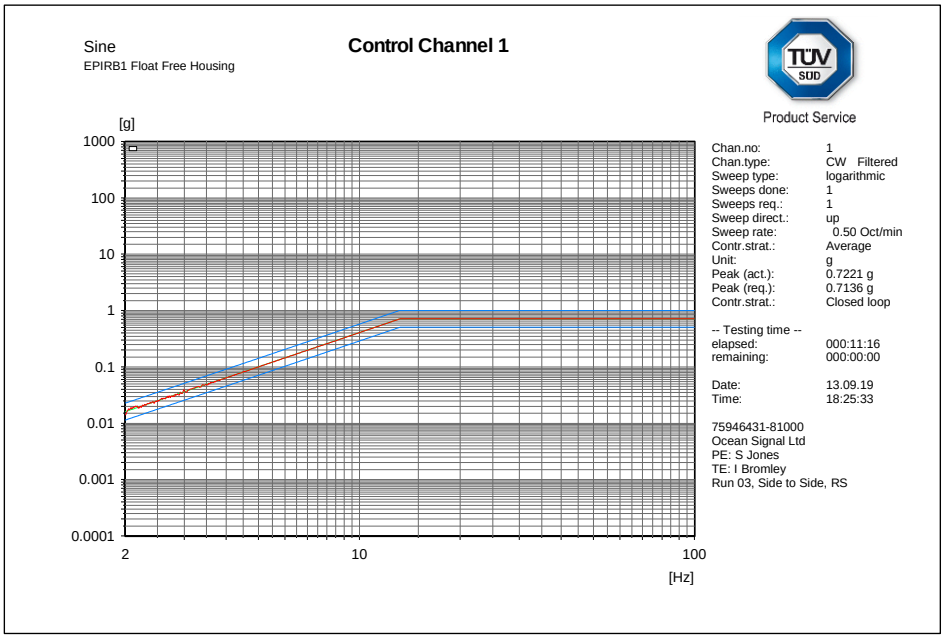
The EUT was subjected to a 2 hour dwell at each of the following resonant frequencies:

Axis	Resonant Frequency (Hz)
X	67.19
Y	84.51
Z	89.85

2.4.8 Test Results

X Axis

Resonant Search



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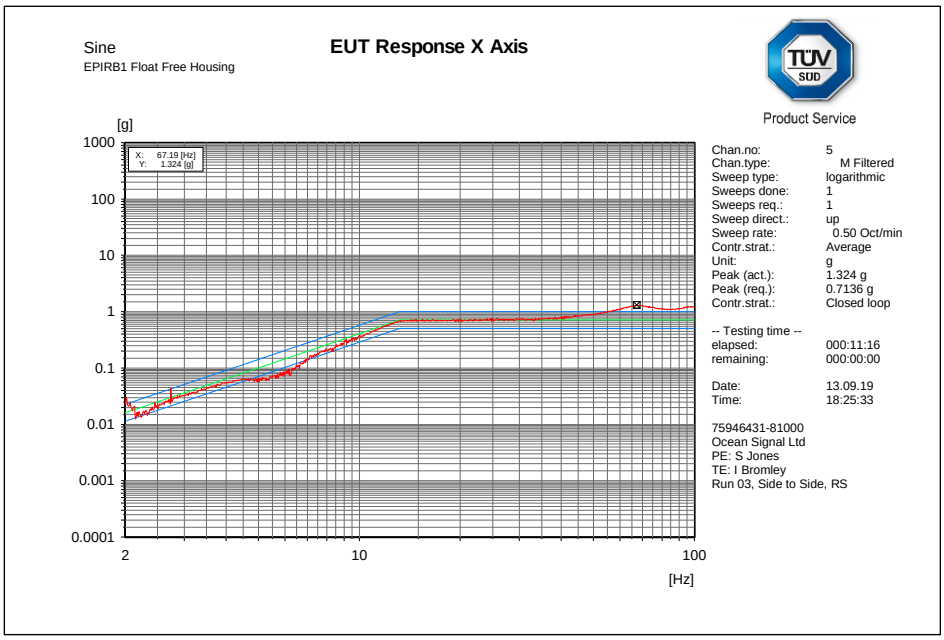

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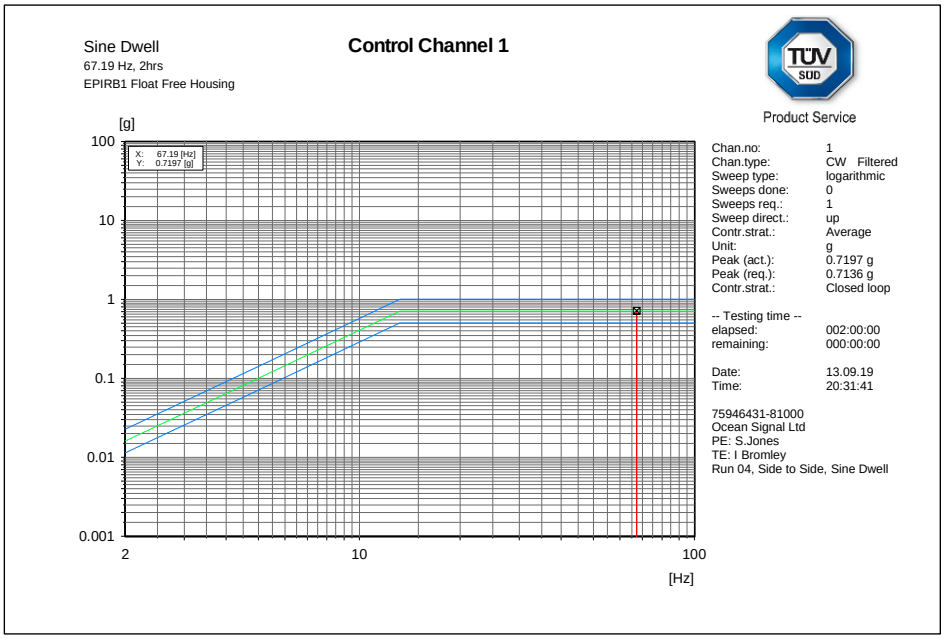
Endurance Run



