PUBLIC ENTERPRISE TESTING CENTER «OMEGA»

Approved by
Director
PE TC "OMEGA"

Belikov N.I.
31 January, 2013

TEST REPORT No. 12/1093

Issue 1

Personal Locator Beacon (PLB)
for compliance with RTCM Standard 11010.2

Models	**rescueME PLB1**
	rescueME PLB2
Manufacturer	**Ocean Signal Ltd., Great Britain**

Sevastopol
2013

PUBLIC ENTERPRISE TESTING CENTER «OMEGA»

P.O.B. No.37, Sevastopol, 99053, Ukraine
Phone: +380 692 537 072
Fax: +380 692 469 679
E-mail: stcomega@stc-omega.biz

ACCREDITATION

COSPAS-SARSAT Secretariat
Reference No. CS497/F530 dated 21/09/1994

Ministry of Transport Russian Federation Certificate of accreditation of testing laboratory No. АКР.0510-14 PTH dated 19.05.2010 valid until 19.05.2015

Russian Maritime Register of Shipping Certificate of Recognition testing laboratory No.12.61074.184 dated 21.08.2012 valid until 21.08.2017

National Accreditation Agency of Ukraine Certificate of accreditation for compliance DSTU ISO 17025:2006 No. 2H339 dated 18.05.2012 valid until 17.05.2014

Letter of FCC acceptance #181479
dated August 18, 2011

IC registration of 3/10m OATS #8780A-1
dated January 18, 2010

IC registration of 3m alternative test site #8780A-2 dated January 18, 2010

BABT Certificate of Recognition testing laboratory No.LAB/033 dated 30.06.2012 valid until 30.06.2014

Letter of USCG Acceptance for testing EPIRBs #16714/161.011/OMEGA dated February 7, 2008

Accreditation certificate No. AAC.T.00130 dated 28.10.2012 valid until 28.10.2014 issued by AAC "Analitica", Full Member and Signatory to ILAC and APLAC Mutual Recognitions Arrangements (www.aac-analitica.ru)

Equipment under test	Personal Locator Beacon (PLB) 406 MHz COSPAS–SARSAT models: rescueME PLB1, rescueME PLB2
Manufacturer	Ocean Signal Limited, Unit 4, Ocivan Way, Margate, Kent, CT9 4NN, United Kingdom
Applicant	Ocean Signal Limited, Unit 4, Ocivan Way, Margate, Kent, CT9 4NN, United Kingdom
Technical officer	
Name	Simon Nolan
Title	Technical Director
Phone	+44 (0)1843 282931
E-mail	simon.nolan@OceanSignal.com
Test commencement date	30.10.2012
Test completion date	30.01.2013

CONTENTS

Report Issue History		
No	**Data of issue**	**Report reissue reason**
1	31.01.2013	The initial issue

1. EQUIPMENT UNDER TEST

1.1 Equipment category	Personal Locator Beacon (PLB) 406 MHz COSPAS–SARSAT
1.2 Equipment type	Personal Locator Beacon (PLB)
1.3 Equipment model*	rescueME PLB1 rescueME PLB2
1.4 Cospas-Sarsat equipment class	Class 2 (operating temperature range - 20°C to +55°C)
1.5 RTCM PLB category	Category 2 - Not required to float in fresh water
1.6 Equipment serial number	TA1 (PLB1 conducted unit configured so that antenna port could connect to the 50 Ohms test system using coaxial cable), TA5 (PLB1 radiated unit which is similar to the proposed production beacons equipped with its proper antenna) TA3 (PLB2 radiated unit which is similar to the proposed production beacons equipped with its proper antenna) TA4 (PLB2 conducted unit configured so that antenna port could connect to the 50 Ohms test system using coaxial cable)
1.7 Equipment destination	Alarm message transmission of distressed accident via COSPAS-SARSAT satellite system
1.8 Equipment software/firmware version**	issue 00.02 (tested since 30.10.2012 till 01.11.2012) issue 00.03 (tested since 02.11.2012 till 21.11.2012) issue 00.04 (tested since 21.11.2012 till 04.12.2012) issue 00.06 (tested since 19.12.2012 till 30.01.2013)

Note*. PLB model rescueME PLB2 is non GPS variant of model rescueME PLB1. Differences between variants are stated by manufacturer in document “T.007: 5.q differences between variants” (see Annex 16).

Note**. Modification of software is described in manufacturer’s letter (see Annex 17).

2. MODIFICATIONS OF THE TEST SAMPLES DURING TESTING

2.1 After successful completion of the Vibration test PLB1 TA5 required battery replacement. During the assembly of PLB1 TA5, cracking of the lid and case was observed. This cracking was caused by over tightening of the screws. The lid and case were changed for new ones and the unit assembled to the correct torque before the commencement of the Bump test.

2.2 Additional label was added to the case of PLB1 TA5 before thermal shock because first thermal shock failed – ingress of water was found.

2.3 Electronics of PLB1 TA5 before thermal shock were changed because the electronics were damaged by direct impact of water ingress when the first thermal shock test failed.

3. TEST PURPOSE

The purpose of tests is to confirm compliance of PLB model rescueME PLB1 with RTCM Standard 11010.2 (2012) for 406 MHz satellite personal locator beacons (PLBs).

4. TEST CONDITIONS AND METHODS

Procedures, conditions and methods of testing correspond to requirements and methods of RTCM Standard 11010.2 (2012) and IEC60945 (2002).

5. TEST PROGRAM

No.	Test name	Requirements RTCM 11010.2	Methods RTCM 11010.2
1.	Performance check	A.1.13	A1.11
2.	Dry heat tests (storage and functional)	A.3	IEC60945, §8.2
3.	Damp heat test	A.4	IEC60945, §8.3
4.	Low temperature tests (storage and functional)	A.5	IEC60945, §8.4
5.	Vibration tests	A.6	IEC60945, §8.7
6.	Bump test	A.7	A.7
7.	Corrosion test*	A.8	A.8
8.	Drop test	A.9	A.9 IEC60945, §8.6.1
9.	Thermal shock	A.10	A.10 IEC60945, §8.5
10.	Immersion test	A.11	A.11 IEC60945, §§8.9.2, 8.9.3
11.	Spurious emissions test	A.12	A.12
12.	Operational life test	A.13.1	A.13.1
13.	Self-test	A.13.2	A.13.2
14.	COSPAS-SARSAT type approval procedure	A.14	C/S T.007
15.	121.5 MHz auxiliary radio-locating device transmitter test	A.16	A.16
16.	Solar radiation test*	A.17	A.17
17.	Oil resistance test*	A.18	A.18
18.	Compass safe distance test	A.19	IEC60945, §11.2
19.	Miscellaneous tests	A.20	A.20

Note *. Waiver requests have been provided for Corrosion (A.8), Solar Radiation (A.17) and Oil Resistance (A.18). See Annex 18, manufacturer's document "rescueME Material waiver and Disclosure Information".

6. TEST SCHEDULE

No.	Test name	Dates of test	Notes
1.	Performance check	30.10.2012	SW issue 00.02
2.	Dry heat tests (storage and functional)	30.10.2012 - 31.10.2012	SW issue 00.02
3.	Damp heat test	31.10.2012 - 01.11.2012	SW issue 00.02
4.	Low temperature tests (storage and functional)	01.11.2012- 02.11.2012	SW issue 00.02
5.	Vibration tests	05.11.2012 - 06.11.2012	SW issue 00.03
6.	Bump test	08.11.2012	SW issue 00.03
7.	Drop test	15.11.2012	SW issue 00.03
8.	Thermal shock	10.01.2013 - 12.01.2013	SW issue 00.06
9.	Immersion test	15.11.2012 (TA3) 12.01.2013 (TA5)	SW issue 00.03 SW issue 00.06
10.	Spurious emissions test	29.11.2012 - 30.11.2012	SW issue 00.04
11.	Operational life test	24.12.2012 - 25.12.2012	SW issue 00.06
12.	Self-test	03.11.2012 - 07.11.2012	SW issue 00.03
13.	COSPAS-SARSAT type approval procedure	19.12.2012 - 28.12.2012	SW issue 00.06
14.	121.5 MHz auxiliary radio-locating device transmitter test	02.11.2012, 06.11.2012 03.12.2012 - 04.12.2012	SW issue 00.03 SW issue 00.04
15.	Compass safe distance test	07.11.2012	SW issue 00.03
16.	Miscellaneous tests	10.12.2012 - 30.01.2013	SW issue 00.04 SW issue 00.06

7. CONCLUSION

Name and Location of Beacon Test Facility: **PUBLIC ENTERPRISE TESTING CENTER «OMEGA»**
Vakulenchuka, 29
Sevastopol, 99053
Ukraine

Date of Submission for Testing: **30.10.2012**

Applicable Standard:

Document	Edition
RTCM 11010.2	2012

I hereby confirm that the 406 MHz beacon model rescueME PLB1 and rescueME PLB2 described above have been successfully tested in accordance with the applicable standard (except A.8, A.17, A.18 for which waiver requests have been provided) and complies with the requirements as demonstrated in the attached report.

Dated January 31, 2013 Signed

V. Kovalenko
Department manager

8. SUMMARY OF TEST RESULTS

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			Tmin (-20°C)	Tamb (+20°C)	Tmax (+55°C)	
1. PERFORMANCE CHECK (A.1.13)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 1
• Visual Inspection	No Damage	√		√		
• Carrier Frequency	406.040 ± 0.001	MHz		406.0399		
• Digital message	15 Hex / 30 Hex Correct	√		√		
• 121.5 MHz Homer	Functional	√		√		
Note Wherever a Performance Check is called for in these Test Results Tables it also includes a Visual Inspection of the PLB						
rescueME PLB1, s/n TA5						Result: Pass, Annex 1
• Visual Inspection	No Damage	√		√		
• Carrier Frequency	406.040 ± 0.001	MHz		406.0401		
• Digital message	15 Hex / 30 Hex Correct	√		√		
• 121.5 MHz Homer	Functional	√		√		
rescueME PLB3, s/n TA4						Result: Pass, Annex 1
• Visual Inspection	No Damage	√		√		
• Carrier Frequency	406.040 ± 0.001	MHz		406.0401		
• Digital message	15 Hex / 30 Hex Correct	√		√		
• 121.5 MHz Homer	Functional	√		√		
rescueME PLB2, s/n TA3						Result: Pass, Annex 1
• Visual Inspection	No Damage	√		√		
• Carrier Frequency	406.040 ± 0.001	MHz		406.0402		
• Digital message	15 Hex / 30 Hex Correct	√		√		
• 121.5 MHz Homer	Functional	√		√		
2. DRY HEAT TEST (A.3)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 2
• After Storage repeat Performance Check (See 1 above)	Pass / Fail	√			√	
• During Functional Test carry out following:						
PERFORMANCE TEST						
- 406 Transmitter Output Power	Rise Time <5ms 37dBm ± 2dB	√ dBm			√ 36.02	
- Digital message	Valid	√			√	
- Bit Rate and Stability	400 bps ± 1%	bps			400.05 to 400.18	
- 406 Modulation	Phase Dev ± 1.1 Rad ± 0.1 Rad	Rad			1.08 to 1.10 -1.13 to -1.15	
- 406 Frequency	406.040 ± 0.001	MHz			406.0399	
- 406 Spurious Output	Within emission mask	√			√	

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			Tmin (-20°C)	Tamb (+20°C)	Tmax (+55°C)	
• After Functional Test repeat Performance Check	Pass / Fail	√			√	
3. DAMP HEAT TEST (A.4)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 3
• During Functional Test carry out Performance Check	Pass / Fail	√			√	
4. LOW TEMP TEST (A.5)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 4
• After Storage repeat Performance Check	Pass / Fail	√	√			
• During Functional Test carry out following:						
PERFORMANCE TEST						
- 406 Transmitter Output Power	Rise Time <5ms 37dBm ± 2dB	√ dBm	√ 36.32 to 36.37			
- Digital message	Valid	√	√			
- Bit Rate and Stability	400 bps ± 1%	bps	400.06 to 400.20			
- 406 Modulation	Phase Dev ± 1.1 Rad ± 0.1 Rad	Rad	1.09 to 1.12 -1.06 to -1.04			
- 406 Frequency	406.040 ± 0.001	MHz	406.0399			
- 406 Spurious Output	Within emission mask	√	√			
• After Functional Test repeat Performance Check	Pass / Fail	√	√			
rescueME PLB1, s/n TA5						Result: Pass, Annex 4
• After Storage repeat Performance Check	Pass / Fail	√	√			
• Visual Inspection	No Damage	√	√			
• Carrier Frequency	406.040 ± 0.001	MHz	406.0402			
• Digital message	15 Hex / 30 Hex Correct	√	√			
• 121.5 MHz Homer	Functional	√	√			
	Pass / Fail	√	√			
• After Functional Test repeat Performance Check						
5. VIBRATION TEST (A.6)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 5
• During Test no Activation	No activation during test	√		√		
• After Test carry out Performance Check	Pass / Fail	√		√		
6. BUMP TEST (A.7)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 6
• During Test no Activation	No activation during test	√		√		
• After Test carry out Performance Check	Pass / Fail	√		√		

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			Tmin (-20°C)	Tamb (+20°C)	Tmax (+55°C)	
7. DROP TEST (A.9)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 7
• During Test no Activation	No activation during test	√	√			
• After Test carry out Performance Check and examine exterior for signs of damage	Pass / Fail	√	√			
8. THERMAL SHOCK (A.10)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 8
• After test examine for Signs of Water Ingress	No evidence of water ingress	√		√		
• After Test carry out Performance Check	Pass / Fail	√		√		
9. IMMERSION TEST (A.11)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 9
• After Test carry out Performance Check	Pass / Fail	√		√		
• Open unit and examine for signs of any water ingress	No water	√		√		
rescueME PLB2, s/n TA3						Result: Pass, Annex 9
• After Test carry out Performance Check	Pass / Fail	√		√		
• Open unit and examine for signs of any water ingress	No water	√		√		
10. SPURIOUS EMISSIONS TEST (A.12)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 10
• Close In Emissions	Comply with Figure 2 and Figure 6	√	√	√	√	
• Aeronautical, Maritime and Satellite Band Emissions	No signal to exceed 25µW in stated bands	√		√		
11. OPERATIONAL LIFE AND SELF TESTS (A.13)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 11
• Operational Life	24 Hours min	√	√ 33:00:22 hours			
• At start of and every 6 hours during and at end of Operational Life Test carry out PERFORMANCE TEST and 121 Output Power Test						
- 406 Transmitter Output Power	Rise Time <5ms 37dBm ± 2dB	√ dBm	√ 35.07 to 36.72			
- Digital message	Valid	√	√			
- Bit Rate and Stability	400 bps ± 1%	bps	400.01 to 400.21			
- 406 Modulation	Phase Dev ± 1.1 Rad ± 0.1 Rad	Rad	-1.02 to -1.07 1.08 to 1.13			
- 406 Frequency	406.040 ± 0.001	MHz	406.0399 to 406.0399			
- 406 Spurious Output	Within emission mask	√	√			

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			Tmin (-20°C)	Tamb (+20°C)	Tmax (+55°C)	
- 121 Peak Envelope Output Power	Value	dBm	15.90 to 16.80			
	Confirm all 6 hourly tests passed	√	√			
12. OPERATIONAL LIFE AND SELF TESTS (A.13.2)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 12
• Self test						
- RF pulse duration	≤ 0.444 sec or ≤ 0.525 sec	√ sec	√ 0.51825	√ 0.51820	√ 0.51815	
- Frame synchronization pattern	0 1101 0000	√	√	√	√	
- Number of RF bursts	1-burst	√	√	√	√	
- Beacon 15 Hex ID	must be provided by self-test burst	√	√	√	√	
- 121.5 MHz transmission	≤ 1 sec / 3 sweeps	√	√	√	√	
13. COSPAS-SARSAT TYPE APPROVAL TESTS (A.14)	C/S Certificate (attach test report)	√				C/S TAC is awaited
rescueME PLB1, s/n TA1. TA5						C/S Test report No.12/1410
rescueME PLB1, s/n TA3. TA4						C/S Test report No.12/1312
14. 121.5 MHz AUXILIARY RADIO-LOCATING DEVICE TRANSMITTER TEST (A.16)						
rescueME PLB1, s/n TA1						Result: Pass, Annex 13
• Carrier Frequency	121.5 ± 0.006075	MHz	121.499		121.498	
• Transmitter Duty Cycle	Continuous - interrupted for up to a maximum of 2 seconds encompassing the 406 MHz burst and plus the additional time required for the Morse "P" transmission	√	√		√	
• Modulation						
- Frequency	700 Hz within range of 300 – 1600 Hz	Hz	350.0 1118		350.1 1118	
- Duty cycle	33 - 55	%	33.05 33.99 34.59		35.21 35.38 35.30	Near start Midpoint Near end
- Factor	0.85 – 1.0	√	0.9826		0.9866	
- Sweep repetition rate	2 - 4	Hz	2.83		2.82	
- Frequency Coherence	√	√	√		√	
• Morse Letter P						
- Dot length	115 ms ± 5%	ms	120		112	
- Dash length	345 ms ± 5%	ms	344		352	
- Gap	115 ms ± 5%	ms	112		112	
- Mod Frequency	1000 Hz ± 50 Hz	Hz	1003		1001	
rescueME PLB1, s/n TA5						Result: Pass, Annex 13
• PEIRP (radiated)	Median 14 – 20 dBm (25 – 100 mW)	dBm		15.96		
• Max PEIRP	Value	dBm		16,17		
• Min PEIRP	Value	dBm		15,80		
• Ratio Max – Min	<4:1 (<6dB)	dB		0.33:1		
• Off Ground Plane PEIRP	≥ 2 mW	mW		3.09		

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			Tmin (-20°C)	Tamb (+20°C)	Tmax (+55°C)	
15. COMPASS SAFE DISTANCE TEST (A.19)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 14
• Standard Compass Safe Distance	Mark Distance on PLB and / or in User Manual	m		0.35		
16. MISCELLANEOUS TESTS (A.20)						
rescueME PLB1, s/n TA5						Result: Pass, Annex 15
• A.20.1 Controls and Indicators						Note. For Section 16 of this table "√" denotes that the particular parameter or feature was inspected and observations reported at Annex 14 or that information provided by the manufacturer is at appropriate Annexes. No final decision or comment is made upon compliance
PLB complies with 4.4.1	Inspection	√		√		
Two independent step activation	Inspection	√		√		
Means to indicate previous activation	Inspection	√		√		
Visual or Audible indication of activation	Inspection	√		√		
• A.20.2 Self-test and GNSS Self Test Function						
Self Test automatically resets	Inspection	√		√		
Self Test has indication of activation	Inspection	√		√		
Manufacturers declaration complies with 4.4.2 a), b) and c)	Inspection	√		√		
• A.20.2 Self-test and GNSS Self Test Function						
GNSS Self Test (if applicable)						
Distinct Means of Operation	Inspection	√		√		
Prevents Inadvertent Operation	Inspection	√		√		
Distinct Pass / Fail Indicators	Inspection	√		√		
Manufacturers declaration complies with 4.4.2 c), d), e) and f)	Inspection	√		√		
• A.20.3 Battery						
Check manufacturer's declaration covers all aspects of 4.4.3	Inspection	√		√		
Battery non-hazardous	Inspection	√		√		
Includes safety measures	Inspection	√		√		
Life and Expiry Date justified	Inspection	√		√		
Labeling complies with 4.5.2.1	Inspection	√		√		
Manufacturer has provided evidence that Battery and Cells are either exempt from or meet UN Dangerous Goods regulations	Inspection	√		√		See Annex 20
• A.20.4 General Construction						
PLB complies with 4.5	Inspection	√		√		
• A.20.5 Exterior Finish						
PLB complies with 4.5.1	Inspection	√		√		

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			Tmin (-20°C)	Tamb (+20°C)	Tmax (+55°C)	
• A.20.6 Labeling						
Labeling complies with 4.5.2.2 to 4.5.2.2.4	Inspection	√		√		
Labeling tested for Abrasion Resistance	Inspect manufacturers report	√		√		See Annex 18
Instructions and Pictograms tested for Comprehension	Inspect manufacturers report	√		√		See Annex 18
• A.20.7 Documentation		√		√		
Manual complies with 4.5.3	Inspection					
Packaging complies with 4.5.4	Inspection	√		√		

Leading Engineer  E.Yurasov

ANNEX 1.
PERFORMANCE CHECK (A.1.13)

Equipment Under Test (EUT): 1) rescueME PLB1, s/n TA1
2) rescueME PLB1, s/n TA5
3) rescueME PLB2, s/n TA3
4) rescueME PLB2, s/n TA4

SW version: Issue 00.02

Test Date: 30.10.2012
Test Conditions:

- Ambient temperature: 22…23°C
- Relative humidity: 56…58 %
- Atmospheric pressure: 755 mm/Hg

Figure 1.1 – View of rescueME PLB1, s/n TA1

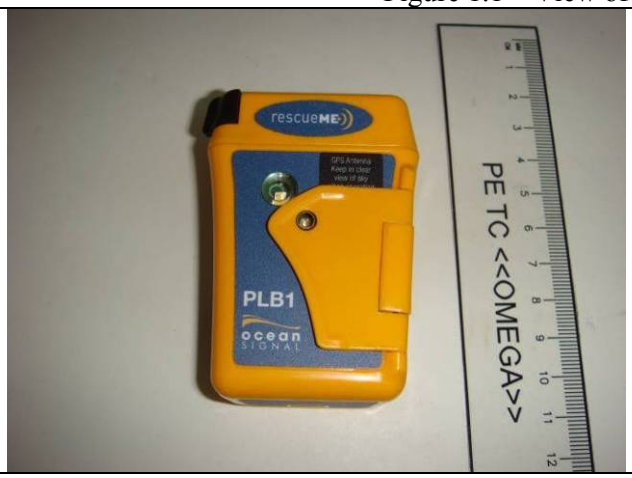


Figure 1.2 – View of rescueME PLB1, s/n TA5

Figure 1.3 – View of rescueME PLB2, s/n TA4

Figure 1.4 – View of rescueME PLB2, s/n TA3

Test Results

Visual Inspection

EUTs were subjected to visual inspection. No damage was found.

Performance Check

A Performance Check was conducted to ensure that EUTs were functional.

Summary of Performance Check

Table 1.1 - rescueME PLB1, s/n TA1

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0399
3.	The 406 MHz digital message	FFFE2F8C9E0000037FDFFC13353783E0F66C
4.	Homing Transmitter output	present

Table 1.2 - rescueME PLB1, s/n TA5

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0401
3.	The 406 MHz digital message	FFFE2F8C9E0000037FDFFC13353783E0F66C
4.	Homing Transmitter output	present

Table 1.3 - rescueME PLB1, s/n TA4

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0401
3.	The 406 MHz digital message	FFFE2F4C9E000000000004355ED0
4.	Homing Transmitter output	present

Table 1.4 - rescueME PLB1, s/n TA3

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F4C9E000000000004355ED0
4.	Homing Transmitter output	present

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1	Beacon tester	BT-611	1005	06.2013
2	Spectrum analyzer	FSH8	105763	06.2015
3	Antenna	FCC-4	587A	09.2016
4	Semi-anechoic chamber	«Don»	1	08.2014

ANNEX 2.
DRY HEAT TEST (A.3)

Equipment Under Test (EUT): 1) rescueME PLB1, s/n TA1
2) rescueME PLB1, s/n TA5

SW version: Issue 00.02

Test Date: from 30.10.2012 until 31.10.2012
Test Conditions:
- Ambient temperature: 20-22°C
- Relative humidity: 51-67%
- Atmospheric pressure: 749-757 mm/Hg

TEST PROGRAM

No	Test name	Requirements	Methods
1	Dry heat test (storage)	A.3 RTCM 11010.2	8.2.1.2 IEC 60945:2002
2	Dry heat test (functional)	A.3 RTCM 11010.2	8.2.2.2 IEC 60945:2002

TEST DESCRIPTION

Storage Test
The dry heat storage test defined in IEC 60945 shall be performed, after the completion of the test a performance check shall be made.
– The EUT shall be in position OFF.
– The EUT shall be placed according to the manufacturer's specifications with all connectors and fittings engaged in a temperature test chamber at normal room temperature and relative humidity.
– The temperature shall then be raised to +70°C and maintained at +70 ± 3°C during the whole storage test period.
– At the end of the test, the EUT shall be returned to normal environmental conditions and then subjected to a performance check.

Functional Test
The dry heat functional test defined in IEC 60945 shall be performed, during the operational period at elevated temperature a performance test shall be made. After completion a performance check shall be made.
– The EUT shall be in position ON.
– The EUT all be placed according to the manufacturer's specifications with all connectors and fittings engaged in a temperature test chamber at normal room temperature and relative humidity.
– The temperature shall then be raised to +55°C and maintained at +55 ± 3°C during the whole functional test period.
– At the end of a soak period of 10 h at +55 ± 3°C, the EUTs shall be subjected to a performance test and check.
– At the end of the test, the EUT shall be returned to normal environmental conditions.

TEST RESULT

Storage Test Result:
– STEP 1. The EUT1 and EUT2 were switched OFF and were placed in the temperature test chamber at ambient temperature. The chamber temperature was raised to 70°C.
– STEP 2. During the next 10-hour period, the temperature was maintained in the test chamber 70 ± 3°C.
– STEP 3. The test chamber temperature was reduced to ambient temperature, and EUT1 and EUT2 were allowed to stabilize at ambient temperature for two hours.
– STEP 4. The EUT1 and EUT2 were removed from the test chamber and were subjected to performance check.

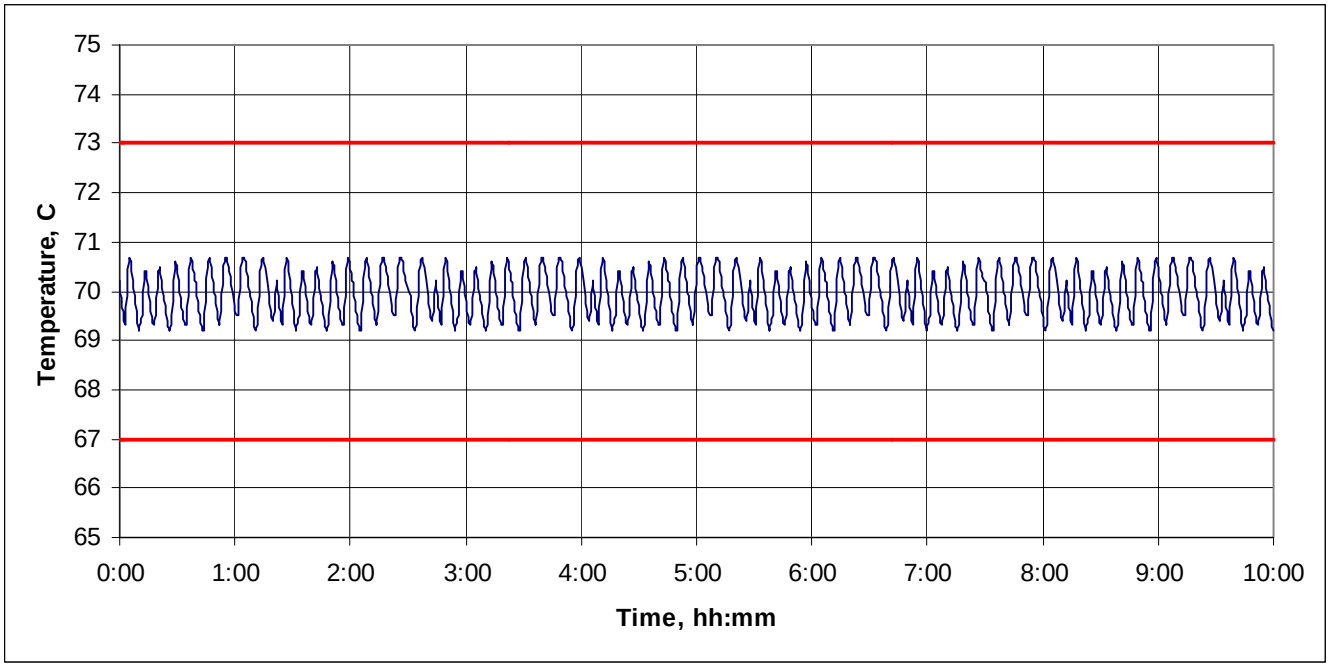


Figure 2.1 – Schedule of chamber temperature during Dry Heat Storage test

Table 2.1 - The EUT (TA1) performance check Results after Dry Heat Storage test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0400
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

Table 2.2 - The EUT (TA5) performance check Results after Dry Heat Storage test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

Functional Test Result:

– STEP 1. The EUT2 was switched ON and was placed in the temperature test chamber at ambient temperature. EUT1 was switched OFF and was placed in the temperature test chamber at ambient temperature. The chamber temperature was raised to 55°C. EUT1 was switched ON after stabilizing at 55 ± 3°C for two hours.

– STEP 2. During the next 10-hour period, the temperature was maintained in the test chamber to 55 ± 3°C.

– STEP 3. At the end of the exposure period the EUT1 and EUT2 were subjected to a performance test and check.

– STEP 4. At the end of the test the EUT1 and EUT2 were returned to normal environmental conditions were stabilized at ambient temperature for two hours.

