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Report On

Emergency Beacons RTCM Standard 11010.2 Testing of the
McMurdo A Division of Signature Industries Limited
Fastfind PLB 200 & PLB 210

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Document 75904389 Report 10 Issue 1 **February 2009**

Product Service

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REPORT ON

Emergency Beacon Testing of the
McMurdo A Division of Signature Industries Limited
Fastfind PLB 200 & PLB 210

Document 75904389 Report 10 Issue 1

February 2009

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DATED

13th February 2009

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SECTION 1

REPORT SUMMARY

Emergency Beacons Testing of the
Signature Industries Limited
Fastfind PLB 200 & PLB 210

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Emergency Beacon Testing of the McMurdo A Division of Signature Industries Ltd Fastfind PLB 200 & PLB 210 to the requirements of RTCM 11010.2:2008 (RTCM Paper 114-2008-SC110-STD).

Objective	To perform Emergency Beacon Testing to determine the Equipment Under Test's (EUT's) compliance with the specification/Test Plan, for the series of tests carried out.
Manufacturer	McMurdo A Division of Signature Industries Ltd
Model Number(s)	Fastfind PLB 210 (GPS) Fastfind PLB 200 (Non GPS)
Serial Number(s)	75904389_01 Fastfind PLB 210, "TUV 1" 75904389_04 Fastfind PLB 200, "TUV 4"
Number of Samples Tested	Two
Test Specification/Issue/Date	RTCM 11010.2:2008 (RTCM Paper 114-2008-SC110-STD)
Incoming Release Date	Application Form 16 January 2008
Order Number Date	PC0003427 24 July 2008
Start of Test	27 August 2008
Finish of Test	09 February 2009
Name of Engineer(s)	R Hampton M P Hardy C Hedley S Mooney C Foster C Bowles C Lewis R Bennett

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Related Document(s)

The following referenced documents were referenced in the application of RTCM 11010.2:2008.

Cospas-Sarsat C/S T.001 Issue 3 Revision 8 November 2007, Specification for Cospas-Sarsat 406 MHz Distress Beacons

Cospas-Sarsat C/S T.007 Issue 4 Revision 2 November 2007, Cospas-Sarsat 406 MHz Distress Beacon Type Approval Standard

Cospas-Sarsat C/S T.012 Issue 1 Revision 4 November 2007, COSPAS-SARSAT 406 MHz Frequency Management Plan

IEC 60945:2002, Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results

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1.2 APPLICATION FORM

Note: Non- GPS Variant Details are shown in (parentheses) where different.

1.1.1 Beacon Manufacturer and Beacon Model

Beacon Manufacturer	Signature Industries
Beacon Model	McMurdo Fastfind PLB 210 (McMurdo Fastfind 200)
Other Model Names	McMurdo Fastfind PLB 211 (McMurdo Fastfind 201)

1.1.2 Beacon Type and Operational Configurations

Beacon Type	Beacon used while:	Tick where appropriate
EPIRB	Floating in water or on deck or in a safety raft	☐
PLB	On ground and above ground	☒
	On ground and above ground and floating in water	☐
ELT Survival	On ground and above ground	☐
	On ground and above ground and floating in water	☐
ELT Auto Fixed	Fixed ELT with aircraft external antenna	☐
ELT Auto Portable	In aircraft with an external antenna	☐
	On ground, above ground, or in a safety raft with an integrated antenna	☐
ELT Auto Deployable	Deployable ELT with attached antenna	☐
Other (specify)		☐

1.1.3 Beacon Characteristics

Characteristic	Specification
Operating temperature range	Tmin = -20°C Tmax = +55°C
Operating lifetime	24 hours
Battery chemistry	Lithium Manganese Dioxide
Battery cell size and number of cells	CR 2/3 AH x4 cells Alt Batt: CR123 x4 cells
Battery cell manufacturer	Varta Microbattery Alt Batt: Panasonic
Battery pack manufacturer and part number	Varta Microbattery /91-156D Alt Batt: Panasonic CR123A

Product Service

Characteristic	Specification
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO
Oscillator manufacturer	Rakon
Oscillator part name and number	E4892LF
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes
Antenna type: Integral or Other (e.g. External, Detachable – specify type)	Integrated
Antenna manufacturer	Doig
Antenna part name and number	91-206
Navigation device type (Internal, External or None)	Internal
Features in beacon that prevent degradation to 406 MHz signal or beacon lifetime resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	Yes
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	Yes
Navigation device capable of supporting global coverage (Yes, No or N/A)	Yes
For Internal Navigation Devices	
- Geodetic reference system (WGS 84 or GTRF)	WGS 84
- GNSS receiver cold start forced at every beacon activation (Yes or No)	Yes
- Navigation device manufacturer	uBlox
- Navigation device model name and part Number	LEA 5A
- GNSS system supported (e.g. GPS, GLONASS, Galileo)	GPS, Galileo
For External Navigation Devices	
- Data protocol for GNSS receiver to beacon interface	
- Physical interface for beacon to navigation device	
- Electrical interface for beacon to navigation device	
- Navigation device model and manufacturer (if beacon designed to use specific devices)	

Product Service

Characteristic	Specification	
Self-Test Mode Characteristics	Self-Test Mode	Optional GNSS Self-Test Mode
- Self-test has separate switch position (Yes or No)	Yes	Yes
- Self-test switch automatically returns to normal position when released (Yes or No)	Yes	Yes
- Self-test activation can cause an operational mode transmission (Yes or No)	No	No
- Self-test causes a single beacon self-test message burst only regardless of how long the self-test activation mechanism applied (Yes or No)	Yes	Yes
- Results of self-test indicated by (e.g. Pass / Fail Indicator Light, Strobe Light, etc.)	Pass/ Fail LED	Pass / Fail LED
- Self-test can be activated from beacon remote activation points (Yes or No)	No	No
- Self-test performs an internal check and indicates that RF power emitted at 406 MHz and 121.5 MHz if beacon includes a 121.5 MHz homer (Yes or No)	Yes	No
- Self-test transmits a signal(s) other than at 406 MHz (Yes & details or No)	Yes 121.5MHz	No
- Self-test can be activated directly at beacon (Yes or No)	Yes	Yes
- List of Items checked by self-test	406.037/ 121.5MHz Power, PLL lock, GPS Module	GPS position fix
- Self-test transmission burst duration (440 or 520 ms)	440 ms	520 ms
- Self-test format bit ("0" or "1")	1	
- Maximum duration of GNSS Self Test	N/A	5 mins ±10 secs
- Maximum number of GNSS Self Tests (beacons with internal navigation devices only)	N/A	10
Beacon includes a homer transmitter (if yes identify frequency of transmission)	121.5MHz	
-Homer Transmit Power	16dBm	
-Homer Duty Cycle	99.13%	
-Duty Cycle of Homer Swept Tone	35%	

Product Service

Characteristic	Specification
Beacon includes a strobe light (Yes or No)	No
- Strobe light intensity	
- Strobe light flash rate	
Beacon transmission repetition period satisfies C/S T.001 requirement that two beacon's repetition periods are not synchronised closer than a few seconds over 5 minute period, and the time intervals between transmissions are randomly distributed on the interval 47.5 to 52.5 seconds (Yes or No)	Yes
Other ancillary devices (e.g. voice transceiver). List details on a separate sheet if insufficient space to describe.	None
Beacon includes automatic activation mechanism (Yes or No) Specify type of automatic beacon activation mechanism	No
Beacon includes software or hardware features and functions not listed above and non-related to 406 MHz (Yes or No) List features and use a separate sheet if insufficient space	No

Product Service

Characteristic	Specification	
Message Coding Protocols:	(x) Tick the boxes below against the intended protocol options	
User Protocol (tick where appropriate) (This section applicable to Non-GPS Variant only)	☒	Maritime with MMSI
	☒	Maritime with Radio Call Sign
	☐	EPIRB Float Free with Serial Number
	☒	EPIRB Non Float Free with Serial Number
	☒	Radio Call Sign
	☐	Aviation
	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
	☒	PLB with Serial Number
	☐	National (Short Message Format)
	☐	National (Long Message Format)
Standard Location Protocol (tick where appropriate)	☒	EPIRB with MMSI
	☒	EPIRB with Serial Number
	☐	ELT with 24-bit Address
	☐	ELT with Aircraft Operator Designator
	☐	ELT with Serial Number
	☒	PLB with Serial Number
National Location Protocol (tick where appropriate)	☒	National Location: EPIRB
	☐	National Location: ELT
	☒	National Location: PLB
User Location Protocol (tick where appropriate)	☒	Maritime with MMSI
	☒	Maritime with Radio Call Sign
	☐	EPIRB Float Free with Serial Number
	☒	EPIRB Non Float Free with Serial Number
	☒	Radio Call Sign
	☐	Aviation
	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
	☒	PLB with Serial Number

Product Service

1.1.4 Information Provided by the Cospas-Sarsat Accepted Test Facility

Name and Location of Beacon Test Facility: TUV Product Service Ltd, United Kingdom

Date of Submission for Testing: 28 August 2008

Applicable C/S Standards:

Document	Issue	Revision	Date
C/S T.001	3	8	Nov-07
C/S T.007	4	2	Nov-07

I hereby confirm that the 406 MHz beacon described above has been successfully tested in accordance with the Cospas-Sarsat Type Approval Standard (C/S T.007) and complies with the Specification for Cospas-Sarsat 406 MHz Distress Beacons (C/S T.001) as demonstrated in the attached report.

Signed:

Name: M Jenkins

Position Held: Authorised Signatory

Date: 13th February 2009

Product Service

1.1.5 Applicant Details

Company Name	Signature Industries		
Address	Silver Point, Airport Service Road, Portsmouth, P03 5PB		
Category of Applicant	☒ Manufacturer	☐ Importer	
	☐ Distributor	☐ Agent	
Contact Name	Neil Jordan	Telephone	02392 623934
Email	neiljordan@mcmurdo.co.uk	Facsimile	02392 623997

1.1.6 Manufacturer Details

Company Name	Same as above		
Address			
Contact Name		Telephone	
Email		Facsimile	

1.1.7 Declaration of Build Status

Hardware Version	
- PCB Revision	1
- Battery Model	Varta CR 2/3 AH / Panasonic CR123A
Software Version	N/A
Firmware Version	1.1.165
Other (Specify)	

1.1.8 Applicant's Declaration

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

Signed: _____

Name: Neil Jordan

Position Held: Engineering Manager

Date: 25-11-08

Product Service

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Signature Industries Limited Fastfind PLB 210 & PLB 200 (Non GPS Version – only limited tests conducted) as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test, Sample Serial Number TUV 1

Product Service

1.3.2 Physical Configuration

The Main Equipment Under Test (EUT) S/N TUV 1 was operated using its own power source i.e. internal VARTA batteries, note that the alternative Panasonic batteries were not tested under the scope of this document. The EUT was configurable so that it could be either connected to the 50Ω test system using a coaxial cable or so that it radiated through its antenna as per normal operation. In the 50Ω-conducted mode, the 406MHz and 121MHz transmissions came from separate ports.

The test configuration (50Ω-conducted or radiated) will be stated for each test under the "Equipment Under Test" subheading.

The Secondary EUT S/N TUV 4 was a Non-GPS unit and was used (alongside the Main EUT) for the following tests:

- Performance Check, Section 2.1
- Dry Heat , Section 2.2

This unit was also configurable for either conducted or radiated testing but all testing was performed in the conducted configuration so that the more detailed Performance Test could be carried out.

1.3.3 Modes of Operation

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

Standby Mode:

- No Switches Depressed
- No apparent EUT activity
- No ancillary devices were declared

Self-test:

- "TEST" button depressed until White LED light indicated Self-test operation
- List of features tested as per Application Form

Operating:

- 121 MHz homer active and offset to 121.65 MHz
- 243 MHz homer not declared
- GPS active and in search mode (no signals supplied) unless otherwise declared
- Physical configuration as above

Product Service

1.3.4 Monitoring of Performance

Performance Check

Definition:

RTCM 11010.2: "*For the purposes of IEC 60945 and this standard a performance check consists of measuring the following parameters using suitable test equipment (e.g., a handheld Beacon Tester):*

a) 406 MHz transmitted frequency (single burst only);
b) 406 MHz digital message (check of 15 Hex ID and full 112 or 144 message bits as appropriate); and
c) *the presence of Auxiliary Radio-Locating Device transmissions (either by an audio tone or display of key parameters (e.g. homing frequency))*."

Performance Check, in the scope of this document, will mean that a self-test was conducted and that the message was successfully captured and decoded. "Beacon Test Report" files will be displayed to show successful output of a message and it's decode. 121 MHz Homer frequency will also be measured.

Also checked and occasionally displayed herein (but not held to any specific performance requirements) were:

- Self-test result (as indicated by the EUT).
- Normal message capture
- 406 MHz Output Power
- 121 MHz Output Power

Performance Test

Definition:

RTCM 11010.2: "*For the purposes of IEC 60945 and this standard a performance test consists of measuring the following parameters as defined in C/S T.007 Annex A.2.1:*

a) 406 MHz transmitter power output;
b) 406 MHz digital message;
c) 406 MHz digital message generator (Bit Rate and Stability (C/S T.007 A.3.1.3) only);
d) 406 MHz modulation;
e) 406 MHz transmitted frequency; and
f) *406 MHz spurious output;*"

A Performance Test, in the scope of this document, comprises one Self-test (as per Performance Check) followed by a period of activation ("Normal" transmissions). During the Performance Test the aforementioned parameters are measured:

Note for both Performance Check and Test

The "Beacon Test Reports" contained within this report show several other parameters (e.g. modulation characteristics), whilst these were checked but due to the traceability of the Beacon Tester the results are not considered accurate and should be for reference/indication of functionality/comparison only.

Product Service

1.3.5 Performance Criterion

EUT must successfully complete the performance check or performance test if required.

1.3.6 Additional Variants

Variants of the Fastfind PLB 210 include the following (specific variation from the 210 in parentheses)

- Fastfind PLB 211
- Fastfind PLB 200 (Non-GPS)
- Fastfind PLB 201 (Non-GPS)
- Flotation variant: Any of the above variants and the main 210 tested can be fitted with a foam over-jacket, rear label is moved onto foam so it is visible, see Modification State 1 information for further details

Full details can be found in the Application Form (Section 1.2) and manufacturer's documentation.

Product Service

1.4 DEVIATIONS FROM THE STANDARD

For accurate representation of the physical characteristics of the EUT the tests designed to stress these characteristics were conducted on the Primary EUT (Fastfind PLB 210, "TUV 1"). This unit was not equipped with conducted output, hence, Power Output measurements displayed for this unit are radiated and not accurate, they can be used only for comparison. The unit was converted to a conducted configuration for numerous tests including the Cospas-Sarsat accreditation test campaign. This testing demonstrated correct power output; the Cospas-Sarsat Accreditation confirms this.

1.5 MODIFICATION RECORD

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

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	N/A	N/A
1	Buoyancy Jacket fitted, see Annex A for further details.	McMurdo	05 January 2009

1.6 ALTERNATIVE TEST SITE

Under our group UKAS Accreditation, TÜV Product Service Ltd conducted the following tests at Bearley, Stratford-upon-Avon Test Laboratory:

2.24 Peak Equivalent Isotropic Radiated Power

Product Service

SECTION 2

TEST DETAILS

Emergency Beacons Testing of the
Signature Industries Limited
Fastfind PLB 200 & PLB 210

Product Service

TABLE OF TEST RESULTS

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
1. PERFORMANCE CHECK						Section 2.1
Visual Inspection	No Damage	✓		✓		
Carrier Frequency	406.025 MHz ± 0.002 MHz or Other ± 0.001 MHz			✓		
Digital Message	15 Hex / 30 Hex Correct	✓		✓		
121 MHz Homer						
Note Wherever a Performance Check is called for in these Test Results Tables it also includes a Visual Inspection of the PLB.	Functional	✓		✓		
2. DRY HEAT TEST (A.3)						Section 2.2
Post-Storage Performance Check	Pass/Fail	✓			✓	
Performance Test	Pass/Fail	✓			✓	See main section for full test details
Post-Functional Test Performance Check	Pass/Fail	✓			✓	
3. DAMP HEAT TEST (A.4)						Section 2.3
Performance Check	Pass/Fail	✓			✓	
4. LOW TEMPERATURE TEST(A.5)						Sections 2.4 and 2.5
Post-Storage Performance Check	Pass/Fail	✓	✓			See main sections for full test details
Performance Test	Pass/Fail	✓	N/A *			*Combined with Operational Life Test, see main section for details.
Post-Functional Test Performance Check	Pass/Fail	✓	N/A *			
5. VIBRATION TEST (A.6)						Section 2.6
During Test no Activation	No activation during test	✓			✓	
Post-Functional Test Performance Check	Pass/Fail	✓			✓	

Product Service

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
6 BUMP TEST (A.7)						Section 2.7
During Test no Activation	No activation during test	✓		✓		
Post-Functional Test Performance Check	Pass/Fail	✓		✓		
7. CORROSION TEST (A8)						Section 2.8
No sign of corrosion, peeling paint and other signs of deterioration.	Pass/Fail	✓		N/A		Test waivered, see main section and Annex A for details.
Post-Functional Test Performance Check	Pass/Fail	✓		N/A		
8. DROP TEST (A.9)						Section 2.9
During Test no Activation	No activation during test	✓	✓			
Post-Functional Test Performance Check	Pass/Fail	✓	✓			
9. THERMAL SHOCK (A.10)						Section 2.10
After test examine for signs of water ingress	No evidence of water ingress	✓	✓			
Post-Functional Test Performance Check	Pass/Fail	✓	✓			
9. IMMERSION TEST (A.11)						Sections 2.11 & 2.12
Post-Functional Test Performance Check	Pass/Fail	✓		✓		
Open unit and examine for sign any water ingress	No water	✓		✓		
10. SPURIOUS EMISSIONS TEST (A.12)						Section 2.13
Close in emissions	Comply with Figures 2 and 6	✓	✓	✓	✓	
Aeronautical, Maritime and Satellite Band Emissions	No signal to exceed 25µW in stated bands	✓		✓		Graphs attached for worst case result only

Product Service

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
12. OPERATIONAL LIFE AND SELF TESTS (A.13)						Sections 2.14 & 2.15
Operational Life	24 Hours min	✓	✓			Note: Test combined with that of C/S T.007test campaign.
Pre-test battery discharge duration (operating) required	-	hours	5.21			Operational Life = 36.9 hours (Time to First Failure – (required pre-test discharge – actual discharge))
Pre-test battery discharge duration (operating)	-	hours	5.12			
Time to First Failure	-	hours	37.0			
Transmitted Frequency	Pass/Fail	✓	✓			Where two results are displayed the upper is the minimum value across 24 hours, the lower is the maximum
Nominal value	C/S T.001	MHz	406.0371249 406.0371267			
Short-term stability	≤ $2x10^{-9}$	/100ms	$3.699x10^{-11}$ $1.186x10^{-10}$			See main section for plots
Medium-term stability – Slope	(-1 to +1)$x10^{-9}$	/min	$-9.88x10^{-11}$ $1.342x10^{-10}$			
Medium-term stability – Residual frequency variation	≤ $3x10^{-9}$		$5.195x10^{-11}$ $5.083x10^{-10}$			
Transmitter power output	35 - 39	dBm	36.08 36.17			
Digital message	correct	✓	✓			
121 Peak Envelope Output Power	✓	✓	✓			
Self-test						
RF Pulse Duration	≤ 0.444 sec or ≤ 0.525 sec	✓		✓		
Frame synchronization pattern	0 1101 0000	✓		✓		
Number of RF bursts	1-burst	✓		✓		
Beacon 15 Hex ID	Must be provided	✓		✓		
121.5 MHz transmission	≤ 1 sec / 3 sweeps	✓		✓		

Product Service

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
13. Cospas-Sarsat TYPE APPROVAL TESTS (A.14)	C-S Certificate (attach C/S test report)	✓		✓		Section 2.16
14. BUOYANCY TEST (Category 1 PLBs only) (A.15)						Section 2.17
A.15.1 Buoyancy	Floats	✓		✓		
A15.2 Floating Upright (PLBs designed to work floating in water only)	Self rights	<2s		N/A		
15. 121.5 MHz AUXILLY RADIO-LOCATING DEVICE TRANSMITTER TEST (A.16)						
Carrier Frequency	121.5 ± 0.006075*	MHz	121.650025962		121.648656731	Section 2.18 * Offset to 121.65MHz so limit becomes 121.65 ± 0.006
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.	✓	✓		✓	Section 2.19
Modulation						Section 2.20
Frequency	≥ 700 Hz within 300 – 1600Hz	✓	✓		✓	
Duty Cycle	33 – 55	%	34.04		36.12	
Factor	0.85 – 1.0	✓	0.91		0.89	Section 2.21
Sweep Repetition Rate	2 – 4	Hz	3.0		3.0	
Frequency Coherence	✓	✓	✓		✓	Section 2.22

Product Service

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
15. 121.5 MHz AUXILLY RADIO-LOCATING DEVICE TRANSMITTER TEST (A.16)						
Morse Letter P						Section 2.23
Dot Length	115 ms ± 5%	ms	117.0		116.00	
Dash Length	345 ms ± 5%	ms	343.6		344.80	
Gap	115 ms ± 5%	ms	115.4		114.91	
Mod Frequency	1000 Hz ± 50Hz	Hz	997.5		1030	
PEIRP (Radiated)	Median 14 – 20 dBm (25 – 100 mW)	dBm		16.65		Section 2.24
Max PEIRP	Value	dBm		47.347		
Min PEIRP	Value	dBm		43.181		
Ratio Max – Min	< 4:1 (<6dBm)	dB		0.30		* 1.071:1
Off Ground Plane PEIRP	≥ 2 mW	mW		10.197		
16. SOLAR RADIATION TEST (A.17)						Section 2.25
After Test visually inspect unit and carry out Performance Check (see 1 above)	Pass/Fail	✓	N/A *			* Test waivered, see main section for details
17. OIL RESISTANCE TEST (A.18)						Section 2.26
After Test visually inspect unit and carry out Performance Check (see 1 above)	Pass/Fail	✓	N/A *			* Test waivered, see main section for details

Product Service

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
18. COMPASS SAFE DISTANCE TEST (A.19)						Section 2.27
Standard Compass Safe Distance	-	m		0.30		
Emergency Compass Safe Distance	-	m		0.20		
19. MISCELLANEOUS TESTS (A.20)						Section 2.28
A.20.1 Controls and Indicators						Note: For Section 19 of this table "✓" denotes that the particular parameter or feature was inspected and observations reported at the main section or that information supplied by the customer is supplied at Annex A. No final decision or comment is made upon compliance.
PLB complies with 4.4.1	Inspection	✓		✓		
Two independent step activations	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	✓		✓		
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	✓		✓		

Product Service

PARAMETER TO BE MEASURED	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)	
19. MISCELLANEOUS TESTS (A.20) continued...						Section 2.28
A.20.3 Battery						
Labelling 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	✓		✓		
A.20.4 General Construction						
PLB complies with 4.5	Inspection	✓		✓		
A.20.5 Exterior Finish						
PLB complies with 4.5.1	Inspection	✓		✓		
A.20.6 Labelling						
Labelling complies with 4.5.2.2 to 4.5.2.2.4	Inspection	✓		✓		
Labelling tested for Abrasion Resistance	Inspect manufacturers report	✓		✓		
Instructions and Pictograms tested for Comprehension	Inspect manufacturers report	✓		✓		
A.20.7 Documentation						
Manual complies with 4.5.3	Inspection	✓		✓		
Packaging complies with 4.5.4	Inspection	✓		✓		

Product Service

2.1 PERFORMANCE CHECK

2.1.1 Specification Reference

RTCM 11010.2:2008, Clause A.1.13

2.1.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated) and TUV 4 (50Ω Conducted)

2.1.3 Date of Test and Modification State

27 August 2008 - Modification State 0

2.1.4 Test Equipment Used

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

2.1.5 Operating Modes

The test was performed with the EUT in the following mode(s): Normal and Self-test

2.1.6 Environmental Conditions

Ambient Temperature	21.1°C
Atmospheric Pressure	1018mbar

2.1.7 Test Results

Visual Inspection

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

Performance Check

A Performance Check was conducted to ensure EUT was functional before all upcoming tests, measurements were made using a Beacon Tester (providing the Beacon Test Reports) and spectrum analyser for 121MHz measurements and calibrated frequency reference to Beacon Tester. A summary of the results follows.

Product Service

Summary of Performance Check results

Parameter	Result for TUV 1	Result for TUV 4
Self-test Mode:		
Self-test Message	Received, see Beacon Test Report below	Received, see Beacon Test Report below
Normal Mode:		
Normal Message	N/A (EUT in Radiated configuration, following values from Self-test mode)	Received, see Beacon Test Report below
406 MHz Frequency	406.037053 MHz	406.037074 MHz
406 MHz Output Power	N/A (EUT Radiated; not traceable)	36.3 dBm
121 MHz Frequency	121.64975 MHz (unmodulated)	121.64950 MHz
121 MHz Output Power	12.45 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)	21.98 dBm

Product Service

Beacon Test Report (Self-test Message Sample TUV 1)

Beacon Test Report

193DF380C6FFBFF

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/27/08 4:18:25 PM
Tester Model/Serial No./File Name: BT100S/1025/04389_01-Initial Test-1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 23°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

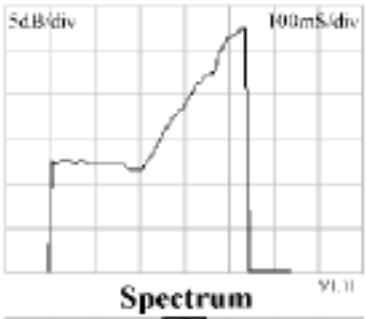
Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

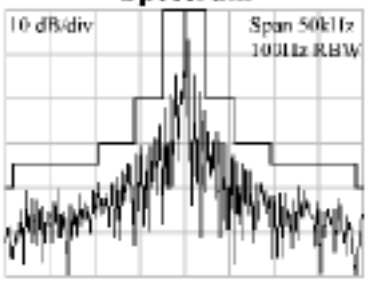
Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

406 MHz Measurements
406 Frequency (EXT REF): 406.037053 MHz
406 Power (INT ANT): 37%
Power Rise Time: > 5 ms
Phase Deviation: -1.12 +1.09 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 209 uS
Modulation Symmetry: 0.3%
Modulation Bit Rate: 399.8 bps

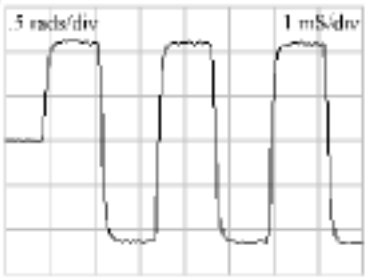
Power vs. Time



Spectrum



Phase vs. Time



DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

Beacon Test Report (Self-test Message Sample TUV 4)

Beacon Test Report

993F40018C00F9D

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/27/08 4:24:15 PM
Tester Model/Serial No./File Name: BT100S/1025/04389_02-Initial Test–1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 24°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

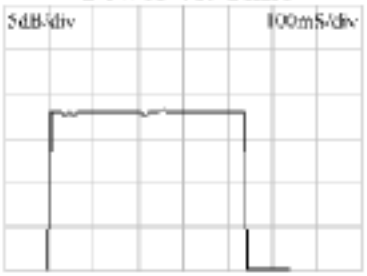
15 Hex ID: 993F40018C00F9D
Full Hex: FFED04C9FA000C6007CEA694640
Burst Mode: Self Test Mode (Short)
Protocol: Test User Protocol
Country 201: Albania
National Use: 57175019884445

Emergency type: unspecified
Activation type: Man

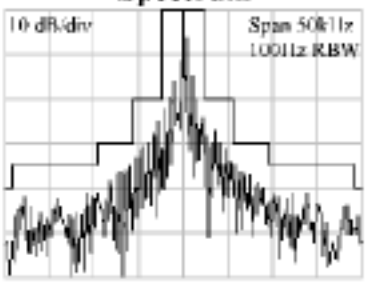
406 MHz Measurements
406 Frequency (EXT REF): 406.037085 MHz
406 Power (5 Watt): 36.3 dBm
Power Rise Time: < 5 ms
Phase Deviation: -1.13 +1.11 radians
Modulation Rise Time: 188 uS
Modulation Fall Time: 209 uS
Modulation Symmetry: 0.4%
Modulation Bit Rate: 400 bps
CW Preamble: 160.5 ms

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

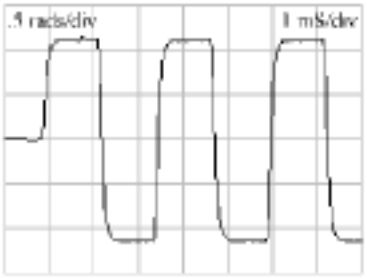
Power vs. Time ☒



Spectrum



Phase vs. Time



Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

Beacon Test Report (Normal Message Sample TUV 4)

Beacon Test Report

993F40018C00F9D

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/27/08 4:25:35 PM
Tester Model/Serial No./File Name: BT100S/1025/04389_02-Initial Test--2
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 26°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

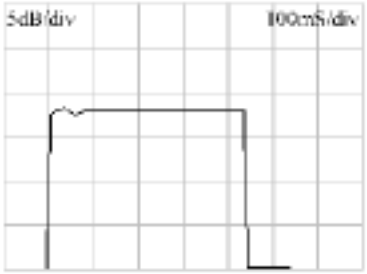
15 Hex ID: 993F40018C00F9D
Full Hex: FFFE2F4C9FA000C6007CEA694640
Burst Mode: Normal Mode (Short)
Protocol: Test User Protocol
Country 201: Albania
National Use: 57175019884445

Emergency type: unspecified
Activation type: Man

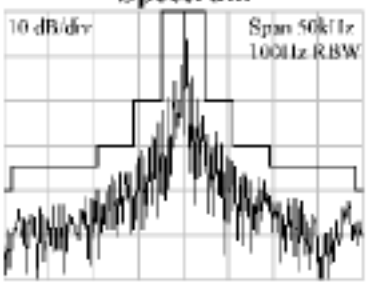
406 MHz Measurements
406 Frequency (EXT REF): 406.037074 MHz
406 Power (5 Watt): 36.3 dBm
Power Rise Time: < 5 ms
Phase Deviation: -1.12 +1.12 radians
Modulation Rise Time: 188 uS
Modulation Fall Time: 209 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400.2 bps
CW Preamble: 159.7 ms

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

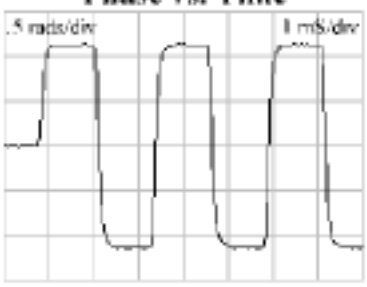
Power vs. Time



Spectrum



Phase vs. Time



Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

2.2 DRY HEAT TESTS

2.2.1 Specification Reference

RTCM 11010.2:2008, Clause A.3

2.2.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated) and TUV 4 (50Ω Conducted)

2.2.3 Date of Test and Modification State

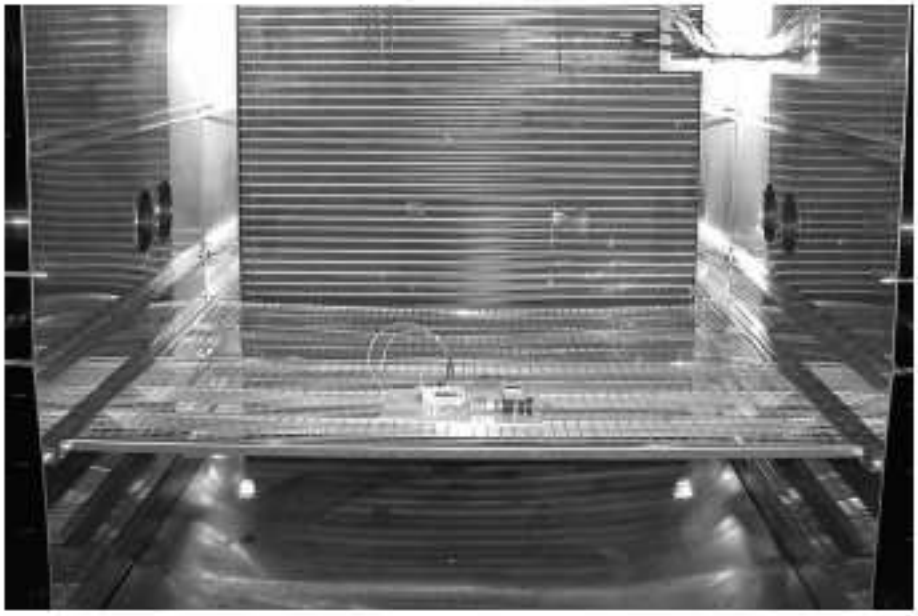
27 to 28 August 2008 - Modification State 0

2.2.4 Test Equipment Used

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

2.2.5 Test Set-up and Operating Modes

The test was performed with the EUT in the following mode(s): Idle and Operating as per "Specification Reference", above.

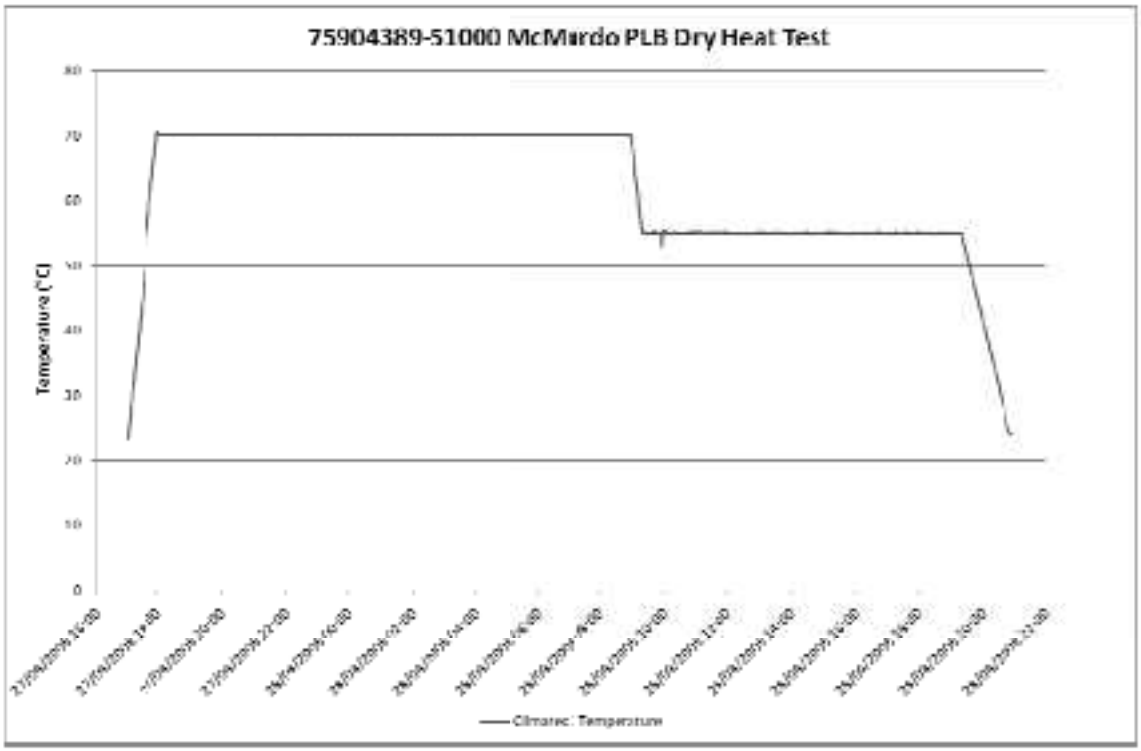


Test Set-up

Product Service

2.2.6 Environmental Conditions

Dry Heat Cycle Temperature Plot



2.2.7 Performance Checks and Tests

As the two EN 60945 tests (storage and functional) were combined the required performance checks and tests were as follows (in order performed):

(Format is: <Stage Check/Test Performed>: <Standard (Clause) Requiring the Test>, <Type of Check/Test>)

- Post-Storage Period at +70°C: EN 60945 (Storage), Performance Check
- During +55°C Operational Period: EN 60945 (Functional), Performance Test
- Post- +55°C Operational Period: EN 60945 (Functional), Performance Check

Product Service

2.2.8 Test Results

Post-Storage Period at +70°C: EN 60945 (Storage), Performance Check

Parameter	Result for TUV 1	Result for TUV 4
Self-test Mode:		
Self-test Message	Received, see Beacon Test Report 1	Received, see Beacon Test Report 2
Normal Mode:		
Normal Message	Received, see Beacon Test Report 3	Received but not on Beacon Tester, Full Hex: FFFE2F 4C9FA0 00C60 07CEA 694640
406 MHz Frequency	406.037039 MHz	406.037070 MHz
406 MHz Output Power	N/A (EUT Radiated; not traceable)	36.67 dBm
121 MHz Frequency	121.64825 MHz	121.64800 MHz
121 MHz Output Power	2.45 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)	19.56 dBm

Product Service

Beacon Test Report 1

Beacon Test Report

193DF380C6FFBFF

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/28/08 9:43:57 AM
Tester Model/Serial No./File Name: BT100S/1025/04389_01-DryHeat1-2
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 23°C

☐ **PASS** ☐ **FAIL** **INITIALS:**_____

Notes: Add text comments here.

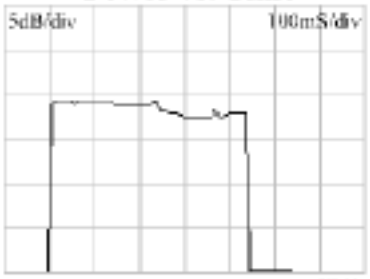
15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

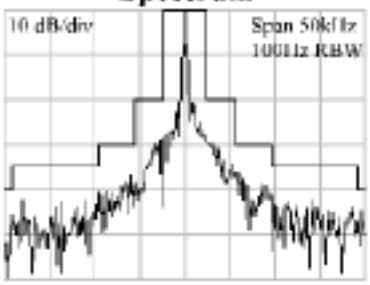
406 MHz Measurements
406 Frequency (EXT REF): 406.037037 MHz
406 Power (INT ANT): 84%
Power Rise Time: < 5 ms
Phase Deviation: -1.1 +1.09 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 188 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400 bps
CW Preamble: 160.8 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Detected.
121 Power (INT ANT): 26%
Unable to measure details.

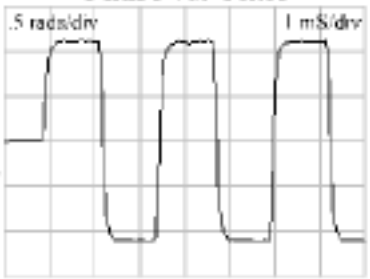
Power vs. Time



Spectrum



Phase vs. Time



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

Beacon Test Report 2

Beacon Test Report

993F40018C00F9D

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/28/08 9:48:33 AM
Tester Model/Serial No./File Name: BT100S/1025/04389_01-DryHeat1-3
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 25°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

15 Hex ID: 993F40018C00F9D
Full Hex: FFFE2F4C9FA000C6007CEA694640
Burst Mode: Normal Mode (Short)
Protocol: Test User Protocol
Country 201: Albania
National Use: 571750198844 45

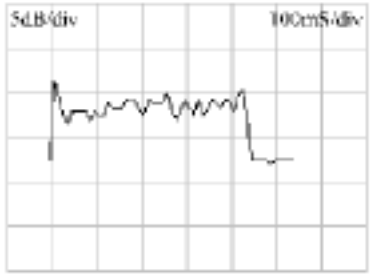
Emergency type: unspecified
Activation type: Man

406 MHz Measurements
406 Frequency (EXT REF): 406.03707 MHz
406 Power (INT ANT): 12%
Power Rise Time: : N/A
Phase Deviation: -1.16 +1.06 radians
Modulation Rise Time: 198 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400.4 bps

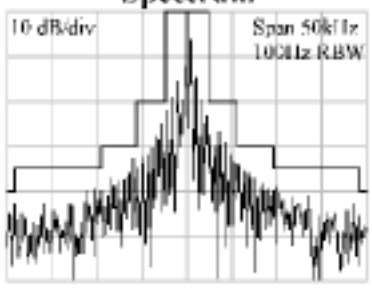
121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 15%
Unable to measure details.

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

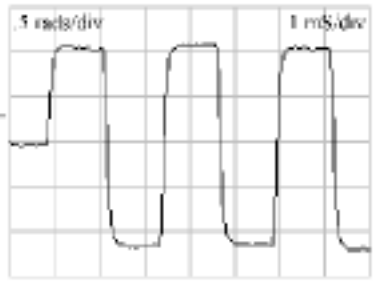
Power vs. Time ☒



Spectrum



Phase vs. Time



Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

Beacon Test Report 3

Beacon Test Report

193DF380C6FFBFF

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/28/08 9:43:28 AM
Tester Model/Serial No./File Name: BT100S/1025/04389_01-DryHeat1-1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 21°C

☐ **PASS** ☐ **FAIL** **INITIALS:** _____

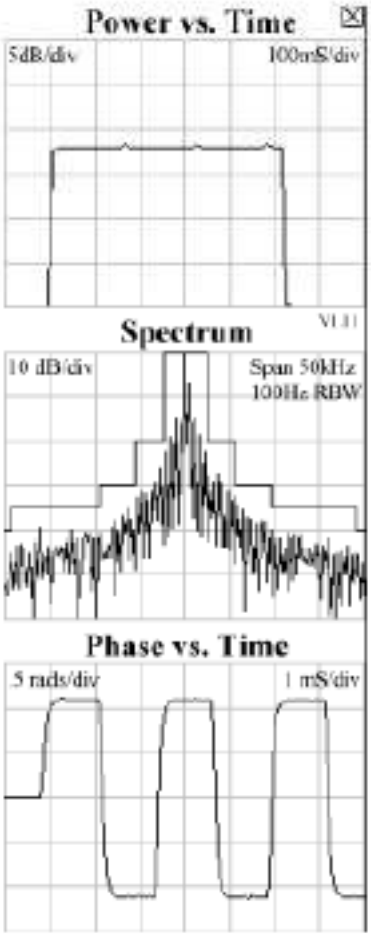
Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
Burst Mode: Normal Mode (Long)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * ***°**.**

406 MHz Measurements
406 Frequency (EXT REF): 406.037039 MHz
406 Power (INT ANT): 84%
Power Rise Time: < 5 ms
Phase Deviation: -1.11 +1.09 radians
Modulation Rise Time: 188 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400 bps
CW Preamble: 160.4 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 20%
Sweep Direction: Downwards
Audio Frequency: 312 Hz to 1187 Hz
Sweep Range: 875 Hz
Sweep Rep Rate: 3 Hz
Modulation Factor: N/A
Duty Cycle: 33 %



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

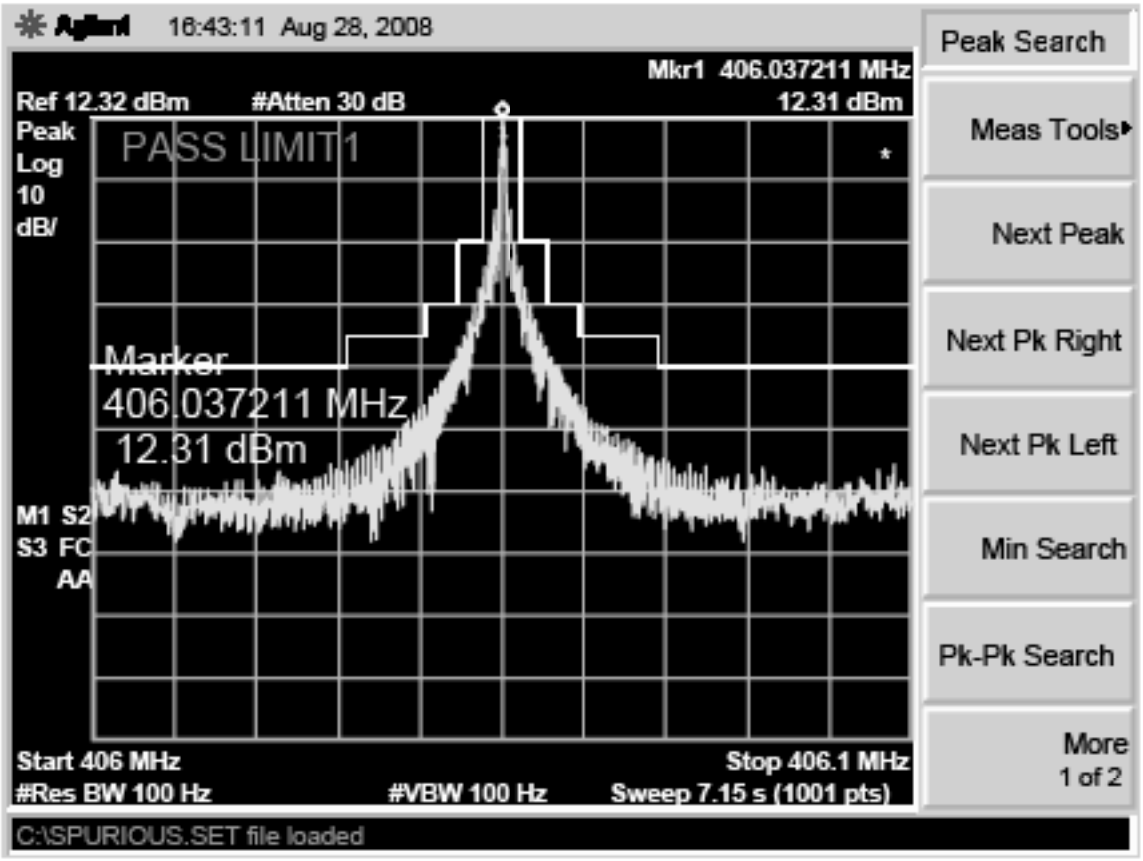
During +55°C Operational Period: EN 60945 (Functional), Performance Test

All tests in this section performed on TUV 1 as conducted connection to test equipment required.