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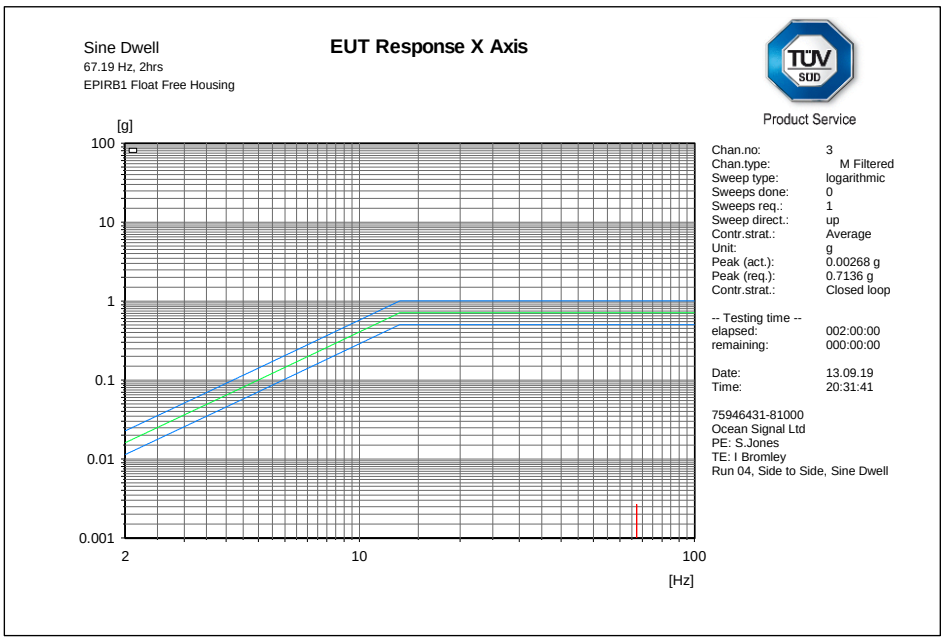

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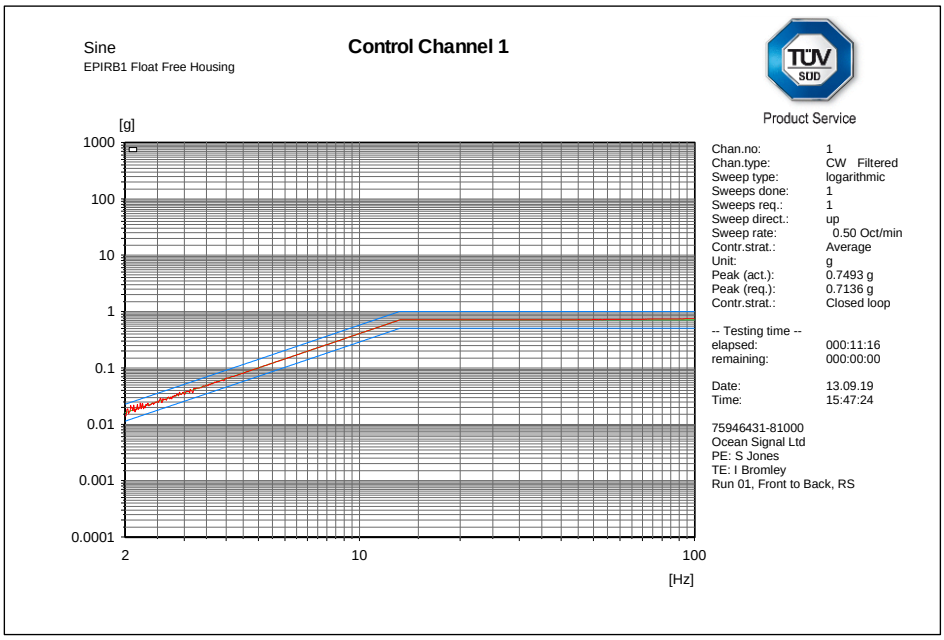
Y Axis

Resonant search



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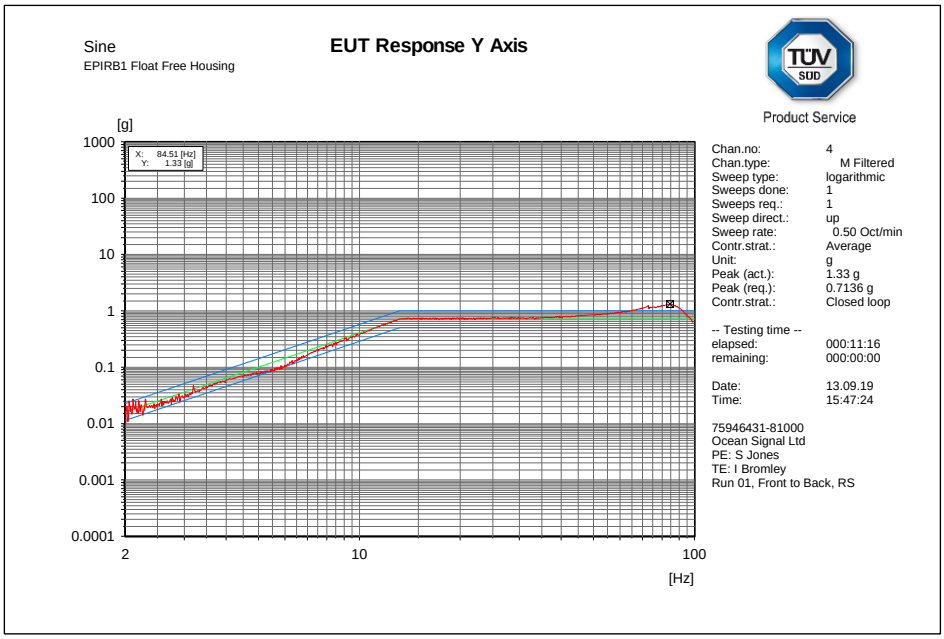

