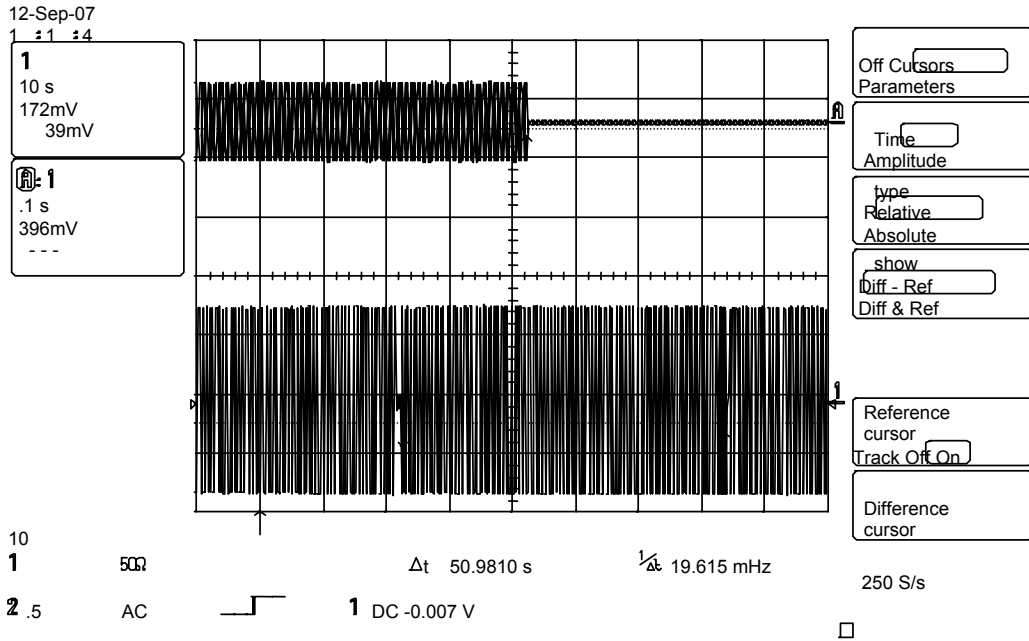
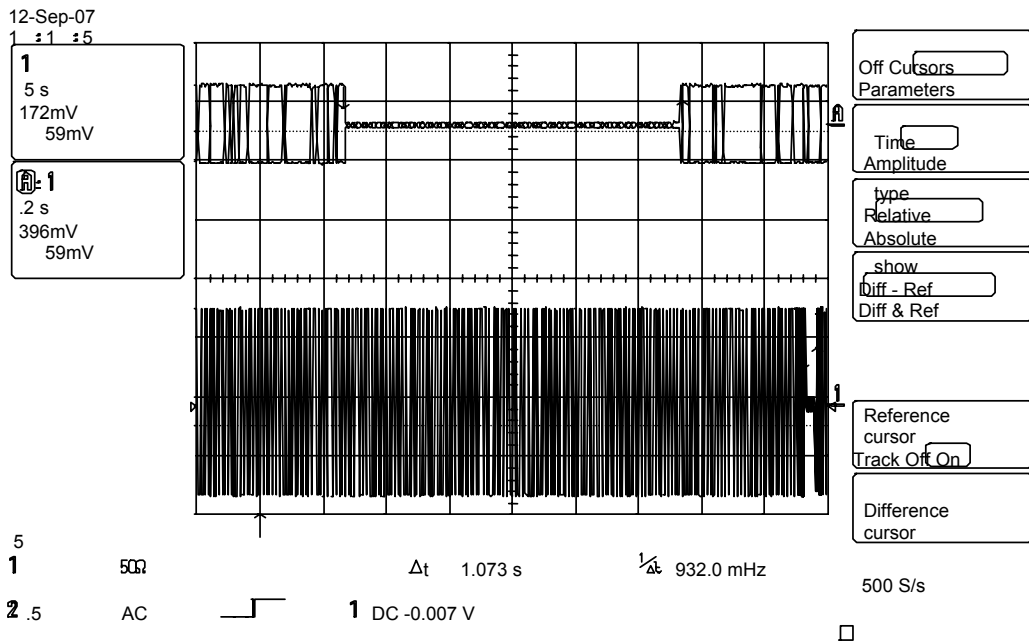




Product Service



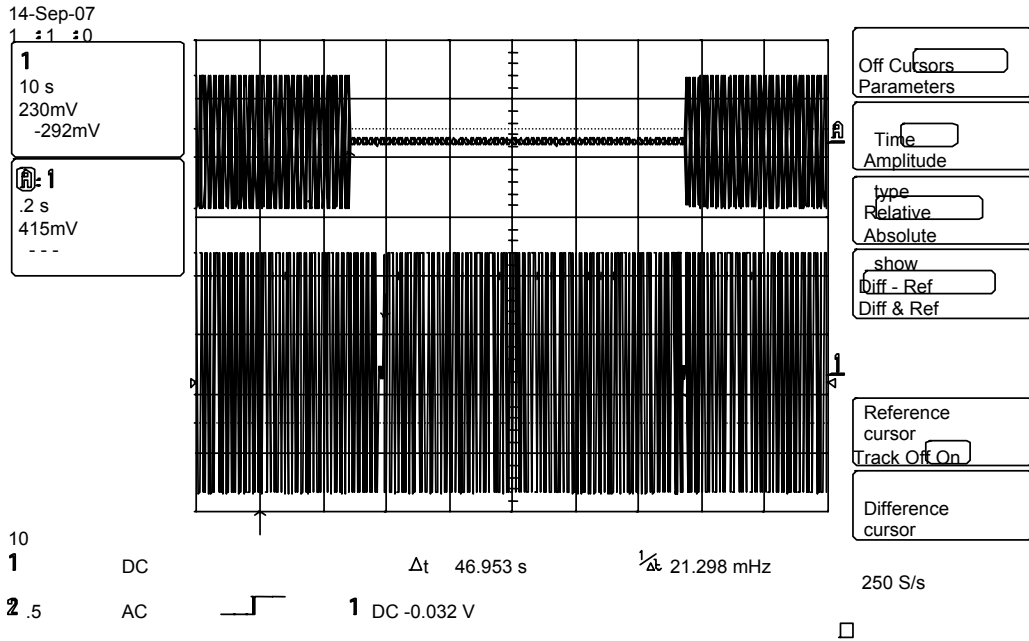
Plot showing 121.5MHz Transmission Duration (High Temperature, +55°C)



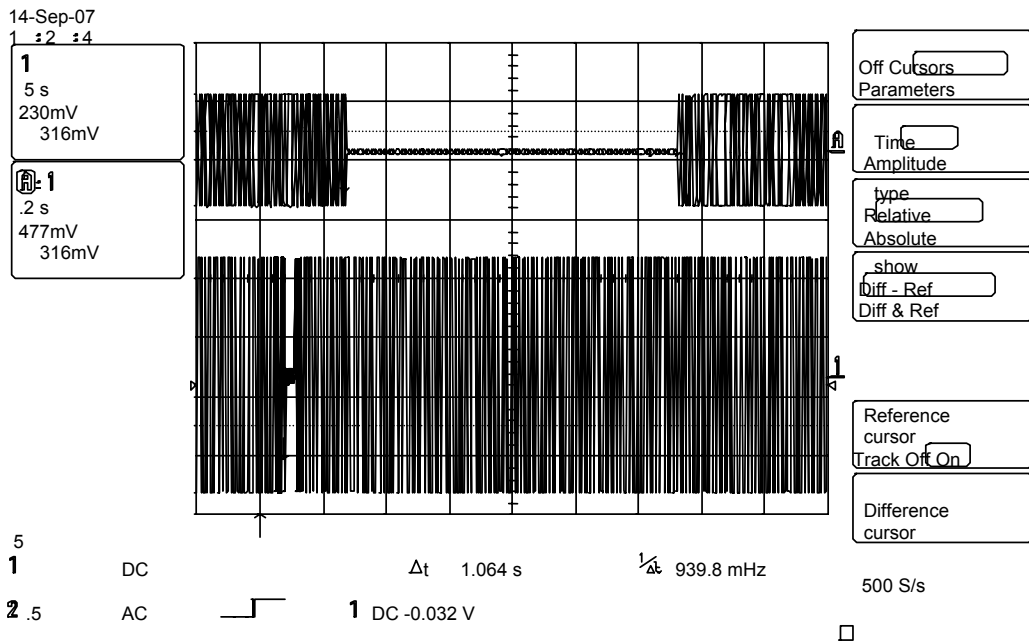
Plot showing 121.5MHz Transmission Interruption Duration (High Temperature, +55°C)



Product Service



Plot showing 121.5MHz Transmission Duration (Low Temperature, -20°C)



Plot showing 121.5MHz Transmission Interruption Duration (Low Temperature, -20°C)



Product Service

2.21 MODULATION CHARACTERISTICS (MODULATION FREQUENCY AND SWEEP REPETITION RATE, MODULATION DUTY CYCLE)

2.21.1 Specification Reference

RTCM Paper 77-2002/SC110-STD, Clause A17.2

2.21.2 Equipment Under Test

Tron 40GPS MkII, Serial Number 001

2.21.3 Date of Test and Modification State

Test at +55°C: 14 September 2007 - Modification State 7
 Test at -20°C: 13 September 2007 - Modification State 7

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 Test Set-up and Operating Modes

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

2.21.6 Test Procedure

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

2.21.7 Test Results

Parameter	Units	Test Results	
		T _{min} (-20°C)	T _{max} (+55°C)
Frequency Range	Hz	944.30	945.75
Minimum Frequency	Hz	387.30	385.36
Maximum Frequency	Hz	1331.6	1331.1
Sweep Direction	Upward / Downward	Downward	Downward
Modulation Duty Cycle	%	33.61	35.73
Sweep repetition rate	sweeps per second (Hz)	2.61	2.70



Product Service

2.22 MODULATION CHARACTERISTICS (MODULATION FACTOR)

2.22.1 Specification Reference

RTCM Paper 77-2002/SC110-STD, Clause A17.2

2.22.2 Equipment Under Test

Tron 40GPS MkII, Serial Number 001

2.22.3 Date of Test and Modification State

Test at +55°C: 14 September 2007 - Modification State 7
 Test at -20°C: 13 September 2007 - Modification State 7

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 Test Set-up and Operating Modes

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

2.22.6 Test Procedure

Using an oscilloscope the 121MHz transmission was observed; peak and trough voltages (“A” and “B” respectively) were measured. The Modulation Factor was then calculated using the following formula:

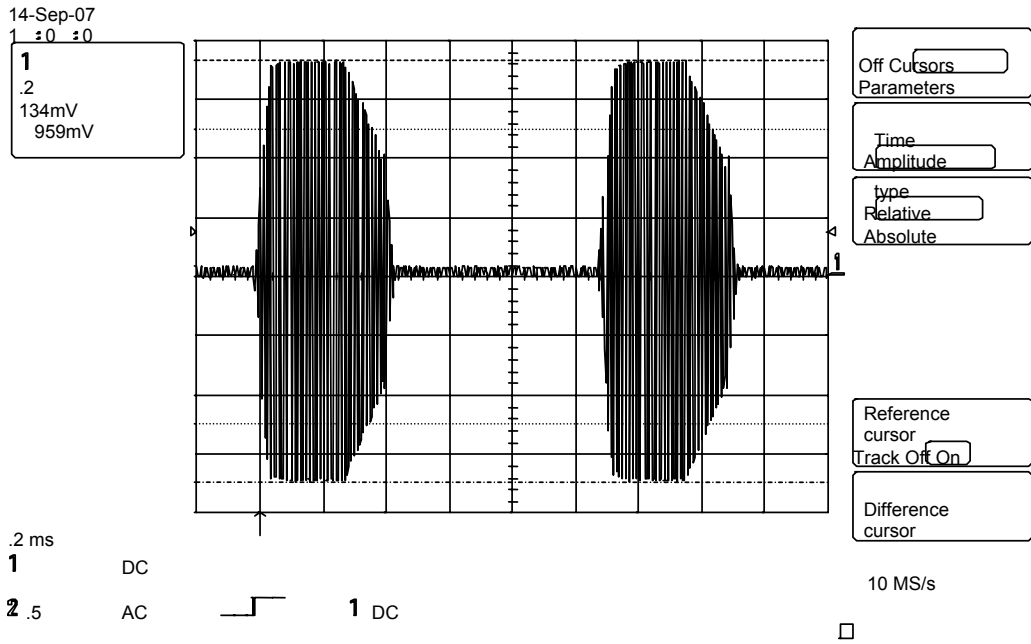
$$\text{Modulation Factor} = \frac{A - B}{A + B}$$

