Product Service

Choose certainty.
Add value.

Report On

Emergency Beacons Limited Testing of the
Astronics DME Corporation SATRO™ Model PLB-110
In accordance with
RTCM Standard 11010.2 (Paper 114-2008-SC110-STD) with
Amendment 1 (Paper 189-2010-SC110-STD)

Document 75914042 Report 02 Issue 1 May 2012

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

REPORT ON

Emergency Beacons Limited Testing of the
Astronics DME Corporation SATRO™ Model PLB-110

Document 75914042 Report 02 Issue 1

May 2012

PREPARED FOR

Astronics DME Corporation
6830 NW 16th Terrace
Fort Lauderdale
Florida 33309
USA

PREPARED BY

Rob Hampton
Engineer

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED

04 May 2012

UKAS TESTING 0141

Product Service

CONTENTS

SECTION 1

REPORT SUMMARY

Emergency Beacons Limited Testing of the
Astronics DME Corporation SATRO™ Model PLB-110

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Emergency Beacons Limited Testing of the Astronics DME Corporation SATRO™ Model PLB-110 to the requirements of RTCM Standard 11010.2 (Paper 114-2008-SC110-STD) with Amendment 1 (Paper 189-2010-SC110-STD).

Objective	To perform Emergency Beacons Limited Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Astronics DME Corporation
Model Number(s)	SATRO™ Model PLB-110
Serial Number(s)	TUV #9 (TUV Ref:TSR0023)
Number of Samples Tested	1
Test Specification/Issue/Date	RTCM Standard 11010.2 (Paper 114-2008-SC110-STD) with Amendment 1 (Paper 189-2010-SC110-STD)
Date of Receipt of Test Samples	22 August 2011
Order Number Date	73680 19 May 2011
Start of Test	26 October 2011
Finish of Test	27 October 2011
Name of Engineer(s)	R Hampton

1.2 BRIEF SUMMARY OF RESULTS

Section	Spec. Clause	Test Description	Result	Comments
S/N: TUV #9 (TUV Ref:TSR0023)				
2.1	Annex G	G.2.2 Land and Maritime Scenario	Pass	Deviation from the Standard – See test section for details

1.3 APPLICATION FORM

Beacon Manufacturer and Beacon Model

Beacon Manufacturer	Astronics DME Corporation
Beacon Model	SATRO ™ Model PLB-110
Other Model Names	

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)		☐

Beacon Characteristics

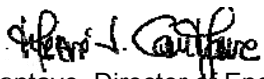
Characteristic	**Specification**
Operating frequency	406.037 MHz distress frequency 121.5 MHz homing frequency
Operating temperature range	™in = -20°C ™ax = +55°C
Operating lifetime	24 hours
Beacon power supply type (internal, external, combined, other)	Internal, 9.0 VDC
External power supply parameters (AC/DC and nominal voltages)	N/A
Is external power supply needed to energise the beacon or its ancillary devices in any of operation modes (Y/N or Yes of No)	No

Characteristic	Specification
Battery chemistry	LiMnO2
Battery cell model name, size and number of cells	Model: CR123A, Size: 2/3A, # of cells: 3 each
Battery cell manufacturer	Panasonic, CR123A
Battery pack manufacturer and part number	A3-03-1025-001 Astronics
Battery pack replacement period	5 Years
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO
Oscillator manufacturer	RAKON/C-MAC (E4672LF)
Oscillator part name and number	A1-24-0015-001 (E4672LF)
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes
Antenna type: Integral or Other (e.g. External, Detachable – specify type)	Integral
Antenna manufacturer	Astronics DME Corporation
Antenna part name and number	Antenna, A1-04-0225-001
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)	WGS84
- GNSS receiver cold start forced at every beacon activation (Yes or No)	Yes
- Navigation device manufacturer	GTOP
- Navigation device model name and part Number	FGPMMOPA6B
- Internal navigation device antenna type (integrated, internal, external, passive/active), manufacturer and model	Integrated patch (FGPMMOPA6B)
- GNSS system supported (e.g. GPS, GLONASS, Galileo)	GPS