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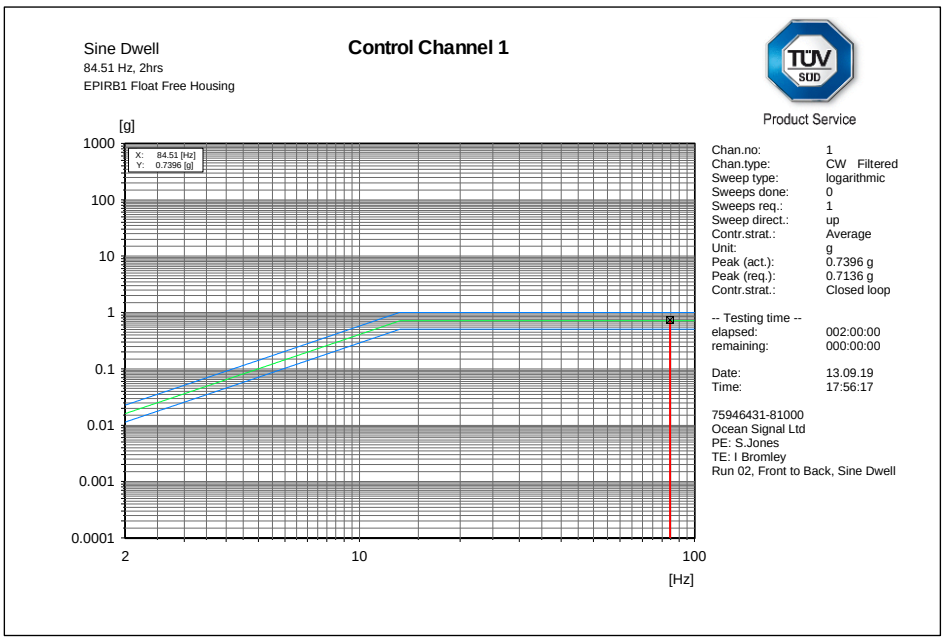
Endurance Run



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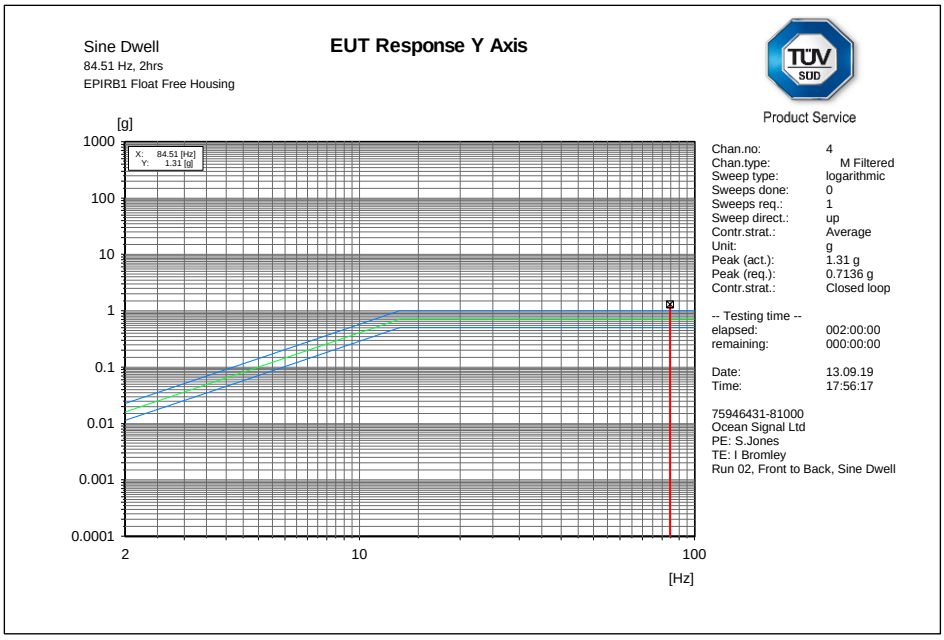
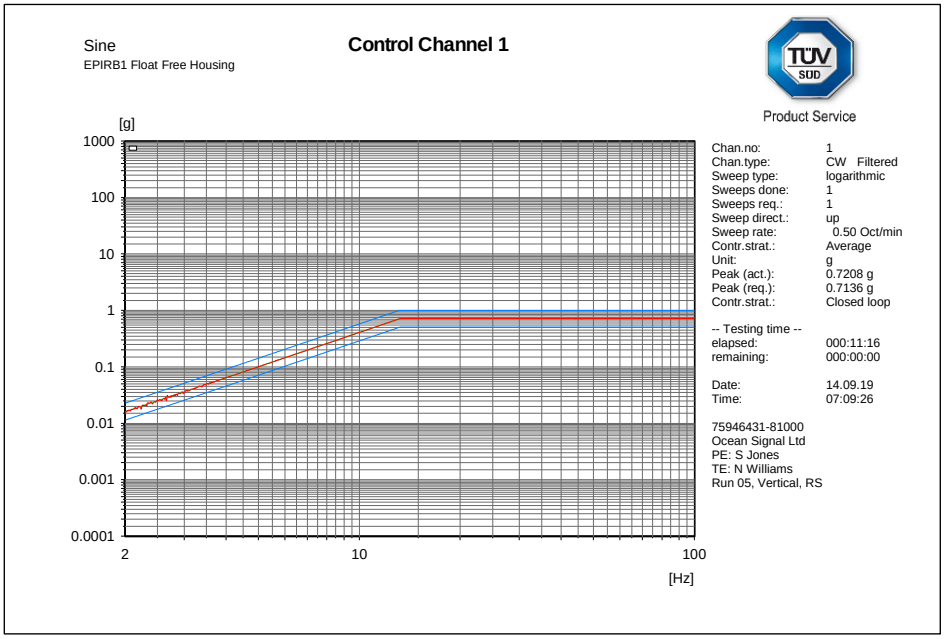