2.22.7 Test Results

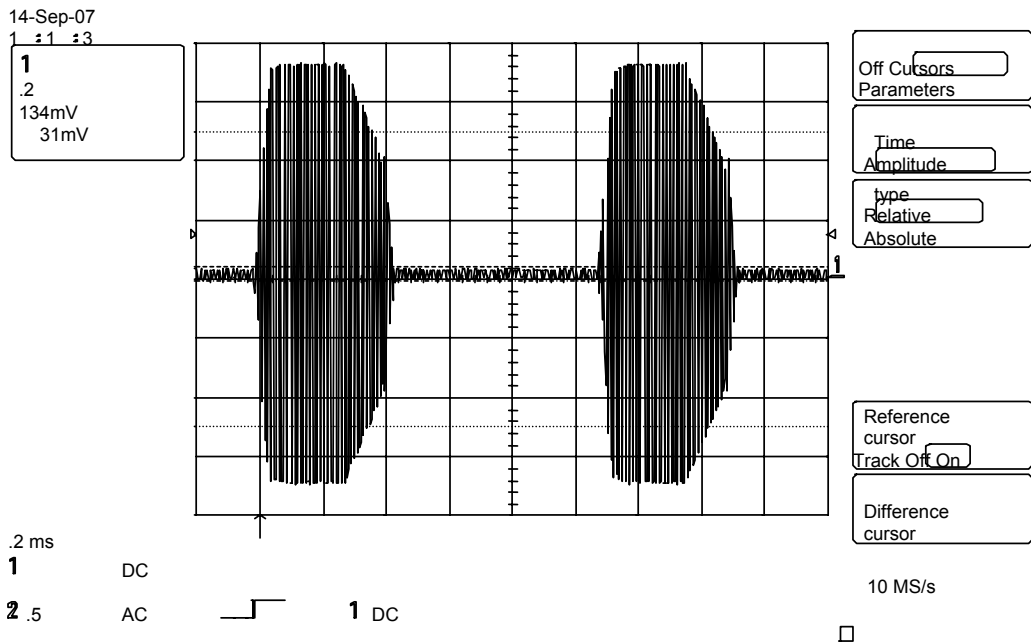
Parameter	Units	Test Results	
		T _{min} (-20°C)	T _{max} (+55°C)
A	mv	456	959
B	mv	31	31
Modulation Duty Cycle	%	87.3	93.7



Product Service



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

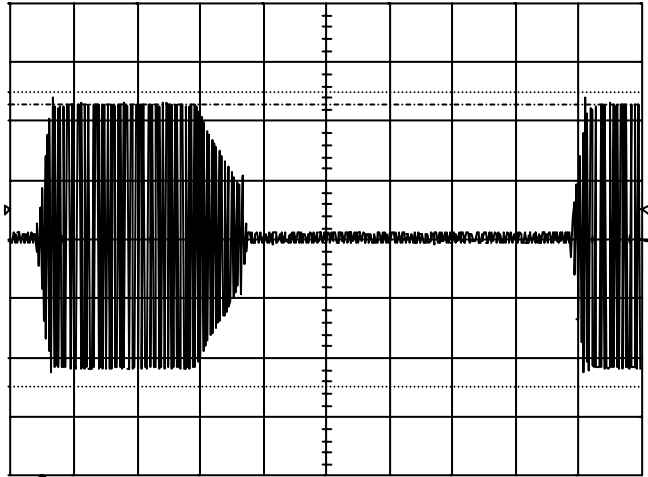


Plot Showing "B" (High Temperature, +55°C)



13-Sep-07
16 : 32 : 39

1
.2 ms
200mV
456mV



.2 ms
1 .2 V DC
2 .5 V AC



1 DC 0.100 V

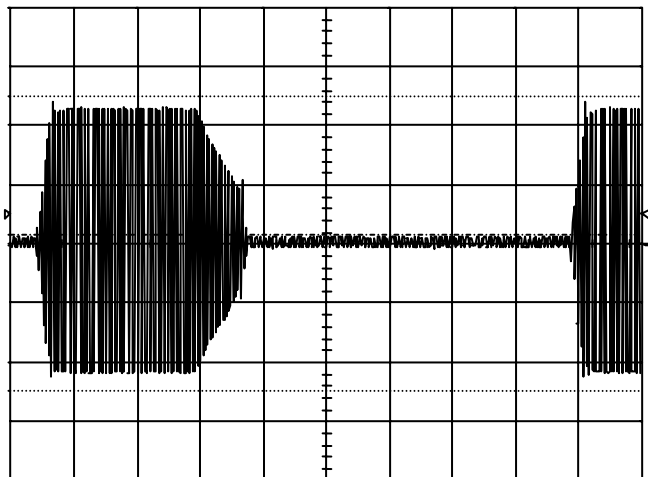
10 MS/s

STOPPED

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

13-Sep-07
16 : 34 : 35

1
.2 ms
200mV
31mV



.2 ms
1 .2 V DC
2 .5 V AC



1 DC 0.100 V

10 MS/s

STOPPED

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



Product Service

2.23 MODULATION CHARACTERISTICS (FREQUENCY COHERENCE)

2.23.1 Specification Reference

RTCM Paper 77-2002/SC110-STD, Clause A17.2

2.23.2 Equipment Under Test

Tron 40GPS MkII, Serial Number 001

2.23.3 Date of Test and Modification State

Test at +55°C:	14 September 2007	- Modification State 7
Test at -20°C:	12 September 2007	- Modification State 7

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 Test Set-up and Operating Modes

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

2.23.6 Test Procedure

Using a spectrum analyser the 121MHz transmission was observed, using the “max hold” (peak hold) function combined with a “clear write” trace for instantaneous information on the timing of the 121MHz transmission cessation for 406MHz transmission.

The following test results were checked to show that 30% of the output power of the EUT lies within $\pm 30\text{Hz}$ of the carrier. The results were also checked for evidence that the carrier does not shift more than $\pm 30\text{Hz}$ when 121MHz transmission resumes after the 406MHz burst.

The modulation was disabled by means of a dipswitch on the EUT main PCB for the purposes of this test.

2.23.7 Test Results

The following plots show that 30% of the output power of the EUT does lie within $\pm 30\text{Hz}$ of the carrier.

The frequency drift plots (with two traces) show the outline of the transmitted RF (121.5 MHz) before and after the interruption for the 406 MHz RF burst. It can be seen that the peaks are less than $\pm 30\text{Hz}$ from one another. I.e. carrier did not shift by more than $\pm 30\text{Hz}$.



Product Service

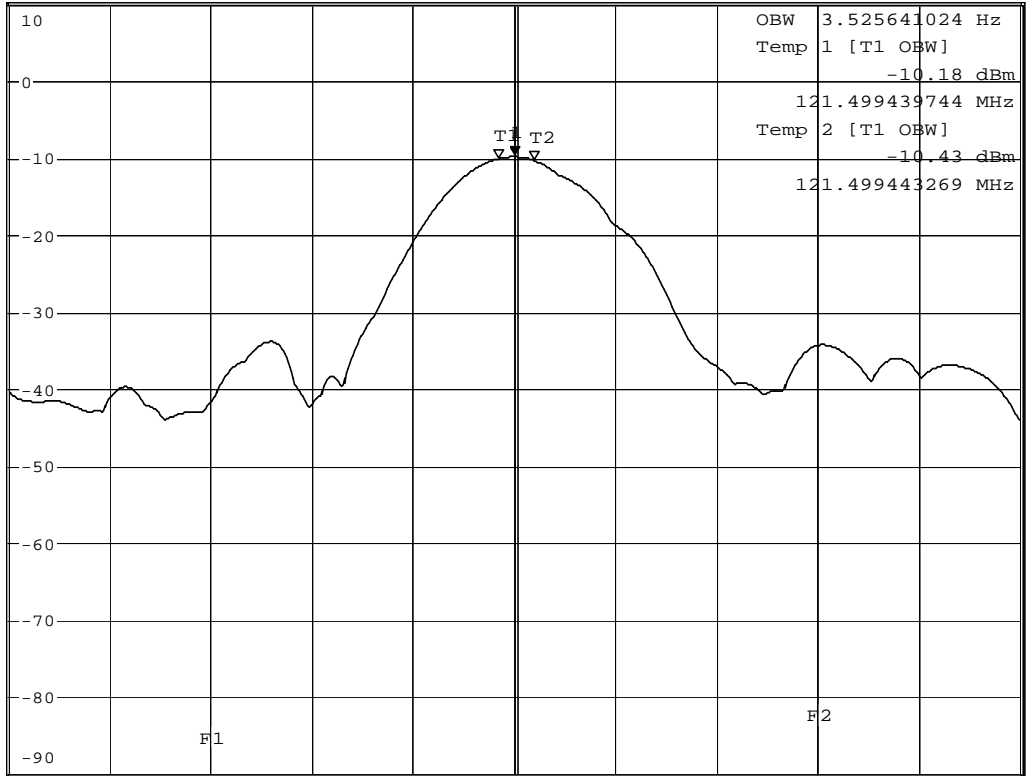


*RBW 10 Hz Marker 1 [T1]
 VBW 30 Hz -9.94 dBm
 SWT 1 s 121.499441346 MHz

Ref 10 dBm

Att 15 dB

1 PK
 VIEW



Center 121.4994413 MHz 10 Hz/ Span 100 Hz

Date: 14.SEP.2007 15:04:23

Frequency Coherence – High (+55°C)