Parameter		Value & Units
Output Power		36.67 dBm
Digital Message		FFFE2F4C9FA000C6007CEA694640 *
15 Hex ID		993F4 0018C 00F9D
Bit Rate:	Maximum	400.453 bps
	Minimum	400.451 bps
	Average	400.45 bps
	Standard Deviation	0.000981 bps
Modulation:	Rise Time	166.23 µs
	Fall Time	179.79 µs
	Average Positive Deviation	+1.10 rad
	Average Negative Deviation	-1.12 rad
	Phase Symmetry	0.0049 *
Nominal Frequency		406.037086 MHz
Short-term Stability		1.230×10^{-10} /100ms
Medium-term Stability - Slope		4.416×10^{-11} /minutes
Medium-term Stability – Residual Frequency Stability		3.488×10^{-10} *
Spurious Emissions		See Plot below

* No units

Product Service



Spurious Emissions During +55°C Operational Period

Product Service

Post- +55°C Operational Period: EN 60945 (Functional), Performance Check

Parameter	Result for TUV 1	Result for TUV 4
Self-test Mode:		
Self-test Message	Received, see Beacon Test Report 7	Received, see Beacon Test Report 8
Normal Mode:		
Normal Message	N/A (EUT In Radiated configuration)	Received, see Beacon Test Report 9
406 MHz Frequency	406.037039 MHz	406.037077 MHz
406 MHz Output Power	N/A (EUT Radiated; not traceable)	37.1 dBm
121 MHz Frequency	121.64900 MHz	121.64850 MHz
121 MHz Output Power	9.97 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)	21.84 dBm

Product Service

Beacon Test Report 7

Beacon Test Report

193DF380C6FFBFF

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/28/08 5:14:00 PM
Tester Model/Serial No./File Name: BT100S/1025/04389_01-DryHeat3--1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 25°C

☐ **PASS** ☐ **FAIL** **INITIALS:**_____

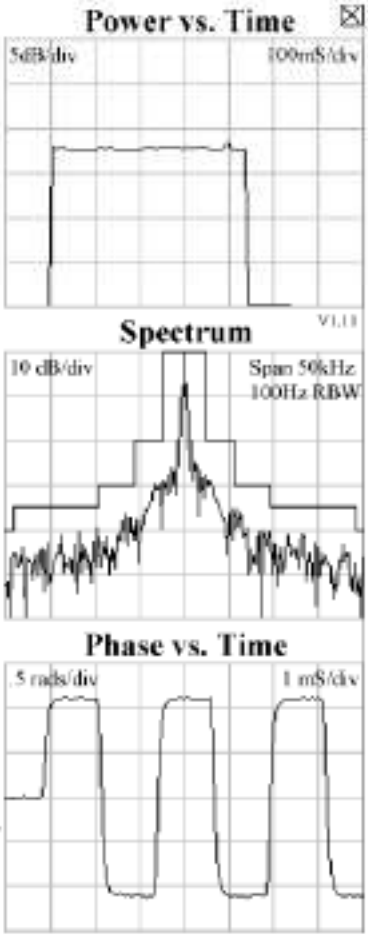
Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * ***°**.**

406 MHz Measurements
406 Frequency (EXT REF): 406.037039 MHz
406 Power (INT ANT): 170%
Power Rise Time: < 5 ms
Phase Deviation: -1.1 +1.1 radians
Modulation Rise Time: 188 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400 bps
CW Preamble: 160.7 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Detected.
121 Power (INT ANT): 56%
Unable to measure details.



DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

Beacon Test Report 8

Beacon Test Report

993F40018C00F9D

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/28/08 5:12:27 PM
Tester Model/Serial No./File Name: BT100S/1025/04389_04-DryHeat3-2
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 23°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

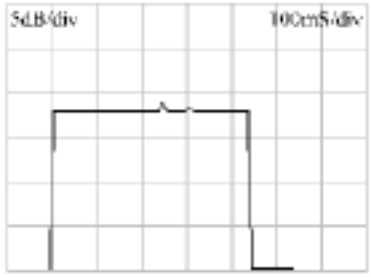
15 Hex ID: 993F40018C00F9D
Full Hex: FFFED04C9FA000C6007CEA694640
Burst Mode: Self Test Mode (Short)
Protocol: Test User Protocol
Country 201: Albania
National Use: 571750198844 45

Emergency type: unspecified
Activation type: Man

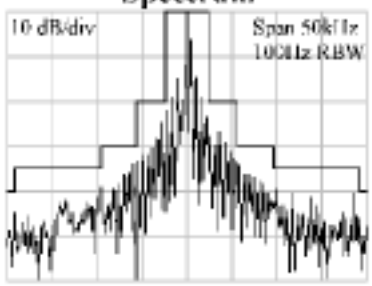
406 MHz Measurements
406 Frequency (EXT REF): 406.03707 MHz
406 Power (5 Watt): 37.1 dBm
Power Rise Time: < 5 ms
Phase Deviation: -1.1 +1.11 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 188 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400.4 bps
CW Preamble: 160.5 ms

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

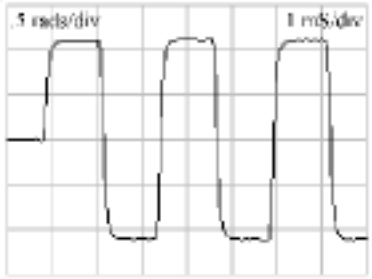
Power vs. Time



Spectrum



Phase vs. Time



Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

Beacon Test Report 9

Beacon Test Report

993F40018C00F9D

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 8/28/08 5:09:03 PM
Tester Model/Serial No./File Name: BT100S/1025/04389_04-DryHeat3-1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 25°C

☐ **PASS** ☐ **FAIL** **INITIALS:**_____

Notes: Add text comments here.

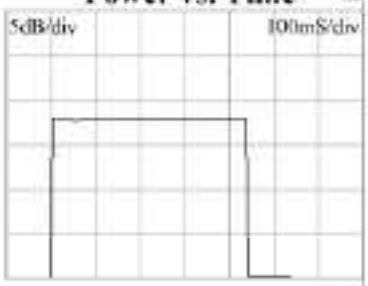
15 Hex ID: 993F40018C00F9D
Full Hex: FFFE2F4C9FA000C6007CEA694640
Burst Mode: Normal Mode (Short)
Protocol: Test User Protocol
Country 201: Albania
National Use: 57175019884445

Emergency type: unspecified
Activation type: Man

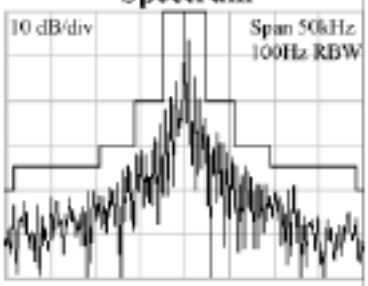
406 MHz Measurements
406 Frequency (EXT REF): 406.037077 MHz
406 Power (5 Watt): 37.1 dBm
Power Rise Time: < 5 ms
Phase Deviation: -1.11 +1.1 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 188 uS
Modulation Symmetry: 0.4%
Modulation Bit Rate: 400.4 bps
CW Preamble: 161 ms

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

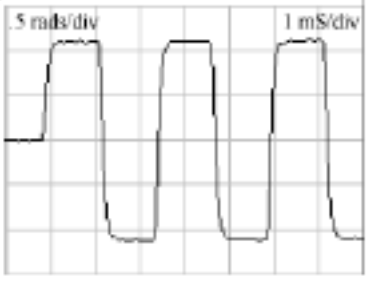
Power vs. Time



Spectrum



Phase vs. Time



Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

2.3 DAMP HEAT CYCLE

2.3.1 Specification Reference

RTCM 11010.2:2008, Clause A.4

2.3.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.3.3 Date of Test and Modification State

31 August to 1 September 2008 - Modification State 0

2.3.4 Test Equipment Used

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

2.3.5 Test Set-up and Operating Modes

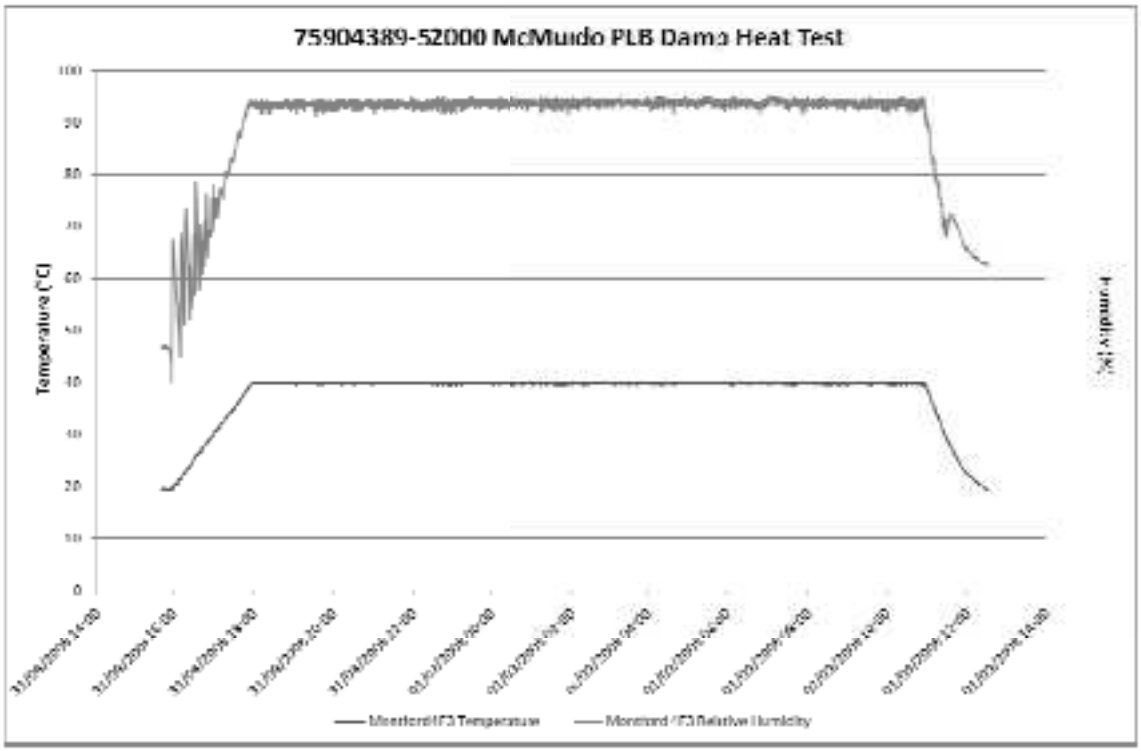
The test was performed with the EUT in the following mode(s): Idle and Self-test as per Specification Reference above.

Test Set-up

Product Service

2.3.6 Environmental Conditions

Damp Heat Cycle Temperature Plot



2.3.7 Test Results

Summary of Performance Check Results

Stage/Parameter	Pass / Fail or Value & Units
During Two Hour Operational Period – Self-test mode	
Self-test Message	Received, see Beacon Test Report
406 MHz Frequency	406.037029 MHz
121 MHz Frequency	121.64925 MHz (unmodulated)
121 MHz Output Power	-39.85 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/13/05 11:14:12 AM
Tester Model/Serial No./File Name: BT100S/2383/04389_Damp Heat - Last 2Hrs--1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 21°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

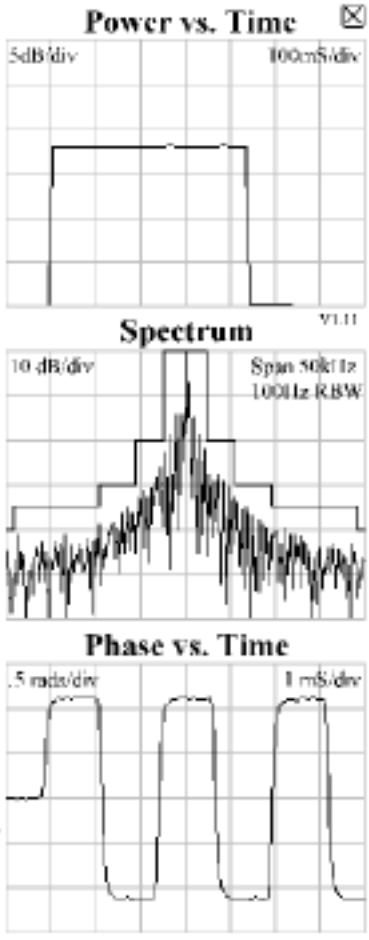
Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

406 MHz Measurements
406 Frequency (EXT REF): 406.037029 MHz
406 Power (INT ANT): 74%
Power Rise Time: < 5 ms
Phase Deviation: -1.11 +1.11 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400 bps
CW Preamble: 161 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 26%
Unable to measure details.



DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Date and time are also incorrect, correct data is 01 September 2009, ~10:10 am

Product Service

2.4 LOW TEMPERATURE TEST (STORAGE)

2.4.1 Specification Reference

RTCM 11010.2:2008, Clause A.5 (Paragraph 1)

2.4.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.4.3 Date of Test and Modification State

02 and 04 September 2008 - Modification State 0

2.4.4 Test Equipment Used

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

2.4.5 Test Set-up and Operating Modes

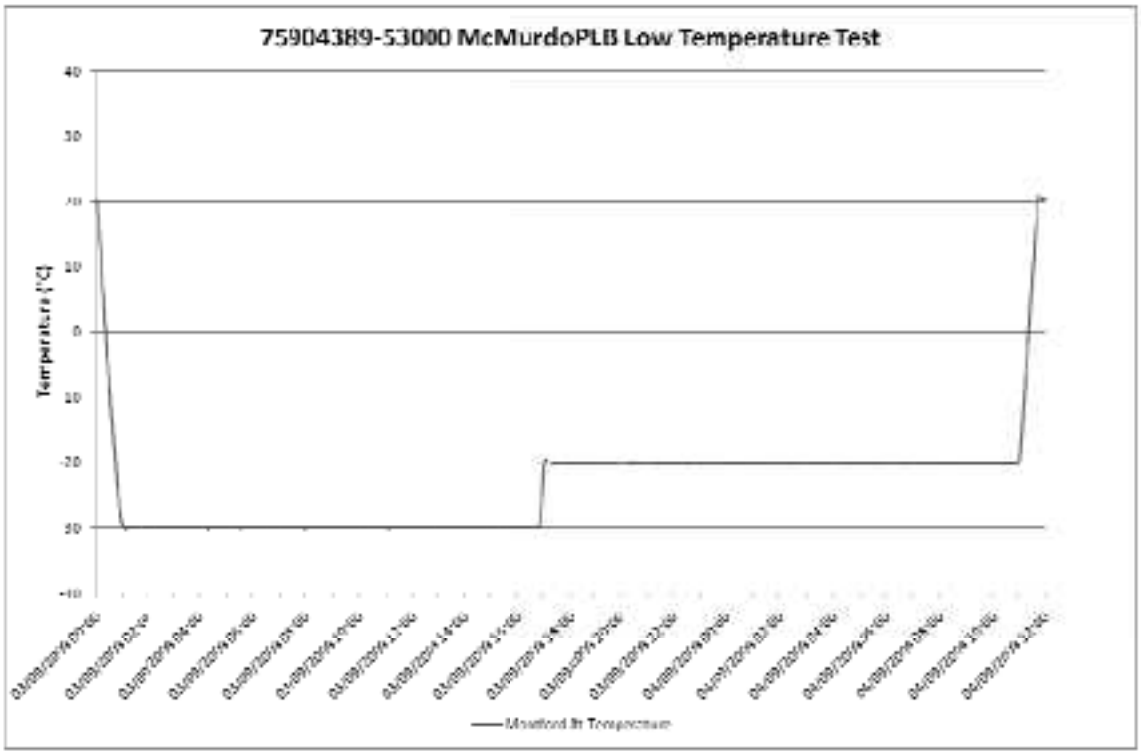
The test was performed with the EUT in the following mode(s): Idle and Self-test as per "Specification Reference", above.

Test Set-up

Product Service

2.4.6 Environmental Conditions

Low Temperature Plot



2.4.7 Test Results

EUT placed in chamber and temperature reduced to -30°C. After 16 hours the temperature was raised in 10 minutes to -20°C, EUT was subjected to a Performance Check.

Deviation from standard: In order to satify the requirements of another standard (the subject of a seperate report) some testing was carried out at -20°C. For the purposes of this test the Performance Check was carried out immediatly after the ramp to -20°C from the -30°C storage period, rather than at ambient. This was considered over-test for RTCM 11010.2.

Product Service

Summary of Performance Check Results

Stage/Parameter	Result
Performance Check 1	
Self-test Message	Received, see Beacon Test Report
406 MHz Frequency	406.037095 MHz
121 MHz Frequency	121.65025 MHz (unmodulated)
121 MHz Output Power	-30.97 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/16/05 10:07:00 AM
Tester Model/Serial No./File Name: BT100S/2383/04389_Low Temp Functional – at -20–1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 22°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

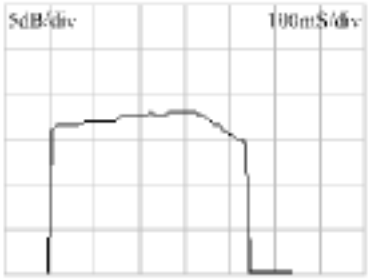
15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

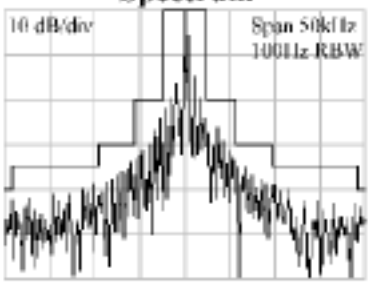
406 MHz Measurements
406 Frequency (EXT REF): 406.037095 MHz
406 Power (INT ANT): 62%
Power Rise Time: > 5 ms
Phase Deviation: -1.09 +1.09 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0.8%
Modulation Bit Rate: 399.8 bps

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

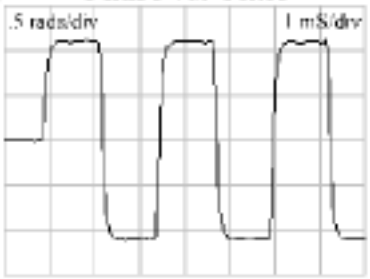
Power vs. Time



Spectrum



Phase vs. Time



Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Date and time are also incorrect, correct data is 01 September 2009, ~08:55am

Product Service

2.5 LOW TEMPERATURE TEST (FUNCTIONAL)

2.5.1 Specification Reference

RTCM 11010.2:2008, Clause A.5 (Paragraph 2)

2.5.2 Test Results

RTCM 11010.2: "*The low temperature functional test may be combined with the Operational Life test in A.13.1*"

The test was combined with the Operational Life test, details can be found at Section 2.14

Product Service

2.6 VIBRATION TESTS

2.6.1 Specification Reference

RTCM 11010.2:2008, Clause A.6

2.6.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.6.3 Date of Test and Modification State

05 to 08 September 2008 - Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Operating Modes

The test was performed with the EUT in the following mode(s): Idle

Test Set-up

Product Service

2.6.6 Test Results

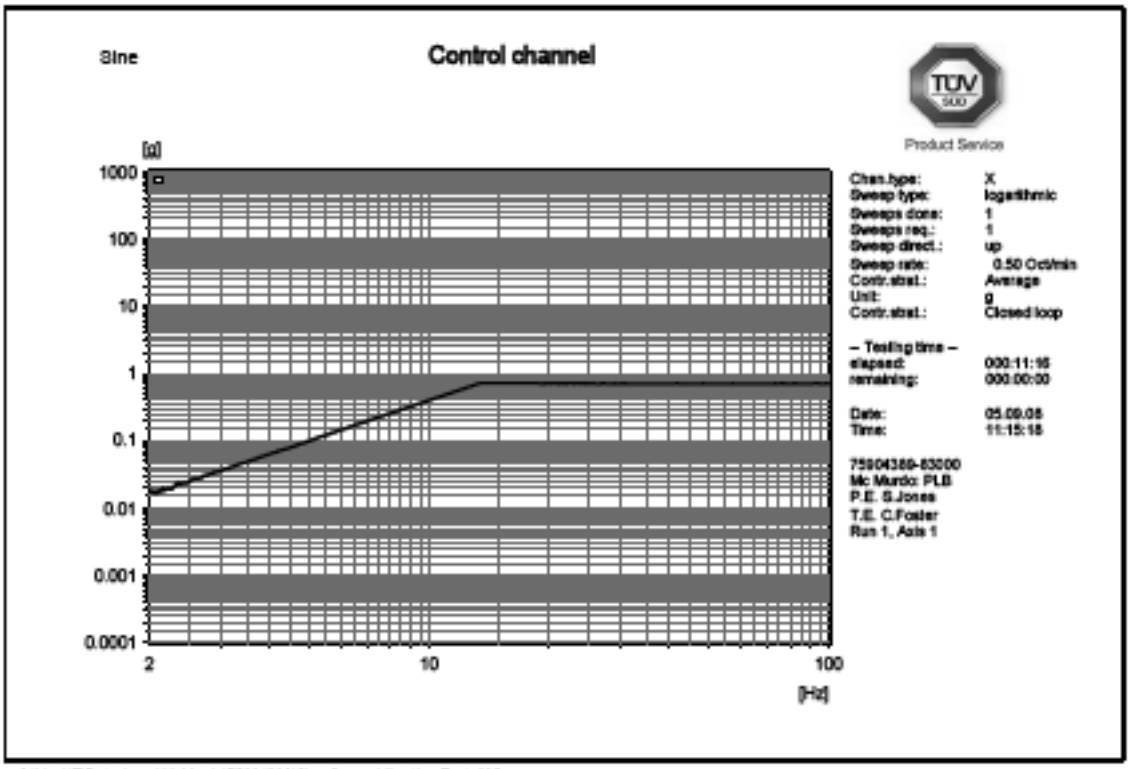
For each axis a resonance search was conducted, see Control Channel (input) and Response Channel (output/EUT response) plots. If no resonance(s) was(were) found the endurance run was performed at 30Hz, see following Control Channel and Response Channel plots.

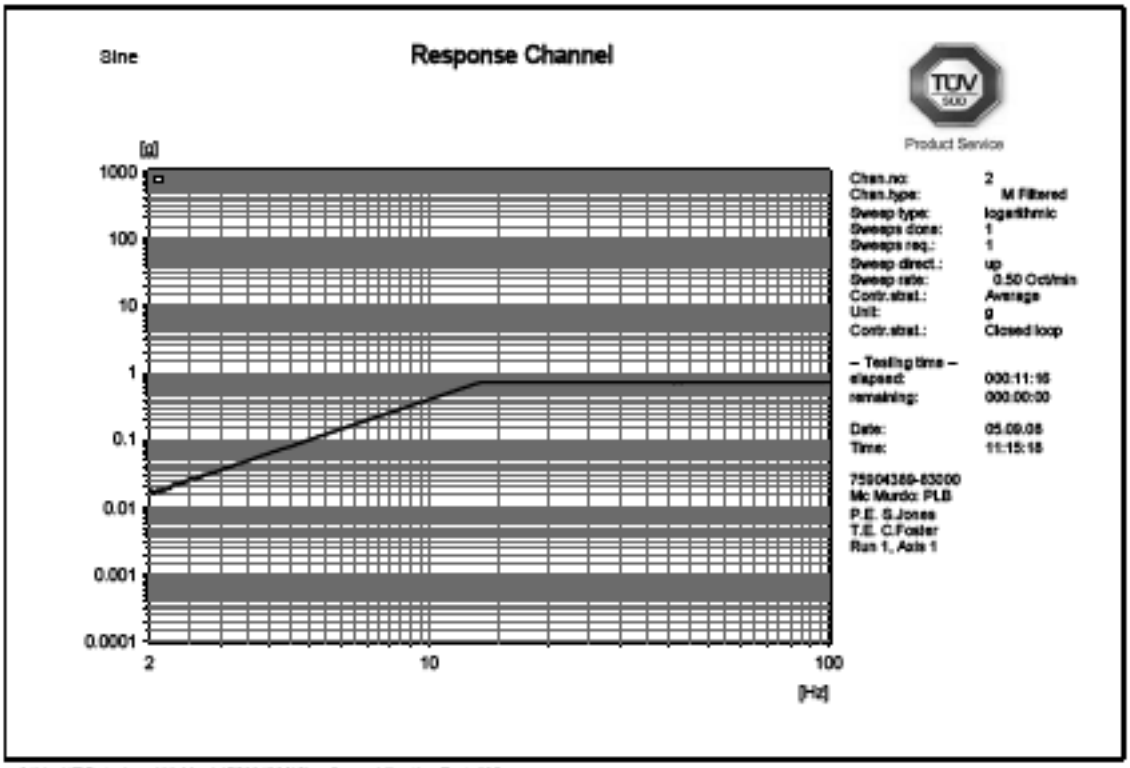
Summary of Performance Check Results

Stage/Parameter	Result
Vertical Axis	
Resonance Search	None Found
Endurance Run	Completed 2 hours at 30Hz
Self-test Message	Received, see Beacon Test Report
121 MHz Frequency	121.64975 MHz (unmodulated)
121 MHz Output Power	-36.11 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)
Lateral Axis	
Resonance Search	None Found
Endurance Run	Completed 2 hours at 30Hz
Self-test Message	Received, see Beacon Test Report
121 MHz Frequency	121.64975 MHz (unmodulated)
121 MHz Output Power	-38.35 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)
Longitudinal Axis	
Resonance Search	None Found
Endurance Run	Completed 2 hours at 30Hz
Self-test Message	Received, see Beacon Test Report
121 MHz Frequency	121.64975 MHz (unmodulated)
121 MHz Output Power	-36.27 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

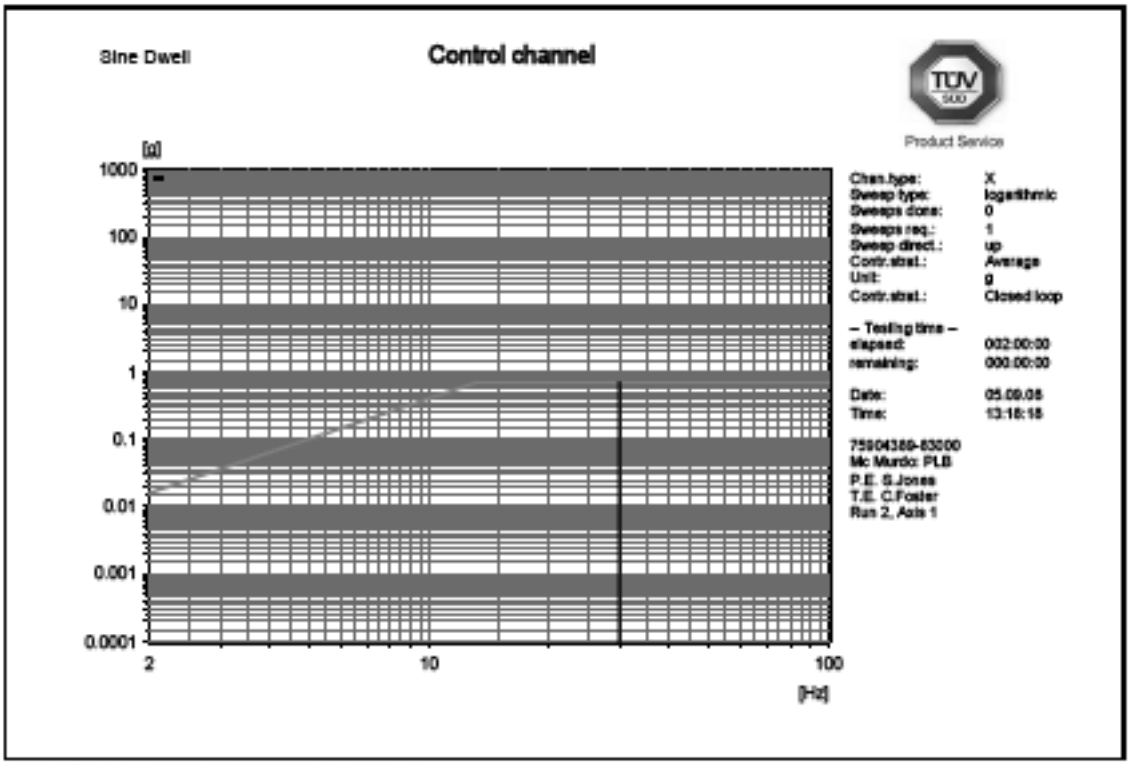
Product Service

Vertical axis

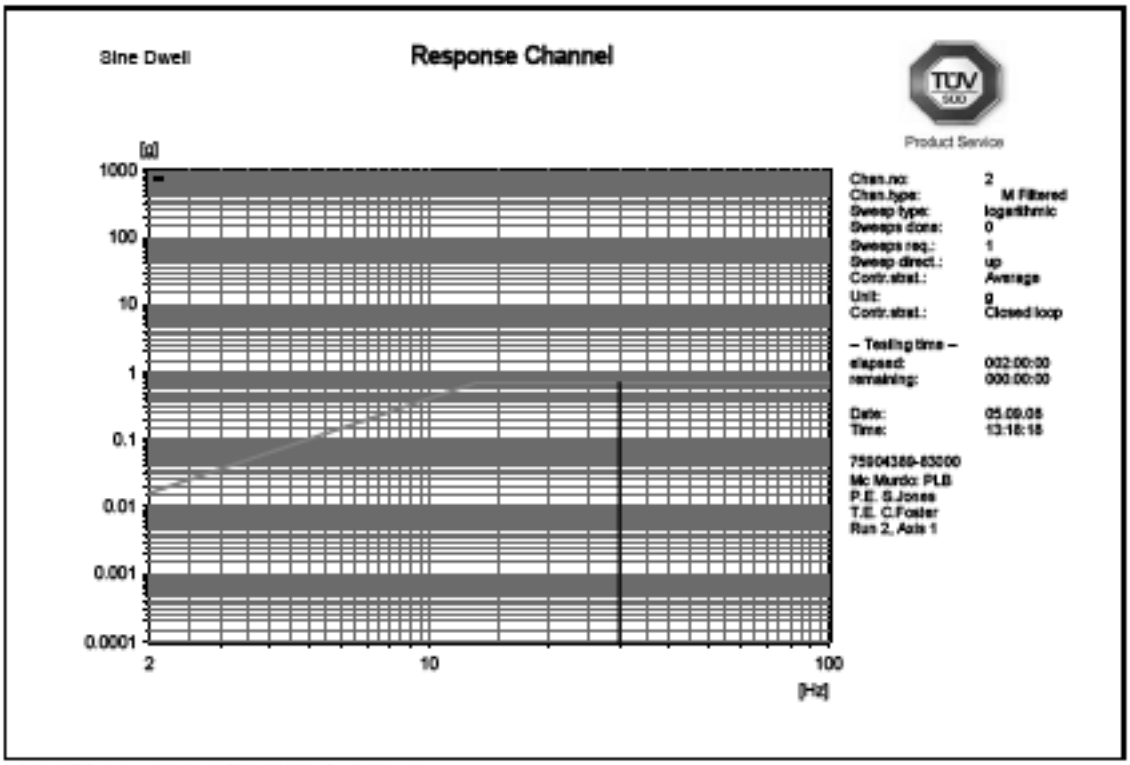




Product Service



C:\Vcp\NT\Daten\m=p\McMurdo\75904389\SineDwell 001.rsd



C:\Vcp\NT\Daten\m=p\McMurdo\75904389\SineDwell 001.rsd

Product Service

Beacon Test Report – Vertical Axis

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/20/05 1:25:47 PM
Tester Model/Serial No./File Name: BT100S/2383/04389_Vibration Test - Post Axis 1 (vert)—1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 18°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

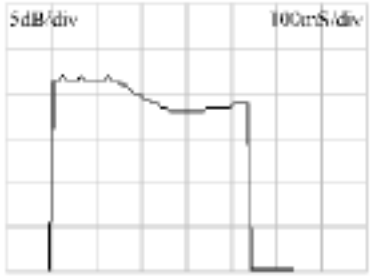
Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

406 MHz Measurements
406 Frequency (EXT REF): 406.038489 MHz
406 Power (INT ANT): 78%
Power Rise Time: < 5 ms
Phase Deviation: -1.11 +1.11 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 399.8 bps
CW Preamble: 161.3 ms

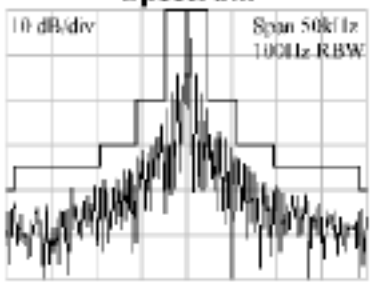
121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 26%
Unable to measure details.

DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

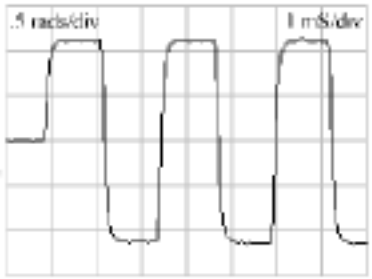
Power vs. Time



Spectrum



Phase vs. Time

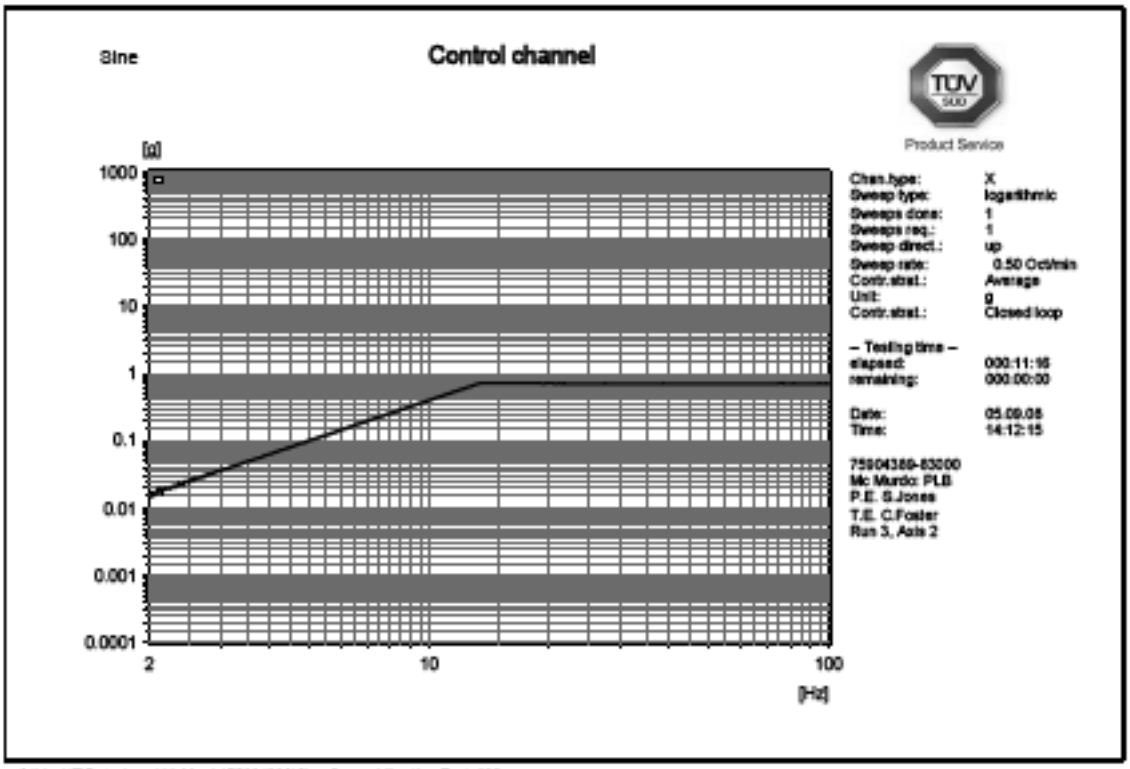


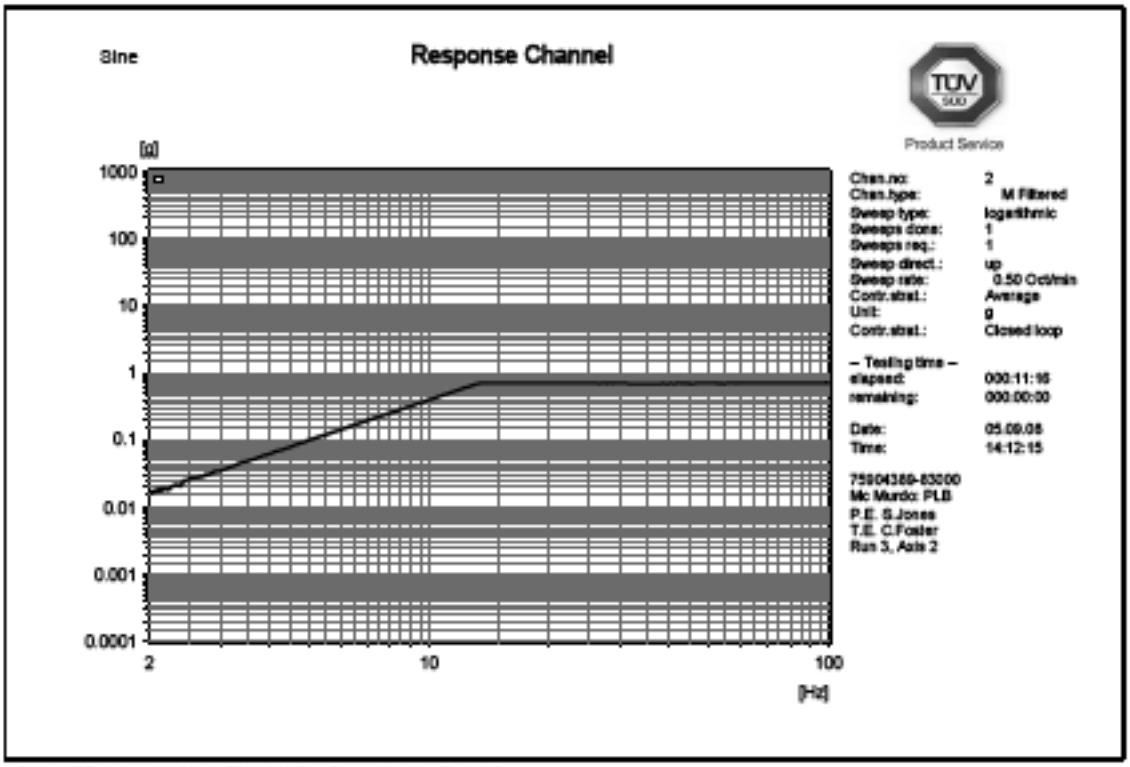
Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Date and time are also incorrect, correct data is 08 September 2009

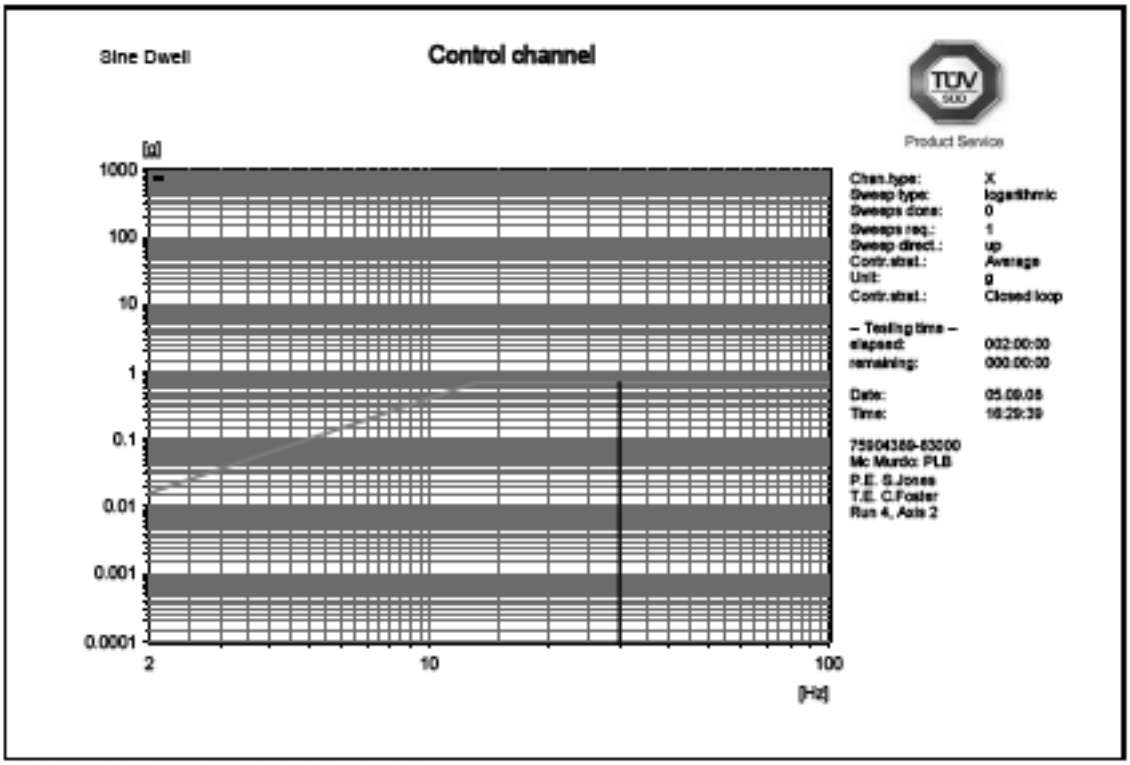
Product Service

Lateral axis

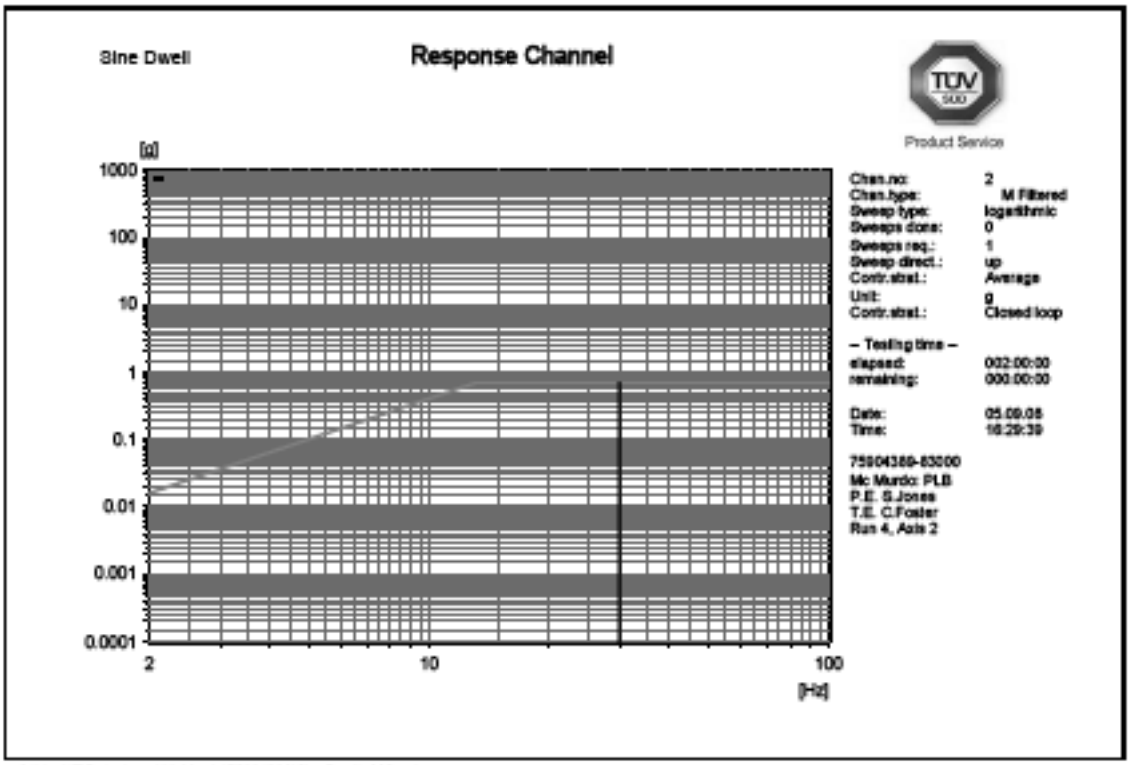




Product Service



C:\Vcp\NT\Daten\m=p\McMurdo\75904389\SineDwell 002.rsd



C:\Vcp\NT\Daten\m=p\McMurdo\75904389\SineDwell 002.rsd

Product Service

Beacon Test Report – Lateral Axis

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/20/05 10:12:39 AM
Tester Model/Serial No./File Name: BT100S/2383/04389_Vibration Test - Post Axis 1 (tran)-1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 16°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

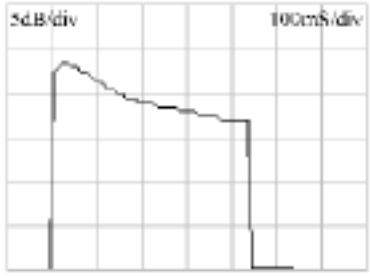
15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EP9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

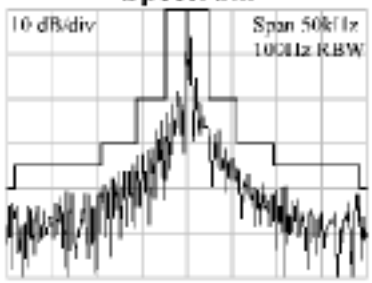
406 MHz Measurements
406 Frequency (EXT REF): 406.038124 MHz
406 Power (INT ANT): 58%
Power Rise Time: < 5 ms
Phase Deviation: -1.11 +1.11 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 198 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400 bps
CW Preamble: 161.5 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 19%
Signal was unmodulated.