C:\VcpNT\Daten\m+p\Ocean Signal\75946431-81000\84.51Hz Dwell_001.rsd

Z Axis

Resonant Search



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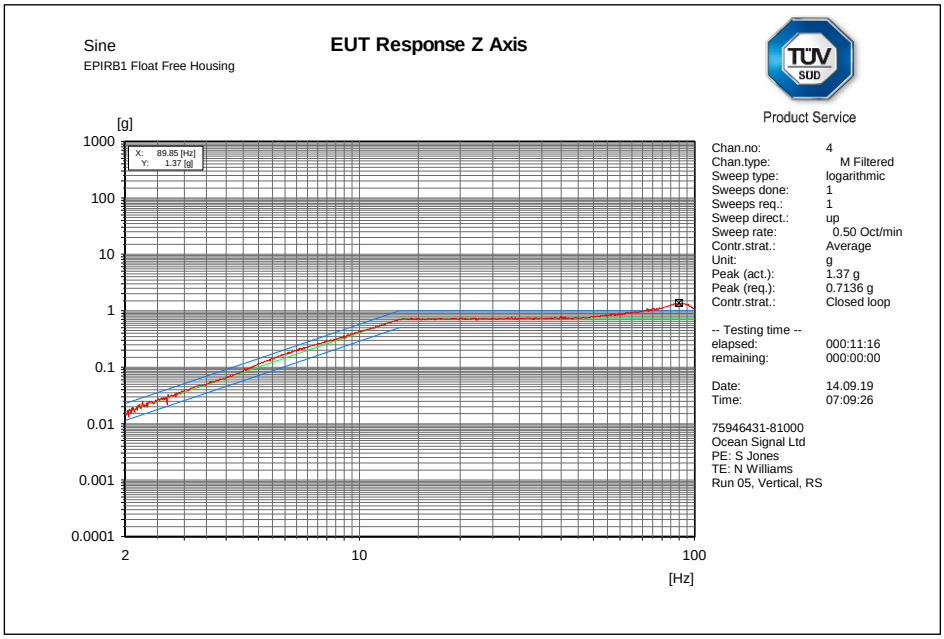

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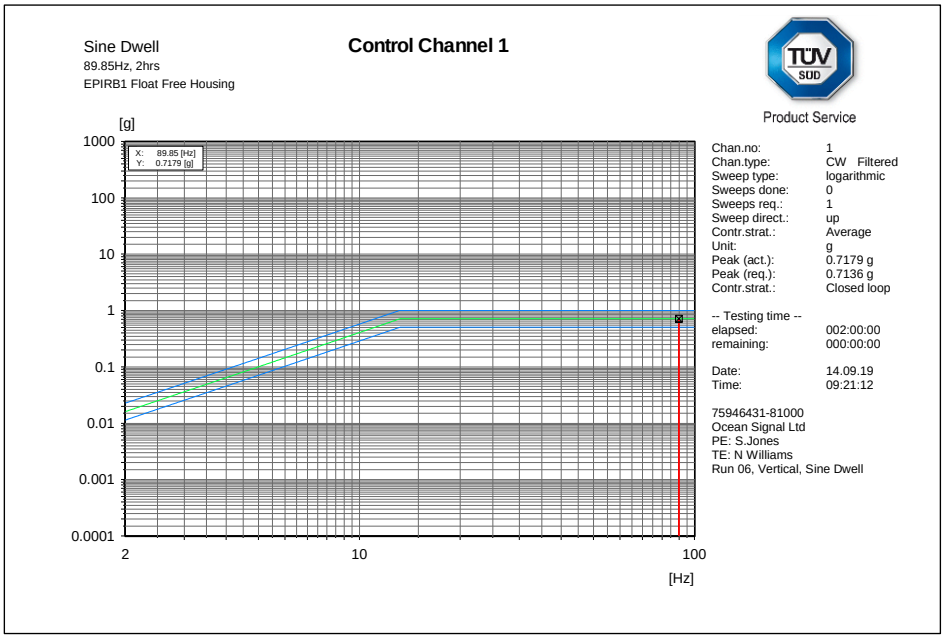
Endurance Run



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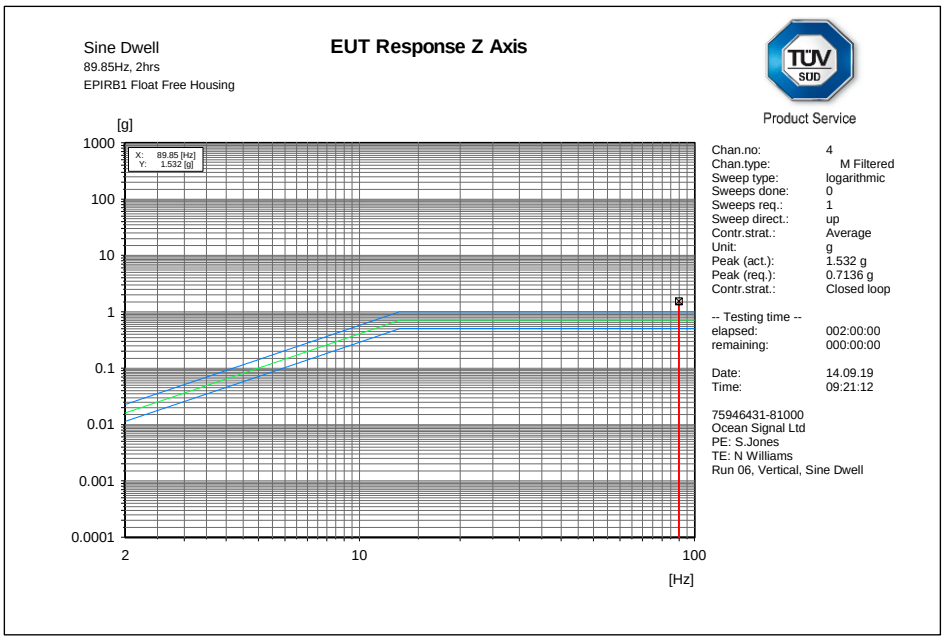

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EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message	FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
406 MHz Frequency	406.039984
121 MHz Presence	P