Characteristic	Specification	
For External Navigation Devices		
- Data protocol for GNSS receiver to beacon interface	N/A	
- Physical interface for beacon to navigation device	N/A	
- Electrical interface for beacon to navigation device	N/A	
- Part number of the external navigation interface device (if applicable)	N/A	
- Navigation device model and manufacturer (if beacon designed to use specific devices)	N/A	
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.)	LED display	LED display
- The content of the encoded position data fields of the self-test message has default values	Yes	N/A
- 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)	No	No
- Self-test transmits a signal(s) other than at 406 MHz (Yes & details or No)	No	No
- Self-test can be activated directly at beacon (Yes or No)	Yes	Yes
- List of Items checked by self-test	Battery, Lock detect, 406 PWR	GPS ACQ. 406 burst
- Self-test transmission burst duration (440 or 520 ms)	440 ms	520 ms
- Self-test format bit (“0” or “1”)	1	
- Maximum duration of Self Test	8 seconds	2 minutes
- Maximum number of GNSS Self Tests (beacons with internal navigation devices only)	N/A	12
- Self-test results in transmission of a single burst, irrespectively of the test result (Yes or No)	N/A	Yes
- Maximum number of self-tests during battery pack replacement period	60	12

Characteristic	Specification	
Message Coding Protocols:	(x) Tick the boxes below against the intended protocol options	
User 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
	☐	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
RLS Location Protocol (tick where appropriate)	☐	EPIRB
	☐	ELT
	☐	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

Characteristic	Specification
Beacon includes a homer transmitter (if yes identify frequency of transmission)	121.5MHz
-Homer Transmit Power	17dBm
-Homer Transmitter Duty Cycle	98%
-Duty Cycle of Homer Swept Tone	37.5%
Beacon includes a strobe light (Yes or No)	Yes
- Strobe light intensity	N/A
- Strobe light flash rate	21/minute
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, remote control, external audio and light indicators, external activation device). List details on a separate sheet if insufficient space to describe.	N/A
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	Yes, LED Strobe Light is used as secondary indicators besides LED indicators, buoyant, Morse code letter "P" in homer signal, GPS receiver automatic.
Beacon model hardware part number (P/N) and version	P3-03-0060, rev (A)
Beacon model software/firmware P/N and version	S2-03-0061, rev. (-)
Beacon model printed circuit board P/N and version	A1-07-1062-001, rev, (B)

Dated:17 February 2012 Signed 

Hervé Cantave, Director of Engineering

(Name, Position and Signature of Beacon Manufacturer Representative)

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Astronics DME Corporation SATRO™ Model PLB-110 as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

1.4.2 Physical Test Configuration

The Equipment Under Test (EUT) was operated using its own power source (internal battery) this was a fully packaged beacon, similar to the proposed production beacons equipped with its proper antenna. The 121.5 MHz homing transmitter was on frequency and active as required by the standard. The test configuration for these tests is a function of the beacon type and the operational environments supported by the beacon, as declared by the manufacturer.

1.4.3 Modes of Operation

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

Operating:

- 121 Homing Transmitter: Active and On Frequency (121.5 MHz)
- GPS Receiver active in normal oeprating duty cycle (EUT will enter sleep mode after 10 minutes of unsuccessfull search mode)
- 406 Transmitter active in normal operating mode

1.5 DEVIATIONS

Deviations were made from the test standard, see the relevant test result section for details.