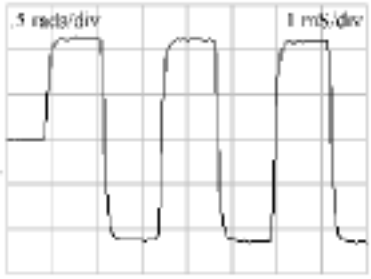
Power vs. Time



Spectrum



Phase vs. Time



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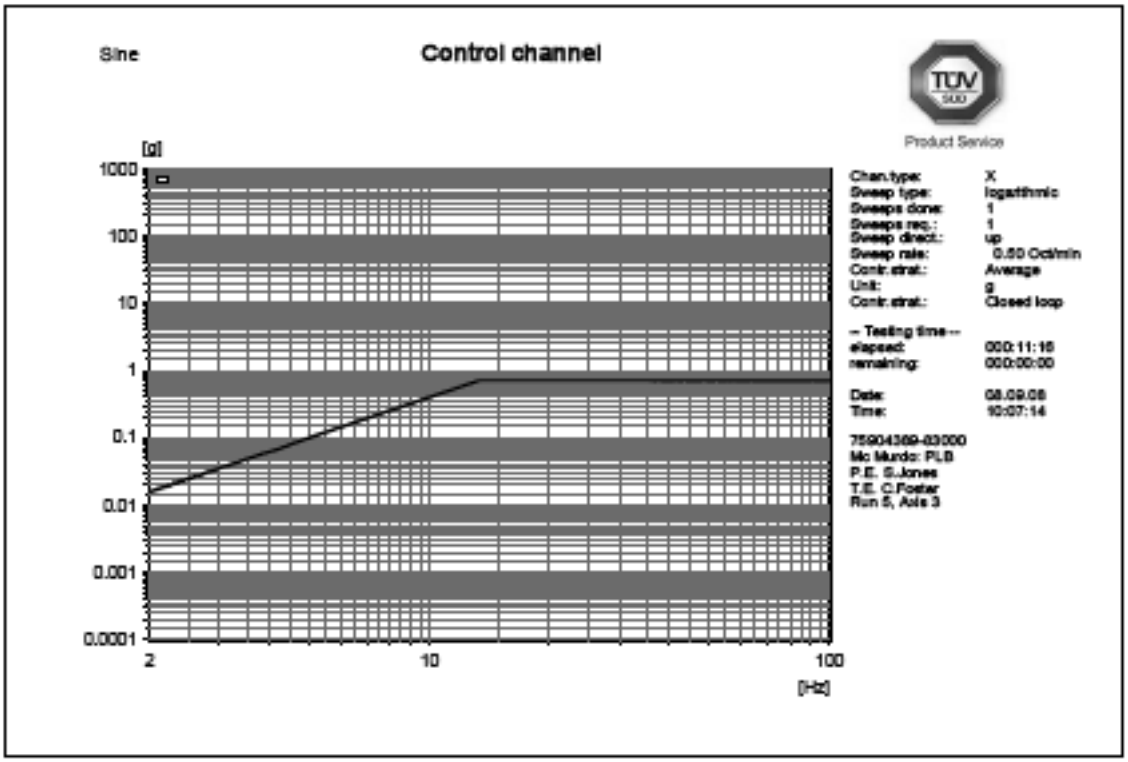
Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

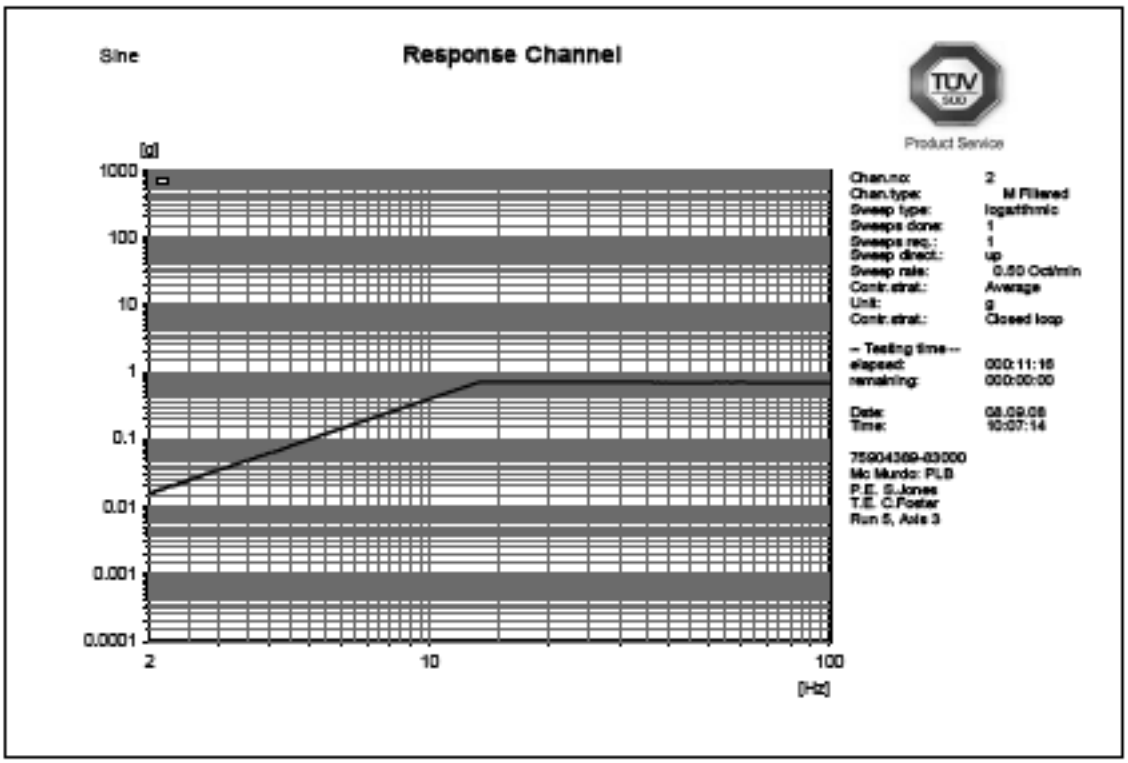
Date and time are also incorrect, correct data is 05 September 2009

Product Service

Longitudinal axis

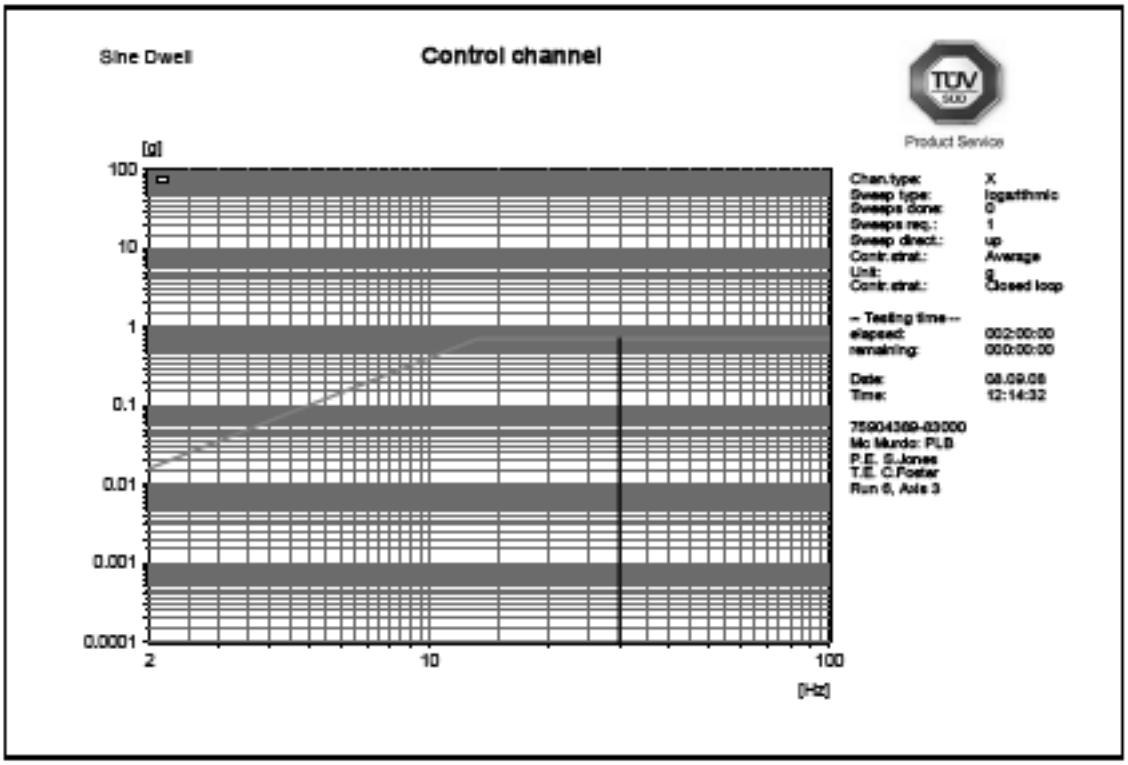


C:\Vco\NT\Daten\m+s\Mcmurdo\Sine Sweep Vibration Test 002.mn

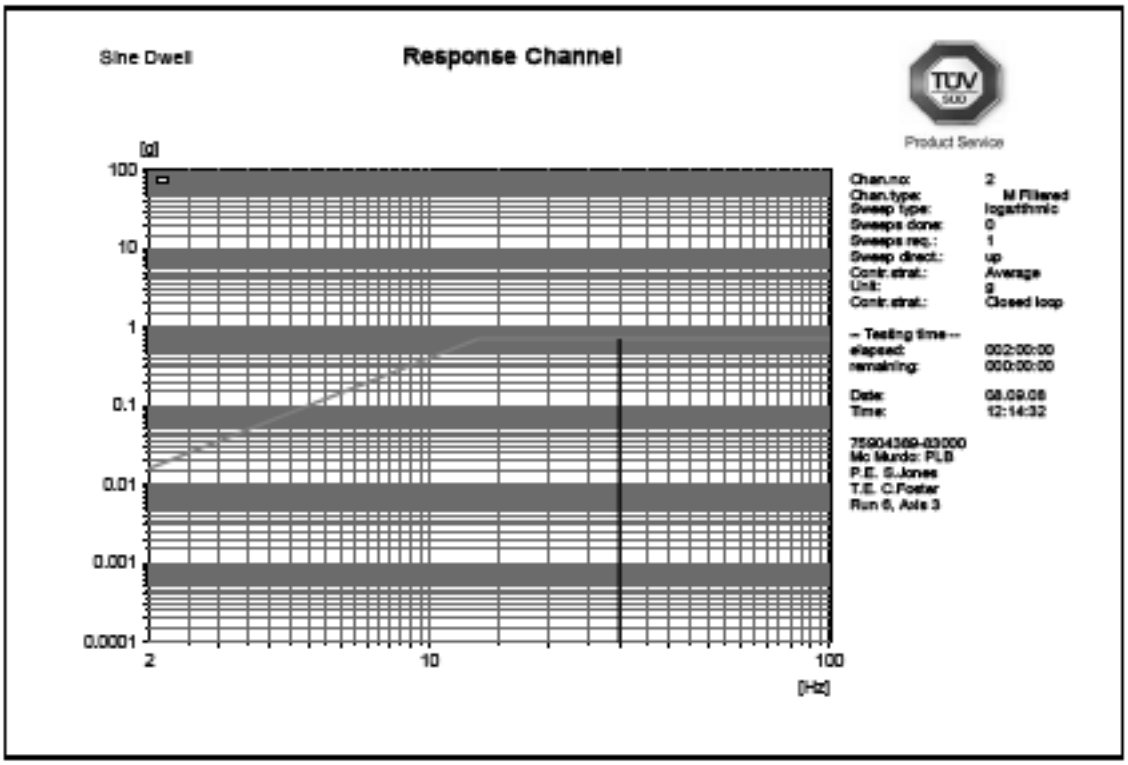


C:\Vco\NT\Daten\m+s\Mcmurdo\Sine Sweep Vibration Test 002.mn

Product Service



C:\Vcp\NT\Daten\m+p\Mcmurdo\SineDwell 002.rsd



C:\Vcp\NT\Daten\m+p\Mcmurdo\SineDwell 002.rsd

Product Service

Beacon Test Report – Longitudinal Axis

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/17/05 2:59:40 PM
Tester Model/Serial No./File Name: BT100S/2383/04389_Vibration Test - Post Axis 1 (longi-)–1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 21°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

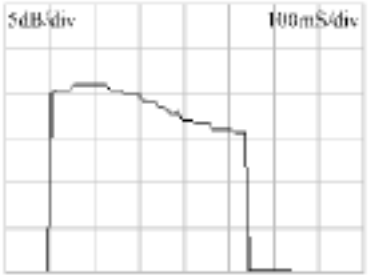
15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**
Longitude: * **°**.**

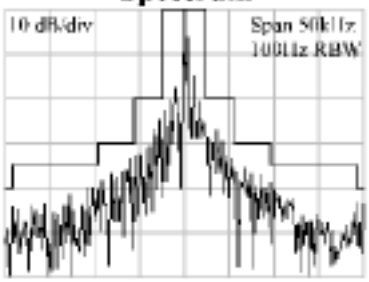
406 MHz Measurements
406 Frequency (EXT REF): 406.037556 MHz
406 Power (INT ANT): 73%
Power Rise Time: < 5 ms
Phase Deviation: -1.11 +1.11 radians
Modulation Rise Time: 188 uS
Modulation Fall Time: 198 uS
Modulation Symmetry: 0.4%
Modulation Bit Rate: 399.8 bps
CW Preamble: 160.7 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 17%
Unable to measure details.

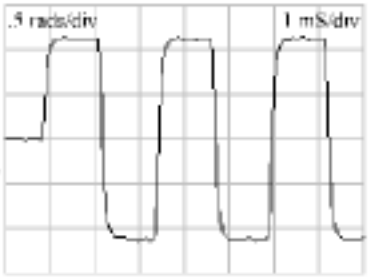
Power vs. Time



Spectrum



Phase vs. Time



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Date and time are also incorrect, correct data is 05 September 2009

Product Service

Mechanical Inspection

Post test no signs of mechanical degradation could be witnessed.

Activation Monitoring

During the test the EUT was monitored for signs of activation, none was found.

Product Service

2.7 BUMP TEST

2.7.1 Specification Reference

RTCM 11010.2:2008, Clause A.7

2.7.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.7.3 Date of Test and Modification State

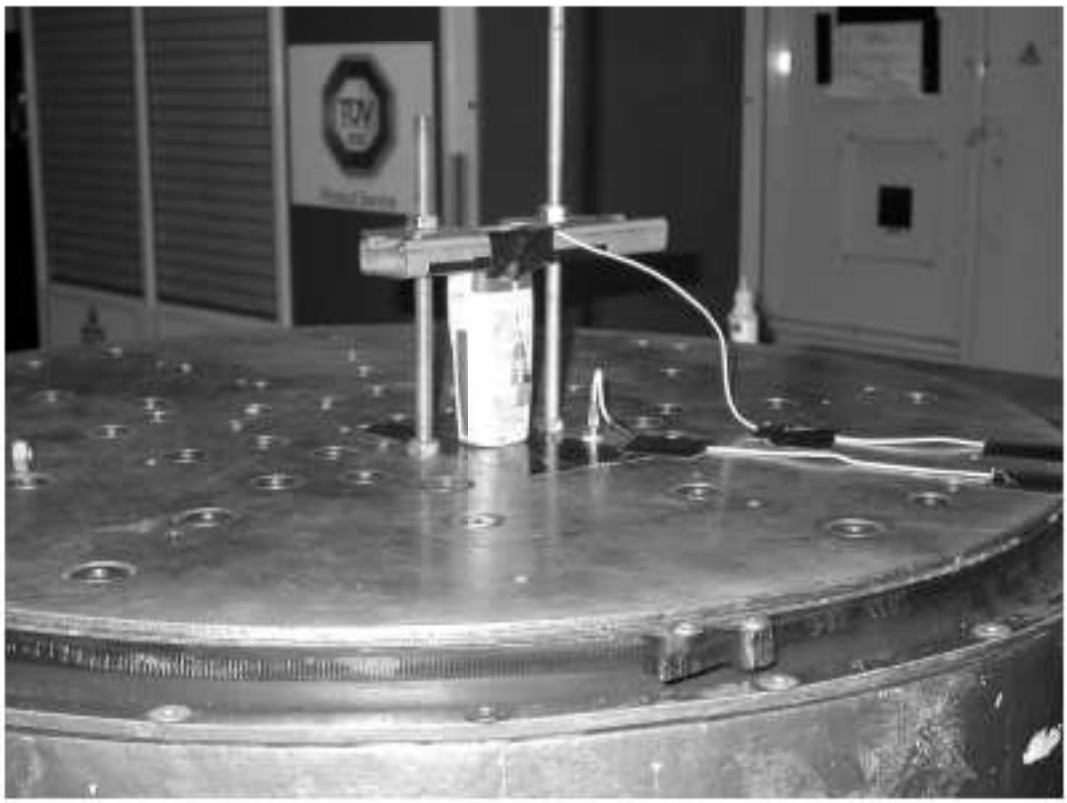
08 and 09 September 2008 - Modification State 0

2.7.4 Test Equipment Used

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

2.7.5 Test Set-up and Operating Modes

The test was performed with the EUT in the following mode(s): Idle.

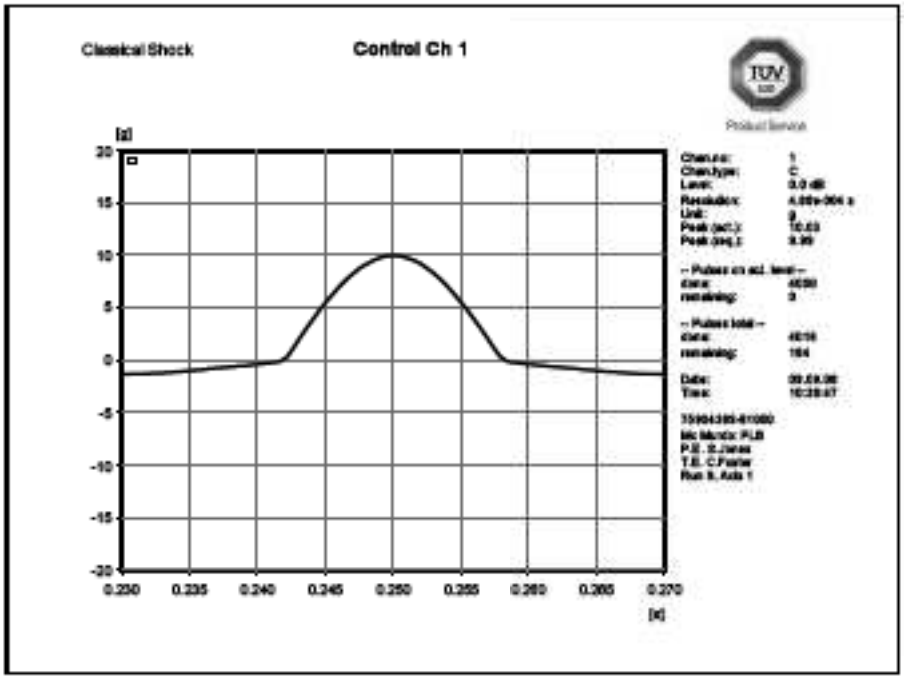


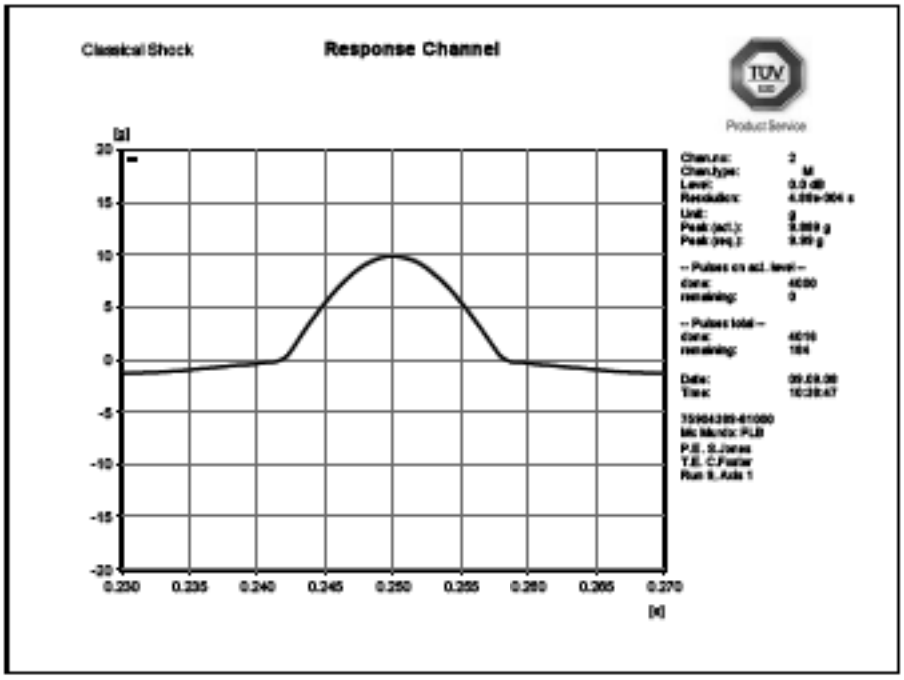
Test Set-up

Product Service

2.7.6 Test Results

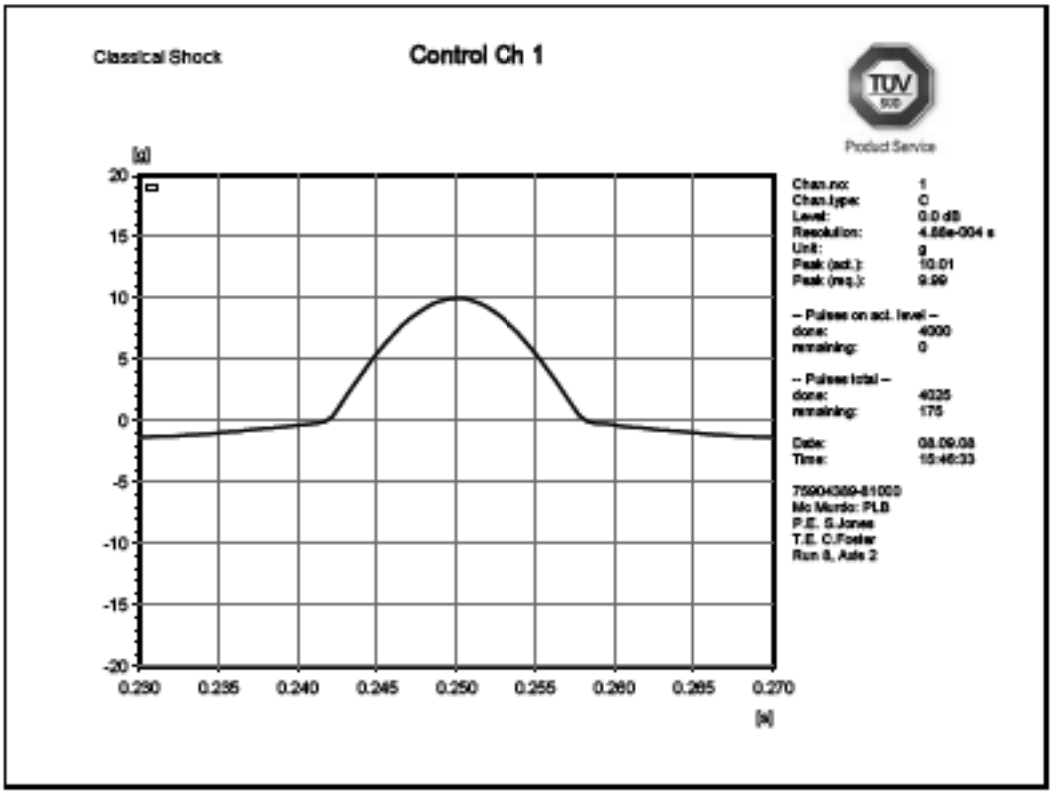
Vertical axis, 4000 Bumps



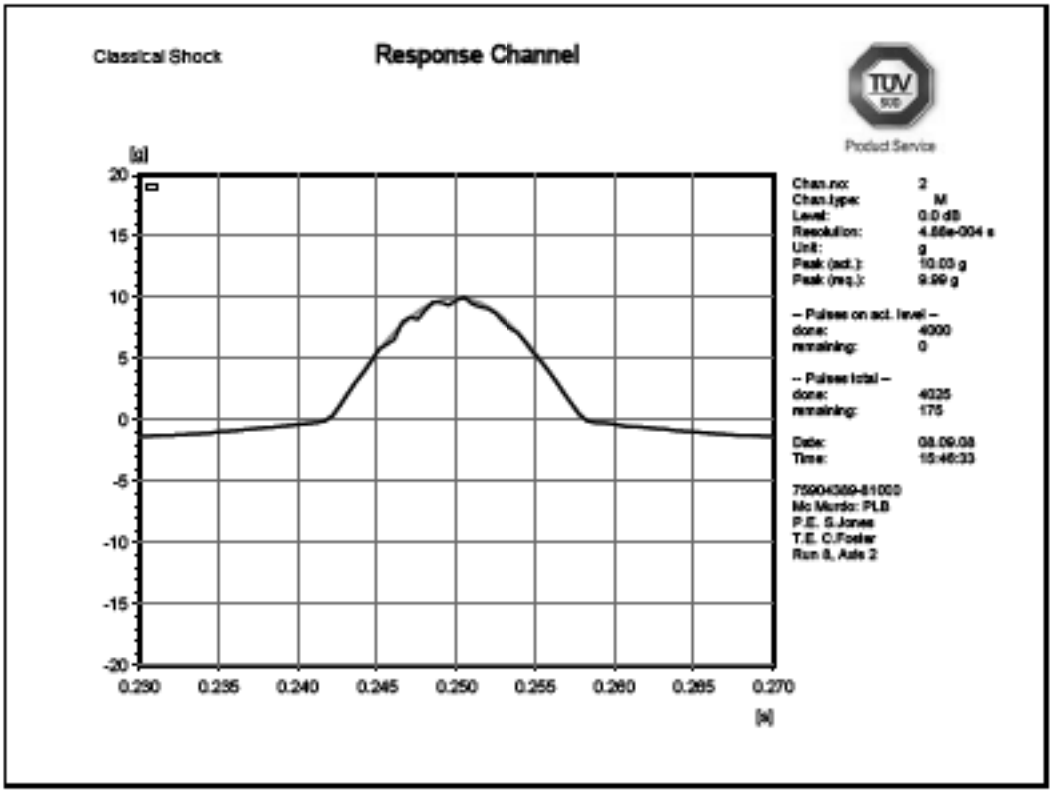


Product Service

Lateral axis, 4000 Bumps



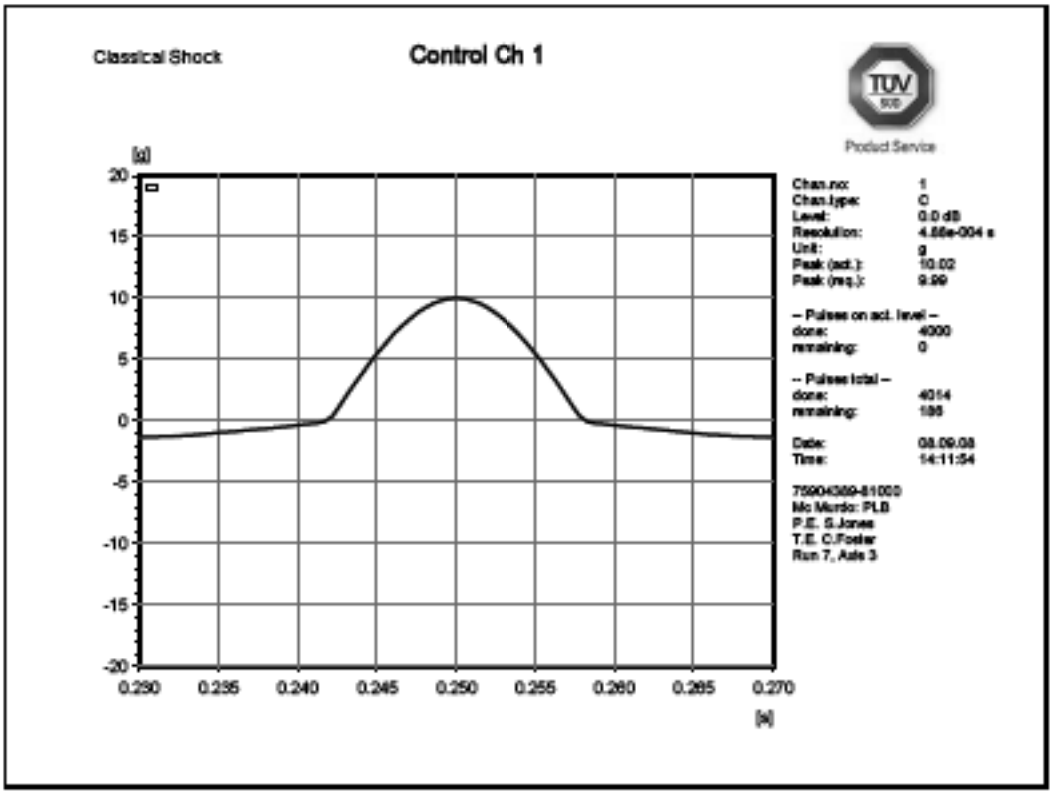
C:\V\calNT\Daten\m+s\Mcmurdo\Bumo 008.rcs



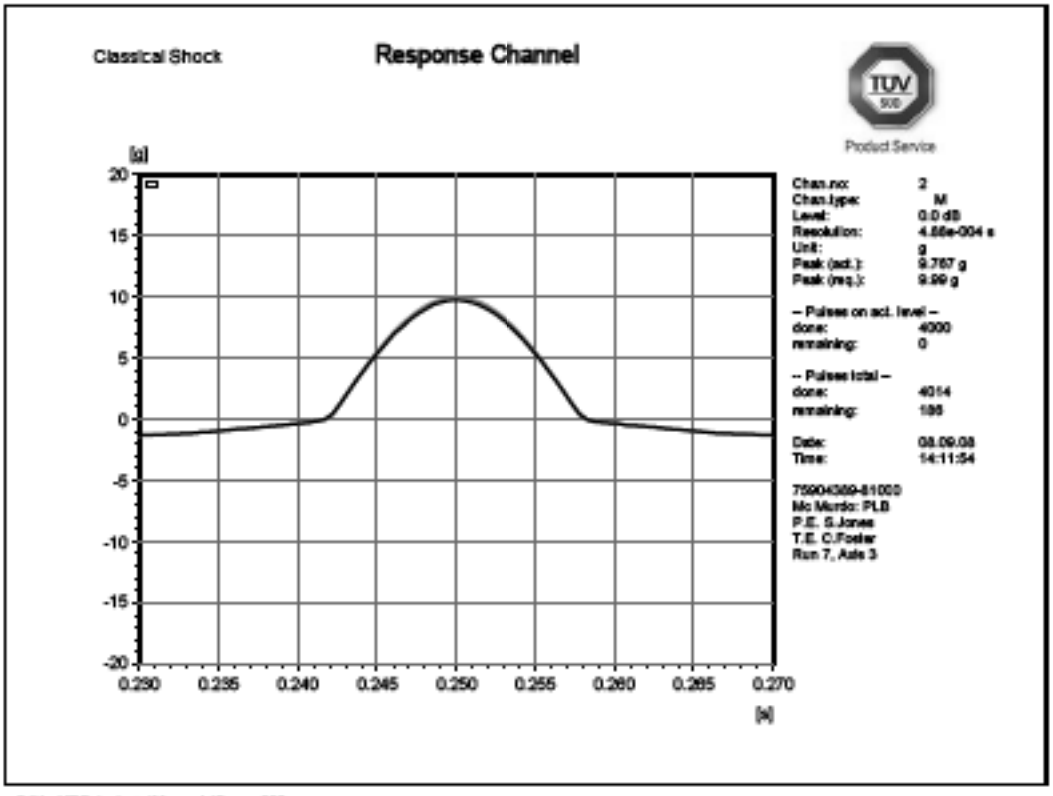
C:\V\calNT\Daten\m+s\Mcmurdo\Bumo 008.rcs

Product Service

Longitudinal axis, 4000 Bumps



C:\V\calNT\Daten\ms-roll\Mcmurdo\Bumo 005.rcs



C:\V\calNT\Daten\ms-roll\Mcmurdo\Bumo 005.rcs

Product Service

Mechanical Inspection

Post-test no signs of mechanical degradation could be witnessed.

EUT Response

During the test the EUT did not release from its mounting nor did it activate during the test.

Summary of Performance Check Results

Stage/Parameter	Result
Post-test Performance Check	
Self-test Message	Received, see Beacon Test Report
121 MHz Frequency	121. 649750 MHz (unmodulated)
121 MHz Output Power	-39.27 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report (Performance Check, Post-Test)

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/21/05 11:48:40 AM
Tester Model/Serial No./File Name: BT100S/2383/04389_Bump Test - Post Test (run 9)–1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 21°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

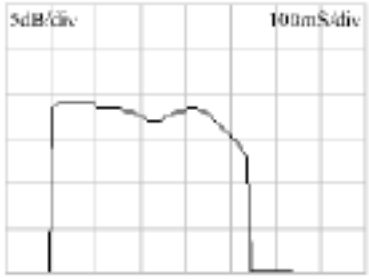
Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

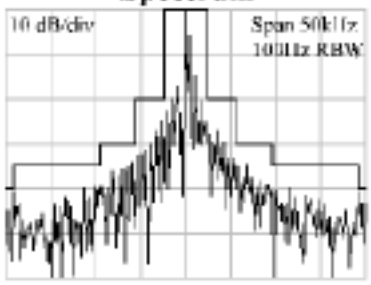
Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**'
Longitude: * ***°**.**'

406 MHz Measurements
406 Frequency (EXT REF): 406.03944 MHz
406 Power (INT ANT): 72%
Power Rise Time: < 5 ms
Phase Deviation: -1.12 +1.09 radians
Modulation Rise Time: 188 uS
Modulation Fall Time: 198 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 400 bps
CW Preamble: 161.1 ms

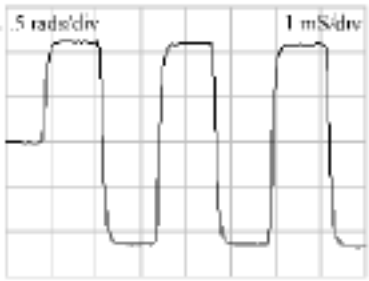
Power vs. Time



Spectrum



Phase vs. Time



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Date and time are also incorrect, correct data is 09 September 2009

Product Service

2.8 CORROSION TEST (SALT MIST)

2.8.1 Specification Reference

RTCM 11010.2:2008, Clause A.8

2.8.2 Test Waiver

Corrosion test was waivered in accordance with the following above specification reference which states: "*The corrosion test shall be waived where the manufacturer is able to produce evidence that the components, materials and finishes employed in the equipment would satisfy the test.*"

2.8.3 Justification

Customer supplied information (see Annex A) intends to show that the waiver is justified.

Product Service

2.9 DROP TEST (ON HARD SURFACE)

2.9.1 Specification Reference

RTCM 11010.2:2008, Clause A.9

2.9.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.9.3 Date of Test and Modification State

09 September 2008 - Modification State 0

2.9.4 Test Equipment Used

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

2.9.5 Operating Modes

The test was performed with the EUT in the following mode(s): Idle

2.9.6 Test Results

EUT placed in chamber set to -30°C, and stabilised for 4 hours 10 minutes. The test piece was removed and the Drop-test was performed as follows: 6 drops, one to each face, from a height of 1.220 metres onto the test surface

Test Observations

The EUT was monitored and did not activate automatically during the test. The EUT was subjected to a mechanical inspection post-test and no signs of deterioration were noted.

Performance Check

Stage/Parameter	Result
Post-test Performance Check	
Self-test Message	Received, see Beacon Test Report
406 MHz Frequency	406.037618 MHz
121 MHz Frequency	121. 650000 MHz (unmodulated)
121 MHz Output Power	-35.90 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report (Performance Check, Post-test)

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/21/05 6:14:20 PM
Tester Model/Serial No./File Name: BT100S/2383/04389_Cold Temp Drops -1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 23°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

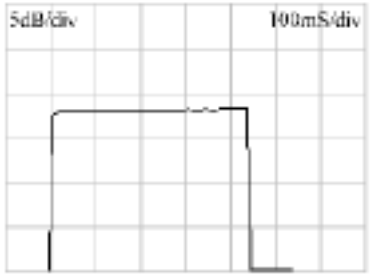
15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits **41 - 64:** 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits **107-110:** Default
Latitude: * **°**.*'*
Longitude: * ***°*.**'

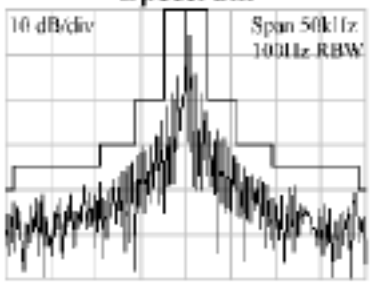
406 MHz Measurements
406 Frequency (EXT REF): 406.037618 MHz
406 Power (INT ANT): 76%
Power Rise Time: < 5 ms
Phase Deviation: -1.1 +1.11 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 399.8 bps
CW Preamble: 160.2 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 20%
Unable to measure details.