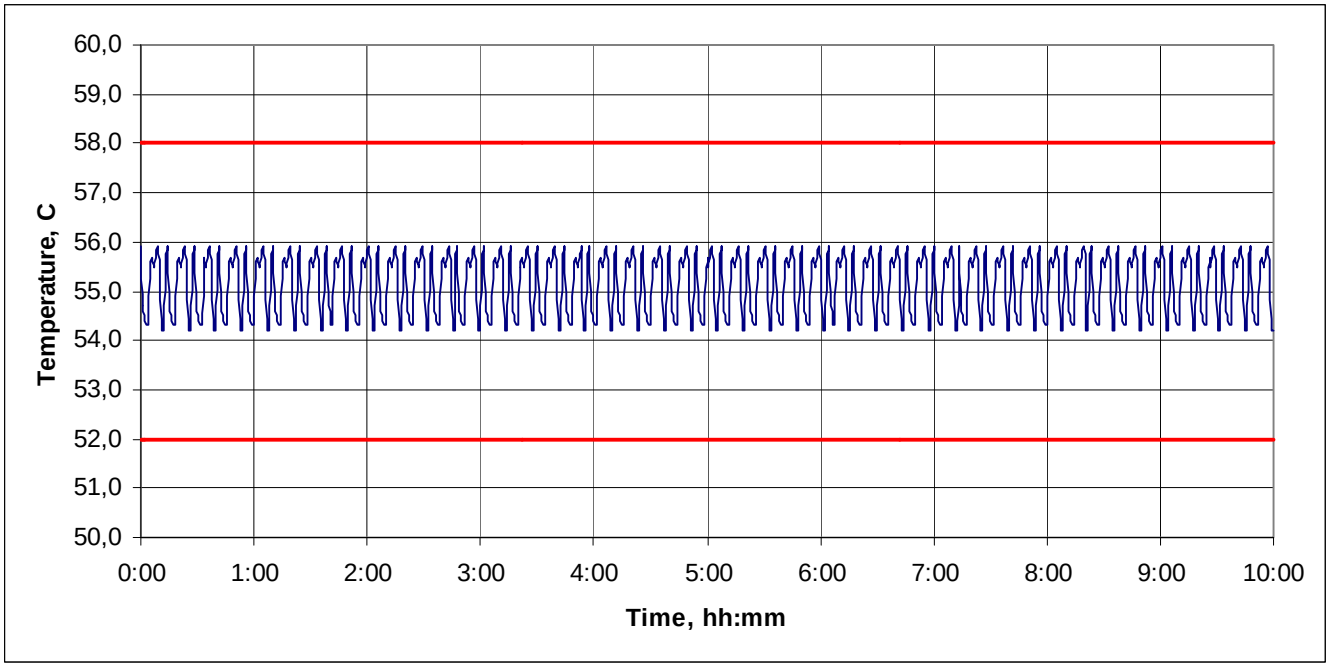


Figure 2.2 – Schedule of chamber temperature during Dry Heat Functional test

Table 2.3 - The EUT (TA5) performance check Results at the end of Dry Heat Functional test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406039.000	406041.000	406039.962	406039.962	406039.962
+Phase deviation, rad	1.00	1.20	1.08	1.09	1.10
-Phase deviation, rad	-1.00	-1.20	-1.13	-1.14	-1.15
Phase time rise, mcs	50.00	250.00	142.54	143.87	146.61
Phase time fall, mcs	50.00	250.00	152.62	154.62	154.84
Power, dBm	35	39	36.02	36.02	36.02
Power rise, ms	0.00	5.00	0.00	0.45	0.00
Bit Rate, bps	396.00	404.00	400.05	400.18	400.18
Asymmetry, %	0.00	5.00	0.20	0.28	0.32
CW Preamble, ms	158.40	161.60	159.92	159.92	159.93
Total burst duration, ms	514.80	525.20	518.10	518.15	518.15
Repetition period, s	47.50	52.50	47.51	48.31	52.21
Delta Rep. period, s		>4.00	4.70	4.70	4.70
Slope(E-9)	-1.00	1.00	0.048	0.051	0.055
Residual variations (E-9)	0.00	3.00	0.049	0.055	0.055
Short term variations (E-9)	0.00	2.00	0.55	0.059	0.059

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121499429	Low Sweep Frequency, Hz	351
Power, mW	47.7	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	825
Modulation Index, %	100		

Message	
Contents (full)	: FFFE2F8C9E7CE0317FDFFA48B57783E0F66C

Figure 2.3 - The EUT (TA1) performance test Results at the end of Dry Heat Functional test

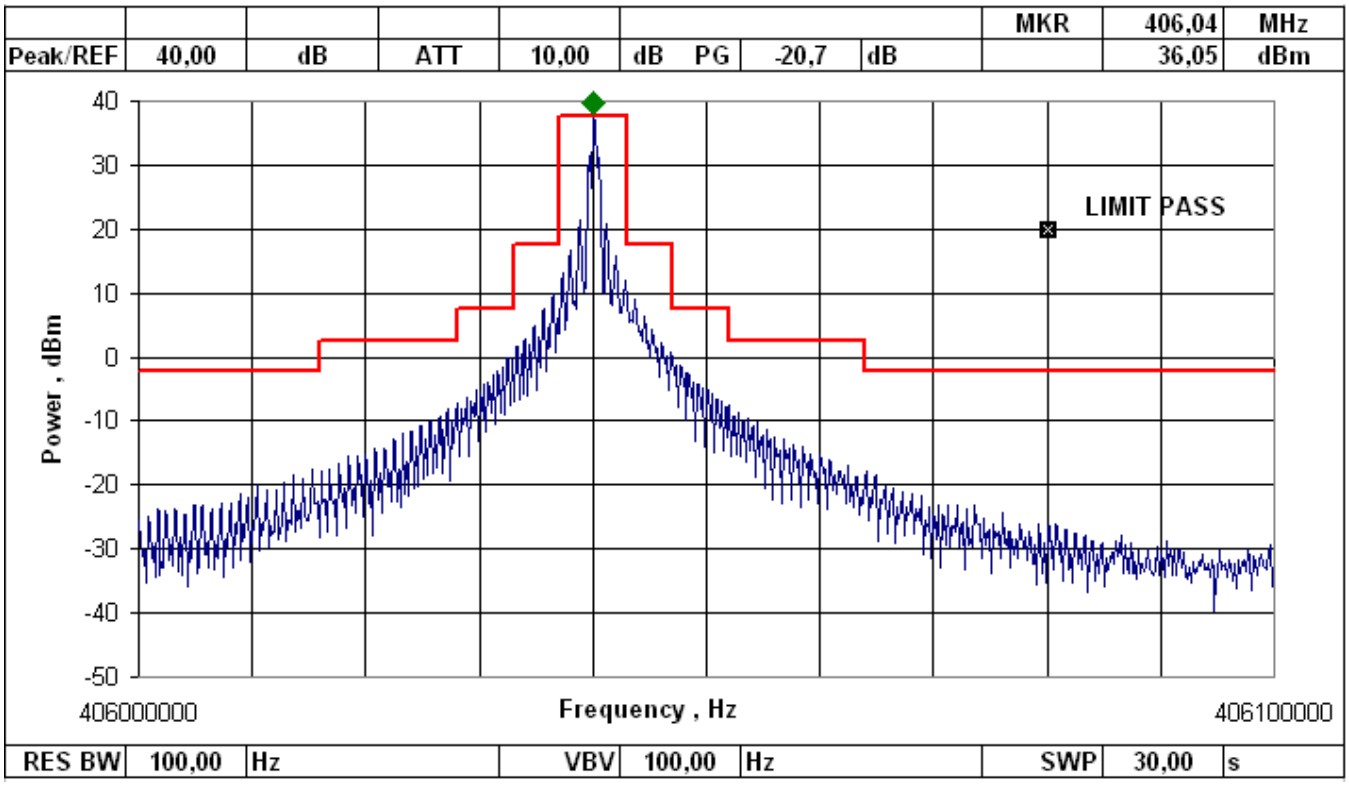


Figure 2.4 – The EUT (TA1) Spurious output during performance test at the end of Dry Heat Functional test

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1.	Climatic chamber	KPK 400V	015	08.2014
2.	Temperature meter	gradient 2002	078	03.2013
3.	Beacon tester	BT100AVS	2315	07.2014
4.	Beacon tester	BT-611	1005	06.2013
5.	Spectrum analyzer	FSH8	105763	06.2015

ANNEX 3.
DAMP HEAT TEST (A.4)

Equipment Under Test (EUT): rescueME PLB1, s/n TA5

SW version: Issue 00.02

Test Date: from 31.10.2012 until 01.11.2012
Test Conditions:
- Ambient temperature: 17-18°C
- Relative humidity: 49-53 %
- Atmospheric pressure: 758-760 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1.	**Damp heat test**	A.4 RTCM 11010.2	8.3 IEC 60945:2002

TEST DESCRIPTION

The damp heat functional test defined in IEC 60945 shall be performed. During the operational period at elevated temperature and humidity a performance check shall be made.
– The EUT shall be in position OFF.
– The EUT shall be placed in a chamber at normal room temperature and relative humidity.
– The temperature shall then be raised to +40 ± 2°C, and the relative humidity raised to 93 % ± 3 % over a period of 3 h ± 0,5 h.
– These conditions shall be maintained for a period of 12 h.
– After period of 12 h the EUT shall be kept operational for at least 2 h during which period the EUT shall be subjected to a performance check.
– The temperature and relative humidity of the chamber shall be maintained as specified during the whole test period.
– At the end of the test period and with the EUT still in the chamber, the chamber shall be brought to room temperature in not less than 1 h.
– At the end of the test the EUT shall be returned to normal environmental conditions.
The requirements of the performance check shall be met.

TEST RESULT:
– STEP 1. The EUT was switched OFF and placed in the climatic test chamber at ambient temperature and relative humidity.
The temperature was raised to +40°C, and the relative humidity was raised to 93 % over the period of 3 h.
– STEP 2. During the next 12-hour period, the temperature were maintained in the climatic test chamber 40 ± 2°C and the relative humidity 93 % ± 3 %.
– STEP 3. After period of 12 h the EUT was switched ON and was kept operational at the temperature 40 ± 2°C and the relative humidity 93 % ± 3 % for 2 h. During this period the EUT was subjected to a performance check.
– STEP 4. At the end of the test period and with the EUT still in the chamber, the chamber was brought to room temperature during 1 h.

Figure 3.1 – Test site

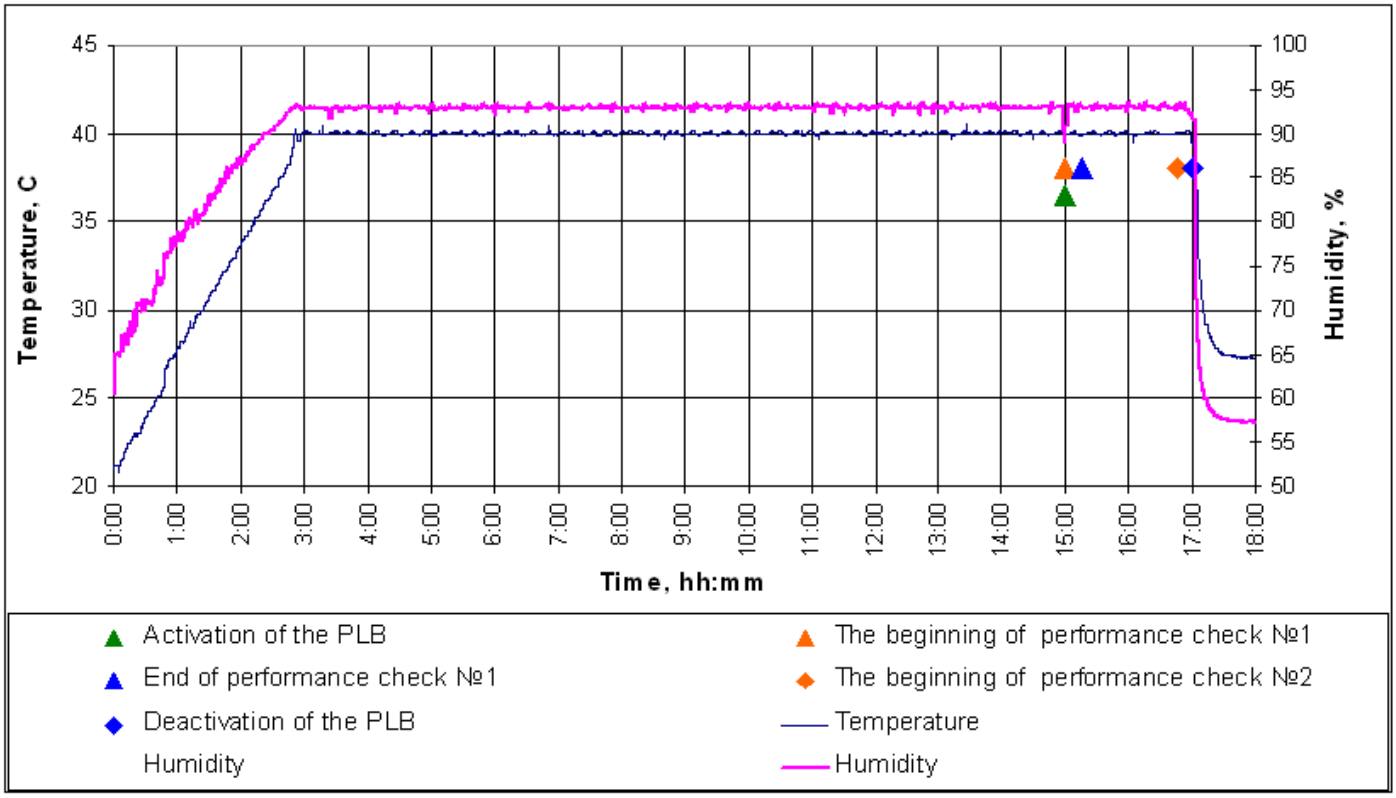


Figure 3.2 – Humidity Module Test Conditions Plot

Table 3.1 – Performance check during test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

Table 3.2 – Performance check at the end of the test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0401
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

TEST EQUIPMENT USED

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1.	Climatic chamber	KPK 400V	015	08.2014
2.	Beacon tester	BT100AVS	2315	07.2014
3.	Thermometer	-	104111	06.2013

ANNEX 4.
LOW TEMPERATURE TEST (A.5)

Equipment Under Test (EUT): 1) rescueME PLB1, s/n TA1
2) rescueME PLB1, s/n TA5

SW version: Issue 00.02

Test Date: from 01.11.2012 until 02.11.2012
Test Conditions:
- Ambient temperature: 20-22°C
- Relative humidity: 49-65 %
- Atmospheric pressure: 746-757 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Low temperature (storage test)	A.5 RTCM 11010.2	8.4.2.6 IEC 60945:2002
2	Low temperature (functional test)	A.5 RTCM 11010.2	8.4.2.4 IEC 60945:2002

TEST DESCRIPTION
Low temperature Storage Test
The low temperature storage test as defined in IEC 60945 shall be performed on Class 2 PLBs. After the completion of the test a performance check shall be made.
– The EUT shall be in position OFF.
– The EUT shall be placed in a chamber at normal room temperature and relative humidity.
– The temperature shall then be reduced to –30°C.
– This temperature shall be maintained for a period of 10 h.
– After period of 10 h the EUT shall be returned to normal environmental conditions and then shall be subjected to a performance check.

Low temperature Functional Test
The low temperature functional test for portable equipment defined in IEC 60945 shall be performed on Class 2 PLBs. After the completion of the test a performance check shall be made.
– The EUT shall be in position OFF.
– The EUT shall be placed in a temperature test chamber at normal room temperature and relative humidity.
– The temperature shall then be reduced to, and maintained at –20°C ± 3°C, for a period of 12 hours.
– The EUT shall be switched on 30 min later, or after such period as agreed by the manufacturer, and shall be kept operational for at least 2 h during which period the EUT shall be subjected to a performance test and check as specified in the relevant equipment standard.
– At the end of the test the EUT shall be returned to normal environmental conditions and shall be subjected to a performance check.

TEST RESULT

Low temperature Storage Test Result:
– STEP 1. The EUT1 and EUT2 were switched OFF and were placed in the temperature test chamber at ambient temperature. The temperature was reduced to - 30°C over the period of 1 h.
– STEP 2. During the next 12 hours the temperature was maintained in the test chamber - 30 ± 3°C.
– STEP 3. The test chamber temperature was increased to ambient temperature, and EUT1 and EUT2 were allowed stabilizing at ambient temperature for two hours.
– STEP 4. The EUT1 and EUT2 were subjected to a performance check.

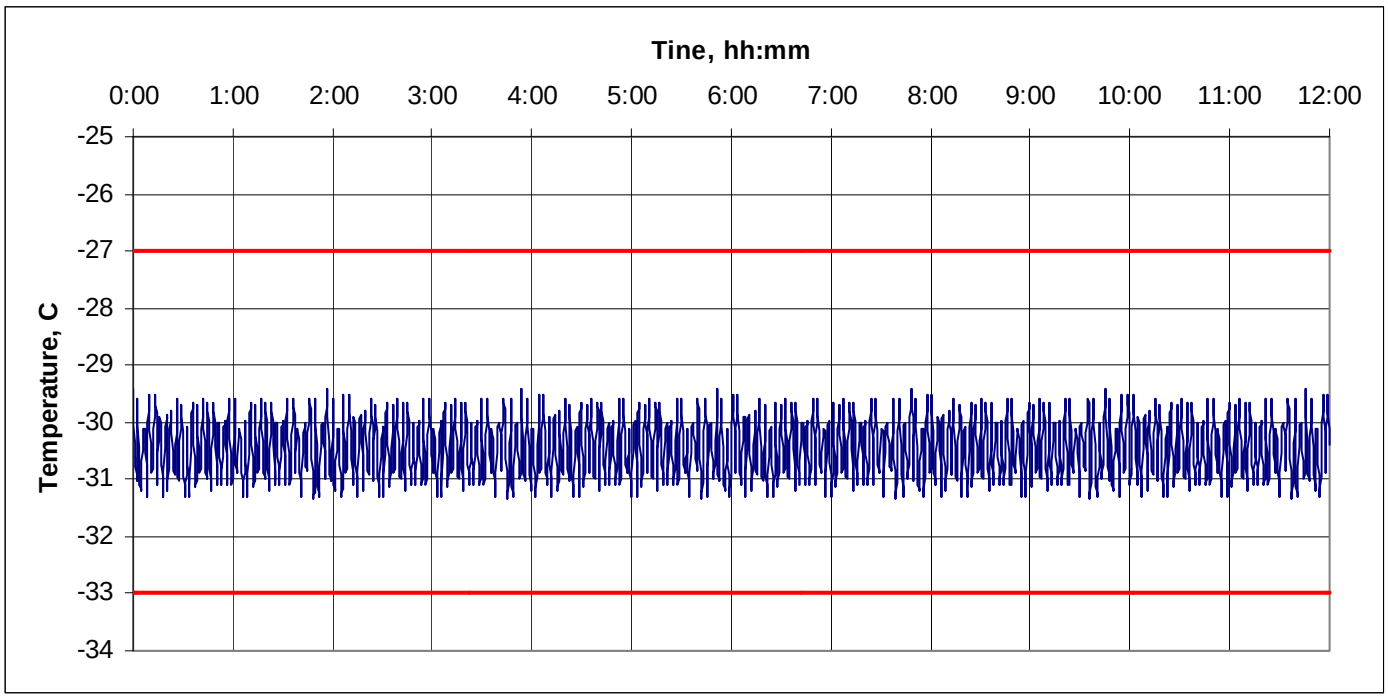


Figure 4.1 – Schedule of chamber temperature during Low Temperature Storage test

Table 4.1 - The EUT (TA1) performance check Results after Low Temperature storage test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0400
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

Table 4.2 - The EUT (TA5) performance check Results after Low Temperature storage test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

Low temperature Functional Test Result:

- STEP 1. The EUT1 and EUT2 were switched OFF and were placed in the temperature test chamber at ambient temperature. The temperature was reduced to -20°C over the period of 1 hour.
- STEP 2. During the next 12 hours the temperature was maintained in the test chamber at -20°C ± 3°C.
- STEP 3. After period of 12 hours the EUT1 and EUT2 were switched ON and were kept operational for 2 hours during which period the EUT1 and EUT2 were subjected to a performance test and check.
- STEP 4. The EUT was allowed to stabilize at ambient temperature for two hours.
- STEP 5. At the end of the test the EUT1 and EUT2 were returned to normal environmental conditions and were subjected to a performance check.

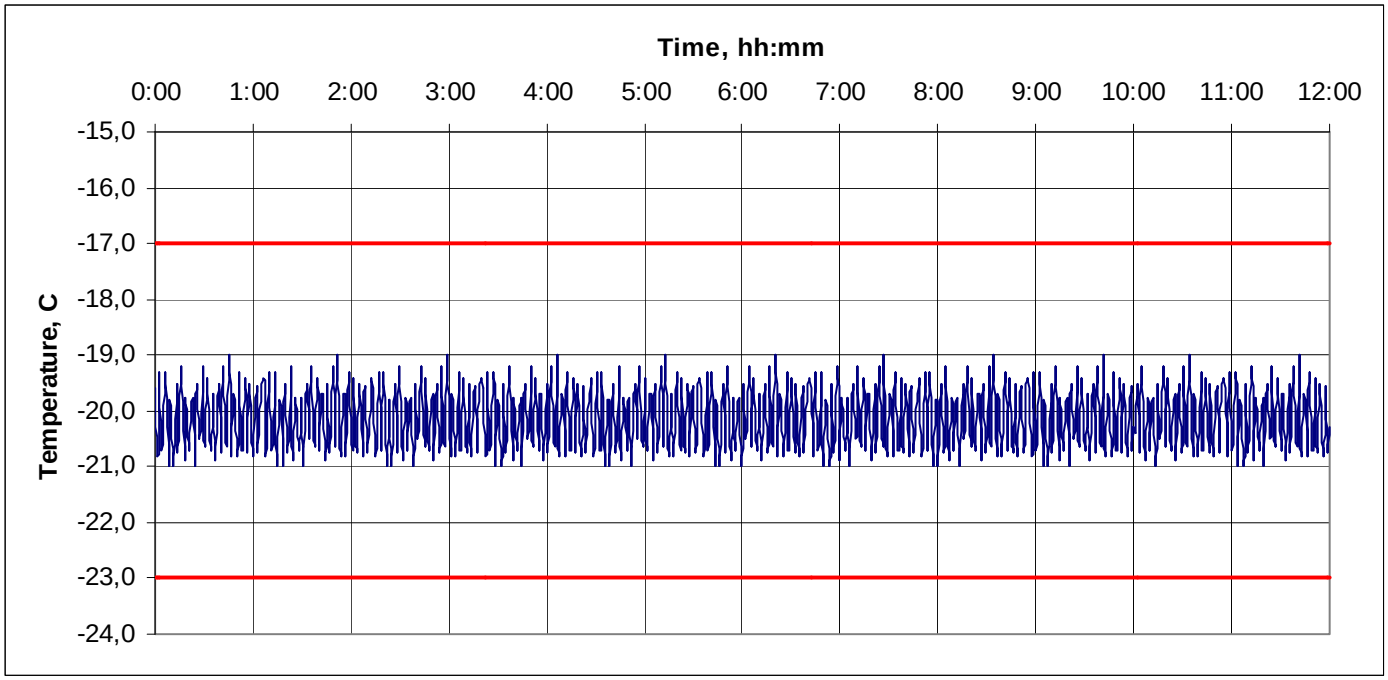


Figure 4.2 – Schedule of chamber temperature during Low Temperature Functional test

Table 4.3 - The EUT (TA5) performance check Results during Low Temperature Functional test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

Table 4.4 - The EUT (TA5) performance check Results after Low Temperature Functional test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406039.000	406041.000	406.039959	406.039959	406.039959
+Phase deviation, rad	1.00	1.20	1.09	1.11	1.12
-Phase deviation, rad	-1.00	-1.20	-1.06	-1.05	-1.04
Phase time rise, mcs	50.00	250.00	143.61	144.60	145.57
Phase time fall, mcs	50.00	250.00	159.56	161.07	162.11
Power, dBm	35	39	36.32	36.32	36.37
Power rise, ms	0.00	5.00	0.30	0.30	0.35
Bit Rate, bps	396.00	404.00	400.06	400.06	400.20
Asymmetry, %	0.00	5.00	0.52	0.61	0.67
CW Preamble, ms	158.40	161.60	159.90	159.90	159.91
Total burst duration, ms	514.80	525.20	518.20	518.20	518.25
Repetition period, s	47.50	52.50	47.51	49.91	52.21
Delta Rep. period, s		>4.00	4.70	4.70	4.70
Slope(E-9)	-1.00	1.00	0.013	0.013	0.013
Residual variations (E-9)	0.00	3.00	0.479	0.479	0.479
Short term variations (E-9)	0.00	2.00	0.011	0.011	0.011

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121499458	Low Sweep Frequency, Hz	345
Power, mW	57.7	High Sweep Frequency, Hz	1333
Sweep Period, sec	0.3	Sweep Range, Hz	988
Modulation Index, %	100		

Message	
Contents (full)	: FFFE2F8C9E7CE0317FDFFA48B57783E0F66C

Figure 4.3 - The EUT (TA1) performance test results during Low Temperature Functional Test

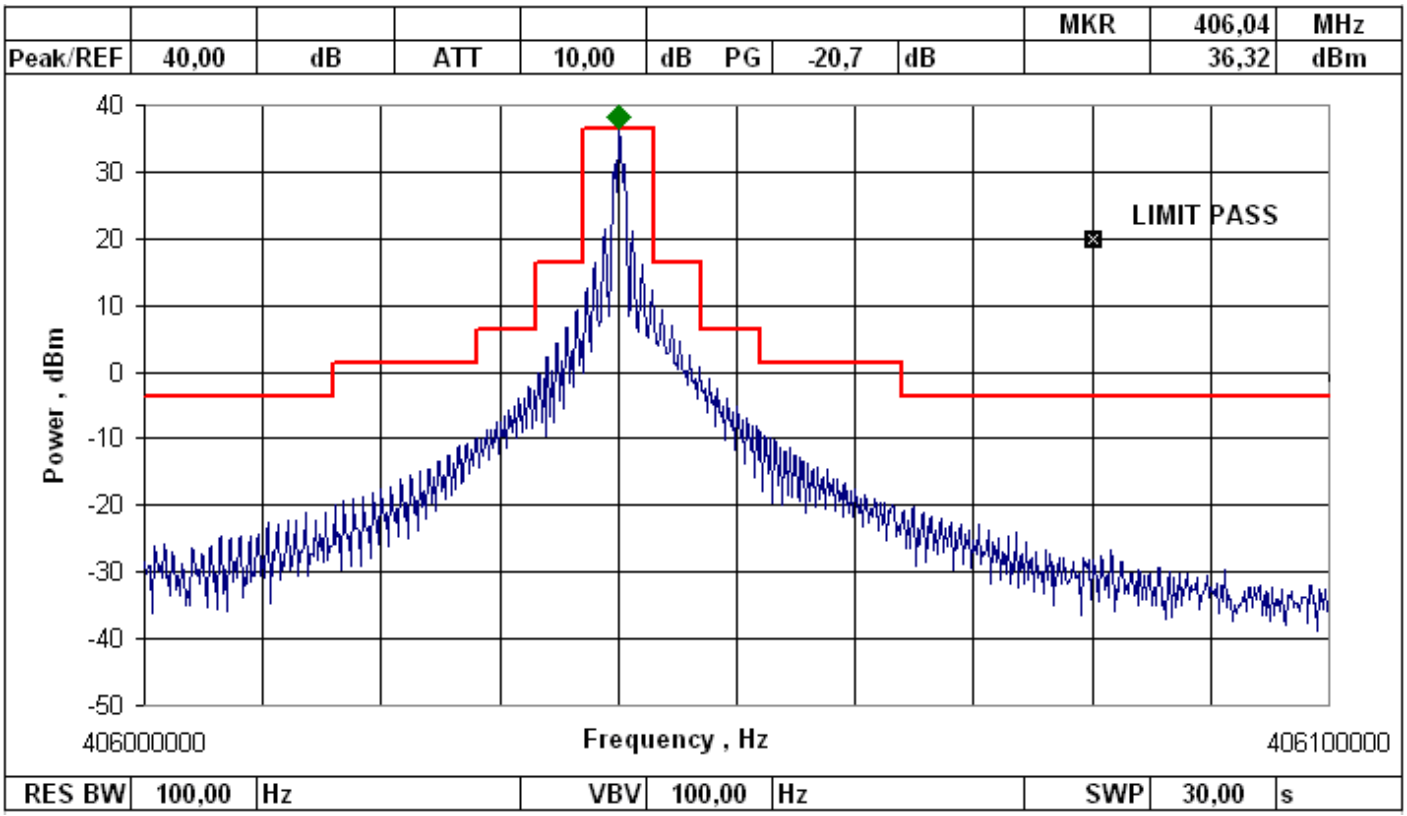


Figure 4.4 – The EUT (TA1) Spurious output during Low Temperature Functional Test

TEST EQUIPMENT USED

No	Name of test equipment	Type, model	ser. No	Calibration Due date
6.	Climatic chamber	KPK 400V	015	08.2014
7.	Temperature meter	gradient 2002	078	03.2013
8.	Beacon tester	BT100AVS	2315	07.2014
9.	Beacon tester	BT-611	1005	06.2013
10.	Spectrum analyzer	FSH8	105763	06.2015

ANNEX 5.
VIBRATION TEST (A.6)

Equipment Under Test (EUT): rescueME PLB1, s/n TA5

SW version: Issue 00.03

Test Date: from 05.11.2012-06.11.2012
Test Conditions:

- Ambient temperature: 17..18°C
- Relative humidity: 63..69 %
- Atmospheric pressure: 755..757 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Vibration test (resonance search) vertical axis Z	A.6 RTCM 11010.2	8.7.2 IEC 60945:2002
2	Vibration test (resonance search) horizontal axis X		
3	Vibration test (resonance search) horizontal axis Y		
1	Vibration test vertical axis Z	A.6 RTCM 11010.2	8.7.2 IEC 60945:2002
2	Vibration test horizontal axis X		
3	Vibration test horizontal axis Y		

Upon completion of the each endurance test period PERFORMANCE CHECK was carried out

The performance check (PC) procedure:

1 checking the 406 MHz transmitted frequency (single burst only);
2 the 406 MHz digital message;
3 presences of Auxiliary Radio-Location Device transmissions (Homing Transmitter output).