Product Service

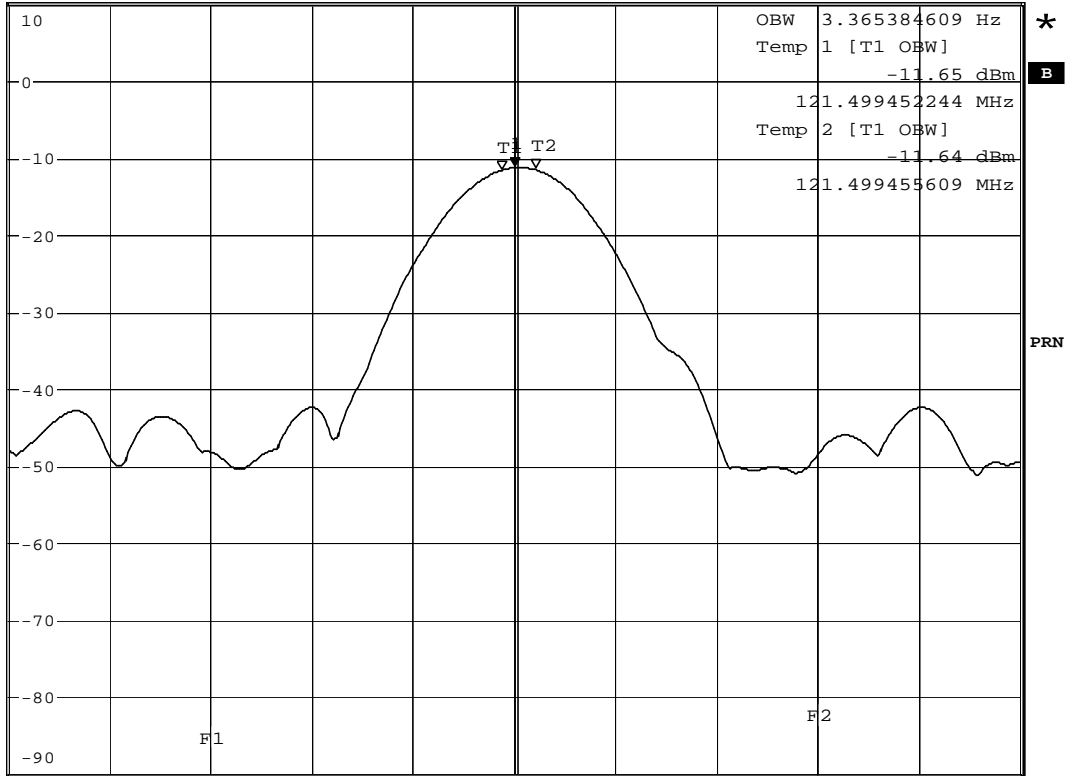


RBW 10 Hz Marker 1 [T1]
 VBW 30 Hz -11.32 dBm
 SWT 1 s 121.499453526 MHz

Ref 10 dBm

Att 15 dB

1 PK
VIEW



Center 121.4994535 MHz 10 Hz/ Span 100 Hz

Date: 12.SEP.2007 10:00:18

Frequency Coherence – Low (-20°C)



Product Service



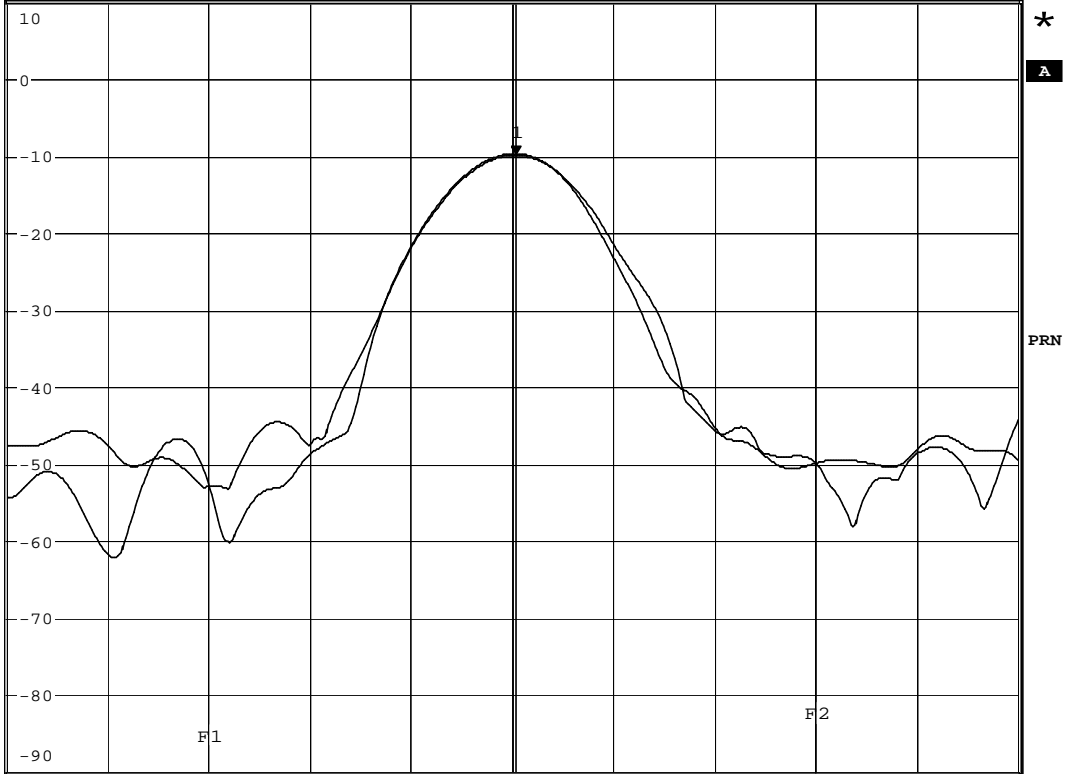
*RBW 10 Hz Marker 1 [T1]
VBW 30 Hz -9.98 dBm
SWT 1 s 121.499441346 MHz

Ref 10 dBm

Att 35 dB

1 PK
VIEW

2 AP
VIEW



Center 121.499441 MHz 10 Hz/ Span 100 Hz

Date: 14.SEP.2007 18:18:47

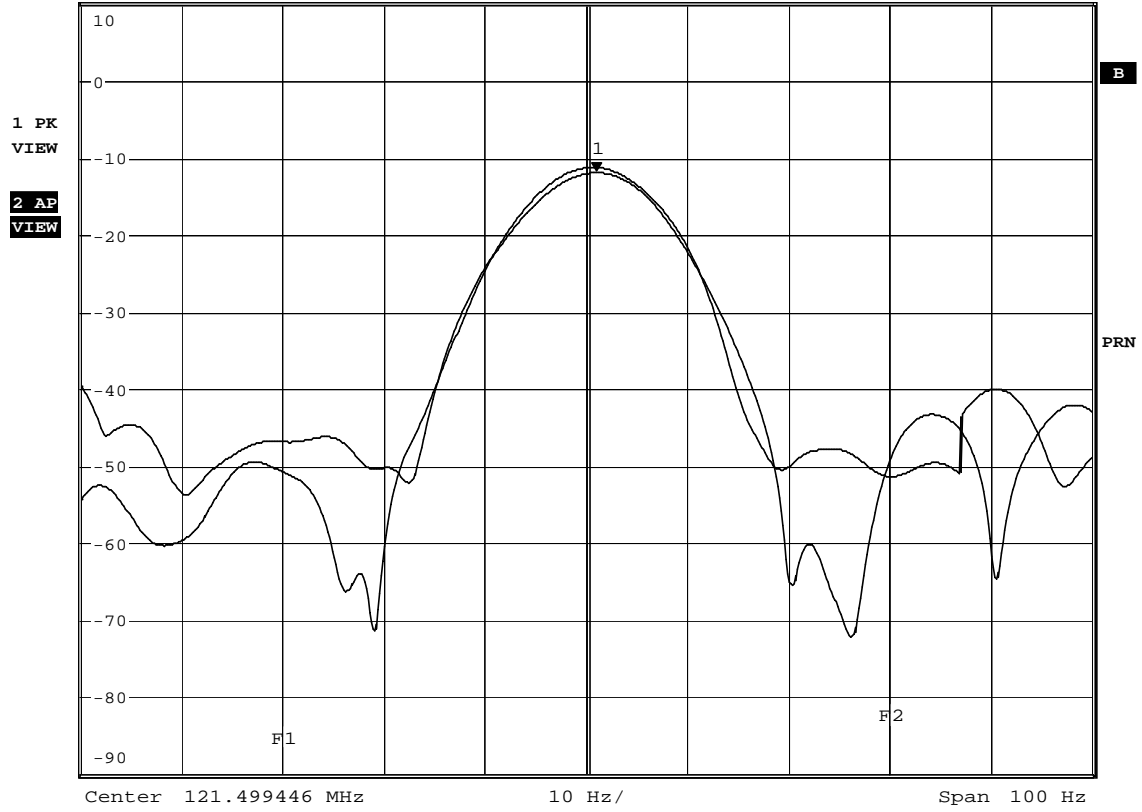
Frequency Drift – High (+55°C)



Product Service



Ref 10 dBm Att 35 dB RBW 10 Hz Marker 1 [T1]
VBW 30 Hz -12.00 dBm
SWT 1 s 121.499446955 MHz



Date: 12.SEP.2007 10:08:00

Frequency Drift – Low (-20°C)



Product Service

2.24 PEAK EFFECTIVE RADIATED POWER

2.24.1 Specification Reference

RTCM Paper 77-2002/SC110-STD, Clause A17.3

2.24.2 Equipment Under Test

Tron 40S MkII, Serial Number 003

2.24.3 Date of Test and Modification State

25 October 2007 - Modification State 7

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 Test Set-up and Operating Modes

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

2.24.6 Test Results

Note: EUT battery used for test had been operational in the same beacon for a duration of »44hours.

Measurements were made (in dBm) at an arbitrarily chosen azimuth angle across a range of elevation angles. 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	57.3	-	-	-	-	-	-	-	-	-	-	-
10	82.9	-	-	-	-	-	-	-	-	-	-	-
15	88.2	86.2	76.8	71.7	68.4	75.0	84.2	90.2	82.3	80.4	76.8	80.4
20	74.0	-	-	-	-	-	-	-	-	-	-	-

The median result was calculated to be 79.3mW, or 18.99dBm.

The ratio between the maximum and minimum of the highest 11 values was calculated to be 1.26 (showing the antenna to be radiating almost equally in all directions, hence, omnidirectional)



Product Service

2.25 VSWR MEASUREMENT

2.25.1 Specification Reference

RTCM Paper 77-2002/SC110-STD, Clause A17.1

2.25.2 Test Results

Antenna is not removable, hence test is not applicable.



Product Service

2.26 HUMIDITY TEST

2.26.1 Specification Reference

RTCM Paper 77-2002/SC110-STD, Clause A18

2.26.2 Equipment Under Test

Tron 40S MkII, Serial Number 002

2.26.3 Date of Test and Modification State

18 to 19 October 2007 - Modification State 7

2.26.4 Test Equipment Used

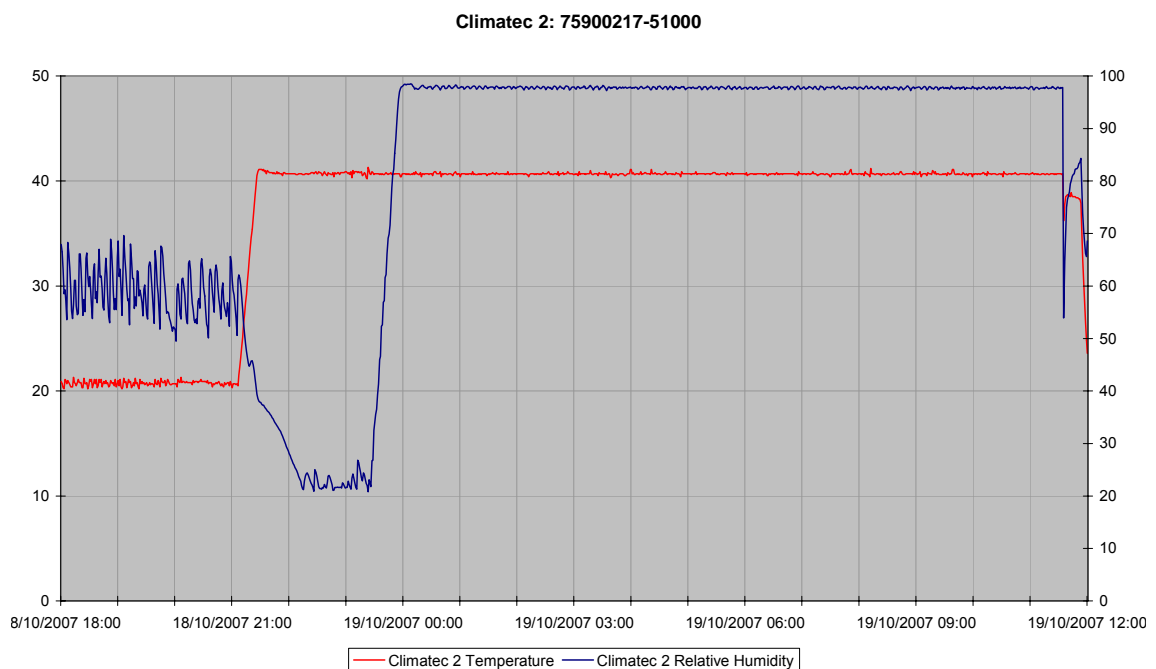
The major items of test equipment used for the above tests are identified in Section 3.1.