2.5 RUGGEDNESS TESTS

2.5.1 Specification Reference

RTCM 11000.3 ANNEX A (A.7) / IEC 61097-2, clause A.1.5

2.5.2 Equipment Under Test and Modification State

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001) - Modification State 0

2.5.3 Date of Test

14 September 2019

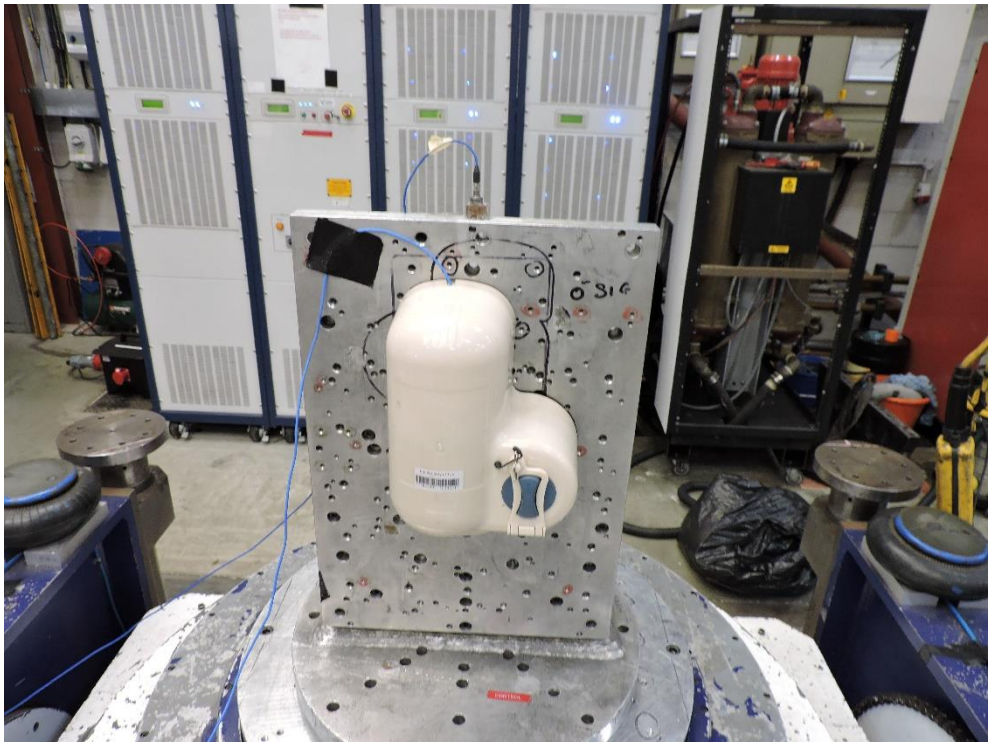
2.5.4 Test Equipment Used

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

2.5.5 Environmental Conditions

Ambient Temperature 23.0 – 25.8°C
Relative Humidity 40.8 - 46.2%

2.5.6 Test Setup

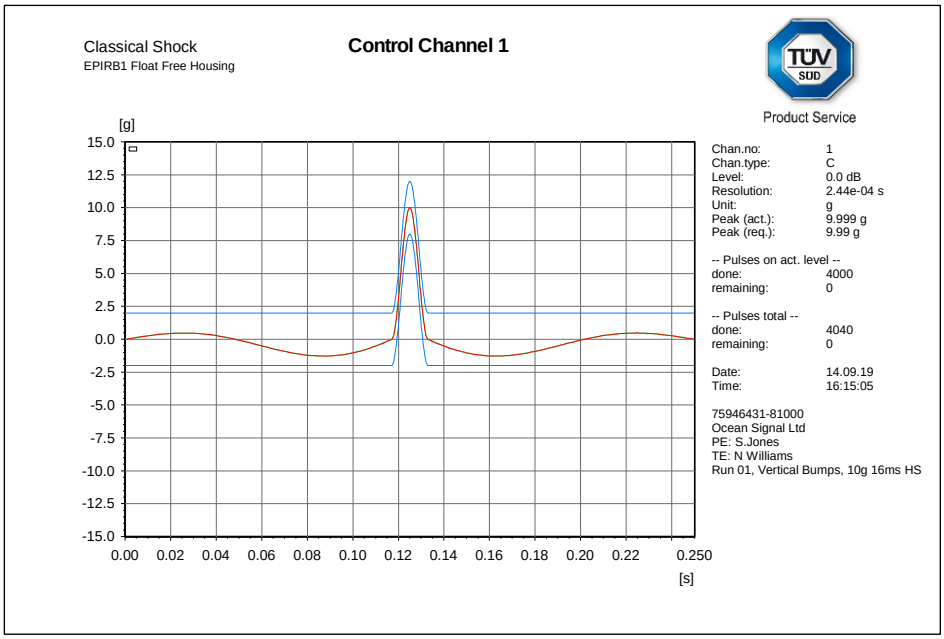


2.5.7 Test Method

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

– 4000 bumps
– Vertical axis
– 10g
– Half sine
– 16ms.

2.5.8 Test Results



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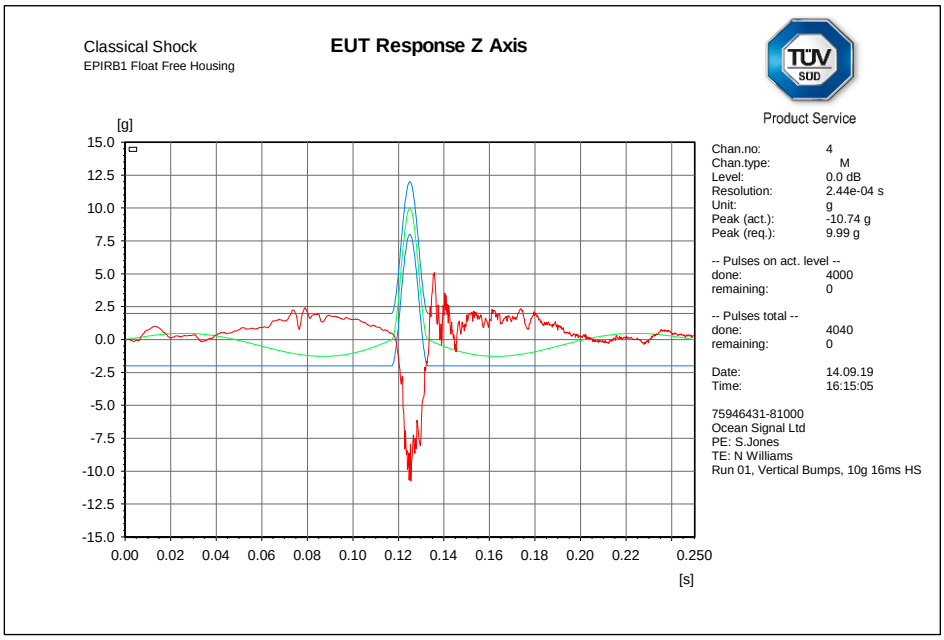


C:\VcpNT\Daten\m+p\Ocean Signal\75946431-82000\Bump 10g 6mm HS_002.rcs

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message	FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
406 MHz Frequency	406.039984
121 MHz Presence	P

2.6 AUTOMATIC RELEASE MECHANISM AND AUTOMATIC ACTIVATION TEST FOR CLASS 1 AND CLASS 2 SATELLITE EPIRBS (FLOAT FREE TESTS)

2.6.1 Specification Reference

RTCM 11000.3 ANNEX A / IEC 61097-2, clause A.2.2 (5.2.1 Tests for float free arrangements)