1.6 MODIFICATIONS

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: TUV #9 (TUV Ref:TSR0023)			
0	As supplied by manufacturer.	N/A	N/A

1.7 REPORT MODIFICATION RECORD

Issue 1 – First Issue

Product Service

SECTION 2

TEST DETAILS

Emergency Beacons Limited Testing of the
Astronics DME Corporation
SATRO™ Model PLB-110

2.1 ANNEX G – NAVIGATION TEST

2.1.1 Equipment Under Test and Modification State

SATRO ™ Model PLB-110, S/N TUV #9 – (TUV Ref: TSR0023) – Modification State 0

2.1.2 Date of Test

26 October 2011 to 27 October 2011

2.1.3 Test Equipment Used

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

2.1.4 Environmental Conditions

Ambient Temperature 25.0 °C
Relative Humidity 42%

2.1.5 Test Method

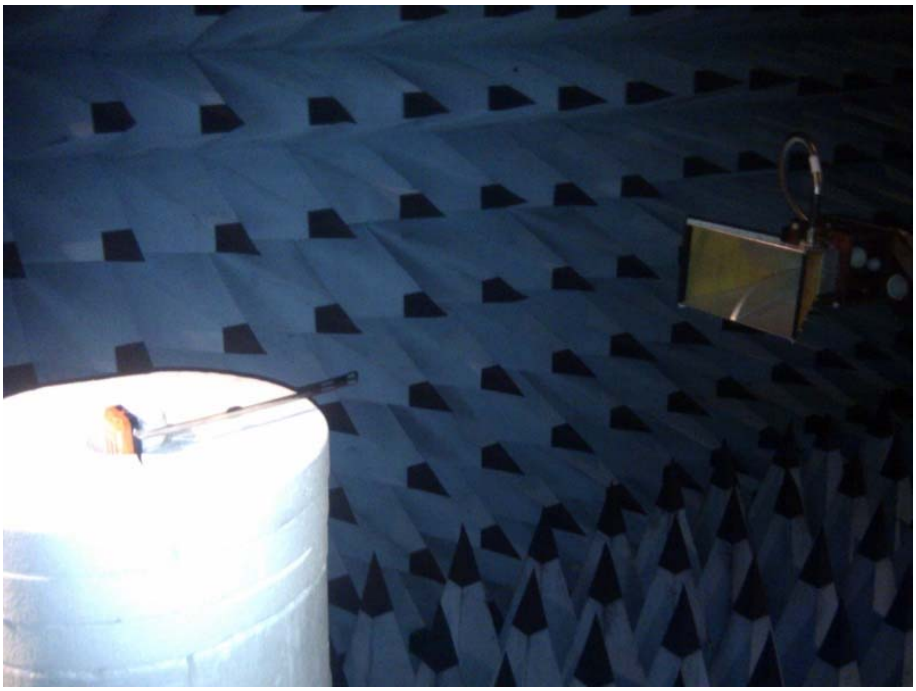
RTCM Standard 11010.2 with Amendment 1 (Summarised):

> *The Scenario* [should be] *started and within 10 seconds of the scenario starting the PLB shall be switched on*
>
> *At the same time as the PLB is activated a stopwatch or similar timer shall be started*
>
> *The Scenario is then left to run until either a GPS fix is obtained and a location protocol message containing position is received by the Beacon Tester or the Scenario runs to completion plus one minute*
>
> *If a location is received on the Beacon Tester then the stop watch or timer shall immediately be stopped and the time and received location shall be recorded in the Test Results Tables*
>
> *If a location is not received within 13 minutes of starting the Scenario then a "Fail" shall be indicated for that Scenario in the Table*
>
> *The Scenario is NOT repeated and the next Scenario is loaded*
>
> *The PLB is then switched off and left turned off for at least the specified time interval* [see below]

Specified time interval, from Clause G.3.2:

> *The manufacturer shall provide evidence of the time it takes all of the power supplies within the PLB to drop to 0V (in this case 0V means less than 0.1Vdc). The minimum time between tests that the PLB shall remain off for is the above time plus one minute.*

Setup Photo



Note: GPS Signal Transmitting Antenna is a linearly polarised Double Ridged wave-Guide (DRG). EUT antenna is a patch antenna (circularly polarised). Hence, the linear transmitting antenna was deemed 'suitable', as per the test clause, with a +3 dB correction factor applied. (RSS applied 3 dB higher than required to compensate for loss due to polarisation mismatch of 3 dB.)