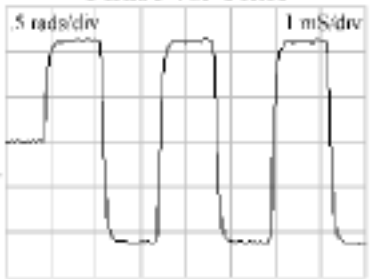
Power vs. Time ☒



Spectrum



Phase vs. Time



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Date and time are also incorrect, correct data is 09 September 2009

Product Service

2.10 THERMAL SHOCK TEST

2.10.1 Specification Reference

RTCM 11010.2:2008, Clause A.10

Note: Not to be confused with Thermal Shock Test of Cospas-Sarsat T.007 as distinctly different

2.10.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.10.3 Date of Test and Modification State

10 to 12 September 2008 - Modification State 0

2.10.4 Test Equipment Used

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

2.10.5 Test Set-up and Operating Modes

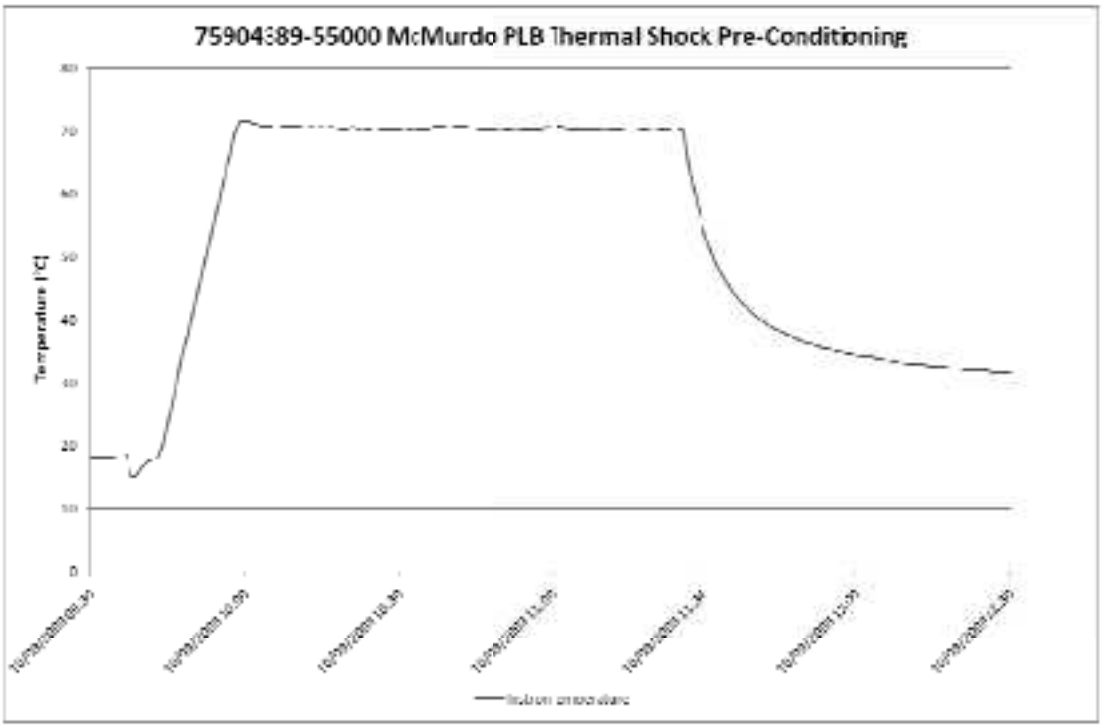
The test was performed with the EUT in the following mode(s): Idle

Test Set-up

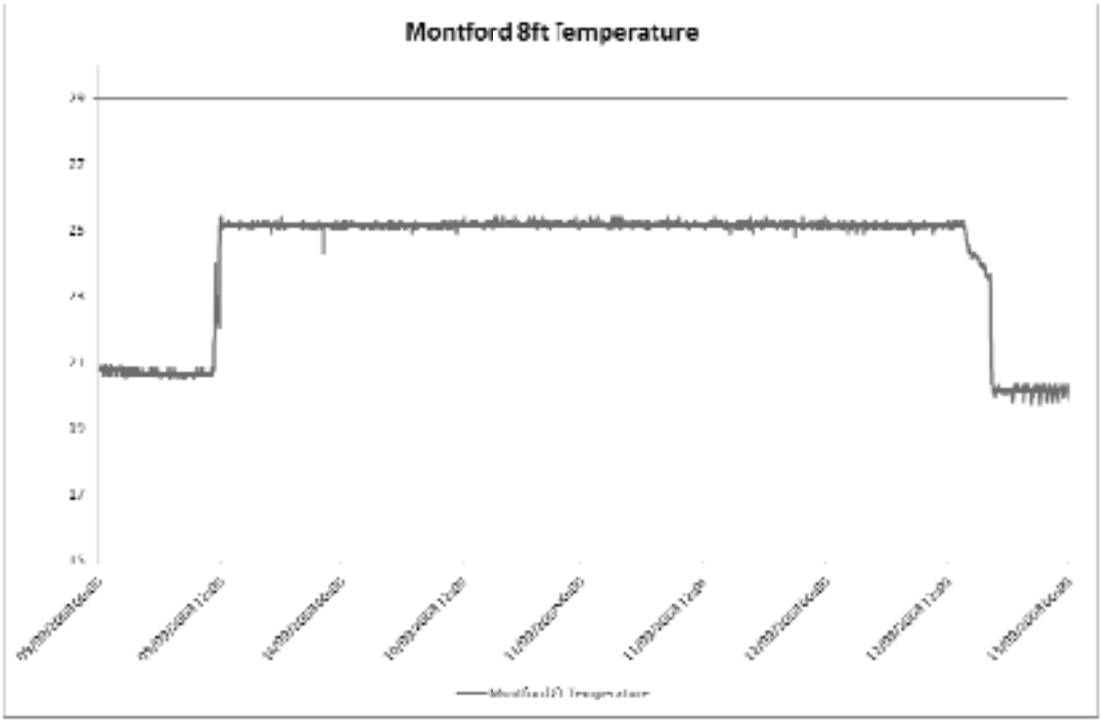
Product Service

2.10.6 Environmental Conditions

Preconditioning Temperature Plot



Water Temperature Plot



Product Service

2.10.7 Test Results

The EUT was placed in the pre-conditioning climatic chamber at a temperature of +70°C for 2 hours.

The EUT was located into the Montford climatic chamber which contained the water vessel (conditioned for approximately 24 hours) at +25°C.

The unit was prevented from floating to the surface with the use of a metal stand which held it 100mm below the surface of the water (measured to the highest point of the EUT) as pictured in Test Setup above.

Performance Check

Stage/Parameter	Result
Post-test Performance Check	
Self-test Message	Received, see Beacon Test Report
406 MHz Frequency	406.036943 MHz
121 MHz Frequency	121.64950 MHz (unmodulated)
121 MHz Output Power	-38.31 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report (Post-test Self-test Message)

Beacon Test Report

193DF380C6FFBFF

Organization: TUV Product Service
Tested By: BT100A S/N: 2383
Date: 5/24/05 2:08:09 PM
Tester Model/Serial No./File Name: BT100S/2383/04389_Thermal Shock - Post-Test--1
Tester Cal Due Date: Sep 6, 2008
Tester Temperature: 24°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

Notes: Add text comments here.

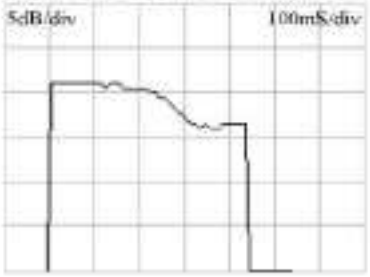
15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 16367715

Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * *****.**
Longitude: * *****.**

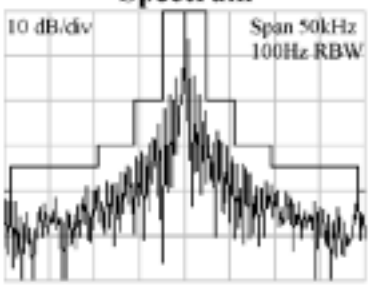
406 MHz Measurements
406 Frequency (EXT REF): 406.036943 MHz
406 Power (INT ANT): 73%
Power Rise Time: < 5 ms
Phase Deviation: -1.1 +1.11 radians
Modulation Rise Time: 165 uS
Modulation Fall Time: 188 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 399.8 bps
CW Preamble: 160.9 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Out of Range.
121 Power (INT ANT): 19%
Unable to measure details.

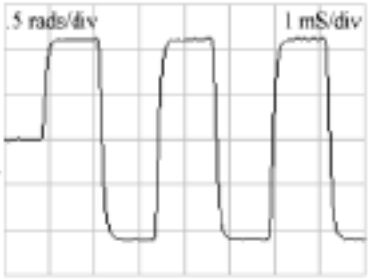
Power vs. Time



Spectrum



Phase vs. Time



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

2.11 IMMERSION TEST

2.11.1 Specification Reference

RTCM 11010.2:2008, Clause A.11 (Immersion only, excludes Temporary Immersion)

2.11.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 4 (Radiated)

2.11.3 Date of Test and Modification State

09 February 2009 - Modification State 0

2.11.4 Test Equipment Used

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

2.11.5 Test Set-up and Operating Modes

The test was performed with the EUT in the following mode(s): Idle

Test Set-up

Product Service

2.11.6 Test Results

EUT placed in pressure vessel with the highest point just below the water surface, see Test Setup above. Pressure increased to +1.000 bar relative to atmospheric pressure and maintained for 5 minutes.

The EUT was weighed before and after the test, on each occasion the weight was 0.152 kg, this indicates that no measureable ingress occurred.

Inspection

Subsequent to the test the EUT case was dismantled inspected internally and no sign of ingress was found.

Summary of Performance Check Results

Parameter	Result/Units
Self-test Message	Received, see Beacon Test Report below
406 MHz Frequency	406.037054MHz
121 MHz Frequency	121.65000 MHz (unmodulated)
121 MHz Output Power	-29.49 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report

Beacon Test Report

192FF380C6FFBFF

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 2/9/09 10:49:53 AM
Tester Model/Serial No./File Name: BT100S/1025/04389-Immersion-post-1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 18°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

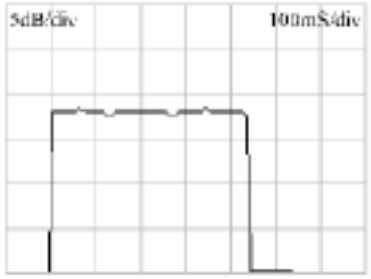
Notes: Add text comments here.

15 Hex ID: 192FF380C6FFBFF
Full Hex: FFFED08C97F9C0637FDFFF11B237
Burst Mode: Self Test Mode (Short)
Protocol: PLB Serial SLP Protocol
Country 201: Albania
C/S Approval #: 999
Serial Number: 99
Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits 107-110: Default
Latitude: * **°**.**'
Longitude: * ***°**.**'

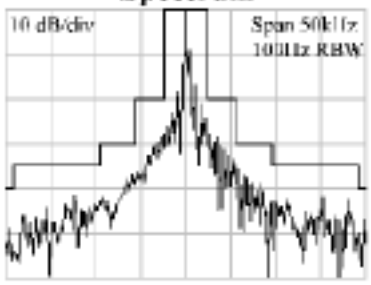
406 MHz Measurements
406 Frequency (EXT REF): 406.037054 MHz
406 Power (5 Watt): 13.8 dBm
Power Rise Time: < 5 ms
Phase Deviation: -1.09 +1.11 radians
Modulation Rise Time: 198 uS
Modulation Fall Time: 177 uS
Modulation Symmetry: 0.4%
Modulation Bit Rate: 400.9 bps
CW Preamble: 159.9 ms

121.5 MHz Measurements
121 Frequency (EXT REF): Detected.
121 Power (5 Watt): -15.5 dBm
Unable to measure details.

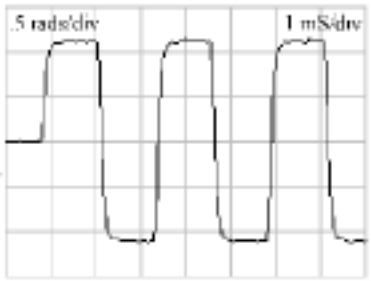
Power vs. Time



Spectrum



Phase vs. Time



DISCLAIMER: IN NO EVENT SHALL WS TECHNOLOGIES INC. OR ITS DISTRIBUTORS OR AGENTS BE LIABLE FOR ANY DAMAGES OR LOSSES INCURRED AS A RESULT OF THE USE OR FAILURE OF THIS MEASUREMENT EQUIPMENT.

Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

2.12 TEMPORARY IMMERSION TEST

2.12.1 Specification Reference

RTCM 11010.2:2008, Clause A.11 (Temporary Immersion only)

2.12.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.12.3 Date of Test and Modification State

27 January 2009 - Modification State 0

2.12.4 Test Equipment Used

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

2.12.5 Test Set-up and Operating Modes

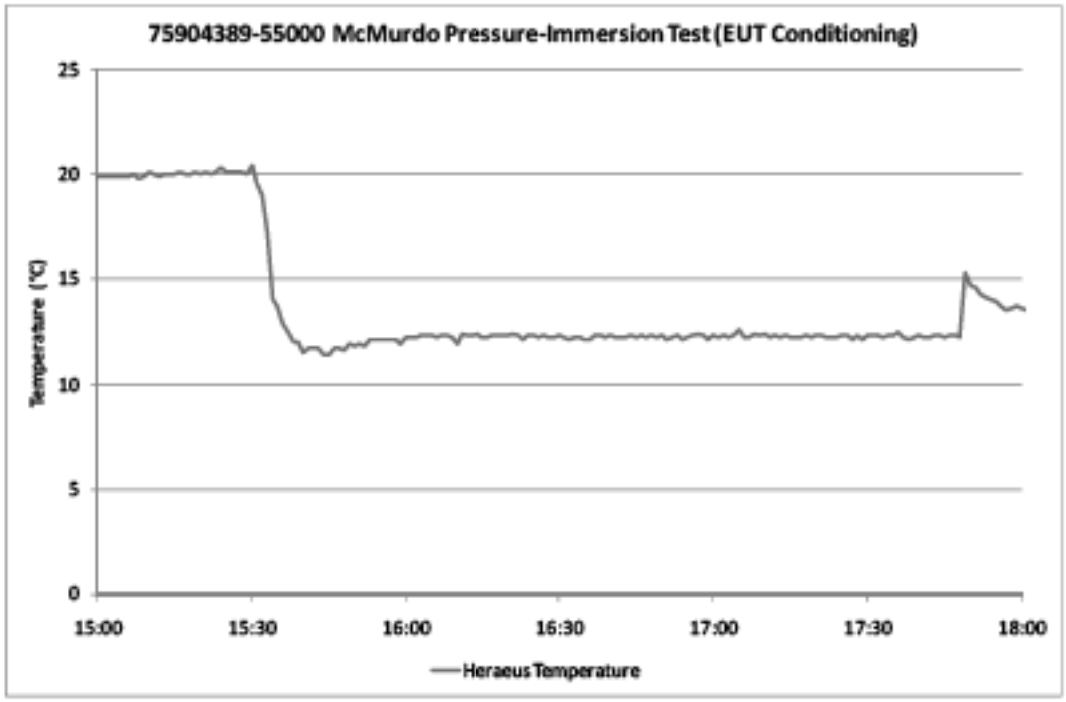
The test was performed with the EUT in the following mode(s): Idle

Test Set-up

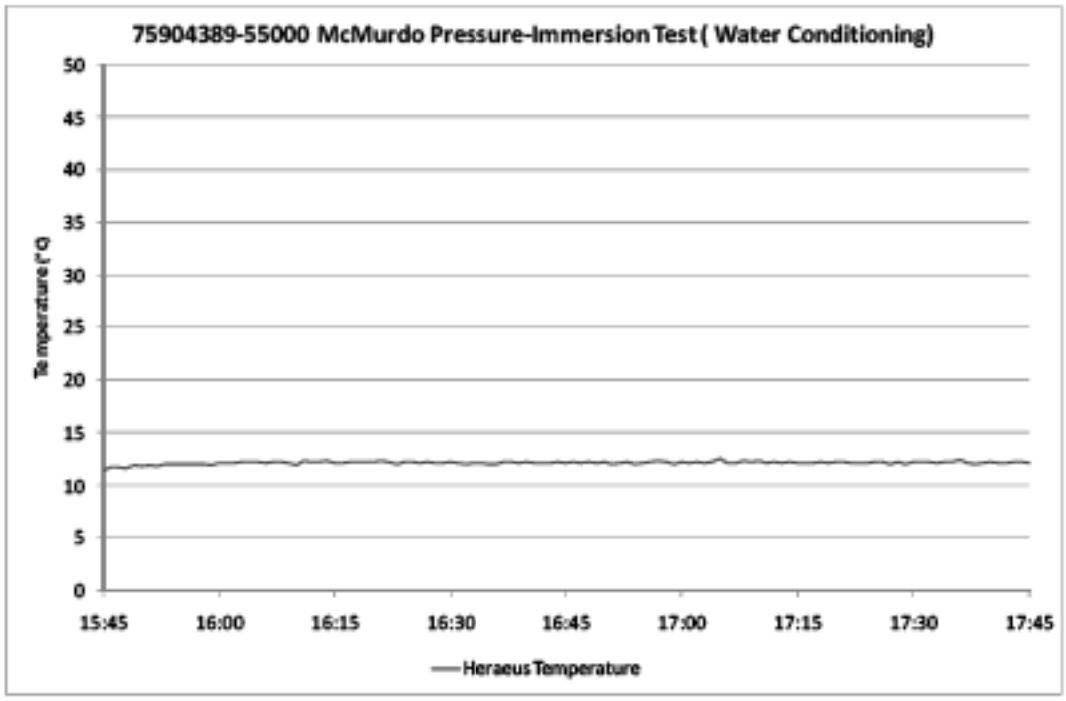
Product Service

2.12.6 Environmental Conditions

Pre-Conditioning Plot



Water Temperature Plot



Product Service

2.12.7 Test Results

EUT placed in the Heraeus chamber for pre-conditioning prior to the test.
Pre-Conditioning Temperature: 12.5°C

EUT placed in pressure vessel with the highest point just below the water surface, see Test Setup above. Pressure increased to +0.09 bar relative to atmospheric pressure (equivalent to 1m head of water) and maintained for duration of 1 hour.

Inspection

Subsequent to the test the EUT was inspected internally and no sign of ingress was found.

Summary of Performance Check Results

Parameter	Result/Units
Self-test Message	Received, see Beacon Test Report below
406 MHz Frequency	406.0375 MHz
121 MHz Frequency	121.65000 MHz (unmodulated)
121 MHz Output Power	9.333 dBm (EUT Radiated; not traceable, for reference/confirmation of operation only)

Product Service

Beacon Test Report

Beacon Test Report

193DF380C6FFBFF

Organization: TÜV Product Service Ltd
Tested By: Emergency Beacons Dept.
Date: 1/27/09 7:07:07 PM
Tester Model/Serial No./File Name: BT100S/1025/mcmurdo-1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 22°C

☐ **PASS** ☐ **FAIL** **INITIALS:_____**

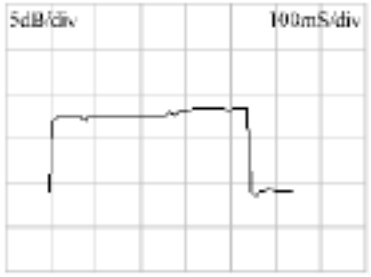
Notes: Add text comments here.

15 Hex ID: 193DF380C6FFBFF
Full Hex: FFFED08C9EF9C0637FDFF83D15B7
Burst Mode: Self Test Mode (Short)
Protocol: Standard Test Protocol
Country 201: Albania
Bits **41 - 64:** 16367715

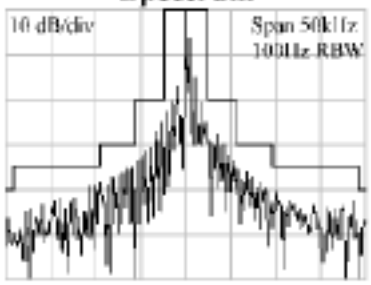
Position Source: Internal GPS
Auxiliary Radio: 121.5 MHz
Bits **107-110:** Default
Latitude: * **°**.**'
Longitude: * ***°**.**'

406 MHz Measurements
406 Frequency (INT REF): 406.0375 MHz
406 Power (INT ANT): 20%
Power Rise Time: : N/A
Phase Deviation: -1.1 +1.13 radians
Modulation Rise Time: 177 uS
Modulation Fall Time: 188 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 399.8 bps

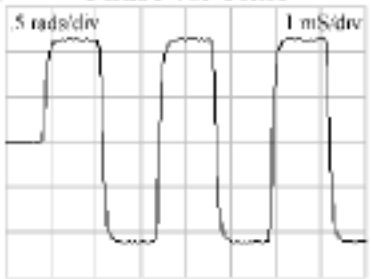
Power vs. Time ☒



Spectrum



Phase vs. Time



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Note: Beacon tester out of calibration, traceability maintained for frequency measurement by using a calibrated external reference. Power measurement for reference/comparison only and hence traceability unimportant. Similarly for the other parameters (e.g. modulation details).

Product Service

2.13 SPURIOUS EMISSIONS TEST

2.13.1 Specification Reference

RTCM 11010.2:2008, Clause A.12

2.13.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1

2.13.3 Date of Test and Modification State

406 MHz:	16 and 17 September 2008	- Modification State 0
121 MHz:	01 and 02 December 2008	- Modification State 0
Other bands:	10 February 2009	- Modification State 0

2.13.4 Test Equipment Used

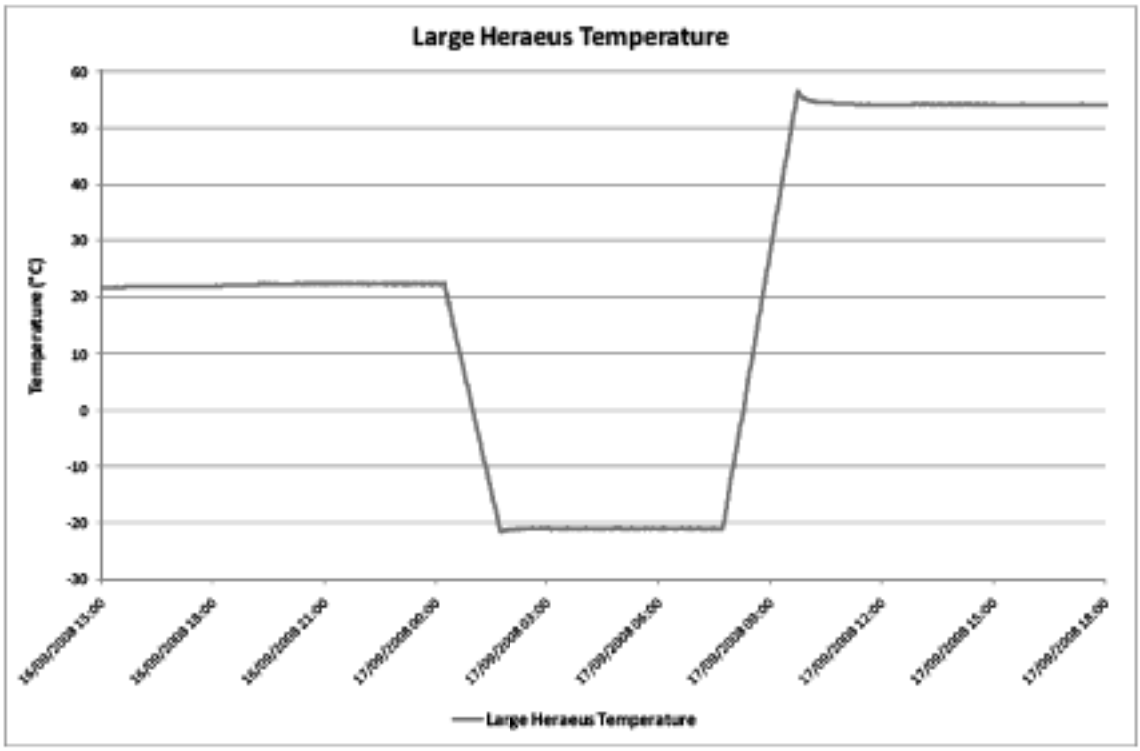
The major items of test equipment used for the above tests are identified in Section 3.1.

2.13.5 Operating Modes

The test was performed with the EUT in the following mode(s): Normal

2.13.6 Environmental Conditions

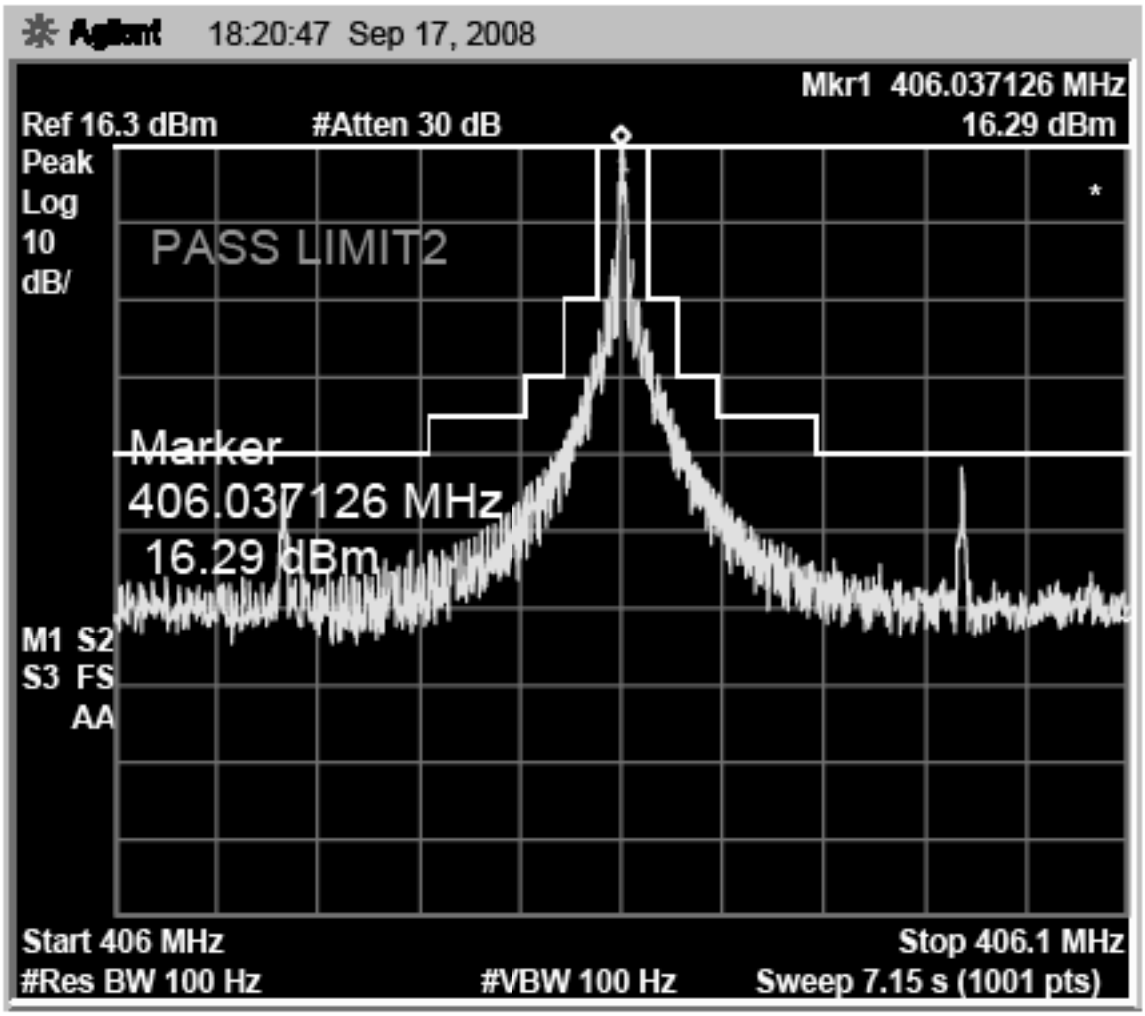
406 MHz Combined Test



Product Service

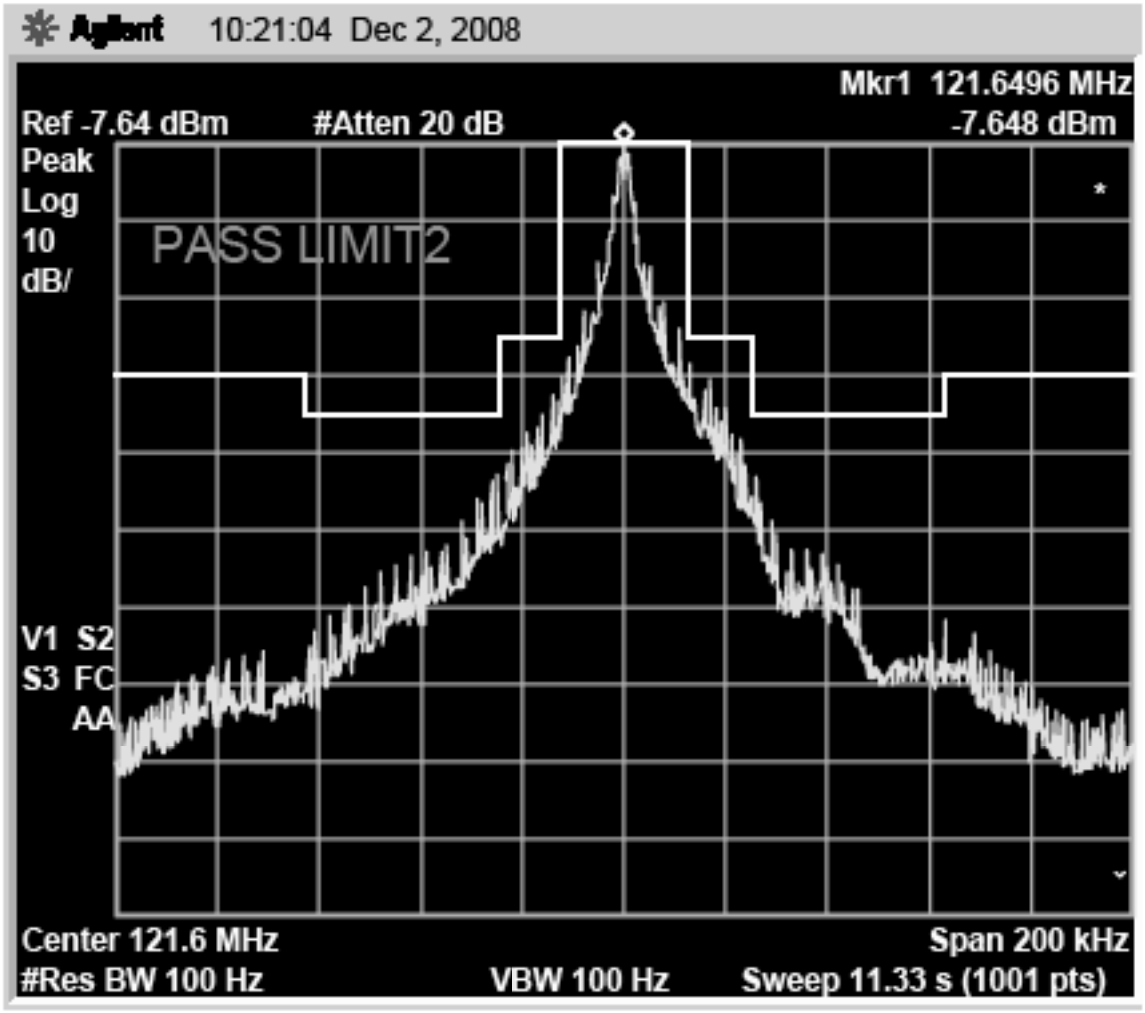
2.13.7 Test Results (Close In Emissions)

406 MHz Combined Plot over Ambient Temperature, +55°C and -20°C



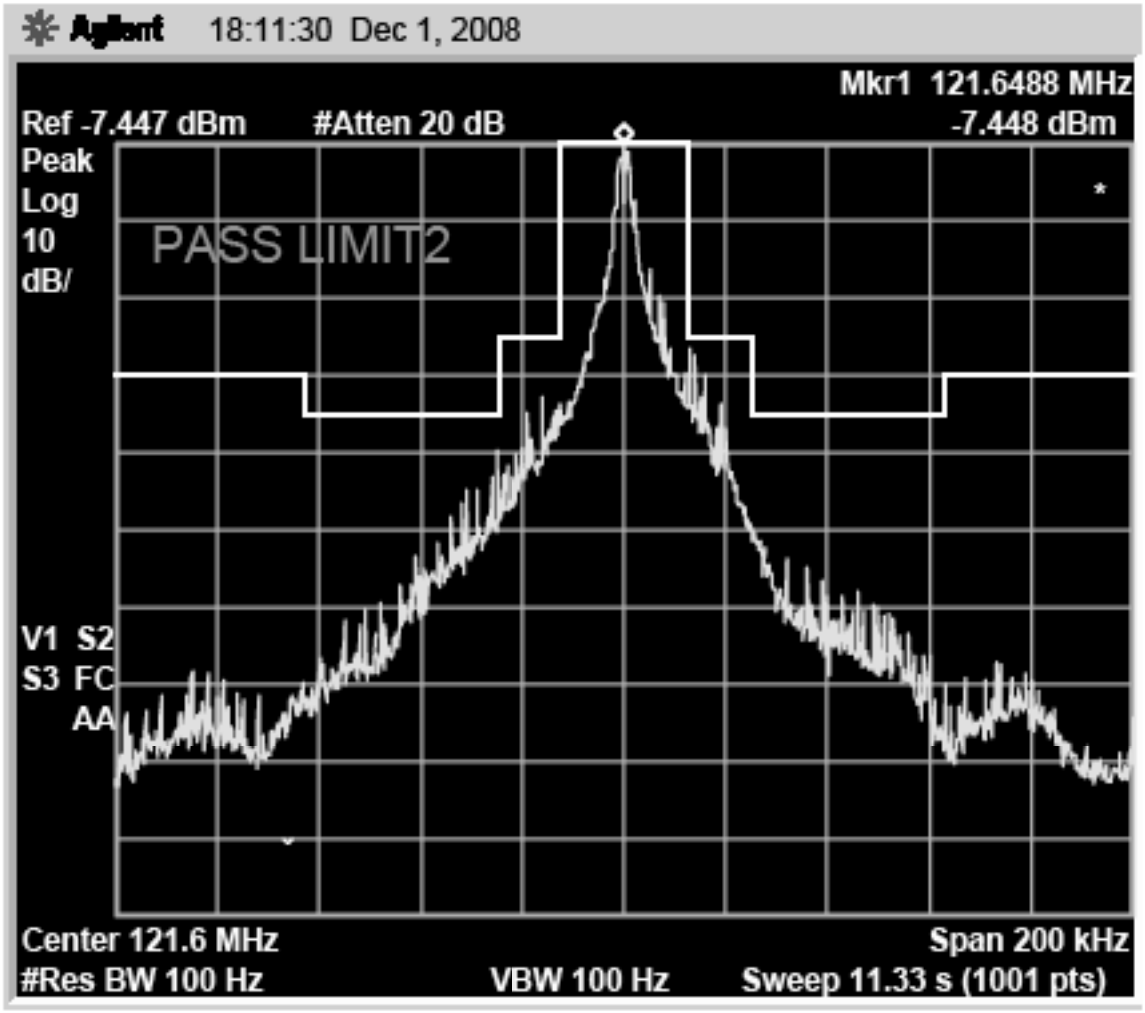
Product Service

121 MHz Plot at Ambient Temperature



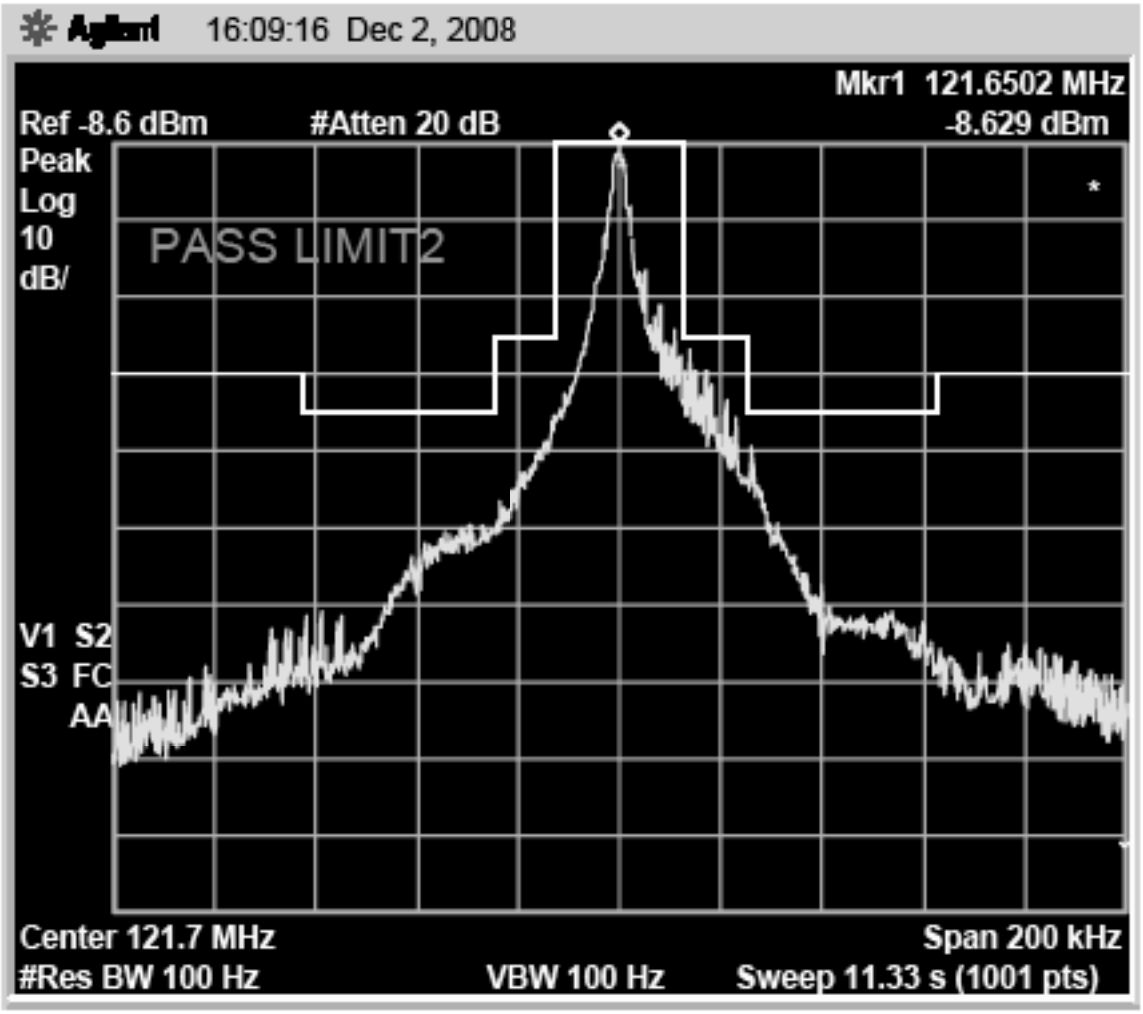
Product Service

121 MHz Plot at MaximumTemperature (+55ºC)



Product Service

121 MHz Plot at MinimumTemperature (-20ºC)



Product Service

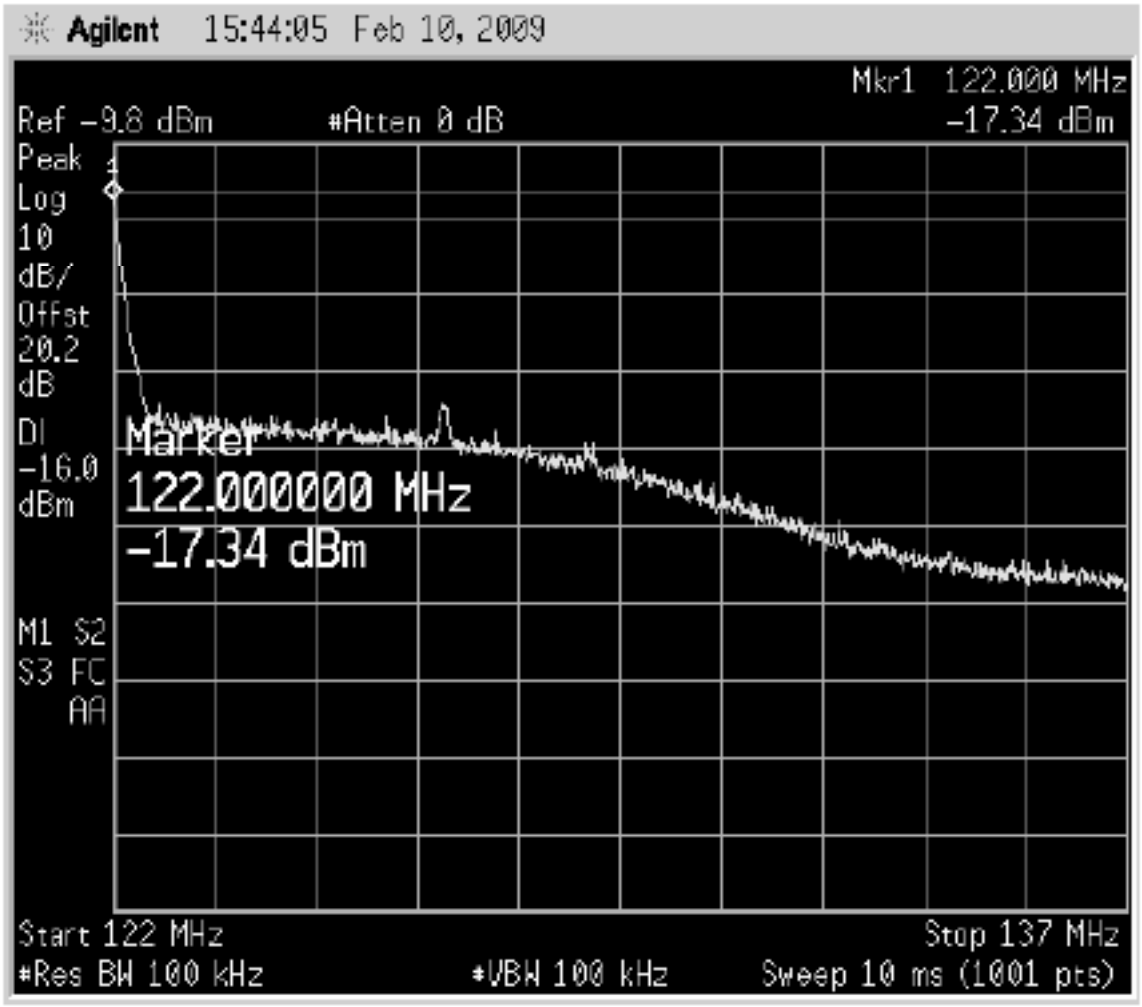
2.13.8 Test Results (Close In Emissions)

108 MHz to 121 MHz, 122 MHz to 137 MHz, 156 MHz to 162 MHz and 1525 MHz to 1610 MHz bands were checked, as per Specification Reference above, only the worst case is reported herein.

The EUT was equipped with two 50Ω outputs in the 50Ω-conducted configuration, one for the 121 MHz transmitter and one for the 406 MHz transmitter. Spurious Emissions were measured at each port.

Note: Limit of 25 µW converted to -16.0 dBm for the purposes of using the logarithmic scale on the test instrument. This limit was displayed on the plot as the green horizontal line.