TEST DESCRIPTION

Testing was performed in accordance to the methods of the standard IEC 60945 item 8.7.

Vibrations were conducted sequentially in vertical and two horizontal orthogonal axes.

The EUT was subjected to sequentially vibration at all frequencies between:

-2 Hz to 13,2 Hz with an excursion of ±1mm ±10%

-above 13,2 Hz and up to 100 Hz with a constant acceleration of 7 m/s^2 (0.71 g)

The frequency sweep rate was less than 0.5 octaves/min. A resonance search was carried out throughout the frequency sweep period. Then relative magnitude ratio was calculated as magnitude measured by a sensor fixed to the outside of the EUT divided to magnitude on the surface where the EUT is fastened.

If resonance with a magnitude ratio ≥5 (i.e. excursion ≥5 mm or acceleration ≥3.57 g) occurs, the EUT shall be subjected to a vibration endurance test at each resonant frequency at the vibration level specified in the test with a duration of 2 h.

If no resonance with a magnitude ratio <5 occurs, the endurance test shall be carried out at one single observed frequency.

If no resonance occurred, the endurance test shall be carried out at a frequency of 30 Hz in all three axes.

Performance check was carried out upon completion of the each endurance test period.

For vertical vibration in Z vertical axis EUT was fastened to the vibration table in its normal attitude using special brackets (see Figure 5.1).

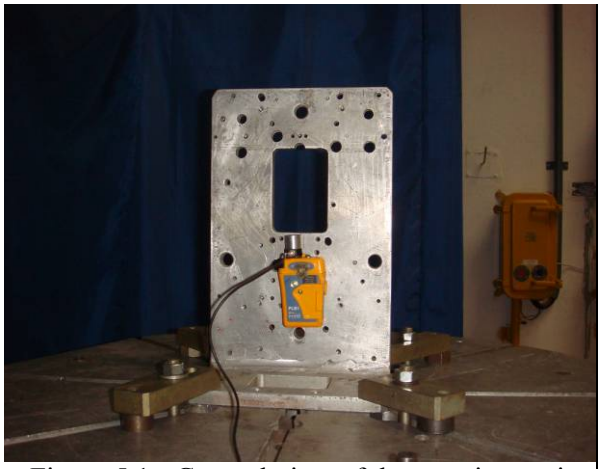


Figure 5.1 - General view of the test site vertical vibration

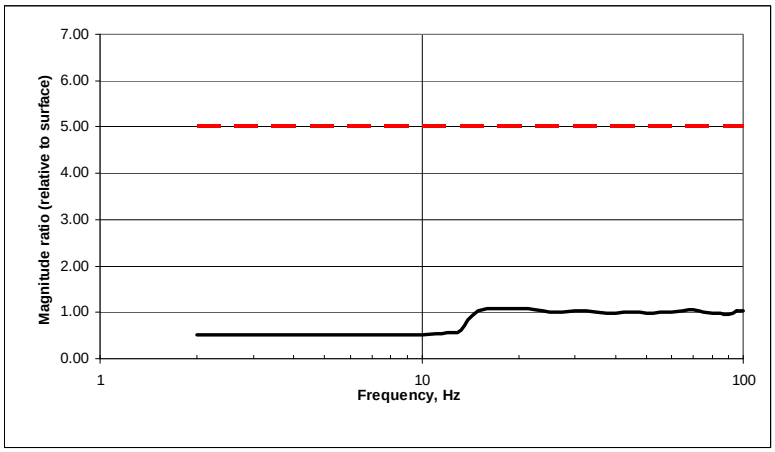


Figure 5.2 - Magnitude ratio vs. frequency during vibration on vertical axis Z

During the search of EUT resonance, tested specimen was externally observed by unaided aural and visual means. Relative magnitude is shown in table below.

Frequency, Hz	Magnitude ratio	Frequency, Hz	Magnitude ratio
2	0.52	55	0.72
4	0.52	60	0.71
6	0.51	65	0.74
8	0.53	70	0.75
10	0.52	75	0.71
12	0.52	80	0.70
13.2	0.56	85	0.70
15	0.74	90	0.69
20	0.77	95	0.73
25	0.72	100	0.74
30	0.73		
35	0.72		
40	0.70		
45	0.71		
50	0.70		

As no resonance with magnitude ratio ≥5 occurred, the endurance test was carried out at one single observed frequency 30 Hz during 2 hours.

For horizontal vibration in X horizontal axis, EUT was then fastened to the vibration table in its normal attitude using special brackets (see Figure 5.3).

Figure 5.3 - General view of the horizontal axis X vibration test

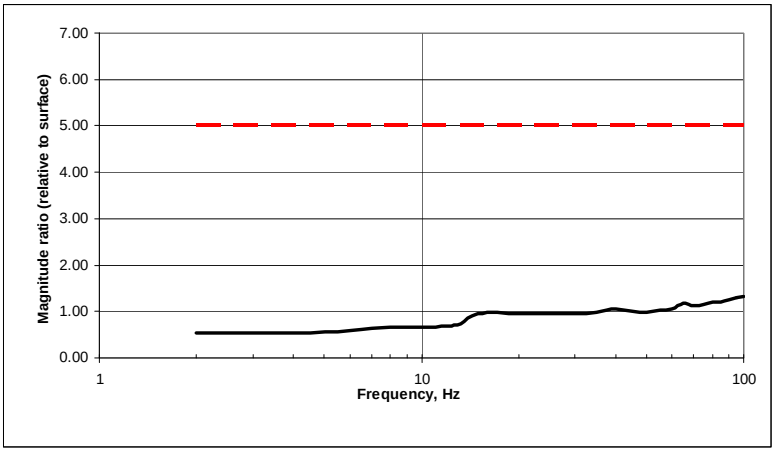


Figure 5.4 - Magnitude ratio vs. frequency during vibration on horizontal axis X

During the search of EUT resonance, tested specimen was externally observed by unaided aural and visual means. Relative magnitude is shown in table below.

Frequency, Hz	Magnitude ratio	Frequency, Hz	Magnitude ratio
2	0.53	55	1.04
4	0.54	60	1.05
6	0.58	65	1.19
8	0.67	70	1.14
10	0.66	75	1.16
12	0.70	80	1.21
13.2	0.73	85	1.21
15	0.97	90	1.26
20	0.95	95	1.30
25	0.97	100	1.32
30	0.95		
35	0.98		
40	1.07		
45	1.01		
50	0.98		

As resonance with magnitude ratio ≥ 5 occurred, the endurance test was carried out at resonance frequency 30 Hz during 2 hours.

For horizontal vibration in Y axis, EUT was fastened to the vibration table in its normal attitude using special brackets (see Figure 5.5).

Figure 5.5 - General view of the horizontal Y vibration test

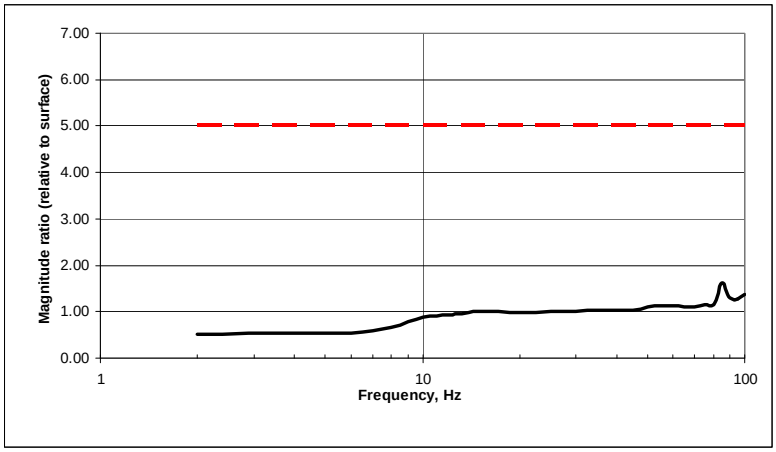


Figure 5.6 - Magnitude ratio vs. frequency during vibration on horizontal axis Y

During the search of EUT resonance, test specimen was externally observed by unaided aural and visual means. Relative magnitude is shown in table below.

Frequency, Hz	Magnitude ratio	Frequency, Hz	Magnitude ratio
2	0.53	55	1.14
4	0.54	60	1.12
6	0.55	65	1.09
8	0.68	70	1.11
10	0.89	75	1.16
12	0.93	80	1.15
13.2	0.97	85	1.61
15	1.00	90	1.30
20	0.98	95	1.28
25	1.00	100	1.37
30	1.01		
35	1.02		
40	1.04		
45	1.04		
50	1.09		

As no resonance with magnitude ratio ≥5 occurred, the endurance test was carried out at one single observed frequency 30 Hz during 2 hours.

The PLB did not activate during all the vibration tests.

Table 5.1 - Performance check at the end of test

№	Parameter	Measured value
1.	Activation	No activation during test
2.	The 406 MHz transmitted frequency	406.0403
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

EUT passed Vibration Test

TEST EQUIPMENT USED

No	Name	Type, model	Ser. No	Next calibration date
1.	Vibration table	G 0227	496	07.2014
2.	Beacon tester	BT100AVS	2315	07.2014

ANNEX 6.
BUMP TEST (A.7)

Equipment Under Test (EUT): rescueME PLB1, s/n TA5

SW version: Issue 00.03

Test Date: 08.11.2012
Test Conditions:
- Ambient temperature: 19°C
- Relative humidity: 59 %
- Atmospheric pressure: 754 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Bump test	A.7 RTCM 11010.2	A.7 RTCM 11010.2

TEST DESCRIPTION
The EUT was secured to the bump testing equipment through its normal attachments for use in service conditions, using no additional straps or other holding means.
The EUT was subjected to the bump test according to the following profile:
- Peak Acceleration: 98 m/s^2
- Pulse Duration: 16 ms
- Waveshape: Half-cycle Sinewave
- Number of Bumps: 4000

The bump test was conducted three times, once with the EUT mounted in each of the 3-axes. After the completion of the tests a visual inspection shall be performed and the EUT was subjected to the performance check. The EUT shall not activate during the bump tests.

TEST RESULT
Step No. 1 Vertical axis of the EUT; 4000 bumps.
No. 2 Lateral axis of the EUT; 4000 bumps.
No. 3 Longitudinal axis of the EUT; 4000 bumps.
No. 4 Performance check.
No. 5 Exterior Mechanical Inspection
Activation of the EUT during the bump tests was monitored. The EUT was not switched on during the test and the EUT did not inadvertently activate during the test.

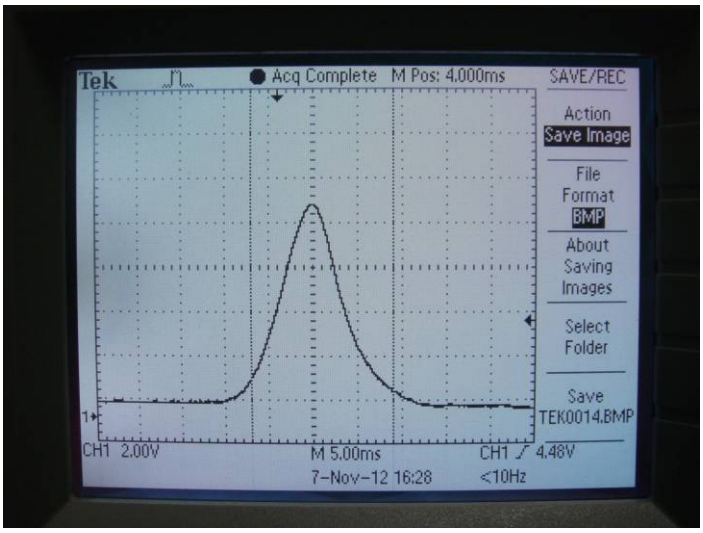


Figure 6.1 – Diagram of the bump testing equipment control channel (16 ms)


Figure 6.2 - Test Set-up. Vertical axis of the EUT

Figure 6.3 - Test Set-up. Lateral axis of the EUT

Figure 6.4 - Test Set-up. Lateral axis of the EUT. Longitudinal axis of the EUT

Figure 6.5 – View of the EUT upon completion of the Bump Test

Figure 6.6 – View of the EUT upon completion of the Bump Test

Figure 6.7 – View of the EUT upon completion of the Bump Test

Table 6.1 - Performance check at the end of test

№	Parameter	Measured value
1.	Activation	No activation during test
2.	The 406 MHz transmitted frequency	406.0403
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1	Beacon tester	BT100AVS	2315	07.2014
2	Shock table	Tirashock 4110	41/88	06.2013

ANNEX 7.
DROP TEST (A.9)

Equipment Under Test (EUT): rescueME PLB1, s/n TA5

SW version: Issue 00.03

Test Date: 15.11.2012
Test Conditions:
- Ambient temperature: 16..19°C
- Relative humidity: 47..50 %
- Atmospheric pressure: 762..763 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Drop test	A.9 RTCM 11010.2	A.9 RTCM 11010.2 8.6.1.2 IEC 60945:2002

TEST DESCRIPTION

The PLB shall be tested in its normal stowage condition. If applicable the antenna shall also be secured in its normal stowage position for this test. If the PLB is provided with a pouch or similar package not permanently affixed to the PLB, it shall be removed before conducting the drop tests.
The PLB shall be pre-conditioned before the drop tests as appropriate by soaking it at the following temperatures for at least two hours:
Class 2 PLBs -30°C.
The drop test shall then be completed within 5 minutes of removing the PLB from preconditioning.
The PLB shall be dropped onto a hard surface as defined in IEC 60945.
The PLB shall not activate during the test. Upon completion of the tests the exterior of the device shall be examined for signs of damage and a performance check shall be made.

TEST RESULT
The EUT was soaked at minimum stowage temperature -30°C for 2 hours. EUT antenna was secured in its normal stowage position for this test.
The drop test was then performed within two minutes (less than the five minutes requirement) after removal from a temperature chamber. A series of six drops were carried out; one on each face of the EUT.

The test surface consists of a piece of solid hard wood with a thickness of at least 150 mm and a mass of 30 kg
The height of the lowest part of the EUT relative to the test surface at the moment of release was 1000 mm ± 10 mm.

The EUT did not activate during the test.

At the end of the test the EUT was subjected to a performance check, and was examined for external signs of damage.

Figure 7.1 - Detailed measurement of the EUT temperature before the drop test


Figure 7.2 - Total view of test site of the drop from a height of 1 m above the test surface

Figure 7.3 - Thickness of wood test surface

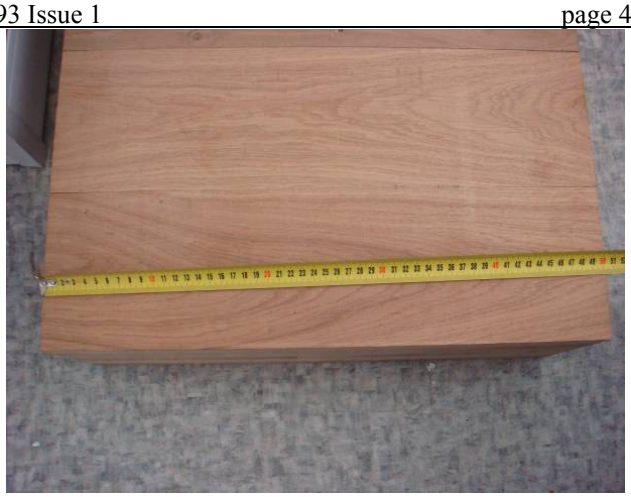


Figure 7.4 - Dimensions of the wood test surface

Figure 7.5 - View EUT upon completion of the drop test

Figure 7.6 - View EUT upon completion of the drop test

Figure 7.7 - View EUT upon completion of the drop test

Figure 7.8 - View EUT upon completion of the drop test

Figure 7.9 - View EUT upon completion of the drop test

Figure 7.10 - View EUT upon completion of the drop test

Table 7.1 – Performance check at the end of the test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0401
3.	The 406 MHz digital message	FFFE2F8C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1	Beacon tester	BT100AVS	2315	07.2014
2	Climatic chamber	KPK-400V	15	08.2014
3	Temperature meter	Center-309	50310908	05.2013
4	Wooden drop installation	-	101231	05.2013

ANNEX 8.
THERMAL SHOCK (A.10)

Equipment Under Test (EUT): rescueME PLB1, s/n TA5

SW version: Issue 00.06

Test Date: from 10.01.2013 until 12.01.2013

Test Conditions:
- Ambient temperature: 15..19°C
- Relative humidity: 48..59 %
- Atmospheric pressure: 753..758 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Thermal shock test	A.10 RTCM 11010.2	A.10 RTCM 11010.2 8.5 IEC60945

TEST DESCRIPTION

The thermal shock test for portable equipment defined in IEC 60945 shall be performed, except that the period of time that the PLB remains under water shall be increased to 48 hours.
- The EUT shall be subjected to the Thermal Shock Test in position OFF.
- The EUT shall be placed according to the manufacturer's specifications with all connectors and fittings engaged in a temperature test chamber at temperature + 70°C ± 3°C for 1 hour.
- The EUT shall then be immersed in water at +25°C ± 3°C to a depth of 100 mm ± 5 mm, measured from the highest point of the beacon to the surface of the water, for a period of 48 h.
- After the completion of the test the EUT shall be examined for signs of any ingress of water and a performance check shall be made.

The requirements of the performance check shall be met.
There shall be no damage to the beacon or ingress of water.
Subject to a satisfactory performance check, the opening of the EUT to check for water ingress may be delayed until the completion of all tests.

TEST RESULT:
- STEP 1. The EUT was switched OFF and placed in the climatic test chamber at temperature + 68°C* for 1 hour.
- STEP 2. The EUT was then immersed in water at +23°C* to a depth of 100 mm, measured from the highest point of the EUT to the surface of the water, for a period of 48 hours.
- STEP 3. After period of 48 hours the EUT was removed from the water.
- STEP 5. The EUT was then examined for damage and for obvious unwanted ingress of water without opening as agreed with manufacturer.
- STEP 6. The EUT was then subjected to a performance check. The result of performance check was positive. Therefore the opening of the EUT to check for water ingress was delayed until the completion of immersion test.

*This temperature was used to cover requirements of ETSI EN 302 152-1 V1.1.1:2003 which requires +65°C ± 3°C for the EUT soaking and +25°C ± 3°C for the EUT immersion.

Figure 8.1 – View of the EUT in the water during the Thermal Shock Test

Figure 8.2 – View of the EUT upon completion of the Thermal shock test.

Table 9.1 – Performance check at the end of the test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0401
3.	The 406 MHz digital message	FFFED08C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage, no obvious unwanted ingress of water. Subsequent disassembly after immersion test showed no ingress of water

TEST EQUIPMENT USED

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1.	Beacon tester	BT100AVS	2315	07.2014
2.	Climatic chamber	KPK 400V	015	08.2014
3.	Climatic chamber	SNOL-58/350	61686	05.2015
4.	Temperature meter	Gradient 2002	078	03.2013
5.	Thermometer	-	104111	06.2013

ANNEX 9.
IMMERSION TEST (A.11)

Equipment Under Test (EUT): 1) rescueME PLB1, s/n TA5
2) rescueME PLB2, s/n TA3

SW version: Issue 00.06 (TA5)
Issue 00.03 (TA3)

Test Date: 15.11.2012 (Portable Equipment Immersion. Manufacturers additional test requirement),
12.01.2013 (Portable Equipment Temporary Immersion)

Test Conditions:
- Ambient temperature: 18°C
- Relative humidity: 57 %
- Atmospheric pressure: 754 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Immersion test (Portable Equipment Immersion)*	A.11 RTCM 11010.2	A.11 RTCM 11010.2 8.9.2 IEC60945
2	Immersion test (Portable Equipment Temporary Immersion)	A.11 RTCM 11010.2	A.11 RTCM 11010.2 8.9.3 IEC60945

* Though this test is applied only for Category 1 PLB the test was performed as per request of manufacturer.

TEST DESCRIPTION

Portable Equipment Immersion
The EUT shall be subjected to Category 1 PLBs IEC 60945 Portable Equipment Immersion.
– The EUT shall be subjected to the Immersion Test in position OFF.
– A hydraulic pressure of 200 kPa (2 bar)* shall be applied to the EUT for a period of 1 hour*.
– At the end of the test the EUT shall be subjected to a performance check, and shall then be
– examined for damage and for unwanted ingress of water. After the completion of these tests a performance check shall be made and then the EUT shall be opened and examined for signs of any ingress of water.
* These values of pressure and period are in excess of those detailed in IEC 60945 and were used as per request of manufacturer.

Portable Equipment Temporary Immersion
The EUT shall be subjected to Category 2 PLBs IEC 60945 Portable Equipment Temporary Immersion. The duration of the Temporary Immersion test only shall be extended to one hour.
– The EUT shall be subjected to the Immersion Test in position OFF.
– The test shall be carried out by completely immersing the EUT in water so that the following conditions are satisfied:
  – the highest point of the EUT is located 1 m below the surface of the water;
  – the water temperature does not differ from that of the EUT by more than 5 K.
– After the completion of these tests a performance check shall be made and then the EUT shall be opened and examined for signs of any ingress of water.

TEST RESULT:

Portable Equipment Immersion
– STEP 1. The EUT was stabilized at temperature +20°C±2°C for one hour.

– STEP 2. The EUT was then immediately immersed into the pressure vessel which had been filled with water at +17°C±2°C to a depth of 0,5 meter measured from the highest point of the equipment to the surface of the water.

– STEP 3. Then pressure was increased to 1,95 bar (relative to atmospheric pressure) that corresponds total depth of immersion of 20 meters and maintained for one hour.
– STEP 4. The EUT was removed from the water and wiped dry.
– STEP 5. At the end of the test period:
  - the EUT was subjected to a performance check,
  - the EUT was opened and inspected for signs of any ingress of water.

Figure 9.1 –View of immersion test site

Figure 9.2 –Manometer of immersion test site shows 1,95 bar.

Figure 9.3 – View of the interiors of the Beacon upon completion of the Immersion Test. There is no water inside

Table 9.1 – Performance check (TA3) at the end of the test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0402
3.	The 406 MHz digital message	FFFE2F4C9E000000000004355ED0
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage, no water inside the EUT

Portable Equipment Temporary Immersion

– STEP 1. The EUT was stabilized at temperature +20°C±2°C for one hour.

– STEP 2. The EUT was then immediately immersed into the pressure vessel which had been filled with water at +16°C±2°C to a depth of 0,5 meter measured from the highest point of the equipment to the surface of the water.

– STEP 3. Then pressure was increased to 50 mbar (relative to atmospheric pressure) that corresponds total depth of immersion of 1 meter and maintained for one hour.

– STEP 4. The EUT was removed from the water and wiped dry.

– STEP 5. At the end of the test period:
- the EUT was subjected to a performance check,
- the EUT was opened and inspected for signs of any ingress of water.

Figure 10.4 –View of immersion test site

Figure 10.5 –Manometer of immersion test site shows 50 mbar.

Figure 10.6 – View of the interiors of the Beacon upon completion of the Immersion Test. There is no water inside

Table 10.2 – Performance check (TA5) at the end of the test

№	Parameter	Measured value
1.	Activating EUT	Activated
2.	The 406 MHz transmitted frequency	406.0401
3.	The 406 MHz digital message	FFFED08C9E7CE0317FDFFA48B57783E0F66C
4.	Homing Transmitter output	present
5.	Exterior Mechanical Inspection	No damage, no water inside the EUT

TEST EQUIPMENT USED

No	Name	Type, model	Ser. No	Calibration Due date
1	Beacon tester	BT100AVS	2315	07.2014
2	Climatic chamber	KPK 400V	15	08.2014
4	Set of immersion	-	102070	08.2013
5	Thermometer	-	104111	06.2013

ANNEX 10
SPURIOUS EMISSIONS TEST (A.12)

Equipment Under Test (EUT): rescueME PLB1, s/n TA1

SW version: Issue 00.04

Test Date: 29.11.2012 - 30.11.2012

Test Conditions:
– Atmospheric pressure: 743..761 mm/Hg
– Relative air humidity: 55..60 %
– Temperature:
Minimum: -20 °C
Maximum: +55 °C
Ambient: +26 °C

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Spurious emissions test	A.12 RTCM 11010.2	A.12 RTCM 11010.2