Field Calibration

Field strength was ascertained by the following process.

1) "System Loss" taken from calibrated chamber 'Transducer Factor'. The system is calibrated at 1.5 GHz and 1.6 GHz and the value for 1.57542 GHz was interpolated as follows:

Frequency (x)	System Loss (y)	Comments
1.5 GHz	29.720 dB	Calibrated (a)
1.57542 GHz	30.15 dB	Interpolated as below
1.6 GHz	30.287 dB	Calibrated (b)

The Interpolant, y (System Loss at 1.57542 GHz) is given by the equation:

$$y = y_a + (x - x_a)\frac{(y_b - y_a)}{(x_b - x_a)}$$

$$y = 29.720 + \left((1.57542 - 1.5) \times \frac{30.287 - 29.720}{1.6 - 1.5}\right)$$

$$y = 30.15$$

Where x, y, a and b are indicated in parenthesis in the above table.

2) Additional Attenuation was calibrated using a Power Meter zeroed (i.e. Relative Measurement) on the output of a Signal Generator at 1.57542 GHz. This Additional Attenuation was required to drop the GPS Simulator output from the measurable range into the required range. This was measured as 21.47 dB for the -123 dBm, -130 dBm and -135 dBm scenarios. It was increased to 27.35 dB for the -137 dBm scenarios.

3) GPS Simulator output (1 satellite) measured on a spectrum analyser using the following settings:

Parameter	Setting	Comments
Centre Frequency	1.57542 GHz	GPS L1 Band
Span	10 MHz	
Reference Level	-50 dBm	
Reference Attenuation	10 dB	Automatic
Resolution Bandwidth	100 kHz	
Video Bandwidth	100 kHz	Automatic
Sweep Time	5 ms	Automatic
Sweep Count	200	
Trace Type	Max Hold	Gives Peak Power across 200 samples
Marker Frequency	1.57542 GHz	GPS L1 Band

GPS Simulator software was adjusted to achieve a power output as per the table in step 4.

4) Final Calculation:

Component	Value			
Target Signal Power at EUT, P_{ST} [dBm]	-120 (-123 + 3)	-127 (-130 + 3)	-132 (-135 + 3)	-134 (-137 + 3)
Target GPS Simulator output P_{GPST} [dBm]	-68.38	-75.38	-80.38	-76.50
Sample GPS Simulator output, P_{GPS} [dBm]	-68.51	-76.12	-82.29	-77.11
Additional Attenuation, L_A [dB]	21.47			27.35
System Loss, L_S [dB]	30.15			
Signal Power, $P_S = P_{GPS} – L_A – L_S$ [dBm]	-120.13 (Effective -123.13)	-127.74 (Effective -130.74)	-133.91 (Effective -136.91)	-134.61 (Effective -137.61)

For each scenario the power level of a single SV was checked and adjusted (if necessary) to be in the P_{ST} +0 dB / -1 dB. (I.e. not more than the target signal power and not more than 1 dB less than the target signal power.)

2.1.6 Test Results

Land Scenario Results recorded as per RTCM 11010.2 with Amendment 1 Table G.4:

Scenario #	TTFF (min : sec)	Simulator Location	PLB Transmitted Location	Location Error (m)
1	Fail	39° 36' N, 119° 35' W	N/A	N/A
2	Fail	39° 36' N, 119° 35' W	N/A	N/A
3	Fail	39° 36' N, 119° 35' W	N/A	N/A
4	Fail	39° 36' N, 119° 35' W	N/A	N/A
5	Fail	39° 36' N, 119° 35' W	N/A	N/A
7	Fail	39° 36' N, 119° 35' W	N/A	N/A
8	Fail	39° 36' N, 119° 35' W	N/A	N/A
13	1:40.7	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
14	1:40.9	39° 36' N, 119° 35' W	N 39° 36' 16" W 119° 34' 52"	499.81
15	6:40	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
16	2:31.3	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
17	5:51	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
19	2:30.8	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
20	Fail	39° 36' N, 119° 35' W	N/A	N/A
25	1:40.6	39° 36' N, 119° 35' W	N 39° 35' 56" W 119° 34' 56"	129.69
26	1:40.6	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
27	6:40.1	39° 36' N, 119° 35' W	N 39° 36' 4" W 119° 35' 0"	123.33
28	2:30.8	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
29	9:59.6	39° 36' N, 119° 35' W	N 39° 35' 56" W 119° 35' 0"	123.33
31	3:20.8	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
32	3:20.7	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
34	1:40.6	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
35	1:40.7	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
36	1:40.3	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00
37	1:40.8	39° 36' N, 119° 35' W	N 39° 36' 4" W 119° 35' 8"	147.11
38	Fail	23° 42.01668' S 133° 53.83336' E	N/A	N/A
39	1:40.8	71° 37.56666' N 128° 52.06668' E	N 71° 37' 32" E 128° 52' 4"	61.65
40	1:40.4	71° 37.56666' N 128° 52.06668' E	S 23° 42' 0" E 133° 52' 52"	32.61 *
41	N/A	71° 37.56666' N 128° 52.06668' E	*	N/A
42	1:41.2	39° 36' N, 119° 35' W	N 39° 36' 0" W 119° 35' 0"	0.00

* NOTE 1: Deviations from the standard: Scenario 40, supplied by Spirent Communications as per the standard, was not set with the correct position as per Table G.1 of the standard. All other parameters were correct. The simulated position was used to determine the position error, not the intended position. Scenario 41 was presumed to contain the correct settings, however the GPS simulator used would not accept a UTC date beyond the year 2037 (scenario is 2040) hence the scenario would not run. The total number of scenarios for calculating the pass rate was adjusted to 29 accordingly; see below.

Maritime Scenario Results recorded as per RTCM 11010.2 with Amendment 1 Table G.5:

Scenario #	TTFF (min : sec)	Simulator Location	PLB Transmitted Location	Location Error (m)
1	1:40.7	0° 0' N, 0° 0' E	S 0° 0' 0" E 0° 0' 0"	0.00
2	1:40.7	0° 0' N, 0° 0' E	N 0° 0' 0" W 0° 0' 0"	0.00
6 **	1:40.9	0° 0' N, 0° 0' E **	N 80° 0' 0" E 0° 0' 0" **	0.00 **
7	1:40.9	0° 0' N, 0° 0' E	S 0° 0' 0" W 0° 0' 0"	0.00
8 ***	1:40.6	0° 0' N, 0° 0' E	N 0° 0' 0" W 0° 0' 0"	0.00
9	1:40.8	0° 0' N, 0° 0' E	S 0° 0' 0" E 0° 0' 4"	123.69
12 ***	1:40.7	80° 0' N, 0° 0' E	N 80° 0' 0" W 0° 0' 0"	0.00
13 ***	1:40.7	80° 0' N, 0° 0' E	N 80° 0' 0" W 0° 0' 0"	0.00
14 ***	1:40.6	80° 0' N, 0° 0' E	N 80° 0' 0" W 0° 0' 0"	0.00
16 ***	1:40.7	80° 0' N, 0° 0' E	N 80° 0' 0" W 0° 0' 0"	0.00
17 ***	1:40.7	80° 0' N, 0° 0' E	N 80° 0' 0" W 0° 0' 0"	0.00
18 ***	1:40.6	80° 0' N, 0° 0' E	N 80° 0' 0" E 0° 0' 0"	0.00
20	1:40.7	0° 0' N, 0° 0' E	N 0° 0' 0" W 0° 0' 0"	0.00
22	5:51.2	0° 0' N, 0° 0' E	N 0° 0' 0" E 0° 0' 0"	0.00
24 ***	1:40.8	0° 0' N, 0° 0' E	S 0° 0' 0" W 0° 0' 0"	0.00
26 ***	1:40.6	0° 0' N, 0° 0' E	N 0° 0' 0" W 0° 0' 0"	0.00
28	1:40.6	0° 0' N, 0° 0' E	N 0° 0' 0" W 0° 0' 0"	0.00
30	1:40.7	0° 0' N, 0° 0' E	S 0° 0' 0" E 0° 0' 0"	0.00
32	1:40.8	0° 0' N, 0° 0' E	S 0° 0' 0" W 0° 0' 0"	0.00
33	1:40.7	0° 0' N, 0° 0' E	S 0° 0' 0" W 0° 0' 0"	0.00
34	2:31.0	0° 0' N, 0° 0' E	S 0° 0' 4" E 0° 0' 4"	174.67
35	4:11.3	0° 0' N, 0° 0' E	N 0° 0' 0" E 0° 0' 0"	0.00
36	5:00.3	0° 0' N, 0° 0' E	N 0° 0' 0" W 0° 0' 0"	0.00
37 **	1:40.8	44° 0' S, 175° 0' E **	S 44° 3' 0" E 174° 9' 0" **	0.00
38 **	1:40.7	47° 0' N, 8° 0' E **	N 47° 21' 0" W 8° 27' 0" **	0.00
39 ***	1:40.7	0° 0' N, 0° 0' E	N 0° 0' 0" E 0° 0' 0"	0.00