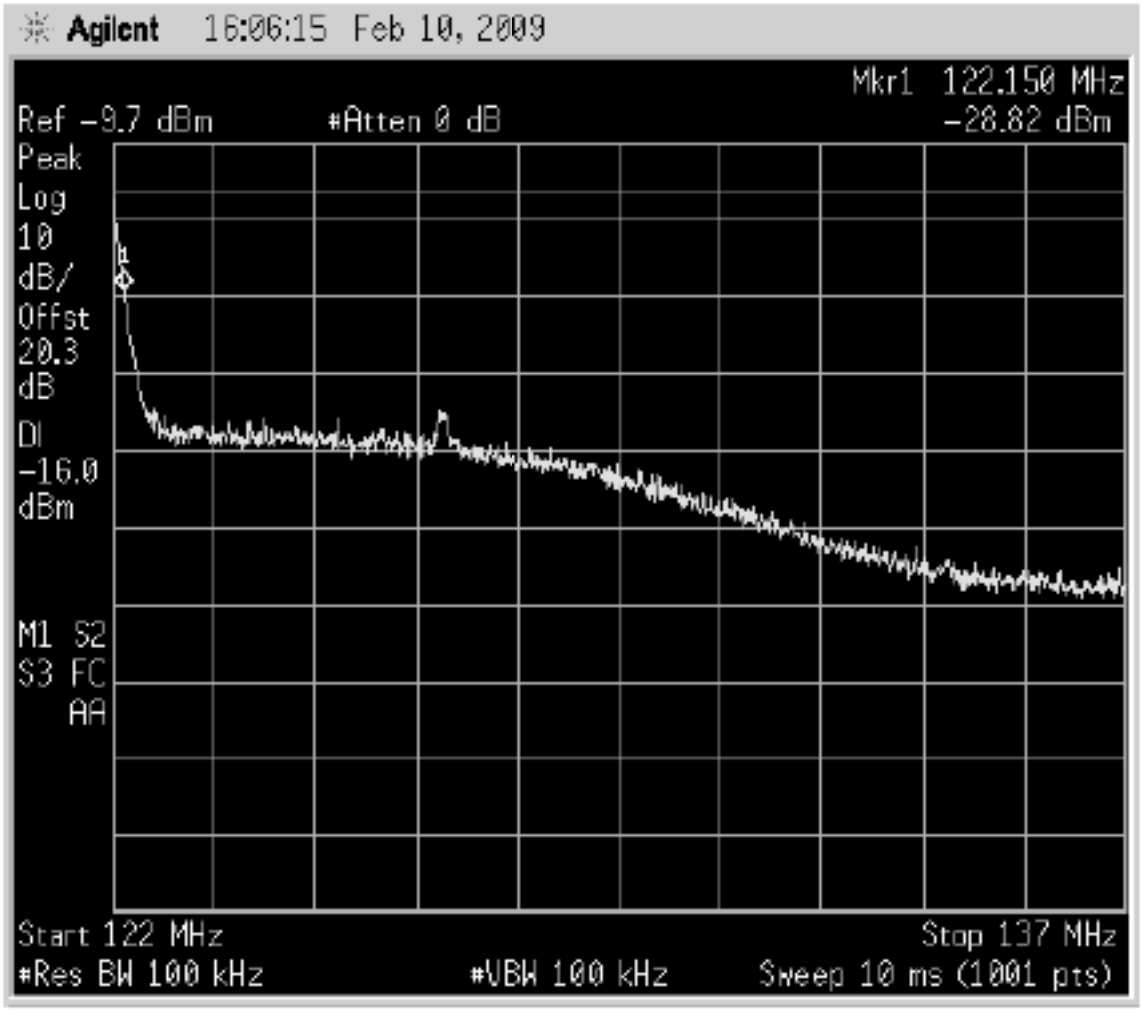
Worst Case at 121 MHz Output Port (122 MHz to 137 MHz)



Note: as the test result is close to the limit (and the source of the emission could be the 121 MHz transmitter itself) the marker was moved to 122.15 MHz (122 MHz + 0.15 MHz) to check the emission level at that point. This was because the transmitter was offset to 121.65 (an offset of +0.15 MHz) to avoid causing a false alert. The result can be seen on the plot below.

Product Service

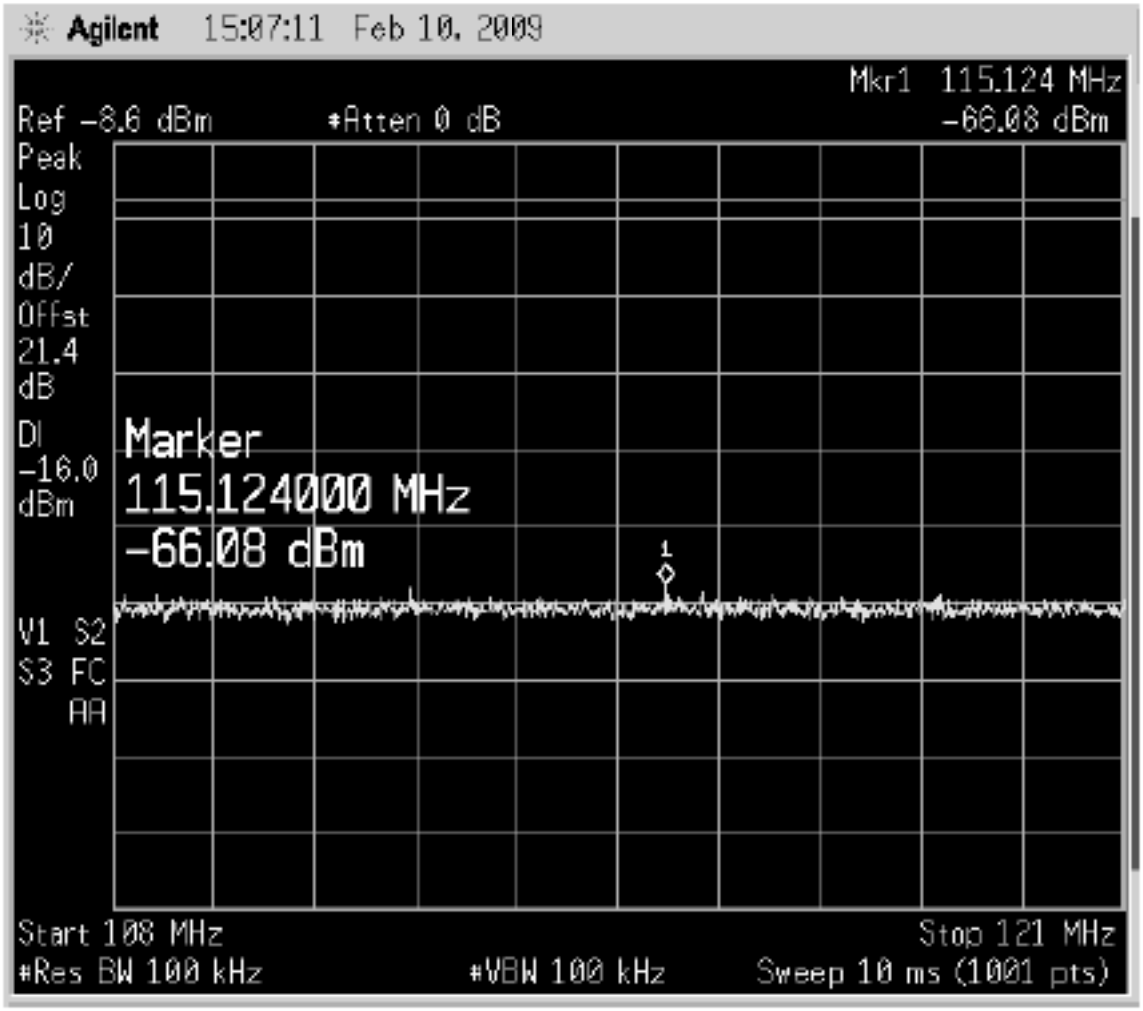
Worst Case at 121 MHz Output Port (122 MHz to 137 MHz) Adjusted for Transmitter Offset



Note: Pass margin is greatly increased.

Product Service

Worst Case at 406 MHz Output Port (108 MHz to 121 MHz)



Product Service

2.14 OPERATIONAL LIFE TEST

2.14.1 Specification Reference

RTCM 11010.2:2008, Clause A.13.1

2.14.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.14.3 Date of Test and Modification State

01 to 03 October - Modification State 0

2.14.4 Test Equipment Used

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

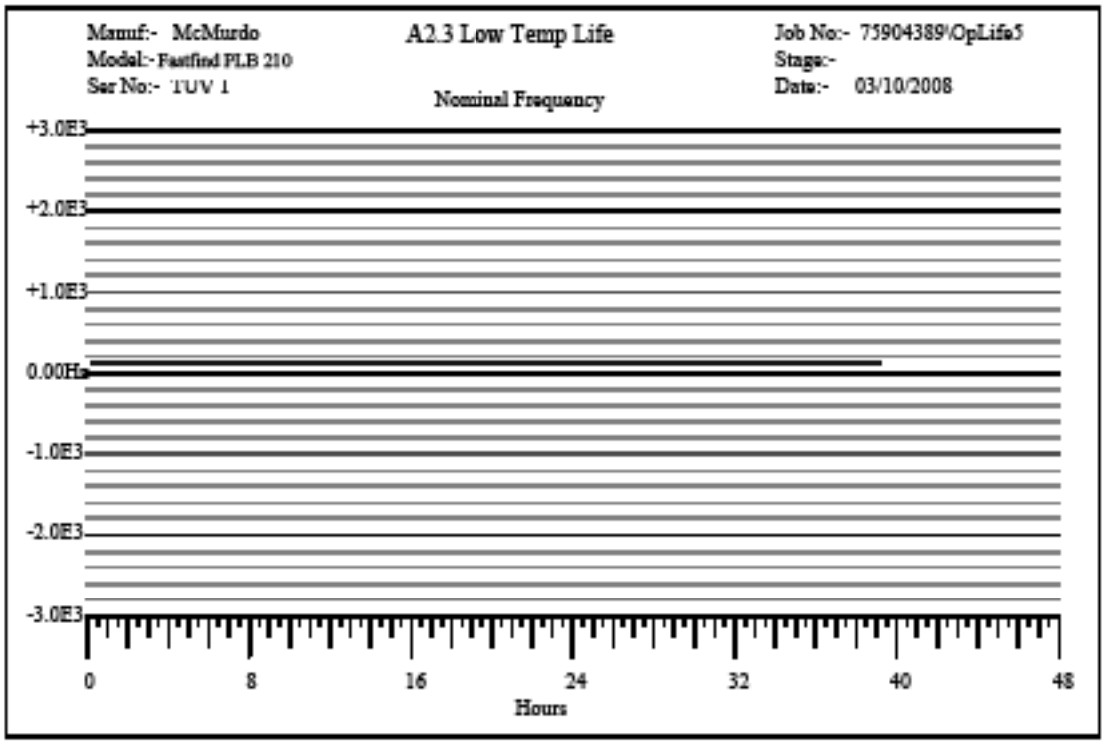
2.14.5 Operating Modes

The test was performed with the EUT in the following mode(s): Normal

Product Service

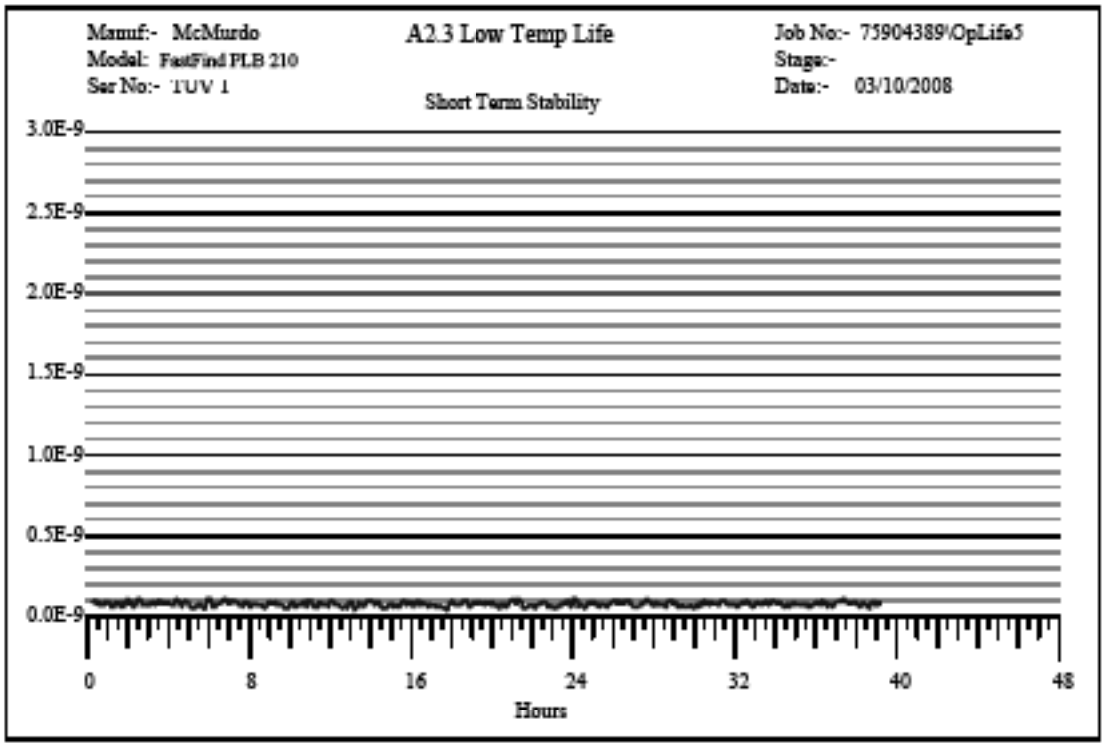
2.14.6 Test Results

Nominal Frequency



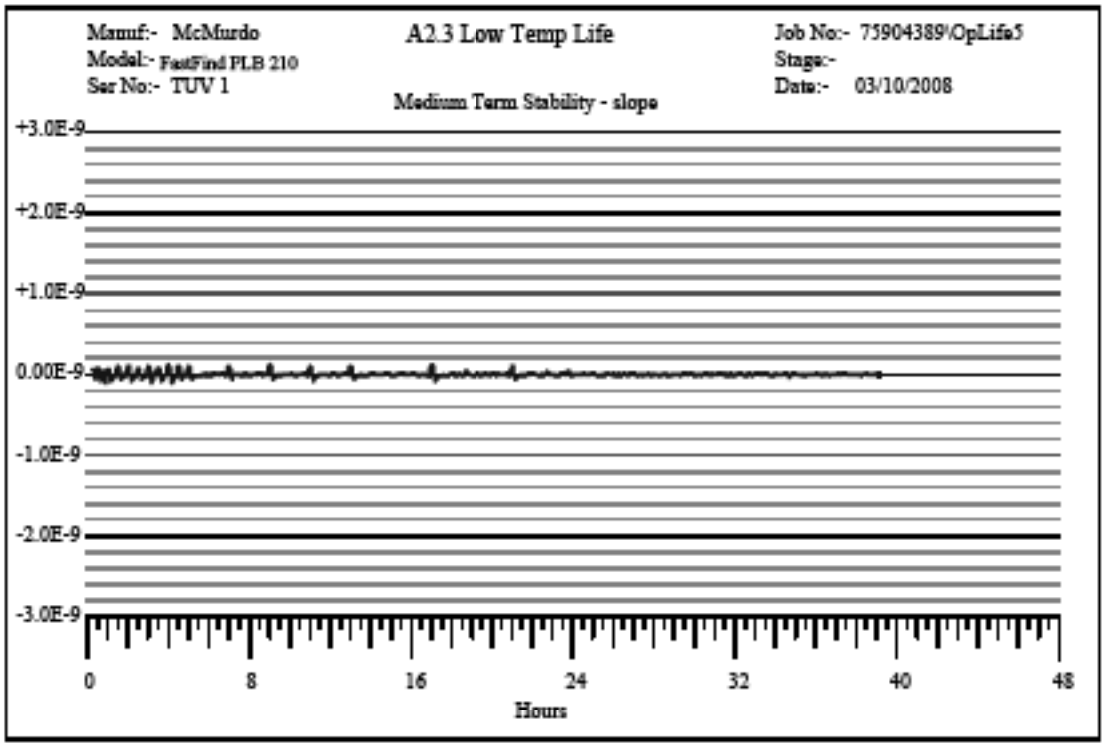
Product Service

Short Term Stability



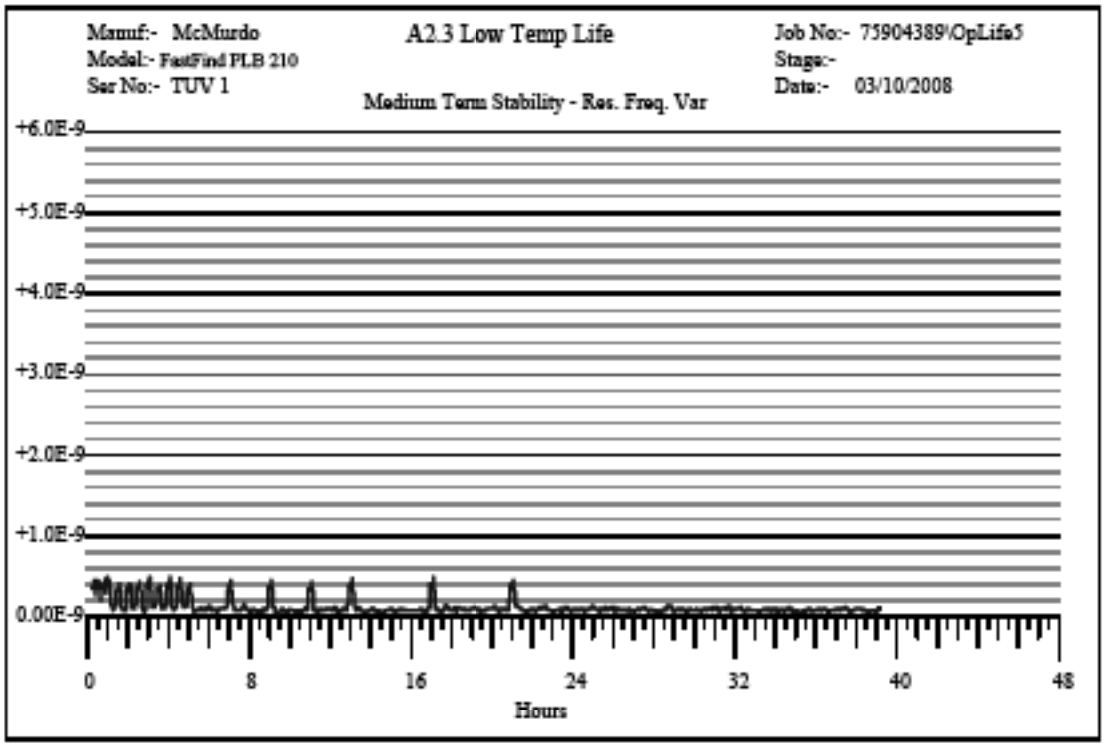
Product Service

Medium Term Stability, Mean Slope



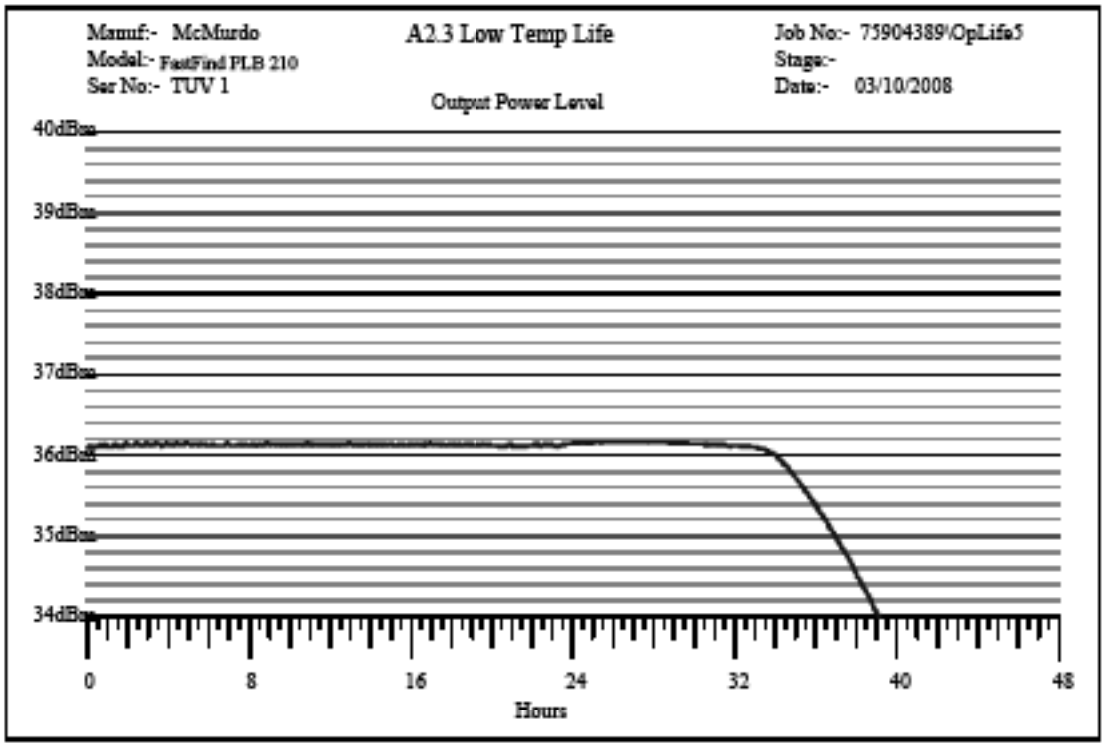
Product Service

Medium Term Stability, Residual Frequency Variation



Product Service

Output Power



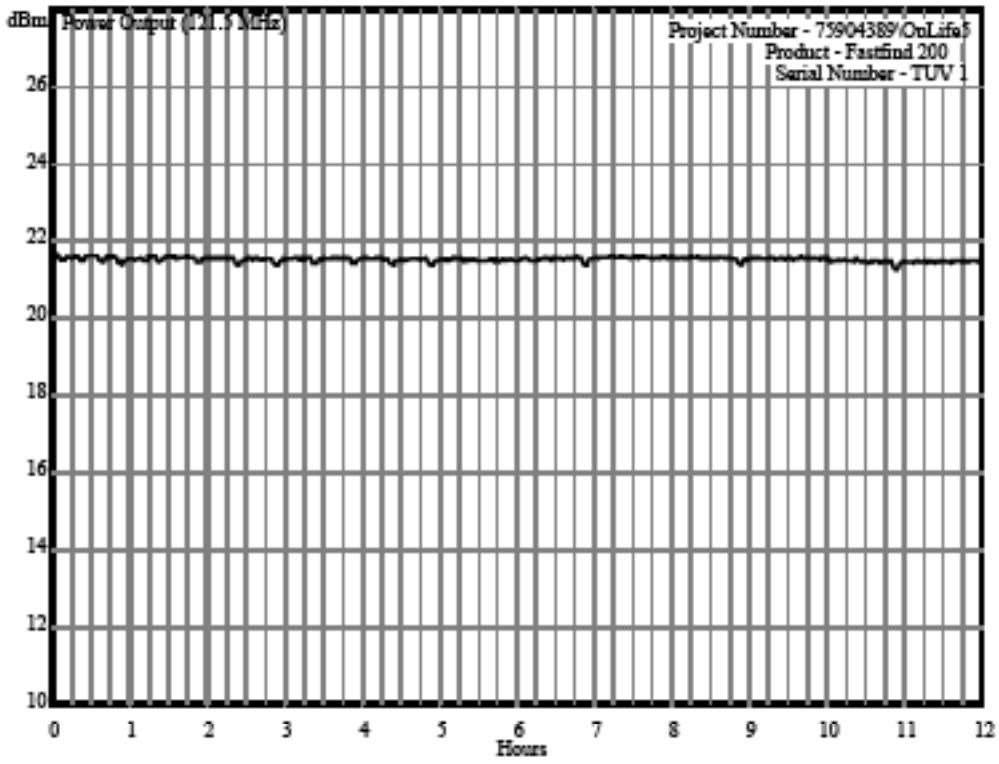
Product Service

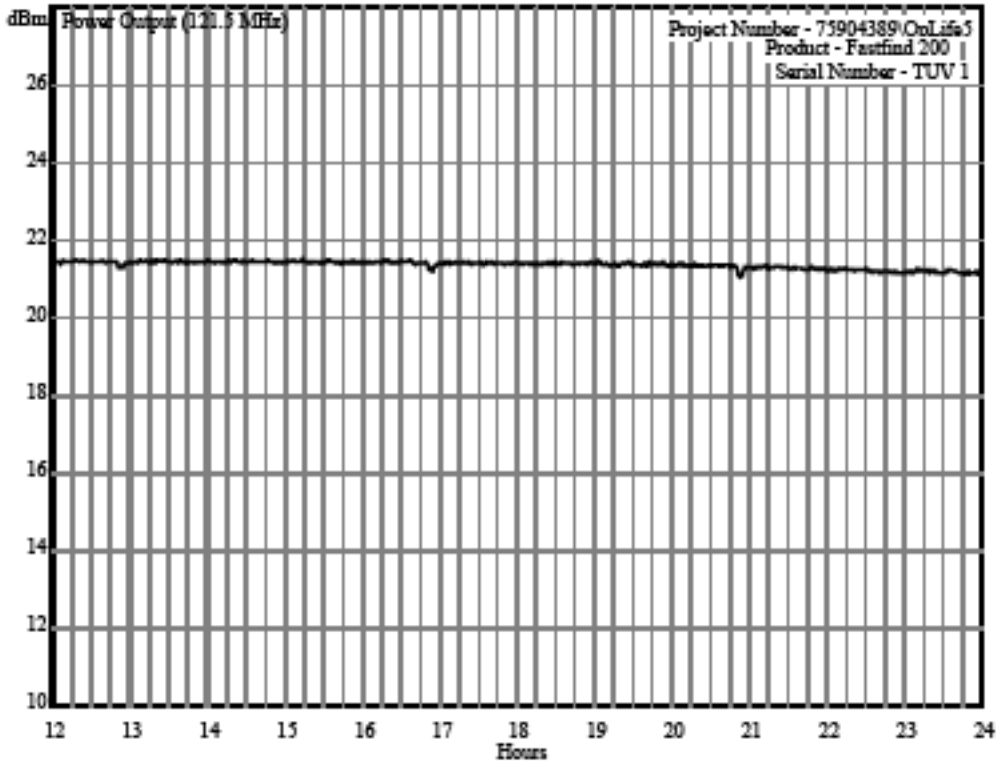
Digital Message

```
Message Content
     Expected Message       FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
     Actual Message         FFFE2F8C9EF9C0637FDFF83D15B783E0F66C
     Message Error Count    00


Beacon Id Format......... 30 Hex Id, Long Message, Bits 25-144
 15 Hex (Bits 26- 85) = 193DF380C6FFBFF              193DF380C6FFBFF Default_Id
 30 Hex (Bits 25-144) = 8C9EF9C0637FDFF83D15B783E0F66C

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0001 1001 0011 1101 1111 0011 1000 0000 1100 0110 1111 1111 1011 1111 1111
   0000 0111 1010 0010 1011 0110 1111 0000 0111 1100 0001 1110 1100 1101 100
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name         Bit Pos    Value Decode                                  Bits
----------         -------    ----- ------                                  ----
Format Flag         25            1 Long Message                               1
Protocol Flag       26            0 Location NEW                               0
MID                 27- 36      201 ALBANIA                        0011 0010 01
Protocol Code       37- 40       14 Test Serial (Standard)                 1110
Spare               41- 64                          1111 1001 1100 0000 0110 0011
Coarse Position     65- 85          DEFAULT            0111 1111 1101 1111 1111 1
BCH Encoded         86-106          Errors=0           0000 0111 1010 0010 1011 0
BCH Generated       86-106                             0000 0111 1010 0010 1011 0
Long Message       107-144          Data Present
Fixed Bits         107-109                                                   110
Fixed Bit          110              1                                          1
Encode Pos Device  111              1 Internal                                 1
121.5 Homing       112              1 YES                                      1
Position Change    113-132          DEFAULT              1000 0011 1110 0000 1111
Resultant Position                 --> Not Defined
BCH Encoded        133-144          Errors=0                      0110 0110 1100
BCH Generated      133-144                                        0110 0110 1100
```

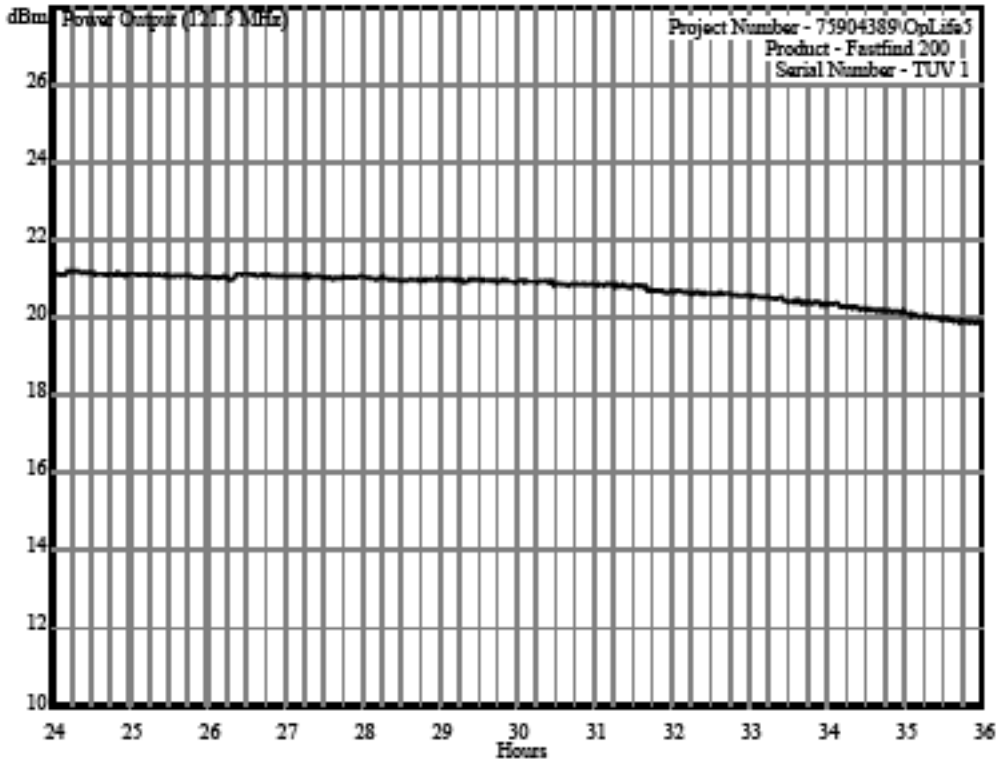
Product Service

121 MHz Peak Envelope Power Results





Product Service



Product Service

Battery Current and Measurement Results

Battery Discharge Current

The discharge current for the batteries was measured for each of the following beacon states.

Beacon in the Off or Standby State, "Standby Current"
Beacon performing a Self-test, "Self-test Current"
Beacon activated and transmitting, "Operating Current"

The individual tests were conducted for the following durations:

Standby Current	:	20 minutes	(1199920 ms)
Self-test Current	:	11.59 seconds	(11588 ms)
GPS Test Current	:	5.124 minutes	(307443 ms)
Operating Current	:	4.997 minutes	(299840 ms)

Assumptions / Supplied Data

Battery Replacement Interval	: 6 years
Battery Capacity	: 1.55 Ah
Battery Self Drain	: 1.00 % per year
Self-test Interval	: 12 tests per year plus 10 per life of the beacon (GPS Tests)
GPS Tests	: 10 tests per life of beacon (limited)

Test Results

Mode Current	=	Accumulated Charge	/	Time		
Standby Current	=	65295829.74 pC	/	1199920 ms	=	54.42 nA
Self-test Current	=	413152 uC	/	11588 ms	=	35.65 mA
GPS Test Current	=	9867346 uC	/	307443 ms	=	32.09 mA
Operating Current	=	9040723.02 uC	/	299840 ms	=	30.15 mA

Product Service

Battery Preconditioning / Discharge Time Calculations

Battery Self Drain = Capacity - [(100% - Self Drain/Year%)$^{\text{Replacement Interval}}$ x Capacity]
= 1.55- ((1- 0.0100)^{6} x 1.55) = 0.0907 Ah

Standby Drain = Hours per year x Battery Replacement Interval x Standby Current
= 365 x 24 x 6 x 54.42 x 10^{-9} = 0.0029 Ah
Worst Case = 1.65 x 0.0029 Ah = 0.0047 Ah

Self-test Drain = Self-tests per battery x Self-test Current x Self-test duration (in hours)
= ((12 x 6) + 10) x 35.65 x 10^{-3} x (12 / 3600) = 0.0094 Ah
Worst Case = 1.65 x 0.0094 Ah = 0.0155 Ah

GPS Test Drain = Self-tests per beacon x Self-test Current x Self-test duration (in hours) + X *
= 10 x 32.09 x 10^{-3} x (5.12 / 60) + 0.00058 = 0.0280 Ah
Worst Case = 1.65 x 0.0280 Ah = 0.0462 Ah

* X = GPS Test contribution = GPS tests per beacon x Burst Current x Burst Duration (in hours)
= 10 x (0.4 x (0.52 / 3600) = 0.00058 Ah

Total Drain = Self Drain + Standby Drain (Worst Case) + Self-test Drain (Worst Case)
= 0.0907 + 0.0047 + 0.0155 + 0.0462 = 0.1571 Ah

Battery Preconditioning / Discharge Time = Worst Case drain / Operational Current
= 0.1571 / (30.15 x 10^{-3})
= 5.21 hours

5.21 hours = 5 hours and 13 minutes. EUT Battery was discharged by operating the beacon into a 50Ω load (the same configuration in which the operating current was measured).

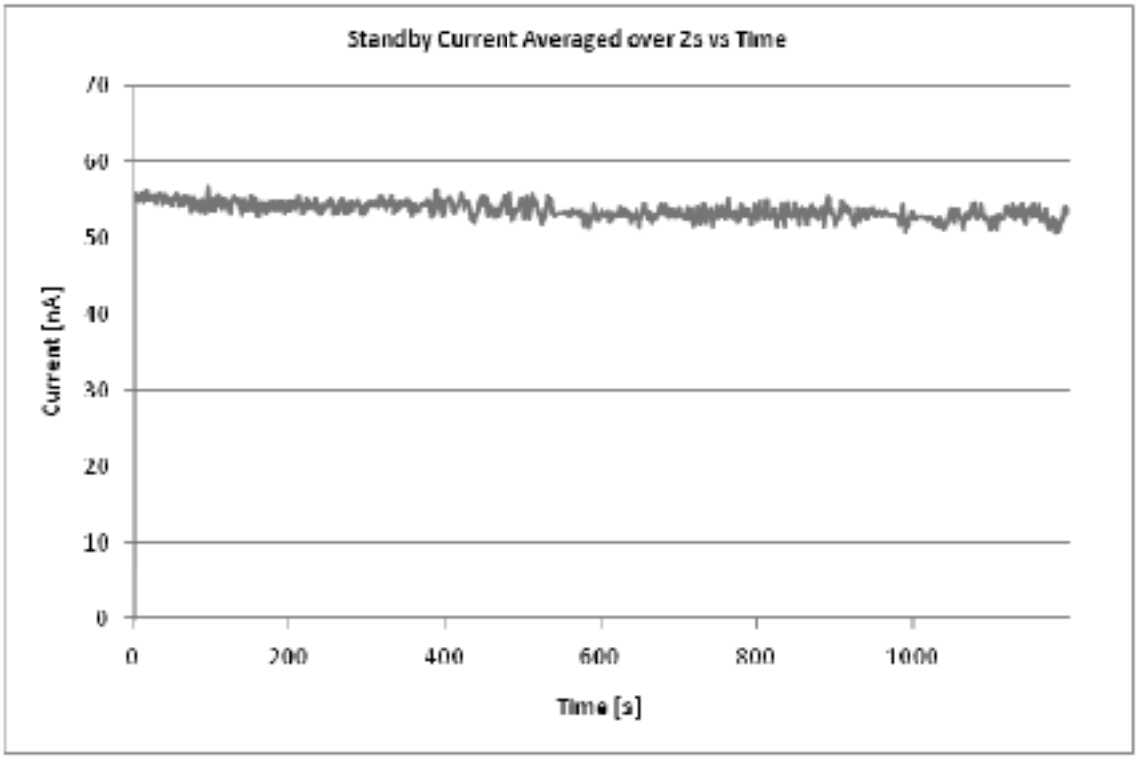
Note: Measurements were all conducted in the 50Ω-conducted configuration with the exception of the Self-test current. This was to enable accurate "real life" equivalent measurements as, in the conducted configuration; the EUT would not pass its Self-test routine and produce the three confirmation flashes of the White LED light.

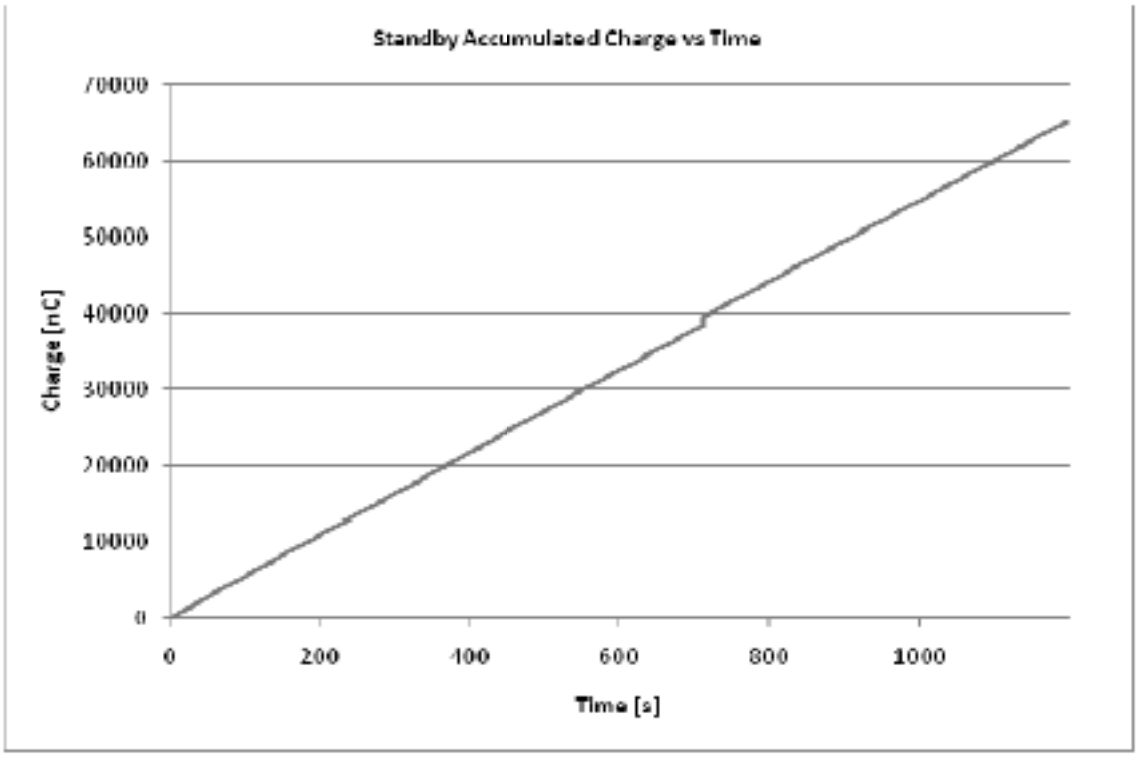
In this configuration the peak current is less than in the operating mode, this is apparently due to antenna mismatch as, with the antenna extended; the peak current was similar to that of the operating mode. Since the normal Self-test physical configuration would be with the 'safely cap' on, the measurements shown and used in the calculations are that with the antenna folded in that position.

10 off 406 bursts were added to the GNSS self test. Since the normal Self-test physical configuration would be with the 'safely cap' on, the measurements shown and used in the calculations are that with the antenna folded in that position.