TEST RESULT

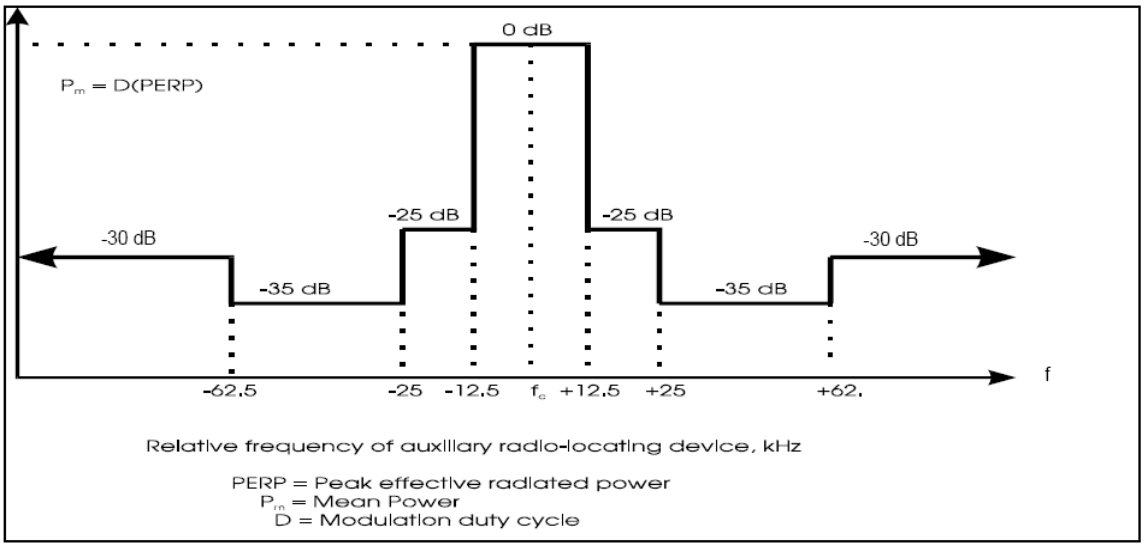


Figure 10.1 – Required Spurious Emissions for 121.5 MHz

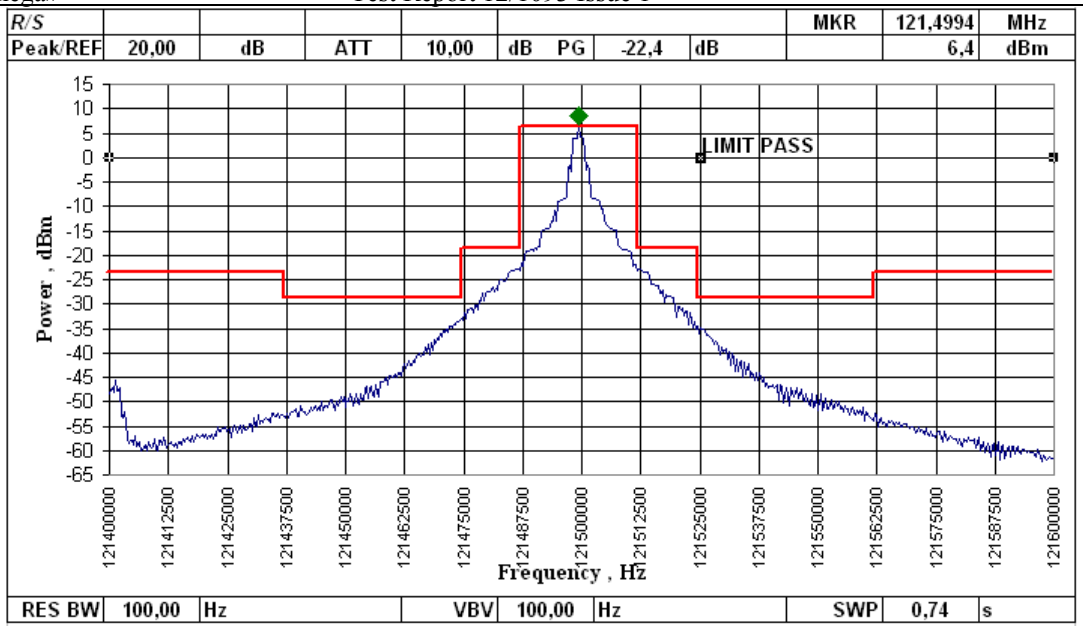


Figure 10.2 – Spurious Emissions for 121.5 MHz at Minimum Temperature

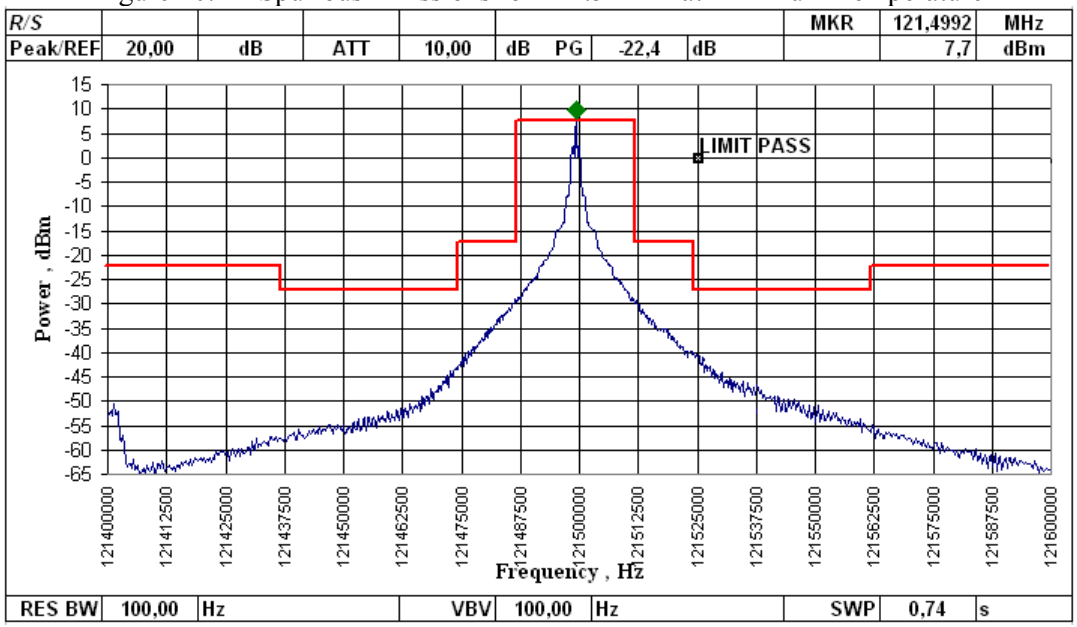


Figure 10.3 – Spurious Emissions for 121.5 MHz at Ambient Temperature

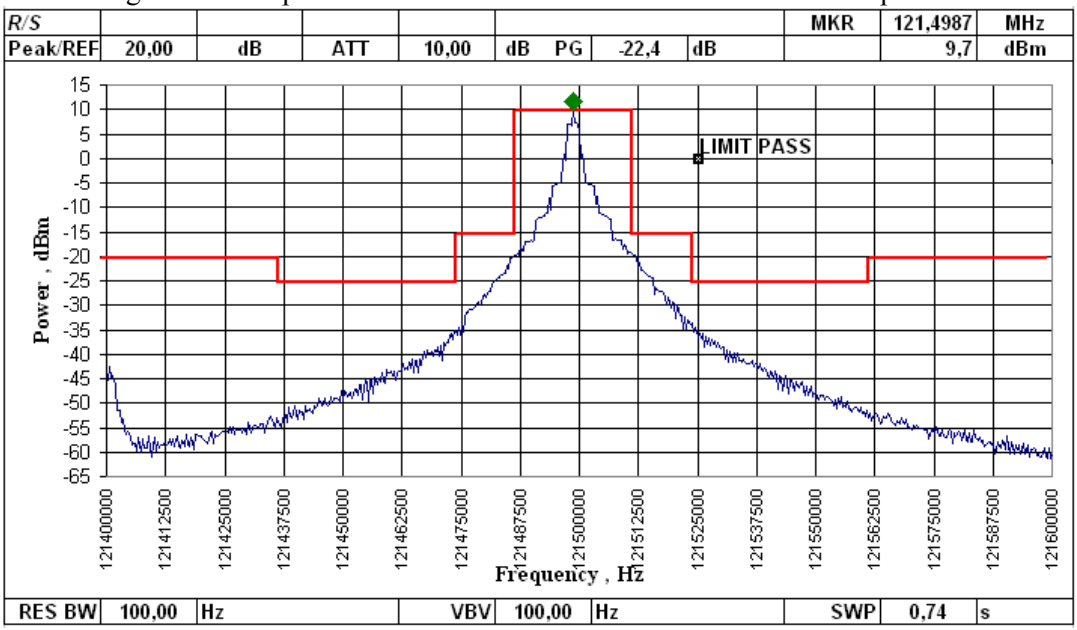


Figure 10.4 – Spurious Emissions for 121.5 MHz at Maximum Temperature

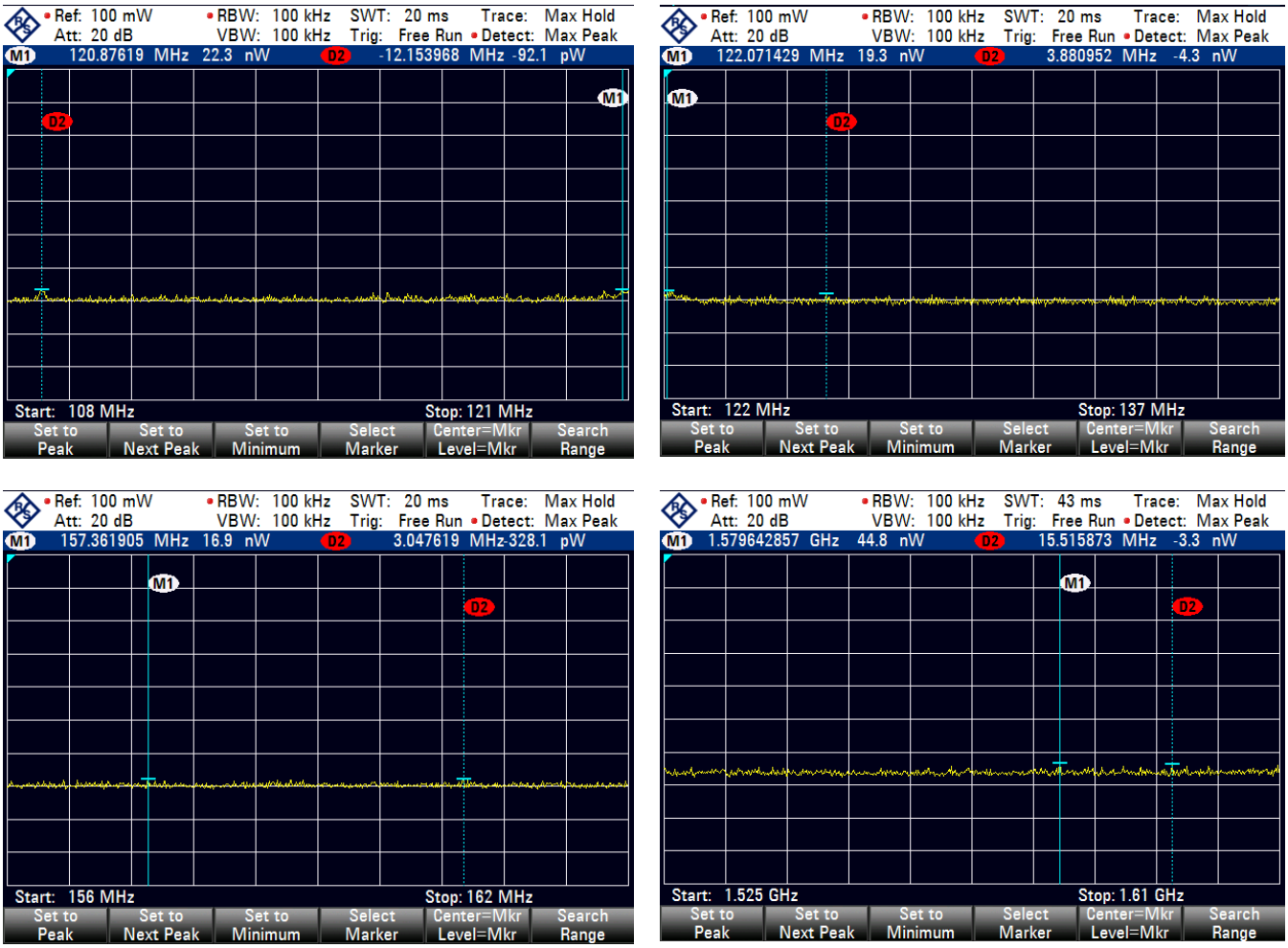


Figure 10.5 – Out of band Spurious Emissions for 121.5 MHz at Ambient Temperature

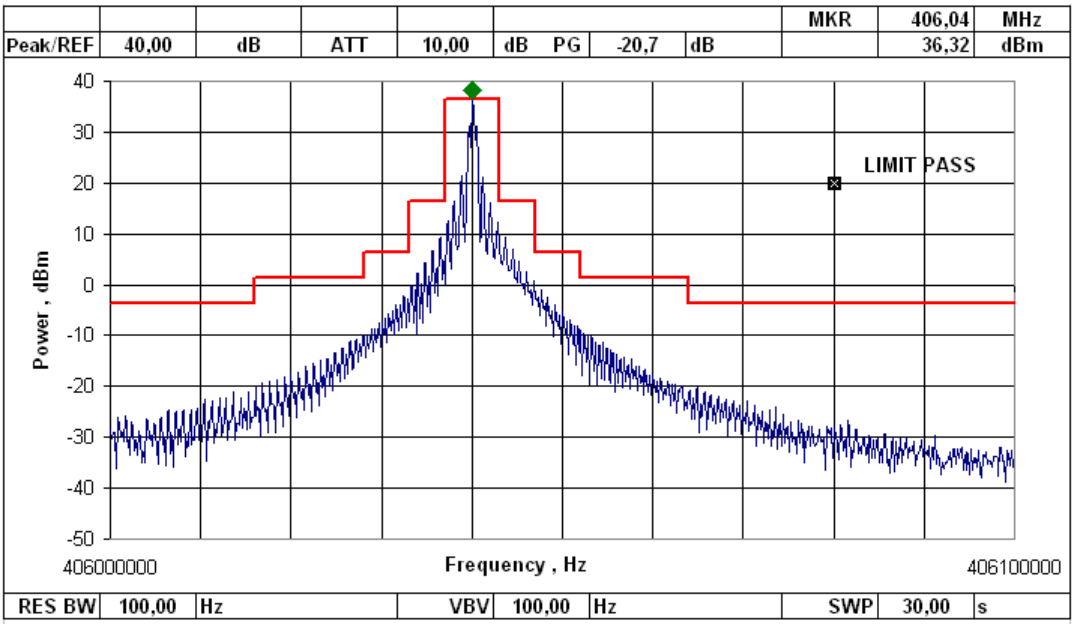


Figure 10.6 - Spurious Emissions for 406 MHz at Minimum Temperature

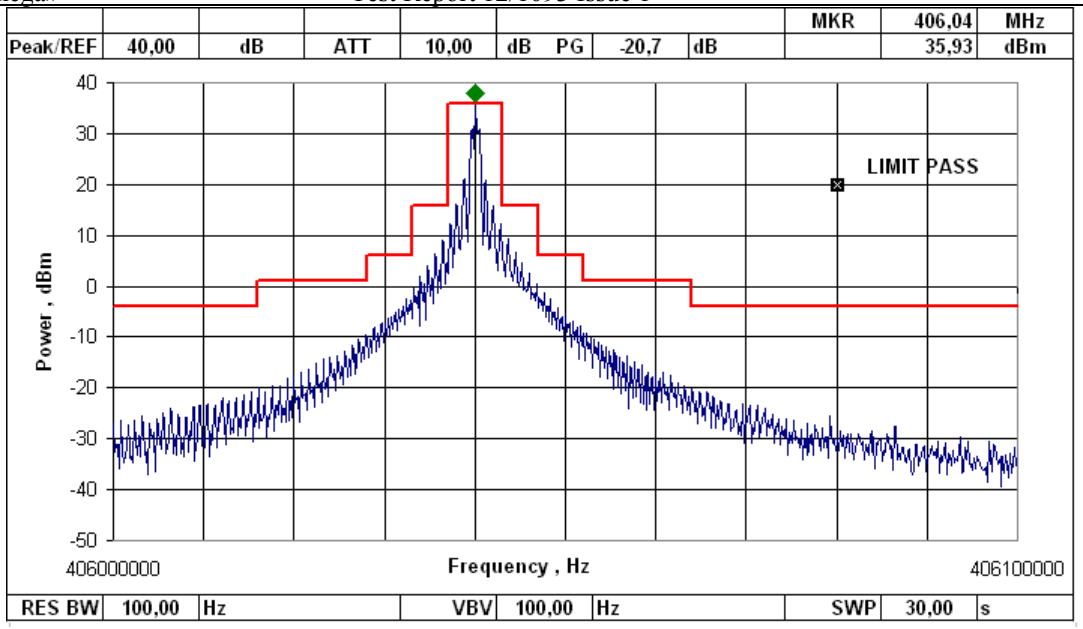


Figure 10.7 – Spurious Emissions for 406 MHz at Ambient Temperature

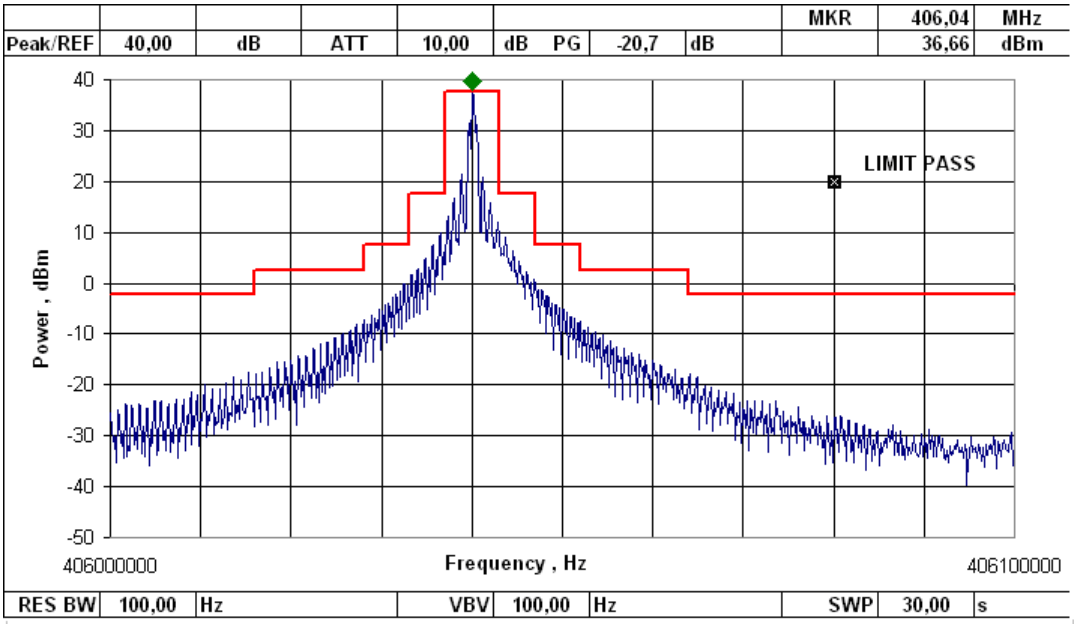


Figure 10.8 - Spurious Emissions for 406 MHz at Maximum Temperature

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1	Beacon tester	BT100AVS	2315	07.2014
2	Climatic chamber	KPK-400V	15	08.2014
3	Temperature meter	gradient 2002	078	03.2013
4	Spectrum analyzer	FSH8	105763	06.2015

ANNEX 11.
OPERATIONAL LIFE TEST (A.13.1)

Equipment Under Test (EUT): rescueME PLB1, s/n TA1

SW version: Issue 00.06

Test Date: 24.12.2012 - 25.12.2012
Test Conditions:

- Ambient temperature: 17…18°C
- Atmospheric pressure: 756…758 mm/Hg
- Relative air humidity: 53…57 %
-
- **TEST PROGRAM**

Item	Test name	Requirements	Methods
1	Operational Life Test	A.13.1 RTCM 11010.2	A.13.1.2 RTCM 11010.2*

* The fresh battery pack was preliminary partially discharged.

TEST RESULT:

Beacon manufacturer provided operating currents and calculations of the extension Factor (F hrs).

Operational currents were verified by the testing laboratory with measurement results reported in Table 11.1 below.

During operating current measurement in modes No. 1, 2, 4, 5 GNSS signal was not available
During operating current measurement in modes No. 3 GNSS signal was available

Measured values do not exceed values provided by manufacturer.

Calculations of the extension Factor (F hrs) are shown in Table 11.2

Table 11.1: Beacon Operating Current

No.	Beacon Operating Modes	Mode: Manually selectable or Automatic	Measurement interval, sec	Average Current, mA	Peak Current, mA
1	Self test mode	Manually to selftest on, auto off	9.35	68.27	1135.29
2	**Operating mode with GPS receiver in search mode (406 MHz+Homer+GPS on)**	**Automatic**	**50**	**38.72**	**1194.12**
3	Operating mode with GPS fix obtained (406 MHz+Homer+GPS off)	Automatic	50	28.94	1170.59
4	GNSS selftest mode	Manually to GNSS selftest on	315.3	16.36	85.29
5	Standby mode	Automatic	600	0.00001	

Conclusions: The beacon mode: **406 MHz+Homer+GPS on** is mode at which beacon has the highest current consumption.

Table 11.2: Calculations of the extension Factor (F hrs)

Characteristic	Designation	Units	Value	Comments
Declared beacon battery replacement period (from date of installation in the beacon to expiry date marked on the beacon)	TBR or TBR	Years	**10**	
Battery Useful Life	UBR	Years	**20**	
Battery pack electrical configuration	3 123 cells in series			
Cell model and cell chemistry	Energizer 123 Photo MNO2			
Nominal cell capacity		A-hrs	1.5	
Nominal battery pack capacity	C_{BN}	A-hrs	1.5	
Annual battery cell capacity loss (self-discharge) due to aging, as specified by cell manufacturer at ambient temperature	L_{SDC}	%	1.0	
Calculated battery pack capacity loss due to self-discharge: $L_{CBN} = C_{BN} - [C_{BN} *(1 - L_{SDC} /100)^{2*TBR}]$	L_{CBN}	mA-hrs	**273,14**	
Number of self-tests per year	N_{ST}		12	
Average battery current during a self-test	I_{ST}	mA	70.02	
Maximum duration of a self-test	T_{ST}	sec	9.35	
Calculated battery pack capacity loss due to self-tests during battery replacement period: $L_{ST} = I_{ST}*T_{ST}*T_{BR}*N_{ST} / 3600$	**L_{ST}**	mA-hrs	**43.65**	
Maximum Number of GNSS self-tests between battery replacements	N_{GST}		10	
Average battery current during a GNSS self-test of maximum duration	I_{GST}	mA	16.85	
Maximum duration of a GNSS self-test	T_{GST}	sec	315.30	
Calculated battery pack capacity loss due to GNSS self-tests during battery replacement period: $L_{GST} = I_{GST}*T_{GST}*N_{GST} / 3600$	**L_{GST}**	mA-hrs	**14.76**	
Average stand-by battery pack current	I_{SB}	mA	1.00E-05	
Battery pack capacity loss due to constant operation of circuitry prior to beacon activation: $L_{ISB} = I_{SB}*2*T_{BR}*8760$	**L_{ISB}**	mA-hrs	**1.75**	
Other Capacity Losses	**L_{OTH}**	mA-hrs	5.0	To simulate worst case of GPS receiver consumption when GNSS signal is available after 12 hrs of Operation life test
Calculated value of the battery pack pre-test discharge $L_{CDC} = L_{CBN} + (L_{ST} + L_{GST} + L_{ISB})/1000$	**L_{CDC}**	mA-hrs	**338,30**	
Extension Factor	F	hrs	11,67 (11 hrs 40 minutes)	Current operational (Operating mode with GPS fix obtained (406 MHz+Homer+GPS off)) =0.029A

According to manufacturer's description (see Test Report 12/1410 Volume 2, page 18) of the operating mode that draws the maximum battery energy other capacity losses equal 5.0 mA-hrs were added in Table 11.2 since the internal GPS receiver timings are different between GPS signal present and absent. The additional current could be drawn if the GPS signal were made available after 12 hours. During operational life testing in this instance however the PLB1 would likely gain a fix within a time less than 40 seconds and switch off the GNSS receiver. For this reason it is not possible to accurately test this mode during the operational life test for PLB1.

Under these conditions additional current which should be taken into account for the potential worst case was calculated as shown below.

With the operational life test carried out without GPS signal the additional worst case GPS on time for 24 hours would be increased over the no GPS time by an additional 20 minutes. The additional current drawn with GPS on against no GPS is given as 38.8mA – 29mA = 9.8mA. This additional current at worst case equates to an extension on the operational life of 3.3 mA-hrs or 6.75 minutes operation, which is insignificant. An additional 5.0 mA-hrs were added to the Battery pre-discharge calculation to account for the additional current.

Other operational life Extensions to be applied after battery Pre-discharge.

Table 11.3 Extension factors to be applied to PLB Operating Lifetime after pre-discharge of battery.

Extension Reference	Description	Additional Battery Capacity requirement	Extension on operating Lifetime (PLB operational current 29mA)
EXT 1	Electronic Witness Allowance 1 hour extension + GPS operation time	29mAh 9.8mAh	60 minutes 20.3 minutes
EXT 2	Additional extension due to PLB gaining a GPS position during testing	17.15mAh	35.5 minutes
EXT 3	Difference between actual pre-discharge and calculated pre-discharge required as per table 11.2	338.30-245.83mAh =92.47mAh	191.32 minutes
		Totals	307.12minutes =5hours 08minutes

EXT 1
The PLB1 (and PLB2) uses an electronic witness to show activation as described in Test Report 12/1410 Volume 2, page 18. To allow for inadvertent activation there is an allowance of 1 hour of operation before the electronic witness is activated. This is accounted for by the additional hour in EXT 1. This additional operational time would normally be with GPS on for 30 minutes in the first hour. However it would be possible for a user to only turn on the PLB1 for 5 minutes 12 times thus having the GNSS receiver on for the full additional electronic witness first hour allowance. The additional current drawn with GPS receiver on against GPS receiver off is 38.8mA – 29mA = 9.8mA (See table 11.1). To allow for this an additional 9.8mAh or 20.3 minutes operation is added to the total time in EXT 1.

EXT 2
During the actual operational life test, the PLB1 was fully operational with the GPS active. Although during the test there was no direct visibility to the GPS satellites, the internal GPS receiver obtained a position fix. (Note that this position obtained from the GPS receiver corresponds to real position of the beacon.) In calculation of the current used during the test it was assumed the GPS position was obtained in zero time (giving worst case current EXT 2). To account for this the worst case current consumption for the PLB without GPS signals present for the first 24 hours was added as EXT 2.
The GPS ON time over the 24 hour period without a GPS signal is 105minutes. The additional current drawn with GPS on against no GPS is 38.8mA – 29mA = 9.8mA. This additional current at worst case equates to an extension on the operational life of 105 minutes x 9.8mA = 17.15 mA-hrs or 35.5 minutes operation.

EXT 3
The battery was pre-discharged for 4 hours 55 minutes at the manufacturer's request (To account for Cospas-Sarsat pre-discharge calculations) with a discharge current of 50 mA. This is equal to a pre-discharge of 245.833mAh (8 hours 29 minutes). The RTCM pre-discharge requirement is 338.30mAh (11 hours 40 minutes) Table 9.2. The additional extension on the operating lifetime to account for reduced pre-discharge is 92.47mAh or 191.32 minutes or 3 hours 12 minutes.

The minimum operating lifetime duration shall be as calculated in Table 11.3 **29 hours 08 minutes**

Lifetime test at minimum temperature minus -20°C with preliminary discharged battery was carried out for 33 hours 00 minutes.

The Ocean Signal PLB 1 exceeds the operational Life requirement of 29 hours 08 minutes.

Figure 11.1 – The test site view of the Operational life test

a) Transmitted Frequency (according to C/S T.007 – section A.3.2.1)

- **Nominal Value (A.3.2.1.1)**

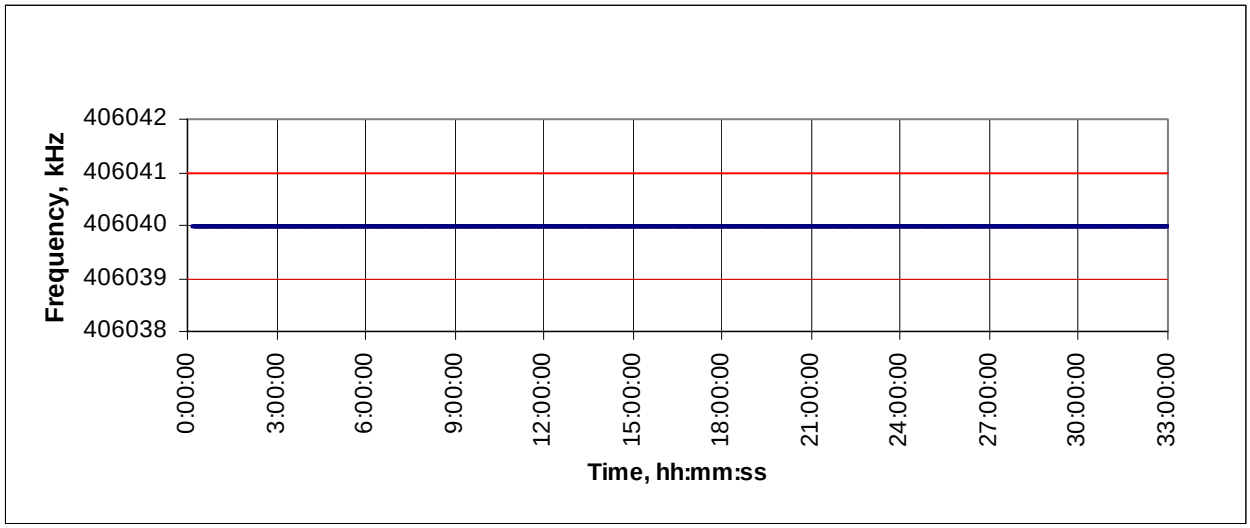


Figure 11.2 – Nominal Value of frequency

- **Short-Term Stability (A.3.2.1.2)**

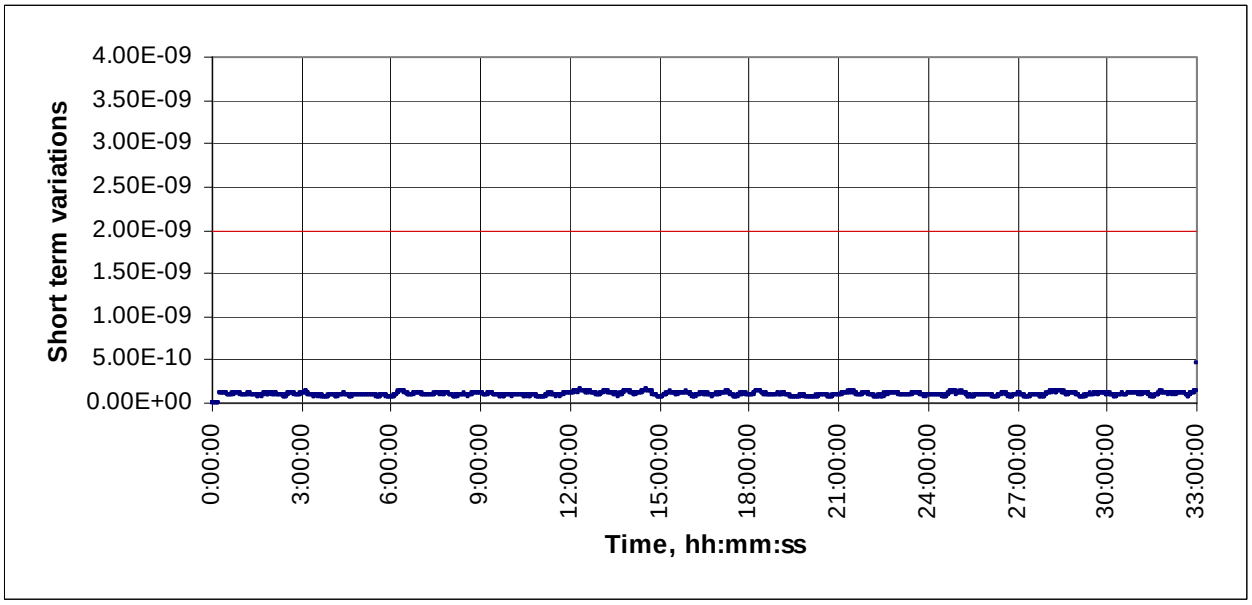
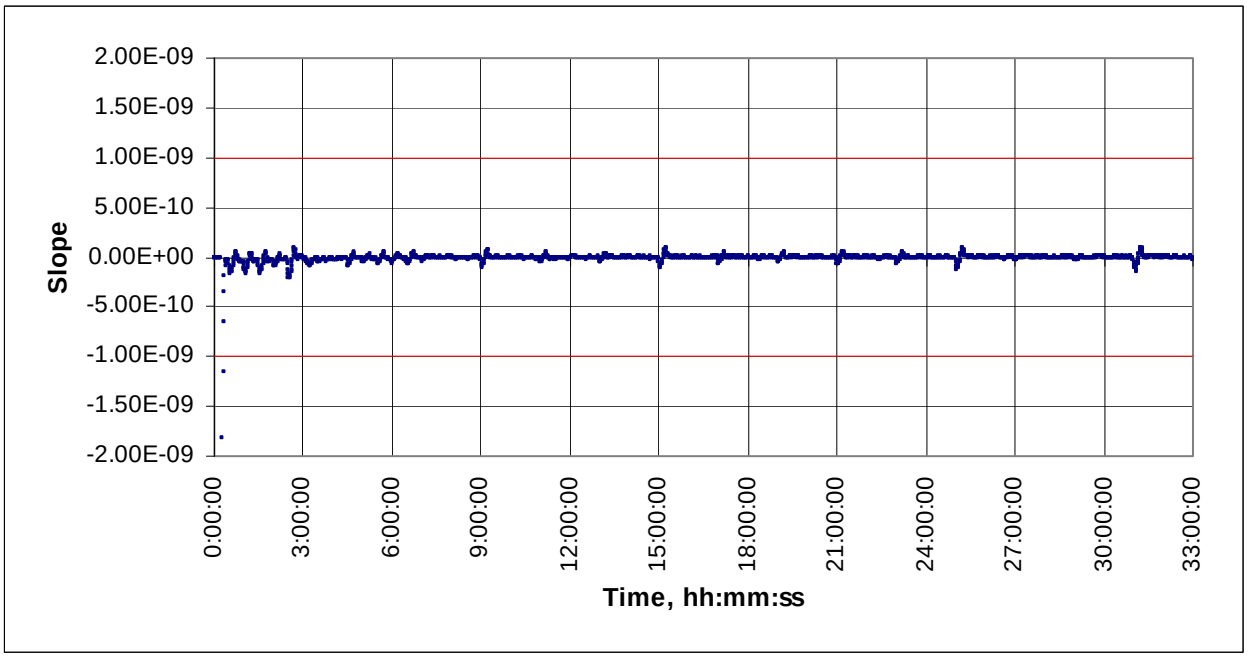