2.26.5 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.

2.26.6 Environmental Conditions

Humidity Test Conditions Plot





Product Service

2.26.7 Test Results

The EUT was subjected to an Aliveness Test before the commencement of testing, see Beacon Test Report below.

18th October 2007

The EUT was dismantled, exposing the internal electrical components to the humid test environment.

The EUT was positioned in the climatic chamber. The chamber conditions were adjusted to +40°C, 97% RH. The chamber conditions were maintained for a period of 11 hours 30 minutes.

19th October 2007

The EUT was removed from the chamber into laboratory ambient conditions. The EUT was powered on immediately after being removed from the chamber. An Aliveness Test was performed 15 minutes after the EUT was removed from the chamber, see Beacon Test Report below.



Product Service

Beacon Test Report (Pre-test)

Beacon Test Report

193DE847E0FFBFF

Organization:
Tested By:
Date: 17-Oct-07 6:33:50 PM
Tester Model/Serial No./File Name: BT100S/1025/jo epirb pre hum-1
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 24°C

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

Notes: Add text comments here.

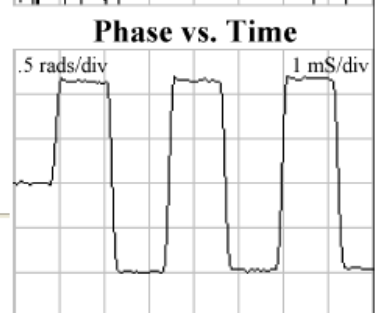
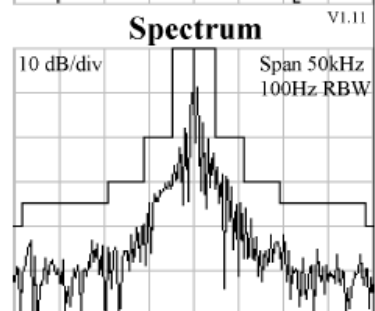
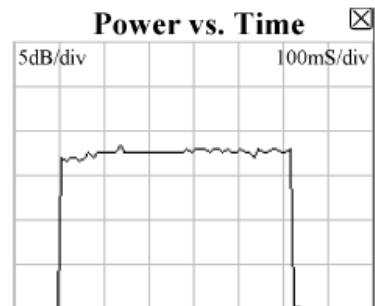
15 Hex ID: 193DE847E0FFBFF
Full Hex: FFFED08C9EF423F07FDFFA53F7F783E0F66C
Burst Mode: Self Test Mode (Long)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 15999984

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

406 MHz Measurements
406 Frequency (INT REF): 406.0371 MHz
406 Power (INT ANT): 46%
Power Rise Time: < 5 ms
Phase Deviation: -0.98 +1.15 radians
Modulation Rise Time: 142 uS
Modulation Fall Time: 117 uS
Modulation Symmetry: 0.8%
Modulation Bit Rate: 399.5 bps
CW Preamble: 159.5 ms

121.5 MHz Measurements
121 Frequency (INT REF): Detected.
121 Power (INT ANT): 15%
Signal was unmodulated.

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: The "Tester Cal Due Date" is expired; this item of test equipment is "TU": Traceability Unscheduled.



Product Service

Beacon Test Report (Post-Test)

Beacon Test Report

193DE847E0FFBFF

Organization:
Tested By:
Date: 19-Oct-07 1:08:43 PM
Tester Model/Serial No./File Name: BT100S/1025/0217-posthumid-3
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 26°C

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

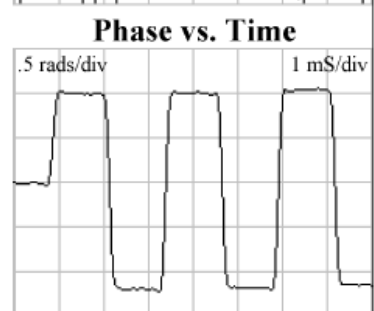
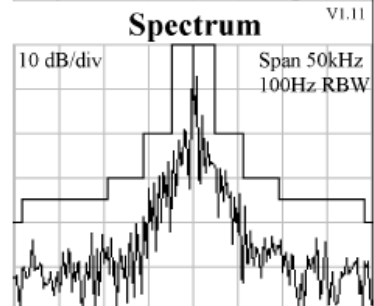
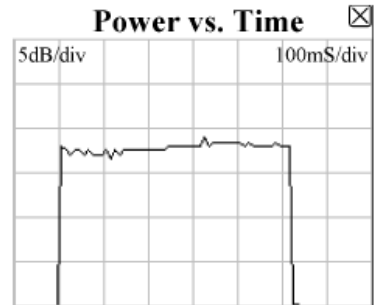
Notes: Add text comments here.

15 Hex ID: 193DE847E0FFBFF
Full Hex: FFFE2F8C9EF423F07FDFFA53F7F783E0F66C
Burst Mode: Normal Mode (Long)
Protocol: Standard Test Protocol
Country 201: Albania
Bits 41 - 64: 15999984

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

406 MHz Measurements
406 Frequency (INT REF): 406.037 MHz
406 Power (INT ANT): 62%
Power Rise Time: < 5 ms
Phase Deviation: -1.19 +1 radians
Modulation Rise Time: 130 uS
Modulation Fall Time: 142 uS
Modulation Symmetry: 0.8%
Modulation Bit Rate: 399.7 bps
CW Preamble: 160.6 ms

121.5 MHz Measurements
121 Frequency (INT REF): 121.4995 MHz
121 Power (INT ANT): 51%
Sweep Direction: Downwards
Audio Frequency: 375 Hz to 1250 Hz
Sweep Range: 875 Hz
Sweep Rep Rate: 2.6 Hz
Modulation Factor: 87 %
Duty Cycle: 40 %



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Note: The "Tester Cal Due Date" is expired; this item of test equipment is "TU": Traceability Unscheduled.



Product Service

2.27 ORIENTATION TEST**2.27.1 Specification Reference**

RTCM Paper 77-2002/SC110-STD, Clause A17.1

2.27.2 Equipment Under Test

Tron 40GPS MkII, Serial Number 001

2.27.3 Date of Test and Modification State

25 January 2008 - Modification State 7

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 Set-up and Operating Modes

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

2.27.6 Environmental Conditions

Ambient Temperature	21.8°C
Relative Humidity	35%
Atmospheric Pressure	1032mbar

2.27.7 Test Procedure

The EUT was connected to two beacon testers (one to the 406MHz output for Aliveness test results and one to the 121MHz homer output for verification of auxiliary radio-locating transmitter operation via audible demodulation). The strobe light's operation was verified visually.

The following results were obtained in the appropriate orientations as per "Specification Reference", above.

2.27.8 Test Results

The strobe light and auxiliary radio-locating transmitter (121MHz homer) operated uninterrupted throughout the test.

The following aliveness test results were obtained the stated number of minutes after the EUT was placed in the appropriate orientation.



Product Service

Vertical Beacon Orientation (Initial, 15 minutes)

Beacon Test Report

A02D4001940017D

Organization:

Tested By:

Date: 25-Jan-08 1:33:09 PM

Tester Model/Serial No./File Name: BT100S/1025/00217_Orientation-19

Tester Cal Due Date: Nov 10, 2006

Tester Temperature: 29°C



PASS



FAIL

INITIALS: _____

Notes: Add text comments here.

15 Hex ID: A02D4001940017D

Full Hex: FFFE2F5016A000CA000BEFC00FD0

Burst Mode: Normal Mode (Short)

Protocol: Serial EPIRB Automatic Protocol

Country 257: Norway

National use: Not Used

C/S Approval #: 95

Serial Number: 101

Auxiliary Radio: 121.5 MHz

Emergency type: Unspecified

Activation type: Auto

406 MHz Measurements

406 Frequency (INT REF): 406.0372 MHz

406 Power (INT ANT): 82%

Power Rise Time: < 5 ms

Phase Deviation: -1.07 +1.08 radians

Modulation Rise Time: 130 uS

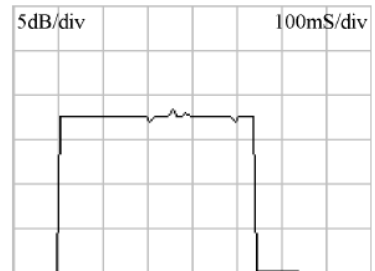
Modulation Fall Time: 130 uS

Modulation Symmetry: 0.4%

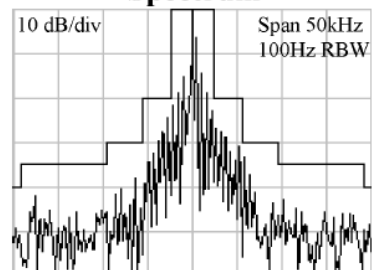
Modulation Bit Rate: 399.7 bps

CW Preamble: 161 ms

Power vs. Time



Spectrum V1.11



Phase vs. Time



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Note: 82% Power is equivalent to 36.9dBm – a check at the time of the test was made to verify this. Furthermore, the “Tester Cal Due Date” is expired; this item of test equipment is “TU”: Traceability Unscheduled.



Product Service

Horizontal Beacon Orientation (2 minutes)

Beacon Test Report

A02D4001940017D

Organization:

Tested By:

Date: 25-Jan-08 1:36:32 PM

Tester Model/Serial No./File Name: BT100S/1025/00217_Orientation-23

Tester Cal Due Date: Nov 10, 2006

Tester Temperature: 30°C



PASS



FAIL

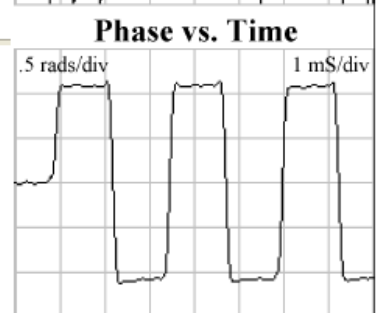
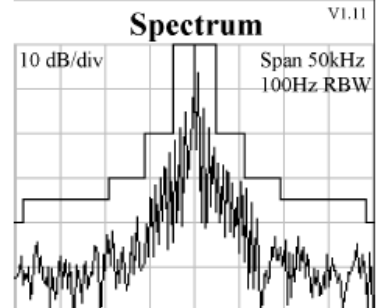
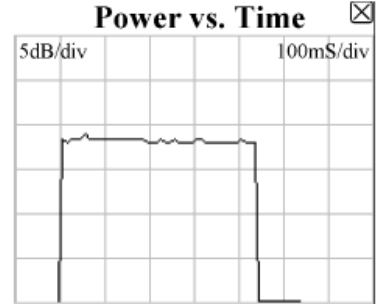
INITIALS: _____

Notes: Add text comments here.

15 Hex ID: A02D4001940017D
Full Hex: FFFE2F5016A000CA000BEFC00FD0
Burst Mode: Normal Mode (Short)
Protocol: Serial EPIRB Automatic Protocol
Country 257: Norway
National use: Not Used
C/S Approval #: 95
Serial Number: 101
Auxiliary Radio: 121.5 MHz
Emergency type: Unspecified
Activation type: Auto

406 MHz Measurements
406 Frequency (INT REF): 406.0372 MHz
406 Power (INT ANT): 82%
Power Rise Time: < 5 ms
Phase Deviation: -1.08 +1.08 radians
Modulation Rise Time: 130 uS
Modulation Fall Time: 117 uS
Modulation Symmetry: 0.3%
Modulation Bit Rate: 399.7 bps
CW Preamble: 160.6 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.