Product Service

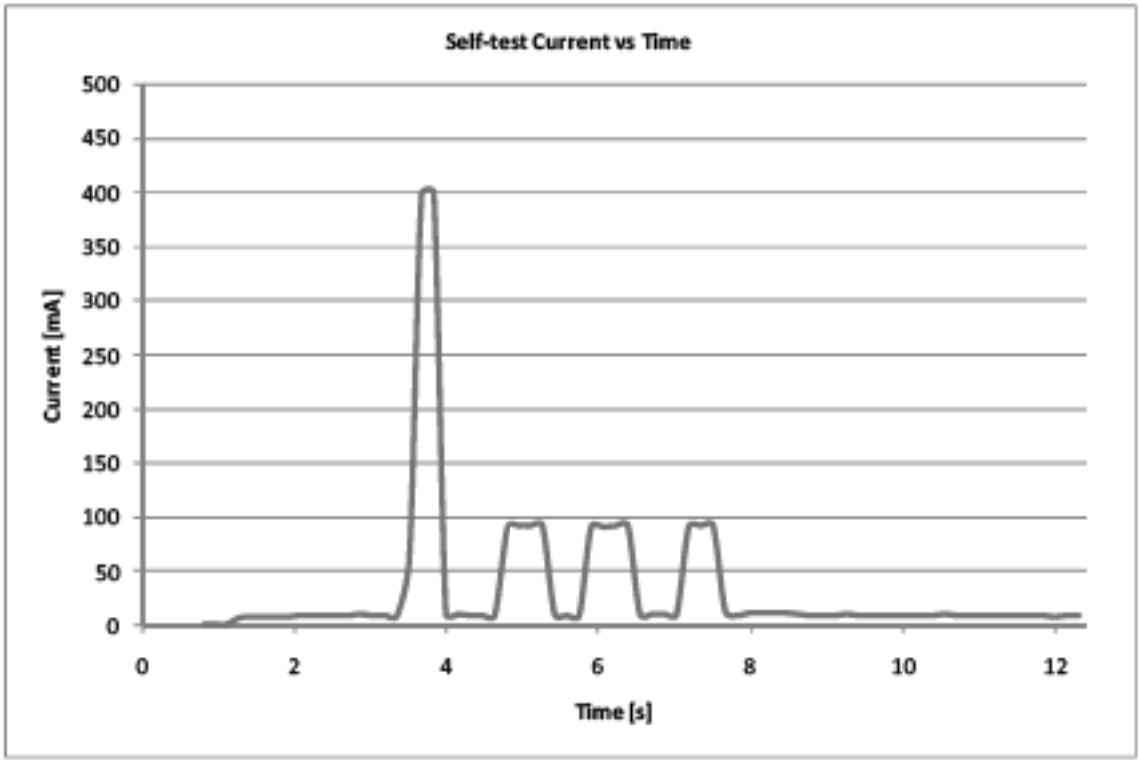
Battery Current and Measurement Results – Standby Mode

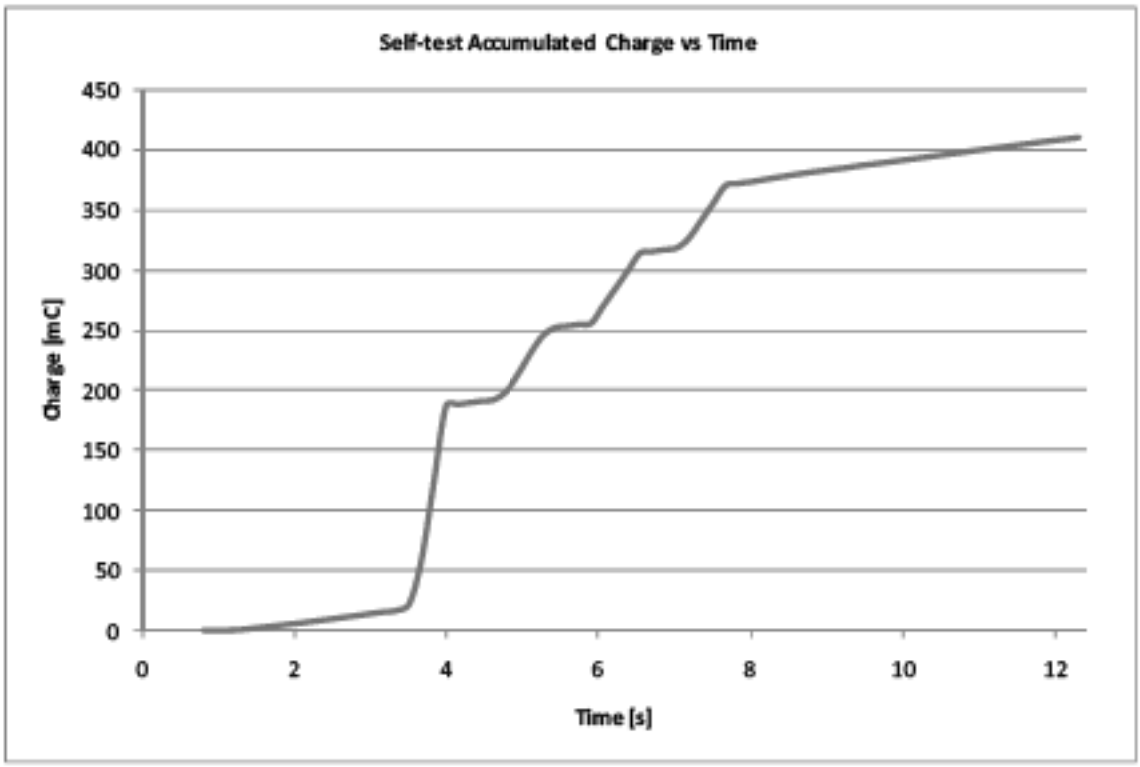




Product Service

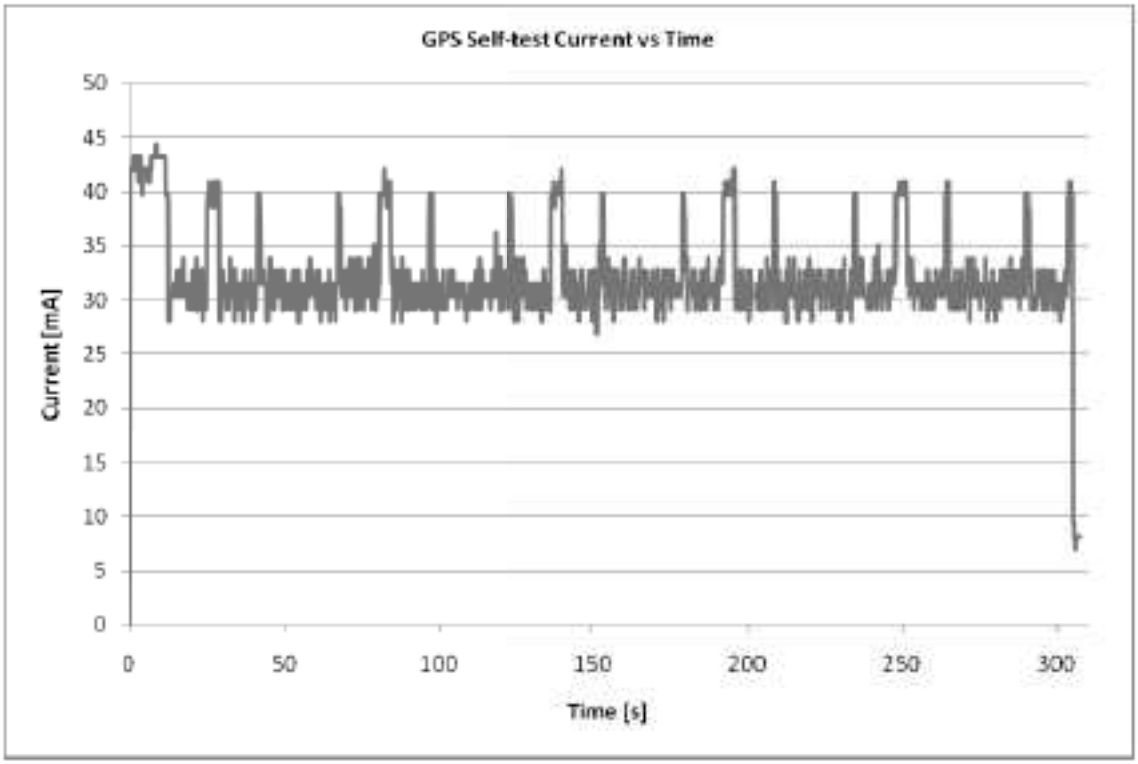
Battery Current and Measurement Results – Self-Test Mode

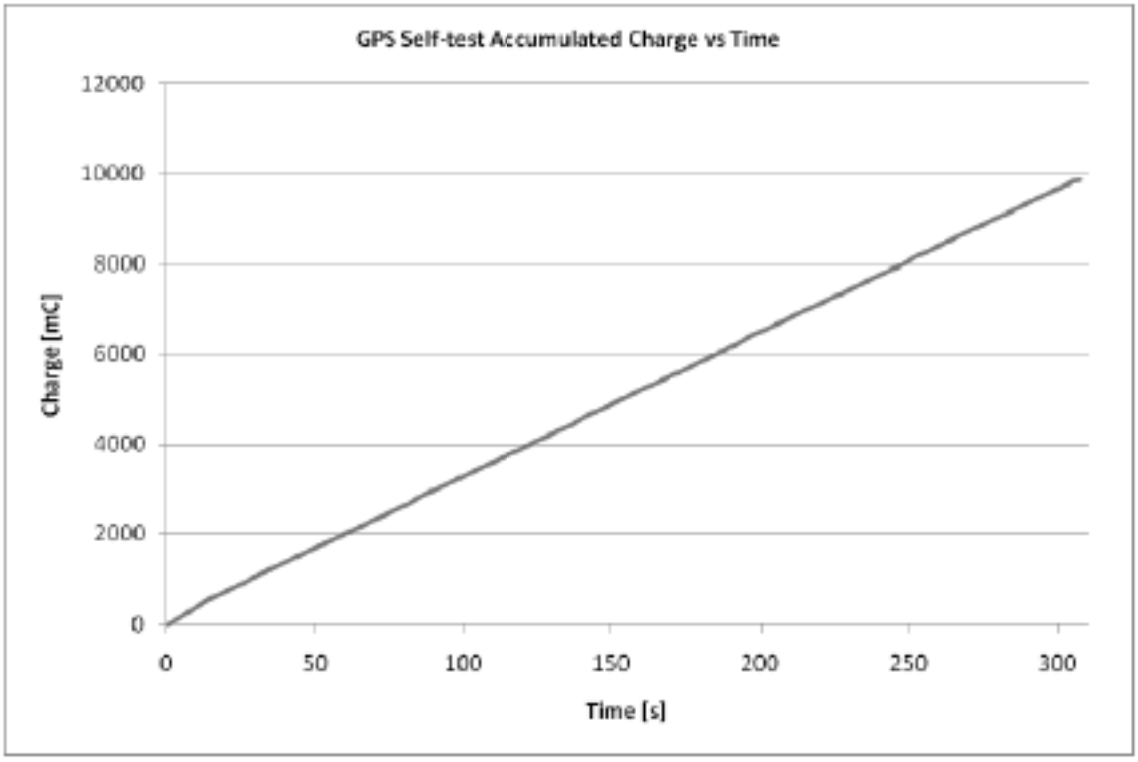




Product Service

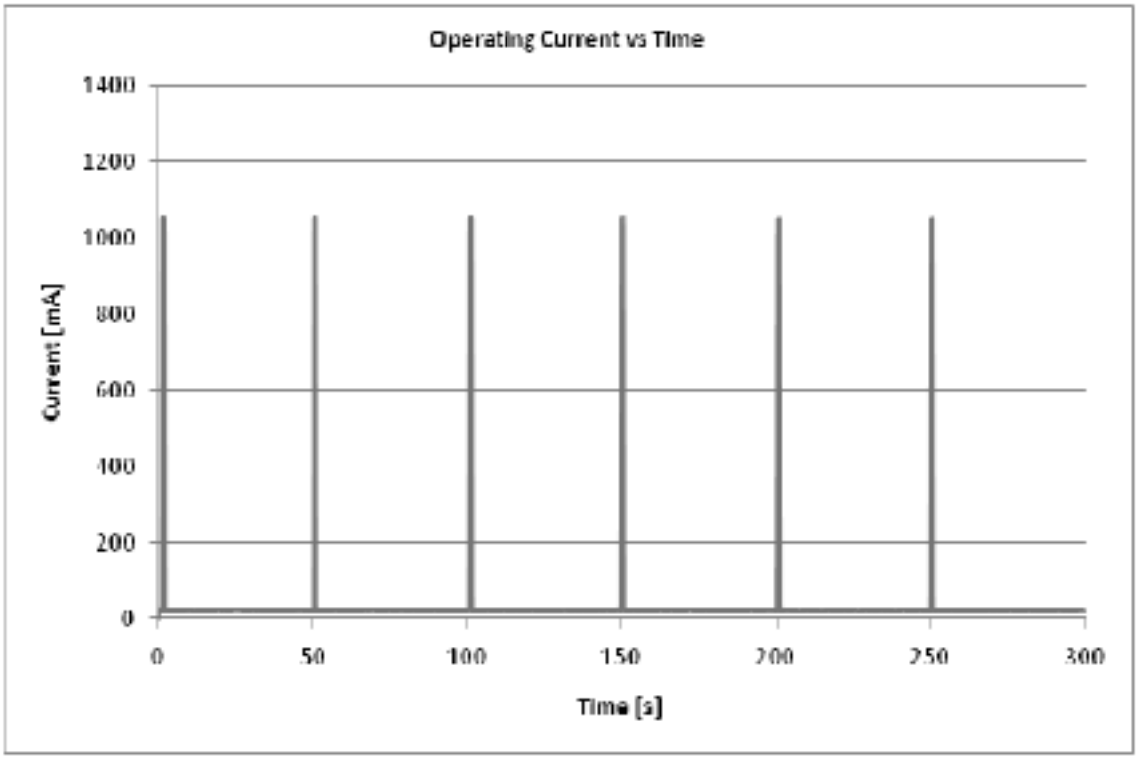
Battery Current and Measurement Results – GPS Test Mode

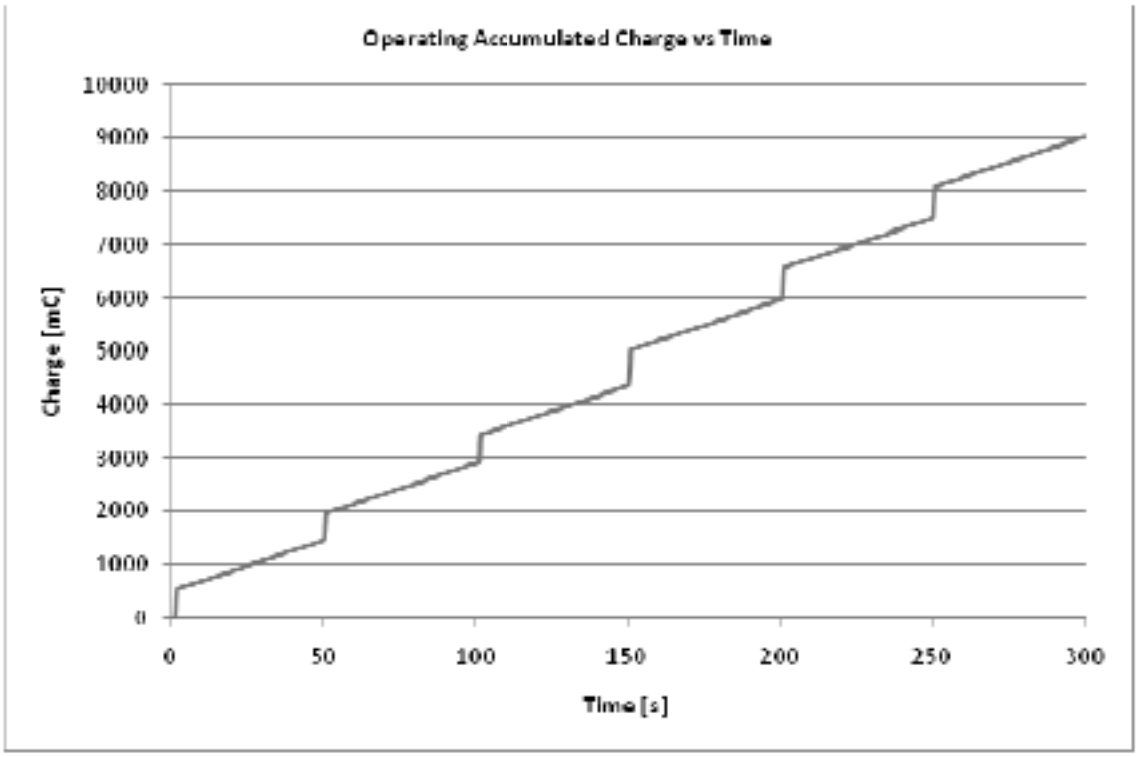




Product Service

Battery Current and Measurement Results – Operational Mode





Product Service

2.15 SELF TEST

2.15.1 Specification Reference

RTCM 11010.2:2008, Clause A.13.2

2.15.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (50Ω Conducted)

2.15.3 Date of Test and Modification State

24, 27 and 29 October 2008 – Modification State 0

2.15.4 Test Equipment Used

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

2.15.5 Operating Modes

The test was performed with the EUT in the following mode(s): Self-test

2.15.6 Environmental Conditions.

	24 October 2008
Ambient Temperature	19.7°C
Atmospheric Pressure	1018mbar

2.15.7 Test Results

Summary of Self-test Results

Parameter	Limit/Units	Test Results		
		(-20°C)	(22.4°C)	(+55°C)
Self-test Indication	Pass/Fail	Pass		
Post-self-test deactivation	Pass/Fail	Pass		
Pulse duration	Ms	442.7932	442.8769	441.3585
Frame sync pattern	011010000	Pass		
Number of bursts	(number)	1	1	1
15 Hex ID	Pass/Fail	Pass		
Self-test 121 MHz burst duration	<1 second	Pass		

Product Service

Digital Message

```
Hex Code:          FFFED08C9EF9C0637FDFF83D15B7


Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112
 15 Hex (Bits 26- 85) = 193DF380C6FFBFF              193DF380C6FFBFF Default_Id
 30 Hex (Bits 25-144) = 8C9EF9C0637FDFF83D15B700000000

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0001 1001 0011 1101 1111 0011 1000 0000 1100 0110 1111 1111 1011 1111 1111
   0000 0111 1010 0010 1011 0110 1110 0000 0000 0000 0000 0000 0000 0000 000
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name         Bit Pos    Value Decode                                  Bits
----------         -------    ----- ------                                  ----
Format Flag         25            1 Long Message: bcn entered Short Non-Spec    1
Protocol Flag       26            0 Location NEW                                0
MID                 27- 36      201 ALBANIA                          0011 0010 01
Protocol Code       37- 40       14 Test Serial (Standard)                   1110
Spare               41- 64                          1111 1001 1100 0000 0110 0011
Coarse Position     65- 85          DEFAULT            0111 1111 1101 1111 1111 1
BCH Encoded         86-106          Errors=0           0000 0111 1010 0010 1011 0
BCH Generated       86-106                             0000 0111 1010 0010 1011 0
Fixed Bits         107-109                                                   110
Fixed Bit          110             1                                           1
Encode Pos Device  111             1 Internal                                  1
121.5 Homing       112             1 YES                                       1
Resultant Position                --> Not Defined
```

Note 1: Short message produced despite Long Message Format Flag is allowed by the standard; however the software used to decode the message does not take the self-test frame sync into account and hence produces an error message.

Note 2: The digital message for Self-test was identical at all three test temperatures.

Product Service

GNSS Self-test Mode (Digital Message Decode)

```
36 Hex Code:                FFFED08C9F0018CCD701C85E1A37920C0AB2


Beacon Id Format......... 30 Hex Id, Long Message, Bits 25-144
 15 Hex (Bits 26- 85) = 193E003199AE039              193E0031BF81FE0 Default_Id
 30 Hex (Bits 25-144) = 8C9F0018CCD701C85E1A37920C0AB2

   26   30   34   38   42   46   50   54   58   62   66   70   74   78   82
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
 1 0001 1001 0011 1110 0000 0000 0011 0001 1001 1001 1010 1110 0000 0011 1001
   0000 1011 1100 0011 0100 0110 1111 0010 0100 0001 1000 0001 0101 0110 010
   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
   86   90   94   98  102  106  110  114  118  122  126  130  134  138  142

Field Name         Bit Pos    Value Decode                                  Bits
----------         -------    ----- ------                                  ----
Format Flag         25            1 Long Message                               1
Protocol Flag       26            0 Location NEW                               0
MID                 27- 36      201 ALBANIA                        0011 0010 01
Protocol Code       37- 40       15 Test (National)                        1111
Serial Number       41- 58       99                          0000 0000 0001 1000 11
Medium Position     59- 85          Data Present
Latitude Flag       59            0 North:                                     0
Latitude Degrees    60- 66       51  51 deg                           0110 011
Lat. Minutes /2     67- 71       11  22 min                             0101 1
Longitude Flag      72            1 West:                                      1
Long. Degrees       73- 80        1   1 deg                          0000 0001
Long. Minutes /2    81- 85       25  50 min                               1100 1
BCH Encoded         86-106          Errors=0           0000 1011 1100 0011 0100 0
BCH Generated       86-106                             0000 1011 1100 0011 0100 0
Long Message       107-144          Data Present
Fixed Bits         107-109                                                  110
More Data Flag     110            1 Position Data in bits 113-132              1
Encode Pos Device  111            1 Internal                                   1
121.5 Homing       112            1 YES                                        1
Position Change    113-126        Data Present
Lat. Change Sign   113            1 Plus:                                      1
Lat. Chg. Minutes  114-115        0  0 min                                    00
Lat. Chg. Secs /4  116-119        9 36 sec                                  1001
Long Change Sign   120            0 Minus:                                     0
Long Chg. Minutes  121-122        0  0 min                                    00
Long Chg. Secs /4  123-126        3 12 sec                                  0011
Resultant Position              -->  51.37667 LAT,   -1.83000 LONG
                   51 deg 22 min 36 sec N,    1 deg 49 min 48 sec W
National Use       127-132        0 Default                          0000 00
BCH Encoded        133-144          Errors=0                   1010 1011 0010
BCH Generated      133-144                                     1010 1011 0010
```

Note: The digital message for GNSS Self-test was identical at all three test temperatures.

GNSS Self-test Mode (Position Error)

Position	Latitude	Longitude
Input ⊙	N 51° 22' 35"	W 001° 49' 50"
Output (as decoded message above)	N 51° 22' 36"	W 001° 49' 48"
Error	49.5 m	

Positional accuracy was estimated using the Haversine Formula, Earth's radius taken as 6367km.

⊙ Input from GPS simulator.

Product Service

Maximum GNSS Self-test Duration

EUT was placed in the GNSS Self-test mode with no GPS signals applied, current draw from the battery was monitored and the "Power up" and "Power down" times noted.

The interval was 5 minutes and 4 seconds.

Maximum Number of GNSS Self-tests

The EUT operational counters were reset and GNSS Self-tests were conducted repeatedly until the EUT indicated that no more were possible. The number of tests was noted.

The maximum number of GNSS Self-tests allowed by the EUT was 10.

Product Service

2.16 COSPAS-SARSAT TYPE APPROVAL

2.16.1 Specification Reference

RTCM 11010.2:2008, Clause A.14

2.16.2 Test Results

EUT Tested in accordance with Cospas-Sarsat T.001 Issue 3 Revision 8 November 2007 and Cospas-Sarsat T.007 Issue 4 Revision 2 November 2007 and submitted to Cospas-Sarsat Secretariat for approval.

Copies of the Cospas-Sarsat Type Approval Certificates (TAC) can be found at Annex B.

This is intended to show compliance with the above Specification References.

Product Service

2.17 BUOYANCY TEST (CATEGORY 1 ONLY)

2.17.1 Specification Reference

RTCM 11010.2:2008, Clause A.15

2.17.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.17.3 Date of Test and Modification State

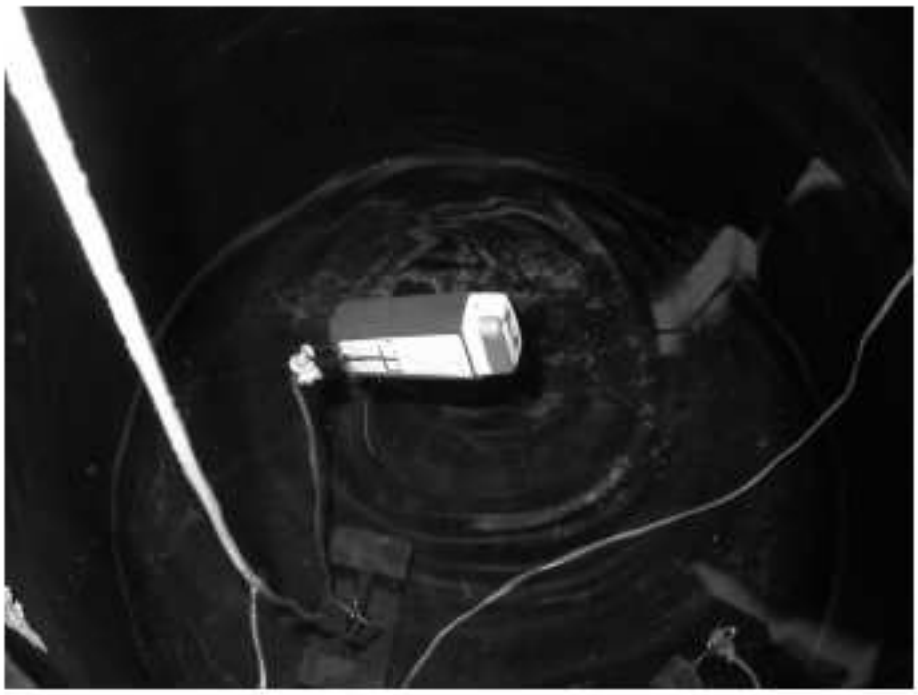
07 January 2009 - Modification State 1

2.17.4 Test Equipment Used

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

2.17.5 Test Set-up and Operating Modes

The test was performed with the EUT in the following mode(s): Idle



Test Set-up

Product Service

2.17.6 Environmental Conditions

Test Water Temperature:	12°C
Ambient Temperature	23.9 °C
Atmospheric Pressure	1021mbar

2.17.7 Test Results

A vessel was filled with domestic tap water. A large mass with a pulley attachment was submerged into the tank, the pulley converted an angled force supplied by the test engineer into a downwards force, completely submerging the EUT. The upwards vertical force (buoyant force) supplied to the EUT was measured with a force gauge. It was a positive force and hence the test was complete and the EUT complied. The buoyancy is calculated below for information.

EUT mass	=	0.155 kg	(measured)
EUT weight	=	1.521 N	(calculated by multiplying weight by g = 9.81)

Buoyant forces measured were 0.25, 0.33 and 0.28 N

Mean = 0.287 N

$$\text{Buoyancy} = \frac{\text{Buoyant Force}}{\text{Weight}} = \frac{0.287}{1.521}$$

Buoyancy = 0.1887

= 18.87 %

Note: EUT is not required to operate floating in water; hence the Floating Upright Test is not applicable.

Product Service

2.18 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (CARRIER FREQUENCY)

2.18.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.1

2.18.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.18.3 Date of Test and Modification State

Test at +55°C: 01 December 2008- Modification State 0
Test at Ambient: 02 December 2008- Modification State 0
Test at -20°C: 02 December 2008- Modification State 0

2.18.4 Test Equipment Used

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

2.18.5 Operating Modes

The test was performed with the EUT in the following mode(s): Operating

2.18.6 Test Results

Note: Though not required by the above Specification Reference, Ambient Temperature results are shown for information.

Parameter	Limit	Units	Test Results		
			T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)
Carrier Frequency	121.5 ± 0.006 *	MHz	121.650025962	121.649415064	121.648656731

* Offset to 121.65MHz so limit becomes 121.65 ± 0.006

Product Service

2.19 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (TRANSMITTER DUTY CYCLE)

2.19.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.2

2.19.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.19.3 Date of Test and Modification State

Test at Ambient:	02 December 2008	- Modification State 0
Test at +55°C:	02 December 2008	- Modification State 0
Test at -20°C:	02 December 2008	- Modification State 0

2.19.4 Test Equipment Used

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

2.19.5 Operating Modes

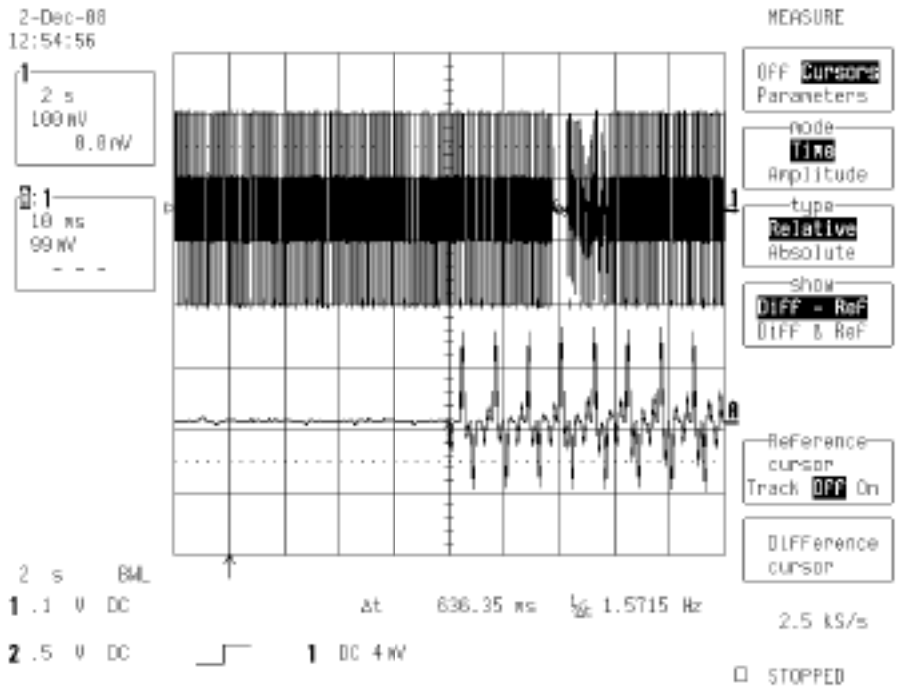
The test was performed with the EUT in the following mode(s): Operating

2.19.6 Test Results

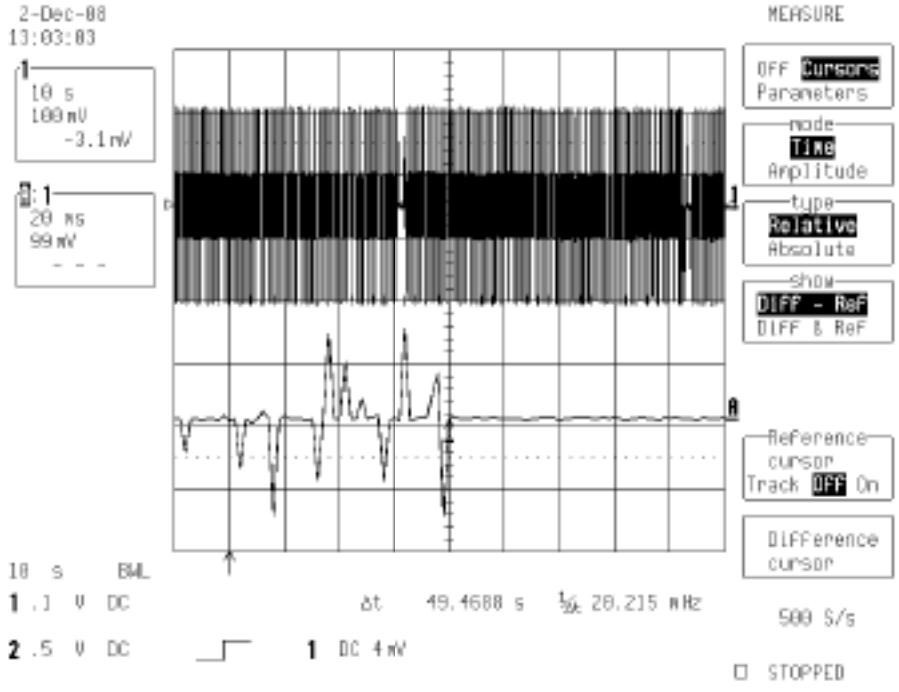
Note: Though not required by the above Specification Reference, Ambient Temperature results are shown for information.

Parameter	Units	Test Results		
		T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)
121.5 MHz transmission interruption interval	seconds	48.15	49.47	49.61
121.5 MHz transmission interruption duration	seconds	0.637	0.636	0.636
Transmitter Duty Cycle	%	98.6	98.7	98.7

Product Service

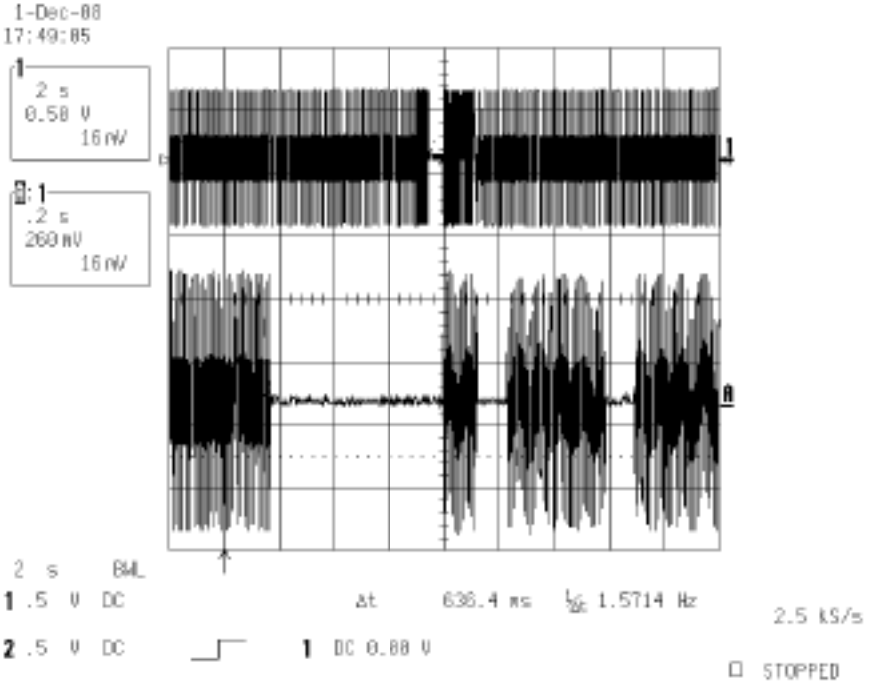


Plot showing 121.5MHz interruption duration (Ambient Temperature)

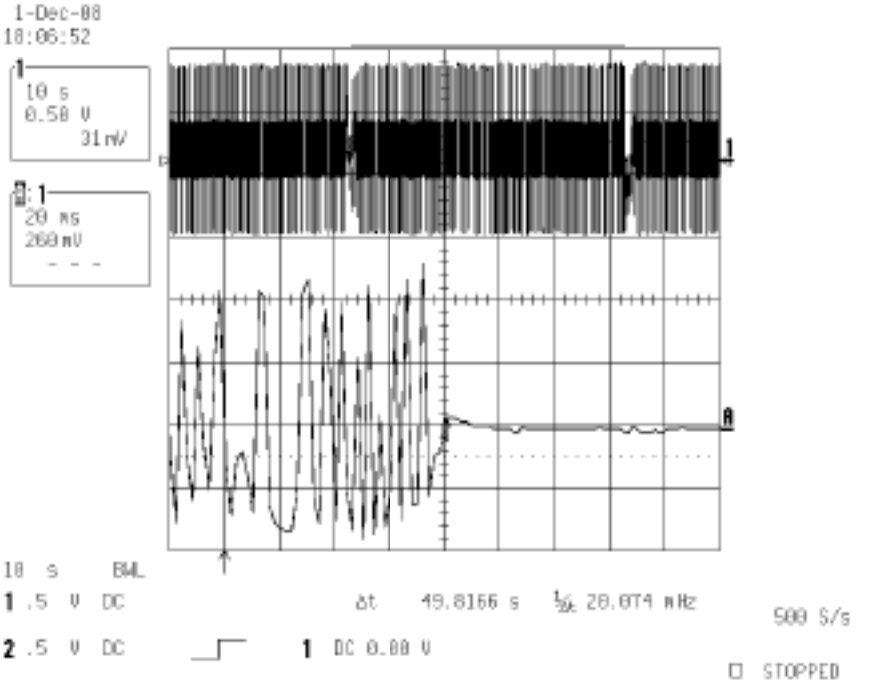


Plot showing 121.5MHz interruption interval (Ambient Temperature)

Product Service

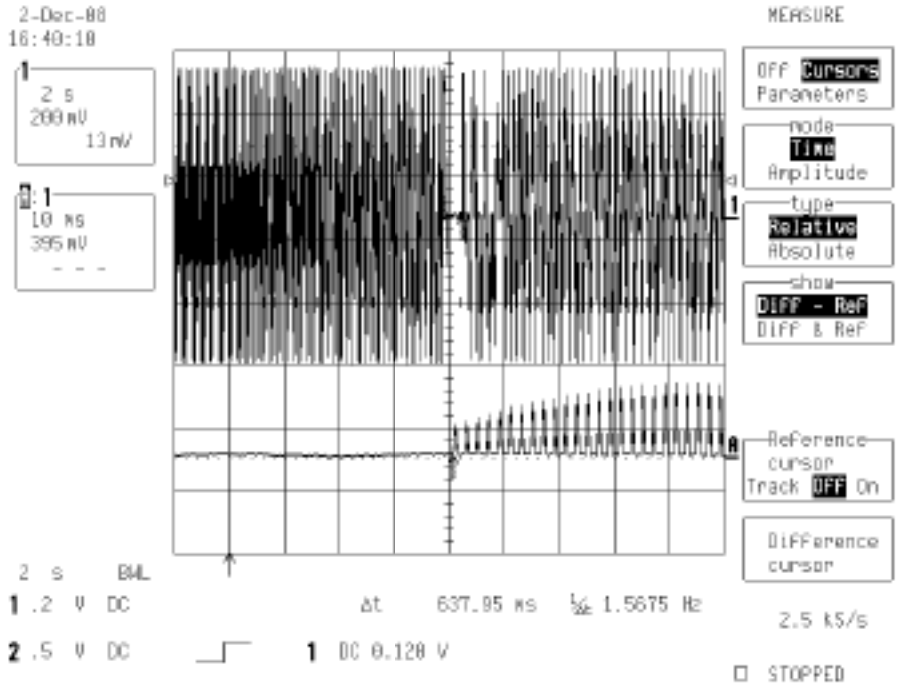


Plot showing 121.5MHz interruption duration (High Temperature, +55°C)

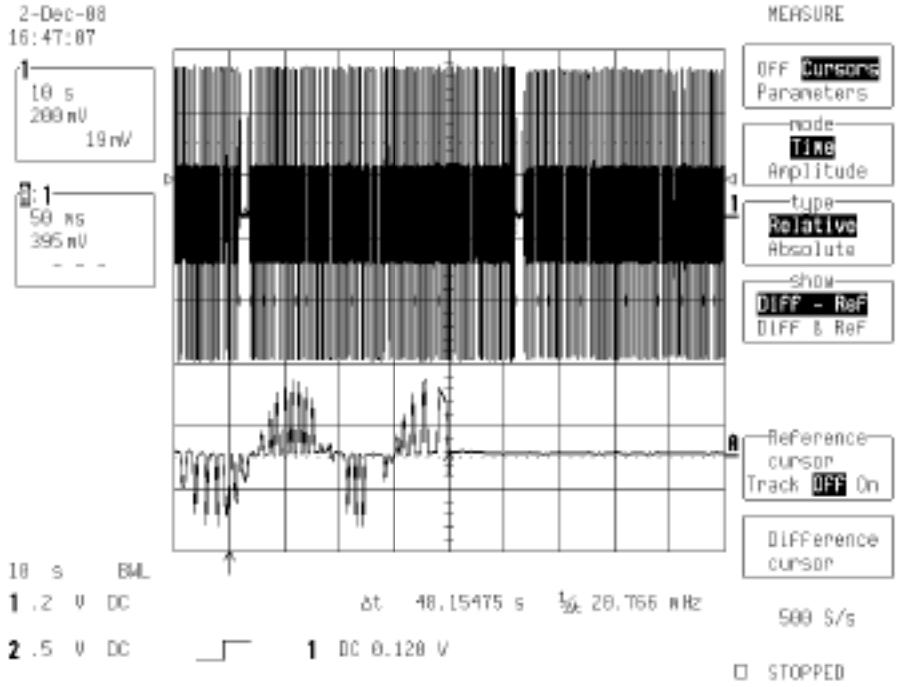


Plot showing 121.5MHz interruption interval (High Temperature, +55°C)

Product Service



Plot showing 121.5MHz interruption duration (Low Temperature, -20°C)



Plot showing 121.5MHz interruption interval (Low Temperature, -20°C)

Product Service

2.20 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (MODULATION FREQUENCY, SWEEP REPETITION RATE AND MODULATION DUTY CYCLE)

2.20.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.2

2.20.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.20.3 Date of Test and Modification State

Test at Ambient: 02 December 2008- Modification State 0
Test at +55°C: 01 December 2008- Modification State 0
Test at -20°C: 02 December 2008- Modification State 0

2.20.4 Test Equipment Used

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

2.20.5 Operating Modes

The test was performed with the EUT in the following mode(s): Operating

2.20.6 Test Results

Note: Though not required by the above Specification Reference, Ambient Temperature results are shown for information.

The EUT was connected to the automated test rack, the following results were obtained.

Parameter	Units	Test Results		
		T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)
Frequency Range	Hz	1143.88	1145.69	1147.54
Minimum Frequency	Hz	339.14	339.18	339.29
Maximum Frequency	Hz	1483.02	1484.87	1486.83
Sweep Direction	Upward / Downward	Downward	Downward	Downward
Modulation Duty Cycle	%	34.04	34.92	36.12
Sweep repetition rate	sweeps per second	3.0	3.0	3.0

Product Service

2.21 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (MODULATION FACTOR)

2.21.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.2

2.21.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.21.3 Date of Test and Modification State

Test at Ambient: 02 December 2008- Modification State 0
Test at +55°C: 02 December 2008- Modification State 0
Test at -20°C: 02 December 2008- Modification State 0

2.21.4 Test Equipment Used

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

2.21.5 Operating Modes

The test was performed with the EUT in the following mode(s): Operating

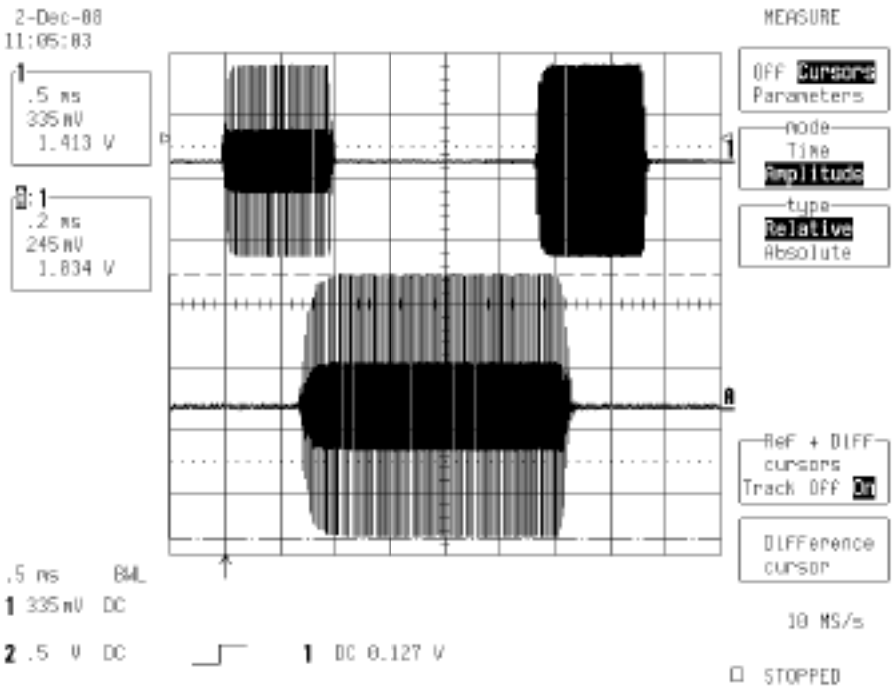
2.21.6 Test Results

Note: Though not required by the above Specification Reference, Ambient Temperature results are shown for information.