Figure 11.3 – Short-Term Stability

- **Medium-Term Stability (A.3.2.1.3)**



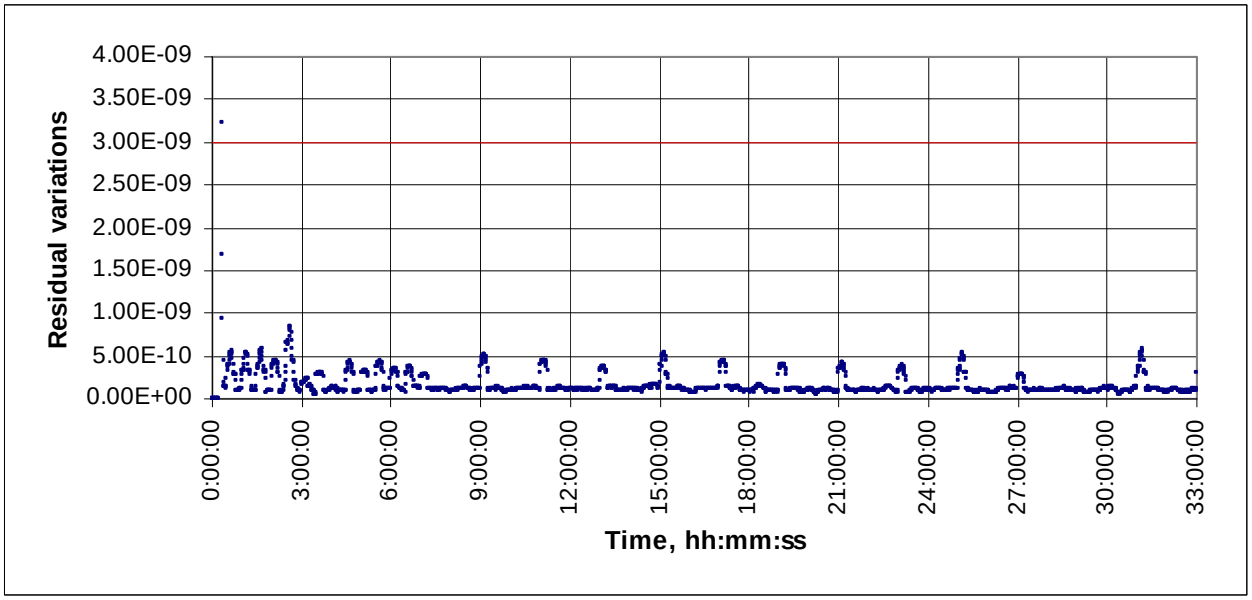


Figure 11.4 – Medium-Term Stability

b) Transmitter Power Output (according to C/S T.007 – section A.3.2.2.1).

- **Transmitter Power Output Level (A.3.2.2.1)**

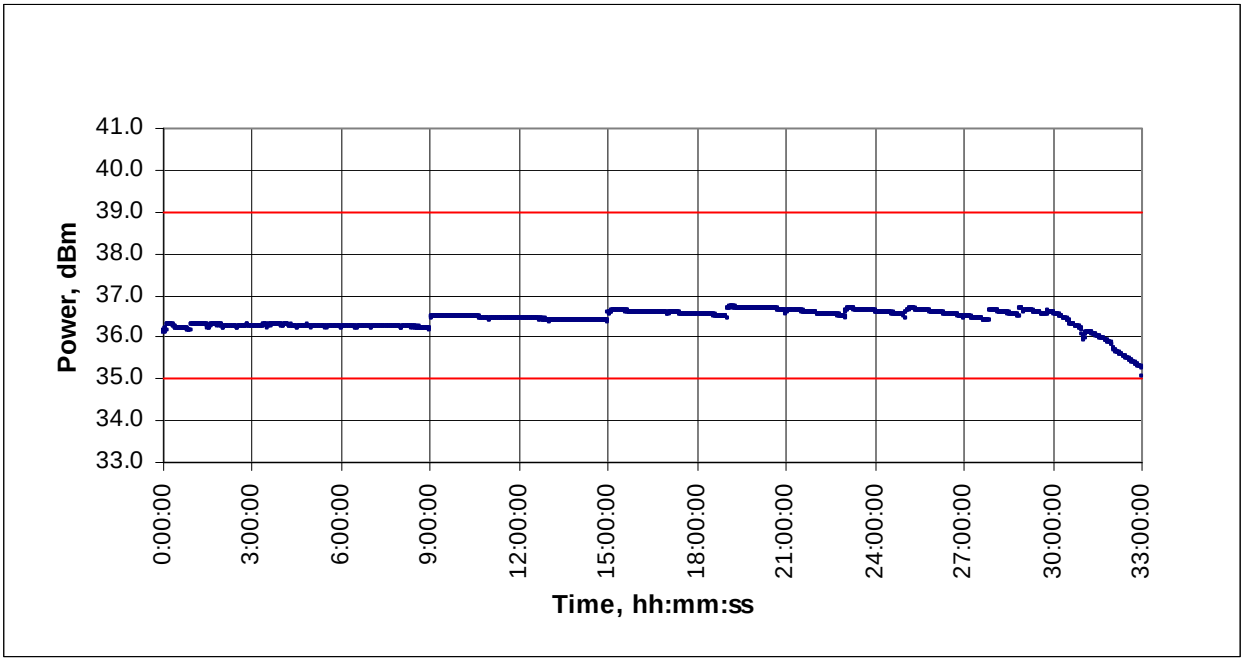


Figure 11.5– Transmitter power during test

c) Message Coding (according to C/S T.007 - A.3.1.4)

Bursts received	2396
BCH error	0
Self test message	0
Full HEX message	FFFE2F8C9E0000037FDFFC13353783E0F66C

Decoding Beacon Message

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	000000000000000000000011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	10000100110011010100
BCH 1 Calculated:	N/A	10000100110011010100
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: 121.5 MHz homer	112	1
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	011001101100
BCH 2 Calculated:	N/A	011001101100
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193C000006FFBFF

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1	Beacon tester	BT-611	1005	06.2013
2	Climatic chamber	КРК-400V	15	08.2014
3	Temperature meter	gradient 2002	078	03.2013
4	Spectrum analyzer	HP8593E	3831U02306	09.2013
5	Beacon tester	BT100AVS	2315	07.2014

ANNEX 12.
SELF- TEST (A.13.2)

Equipment Under Test (EUT): rescueME PLB1, s/n TA1

SW version: Issue 00.03

Test Date: 03.11.2012-07.11.2012
Test Conditions:
- Atmospheric pressure: 754 – 757 mm/Hg
- Relative air humidity: 46 – 48 %
- Temperature
  Minimum: -20 °C
  Maximum: +55 °C
  Ambient: +20 °C

TEST PROGRAM

Item	Test name	Requirements	Methods
1	Self-test	A.13.2 RTCM 11010.2	A.13.2 RTCM 11010.2

TEST RESULT

Test Method:
The self-test was performed at the minimum operating temperature, at the ambient temperature, and at the maximum operating temperature. Before test at each temperature the EUT was turned OFF and thermally-soaked for at least 2 hours at the required operating temperature. The EUT then was placed in the self-test mode in accordance with the manufacturer's operating instructions. The EUT was inspected to indicate successful completion of the self-test and the following parameters were verified:

1. The 406 MHz RF output pulse duration.
2. The frame synchronization pattern.
3. Quantity of bursts transmitted.
4. The content of the message.
5. Self test 121.5 MHz transmission duration.

Test duration 0 h 0 m	Bursts received 1	BCH error 0	Self-Test 1	
406 MHz Transmitter Parameters	**Limits**		**Measured**	
	min	**max**	**current**	
Frequency, kHz	406.039	406.041	406.039959	
Power, Wt	3.16	7.94	3.56	
Total burst duration, ms)	514.80	525.20	518.20	
121.5 MHz Transmitter Parameters				
Carrier Frequency, Hz	121499222			
Self test 121.5 MHz transmission (<1 second or 3 sweeps)		Pass		
Message				
Digital message	FFFED0 8C9E0000037FDFFC13353 783E0F66C			
15 HEX ID	193C000006FFBFF			

Figure 12.1 - rescueME PLB1, s/n TA1 at Ambient Temperature

Test duration 0 h 0 m	Bursts received 1	BCH error 0	Self-Test 1	
406 MHz Transmitter Parameters	**Limits**		**Measured**	
	min	**max**	**current**	
Frequency, kHz	406.039	406.041	406.039964	
Power, Wt	3.16	7.94	4.01	
Total burst duration, ms)	514.80	525.20	518.15	
121.5 MHz Transmitter Parameters				
Carrier Frequency, Hz	121499315			
Self test 121.5 MHz transmission (<1 second or 3 sweeps)		Pass		
Message				
Digital message	FFFED0 8C9E0000037FDFFC13353 783E0F66C			
15 HEX ID	193C000006FFBFF			

Figure 12.2 - rescueME PLB1, s/n TA1 at Maximum Temperature

Test duration 0 h 0 m	Bursts received 1	BCH error 0	Self-Test 1	
406 MHz Transmitter Parameters	**Limits**		**Measured**	
	min	**max**	**current**	
Frequency, kHz	406.039	406.041	406.039971	
Power, Wt	3.16	7.94	4.44	
Total burst duration, ms)	514.80	525.20	518.25	
121.5 MHz Transmitter Parameters				
Carrier Frequency, Hz	121499315			
Self test 121.5 MHz transmission (<1 second or 3 sweeps)		Pass		
Message				
Digital message	FFFED0 8C9E0000037FDFFC13353 783E0F66C			
15 HEX ID	193C000006FFBFF			

Figure 12.3 - rescueME PLB1, s/n TA1 at Minimum Temperature

Decoding Beacon Message

Full message: FFFED08C9E0000037FDFFC13353783E0F66C

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	00000000000000000000000011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	10000100110011010100
BCH 1 Calculated:	N/A	10000100110011010100
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: 121.5 MHz homer	112	1
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	011001101100
BCH 2 Calculated:	N/A	011001101100
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193C000006FFBFF

TEST EQUIPMENT

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1	Beacon tester	BT-611	1005	06.2013
2	Climatic chamber	KPK-400V	15	08.2014
3	Temperature meter	gradient 2002	078	03.2013

ANNEX 13.
AUXILIARY RADIO-LOCATING DEVICE TRANSMITTER TEST (A.16)

Equipment Under Test (EUT): rescueME PLB1, s/n TA1

SW version: Issue 00.03, Issue 00.04

Test Date: 02.11.2012, 06.11.2012
03.12.2012 - 04.12.2012
Test Conditions:
– Atmospheric pressure: 743..761 mm/Hg
– Relative air humidity: 55..60 %
– Temperature
Minimum: -20 °C
Maximum: +55 °C
Ambient: +20 °C

TEST PROGRAM

Item	Test name	Requirements	Methods
1	121.5 MHz auxiliary radio-locating device transmitter test	A.16 RTCM 11010.2	A.16 RTCM 11010.2

TEST DESCRIPTION

1. Carrier Frequency Test
The carrier frequency test was performed with a spectrum analyzer. The carrier frequency measured at the minimum and maximum operating temperatures.

2. Modulation Characteristics
The transmitter duty cycle, modulation frequency, modulation duty cycle, modulation factor and sweep repetition rate were determined by observing the detected RF signal with a storage oscilloscope. The frequency coherence test was performed with a spectrum analyzer.
All measurements were made at the minimum and maximum operating temperatures.
3. Peak Effective Radiated Power

The elevation angle between 5° and 20° which produces a maximum gain was determined with the EUT at an arbitrary azimuth. The peak envelope power was measured and the elevation angle was noted and should remain fixed for the remainder of the test. The remaining 11 measurements of the peak effective radiated power were obtained by rotating the EUT in increments of 30° ± 3°. For each measurement the EUT peak effective radiated power (PERP) was computed using the following equation:

$$PEIRP = LOG^{-1}\frac{P_{REC} - G_{REC} + L_C + L_P}{10},$$

Where:
P_{REC} – Measured Power level from spectrum analyzer (dBm);
G_{REC} – Antenna gain of search antenna (dB);
L_C – Receive system attenuator and cable loss (dB);
L_P – Free space propagation loss (dB).

– Step No. 1
Carrier Frequency Test (A.16.1)
Condition: The carrier frequency was measured at the minimum and maximum operating temperatures.

– Step No. 2
Modulation Characteristics (A.16.2)
Condition for Transmitter Duty Cycle Measurement: During the observation of the transmitted signal the carrier was not interrupted (except for up to two seconds during transmission of the 406 MHz pulse).

– Step No. 3
Modulation Characteristics (A.16.2)
Condition for Modulation Frequency and Sweep Repetition Rate Measurement: During the observation of the modulation envelope the upper and lower audio-frequency sweep limits and sweep repetition rate were measured.

– Step No. 4
Modulation Characteristics (A.16.2)
Condition for Modulation Duty Cycle Measurement: The modulation duty cycle was measured near the start, midpoint, and end of the modulation sweep period. Modulation duty cycle was calculated using the following formula

$$Duty\ Circle = \frac{A}{B} \times 100\%$$

– Step No. 5
Modulation Characteristics (A.16.2)
Condition for Modulation Factor Measurement: The modulation factor was defined with respect to the maximum and minimum amplitudes of the modulation envelope, by the following formula

$$Modulation\ Factor = \frac{A - B}{A + B}$$

– Step No. 6
Modulation Characteristics (A.16.2)
Condition for Frequency Coherence Measurement:
The measurement was made for the total power emitted during any transmission cycle with or without modulation.
The measurement was made to define the carrier frequency shift after interruption by the transmission of the 406 MHz burst.

– Step No.7
Modulation Characteristics (A.16.2)
Morse Letter P:
The transmitted signal was observed to confirm that it conforms with Figure 13.1

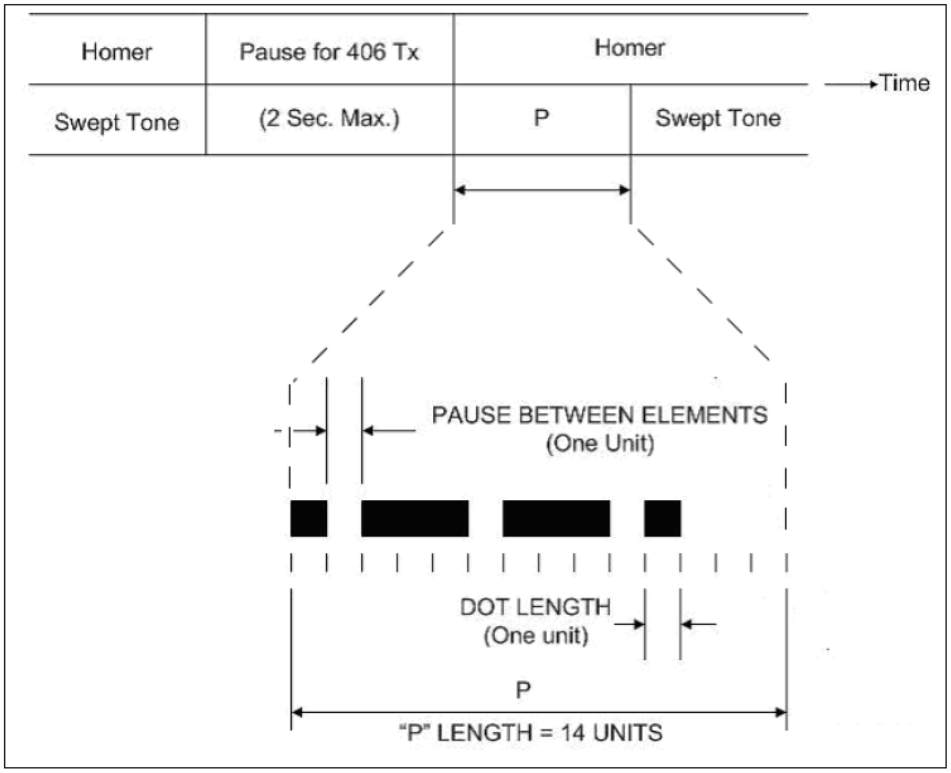


Figure 13.1 – Format of Morse Code "P" In 121.5 MHz homing signal

– Step No. 8

Peak Effective Radiated Power (A.16.3)

Condition for Peak Effective Radiated Power Measurement: This test was performed at ambient temperature for the EUT whose battery had been ON for a minimum of 20 hours.

The test site was positioned on the ground with uniform electrical characteristics. The site was clear of metal objects, overhead wires, etc., and was as free as possible from undesired signals such as ignition noise or other RF carriers. The distance from the EUT, or the search antenna to reflecting objects was more than 30 m. The EUT was placed in the center of a ground plane with a radius of 75 cm ± 5 cm mounted on the ground level.

Measurement of the radiated signals was made at a point 10 m from the EUT. At this point, a wooden pole or insulated tripod with a movable horizontal boom was arranged. The search antenna was raised and lowered through an elevation angle of 5° to 20°. It was mounted on the end of the boom with its cable lying horizontally on the boom and run back to the supporting mast. The other end of the search antenna cable was connected to a spectrum analyzer located at the foot of the mast.

Note. The PERP measurement was performed on OATS which is compliant with CISPR requirements.

– Step No. 9

Off Ground Plane Radiated Power Test (A.16.4)

Condition for Off Ground Plane Radiated Power Test: This test was effectively a repeat of the Peak Equivalent Isotropic Radiated Power test in Step No. 8 except that the PLB was raised off the ground plane.

The test site was the same as used in C/S T.007 Figure B.5 except that the distance between the Beacon Under Test and the RF Receiver was 10 m (not 3 m). The RFAM material was positioned such that the centre of the 3.6 m by 2.4 m section of RFAM was positioned at the specular reflection point for the ground reflected path signal between the EUT and the spectrum analyzer positioned at the elevation angle between 5° and 20° for which the EUT exhibits a maximum antenna gain. The EUT was mounted on a nonconductive wooden stand that raised the height of the base of the EUT 450 mm ± 25 mm above ground level.

The method of measurement was the same as in Step No.8 except that only 4 azimuth measurements were made at 90° ± 3°intervals.

TEST RESULT

Minimum Operating Temperature

Figure 13.2 – Site for Carrier Frequency Test and Modulation Characteristic Measurement at the minimum, ambient and maximum operating temperatures

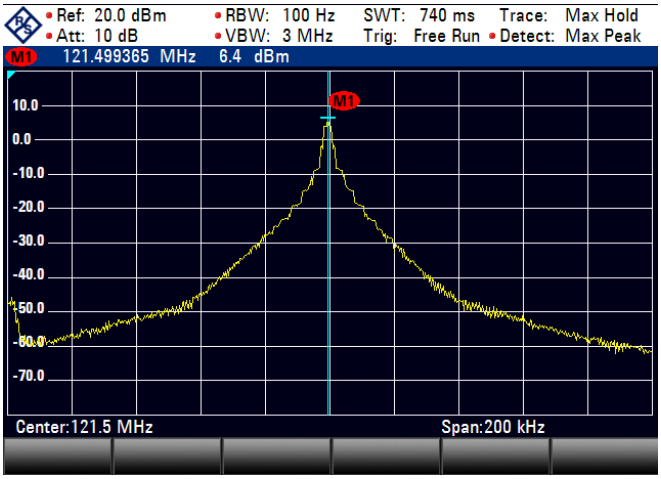


Figure 13.3 – Screenshot of Carrier Frequency Test Result at the minimum operating temperature

Frequency Coherence Measurement Test Result:

(i) Set the spectrum analyzer controls as follows:

- I.F. bandwidth: 10 kHz
- Video filter: OFF or as wide as possible
- Scan time: 100 ms./div.
- Amplitude scale: 5 dB/div.
- Scan width: 10 kHz/div.
- Center frequency: 121.5 MHz

(ii) Record the amplitude in dBm. (Figure 13.4)

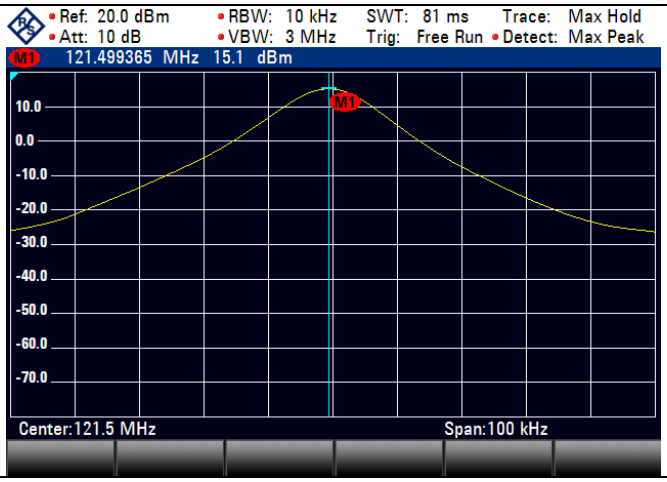


Figure 13.4 – Screenshot of Frequency Coherence Measurement Test Result (transmitted power at wide band) at the minimum operating temperature

(iii) Calculate the mean output power by adding 10 log(D), where D is the modulation duty cycle determined below, to the recorded signal level.

(iv) Set the spectrum analyzer controls as follows:

- I.F. bandwidth: 60 Hz or less
- Video filter: OFF or as wide as possible
- Scan time: 10 sec/div
- Amplitude scale: 0.5 dB/div
- Scan width: 20 Hz/div
- Center frequency: 121.5 MHz

(v) Measure and record the carrier power dBm as displayed on the spectrum analyzer (Figure 13.5).

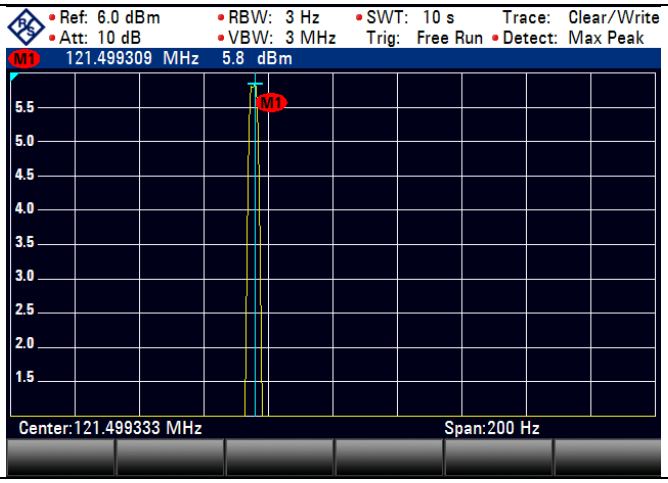


Figure 13.5 – Screenshot of Frequency Coherence Measurement Test Result (transmitted power at narrow band) at the minimum operating temperature

(vi) Calculate the ratio of carrier power to mean power from steps (iii) and (v) using the following formula:

$$\frac{Carrier\_power}{Mean\_power} = 10^{\frac{\text{dBc-dBmean}}{10}}$$

dB_C = carrier power in step (v)
dB_{mean} = mean power in step (iii)

TEST RESULTS

Output power measurement at the antenna connector as per steps (i) and (ii) is 13.67 dBm.

Mean power calculated as per step (iii) is 15.1 + 10 log(D), where D is the modulation duty cycle. In the worst case D is 34.59%, therefore mean power is 15.1 + 10 log(0.3459) = 10.49 dBm
Carrier power that measured with 3 Hz I.F. bandwidth is 5.8 dBm.
Ratio of carrier power to mean power is 34%.

$$\frac{Carrier\_power}{Mean\_power} = 10^{\frac{\text{dBc-dBmean}}{10}} = 10^{\frac{5.8-10.49}{10}} = 0.34$$

Carrier power is below of the mean power by 4.69 dB.
34% of the total power is shown to be within ±3Hz of the carrier frequency.

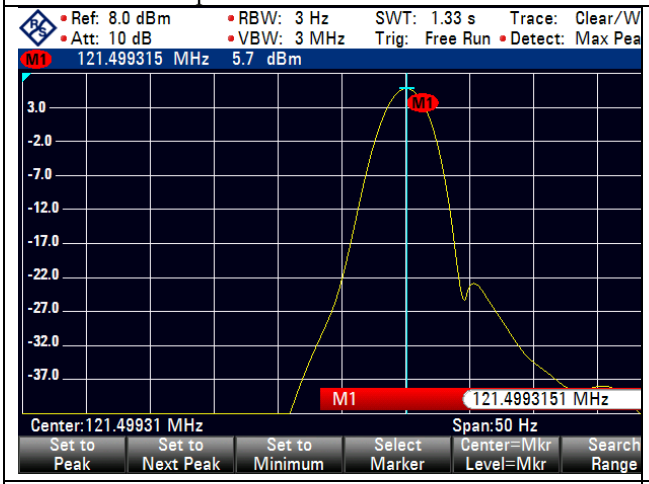


Figure 13.6 – Screenshot of Frequency Coherence Measurement Test Result (Frequency Shift) at the minimum operating temperature. Transmitted RF (121.5 MHz) before the interruption for the 406 MHz RF burst

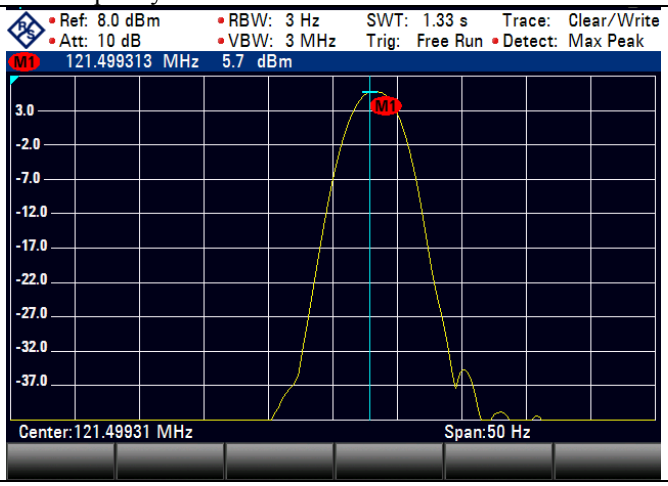


Figure 13.7 – Screenshot of Frequency Coherence Measurement Test Result (Frequency Shift) at the minimum operating temperature. Transmitted RF (121.5 MHz) after the interruption for the 406 MHz RF burst

The carrier frequency does not vary by more than +-30Hz during the interruption for a 406MHz transmission. See Figures 13.6 and 13.7.