Note: 82% Power is equivalent to 36.9dBm – a check at the time of the test was made to verify this. Furthermore, the “Tester Cal Due Date” is expired; this item of test equipment is “TU”: Traceability Unscheduled.



Product Service

Inverted Beacon Orientation (2 minutes)

Beacon Test Report

A02D4001940017D

Organization:

Tested By:

Date: 25-Jan-08 1:39:02 PM

Tester Model/Serial No./File Name: BT100S/1025/00217_Orientation-26

Tester Cal Due Date: Nov 10, 2006

Tester Temperature: 30°C



PASS



FAIL

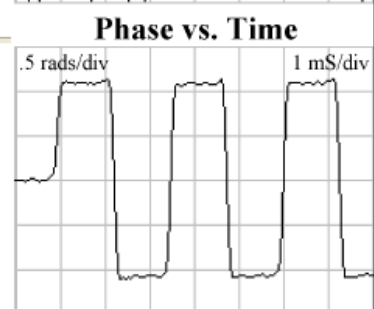
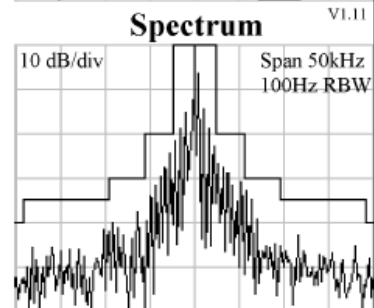
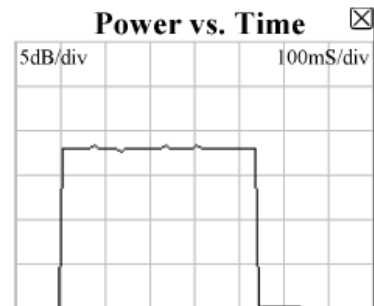
INITIALS: _____

Notes: Add text comments here.

15 Hex ID: A02D4001940017D
 Full Hex: FFFE2F5016A000CA000BEFC00FD0
 Burst Mode: Normal Mode (Short)
 Protocol: Serial EPIRB Automatic Protocol
 Country 257: Norway
 National use: Not Used
 C/S Approval #: 95
 Serial Number: 101
 Auxiliary Radio: 121.5 MHz
 Emergency type: Unspecified
 Activation type: Auto

406 MHz Measurements
 406 Frequency (INT REF): 406.0372 MHz
 406 Power (INT ANT): 82%
 Power Rise Time: < 5 ms
 Phase Deviation: -1.07 +1.08 radians
 Modulation Rise Time: 130 uS
 Modulation Fall Time: 117 uS
 Modulation Symmetry: 0.4%
 Modulation Bit Rate: 399.7 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.



Note: 82% Power is equivalent to 36.9dBm – a check at the time of the test was made to verify this. Furthermore, the “Tester Cal Due Date” is expired; this item of test equipment is “TU”: Traceability Unscheduled.



Product Service

Vertical Beacon Orientation (Final, 2 minutes)

Beacon Test Report

A02D4001940017D

Organization:
Tested By:
Date: 25-Jan-08 1:41:33 PM
Tester Model/Serial No./File Name: BT100S/1025/00217_Orientation-29
Tester Cal Due Date: Nov 10, 2006
Tester Temperature: 30°C

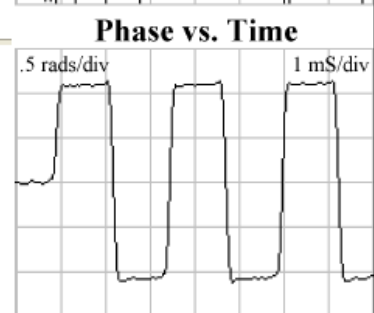
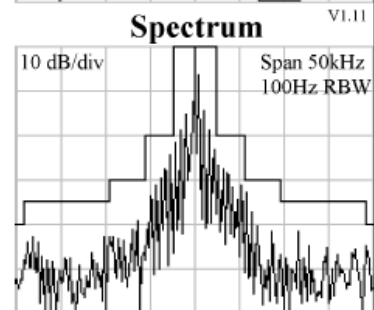
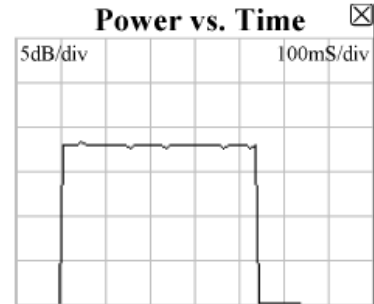
PASS
 FAIL
 INITIALS: _____

Notes: Add text comments here.

15 Hex ID: A02D4001940017D
Full Hex: FFFE2F5016A000CA000BEFC00FD0
Burst Mode: Normal Mode (Short)
Protocol: Serial EPIRB Automatic Protocol
Country 257: Norway
National use: Not Used
C/S Approval #: 95
Serial Number: 101
Auxiliary Radio: 121.5 MHz
Emergency type: Unspecified
Activation type: Auto

406 MHz Measurements
406 Frequency (INT REF): 406.0372 MHz
406 Power (INT ANT): 83%
Power Rise Time: < 5 ms
Phase Deviation: -1.07 +1.09 radians
Modulation Rise Time: 130 uS
Modulation Fall Time: 130 uS
Modulation Symmetry: 0%
Modulation Bit Rate: 399.7 bps
CW Preamble: 160.8 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.



Note: 83% Power is equivalent to 37.0dBm – a check at the time of the test was made to verify this. Furthermore, the “Tester Cal Due Date” is expired; this item of test equipment is “TU”: Traceability Unscheduled.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.23 Beacons - 121 Frequency Coherence				
Climatic Chamber	Heraeus Votsch	VM 04/100	85	O/P Mon
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Attenuator (10dB)	Weinschel	47-10-34	481	26-Feb-2008
Filter, Broadband	Texscan	8BC-134-67-3-BB	1241	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	24-Jul-2008
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	30-May-2008
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	18-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	18-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3357	18-Apr-2008
Section 2.4 Vibration – Sine and Bump				
Charge Amplifier	Endevco	133	2506	28-Sep-2007
Vibration Controller	Hewlett Packard	E1434A	2507	2-Mar-2007
Vibration System	Ling Dynamic Systems	LAS V964	2515	1-May-2007
Charge Amplifier	Endevco	133	2725	6-Jul-2007
Isotron Accelerometer	Endevco	256-10	3111	23-Feb-2007
Isotron Accelerometer	Endevco	256-10	3113	22-Feb-2007
Isotron Accelerometer	Endevco	256-10	3114	22-Feb-2007
Isotron Accelerometer	Endevco	256-10	3119	27-Feb-2007



Product Service

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Sections 2.19, 2.20 & 2.21 Beacons – 121 Modulation and Frequency Characteristics				
Climatic Chamber	Heraeus Votsch	VM 04/100	85	O/P Mon
Rubidium Frequency Standard	Quartzlock	A10-B	92	22-Dec-2007
Signal Generator	Hewlett Packard	8644A	96	11-Jan-2008
Beacon 50Ω Unit	TUV	50Ω	97	TU
Attenuator 10Db 25W	Weinschel	46-10-43	400	13-Apr-2008
Attenuator (10Db, 10W)	Weinschel	23-10-34	470	19-Jun-2008
Attenuator (10Db)	Weinschel	47-10-34	481	26-Feb-2008
Load (50Ω, 15W)	Diamond Antenna	DL-30N	822	5-Sep-2008
Climatic Chamber	Unitemp	MINISTRAT	2129	18-Sep-2007
Distress Beacon 50Ω Unit	TUV	-	2445	TU
Beacon 50Ω Unit	TUV	50Ω	3066	TU
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Termination (50Ω, 6W)	Micronde	R404613	3074	24-Feb-2008
Termination (50Ω, 1W)	Suhner	-	3080	24-Feb-2008
Termination (50Ω, 2W)	Omni-Spectra	3001-6100	3081	24-Feb-2008
Termination (50Ω, 15W)	Diamond Antenna	DL-30N	3096	16-Mar-2008
Attenuator (3Db, 20W)	Aeroflex / Weinschel	23-3-34	3162	19-Jun-2008
Attenuator (3Db, 20W)	Aeroflex / Weinschel	23-3-34	3163	30-May-2008
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
Time Interval Analyser	Yokogawa	TA720 704510	3253	4-Oct-2007
Scope Corder	Yokogawa	DL750 701210	3254	9-Oct-2007
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	18-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3357	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3358	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3359	18-Apr-2008



Instrument	Manufacturer	Type No	TE Number	Calibration Due
Sections 2.19, 2.20 & 2.21 Beacons – 121 Modulation and Frequency Characteristics (Continued)				
Cable (3m, N-type)	Rhophase	NPS-1601-3000-NPS	3360	18-Apr-2008
Cable (3m, N-type)	Rhophase	NPS-1601-3000-NPS	3361	18-Apr-2008
Section 2.22 Beacons - 121 Modulation Factor				
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Attenuator (10dB)	Weinschel	47-10-34	481	26-Feb-2008
Sensor Module	Hewlett Packard	11722A	1333	21-Nov-2007
Climatic Chamber	Unitemp	MINISTRAT	2129	18-Sep-2007
Oscilloscope	Lecroy	9370	2832	21-Sep-2007
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Modulation Analyser	Hewlett Packard	8901B	3292	20-Nov-2007
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	18-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	18-Apr-2008
Section 2.24 Beacons - Antenna Characteristics (“Peak Effective Radiated Power”)				
Antenna, (Tuned Dipole Set)	Roberts Antenna	A-100	569	TU
Spectrum Analyser	Hewlett Packard	8568B	571	4-Jan-2008
Signal Generator	Rohde & Schwarz	SMS-2/28	1431	2-May-2008
Antenna Mast	EMCO	1050	1707	TU
Turntable Controller	Various	RH253	1708	TU
Open Area Site 2	TUV	OATS2	1850	3-Oct-2008
Antenna Tower 6M	EMCO	1050	1859	TU
Roberts Antenna 406MHz	Compliance Design	-	1860	29-Jun-2009
Roberts Antenna 406MHz	Compliance Design	-	1861	12-Sep-2007
Test Receiver	Rohde & Schwarz	ESIB40	2941	19-Oct-2008



Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.10 Beacons - 121 Spurious Emissions				
Rubidium Frequency Standard	Quartzlock	A10-B	92	22-Dec-2007
Climatic Chamber	Unitemp	MINISTRAT	2129	18-Sep-2007
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	30-May-2008
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	16-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	18-Apr-2008
Climatic Chamber	Heraeus Votsch	VM 04/100	85	O/P Mon
Load (50Ω, 15W)	Diamond Antenna	DL-30N	822	5-Sep-2008
Spectrum Analyser	Hewlett Packard	E4407B	1154	31-May-2007
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3158	30-May-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3163	1-Jun-2007
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
Bandpass Filter	Trilithic	5BE406/35-1-AA	3207	O/P Mon
Cable (1m, N type)	Rhophase	NPS-1601-1000-NPS	3350	18-Apr-2008
Cable (1m, N type)	Reynolds	269-0088-1000 0201	3079	2-Aug-2007
Section 2.3, Damp Heat Test				
Climatic Chamber	Climatec	CLIMATEC 3	2846	18-Apr-2007
Section 2.1 Beacons – Initial Aliveness Test				
Beacon Tester	WS Technologies	BT 100S	87	TU
Section 2.27 Beacons – Orientation Test				
Beacon Tester	WS Technologies	BT 100S	87	TU
Stop Clock	R.S Components	RS328 061	2674	TU
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
EPIRB Tester	Arg Electro Design	5412	3270	TU



Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.13 Beacons – Operating Lifetime				
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	O/P Mon
Signal Generator	Rohde & Schwarz	SMX	43	10-May-2008
Power Meter	Hewlett Packard	436A	47	9-Jul-2008
Power Meter	Hewlett Packard	436A	83	11-Aug-2008
Climatic Chamber	Heraeus Votsch	VM 04/100	85	O/P Mon
Rubidium Frequency Standard	Quartzlock	A10-B	92	22-Dec-2007
Signal Generator	Hewlett Packard	8644A	96	11-Jan-2008
Time Interval Analyser	Yokogawa	TA720	181	21-Feb-2008
Termination	Diamond Antenna	DL-30N	187	28-Nov-2007
Signal Generator	Hewlett Packard	8644A	199	11-Jan-2008
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Attenuator: 10dB/20W	Narda	766-10	480	13-Jul-2007
Power Meter	Hewlett Packard	436A	751	12-Sep-2007
Spectrum Analyser	Hewlett Packard	E4407B	1154	19-Jul-2008
Signal Generator	Hewlett Packard	3336C	1185	17-Jul-2007
Signal Generator	Hewlett Packard	3336C	1189	19-Jul-2008
Filter, Broadband	Texscan	8BC-134-67-3-BB	1241	TU
Power Sensor	Hewlett Packard	8482A	1341	4-Oct-2007
Distress Beacon 50Ω Unit	TUV	-	2445	TU
Multimeter	Hewlett Packard	3478A	2758	21-Jul-2007
Beacon 50Ω Unit	TUV	50Ω	3066	TU
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Termination (50Ω, 6W)	Micronde	R404613	3074	24-Feb-2008
Termination (50Ω, 1W)	Suhner	-	3080	24-Feb-2008
Termination (50Ω, 2W)	Omni-Spectra	3001-6100	3081	24-Feb-2008



Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.13 Beacons - Operating Lifetime – Continued				
Termination (Pico, 15W)	Diamond Antenna	DL-30N	3097	16-Mar-2008
Termination (Pico, 15W)	Diamond Antenna	DL-30N	3098	16-Mar-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3158	1-Jun-2007
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	30-May-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	30-May-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3161	30-May-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3162	19-Jun-2008
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
Bandpass Filter	Trilithic	5BE406/35-1-AA	3205	28-Jul-2008
Bandpass Filter	Trilithic	5BE406/35-1-AA	3207	O/P Mon
Time Interval Analyser	Yokogawa	TA720 704510	3253	6-Nov-2008
Scope Corder	Yokogawa	DL750 701210	3254	6-Nov-2008
8 Channel Datalogger + Terminal Board	Pico Technology Ltd	ADC-16	3287	13-Nov-2007
Power Sensor	Agilent	8482A	3290	14-Nov-2007
Resistor (Nominal 0.25ohm)	TUV	2x RS Components 188-071, R5/100W Resistors	3343	TU
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	16-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3351	18-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3353	18-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3358	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3359	18-Apr-2008
Cable (3m, N-type)	Rhophase	NPS-1601-3000-NPS	3360	18-Apr-2008
Cable (3m, N-type)	Rhophase	NPS-1601-3000-NPS	3361	18-Apr-2008



Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.15 Beacons - Self Test				
Climatic Chamber	Heraeus Votsch	VMT 04/30	40	O/P Mon
Beacon Tester	WS Technologies	BT 100S	87	TU
Rubidium Frequency Standard	Quartzlock	A10-B	92	22-Dec-2007
Signal Generator	Hewlett Packard	8644A	96	11-Jan-2008
Climatic Chamber	Unitemp	MINISTRAT	2129	18-Sep-2007
Stop Clock	R.S Components	RS328 061	2674	TU
Beacon RF Unit	TUV	N/A	3066	TU
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Termination (50ohm, 6W)	Micronde	R404613	3074	24-Feb-2008
Attenuator (20dB, 75W)	Bird	8308-200	3076	26-Feb-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	30-May-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3162	19-Jun-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3163	30-May-2008
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
Bandpass filter	Trilithic	5BE406/35-1-AA	3206	28-Jul-2008
Bandpass Filter	Trilithic	5BE406/35-1-AA	3207	O/P Mon
Time Interval Analyser	Yokogawa	TA720 704510	3253	4-Oct-2007
Scope Corder	Yokogawa	DL750 701210	3254	9-Oct-2007
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3355	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3359	18-Apr-2008
Sections 2.7 and 2.8 ENV - Free Fall Drop ("Drop Test")				
Climatic Chamber	Unitemp	MINISTRAT	2129	18-Sep-2007
Tape Measure	Stanley	-	2276	TU
Hardwood Block	Unknown	ELM	2650	TU



Product Service

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.2 Climatic – High Temperature (“Dry Heat”)				
Temperature Chamber	Instron	906	2128	7-Dec-2007
Section 2.6 Climatic - Salt				
WEISS TECHNIK (T)	Weiss Technik	SALT MIST	2121	OP MON
Balance	Geniweigher	GM-11K	2334	15/03/2007 (Used at the beginning of the test when still calibrated)
PM METER	Unknown		2335	TU
Thermometer	Digitron	2098T	2347	27/09/2007
Balance	Sartorius	HK160	2678	15/03/2007 (Used at the beginning of the test when still calibrated)
Measuring cylinder	Unknown	50mL	3136	TU
Section 2.20, Stability And Buoyancy				
Beacon Tester	WS Technologies	BT 100S	87	TU
Digital Force Gauge (500N)	TWL	AFG4	2971	16-Nov-2007
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	16-Apr-2008



Product Service

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.26 Humidity				
Beacon Tester	WS Technologies	BT 100S	87	TU
Climatic Chamber	Climatec	CLIMATEC 3	2846	18-Apr-2008
Sections 2.9, 2.11 & 2.12 Climatic - Wet Tests ("Leakage And Immersion" and "Thermal Shock")				
Beacon Tester	WS Technologies	BT 100S	87	TU
Over Pressure (T)	ASL (TUV)	0 TO 15 PSI	2125	Class 1 (Int)
Balance	Geniweigher	GM-11K	2334	30-Mar-2008
Thermometer	Digitron	T208	2340	20-Jun-2008
Digital Pressure Indicator	Druck	DPI 700	2351	18-Jun-2008
Tape Measure	Stanley		2363	TU
Stopwatch	Farnell	SUPER LAB/SPLIT	2465	15-Jun-2008
Climatic Chamber	Climatec	CLIMATEC 3	2846	18-Apr-2008
Digital Force Gauge (500N)	TWL	AFG4	2971	16-Nov-2007
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	16-Apr-2008
Thermocouple	Unknown	Type T	3415	8-Feb-2009

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)



Equipment Under Test, Sample Serial Number 003



View of EUT (Serial Number 003) in release mechanism



Product Service

SECTION 5

DISCLAIMERS AND COPYRIGHT



Product Service

5.1 DISCLAIMERS AND COPYRIGHT

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

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TÜV Product Service Limited

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Product Service

ANNEX A

CUSTOMER SUPPLIED INFORMATION



Product Service

Similarity of Variants

Jotron AS
Jotron Phontech AS
Jotron UK Ltd.
Jotron Asia Pte. Ltd.
Jotron USA, Inc.
UAB Jotron



TUV Product Service Ltd
Octagon House, Concorde Way, Segensworth
North, Fareham, Hampshire
PO15 5RL
United Kingdom

Tjodalyng: 07.01.2008

Tron 40S MkII and Tron 40GPS MkII

The Tron 40S MkII and Tron 40GPS MkII use the same housing, battery pack, boards, software, brackets and technical manual.

The difference between the Tron 40S MkII and the Tron 40GPS MkII is the GPS module, the GPS patch antenna and the Users manual.

The GPS module and the GPS patch antenna are mounted on each side of the Main Board for the Tron 40GPS MkII.

Eirik Storjordet
Certification Manager

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Hardware Modification Information

	Selftest	Number
	40S MkII	Page 1(1)

Problem:

The beacon failed with error message "low power 121.5" in selftest at -20°C. Det beacon had no error message at selftest in 20°C.

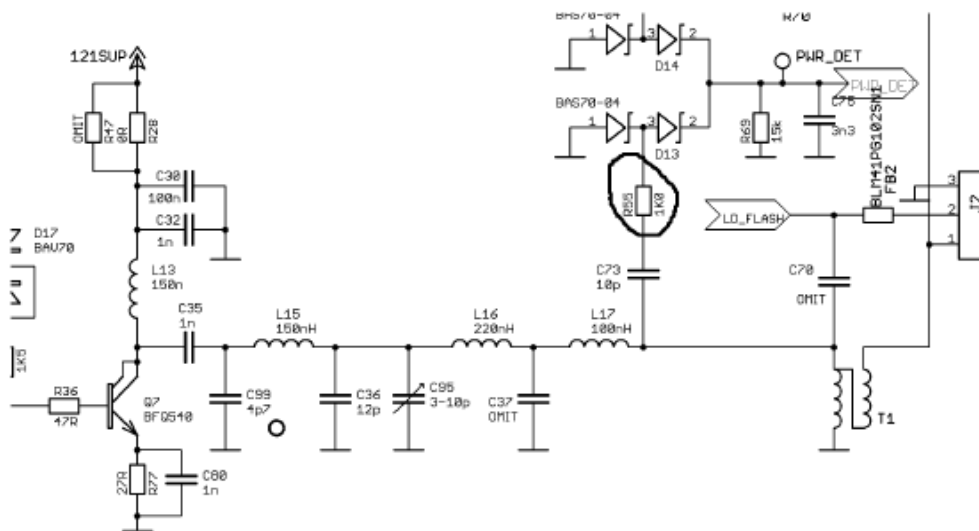
Reason:

The 121.5 MHz signal is rectified through a resistor R55. The rectified signal was too low/ or on edge, to be detected as a "OK" in selftest.

Change:

At the visit at TUV 11. Sept 07, this resistor R55 was changed from 1K5 to 1K0 to increase the rectified signal. This change does not affect other parameters in the beacon.