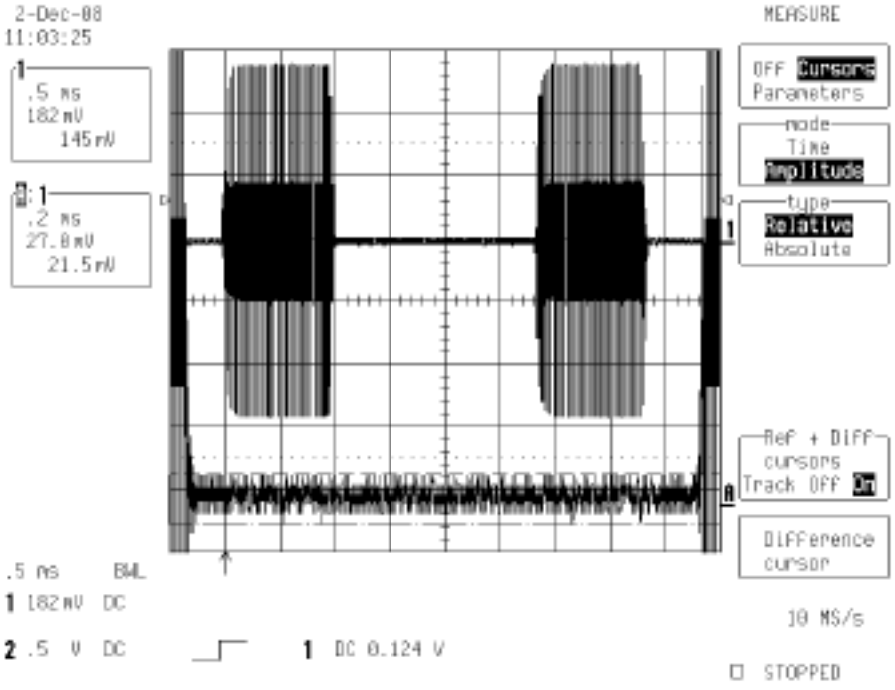
Parameter	Units	Test Results		
		T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)
A	mV	953	1034	564
B	mV	45.6	21.5	31
Modulation Factor	(no units)	0.91	0.96	0.89

Note: Modulation Factor = (A - B) / (A + B)

Product Service

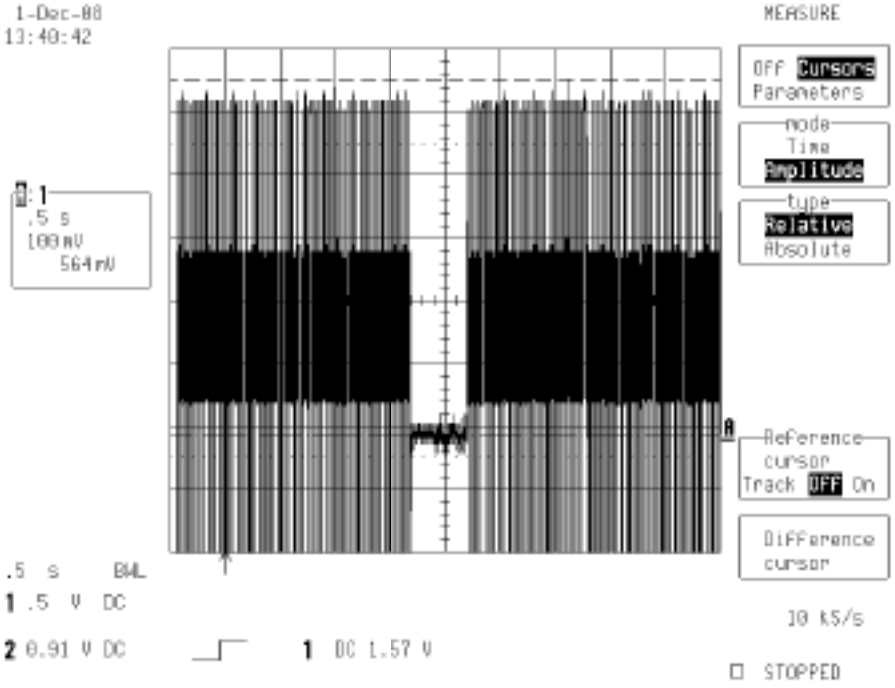


Plot showing "A" (Ambient Temperature)

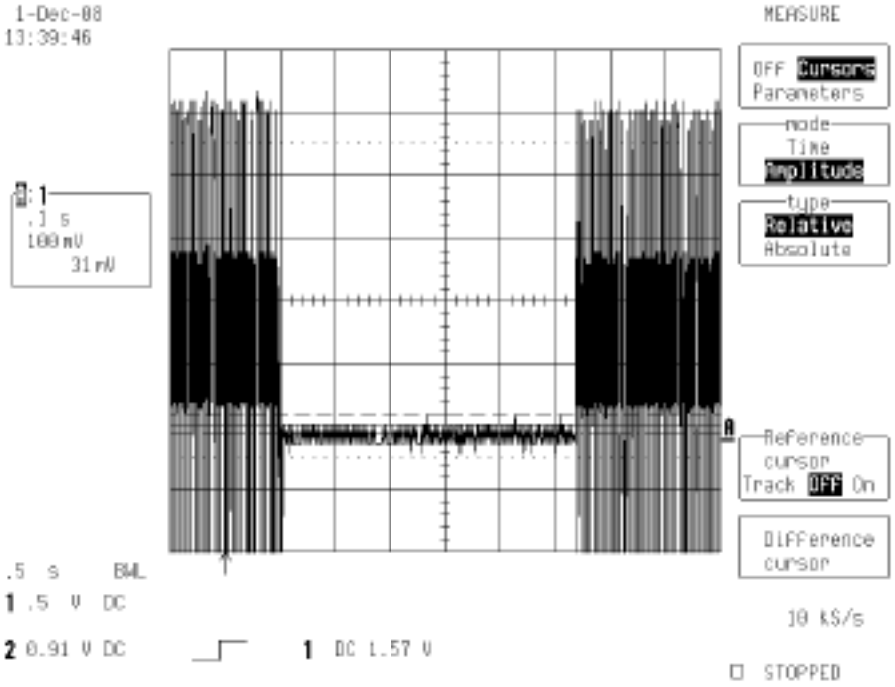


Plot Showing "B" (Ambient Temperature)

Product Service

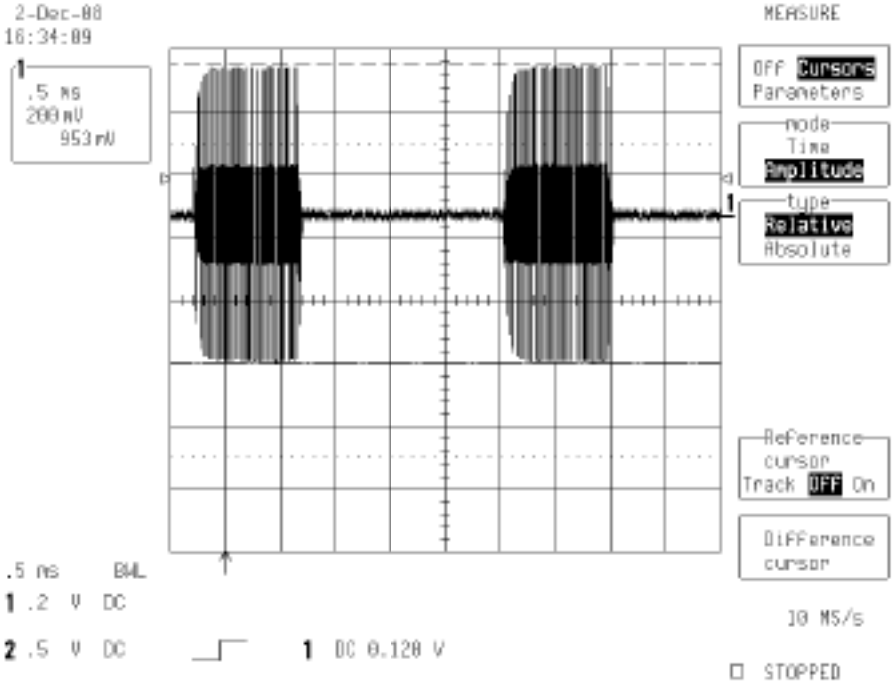


Plot showing "A" (High Temperature, +55°C)

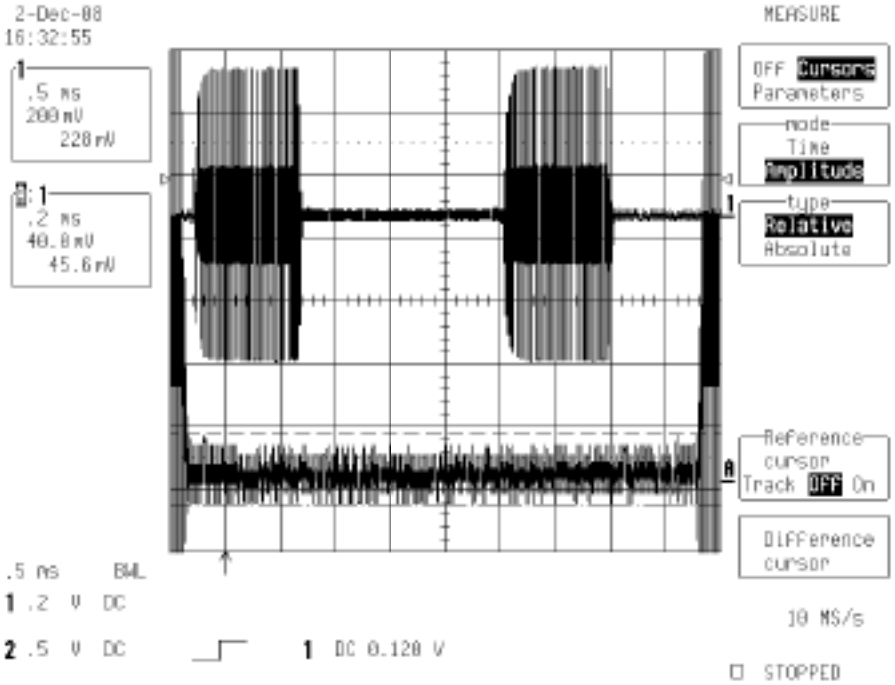


Plot Showing "B" (High Temperature, +55°C)

Product Service



Plot showing "A" (Low Temperature, -20°C)



Plot Showing "B" (Low Temperature, -20°C)

Product Service

2.22 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (FREQUENCY COHERENCE)

2.22.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.2

2.22.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.22.3 Date of Test and Modification State

Test at Ambient: 02 December 2008- Modification State 0
Test at +55°C: 01 December 2008- Modification State 0
Test at -20°C: 02 December 2008- Modification State 0

2.22.4 Test Equipment Used

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

2.22.5 Operating Modes

The test was performed with the EUT in the following mode(s): Operating

2.22.6 Test Results

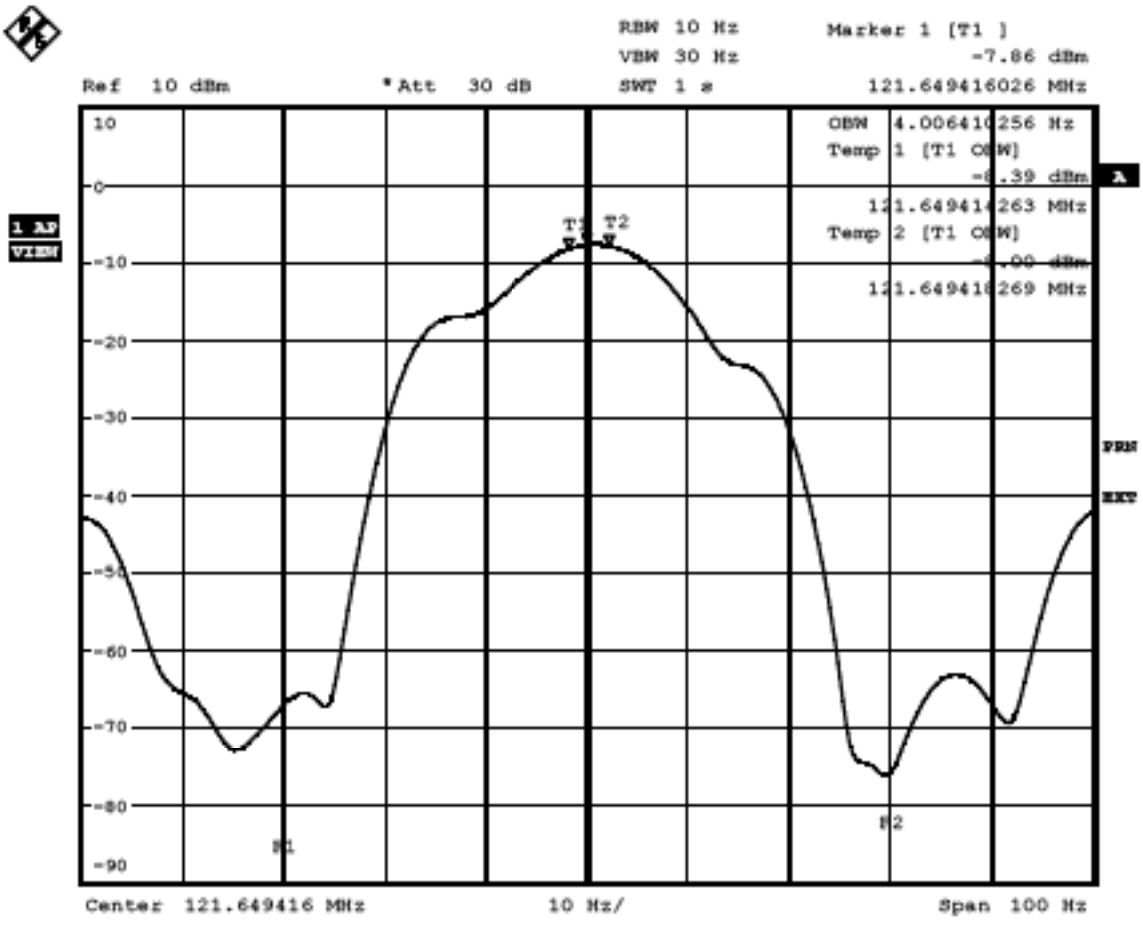
Note: Though not required by the above Specification Reference, Ambient Temperature results are shown for information.

The following Occupied Bandwidth plots show markers encompassing 30% of the total power emitted during a transmission cycle. Frequency Lines (F1 & F2) are at ±30Hz to the centre frequency (carrier). If the markers are within the Frequency Lines the EUT complies.

The following Frequency Shift plots show two traces, the first is the transmitter output envelope for a brief period *before* the 406 MHz burst, the second is the envelope *after* the burst. The plot is centred on the former and Frequency Lines (F1 & F2) are at ±30Hz of said frequency. The marker is at the peak of the latter trace. If the marker is within the frequency lines then the EUT complies.

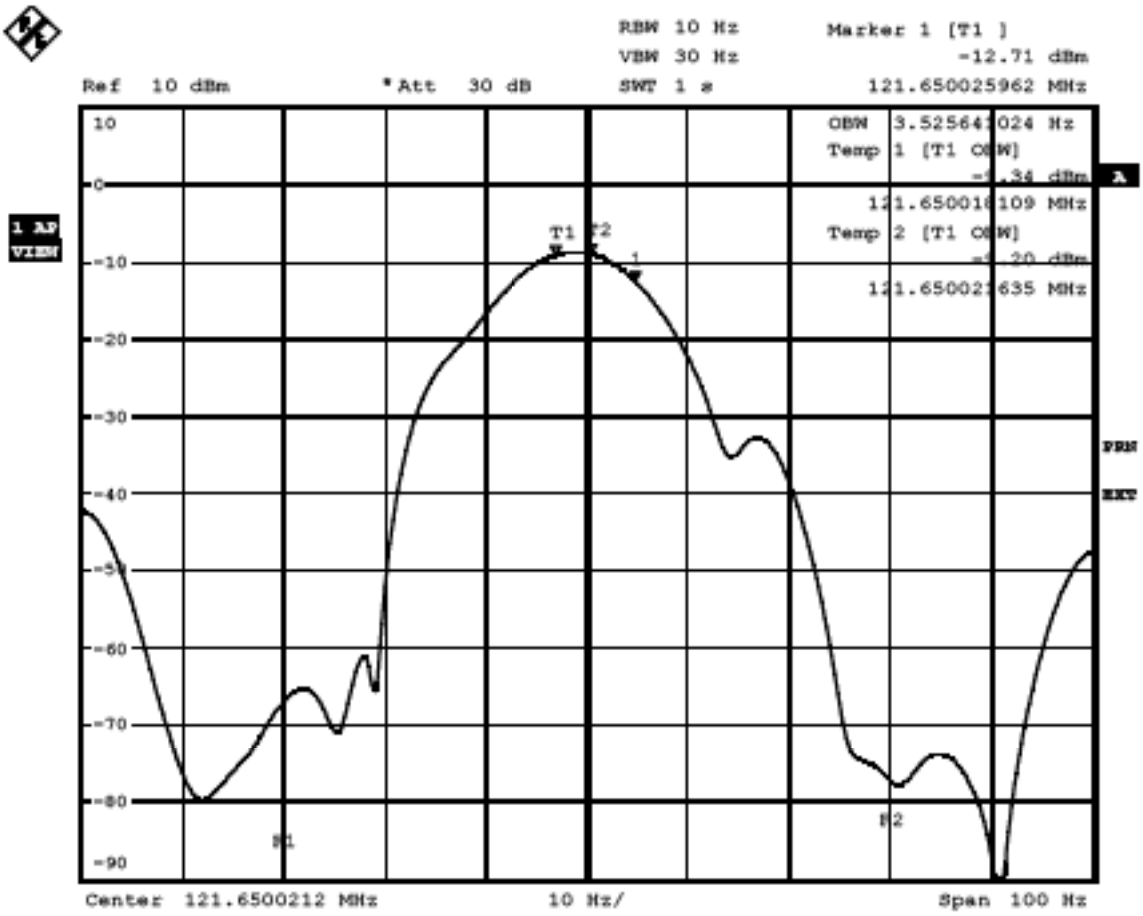
Product Service

Plot for 30% Total Power Ambient Temperature



Product Service

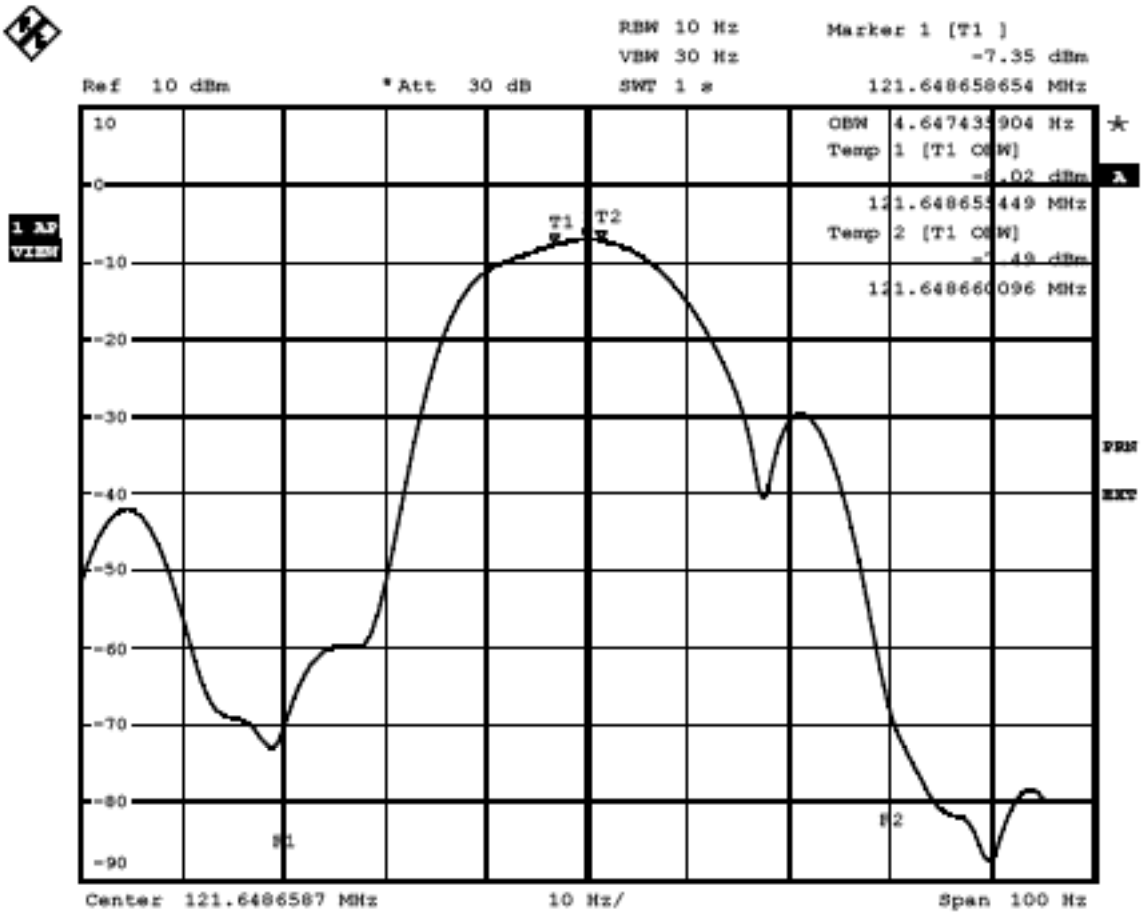
Plot for 30% Total Power for Minimum Temperature -20ºC



Date: 2.DEC.2008 15:52:43

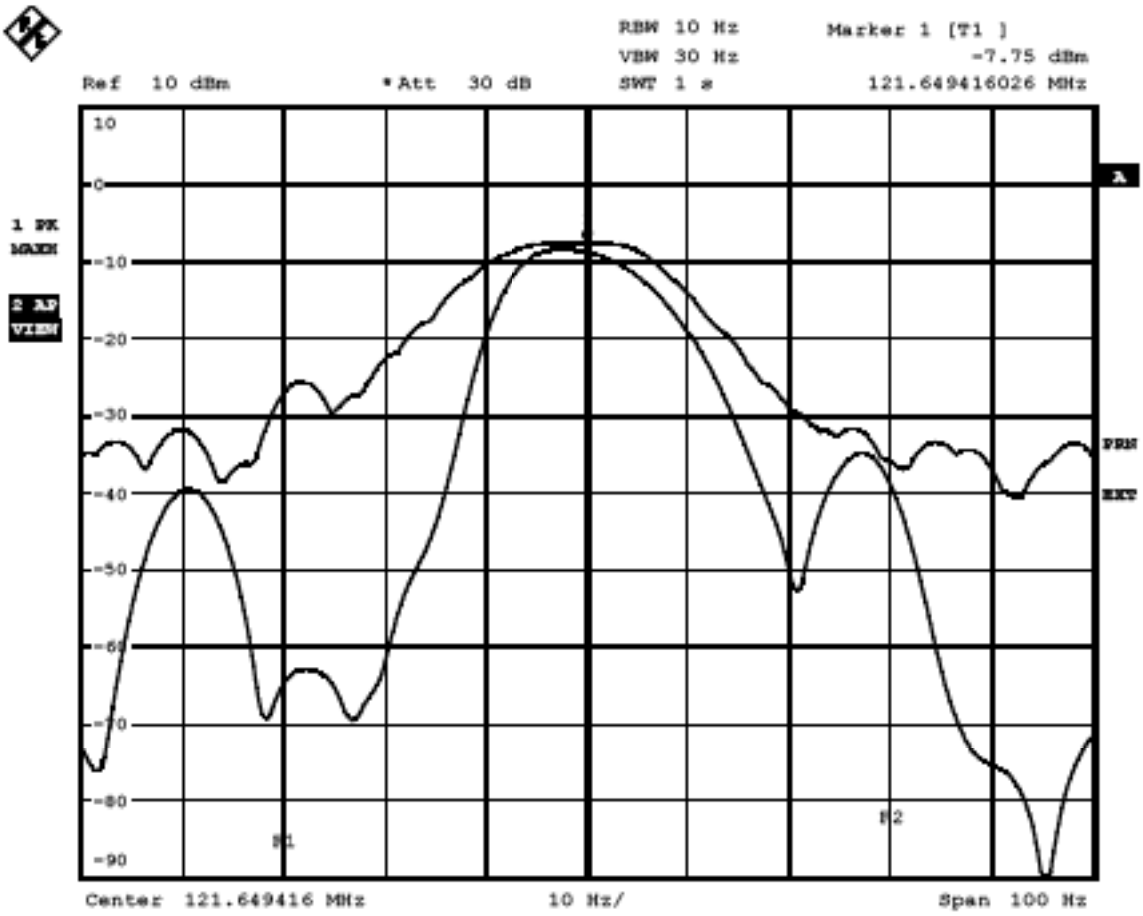
Product Service

Plot for 30% Total Power for Maximum Temperature +55ºC



Product Service

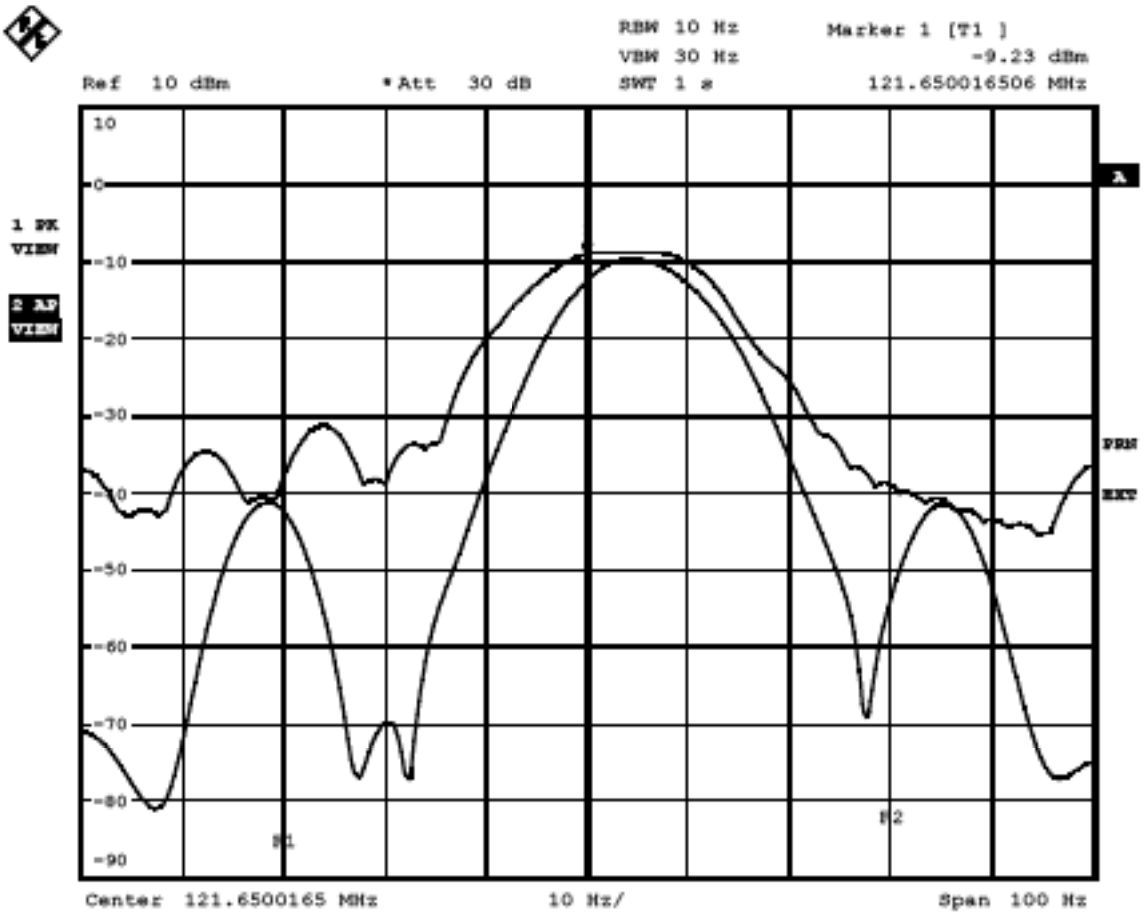
Frequency Shift Plot for Ambient Temperature



Date: 2.DEC.2008 10:45:19

Product Service

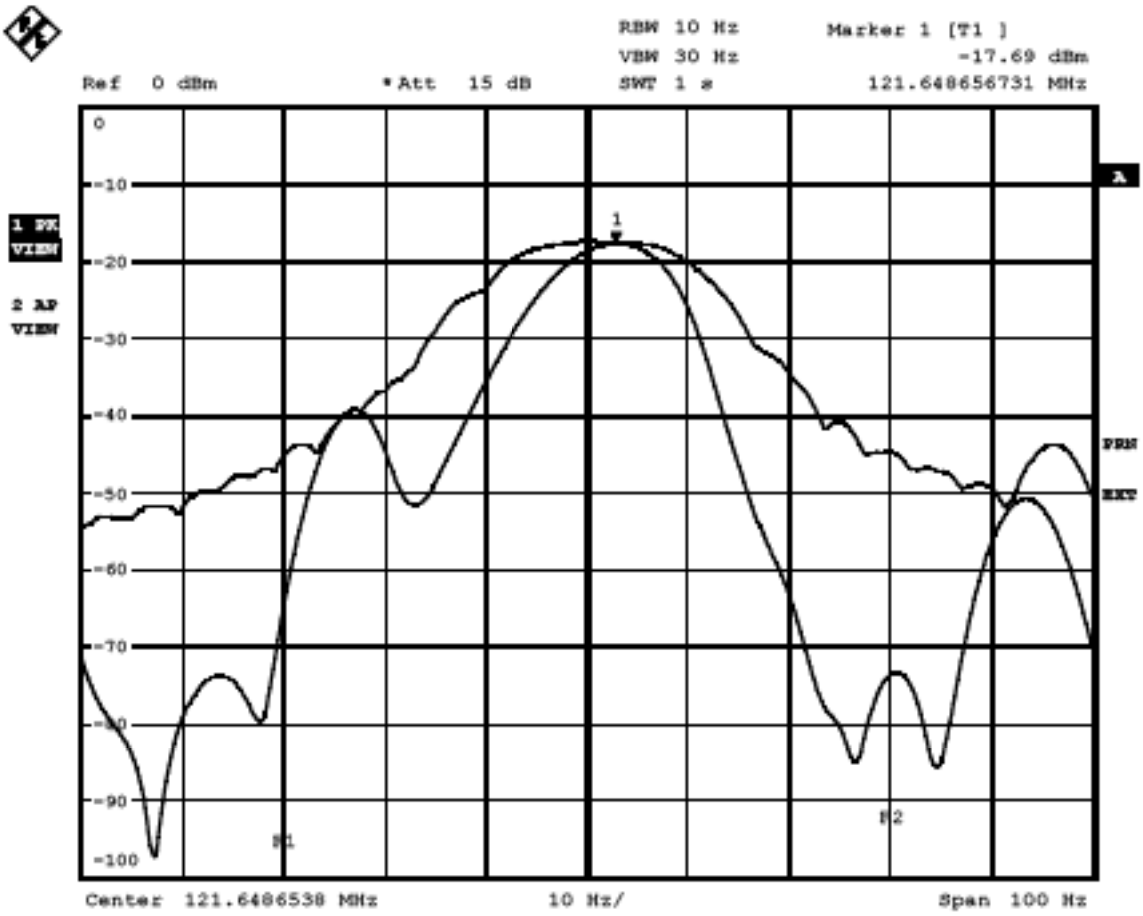
Frequency Shift Plot for Minimum Temperature -20ºC



Date: 2.DEC.2008 16:05:30

Product Service

Frequency Shift Plot for Maximum Temperature +55ºC



Date: 1.DEC.2008 13:42:00

Product Service

2.23 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (MORSE LETTER P)

2.23.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.2

2.23.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (50Ω Conducted)

2.23.3 Date of Test and Modification State

Test at Ambient: 02 December 2008- Modification State 0
Test at +55°C: 01 December 2008- Modification State 0
Test at -20°C: 02 December 2008- Modification State 0

2.23.4 Test Equipment Used

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

2.23.5 Operating Modes

The test was performed with the EUT in the following mode(s): Operating

2.23.6 Test Results

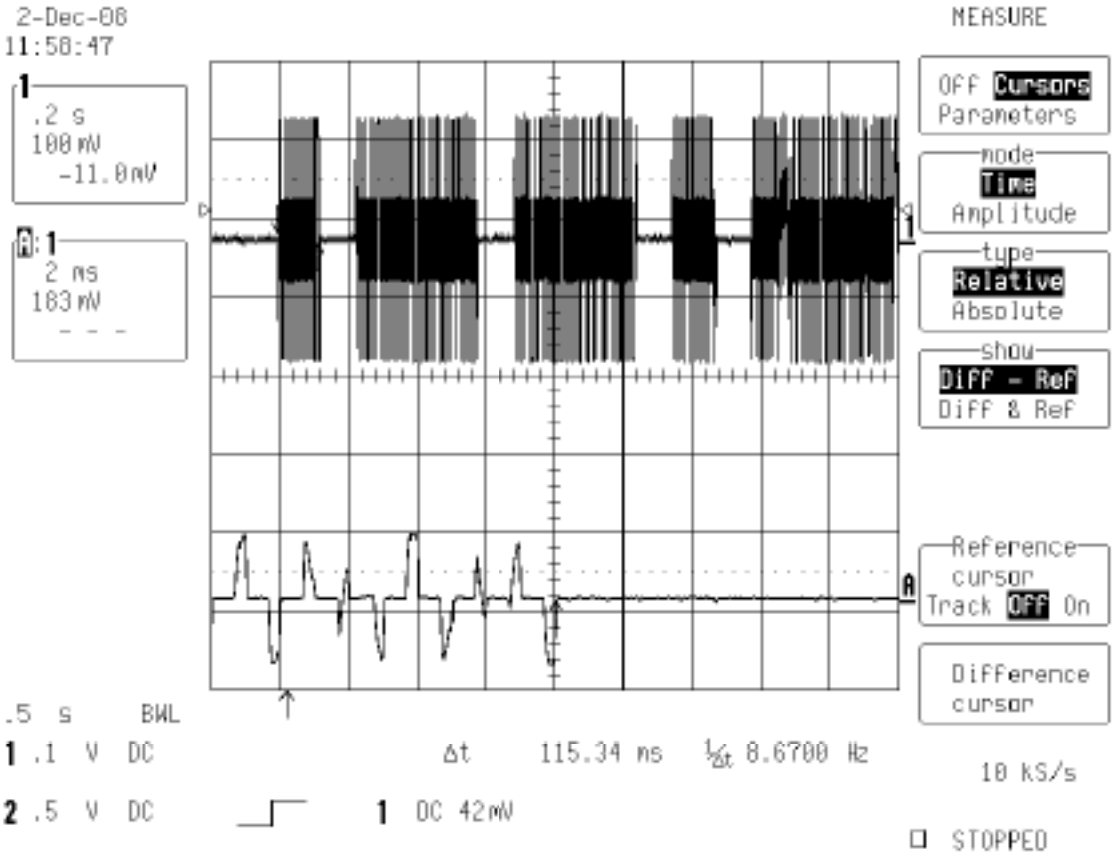
Note: Though not required by the above Specification Reference, Ambient Temperature results are shown for information.

Parameter	Limit /Units	Test Results		
		T_{min} (-20°C)	T_{amb}	T_{max} (+55°C)
Dot 1 Length	115 ± 5% ms	117.0	115.34 *	116.00
Gap 1 Length	115 ± 5% ms	115.4	115.62 *	114.91
Dash 1 Length	345 ± 5% ms	343.6	344.27 *	344.80
Gap 2 Length	115 ± 5% ms	115.6	115.61	114.80
Dash 2 Length	345 ± 5% ms	345.5	344.24	344.96
Gap 3 Length	115 ± 5% ms	114.5	115.64	114.93
Dot 2 Length	115 ± 5% ms	114.6	114.28	115.91
Gap 4 Length	115 ± 5% ms	116.6	116.63	115.89
Modulation Frequency	1000 Hz ± 50 Hz	997.5	1020 *	1030

* The following plots show the measurement of the first three parameters and the modulation frequency from the above table as an example. The other parameters and temperatures were measured the same way.

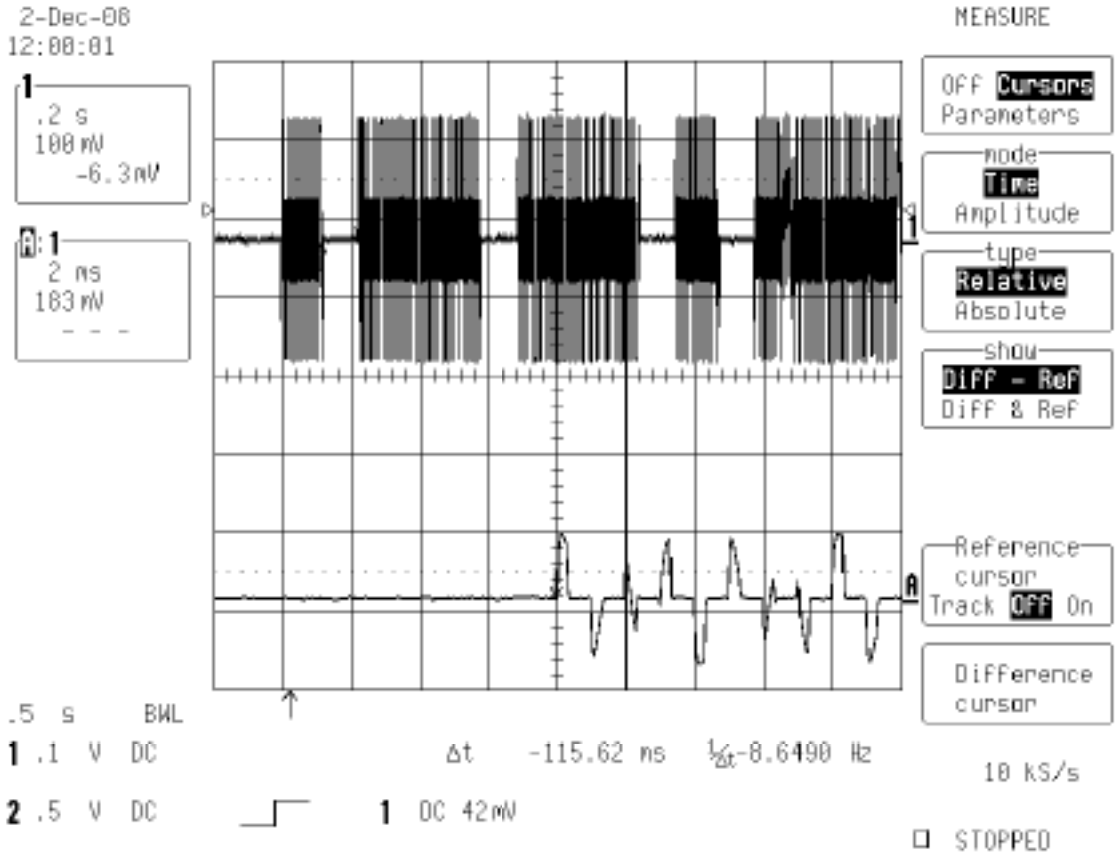
Product Service

Dot 1 Length Measurement Example (Ambient Temperature)



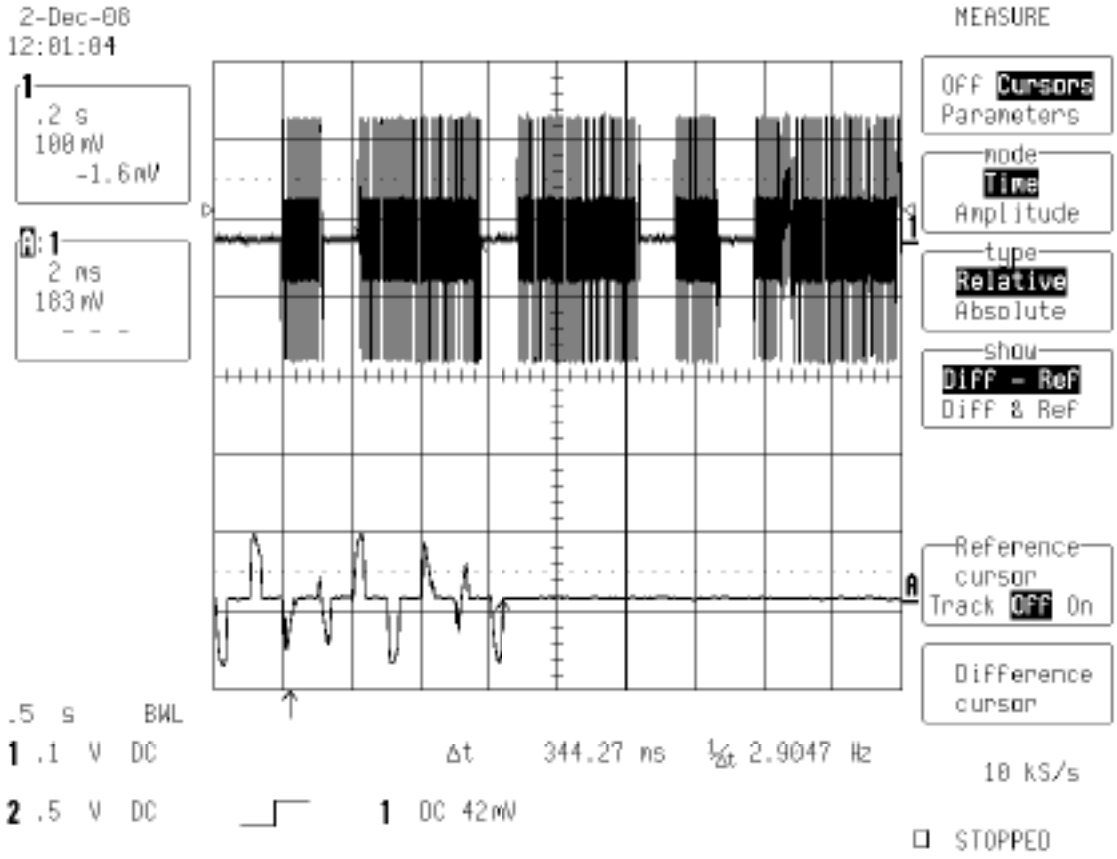
Product Service

Gap 1 Length Measurement Example (Ambient Temperature)



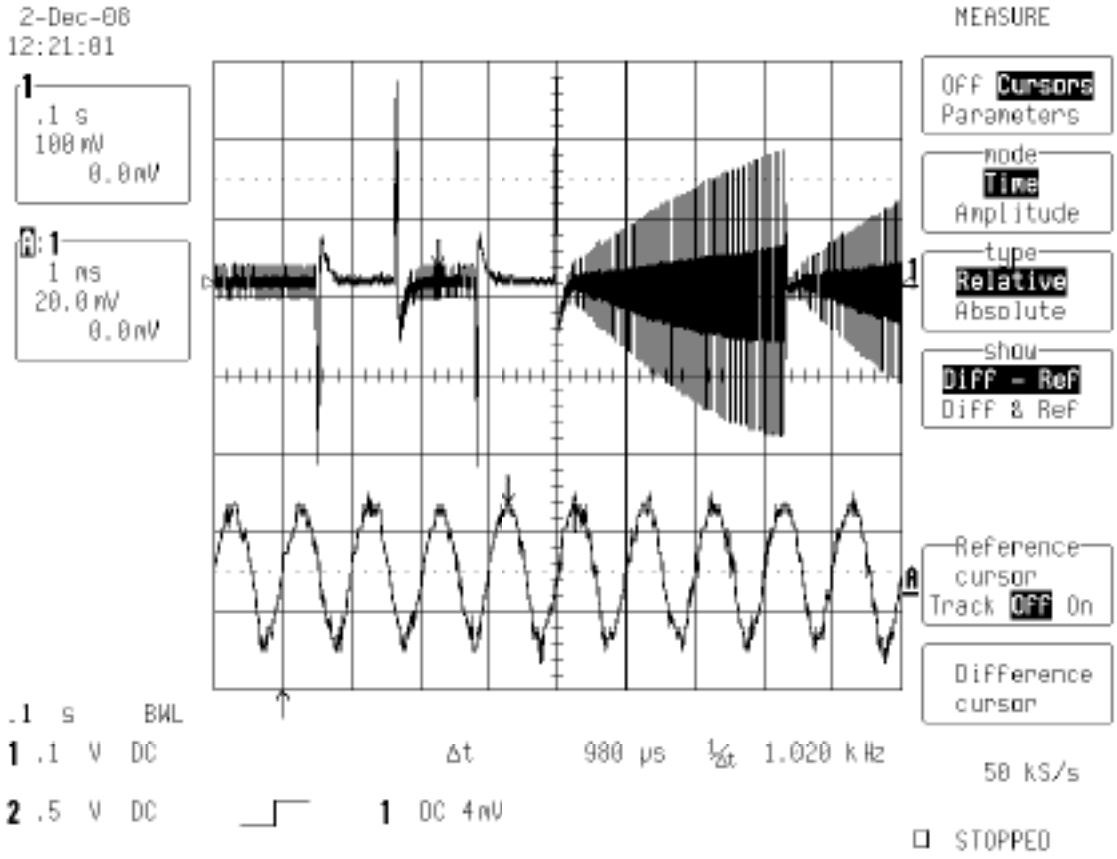
Product Service

Dash 1 Length Measurement Example (Ambient Temperature)



Product Service

Modulation Frequency Measurement Example (Ambient Temperature)



Product Service

2.24 AUXILIARY RADIO LOCATING DEVICE TRANSMITTER TEST (PEAK EQUIVALENT ISOTROPIC RADIATED POWER)

2.24.1 Specification Reference

RTCM 11010.2:2008, Clause A.16.3

2.24.2 Equipment Under Test

Fastfind PLB 210, Serial Number: TUV 1 (Radiated)

2.24.3 Date of Test and Modification State

09 October 2008 – Modification State 0

2.24.4 Test Equipment Used

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

2.24.5 Operating Modes

The test was performed with the EUT in the following mode(s): Operating

2.24.6 Test Results

Peak Equivalent Isotropic Radiated Power

Measurements were made (in dBm) at an arbitrarily chosen elevation angle across the full range of azimuth. The azimuth providing the maximum value was set as 0°. Measurements were made at said azimuth angle across a range of elevation angles from 5° to 20°. Upon finding the maximum, the elevation was fixed and 12 measurements made at 30° azimuth increments.

These results (from the vertically polarised dipole) were converted to PERP in mW. See the following table.

Elevation (°)	Azimuth (°)											
	0	30	60	90	120	150	180	210	240	270	300	330
5	40.597	-	-	-	-	-	-	-	-	-	-	-
10	42.508	-	-	-	-	-	-	-	-	-	-	-
15	47.347	44.187	43.181	44.187	45.216	46.269	46.269	46.269	47.347	47.347	45.216	46.269
20	47.776	-	-	-	-	-	-	-	-	-	-	-

The median of the twelve values was 46.27 mW, or 16.65 dBm.