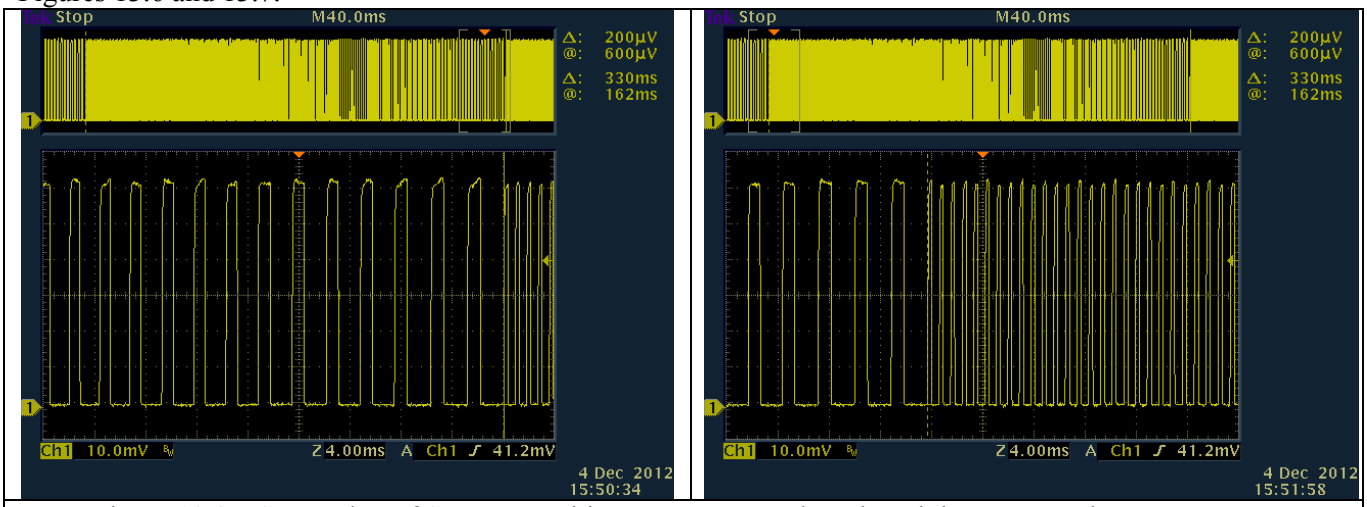


Figure 13.8 – Screenshot of Sweep repetition rate Test Result at the minimum operating temperature

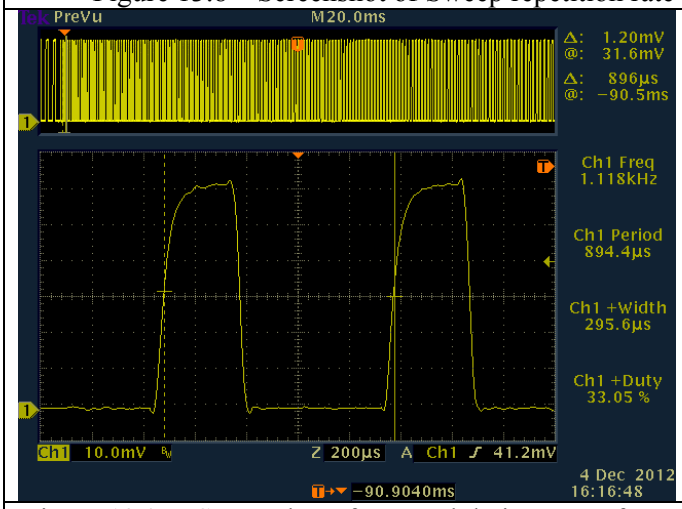


Figure 13.9 – Screenshot of Demodulation Waveform (A) measured start of the modulation sweep period at the minimum operating temperature

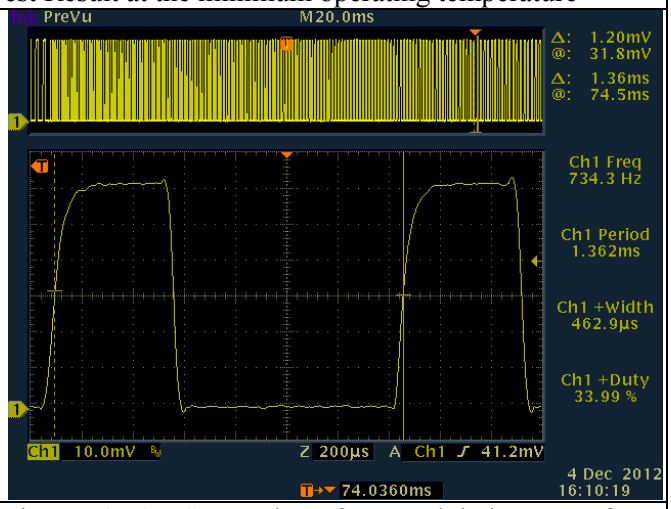


Figure 13.10 – Screenshot of Demodulation Waveform (A) measured near midpoint of the modulation sweep period at the minimum operating temperature

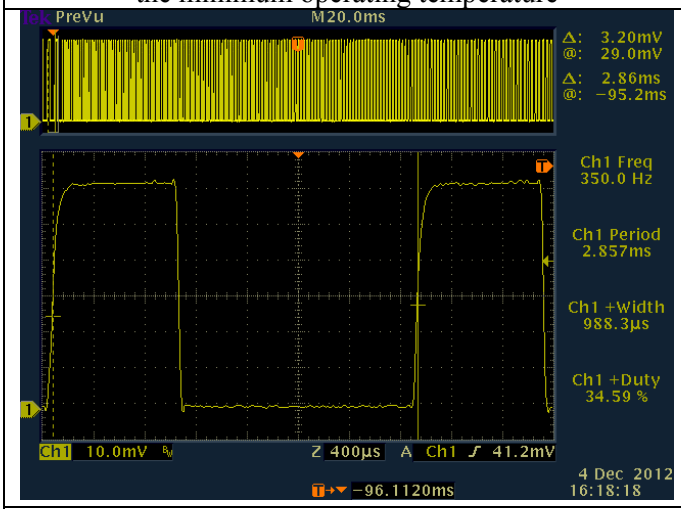


Figure 13.11 – Screenshot of Demodulation Waveform (A) measured near end of the modulation sweep period at the minimum operating temperature

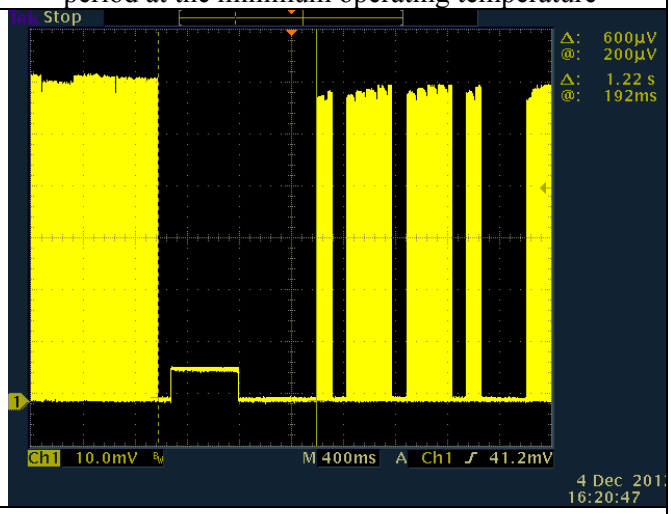


Figure 13.12 – Screenshot of Transmitter Duty Cycle Test Result at the minimum operating temperature

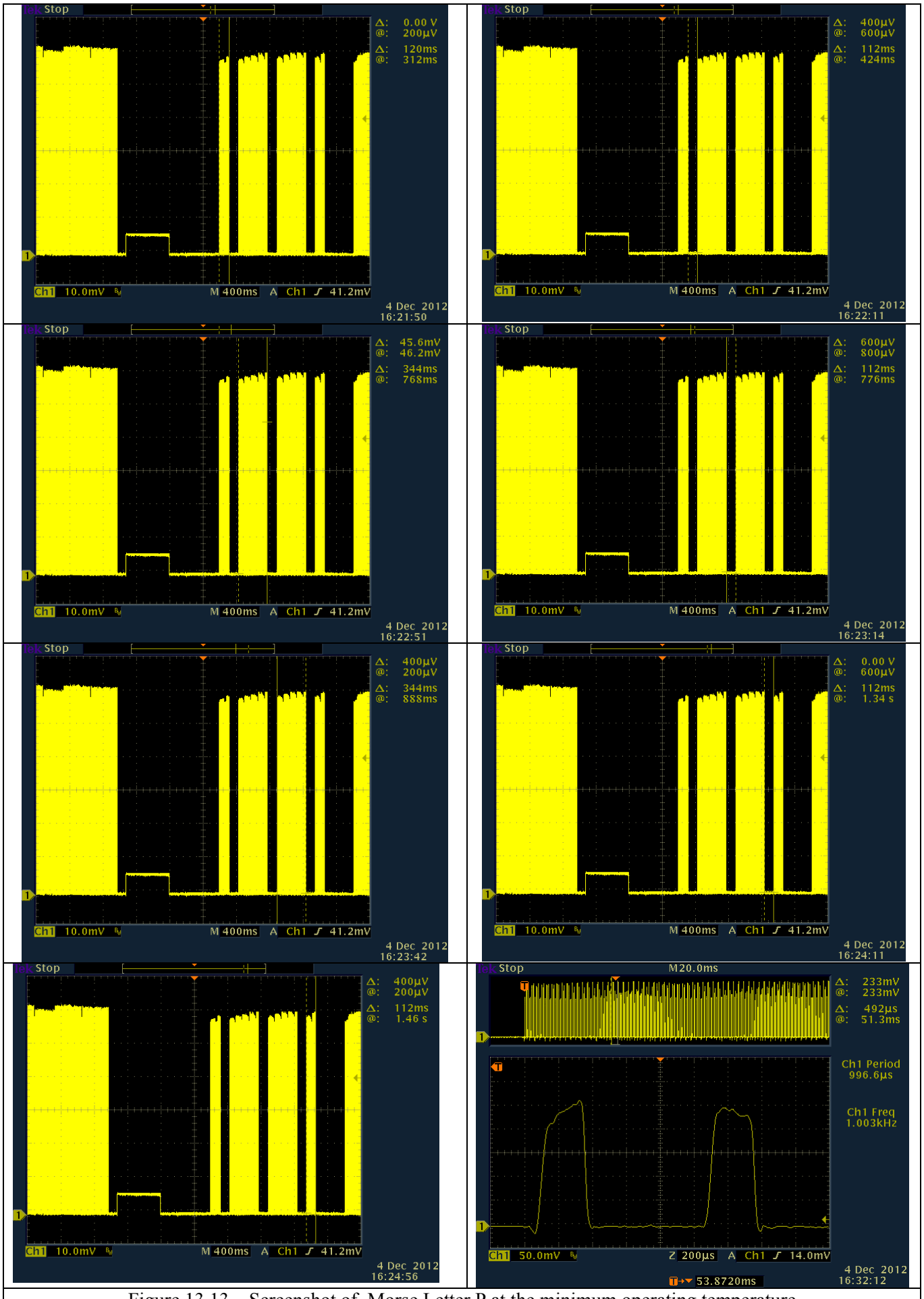


Figure 13.13 – Screenshot of Morse Letter P at the minimum operating temperature

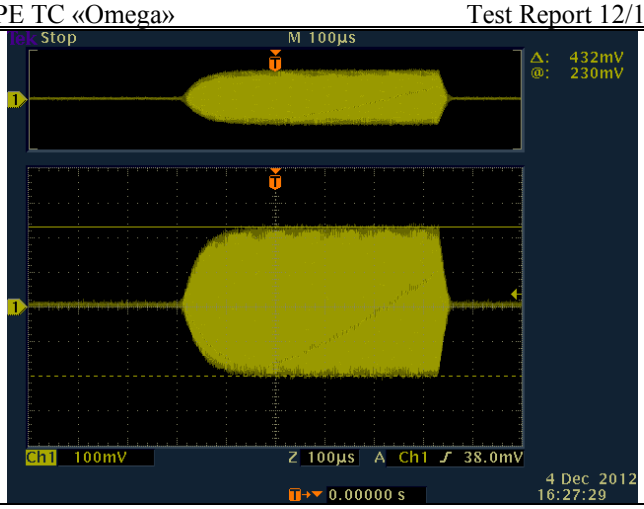


Figure 13.14 – Screenshot of maximum amplitude signal for determination of the Modulation Factor at the minimum operating temperature

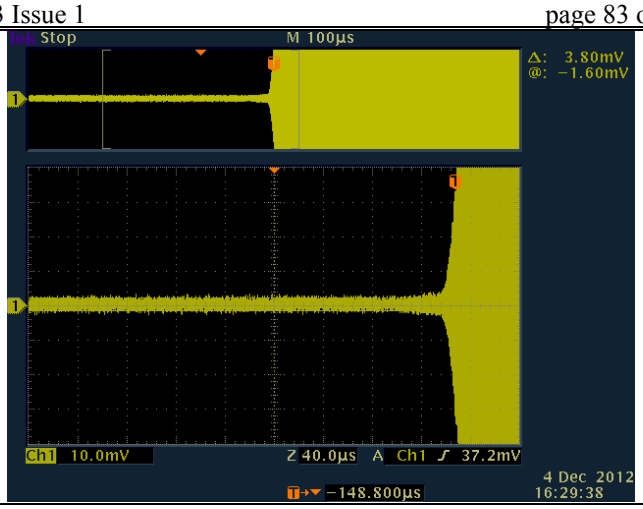


Figure 13.15 – Screenshot of minimum amplitude signal for determination the Modulation Factor at the minimum operating temperature

$$Modulation\ Factor = \frac{A-B}{A+B} = \frac{432-3.80}{432+3.80} = 98.26\%$$

Maximum Temperature

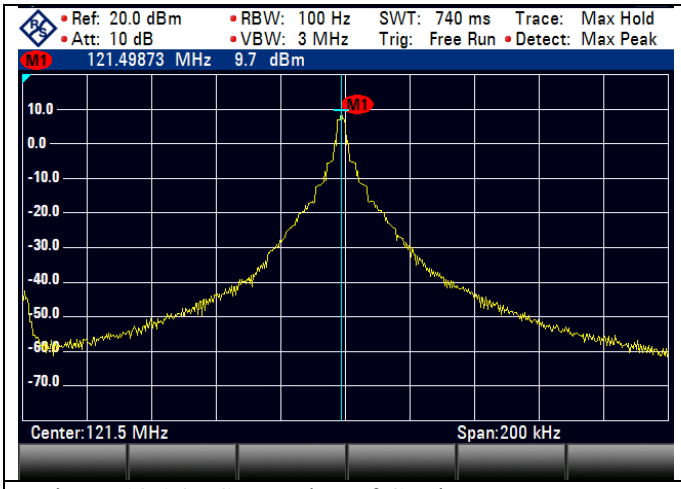


Figure 13.16 – Screenshot of Carrier Frequency Test Result at the maximum operating temperature

Frequency Coherence Measurement Test Result:

(i) Set the spectrum analyzer controls as follows:

- I.F. bandwidth: 10 kHz
- Video filter: OFF or as wide as possible
- Scan time: 100 ms./div.
- Amplitude scale: 5 dB/div.
- Scan width: 10 kHz/div.
- Center frequency: 121.5 MHz

(ii) Record the amplitude in dBm. (Figure 13.17)

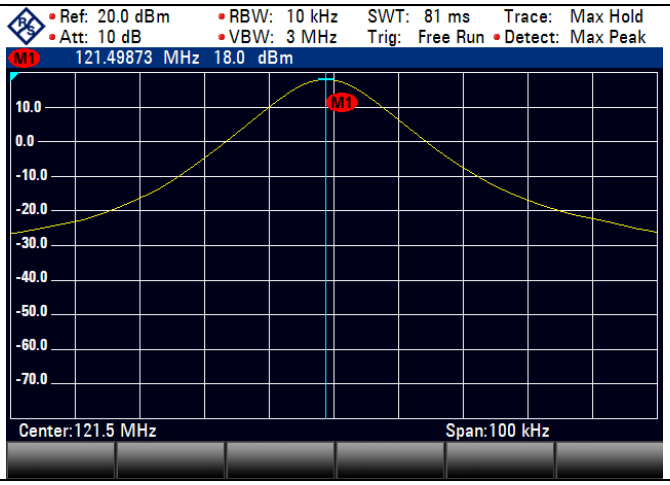


Figure 13.17 – Screenshot of Frequency Coherence Measurement Test Result (transmitted power at wide band) at the maximum operating temperature

(iii) Calculate the mean output power by adding 10 log(D), where D is the modulation duty cycle determined below, to the recorded signal level.
(iv) Set the spectrum analyzer controls as follows:

- I.F. bandwidth: 60 Hz or less
- Video filter: OFF or as wide as possible
- Scan time: 10 sec/div
- Amplitude scale: 0.5 dB/div
- Scan width: 20 Hz/div
- Center frequency: 121.5 MHz

(v) Measure and record the carrier power dBm as displayed on the spectrum analyzer (Figure 15.18).

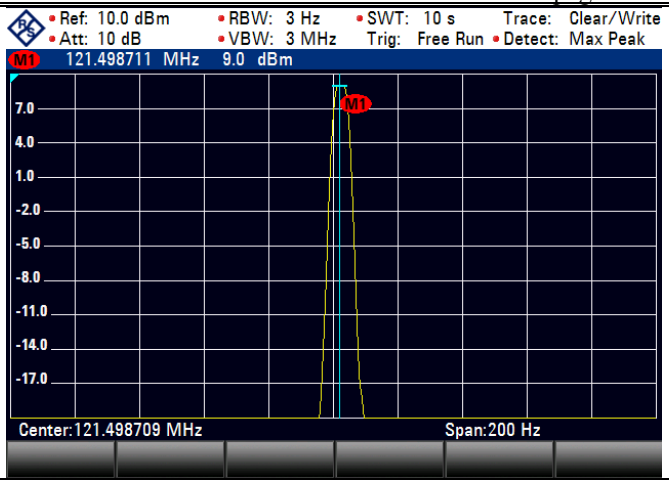


Figure 13.18 – Screenshot of Frequency Coherence Measurement Test Result (transmitted power at narrow band) at the maximum operating temperature

(vi) Calculate the ratio of carrier power to mean power from steps (iii) and (v) using the following formula:

$$\frac{Carrier\_power}{Mean\_power} = 10^{\frac{\text{dBc-dBmean}}{10}}$$

dB_C = carrier power in step (v)
dB_{mean} = mean power in step (iii)

TEST RESULTS

Output power measurement at the antenna connector as per steps (i) and (ii) is 15.48 dBm.

Mean power calculated as per step (iii) is 18.00 + 10 log(D), where D is the modulation duty cycle. In the worst case D is 35.38%, therefore mean power is 18.00 + 10 log(0.3538) = 13.49 dBm

Carrier power that measured with 3 Hz I.F. bandwidth is 9.00 dBm.

Ratio of carrier power to mean power is 36%.

$$\frac{Carrier\_power}{Mean\_power} = 10^{\frac{\text{dBc-dBmean}}{10}} = 10^{\frac{9.00-13.49}{10}} = 0.36$$

Carrier power is below of the mean power by 4.49 dB.
36% of the total power is shown to be within ±3Hz of the carrier frequency.

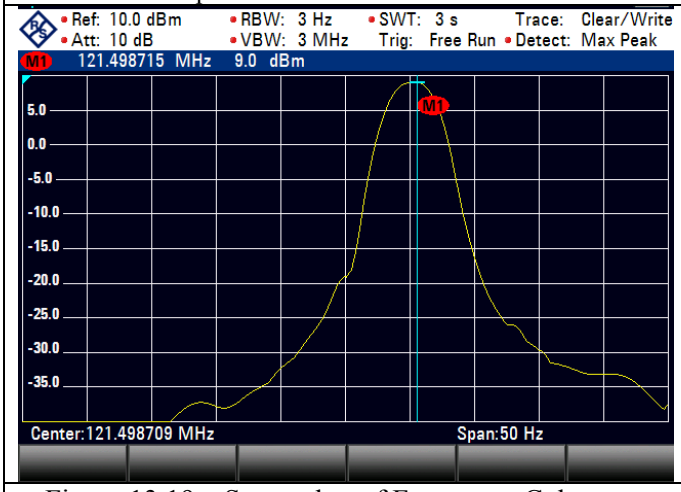


Figure 13.19 – Screenshot of Frequency Coherence Measurement Test Result (Frequency Shift) at the maximum operating temperature. Transmitted RF (121.5 MHz) before the interruption for the 406 MHz RF burst

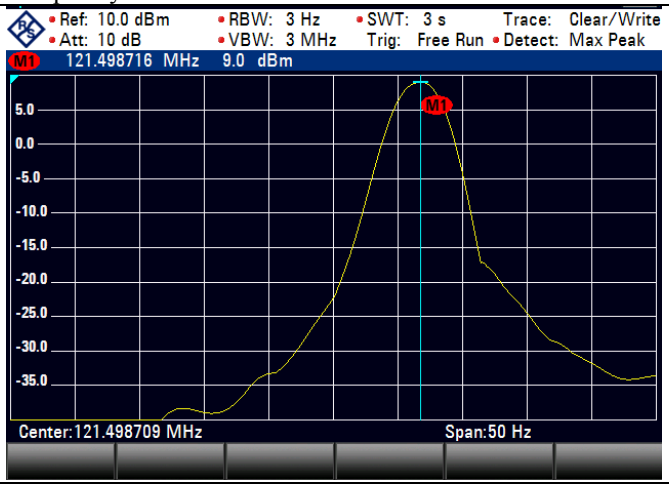
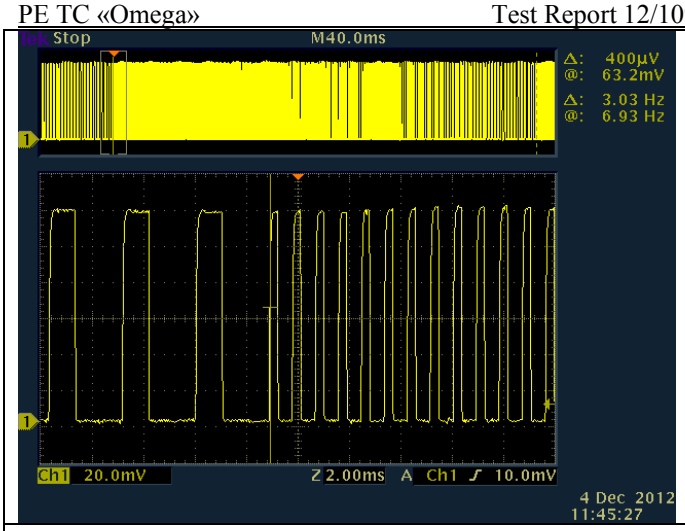


Figure 13.20 – Screenshot of Frequency Coherence Measurement Test Result (Frequency Shift) at the maximum operating temperature. Transmitted RF (121.5 MHz) after the interruption for the 406 MHz RF burst

The carrier frequency does not vary by more than +-30Hz during the interruption for a 406MHz transmission. See Figures 13.19 and 13.20.



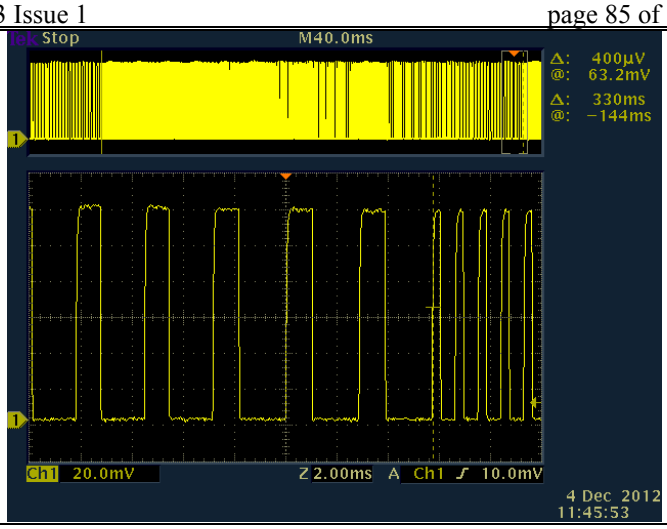


Figure 13.21 – Screenshot of Sweep repetition rate Test Result at the maximum operating temperature

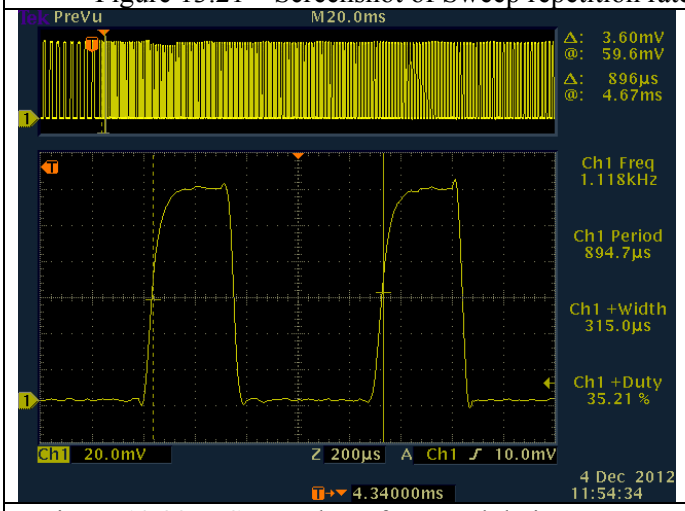


Figure 13.22 – Screenshot of Demodulation Waveform (A) measured start of the modulation sweep period at the maximum operating temperature

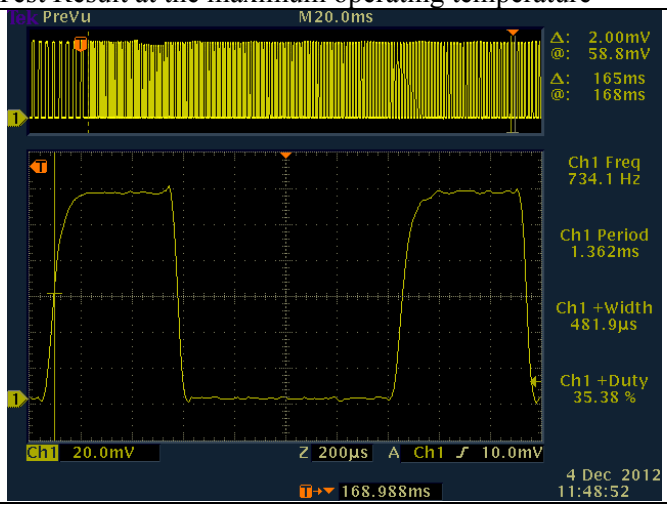


Figure 13.23 – Screenshot of Demodulation Waveform (A) measured near midpoint of the modulation sweep period at the maximum operating temperature

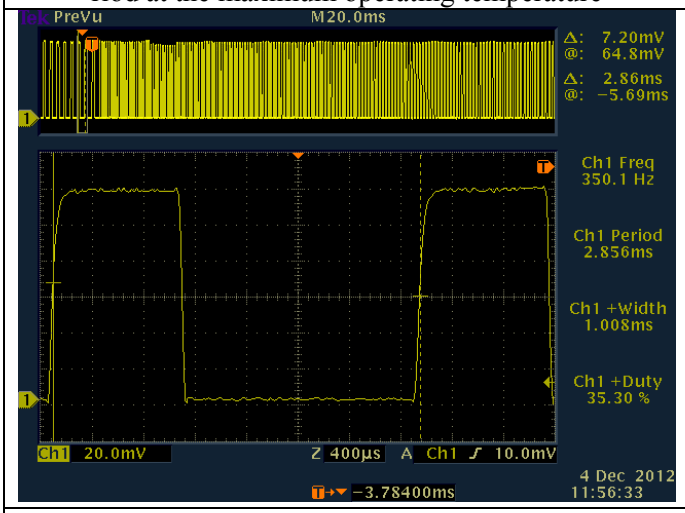


Figure 13.24 – Screenshot of Demodulation Waveform (A) measured near end of the modulation sweep period at the maximum operating temperature