2.6.2 Equipment Under Test and Modification State

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001) - Modification State 0

2.6.3 Date of Test

03 October 2019 – 04 October 2019

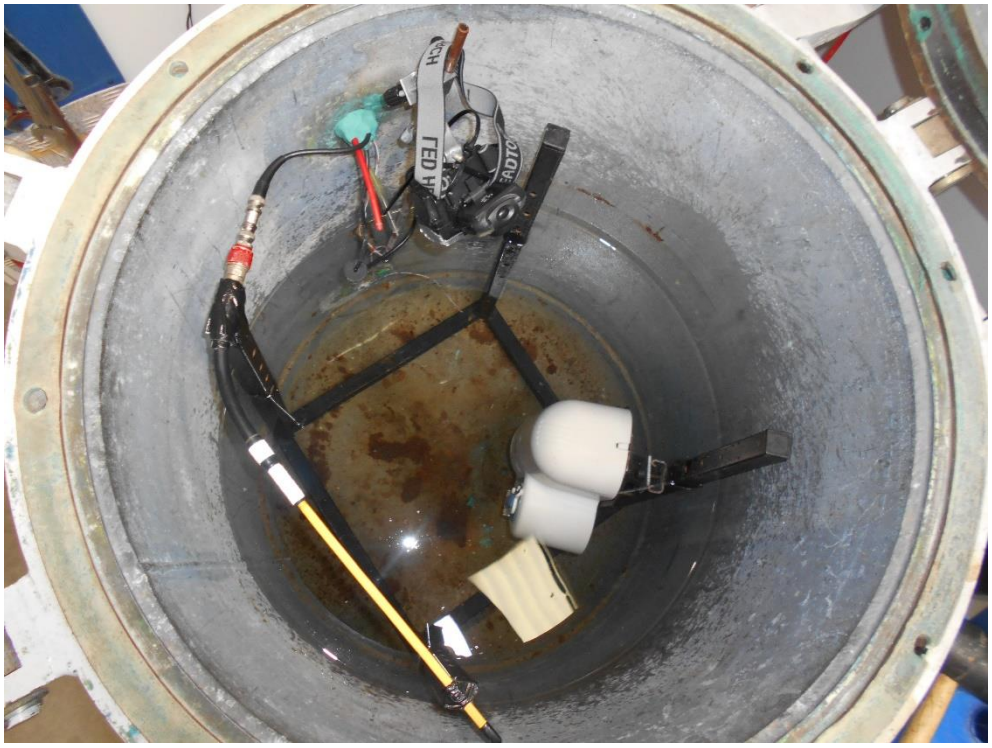
2.6.4 Test Equipment Used

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

2.6.5 Environmental Conditions

Ambient Temperature 22°C
Relative Humidity 35 - 45%

2.6.6 Test Setup



2.6.7 Test Method

The float free housing (with the EUT installed) was fixed to a test fixture in the normal mounting position. The test fixture was loaded into the pressure vessel and filled with water. A camera mounted inside the pressure vessel was set to monitor the release of the EPIRB from the housing.

The test was repeated with the float free housing rotated in the following orientations:

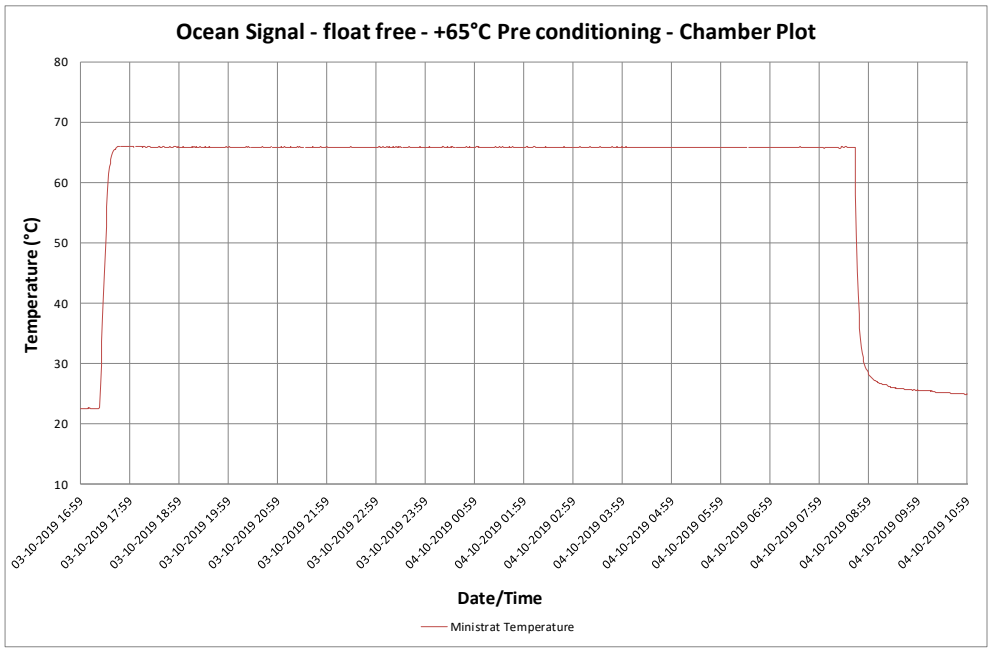
rolling 90° to starboard;
rolling 90° to port;
pitching 90° bow down;
pitching 90° stern down;
upside-down position.

The test was repeated in the normal mounting position following a 16 hour soak at 65°C.