Of the 11 highest values, the max was 47.347 and the minimum was 44.187, the ratio between these is 1.072 to 1 (0.30dB)

Product Service

Off Ground Plane Radiated Power Test

This test is effectively a repeat of the Peak Equivalent Isotropic Radiated Power test except that the EUT was raised above the ground plane as described in C/S T.007 Issue 4 Revision 2 November 2007, Figure B.5.

Elevation (°)	Azimuth (°)			
	0	90	180	270
5	12.546	-	-	-
10	13.136	11.441	10.197	10.678
15	12.170	-	-	-
20	12.280	-	-	-

The minimum of the four values was 10.197 mW, or 10.08 dBm.

Product Service

2.25 SOLAR RADIATION

2.25.1 Specification Reference

RTCM 11010.2:2008, Clause A.17

2.25.2 Test Waiver

Solar Radiation was waivered in accordance with the above specification reference which states: " *The solar radiation test shall be waived where the manufacturer is able to produce evidence that the components, materials and finishes employed in the equipment and its labels would satisfy the test.*"

2.25.3 Justification

Customer supplied information (see Annex A) intends to show that the waiver is justified.

Product Service

2.26 OIL RESISTANCE

2.26.1 Specification Reference

RTCM 11010.2:2008, Clause A.18

2.26.2 Test Waiver

Solar Radiation was waivered in accordance with the above specification reference which states: " *The oil resistance test shall be waived where the manufacturer is able to produce evidence that the components, materials and finishes employed in the equipment would satisfy the test.*"

2.26.3 Justification

Customer supplied information (see Annex A) intends to show that the waiver is justified.

Product Service

2.27 COMPASS SAFE DISTANCE

2.27.1 Specification Reference

RTCM 11010.2:2008, Clause A.19

2.27.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.27.3 Date of Test and Modification State

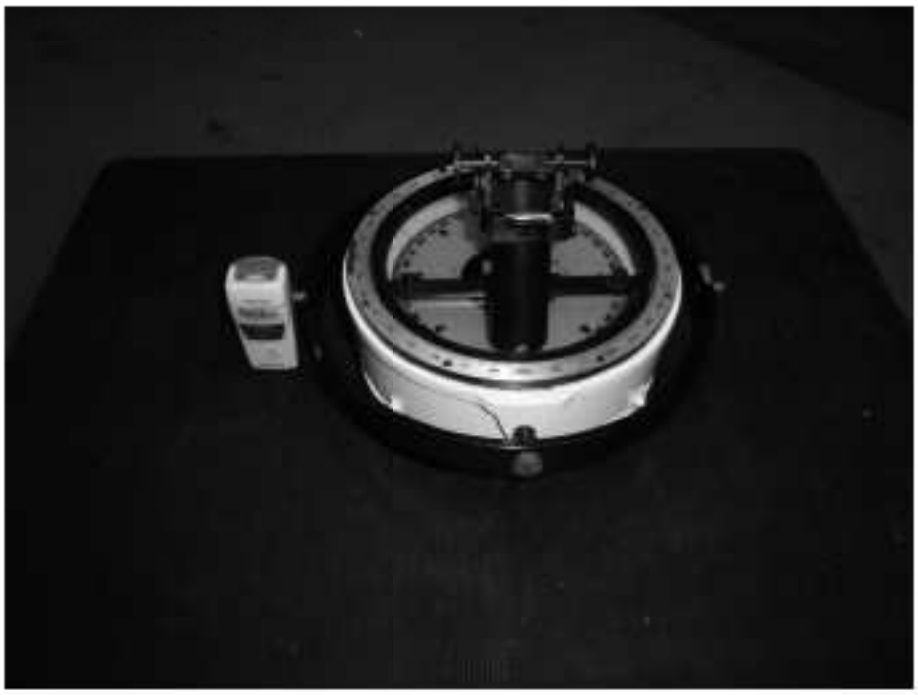
08 December 2008 - Modification State 0

2.27.4 Test Equipment Used

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

2.27.5 Test Setup and Operating Modes

The test was performed with the EUT in the following mode(s): Idle and Active



Test Set-up

Product Service

2.27.6 Environmental Conditions

	08 December 2008
Ambient Temperature	21.3°C
Relative Humidity	35%
Atmospheric Pressure	1009mbar

2.27.7 Test Method

A wooden table aligned E-W was used with the compass set in the centre of the table and aligned to read zero. The table was marked to give a graduated scale of distance. The EUT was gradually moved towards the compass until a standard deviation of 0.2° was obtained. Each orientation of the EUT was tested in this manner with the measurement distance between the compass centre and the EUT being noted.

The test was repeated but with readings being taken when the compass gave a steering deviation of 0.75°

The local area Magnetic Flux density (H) at the site of testing was 24uT.

The above testing was performed twice with the EUT as follows:

a. In the magnetic condition in which it is received with the EUT in Idle mode.
b. After normalising with the EUT in Idle mode.
c. In Operational mode.

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

Product Service

2.27.8 Test Results

The EUT was tested to the requirements of EN 60945 for Compass Safe Distance (Enclosure Port).

The test results are shown below.

Orientation of the EUT	Un-powered State		Normalised		Powered Up	
	Distance From Compass (cm) at A° deflection	Distance From Compass (cm) at B° deflection	Distance From Compass (cm) at A° deflection	Distance From Compass (cm) at B° deflection	Distance From Compass (cm) at A° deflection	Distance From Compass (cm) at B° deflection
Front	20	20	20	20	20	20
Top	20	20	20	20	30	20
Left Hand Side	20	20	20	20	20	20
Right Hand Side	20	20	20	20	25	20
Underside	20	20	20	20	20	20
Rear	20	20	20	20	20	20

Standard Compass safe distance	30
Emergency Compass safe distance	20

Product Service

2.28 MISCELLANEOUS TESTS

2.28.1 Specification Reference

RTCM 11010.2:2008, Clause A.20

2.28.2 Equipment Under Test

Fastfind PLB 210, Serial Number(s): TUV 1 (Radiated)

2.28.3 Date of Test and Modification State

11 February 2009 - Modification State 0

2.28.4 Test Equipment Used

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

2.28.5 Test Setup and Operating Modes

The test was performed with the EUT in the following mode(s): Idle and Active

The following diagrams show key features referenced in the following test results.

Diagram 1

Product Service

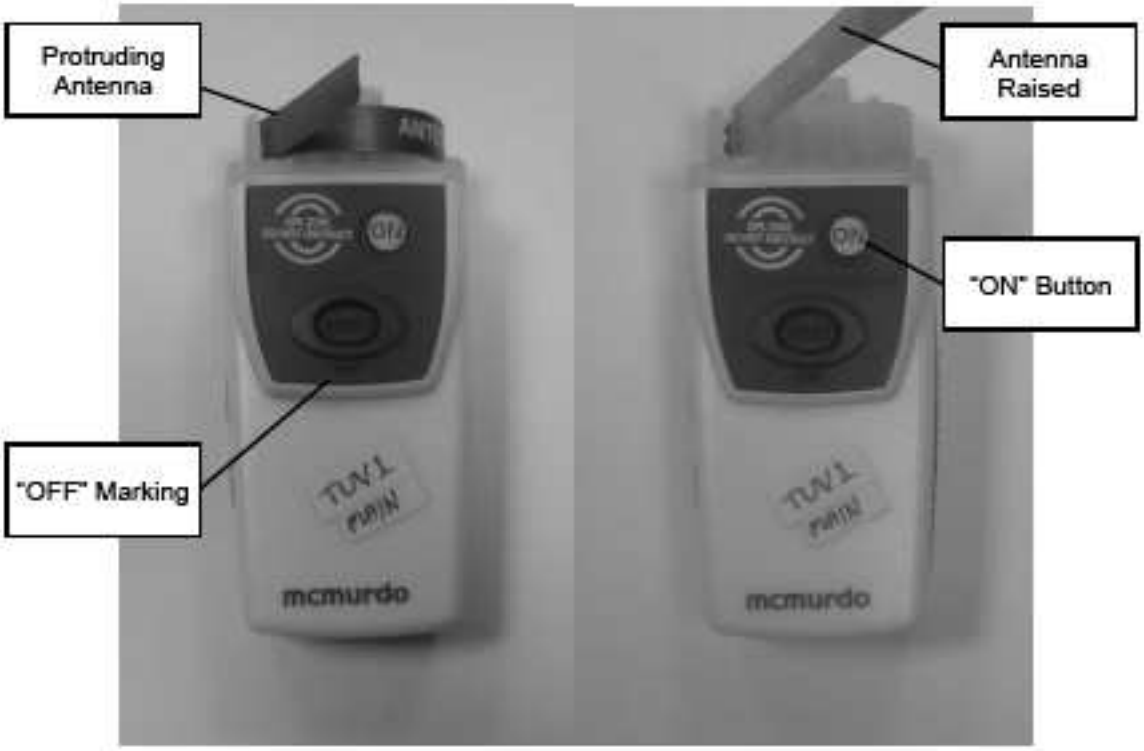


Diagram 1

2.28.6 Test Results

Controls and Indicators

The following actions were undertaken whilst wearing gloves from an immersion suit with a pair of mittens over the top:

1. The red tamper cover was lifted by pulling it up and away from the body of the EUT
2. The red tamper cover was pulled until the tamper proof seal snapped disengaging the button guard
3. The antenna was released to the upright position by pushing the short protruding part away from the "ON" button whereupon the antenna sprung straight rapidly
4. The "ON" button was depressed until the white LED indicated EUT operation

Excluding step 2 (breaking of tamper proof seal) three steps were required to activate the EUT in accordance with the manufacturers instructions. If the instructions were ignored the EUT could be activated in a minimum two steps (1 and 4, again excluding the breaking of the seal).

Notes:

- The "ON" button was marked in white outlined capital letters approximately 3mm high and 2 to 2.5mm wide in contrast with the dark grey surface (as pictured)
- The "TEST" button was marked in capital letters approximately 2mm square by relief of the button surface (without any contrasting colour)

Product Service

- The word "OFF" was marked in capital letters approximately 1 to 1.5mm square by sunken-relief of the EUT surface (without any contrasting colour) below the "TEST" button
- All markings resisted light abrasion with a gloved finger without any visible signs of deterioration
- Until the button guard was forcibly removed it was extremely difficult to depress the "ON" button with a finger, gloved or otherwise
- Whilst removing the red tamper cover, the use of two hands was avoided as per Specification Reference above
    - All actions could be accomplished with only one hand on the EUT except the breaking of the tamper proof seal, this was accomplished by placing one hand on the EUT and putting the red tab in the mouth, gripping with the teeth and pulling with the hand
    - Under manufacturer guidance the following alternative methods were also attempted
        - EUT trapped between knees and the red tamper lever removed with one hand this was achieved successfully within approximately 20 seconds (several attempts were necessary due to the weak grip of the knees) with the immersion suit mitten covering the gloved hand (note this was achieved with one handed operation however, the specification allows two handed operation).
        - EUT trapped in the armpit and the red tamper lever removed with one hand, this was achieved successfully within approximately 10 seconds (a few attempts were necessary due to the weak grip of the armpit) with the immersion suit mitten covering the gloved hand
- The white LED indicated activation, no audible indication was noted
- The controls were few in number (buttons were two in quantity)
- LED patterns relating to the various modes of operation were detailed on the label
- The tamper proof seal was unable to be removed or replaced without the use of tools
- Once removed manually it was clearly visible that the seal had been broken
- Although the tamper proof seal was broken during the complete operation, there was no means of determining whether the "ON" button had been depressed. EUT operation therefore must be assumed to have taken place if destruction of the seal is evident
- After brief activation and de-activation the Self-test routine still indicated a "SELF-TEST OK" and adequate battery life (three flashes of the white LED as opposed to any fewer)

Self-test and GNSS Self-test Function (Activation and Reset)

The following actions were undertaken:

1. The EUT was placed in the Self-test mode by depressing the test button for approximately 3 seconds (until the white LED indicated Self-test mode was activated)
2. The white LED indicated a "SELF-TEST OK" result
3. All LED activity ceased and the EUT appeared to enter idle ("OFF") mode automatically
4. The EUT was places in the Self-test mode again by the same method, indicating that the Self-test mode reset itself automatically

Product Service

Self-test and GNSS Self-test Function (Description)

The following data is supplied with this report:

Manufacturer's Data supplied at Annex A (except where another section is specified)

- Self-test Mode Description
- Protection Against Repetitive Self-test Mode Transmissions

Further information on the Self-test can be found in the Application Form, Section 1.2

Self-test and GNSS Self-test Function (Switch Details)

The Self-test mode is activated by a "TEST" button, it is sprung and returns to the 'off' position when released. It is entirely separate from other controls i.e. the "ON" button.

Self-test and GNSS Self-test Function (Coding)

Self-test functional parameters, coding details and test measurements/results can be found at Section 2.15

Battery

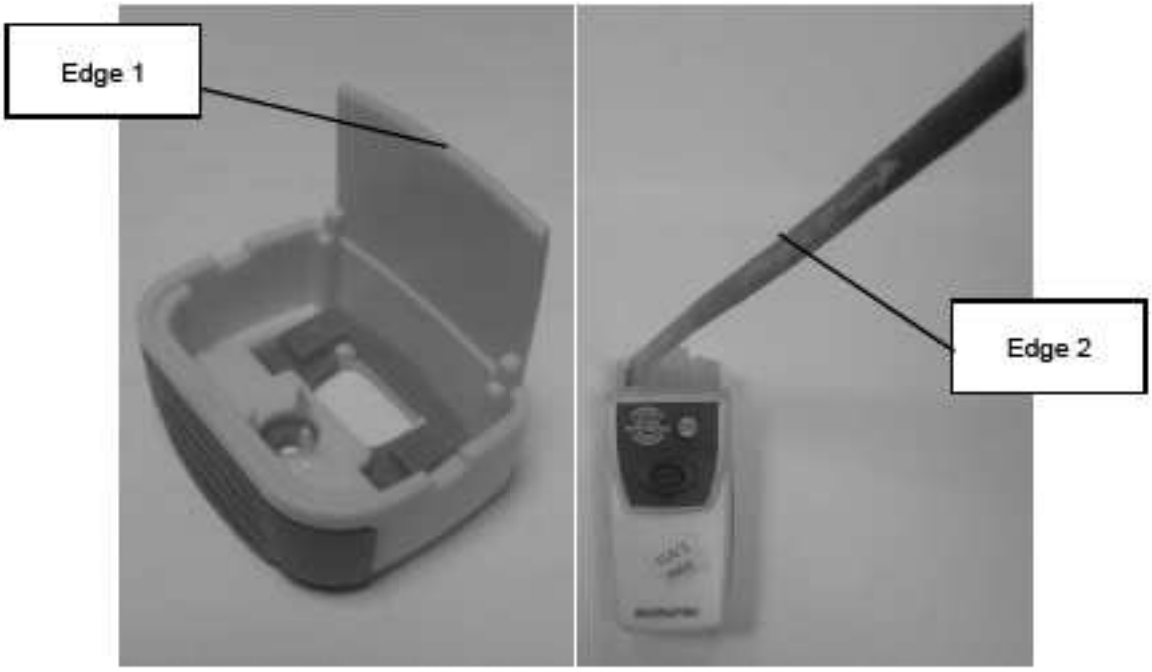
TÜV Report 071-75904720-000 contains details pertaining to battery safety; a copy of said document should accompany this report in any compliance application.

Annex A contains customer supplied information also relating to battery safety.

Product Service

General Construction

A "Sharp Edge Tester", consisting of a 'repeatable-force arm' and a padded 'finger' covered with tape, was run along the following edges:



Edges Tested

Upon inspection of the tape covering the 'finger' no cuts were found, merely creases.

Exterior Finish

The EUT yellow surface areas were approximately measured using a steel rule, as was the total surface area of the EUT. The EUT surface is approximately 60% yellow with the Antenna/Button Guard on in it's normal position.

Labelling (Resistance)

For Sunlight, Seawater and Oil resistance see Customer Supplied Statement on Materials at Annex A

Labelling abrasion resistance information can be found at Annex A

Labelling (Legibility)

For legibility test results (test conducted by the manufacturer) see Customer Supplied Label Viewing Information at Annex A

Product Service

Labelling (Instructions and Information)

Customer Supplied Information at Annex A details the EUT labelling scheme.

Labelling (Comprehensibility)

For comprehensibility test results (test conducted by the manufacturer) see Customer Supplied Comprehensibility Test Results at Annex A

Documentation

A copy of the operation manual and a copy of the end user (consumer) packaging are provided at Annex A.

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.21 Beacons - 121 Modulation Factor					
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	-	O/P Mon
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	22-Jul-2009
1GHz Digital Oscilloscope	Lecroy	9370M	612	12	30-Sep-2009
Hygrometer	Rotronic	I-1000	3068	12	26-Jun-2009
Thermocouple Thermometer	Fluke	51	3172	12	3-Jul-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	22-Apr-2009
Bandpass Filter	Trilithic	5BE121.55/35-3-BA	3411	12	4-Aug-2009
Section 2.24 Beacons - 121 Peak Effective Isotropic Radiated Power					
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	-	O/P Mon
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	22-Jul-2009
Test Receiver	Rohde & Schwarz	ESVP	1669	12	6-Nov-2008
Open Area Site 2	TUV	OATS2	1850	36	11-Sep-2011
Antenna Tower 6M	EMCO	1050	1859	-	TU
Antenna (Bilog, 20MHz-2GHz)	York Electronics	CBL6111B	1868	24	20-Aug-2010
Hygrometer	Rotronic	I-1000	3068	12	26-Jun-2009
Thermocouple Thermometer	Fluke	51	3172	12	3-Jul-2009
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	22-Apr-2009
Bandpass Filter	Trilithic	5BE121.55/35-3-BA	3411	12	4-Aug-2009
Rubidium Frequency Standard	Symmetricom	8040C	3490	12	21-Feb-2009
Section 2.11 Climatic – Immersion Test					
Over Pressure (T)	ASL (TUV)	0 TO 15 PSI	2125	-	TU
Pressure Indicator	Druck	DPI 700	2343	12	22-Sep-2009
Regulator	Unknown		2517	-	TU
Section 2.12 and 2.17 Climatic – Buoyancy Test					
Force Gauge	TWL	AFG 4	926	12	08-Jul-2009
Tape Measure	Stanley	-	2363	-	TU
Stopwatch	Farnell	SUPER LAB/SPLIT	2465	12	24-Jul-2009
Section 2.1 and 2.15 Beacons – Preparation Of Satellite PLB For Testing					
Beacon Tester	WS Technologies	BT 100S	87	-	TU
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.18, 2.19, 2.20, 2.22 and 2.23 Beacons – Various 121 MHz Homer Characteristics					
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	-	O/P Mon
Time Interval Analyser	Yokogawa	TA720	181	12	27-Feb-2009
High Resolution Oscilloscope	Gould	840	182	12	6-Mar-2009
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	22-Jul-2009
Signal Generator (100kHz to 2.6GHz)	Hewlett Packard	8663A	1063	12	13-Feb-2009
Distress Beacon RF Unit	TUV	-	2445	-	TU
Hygrometer	Rotronic	I-1000	3068	12	26-Jun-2009
Termination (50ohm, 6W)	Micronde	R404613	3074	12	15-Mar-2009
Thermocouple Thermometer	Fluke	51	3172	12	3-Jul-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3358	12	22-Apr-2009
Bandpass Filter	Trilithic	5BE121.55/35-3-BA	3411	12	4-Aug-2009
Rubidium Frequency Standard	Symmetricom	8040C	3490	12	21-Feb-2009
Section 2.13 Beacons - Spurious Emissions					
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	-	O/P Mon
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	22-Jul-2009
Test Receiver	Rohde & Schwarz	ESVP	1669	12	7-Nov-2009
Open Area Site 2	TUV	OATS2	1850	36	11-Sep-2011
Antenna Tower 6M	EMCO	1050	1859	-	TU
Antenna (Bilog, 20MHz-2GHz)	York Electronics	CBL6111B	1868	24	20-Aug-2010
Hygrometer	Rotronic	I-1000	3068	12	26-Jun-2009
Thermocouple Thermometer	Fluke	51	3172	12	3-Jul-2009
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	12	22-Apr-2009
Bandpass Filter	Trilithic	5BE121.55/35-3-BA	3411	12	4-Aug-2009
Rubidium Frequency Standard	Symmetricom	8040C	3490	12	21-Feb-2009
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	22-Jul-2009
Attenuator: 10dB/20W	Narda	766-10	480	12	22-Jul-2009
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3068	12	26-Jun-2009
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3163	12	2-Jun-2009
Thermocouple Thermometer	Fluke	51	3172	12	3-Jul-2009
Bandpass filter	Trilithic	5BE406/35-1-AA	3206	12	1-Aug-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3352	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3357	12	22-Apr-2009

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Sections 2.2 Climatic - High Temperature					
Power Meter	Hewlett Packard	436A	83	12	13-Aug-2009
Beacon Tester	WS Technologies	BT 100S	87	-	TU
Frequency -Time Analyser	Hewlett Packard	5372A	93	12	10-Sep-2008
Beacon RF Unit	TUV	N/A	97	-	TU
Logic Analyser	Hewlett Packard	1631D	155	12	18-Sep-2008
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	22-Jul-2009
Attenuator: 10dB/20W	Narda	766-10	480	12	22-Jul-2009
Signal Generator	Hewlett Packard	8663A	765	12	10-Jan-2009
Termination (50ohm, 15W)	Radio Spares	612-192	2425	12	5-Sep-2008
Climatic Chamber	Climatec	CLIMATEC 2	2845	12	5-Nov-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3163	12	2-Jun-2009
Bandpass filter	Trilithic	5BE406/35-1-AA	3206	12	1-Aug-2009
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3355	12	22-Apr-2009
3 Phase Contact Adaptor	TUV	UKN	3458	-	TU
Section 2.3 Climatic - Humidity					
Montford F43	Montford	4FT CUBED	2126	12	23-Apr-2009
Climatic Chamber	Climatec	CLIMATEC 2	2845	12	5-Nov-2008
Climatic Chamber	Climatec	CLIMATEC 3	2846	12	15-Apr-2009
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Section 2.4 and 2.5 Climatic - Low Temperature					
Montford 8F3	Montford	8FT CUBED	2127	12	31-Mar-2009
Temperature Chamber	Instron	906	2128	12	4-Dec-2008
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Section 2.9 ENV - Drop / Topple					
Hardwood Block	Unknown	ELM	2650	-	TU
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
5 metre Tape Measure	Stanley	33-719	3549	-	TU

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.6 and 2.7 Vibration - Sine					
Charge Amp	Endevco	133	2501	12	19-Nov-2008
Vibration Controller	Hewlett Packard	E1434A	2507	12	4-Mar-2009
Vibration Controller	Muller & Partner	VIBCO NT VX1	2510	12	22-Oct-2008
Vibration System	Ling Dynamic Systems	LDS V964	2515	6	9-Dec-2008
Vibration Table	Ling Dynamic Systems	875	3170	6	22-Feb-2009
Charge Amplifier	Endevco	133	3193	12	17-Apr-2009
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Isotron Accelerometer	Endevco	256-10	3381	6	30-Sep-2008
Isotron Accelerometer	Endevco	256-10	3383	6	30-Sep-2008
Accelerometer	Endevco	256-10	3430	6	7-Sep-2008
Accelerometer	Endevco	256-10	3468	6	7-Sep-2008
Section 2.10 Beacons - Thermal Shock					
Beacon Tester	WS Technologies	BT 100S	87	-	TU
Montford 8F3	Montford	8FT CUBED	2127	12	31-Mar-2009
Temperature Chamber	Instron	906	2128	12	4-Dec-2008
Stop Clock	R.S Components	RS328 061	2674	-	TU
Hygrometer	Rotronic	I-1000	3068	12	26-Jun-2009
Timer	Radio Spares	427-590	3282	-	TU
5 metre Tape Measure	Stanley	33-719	3549	-	TU
Section 2.27 EMC - Compass Safe Distance					
Sussex Helmholtz Coil	Various	88771	327	-	TU
Magnetometer	Bartington	MAG01	671	36	3-Sep-2011
Power Supply Unit	Farnell	LT30-2	2045	-	TU
Multimeter	Iso-tech	IDM101	2423	12	3-Sep-2009
Marine Binacle Compass with Azimuth Circle	Cassens & Plath	Type 11	3331	24	1-Jun-2009
Compass Verification Unit	TUV	CVU	3579	-	TU
Section 2.14 Beacons - Operating Lifetime					
Power Meter	Hewlett Packard	436A	47	12	8-Jul-2009
Power Meter	Hewlett Packard	436A	83	12	13-Aug-2009
Climatic Chamber	Heraeus Votsch	VM 04/100	85	-	O/P Mon
Rubidium Frequency Standard	Quartzlock	A10-B	92	12	2-Jan-2009
Signal Generator	Hewlett Packard	8644A	96	12	17-Apr-2009
Load (50ohm, 15W)	Diamond Antenna	DL-30N	337	12	1-Sep-2009
Attenuator: 10dB/20W	Narda	766-10	480	12	22-Jul-2009
Signal Generator (100kHz to 2.6GHz)	Hewlett Packard	8663A	1063	12	13-Feb-2009
Power Sensor	Hewlett Packard	8482A	1341	12	15-Oct-2008
Stop Clock	R.S Components	RS328 061	2674	-	TU
Beacon RF Unit	TUV	N/A	3066	-	TU
Termination (50ohm, 2W)	Omni-Spectra	3001-6100	3081	12	15-Mar-2009
Termination (50ohm, 15W)	Diamond Antenna	DL-30N	3096	12	15-Mar-2009

Product Service

Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3158	12	18-Jun-2009
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3162	12	18-Jun-2009
Thermocouple Thermometer	Fluke	51	3172	12	3-Jul-2009
Bandpass Filter	Trilithic	5BE406/35-1-AA	3205	12	1-Aug-2009
Time Interval Analyser	Yokogawa	TA720 704510	3253	12	6-Nov-2008
ScopeCorder	Yokogawa	DL750 701210	3254	12	6-Nov-2008
Timer	Radio Spares	427-590	3282	-	TU
Power Sensor	Agilent	8482A	3290	12	26-Nov-2008
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	21-Apr-2009
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3355	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3357	12	22-Apr-2009
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3359	12	22-Apr-2009
1m RF Cable sma(m)-sma(m)	Reynolds	262-0248-1000	3453	12	TU
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	16-Apr-2009
Timer ('Electronic Clock Timer')	R.S Components	870A	3558	-	TU

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

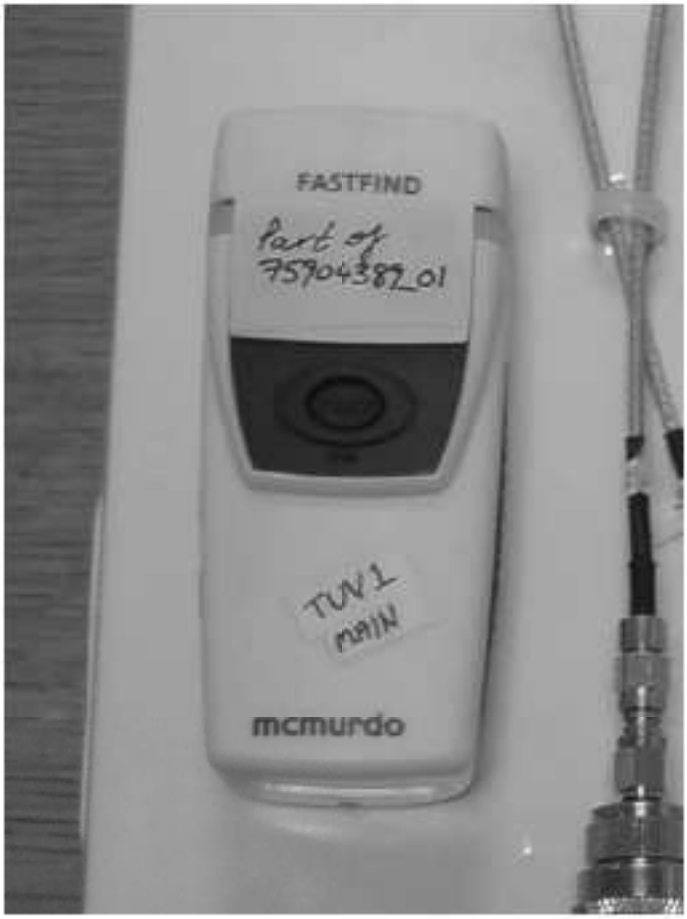
Product Service

SECTION 4

PHOTOGRAPHS

Product Service

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Front View of EUT:

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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Product Service

ANNEX A

CUSTOMER SUPPLIED INFORMATION

Product Service

Customer Supplied Statement on Materials

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Fastfind PLB 200 & 210 Materials Declaration

As required by IEC 61097-2 & RTCM 11010.2 test requirements the Fastfind 200 &210 PLB products are required to be tested and to meet the specific tests -

- Corrosion (Salt Mist) IEC 60945 8.12 & ETSI 302 462-1 (8.5) & RTCM 11010.2 (A.6)
- Solar Radiation IEC 60945 8.10 & RTCM 11010.2 (A.17)
- Oil Resistance IEC 60945 8.11 & RTCM 11010.2 (A.18)

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

In the instance McMurdo claim, for the 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 McMurdo's existing approved marine equipment 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. McMurdo in-house testing has proven the materials to be immune to the cause of degradation (e.g. oil resistance).

McMurdo hereby declares that the materials used in the construction of the Fastfind PLB 200 & 210 products as here-in listed are not affected by the degrading agents listed above.

Signed on behalf of McMurdo

.....N. Jordan..... Date ..19-11-2008

Neil Jordan
Engineering Manager

A division of Signature Industries Ltd
Registered in England No. 2600361 Registered Office: Tom Cribb Road, Thamesmead, London, SE28 0BH
VAT NO GB 626 3127 57

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Components and materials listed below are in contact with the marine environment

BASE MOULDING	CYCOLOY C1200
COVER MOULDING	CYCOLOY C1200
TOP MOULDING	POLYCARBONATE - GALIBRE 305-15
LEVER MOULDING	POLYPROPYLENE PP1900I
SEALING GASKET	WHITE SILICONE SPONGE
SILICON KEYPAD	SILICONE RUBBER 55 SHORE
SILICON SIDE GRIPS	SILICONE RUBBER 55 SHORE
ANTENNA	SUS-301 S/S
ANTENNA BOLT	STAINLESS STEEL SUS-316
ANTENNA O-RING	BS006 N°6 SILICONE O-RING
LABEL SET	CLEAR POLYPROPYLENE
M3.5 NYLOC NUT	STAINLESS STEEL
M3X10MM PAN HEAD POZI STAINLESS STEEL SCREW	STAINLESS STEEL
M3.5X8MM SCREW	STAINLESS STEEL

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VAT NO GB 626 3127 57

Product Service

Customer Supplied Description of Modification 1 and Impact on Testing

"From: *Neil Jordan [neiljordan@mcmurdo.co.uk]*

Sent: *03 February 2009 16:02*

Subject: *Fastfind PLB flotation*

[...]

I can confirm that the neoprene flotation material will have no detrimental effect to the plastic body of the PLB and will also not degrade the electrical or RF performance of the beacon.

Kind regards
Neil Jordan
Engineering Manager
Tel : 02392 623934
Mobile: 07866913321
Fax : 02392 623997
email : neiljordan@mcmurdo.co.uk

McMurdo, A division of Signature Industries Ltd. *Silver Point, Airport Service Road, Portsmouth, Hampshire, PO3 5PB, UK.*
Phone: +44 (0) 23 9262 3900 Fax : +44 (0) 23 9262 3998.
Registered in England No. 2800561 Registered Office: Tom Cribb Road, Thamesmead, London, SE28 0BH VAT NO GB 626 3127 57"

Product Service

Self-test Mode Description and Protection Against Repetitive Self-test Mode Transmissions

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Fastfind PLB 200/210
Statement on protection from repetitive self-test mode transmissions and self-test routine

Self-test routine

The Fastfind PLB is a 406.037MHz PLB operating with the Cospas-Sarsat satellite system.

The PLB has a press and release self-test facility, which operates as follows.

a) Power up the micro-controller, the CMAC oscillator and the GPS module.

b) Generate a burst at 121.5MHz, check the antenna RF level is above threshold.

c) Activate the 406.037MHz PLL and check that it is locked.

d) Generate an inverted frame 406.037MHz transmission. Check the antenna RF level is above threshold. (This also confirms the battery is capable of high current loads).

e) Confirm the GPS receiver has output normal NMEA sentences. (do not wait for a fix).

The self-test completes within 5s. If all of the above checks prove true then the white LED will flash three times.

Protection from repetitive self-test mode transmissions

Once the self-test sequence is complete the hardware is powered off, preventing repetitive self-test transmissions.

Self-test may only be re-initiated by deliberate intervention on the part of the user.

Neil Jordan
Engineering Manager
8-8-08

Product Service

Battery Transport Information

allbatteries

Transportation Assessment Trials

Certificate

Certificate No. TDG-91-156 21st November 2008
Issue No. 1

We hereby certify that the McMurdo Pocket PLB Battery Pack P/N 91-156 (when assembled with Panasonic CR123A cells in accordance with drawing number 91-156D, issue B) meets the current requirements and special provisions of the specifications below:

United Nations Recommendations on the Transport of Dangerous Goods.
European Agreement Concerning the International Carriage of Dangerous Goods by Road.
Code of Federal Regulations CFR 49, parts 100-185 Transportation.
International Civil Aviation Organisation – Technical Instructions for the Safe Transport of Dangerous Goods by Air.
International Air Transport Association Dangerous Goods Regulations.
International Maritime Organisation, International Maritime Dangerous Goods Code.

And has a Lithium Content of 1.12 g and therefore

may be transported as exempt from these regulations.

Signed for and on behalf of allbatteries UK Ltd.

Neil Scholey,
Technical Manager

ABD094 Issue 1

Product Service

Battery Declaration of Conformity

VARTA

Supplier's Declaration of Conformity

(in accordance with ISO/IEC 17050-1)

No.:	2008-08-04-01	
Issuer's name:	VARTA Microbattery GmbH	
Issuer's address:	Daimlerstr. 1 73479 Ellwangen / Germany	
Object of the declaration:	Article:	2/CR2/3AH 5K 5 WC
	Material no.:	701 099
	VKB no.:	06215 302 016
	McMurdo Part Code:	91-156

The object of the declaration described above is in conformity with the requirements of the following documents:

Documents No.	*Title*	*Edition / Date of issue*
ST/SG/AC.10/11/Rev.4	Recommendations on the Transport of Dangerous Goods, UN Manual of Tests and Criteria, Part III, subsection 38.3	2003

Additional information:

In original VARTA packaging the products comply to the following special provisions of international transport regulations:

- IATA: Special Provision A45
- ADR: Special Provision 188
- IMO/IMDG Code: Special Provision 188
- DOT / 49 CFR: Provision 173.185

Ellwangen, 04 August 2008

(place and date of issue)

VARTA Microbattery GmbH
Daimlerstr. 1
73479 Ellwangen
Germany

(company stamp)

i.A.

(signature)

(Dr. Rainer Josties)
General Manager
Quality Assurance

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
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www.varta-microbattery.com

Chairman of the Supervisory Board:
Mag. Klaus Semator

Executive Board:
Dipl.-Wirt.-Ing. Burghard Zimmann, MBA (CEO)
Dipl.-Ing. Herbert Schein (COO)
Mag. Hermann Mayrat (CFO)

Registered Office:
Hannover
Local Court:
Hannover HRB 59833

Product Service

Label Abrasion Information

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EMERGENCY LOCATION BEACONS

RTCM 11010.2 – A.20.6 Labelling

The product labels, Madico Graphic Films (03-665) are Thermal Transfer Printable Gloss Clear Vinyl Film. The labels provide excellent dimensional stability combined with good solvent, humidity, elevated temperature and UV resistance. The labels are very conformable and can be used on textured, contoured and low surface energy substrates. Designed to accept conventional inks and thermal transfer printing with resin and wax/resin ribbons. The labels are coated with P110 high performance acrylic which exhibits excellent adhesion on plastic surfaces combined with very good chemical and plasticiser resistance.

Tensile strength	- >20 N/mm	(ISO 527)
Tensile Elongation	>25 %	(ISO 527)
Dimensional Stability	<0.5mm	
Working Temperature Range	-40C to +100C	
Outdoor UV durability	10 years	

Abrasion

Scratch/Smudge

Apparatus	- Abrasimeter/Crockmeter
Unit of measure	- 680 Cg/cm Load
Test Results	- 200 cycles
Observations	- Text Readable

Solvent Ethanol & Petrol

Apparatus	- Abrasimeter/Crockmeter
Unit of measure	- 680 Cg/cm Load
Test Results	- 200 cycles
Observations	- Text Readable

Heat

Apparatus	- Hot Iron press tester/Iron tester
Unit of measure	- 100°C & 180°C x 3000g/cm x 3seconds
Observations	- Text Readable

Neil Jordan
Engineering Manager
11-2-09

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Registered in England No. 2600561 Registered Office: Tom Cribb Road, Thamesmead, London, SE28 0BH
VAT NO GB 626 3127 57

Product Service

EUT Labelling Diagrams

Scale: 1:1

Reference Length: 100 mm

NOTES:
DO NOT PRINT RED OUTLINE - Use as reference for cutter guide only.
Refer to McMurdo drawing 91-226D for details.
This electronic file is master artwork. Do NOT use a printed copy as master.

mcmurdo	DESCRIPTION: FASTFIND PLB REAR LABEL				
	DCN: C3811	APPROVED: NMJ	DATE: 19.12.08	ISSUE: 1	NUMBER: 91-226N

Product Service

Blank Media

Printed GPS
(US)

Printed Non-GPS
(UK)

Customer Service Paper Label
GPS (US)

Product Service

Scale: 1:1

Reference Length: 100 mm

NOTES:
Colour:- Yellow - C0 M0 Y100 K0 - OR NEAREST EQUIVALENT.
Refer to McMurdo drawing 91-206D for details.
This electronic file is master artwork. Do NOT use a printed copy as master.

Length : 230.0 mm
Width : 5.25 mm

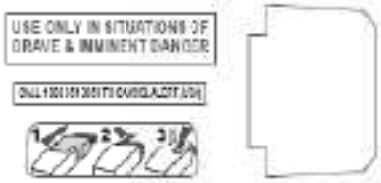
mcmurdo

DESCRIPTION				
POCKET PLB ANTENNA PRINTING				
DCN	APPROVED	DATE	ISSUE	NUMBER
C3818	NMJ	20.01.09	1	91-206N

Product Service

Scale: 1:1

Reference Length: 100 mm



NOTES:
DO NOT PRINT RED OUTLINE - Use as reference for cutter guide only.
Refer to McMurdo drawing 91-2120 for details.
This electronic file is master artwork. Do NOT use a printed copy as master.

mcmurdo

DESCRIPTION				
FASTFIND PLB PRODUCT LABELSET				
DCN	APPROVED	DATE	ISSUE	NUMBER
C3811	NMJ	19.12.08	2	91-212N

Product Service

Comprehensibility / Label Viewing Information and

RTCM 11010.2 – A.20.6 Labelling

RTCM States: *"All labeling essential to the safe and effective operation of the PLB shall be in high contrast to the background of the text or pictograph. Labeling and Pictograph instructions essential to the safe and effective operation of the PLB shall be sized such that they are readable by 4 out of 5 persons having 20/20 normal vision at a minimum viewing distance of 150mm with illumination no greater than 0.3lux."*

Essential to safe and effective operation:

- Lever label pictographs
- LED feedback pictograph on product label.
- ON button keypad printing
- Antenna label text

Lux meter was set-up in a screened room and the light level adjusted but leaving the door slightly ajar. Copies of the issued label set and the unit itself including keypad were placed on the table next to the light sensor. Five suitable persons were selected (with four out of the five recently having had their eyes test to confirm 20/20 vision). With light levels at 0.3lux the group found it possible to read all the operation guides listed above at a distance exceeding 150mm.

Photo showing set-up (Please note LUX meeting reads high due to camera flash)

Product Service

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EMERGENCY LOCATION BEACONS

In conclusion the group were able to clearly read the critical areas of the labelling at 0.3lux

Ben Connor
Mechanical Design Engineer
11.11.08

Product Service

ANNEX B

COSPAS-SARSAT TYPE APPROVAL CERTIFICATE(S)

Product Service

Cospas-Sarsat Type Approval Certificate (Fastfind PLB 200 & Fastfind PLB 201)

Database ID:	194-1				
TAC Number:	194	**TAC Date:**	06-Feb-09	**TAC Rev Date:**	
Beacon Model Name:	Fastfind PLB 200				
Additional Names:	Fastfind PLB 201				
Manufacturer:	Signature Industries Limited				
Tx Frequencies:	406.037 MHz	**In Production:**	Yes	**Class:**	2
Type: **FF=Float Free**	PLB	**Tested Life:** (24 / 48 hrs)	24		
Battery: **Manufacturer (Model, No of Cells)**	Lithium Manganese Dioxide, Varta Microbattery (CR 2/3AH, 4 cells) or Panasonic (CR 123A, 4 cells)				
Protocols Tested:	U	*Protocol Notes: U=User; UL=User-Location; SL=Standard Location; NL=National Location*			
Self Test:	Yes				
Self Test RF:	Yes	**Self Test RF (Short/Long):**	Short		
Self Test Format Flag:	Short	**Self Test Consistent with 15 Hex ID:**	Yes		
Homer Freq:	121.5 MHz	**Homer Duty Cycle:**	99 %		
Homer Power:	16.5 dBm				
Strobe Light:	No	**Strobe Brightness:**	N/A		
Strobe Duty Cycle:	N/A				
Nav Device:	N/A				
Nav Device Model:	N/A				
Separable Antenna:	No				
Antenna Model:	Integrated antenna				
Additional Functions:					
Comments General:	Beacon was tested in PLB configurations only, corresponding to beacon operation while "on ground" and "above ground"				
TAC Rev History:					
Database ID:	194-1				

Product Service

Cospas-Sarsat Type Approval Certificate (Fastfind PLB 210 & Fastfind PLB 211)

Database ID:	194-2				
TAC Number:	194	**TAC Date:**	06-Feb-09	**TAC Rev Date:**	
Beacon Model Name:	Fastfind PLB 210				
Additional Names:	Fastfind PLB 211				
Manufacturer:	Signature Industries Limited				
Tx Frequencies:	406.03 / MHz	**In Production:**	Yes	**Class:**	2
Type: **FF=Float Free**	PLB			**Tested Life:** **(24 / 48 hrs)**	24
Battery: **Manufacturer (Model, No of Cells)**	Lithium Manganese Dioxide, Varta Microbattery (CR 2/3AH, 4 cells) or Panasonic (CR 123A, 4 cells)				
Protocols Tested:	NL, SL, UL	*Protocol Notes: U=User; UL=User-Location; SL=Standard Location; NL=National Location*			
Self Test:	Yes				
Self Test RF:	Yes	**Self Test RF (Short/Long):**	Short		
Self Test Format Flag:	Long	**Self Test Consistent with 15 Hex ID:**	Yes		
Homer Freq:	121.5 MHz	**Homer Duty Cycle:**	99%		
Homer Power:	16.6 dBm				
Strobe Light:	No	**Strobe Brightness:**	N/A		
Strobe Duty Cycle:	N/A				
Nav Device:	Int				
Nav Device Model:	uBlox model "LEA 5A"				
Separable Antenna:	No				
Antenna Model:	Integrated antenna				
Additional Functions:	GNSS Self-test				
Comments General:	Beacon was tested in PLB configurations only, corresponding to beacon operation while "on ground" and "above ground"				
TAC Rev History:					
Database ID:	194-2				