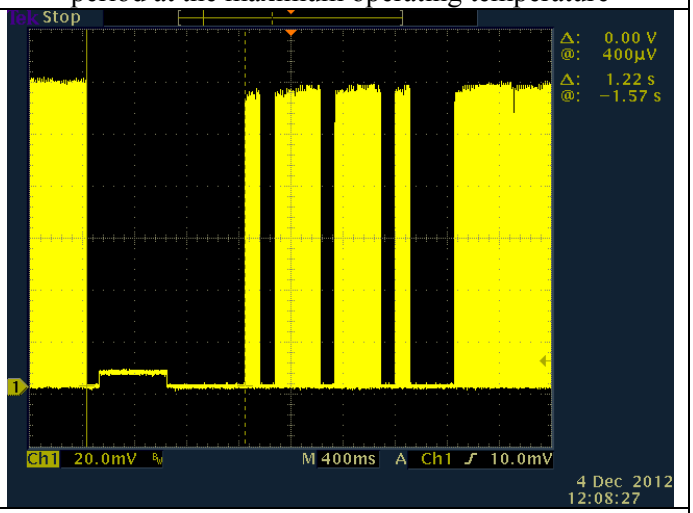
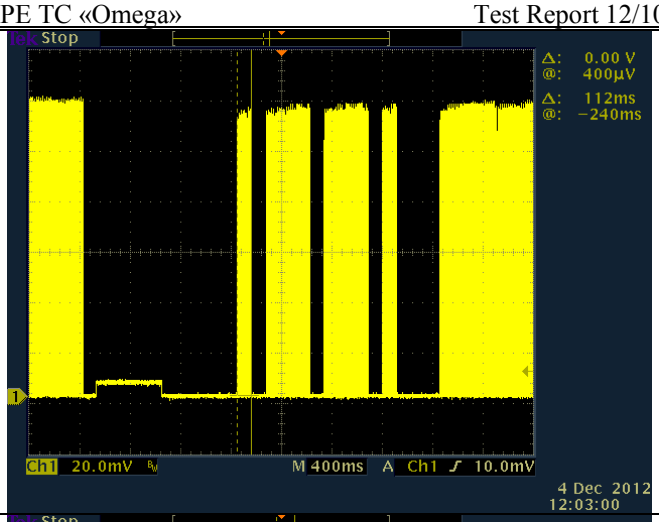
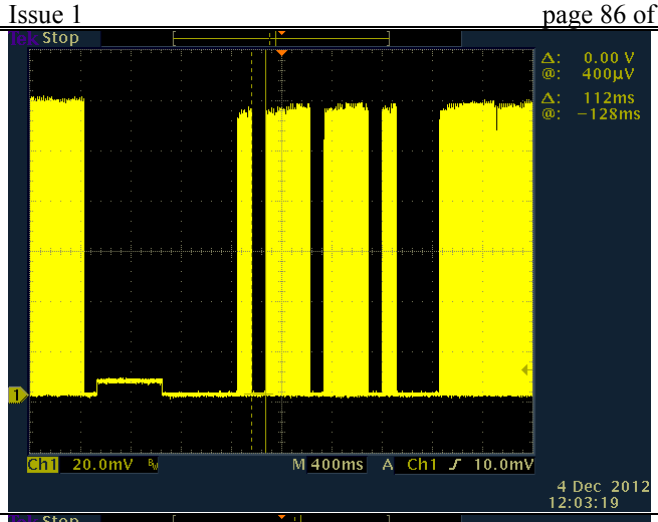
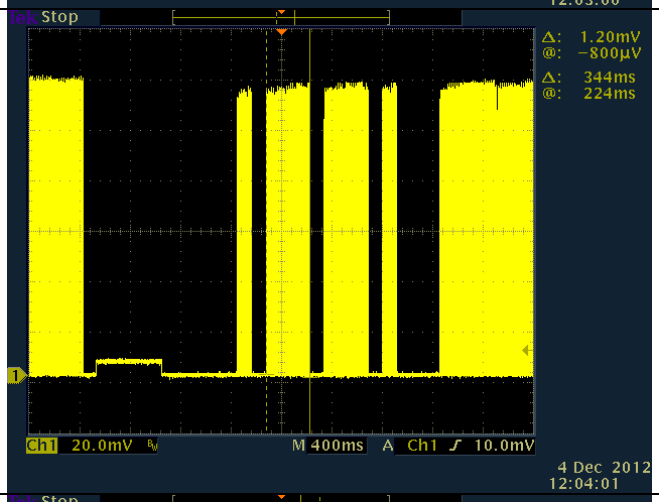
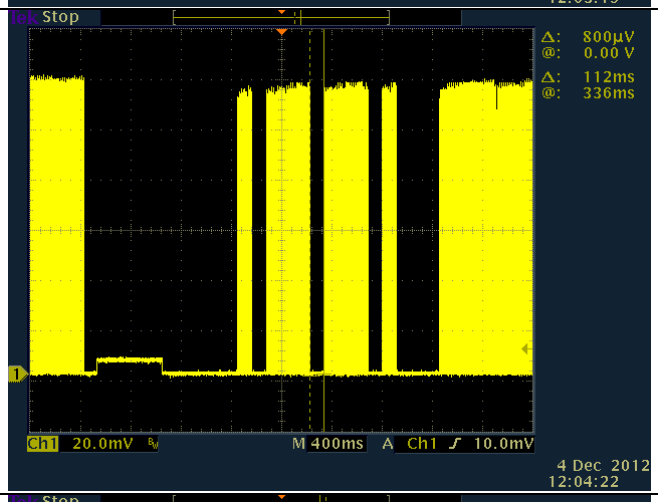


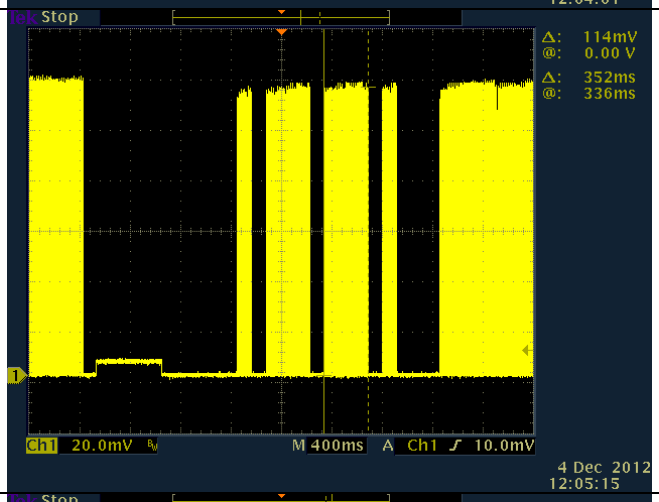
Figure 13.25 – Screenshot of Transmitter Duty Cycle Test Result at the maximum operating temperature

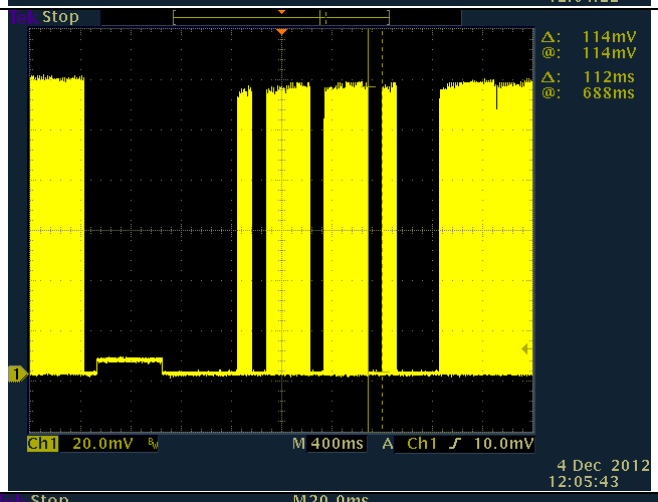


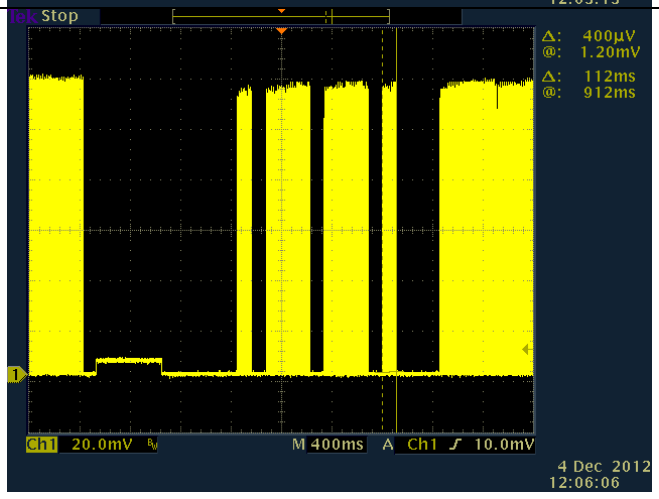












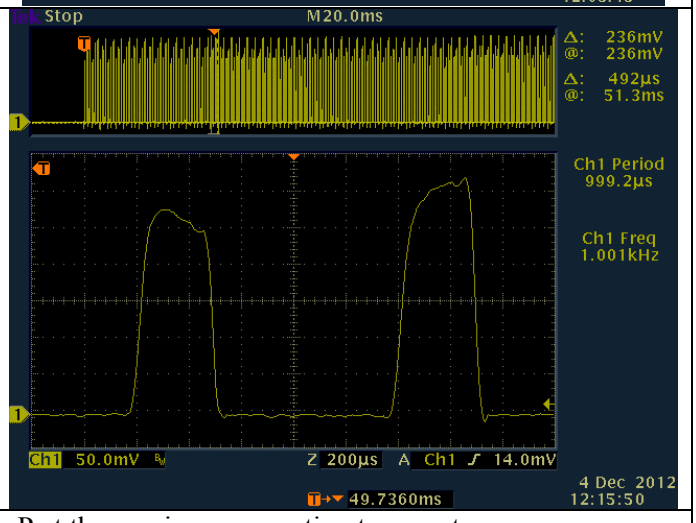


Figure 13.26 – Screenshot of Morse Letter P at the maximum operating temperature

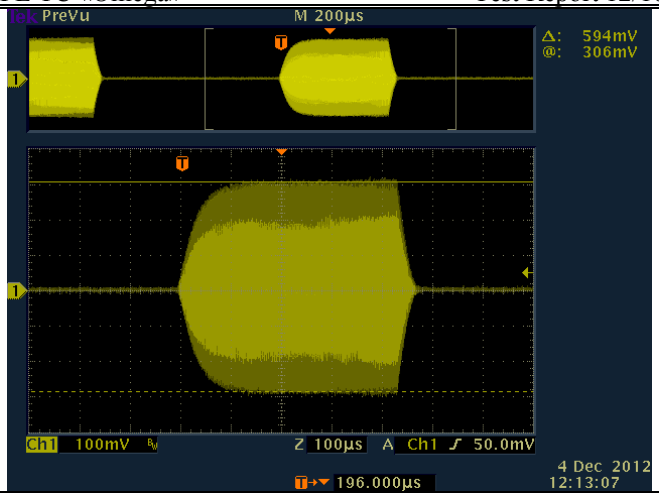


Figure 13.27 – Screenshot of maximum amplitude signal for determination of the Modulation Factor at the maximum operating temperature

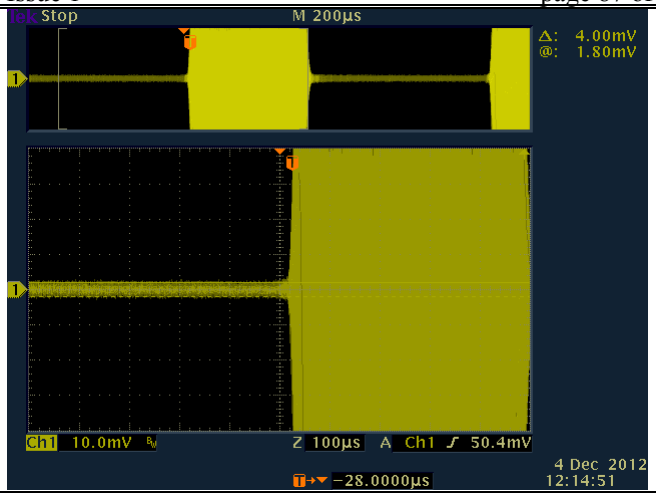


Figure 15.28 – Screenshot of minimum amplitude signal for determination the Modulation Factor at the maximum operating temperature

$$Modulation\ Factor = \frac{A-B}{A+B} = \frac{594-4}{594+4} = 98.66\%$$

Peak Equivalent Isotropic Radiated Power

Table 13.1 - Elevation Maximum search of Peak Equivalent Isotropic Radiated Power

Elevation. degrees	Antenna gain. dB	Receive system attenuator and cable loss. dB	Free space propagation loss. dB	PEIRP. mW
4.97	1.1	0.6	34.162	33.36
10.09	1.1	0.6	34.264	33.92
14.95	1.1	0.6	34.428	38.00
19.95	1.1	0.6	34.666	41.37

Table 13.2 - Peak Equivalent Isotropic Radiated Power

Elevation, degrees	Azimuth, degrees	Antenna gain, dB	Receive system attenuator and cable loss, dB	Free space propagation loss, dB	PEIRP, mW	PEIRP, dBm
19.95	0	1.1	0.6	34.666	41.37	16.17
19.95	30	1.1	0.6	34.666	39.50	15.97
19.95	60	1.1	0.6	34.666	39.96	16.02
19.95	90	1.1	0.6	34.666	38.78	15.89
19.95	120	1.1	0.6	34.666	38.61	15.87
19.95	150	1.1	0.6	34.666	39.05	15.92
19.95	180	1.1	0.6	34.666	37.99	15.80
19.95	210	1.1	0.6	34.666	38.43	15.85
19.95	240	1.1	0.6	34.666	39.41	15.96
19.95	270	1.1	0.6	34.666	39.87	16.01
19.95	300	1.1	0.6	34.666	39.50	15.97
19.95	330	1.1	0.6	34.666	39.69	15.99

The median of twelve values was 39.35 mW (15,95 dBm).
Of the highest 11 values, the maximum was 41.37 mW and the minimum was 38.43 mW.
The ratio of maximum to minimum values is 1.08:1 (0.33 dB).

Off Ground Plane Radiated Power Test

Table 13.3 - Elevation Maximum search of Peak Equivalent Isotropic Radiated Power (Off Ground Plane Radiated Power Test)

Elevation, degrees	Antenna gain, dB	Receive system attenuator and cable loss, dB	Free space propagation loss, dB	PEIRP, mW
4.97	1.1	0.6	34.204	2.29
9.93	1.1	0.6	34.334	2.59
15.00	1.1	0.6	34.334	2.91
20.050	1.1	0.6	34.804	3.31

Table 13.4 - Peak Equivalent Isotropic Radiated Power (Off Ground Plane Radiated Power Test)

Elevation, degrees	Azimuth, degrees	Antenna gain, dB	Receive system attenuator and cable loss, dB	Free space propagation loss, dB	PEIRP, mW
20.05	0	1.1	0.6	34.804	3.31
20.05	90	1.1	0.6	34.804	3.20
20.05	180	1.1	0.6	34.804	3.09
20.05	270	1.1	0.6	34.804	3.16

TEST EQUIPMENT

No	**Name of test equipment**	**Type, model**	**ser. No**	**Calibration Due date**
1.	Climatic chamber	KPK 400V	015	08.2014
2.	Temperature meter	gradient 2002	078	03.2013
3.	Beacon tester	BT100AVS	2315	07.2014
4.	Beacon tester	BT-611	1005	06.2013
5.	Spectrum analyzer	FSH8	105763	06.2015
6.	Oscilloscope	TDS-3052	B011258	03.2013
7.	Coaxial detector	Agilent 8471E	100104	02.2013
8.	Antenna	HK116	100345	08.2013
9.	Antenna	UBAA 9114	9114-214	09.2013
10.	Antenna mast	ATR 2	101208	n/a
11.	OATS No.33			02.2015
12.	RFAM	Ternovnik MO	No.1	n/a
13.	Ground plane	Ug	102282	n/a

ANNEX 14
COMPASS SAFE DISTANCE (A.19)

Equipment Under Test (EUT): rescueME PLB1, s/n TA5

SW version: Issue 00.03

Test Date: 07.11.2012
Test Conditions:
- Ambient temperature: 19..21°C
- Relative humidity: 56..60 %
- Atmospheric pressure: 756 mm/Hg

TEST PROGRAM

Item	Test name	Requirements	Methods
1.	Compass safe distance	A.19 RTCM 11010.2	11.2 IEC 60945:2002

TEST DESCRIPTION

The EUT was tested in the position and attitude relative to the compass at which the error produced at the compass was a maximum, provided the item was fitted in this way.

The compass-safe distance of the EUT is defined as the distance between the nearest point of the unit and the centre of the compass or magnetometer at which it will not produce a deviation in the standard compass of more than 5,4°/H where H is the horizontal component of the magnetic flux density in μT (microtesla) at the place of testing. For the steering compass, the standby steering compass and the emergency compass, the permitted deviation is 18°/H, H being defined as above.

The EUT was tested:
a) in the magnetic condition in which it is received with the EUT unpowered;
b) after normalizing with the EUT unpowered;
c) in the powered condition, if the unit is capable of being energized electrically.

Normalizing means a procedure to maximize the homogeneity of the magnetic flux in the EUT by placing it in Helmholtz coils or by other adequate means.

In each of the above tests, the unit was rotated to determine the direction in which it produces the maximum deviation.

TEST RESULT:

Horizontal maximum flux density, μT	B=	21.4 μT
Standard compass deviation limit (degrees)	5,4°/B	0.25°
Emergency compass deviation limit (degrees)	18°/B	0.84°

The EUT was tested in the magnetic condition in which it is received. The EUT was unpowered.
The direction in which the EUT produces the maximum deviation - horizontal antenna to the compass.

Then the EUT was tested after normalizing. The EUT was unpowered
The direction in which the EUT produces the maximum deviation - horizontal antenna to the compass.

Then the EUT was tested in the powered condition.
The direction in which the EUT produces the maximum deviation - horizontal antenna to the compass

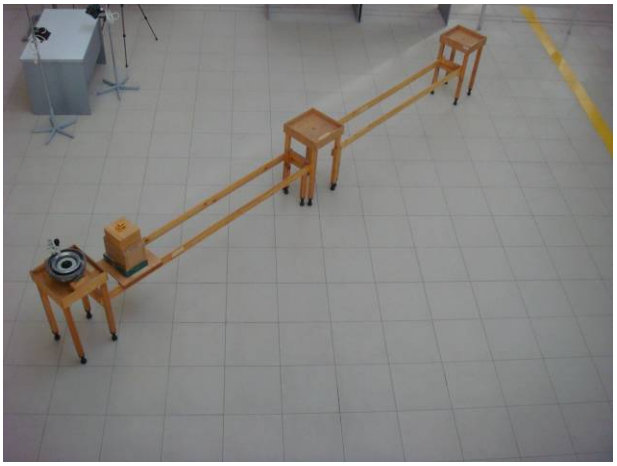


Figure 18.1 - Test installation.

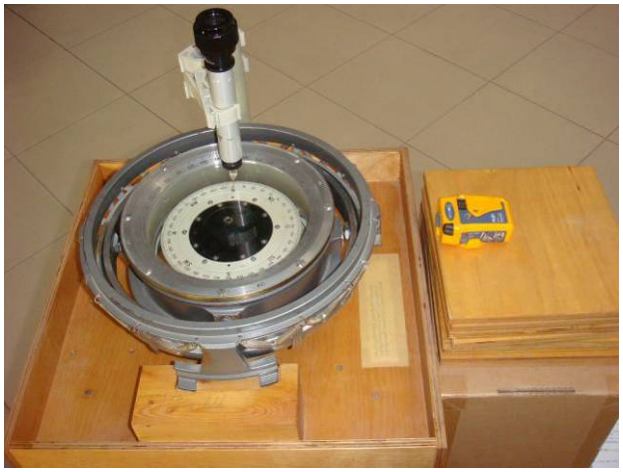


Figure 18.2 - The safety distance from EUT in stand-by mode to standard compass is 0,21 m.

figure 18.3 - Installation for normalizing

Figure 18.4 - The safety distance from EUT, after normalizing in stand-by mode to standard compass is 0,27 m.

Figure 18.5 - The safety distance from EUT in operation mode to standard compass is 0,32 m.

The orientation of the test equipment to the long axis	EUT unpowered		After normalizing with the EUT unpowered		Operation mode	
	The distance to the compass for deviation 0.25°	The distance to the compass for deviation 0.84°	The distance to the compass for deviation 0.25°	The distance to the compass for deviation 0.84°	The distance to the compass for deviation 0.25°	The distance to the compass for deviation 0.84°
Direction “A” - Horizontal antenna to the compass	0.21 m	< 0.15 m	0.27 m	< 0.15 m	0.32m	0.20 m

Test results:

The safety distance from EUT in stand-by mode to compass is 0.35 m (in compliance with the required IEC 60945 item 11.2.3).

Results required IEC 60945 item 11.2.3

The greatest distance obtained under all these conditions is the safe distance. Distances are to be rounded up to the nearest 50 mm or 100 mm.

The safe distance shall be marked on the EUT

Results required RTCM 11010.2, A.19

The safe distance shall be marked on the PLB and / or shall be recorded in the operation manual.

TEST EQUIPMENT USED

No	Name of test equipment	Type, model	ser. No	Calibration Due date
1.	Beacon tester	BT100AVS	2315	07.2014
2.	Uncompensated magnetic compass	-	101555	05.2013
3.	Power supply	SEA PS 3020	100185	02.2015
4.	Multimeter	M2051	19874	02.2013
5.	Compass	KI-13	25	
6.	Helmholtz coils	HHS 5210	1	06.2015
7.	Microscope	MPB-3	9008069	05.2013

ANNEX 15.
MISCELLANEOUS TESTS

Equipment under Test: rescueME PLB1 s/n TA5

SW version: issue 00.04, issue 00.06

Test Date: 10.12.2012 … 30.01.2012

Test Conditions:

- Ambient temperature: 15…17°C
- Relative humidity: 56…63 %
- Atmospheric pressure: 751…758 mm/Hg

TEST PROGRAM

No	Test name	Requirements	Methods
1.	Miscellaneous tests	A.20 RTCM 11010.2	A.20 RTCM 11010.2

TEST RESULT

Passed

TEST DETAILS

A.20.1 Controls and Indicators

The PLB was inspected to ensure that all the requirements of paragraph 4.4.1 are met.
The following requirements met the standard:
- All controls are clearly and durably marked.
All controls shall be operated by a person wearing gloves or mittens from an IMO SOLAS 17 compliant immersion suit. The inspection shall ensure that if there is a tamper proof seal it is not counted as one of the two independent actions required to activate the PLB. The means to indicate that the PLB may have been previously activated shall be checked either visually or by operation of the device in accordance with the manufacturer's instructions, a clear means of visible or audible indication shall be apparent.

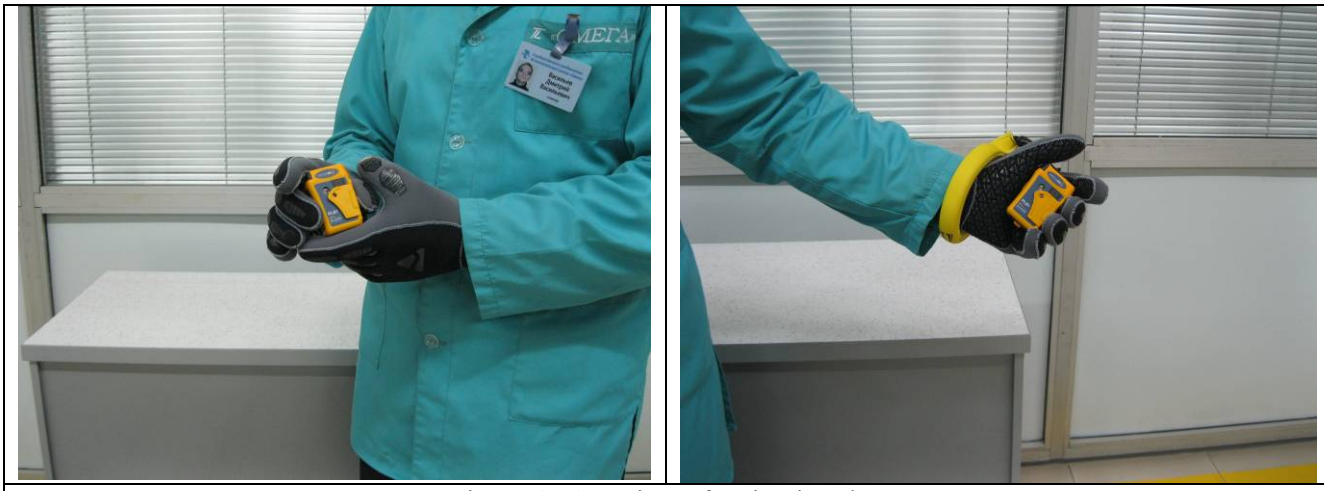


Figure 15.1 – View of activation the EUT

Figure 15.2 – View of activation the EUT

Table 15.1 Miscellaneous test results

RTCM requirements	***Result***	***Comments***
A.20.1 Controls and Indicators and indicators		
1. The PLB shall be inspected to ensure that all the requirements of paragraph 4.4.1 are met:		
- All controls shall be clearly and durably marked.	Inspected	
- All controls shall be designed to prevent inadvertent activation and shall require the use of not less than two simple, independent mechanical actions for manual activation of the PLB	Inspected	Actions for activation: 1. Pull the black antenna tab out completely. 2. Lift up the protective flap. 3. Press On/Off the key
- Activation of the PLB shall not require the use of two hands	Inspected	See Figure 20.2
- The PLB shall be provided with a means to indicate that it has been activated	Inspected	After 1 hour activation electronic witness of beacon activation – the self test will signal with an amber LED
- The controls should be few in number and the function of each control shall be kept simple to permit ease of operation of the PLB	Inspected	On/Off and Test the keys To activate the PLB press On/Off the key for one second until the green LED flashes
- All controls shall be so designed that they can be used by personnel wearing gloves or mittens.		See Figure 20.2

RTCM requirements	*Result*	*Comments*
- PLBs shall have, as a minimum, integral manual controls to operate the device in the following modes: OFF - the PLB is deactivated. ON - the PLB is activated. TEST - See paragraph 4.4.2.	Inspected	On/Off and Test the keys
- The various modes of the PLB shall be readily apparent by visual observation. A positive visual and/or audible indication that the PLB is activated shall be provided.	Inspected	LED patterns and strobe light indications
A.20.2 Self-test and GNSS Self Test Function		
1. The self-test mode of the PLB shall be activated.	Inspected	
2. The automatic reset of the test facility and the indication of the self-test mode shall be checked by inspection.	Inspected	
3. The manufacturer's declaration as to the functioning of the self-test mode shall be checked for compliance with paragraph 4.4.2.a), b) and c):		
▪ The PLB battery experiences full-load current drain during the Self-test	Inspected	Declared by manufacturer (see Annex 19)
▪ Each self-test pass/fail indicator correctly identifies a fail condition when a failure in the monitored function has been induced	Inspected	Declared by manufacturer (see Annex 19). The self-test function tests the following items: - battery; - 121.5 MHz and 406 MHz RF outputs; - phase lock of the 406 MHz phase locked loop (PLL).
▪ Any transmission in either self-test mode is limited to one burst	Inspected	Declared by manufacturer (see Annex 19)
4. The GNSS Self Test function as defined in paragraph 4.4.2 shall be checked by inspection to ensure that it is operated by a Distinct Operation, prevents Inadvertent Operation, is provided with Distinct Pass and Fail indicators.	Inspected	
5. The manufacturer's declaration as to the functioning of the GNSS Self Test mode shall be checked for compliance with paragraph 4.4.2. c), d), e) and f):		
▪ Any transmission in either self-test mode is limited to one burst.	Inspected	GNSS Self Test doesn't result any transmission. Declared by manufacturer (see Annex 19)
▪ If a GNSS Self Test mode is provided it shall be tested to verify that under worst case conditions (no GNSS reception or input) it is limited in duration (all location protocol beacons) and number (beacons with internal navigation devices only)	Inspected	Declared by manufacturer (see Annex 19)
▪ If a GNSS Self Test mode is provided, it shall be verified that inadvertent activation of this mode is precluded	Inspected	Declared by manufacturer (see Annex 19)
▪ If a GNSS Self Test mode is provided, it shall be tested to ensure the correct operation of the GNSS Self Test pass/fail indicator(s)	Inspected	Declared by manufacturer (see Annex 19)

RTCM requirements	*Result*	*Comments*
A.20.3 Battery		
1. The manufacturer shall provide evidence that the primary battery used to power the PLB is not hazardous to personnel as required by paragraph 4.4.3:		Declared by manufacturer (see Annex 20)
- The PLB shall not be hazardous to personnel handling it, operating it, or performing manufacturer-approved servicing of it nor shall it release toxic or corrosive products outside the PLB case during or subsequent to storage at temperatures between -55° and +75°C and: a) During a full or partial discharge at any rate up to and including an external short circuit. b) During a charge or forced discharge of a cell or cells by another cell or cells within the battery. c) After a full or partial discharge	Inspected	Declared by manufacturer (see Annex 20)
2. The manufacturer shall provide evidence that the design of the PLB includes measures to protect the batteries from reversal of polarity, shorting, self heating, cell-to-cell charging and forced discharging.	Inspected	The evidence are provided (see Annex 20)
3. The manufacturer shall declare the useful life of the battery and its expiration date and provide evidence to support these as required by paragraph 4.4.3.	Inspected	Declared by manufacturer (see Annex 20)
4. The battery shall be inspected to ensure that all the labeling requirements of paragraph 4.5.2.1 are met.	Inspected	Battery type: Lithium. Voltage: 9V. Expiration date: Month and Year. Precautions associated with battery use, handling and disposal: present (see Annex 20)
5. The manufacturer shall provide evidence that the battery and the cells making up the battery are either exempt from testing or have been tested to the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth Revised Edition, PART III, Section 38.3 (ST/SG/AC.10/11/Rev.4) as amended	Inspected	The evidence are provided (see Annex 20)
A.20.4 General Construction		
The PLB shall be inspected to ensure that it has no sharp edges or points, likely to cause injury to persons or damage to inflatables or similar survival equipment	Inspected	
A.20.5 Exterior Finish		
The PLB case shall be predominantly a highly-visible yellow/orange color	Inspected	The EUT case is predominantly a highly-visible yellow color
A.20.6 Labeling		
1. The labeling of the exterior of the PLB and any labeling permanently attached to the PLB shall be inspected to ensure that they comply with the requirements of paragraphs 4.5.2.2 to 4.5.2.2.4.	Inspected	Annex 21 details the EUT labeling scheme
2. All labeling on the exterior of the PLB shall be tested for abrasion resistance by the manufacturer who shall present evidence of the suitability of the labeling to last for at least the stated battery shelf life of the beacon	Inspected	Tested by manufacturer. Test results are declared by manufacturer (See Annex 18)
A.20.7 Documentation		
1. The operation manual shall be inspected to ensure that it complies with the requirements of paragraph 4.5.3:		
a) Complete instructions for operating the PLB.	Inspected	

RTCM requirements	*Result*	*Comments*
b) Cautions and recommendations to prevent false alerts.	Inspected	
c) Warning information including the misuse of a PLB is subject to a fine.	Inspected	
d) General battery information (e.g., battery replacement instructions, battery type, safety information regarding battery use and disposal)	Inspected	
e) Instructions for the safe transportation or shipping of the PLB or the location where such information can be obtained on the Internet or by mail by the consumer	Inspected	
f) Information regarding the need to replace the battery after activation of the PLB and how to determine if the PLB has been activated or the battery needs to be replaced.	Inspected	
g) Information related to the requirements of preventive maintenance.	Inspected	
h) Minimum operating lifetime and operating and stowage temperature ranges.	Inspected	
i) Information explaining the requirement and procedure for licensing and registering PLBs, as appropriate, and encouragement to do so promptly	Inspected	
j) Instructions on actions to be taken in the case of false alerts, including toll and toll-free phone numbers for contacts and including instructions that in the case of accidental activation of the PLB, the user should deactivate the PLB and notify the appropriate search and rescue authorities at the earliest possible time	Inspected	
k) For Category 2 PLB, a warning that states “THIS PLB WILL NOT FLOAT" and, if applicable, the information that when used around water it must be installed in a provided auxiliary flotation device, its tested depth and time rating (e.g. waterproof to x meters for x minutes/hours) and that the PLB is not designed to float and transmit a distress signal and that the PLB may not be substituted for a required EPIRB on a vessel.	Inspected	
l) This clause is not applicable (applies to Category 1 PLB only)		
m) For PLBs with an integral GNSS receiver or that can be interfaced with an external GNSS receiver, information to guide the operator towards maximizing self-locating performance including a warning not to obstruct the GNSS antenna's view of the sky and to ensure the GNSS antenna is not submersed in water	Inspected	
n) If the 121.5 MHz signal is transmitted during the Self-test, information noting that the Self-test shall be performed only within the first 5 minutes of any hour	Inspected	
o) An overview and explanation of how the Cospas-Sarsat system operates	Inspected	
p) Beacon registration materials and information	Inspected	Submitted by Manufacturer with operation manual
q) This clause is not applicable as the PLB doesn’t have the capability to be connected to an external GNSS receiver		

RTCM requirements	***Result***	***Comments***
2. End user (consumer) packaging shall include the following information in a conspicuous location, readily readable and visible to the purchaser without opening the packaging:	Inspected	Copy of the labeling for the packaging is submitted by Manufacturer (See Annex 22)
a) The Category of the PLB	Inspected	
b) The temperature operating range in degrees Celsius and Fahrenheit of the PLB	Inspected	
c) The expiration date of the battery	Inspected	
d) The Country that is coded into the 15 Hex ID	Inspected	
e) If the Country Code or unique national characteristics cannot be readily changed in the field at nominal cost to another Country Code due to the configuration of the PLB, a warning to that effect	Inspected	

ANNEX 16
DIFFERENCES BETWEEN PLB1 AND PLB2

T.007: 5.q differences between variants

The rescueME Personal Locator Beacon is supplied in two variants, the PLB1 with integrated GPS receiver and the PLB2 without GPS receiver. The beacons are identical apart from the differences detailed below:-

Electronic Assembly:

Component Description	PLB1	PLB2
ANT1 GPS Patch Antenna	Fitted	Not Fitted
IC1 L70 GPS Receiver	Fitted	Not Fitted
C8 1uF 0603 Ceramic Capacitor	Fitted	Not Fitted
C9 1nF 0402 Ceramic Capacitor	Fitted	Not Fitted
C20 22uF 0806 Ceramic Capacitor	Fitted	Not Fitted
C21 100nF 0402 Ceramic Capacitor	Fitted	Not Fitted
C22 1nF 0402 Ceramic Capacitor	Fitted	Not Fitted
LK2 Normally Open Link	Unmade	Made

Mechanical Assembly:

Component Description	PLB1	PLB2
Case Front Label – PLB1	Fitted	Not Fitted
Case Front Label – PLB2	Not Fitted	Fitted

Product Software:

Both the PLB1 and PLB2 are programmed with the same product software – Ocean Signal Part Number 500S-01239 Issue 01.00

If normally open link LK2 is left unmade, the software is automatically configured as a PLB1 (with GNSS receiver).