Figure 1 – Shows the 121.5 outputstage with the rectifier for the power detect:



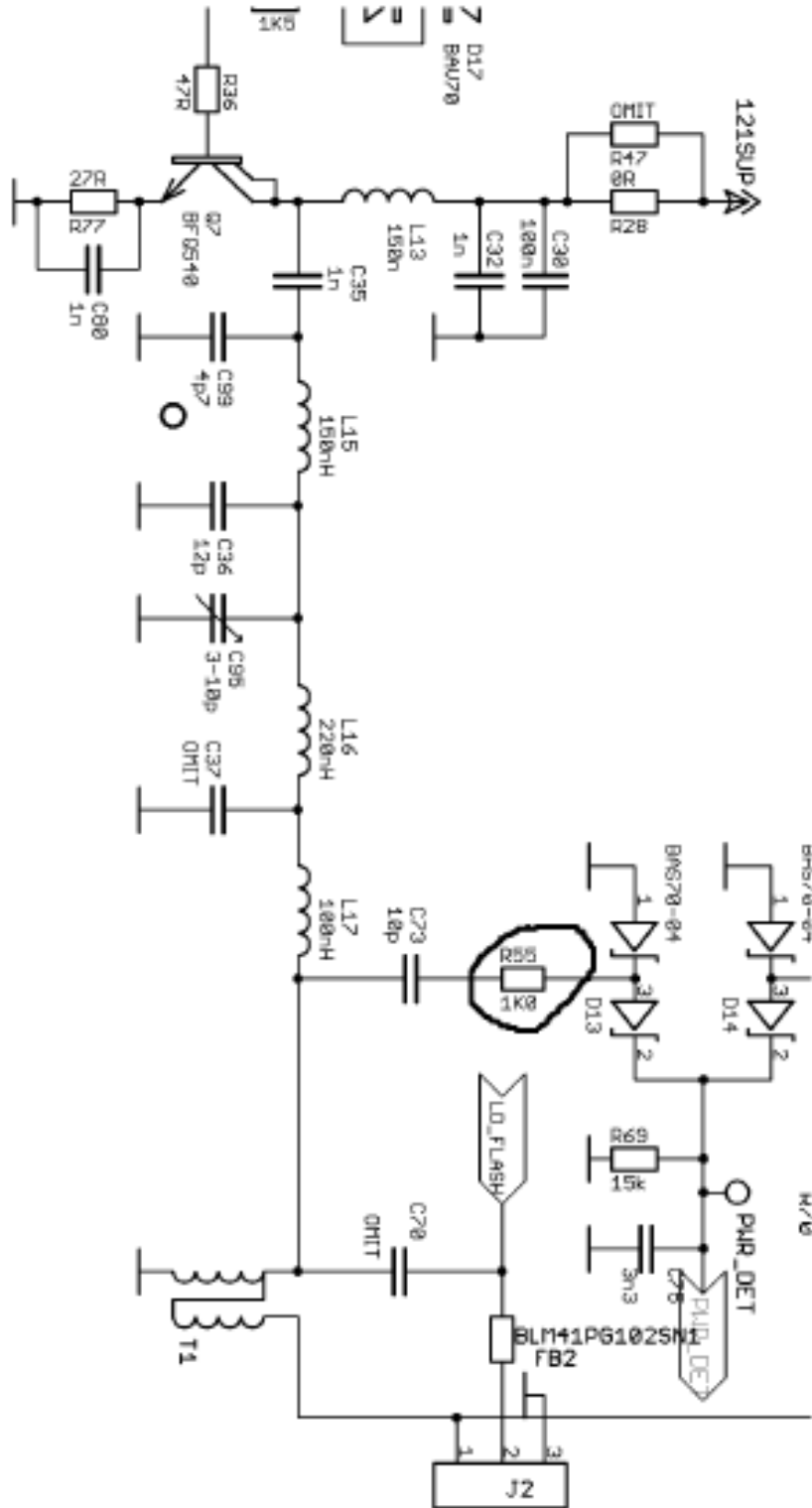
Author: Arne Fredriksen

3707

13. Sept 07



Modification Information (Detail of Schematic, Above)





Information On Previous Testing (Strobe Light Test)

	Test Report	Version D
M:\03_Development\Project_Design\TRON_40SMkII&60S_200503\Admin\Approval\Jotron Tests	Tron 40S/GPS MkII	Page 1 of 10

Project name:

Tron 40S/GPS MkII
Low duty cycle light tests performed by Jotron AS
and supervised by Notified Body 0470

Document title:

Jotron test report

Document reference:

Jotron test report.DOC

D	02.12.07	Inserted calibration certificate and pictures	ES		BR
C	29.11.07	Modified tables for extreme temperature*	ES		
B	20.11.07	Added tables, edited text	ES		
A	15.11.07	Test report	ES		
Rev	Issue Date	Reason for Issue	Made by	Checked by	Approved by
<i>Project no:</i>		<i>Contract no:</i>		<i>Customer Doc.no:</i>	
<i>Jotron File Name:</i>			<i>Jotron File no:</i>		

* Limited measurements agreed with Mrs. Doreen Thoma, BSH, 29.11.2007



Product Service

	<p>Test Report</p>	<p>Version D</p>
<p>M:\03_Development\Project_Design\ TRON_40SMKII&60S_200503\Admin \Approval\Jotron Tests</p>	<p>Tron 40S/GPS MkII</p>	<p>Page 2 of 10</p>

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 1.1 Test specifications and sequence 3

 1.2 Test program 3

 1.3 Equipment under test 3

 1.4 Test site 3

 1.5 Test Equipment 4

 1.6 Description of light test 4

 1.6.1 Conclusion 4

 1.7 Test Jig drawings 5

 1.8 Test Jig pictures 6

 1.9 Calibration certificate 7

 1.10 Light test 9

 1.10.1 Flash rate 9

 1.10.2 Test results 9

 1.11 Test summary 10



Product Service

	<h1 style="text-align: center;">Test Report</h1>	<h2 style="text-align: center;">Version D</h2>
<small>M:\03_Development\Project_Design\ TRON_40SMkII&60S_200503\Admin \Approval\Jotron Tests</small>	<h3 style="text-align: center;">Tron 40S/GPS MkII</h3>	<h3 style="text-align: center;">Page 3 of 10</h3>

1. STROBE LIGHT TESTS

1.1 Test specifications and sequence

The effective luminous intensity shall be at least an arithmetic mean of 0.5 cd over the entire upper hemisphere as determined below. The flash rate shall be 20 to 30 times per minute. The flash duration shall be between 10^{-6} s and 10^{-1} s.

The effective luminous intensity shall be measured at 49 points over the upper hemisphere of the satellite EPIRB. The satellite EPIRB shall be floated in a container of fresh water to determine its waterline, which shall then be marked on the body of the satellite EPIRB and used as the baseline for the following tests. The effective luminous intensity shall be measured in accordance with the following table. The arithmetic mean effective luminous intensity of all 49 points shall be at least 0,50 cd. No points shall have an effective luminous intensity of less than 0.2cd.

1.2 Test program

The effective luminous intensity, flash duration and flash rate shall be checked at the normal temperature and at the extreme temperatures. The effective luminous intensity shall be defined by the following formula as indicated in IMO Resolution MSC.81(70) – Testing of life-saving appliances, 10.4.9:

$$\frac{\int_{t_1}^{t_2} i \cdot dt}{0,2 + (t_2 - t_1)}$$

For 50msec pulse (t2-t1)=0,05

where

i is the instantaneous intensity;

0,2 is the Blondel-Rey constant;

$t_2 - t_1$ are the time limits of integration in seconds at which the intensity is i or greater.

$$\frac{\int_{t_1}^{t_2} i \cdot dt}{0,25} = 4 \int_{t_1}^{t_2} i \cdot dt$$

1.3 Equipment under test

Name : Tron 40GPS MkII

Ser. Nr: 001

1.4 Test site

Jotron AS, New lab.



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1.5 Test Equipment

IL 1700 Light measuring equipment with calibration certificates.
SED033 sensor with type Y filter and type L30 lens.

1.6 Description of light test

The test site was covered inside with black textiles and the light measure equipment was mounted. The calibration factor for lux measurement was installed in the IL 1700.

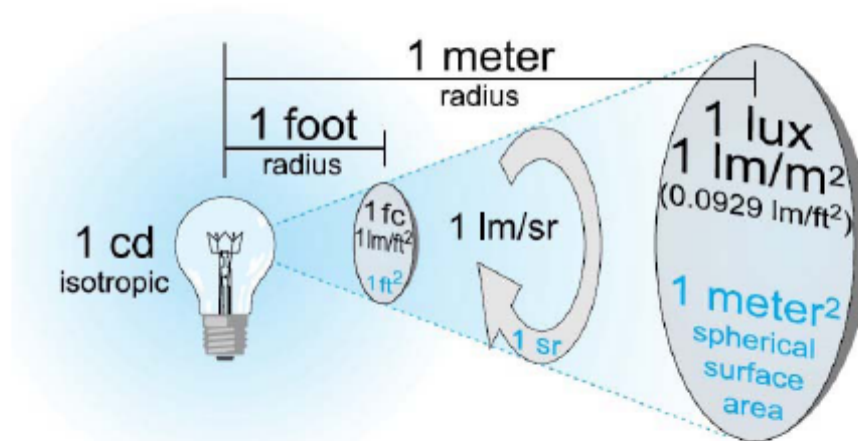


Figure 1.6 The relation between the units

From this relation we can conclude that if we use a distance of 1 meter between the sensor and the light source, 1 lux is equivalent to 1 candela. The pulse width is 50ms.


1.6.1 Conclusion

The light source of the EUT is to be placed 1 meter from the sensor. The IL 1700 is set to zero point the background lightning and to measure integrated light. The integrated light can then be measured during 4 pulses, and the final value will be directly in candela.

The Tron 40S MkII and Tron 40GPS MkII are 100% identical related to this test, so the test results are valid for both units.

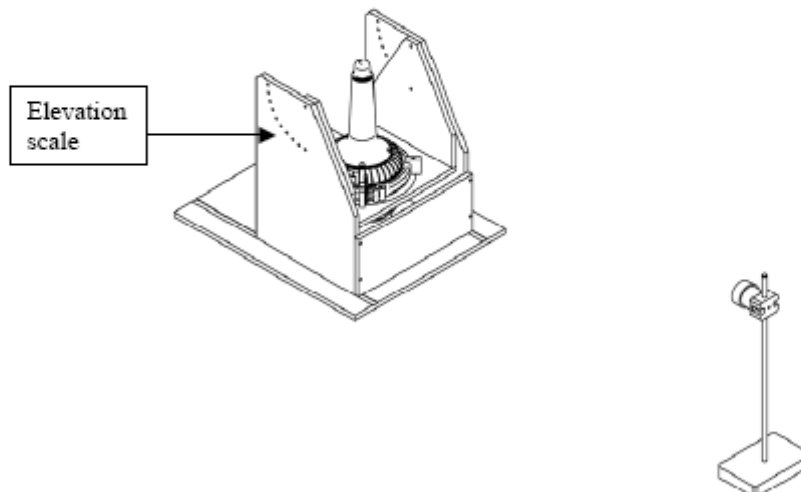
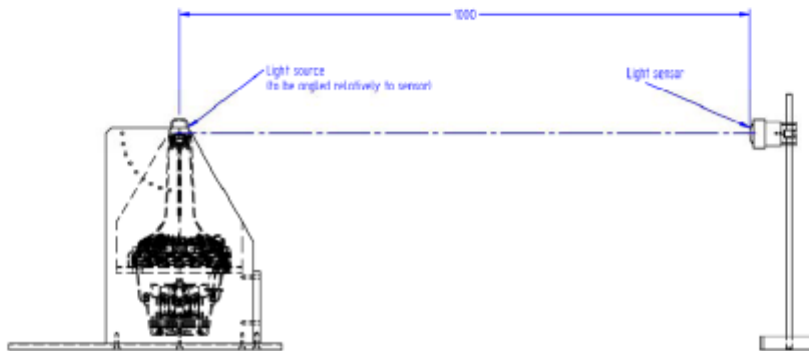


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1.7 Test Jig drawings

The EPIRB can be set to the right elevation and rotated to the right azimuth.