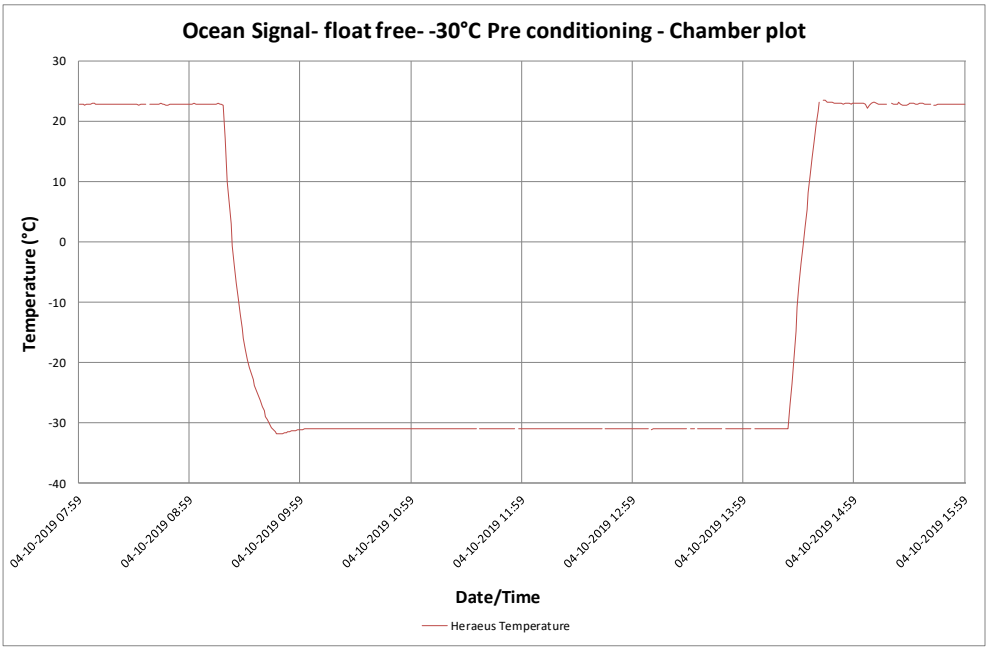
The test was repeated in the normal mounting position following a 4 hour soak at -30°C.

2.6.8 Test Results

High Temperature Plot



Low Temperature Plot



Test Results

Orientation of Float free housing	Simulated Depth of Release (m)
normal mounting position	2.1
rolling 90° to starboard	1.9
rolling 90° to port	1.8
pitching 90° bow down	1.9
pitching 90° stern down	1.8
upside-down position	2.0
Normal mounting position (+65°C)*	0.1
Normal mounting positions (-30°C)	1.6

The EUT shall be automatically released and float free of the mounting before reaching a depth of 4 m.

*It was not possible to reset the HRU following the +65°C EPIRB release test, therefore a second HRU was used for the final test at -30°C.

The EPIRB was released and activated during each release.

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001)

Parameter	Result
Self-test Mode:	
Self-test Message	FFFED08C9EF9C0637FDFF83D15B783E0F66C
Normal Mode:	
Normal Message	FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
406 MHz Frequency	406.039971
121 MHz Presence	P

2.7 TEST TO PREVENT RELEASE WHEN SEA WATER WASHES OVER THE UNIT (NOT UKAS ACCREDITED)

2.7.1 Specification Reference

RTCM 11000.3 ANNEX A / IEC 61097-2, clause 5.5.1.1

2.7.2 Equipment Under Test and Modification State

EPIRB1 Pro (S/N 0409190T) - Modification State 0
NEW FLOAT FREE HOUSING - Modification State 0

2.7.3 Date of Test

11 July 2019

2.7.4 Test Equipment Used

Not Applicable.

2.7.5 Test Setup

2.7.6 Test Method

The EUT was installed in the float free housing and fixed to a test rig in the bulk head mounting position, ready for the water test. The water spray (measured at approximately 2400 l/min) was directed at 5 faces of the EUT for 1 min in each face. The five faces were:

Bulkhead mount: face on
Bulkhead mount: 45 degrees to the left
Bulkhead mount: 45 degrees to the right
Bulkhead mount: 90 degrees to the left
Bulkhead mount: 90 degrees to the right

Test Results

All faces: No visible damage to enclosure which remained closed throughout test. No visual activation of beacon.

2.8 SOLAR RADIATION

2.8.1 Specification Reference

RTCM 11000.3 ANNEX A (A.11) / IEC 61097-2, clause 5.17.9

2.8.2 Test Details

Manufacturer waiver request - see Annex A.

2.9 OIL RESISTANCE

2.9.1 Specification Reference

RTCM 11000.3 ANNEX A (A.11) / IEC 61097-2, clause 5.17.10

2.9.2 Test Details

Manufacturer waiver request - see Annex A.

2.10 CORROSION TEST

2.10.1 Specification Reference

RTCM 11000.3 ANNEX A (A.11) / IEC 61097-2, clause 5.17.11

2.10.2 Test Details

Manufacturer waiver request - see Annex A.

2.11 COMPASS SAFE DISTANCE

2.11.1 Specification Reference

RTCM 11000.3 ANNEX A / IEC 61097-2, clause 5.20

2.11.2 Equipment Under Test and Modification State

EPIRB1 Pro (TSR003) with NEW FLOAT FREE HOUSING (TSR001) - Modification State 0

2.11.3 Date of Test

04 October 2019

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

Ambient Temperature 14.0°C
Relative Humidity 94%

2.11.6 Test Details

A wooden table aligned E-W was used with a compass set in the centre, aligned to read zero. The table was marked to give a graduated scale of distance. The EUT was moved towards the compass until a standard deviation of 0.3° was obtained.

Each orientation of the EUT was tested in this manner with the measurement distance between the compass centre and the EUT being noted.

The test was repeated with readings taken when the compass gave a steering deviation of 0.9°.

The local area Magnetic Flux density (H) at the site of testing was 19.2 uT.

The above testing was performed three times with the EUT as follows:

a. Unpowered.
b. Normalised.
c. Power applied.

Prior to performing the tests in accordance with part b above, the EUT was normalised by placing it into Helmholtz Coil Assembly and subjecting it to a magnetic field of 79A/m.

The test was applied in accordance with the test method requirements of RTCM 11000.3.

2.11.7 Test Results

Standard Compass safe distance (mm)	800
Emergency Compass safe distance (mm)	500

Horizontal maximum flux density, Magnetic North (H)	H	19.2
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	780	500	740	470	200	0.5 @ 170 mm
Top	220	0.4 @ 170 mm	220	0.4 @ 170 mm	200	0.6 @ 170 mm
Left Hand Side	260	0.5 @ 170 mm	380	0.5 @ 170 mm	220	0.5 @ 170 mm
Right Hand Side	450	230	380	210	200	0.4 @ 170 mm
Underside	350	190	320	220	200	0.3 @ 170 mm
Rear	620	480	650	500	270	0.7 @ 170 mm

Where readings have been annotated with “@ 170 mm”, this states the deflection caused by the EUT at the compass boundary.