If the normally open link LK2 is made, the software is automatically configured as a PLB2 (without GNSS receiver).

Available Transmission Protocols:

Available Transmission Protocol functionality is determined by a configuration process with the factory configuration software. This configuration is only carried out by fully trained and authorised personnel.

Transmission Protocols available for PLB1: ULP, SLP, NLP

Transmission Protocols available for PLB2: UP

ANNEX 17
MANUFACTURER'S LETTER ABOUT SOFTWARE CHANGES

ocean SIGNAL

Unit 4
Ocivan Way
Margate
Kent
CT9 4NP

telephone
+44 (0)1843 282930

email
info@oceansignal.com

web
www.oceansignal.com

To whom it may concern

18 December 2012

Dear Sir,

Software Changes during Type Approval Testing

Version 00.01 Initial Release

Version 00.02
In software version 00.01 under certain circumstances the first transmission (only) of the 406MHz could have a power setting that is higher or lower than we would like. In version 00.02 the first 406MHz transmission power level is now based upon the battery voltage and temperature, removing the potential for a level that is outside the desired setting.

Version 00.03
Version 00.02 software homing beacon duty cycle can be as low as 32.8% at certain modulating frequencies due to the rise time of the modulator. Version 00.03 software modulation table has been modified to account for the rise time ensuring the minimum duty cycle is greater than 33%.

Version 00.04
Version 00.03 with the configuration set to Test Protocol the GNSS position uses the default position even when the GPS has obtained a position. In all operational configurations the GPS position is correctly coded into the message.
Version 00.04 software corrects the Test Protocol configuration to use the GPS position from the GNSS receiver when the position is available.

Version 00.05 - Version allocated but not used.

Version 00.06
The GPS position update timing between 12 and 20 hours was incorrect if a position was available. The updating of the position was every 4 hours in version 00.04, version 00.06 now updates every 2 hours with a GPS position available. If no valid position is available then the GPS position update remains every 4 hours.
Inversion 00.06 the stored product name has been changed from P100 to PLB1 or PLB2 depending upon the model (with GPS – PLB1 or without GPS - PLB2).
Additional factory test routines have been added to enable the optical communications during production testing.

Yours sincerely

Simon Nolan
Technical Director

Registration No
6627101

Vat No
938 4374 89

Registered Office
27 New Dover Road
Canterbury
Kent
CT1 3DN

ANNEX 18
rescueME MATERIAL WAIVER AND DISCLOSURE INFORMATION

ocean SIGNAL

Unit 4
Ocivan Way
Margate
Kent
CT9 4NP

telephone
+44 (0)1843 282930

email
info@oceansignal.com

web
www.oceansignal.com

4th September 2012

Subject rescueME Material waiver and Disclosure Information, including Waiver Statement for Label Legibility and Comprehensibility Tests

To Whom it May concern:

Please be advised that the labelling on the exterior of the rescueME PLB is under surface printed polycarbonate. It has been tested for abrasion resistance, per RTCM 11010.2 (A.20.6), by Ocean Signal limited and found successful.

Ocean Signal Limited hereby declares that the labelling on the rescueME product fully complies with the requirements of RTCM 11010.2 Section A.20.6.

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) & ETSI 302-152-1 (6.5) & RTCM 11010.2 (A.8)
- Solar Radiation IEC 60945 (8.10) & RTCM 11010.2 (A.17)
- Oil resistance IEC 60945 (8.11) & RTCM 11010.2 (A.18)

In this instance Ocean Signal Limited claim, for one or more of the reasons listed below that these criteria are met 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)

Registration No
6627101

Vat No
938 4374 89

Registered Office
27 New Dover Road
Canterbury
Kent
CT1 3DN

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

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

Signed on behalf of Ocean Signal Limited.

Simon Nolan
Technical Director

The following is a list of components and materials used in the rescueME PLB that are in direct contact with the marine environment.

Case Bottom	Cycoloy C1200
Case Top	Cycoloy C1200
Sealing Gasket	Silicone Rubber
Antenna Cover	Cycoloy C1200
Antenna Moulding	Santoprene 101-80
Antenna Blade	Stainless Steel 301
Antenna Contact	Stainless Steel 316
Screw	Stainless Steel A2
Antenna Winder	POM
Sprung Door	Cycoloy C1200
Strobe Lens	PMMA
Door Hinge	Cycoloy C1200
Door Axle	Stainless Steel 316
Door Spring	Stainless Steel 304
Labels	Polycarbonate
Lanyard	Polyester Cord and ABS Moulding

ANNEX 19
MANUFACTURER'S SELF-TEST AND GNSS SELF TEST FUNCTION DECLARATION

ocean SIGNAL

Unit 4
Ocivan Way
Margate
Kent
CT9 4NP

telephone
+44 (0)1843 282930

email
info@oceansignal.com

web
www.oceansignal.com

30 January 2013

Manufacturers Declaration of Self Test and GNSS Self Test modes

To whom it may concern

In accordance with section A.20.2 of RTCM 11010.2, Ocean Signal Ltd makes the following declarations.

The operation of the rescueME PLB1 and PLB2 self test and GNSS self test modes is described on pages 8 and 9 of the user manual (sections 5.1.1 and 5.1.2). Note that the GNSS self test is only available on the PLB1; the PLB2 does not have a GNSS receiver.

The self test performs the following checks:

1. the number of self tests performed and duration of activation have not exceeded the allowed values
2. the 406MHz frequency generator has obtained phase lock
3. 406MHz RF power is generated
4. 121.5MHz RF power is generated
5. the battery voltage is within allowable parameters

Failure of any of the above conditions will be indicated by the status LED.

The following conditions have been verified at the minimum, ambient and maximum temperatures.

- During the self test the full load current draw is experienced during the 406MHz transmission as required by 4.4.2.a).
- During self test the indication correctly identifies the fault condition when induced in the PLB as required by 4.4.2.b).
- During the self test a single 406MHz transmission is performed as required by 4.4.2.c). During a GNSS self test (PLB1 only), no transmissions are made.

Registration No
6627101

Vat No
938 4374 89

Registered Office
27 New Dover Road
Canterbury
Kent
CT1 3DN

- During a GNSS self test (PLB1 only), the maximum duration of the test is limited to 315.3seconds per test (worst case with no GPS signal present) and to a maximum of 10 tests over the lifetime of the battery as required be 4.4.2.d).

- The GNSS self test (PLB1 only) is prevented from inadvertent activation by the requirement to lift the protective flap and holding the test key for ten seconds before the test is activated in compliance with 4.4.2.e).

- On completion of a GNSS self test (PLB1 only) the indicator correctly identifies the outcome on the status LED (pass or fail) as required by 4.4.2.f).

Signed on behalf of Ocean Signal Ltd

David Sheekey
Product and Approvals Manager.

ANNEX 20
MANUFACTURER'S BATTERY DECLARATION

ocean SIGNAL

Unit 4
Ocivan Way
Margate
Kent
CT9 4NP

telephone
+44 (0)1843 282930

email
info@oceansignal.com

web
www.oceansignal.com

30 January 2013

Manufacturers declaration of battery safety

To whom it may concern

In accordance with section A.20.3, of RTCM 11010.2 Ocean Signal Ltd makes the following declarations.

The battery used to power the rescueME PLB1 (and PLB2) is constructed using Energizer cells in accordance with the Ocean Signal drawing number 901S-01227 (copy attached).

The battery is protected from reversal of polarity by a polarised connector (item 5) which can only be fitted to the PLB PCB in the correct polarisation.

The battery is protected from accidental shorting, cell to cell charging and forced discharging by the inclusion of additional insulators and overall insulating sleeving in the assembly. In addition each cell incorporates a positive temperature coefficient protective device to ensure that overheating is limited to safe levels should excessive current be drawn.

The battery assembly and cells have been tested in accordance with the UN Manual of Tests and Criteria, Fifth edition (including amendments), Part III, section 38.3.

Signed on behalf of Ocean Signal Ltd,

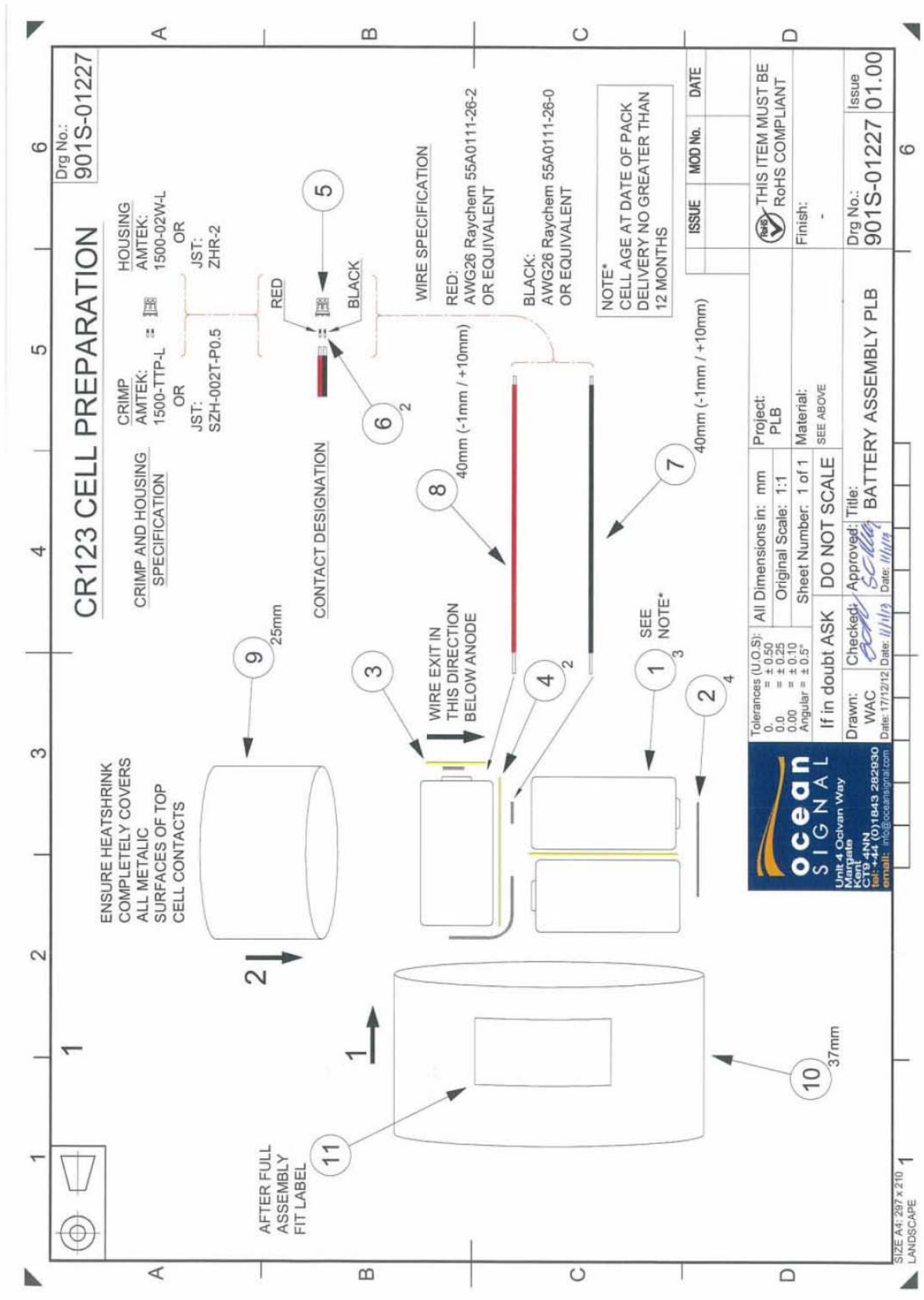
D C Sheekey

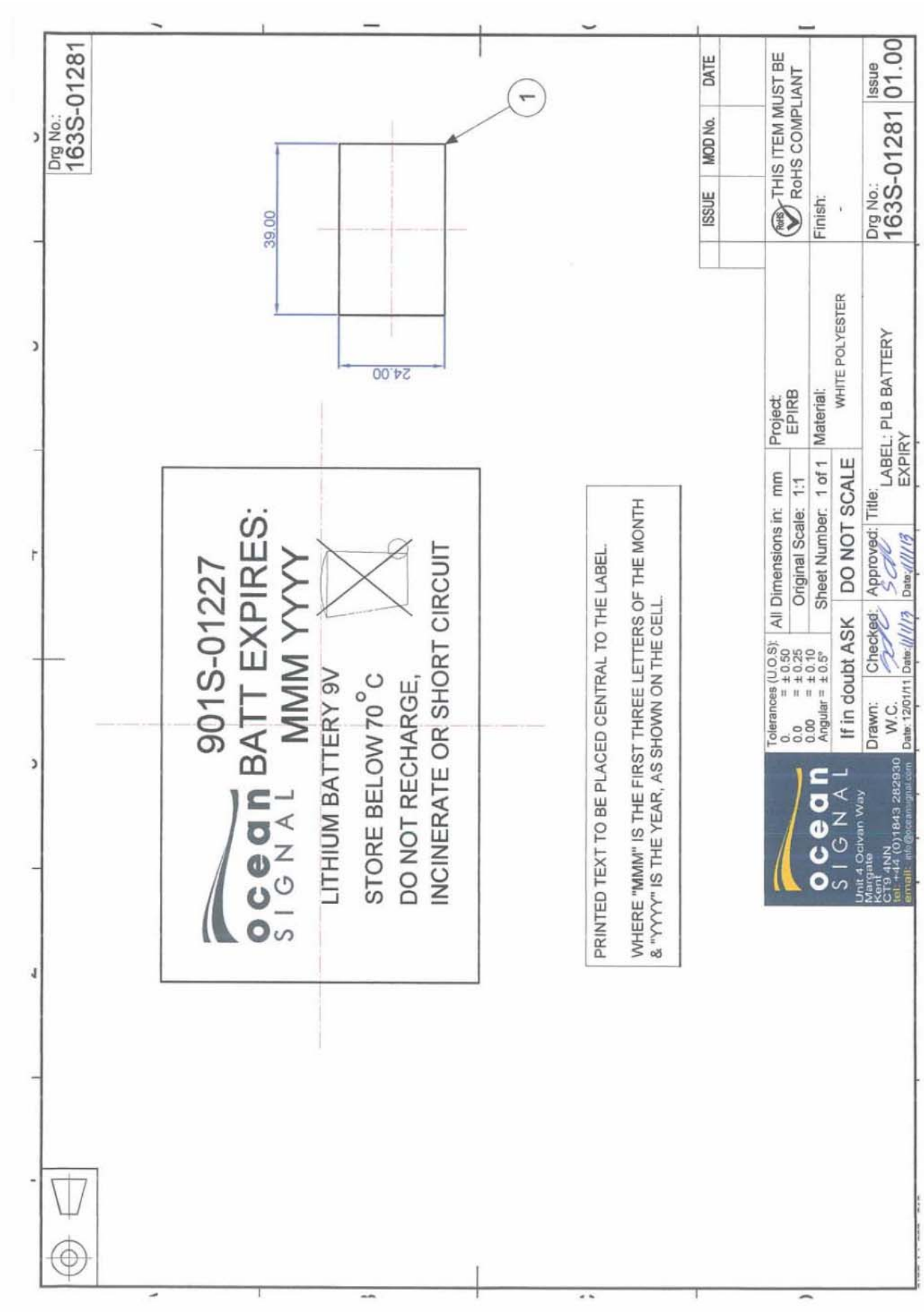
David Sheekey
Product and Approvals Manager

Registration No
6627101

Vat No
938 4374 89

Registered Office
27 New Dover Road
Canterbury
Kent
CT1 3DN


CR123 CELL PREPARATION
Drg No.: 901S-01227
CRIMP AND HOUSING SPECIFICATION
CRIMP AMTEK: 1500-TTP-L OR JST: SZH-002T-P0.5
HOUSING AMTEK: 1500-02W-L OR JST: ZHR-2
RED
BLACK
CONTACT DESIGNATION
WIRE SPECIFICATION
RED: AWG26 Raychem 55A0111-26-2 OR EQUIVALENT
BLACK: AWG26 Raychem 55A0111-26-0 OR EQUIVALENT
NOTE* CELL AGE AT DATE OF PACK DELIVERY NO GREATER THAN 12 MONTHS
40mm (-1mm / +10mm)
40mm (-1mm / +10mm)
25mm
37mm
WIRE EXIT IN THIS DIRECTION BELOW ANODE
SEE NOTE* 3
ENSURE HEATSHRINK COMPLETELY COVERS ALL METALIC SURFACES OF TOP CELL CONTACTS
AFTER FULL ASSEMBLY FIT LABEL
ISSUE
MOD No.
DATE
THIS ITEM MUST BE RoHS COMPLIANT
Tolerances (U.O.S): All Dimensions in: mm
Original Scale: 1:1
Sheet Number: 1 of 1
Material: SEE ABOVE
Finish: -
If in doubt ASK
DO NOT SCALE
Drawn: WAC Date: 17/12/12
Checked: Date:
Approved: Date:
Project: PLB
Title: BATTERY ASSEMBLY PLB
Drg No.: 901S-01227
Issue 01.00
ocean SIGNAL
Unit 4 Ocivan Way Margate Kent CT9 4NN
tel: +44 (0)1843 282930
email: info@oceansignal.com
SIZE A4: 297 x 210 LANDSCAPE


Drg No.:
163S-01281
39.00
24.00
1
901S-01227
ocean SIGNAL
BATT EXPIRES:
MMM YYYY
LITHIUM BATTERY 9V
STORE BELOW 70 °C
DO NOT RECHARGE,
INCINERATE OR SHORT CIRCUIT
PRINTED TEXT TO BE PLACED CENTRAL TO THE LABEL.
WHERE "MMM" IS THE FIRST THREE LETTERS OF THE MONTH
& "YYYY" IS THE YEAR, AS SHOWN ON THE CELL.
ISSUE
MOD No.
DATE
THIS ITEM MUST BE RoHS COMPLIANT
Tolerances (U.O.S):
0 = ± 0.50
0.0 = ± 0.25
0.00 = ± 0.10
Angular = ± 0.5°
All Dimensions in: mm
Original Scale: 1:1
Sheet Number: 1 of 1
Project:
EPIRB
Material:
WHITE POLYESTER
Finish:
-
If in doubt ASK
DO NOT SCALE
Drawn:
W.C.
Date: 12/01/11
Checked:
Date:
Approved:
Date:
Title:
LABEL: PLB BATTERY
EXPIRY
Drg No.:
163S-01281
Issue
01.00
ocean SIGNAL
Unit 4 Ocivan Way
Margate
Kent
CT9 4NN
tel: +44 (0)1843 282930
email: info@oceansignal.com

ANNEX 21
PLB LABELLING

T.007: 5.h Beacon Labelling

rescueME PLB Labels

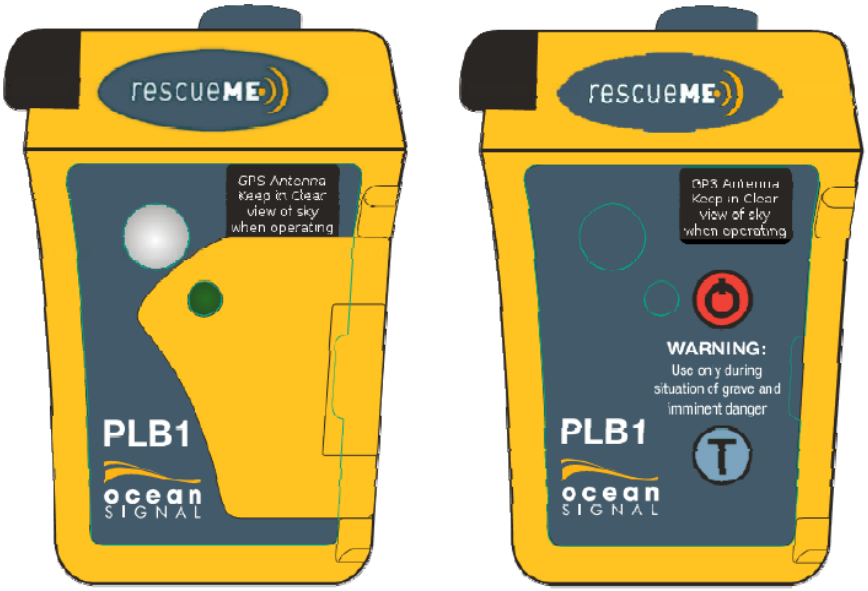


Figure 1: PLB1 Front Label with flap closed and removed

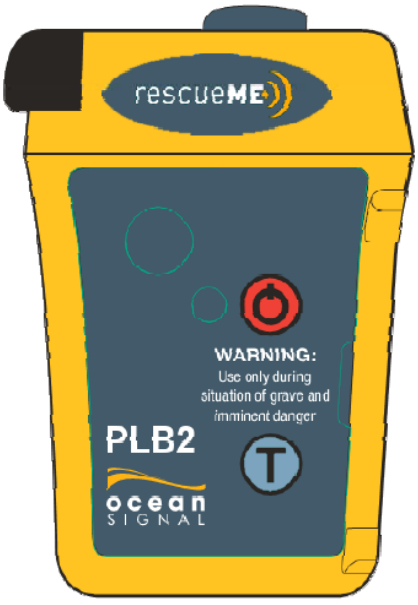


Figure 2: PLB2 Front label: similar to PLB1, but with product code changed and GPS warning removed

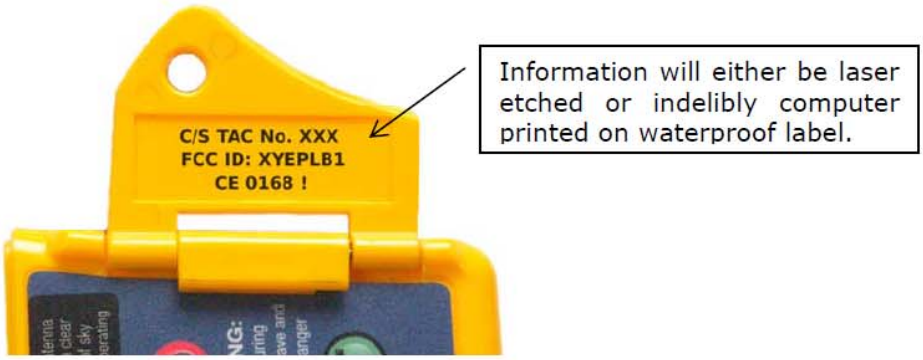


Figure 3: PLB1/PLB2 Approvals information under flap

Figure 4: PLB1/PLB2 Operating instructions

Figure 5: PLB1/PLB2 UIN label and USA registration information label

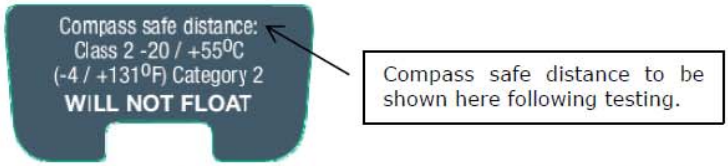


Figure 6: PLB1/PLB2 Operating conditions label

Figure 7: PLB1/PLB2 Battery expiry date (on top of unit)

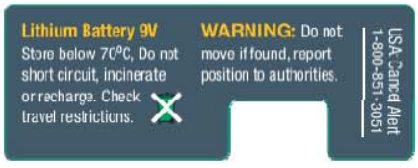


Figure 8: PLB1/PLB2 Warning label

ANNEX 22
PLB PACKAGING LABELLING


rescueME PLB1
Personal Locator Beacon
730S-01261
Battery expiry: Dec 2020
UIN:1234567890ABCDE (USA)
ocean SIGNAL
rescueME PLB 1 the world's smallest Personal Locator Beacon*
30%(Vol) smaller
30% (Hyper) plus petite
7 year battery life
7 durée de vie de la batterie années
7 year warranty †
7 ans de garantie*
Fast accurate positioning
Positionnement précis rapide
No Subscription
Pas d'abonnement
Waterproof to 15m
Etanche à 15m
Easily deployed antenna
Antenne facile à déployer
Specification
Satellite Tx 406.040MHz, 5W
Homing Tx 121.5MHz, 50mW
Operation Life ..... >24hours @-20C
Temp range ..... -20°C to +55°C
-4°F to 131°F
Weight 194.1oz
Dimensions ..... 75x51 x 32.5mm
2.95x2 x 1.28"
RTCM Category 2 (Will not float)
Standards
Cospas-sarsat T.001, T.007
ETSI EN302 52
RTCM SC11910
NSS-PLB11
ICRSS-287
Wherever you are at sea or on land, the rescueME PLB provides the reassurance that emergency services can be alerted by the press of a button.
Où que vous soyez en mer ou sur terre, la rescueME PLB fournit l'assurance que les services d'urgence peuvent être alertés par la presse d'un bouton.
406 MHz
Link via satellite to Emergency services
Lien par satellite aux services d'urgence
121.5 MHz
Homer to aid final locating by Search and Rescue craft
Homère pour aider finale localisation par Recherche et sauvetage
High intensity (1 candela) strobe
Haute intensité (1 candela) stroboscopique
Your rescueME PLB1 should be registered with your National authority to ensure rapid response if activated. Failure to register your beacon may result in a fine.
Votre PLB1 rescueME doit être enregistré auprès de votre autorité nationale pour assurer une réponse rapide s'il est activé. Le défaut d'enregistrement de votre balise peut entraîner une amende.
Please retain this box for shipping. See the User Manual for transportation instructions.
S'il vous plaît garder cette boîte pour l'expédition. Consultez le manuel de l'utilisateur pour obtenir des instructions de transport.
ocean SIGNAL
rescueME PLB1
Your worldwide link to emergency services.
66 Channel GPS
www.oceansignal.com
rescueME PLB1