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1.8 Test Jig pictures

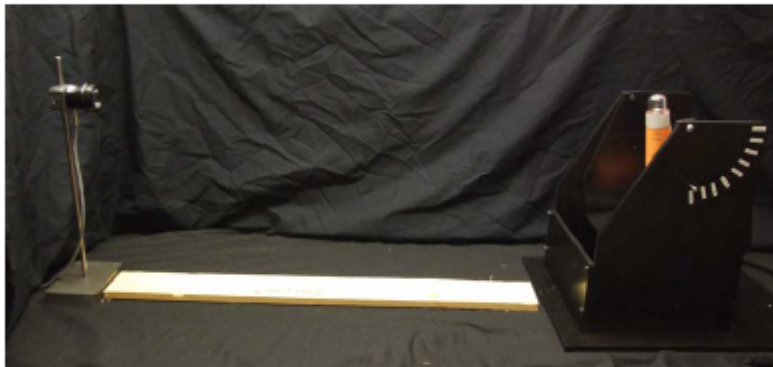


Figure 1.8a Showing test jig and light sensor with lens and a measure stick



Figure 1.8b Front of IL 1700

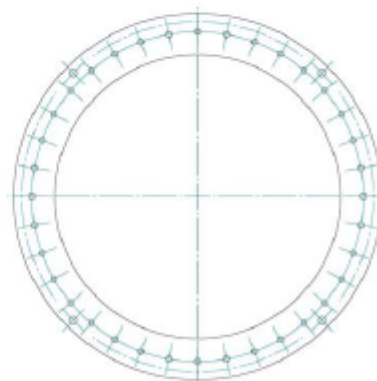


Figure 1.8c Azimuth scale



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1.9 Calibration certificate

Kalibreringsbevis
Certificate of calibration



Oppdragsgiver Client Jotron AS KIRKESTIEN 1 3280 TJODALYNG		Utførende enhet/lab. Department / laboratory responsible Teknologisk Institutt as Postboks 1019 3601 KONGSBERG	
Bevisnr. Certificate no. 07-047546	Kalibreringsdato Date of calibration 21.11.07	Utskriftsdato Date of print 22.11.2007	Sidene /antall sider Page no. / No. of pages 1 av 2
Kalibrert utstyr Calibrated equipment • Tils objektID T's obj. ID 423565 • Kundens ID Clients ID JE-41.5 • Serienr. Serial no. 4651 • Objekt Object Radiometer • Fabrikket Manufacturer InternationalLight • Modell Model IL1700		Kalibrert av Calibrated by Arne Figenschou <i>Arne Figenschou</i>	
Kalibreringsprosedyre Calibration procedure • Status Status • Temperatur og fuktighet Temperature and humidity • Anbefalt ny kalibrering Recommended new calibr.		LP 4007 Kal. uten justering / Cal. without adjustments 23°C±3°, <70% RH 22.11.08	
Kalibreringsnormer Calibration standards			
Objekt ID Object ID	Objekt Object	Fabrikket Manufacturer	Neste kalib. Next calibr.
406067	Research Radiometer	International Light	06.2008
406069	Detector/ Filter	International Light	SED033/Y/W 06.2008
Merknader Comments Kalibrering er utført som kompareringsmåling mot identisk primær referanse og vil ikke erstatte InternationalLight kalibrering av Radiometeret.			

Instrumentet er kalibrert i henhold til dokumentert prosedyre som kan forevises på forespørsel, og mot måleenheter som er spesifisert til nasjonale eller internasjonale normer.

This instrument is calibrated according to documented procedure which will be available upon request, and against measuring norms traceable to national or international standards.

Teknologisk Institutt as

Alneshavn 2HC Pb 2008 SL, Havnshavn, NO-0131 Oslo Tlf +47 22 86 50 00 Faks +47 22 33 16 01	Kongsberg Havningspark Pb 1070, NO-3601 Kongsberg Tlf +47 33 24 87 00 Faks +47 33 24 87 37	Hillevikveien 19 NO-4014 Stavanger Tlf +47 51 60 02 16 Faks +47 51 60 02 18	Fysloben Apsdalen Pb 23, NO-5168 Jægersås Tlf +47 56 22 78 40 Faks +47 56 31 22 51	Tranemoen 1 Pb 44, NO-8411 Ledingen Tlf +47 99 22 79 00 Faks +47 99 91 93 94	Karlsen Industripark Pb 163, NO-3821 Raufoss Tlf +47 81 15 44 29 Faks +47 81 15 36 35	Firmaportalen@teknologisk.no www.teknologisk.no Org. nr. NO 140 680
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Kalibreringsbevis

Certificate of calibration

Bevisnr. Certificate no.
07-047546
Side Page 2 av of 2.
Date Date 22.11.2007



Måleprotokoll fra kalibrering

Kalibrering av: Radiometer
 TT's objekt ID: 423565
 Fabrikat: InternationalLight
 Modell: IL1700 Research Radiometer
 Serie nr.: 4651
 Detector: SED033 #8237
 Filter: Y #28008
 Input Optic: L30 #293

Utførelse:

Kompareringsmåling mot TT's referans Radiometer
 Primer standard Radiometer benyttet ved komparering er identisk med InternationalLight IL1700

Radiometerets detektor er kalibrert mot hvittlysreferanse ved rett lysinnfall.
 Til kalibrering benyttes Tungsten Halogen glødelampe med fargetemperatur 3000K ±3%
 Referansedetektor er cosinus korrigeret for rett lysinnfall med størst spektral følsomhet
 ved 555 nm i henhold til CIE V λ Photopic Standard.

Radiometer er avlest i lux med innstillinger likt iht InternationalLight kalibreringssertifikat pr. 22-Jun-05.
 (YIS) Photopic illuminance response sensitivity factor: 1.342E-07 (A) (lux-1)
 IL1700 +5V Bias: Off

Måleresultat ved komparering:

Nominell måle verdi Illuminans lux	Avlest Radiometer lux	Målt differanse	
		lux	%
280	280	0	0
410	420	10	2
780	820	40	5
1130	1200	70	6
2000	2100	100	5
3000	3000	0	0

Status

Radiometer viser god overenstemmelse ved komparering mot tilsvarende instrumet.

Beregnet måleusikkerhet:

≤ ± 6% ved dekningsfaktor k=2

Måleusikkerhet er utvidet da Input Optic Lens L30 #293 er en High Gain Lens med ±8 grader synsfelt og referanse detektor det kompareres mot er av type Wide Eye Diffuser med relativ spasiel rominnsyn respons på ±30 grader.

Spørbarhet:

NIST, U.S. National Institute of Standards and Technology



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1.10 Light test

The flash rate of the light to be controlled.

1.10.1 Flash rate

The flash rate was: **21**

1.10.2 Test results

Test No.1: Effective luminous intensity at minus 20 degrees

Azimuth (in Degrees)	Elevation (in Degrees)								
	10	20	30	40	50	60	70	80	90
0	2,7	2,3	1,6	1,5	1,6	0,8	0,9	2,4	1,5

Table 1.10a Effective luminous intensity at minus 20 degrees

Test No.2: Effective luminous intensity at normal temperature

Azimuth (in Degrees)	Elevation (in Degrees)								
	10	20	30	40	50	60	70	80	90
0	3,4	2,4	1,6	1,4	1,5	0,8	0,8	2,3	1,5
45	3,8	2,5	1,6	1,5					
90	3,4	2,4	1,7	1,6	1,5	0,8	0,9	2,8	
135	3,8	2,6	1,4	1,4					
180	3,4	2,4	1,6	1,4	1,3	0,6	0,9	2,4	
225	3,8	2,6	1,7	1,4					
270	3,5	2,3	1,7	1,5	1,5	0,8	0,8	2,1	
315	3,6	2,5	1,6	1,4					

Table 1.10b Effective luminous intensity at normal temperature

Test No.3: Effective luminous intensity at plus 55 degrees

Azimuth (in Degrees)	Elevation (in Degrees)								
	10	20	30	40	50	60	70	80	90
180	2,6	1,8	1,1	1,1	1,0	0,4	0,6	1,4	1,2

Table 1.10c Effective luminous intensity at plus 55 degrees



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1.11 Test summary

Test No.	Test	IEC 61097-2 Ed.3 CDV	Result (Pass/Fail)	Date	Witness	Notified Body Number
1	At minus 20 degrees	5.3.3.3*	P	30.11.07	<i>[Signature]</i>	0470
2	At normal temperature	5.3.3.3	P	30.11.07	<i>[Signature]</i>	0470
3	At plus 55 degrees	5.3.3.3*	P	30.11.07	<i>[Signature]</i>	0470

* Limited measurements agreed with Mrs. Doreen Thoma, BSH, 29.11.2007

Authorized By:

[Signature]

Bjorn Rishovd
QA Manager
Jotron AS

Supervised by:

[Signature]

Ole A. Lynum
Technical Examination Officer
Nemko AS



Product Service

Information On Previous Testing (Automatic Release Mechanism And Automatic Activation Tests)

DET NORSKE VERITAS

Report No: 2003-3162, rev. 01

TECHNICAL REPORT



7 TESTS

Wherever several test specifications cover the same issue, the most severe requirement was used as basis for the testing.

7.1 Functional tests

7.1.1 Release mechanism

Test specifications: ETSI EN 300 066, 12

Test characteristics:

Parameters	Severity levels
Release depth	Before 4,0m
Orientations	Normal mounting pos. Rolling 90° both sides Pitching 90° both sides Upside-down

The EUT was mounted on a rod and slowly submerged into water¹, until the release mechanism was activated. The depth at time of activation was observed.

Result: In one of the orientations, the EPIRB floated up successfully, but did not release itself from the outer shell of the EUT even after reaching the surface. The EUT was therefore slightly modified (see Ch. 5.2). Repeated tests after the modification were successful. The EPIRB released itself well before 4 meter and the EUT passed the test.



Product Service

DET NORSKE VERITAS

Report No: 2003-3162, rev. 01

TECHNICAL REPORT



5 EQUIPMENT UNDER TEST

5.1 Equipment submitted for tests

Overall designation of product:

Description	Make	Type	S/N	Remarks
EPIR float free release bracket	Jotron	FB-5	NA	Prototype

The above will be referred from now as **EUT** (Equipment Under Test).

5.2 Modifications during testing

In order to pass the various tests, the EUT was modified as follows:

Test	Modifications
Release Mechanism	An extra weight was added to the outer shell to make the weight asymmetrical.
Vibration/Bump	A new design of the FB-5 bracket is being produced in the nearest future. To upgrade the unit used for testing to the right shape, tape was used on the inner side of the capsule.
Hose stream	Fixing of the label tag was moved from the release pin to a separate screw.



Product Service

Information On Previous Testing (Stability And Buoyancy Test)

Jotron AS
Jotron Phontech AS
Jotron UK Ltd.
Jotron Asia Pte. Ltd.
Jotron USA, Inc.
UAB Jotron



To whom it may concern.

Tjedalyng: 22.01.2008

STATEMENT OF ANTENNA HEIGHT OVER THE FLOAT LINE

for

Tron 40GPS MkII and Tron 40S MkII

We declare that the 406MHz antenna start height is 40mm above the float line.

A handwritten signature in blue ink, appearing to read 'Eirik Storjordet'.

Eirik Storjordet
Certification Manager

DNB Nor Bank ASA | 0021 Oslo | Norway | Bank account: 24400508514 | IBAN: NO6624400508514 | BIC: DNBANOKK | Reg.no.: NO917713324 MVA
QA Certificate: NS-EN ISO 9001:2000

Jotron AS
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Fax: +47 33 12 67 80

www.jotron.com



Product Service

Information On Previous Testing (Inadvertent Activation Test)

DET NORSKE VERITAS

Report No: 2003-3162, rev. 01

TECHNICAL REPORT



7.2.3 Hose stream

Test specifications: IEC 60945, 8.8
ETSI EN 300 066, 6.9

Test characteristics:

Parameters	Severity levels
Flow	2300 l/min
Hose inner diameter	63,5 mm
Distance between end of hose and EUT	3,5 m (1,5 m above EUT)
Directions of flow	All directions in an arc of 180° perpendicular to normal mounting position
Period of testing	5 min

The EUT was fixed to a wooden plat during testing.

Result: With the modification described in Ch. 5.2, EUT passed the test



Product Service

DET NORSKE VERITAS



Report No: 2003-3162, rev. 01

TECHNICAL REPORT

5 EQUIPMENT UNDER TEST

5.1 Equipment submitted for tests

Overall designation of product:

Description	Make	Type	S/N	Remarks
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The above will be referred from now as **EUT** (Equipment Under Test).

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In order to pass the various tests, the EUT was modified as follows:

Test	Modifications
Release Mechanism	An extra weight was added to the outer shell to make the weight asymmetrical.
Vibration/Bump	A new design of the FB-5 bracket is being produced in the nearest future. To upgrade the unit used for testing to the right shape, tape was used on the inner side of the capsule.
Hose stream	Fixing of the label tag was moved from the release pin to a separate screw.