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 2.2 Climatic – Dry Heat					
Beacon Tester	WS Technologies	BT 100S	87	-	TU
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	09-Oct-2019
Chamber	Heraeus	HC 4033	2174	12	05-Jul-2020
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	26-Apr-2020
Section 2.3 Climatic – Humidity					
Beacon Tester	WS Technologies	BT 100S	87	-	TU
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	09-Oct-2019
Chamber	Heraeus	HC 4033	2174	12	05-Jul-2020
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	26-Apr-2020
Section 2.4- Vibration					
Charge Amp	Endevco	133	2501	12	20-Nov-2019
Vibration Controller	m + p International	Vibpilot 8	3769	12	10-Jul-2020
Shaker	Ling Dynamic Systems	A340	4294	6	05-Mar-2020
IEPE Accelerometer	Dytran	3049E1	5088	6	25-Oct-2019
IEPE Accelerometer	Dytran	3049E1	5089	6	18-Oct-2019
Accelerometer triaxial (2Hz to 3.15KHz)	PCB Piezotronic	356A43	5309	6	02-Feb-2020
Charge Amp	Endevco	133	2501	12	20-Nov-2019
Section 2.6- Automatic Release Mechanism and Automatic Activation (Float Free Tests)					
Over Pressure (T)	ASL (TUV)	0 TO 15 PSI	2125	-	TU
Climatic Chamber	Unitemp	Ministrat	2129	12	20-Feb-2020
Chamber	Heraeus	HC 4033	2174	12	05-Jul-2020
Pressure Indicator	Druck	DPI 700	2343	12	11-Apr-2020
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3784	12	24-Jun-2020
Bench Scales	Kern-Sohn	CKE16K0.05	4647	12	20-Mar-2020
Type T PFA Insulated Thermocouple	TC Limited	Type-T	4739	12	23-Jul-2020
Section 2.5 Ruggedness					
Charge Amp	Endevco	133	2501	12	20-Nov-2019
Vibration Controller	m + p International	Vibpilot 8	3769	12	10-Jul-2020
Shaker	Ling Dynamic Systems	A340	4294	6	05-Mar-2020
IEPE Accelerometer	Dytran	3049E1	5089	6	18-Oct-2019
Accelerometer triaxial (2Hz to 3.15KHz)	PCB Piezotronic	356A43	5309	6	2-Feb-2020
Section 2.11 Compass Safe Distance					
Sussex Helmholtz Coil	Various	88771	327	-	TU
Compass Verification Unit	TUV SUD	CVU	3579	-	TU
Marine Binnacle Compass with Repeater Display	Cassens & Plath	Compass: Type 11	3834	-	TU

TU – Traceability Unscheduled

3.2 MEASUREMENT UNCERTAINTIES

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

Test Name	Measurement Uncertainty
Compass safe distance	+/- 0.1 degrees

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.

SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Front View

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Measurement Uncertainty Decision Rule
Determination of conformity with the specification limits is based on the result of the compliance measurement and does not take into account measurement instrumentation uncertainty. Measurement system uncertainty is calculated, as indicated above, in accordance with the appropriate guidelines detailed within the specification of test.

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).

ANNEX A

MANUFACTURER SUPPLIED INFORMATION

ocean SIGNAL

Unit 4
Ocean Way
Margate
Kent
CT9 4NN

telephone
+44 (0)1843 282000

email
info@oceansignal.com

web
www.oceansignal.com

14 November 2019

Subject EPIRB1 Pro & ARH1 Pro Material Waiver and Disclosure Information Tests

To Whom It May Concern:

IEC 60945 stipulates that where a manufacture can produce evidence that the components, materials and finishes employed in the equipment would satisfy the following tests then the tests shall be waived:

- Corrosion (Salt Mist) IEC 60945 (8.12)
- Solar Radiation IEC 60945 (8.10)
- Oil resistance IEC 60945 (8.11)

In this instance Ocean Signal Limited claim, for one or more of the reasons listed below that these criteria are met for the EPIRB1 Pro & ARH1 Pro Cospas/Sarsat Float Free EPIRB and therefore make application that the tests be waived.

1 The materials have a proven history of service in a marine environment, either from use in Ocean Signal's existing approved product range, or by implication from a long-established history of exposure without effect e.g. Stainless steel).

2 The material manufacturer has conducted equivalent testing and has declared the product as being immune to these effects in the relevant data sheet.

3 Ocean Signal Limited, in house testing has proven the materials to be immune to the cause of degradation (e.g. oil resistance)

4 Ocean Signal Limited has previously had the materials tested on other approved products which demonstrated the materials conformance to the test requirements.

Registration No
6827101

Vat No
838 4374 89

Registered Office
Second Floor 26-33
Building 6000,
Langstone
Technology Park,
Langstone Road,
Havant, PO9 1SA

Ocean Signal Limited hereby declares that the materials used in the construction of the EPIRB1 Pro & ARH1 Pro as here-in listed are not affected by the degrading agents listed above.

Signed on behalf of Ocean Signal Limited.

Wayne Card

Senior Engineer

The following is a list of components and materials used in the EPIRB1 Pro & ARH1 Pro that are in direct contact with the marine environment.

Base EPIRB1 Class 2	PC/PBT
Lanyard reel EPIRB1	PC/PBT
Top With lens EPIRB1	PC/PBT
Strobe Lens EPIRB1	PMMA
Antenna Protector	PP
EPIRB1 FF antenna housing	PC/PBT
EPIRB1 FF Flap	PC/PBT
Lanyard Cover EPIRB1	Neoprene
Lanyard	PP Cord
Antenna seal EPIRB1	Neoprene
Antenna housing seal EPIRB1	Silicone Rubber
Antenna Pin	316 Stainless Steel
Antenna EPIRB1 FF	Polyester coated Stainless steel
Flap Spring	304 stainless Steel
Flap Axel	316 stainless Steel
Water Contact	316 stainless steel
Coloured Labels	Lexan
MRH Housing cover	ASA
MRH housing rear	ASA
MRH weight cover	ASA
MRH knob flap	ASA
MRH Hinge block	ASA
MRH R clip block	ASA
Vent seal	Santropene
R clip tether	Neoprene
Chamber HRU	PA6
Chamber cover HRU	PA6
Release Jaw HRU	PA6
Spring float free release	304 Stainless Steel
Spring HRU cover release knob	304 Stainless Steel

Release pin HRU	PA6
Release Knob HRU	PC
Release Plate HRU	PC
Screws	Stainless Steel A2
Break off cover	PMMA
O-ring's	Silicone rubber
Bungs	Santropene
Clear labels	Polyester