** NOTE 2: Deviations from the standard: Scenarios 6, 37 and 38, supplied by Spirent Communications as per the standard, were not set with the correct position. All other

parameters were correct. The simulated position was used to determine the position error, not the intended position.

*** NOTE 3: Deviations from the standard: Scenarios 8, 12, 13, 14, 16, 17, 18, 24, 26 and 39 all had more SVs (Satellite Vehicles, i.e. simulated satellites) active than as per Table G.2 of the standard. As the scenarios were designed to test EUT response to pitch/roll and various data corruption, as opposed to poor HDOP, none of the additional SVs was "deactivated". Scenario 12 also did not have any apparent pitch or roll. Scenarios 37 and 38 also appeared to have pitch/roll of approximately 15° at a rate of approximately 5°/s whereas table G.2 specifies none.

Table G.6 – Land Scenarios Results Analysis

Criteria	Limit / Condition	Result
No of Successful Tests	TTFF ≤ 13 minutes	21
Total No of Land Scenarios	~~30~~ 29 **	N/A
TTFF Percentage Success Rate	(No Success Tests / ~~30~~ 29) * 100	72.4%
TTFF Pass / Fail Limit	≥ 70 %	Pass
No of Locations with Errors	≤ 650 m	20
No of Scenarios with Locations	Enter result	20
Location Accuracy Percentage Pass Rate	(No Locations Errors ≤ 650 m / No Scenarios with Location) * 100	100 %
Location Accuracy Pass / Fail Limit	≥ 70 %	Pass

** See Note 1, above.

Table G.7 – Maritime Scenarios Results Analysis

Criteria	Limit / Condition	Result
No of Successful Tests	TTFF ≤ 13 minutes	26
Total No of Maritime Scenarios	26	N/A
TTFF Percentage Success Rate	(No Success Tests / 26) * 100	100 %
TTFF Pass / Fail Limit	≥ 70%	Pass
No of Locations with Errors	≤ 650 m	26
No of Scenarios with Locations	Enter result	26
Location Accuracy Percentage Pass Rate	(No Locations Errors ≤ 650 m / No Scenarios with Location) * 100	100 %
Location Accuracy Pass / Fail Limit	≥ 70%	Pass

Table G.8 – Pass/Fail Analysis

	PLB Pass / Fail
Land TTFF Success Rate ≥ 70%	Pass
Land Location Accuracy Pass Rate ≥ 70%	Pass
Maritime TTFF Success Rate ≥ 70%	Pass
Maritime Location Accuracy Pass Rate ≥ 70%	Pass
All four results must be a “Pass” for the PLB to pass, any one or more “Fails” indicates failure	

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 - Annex G – Navigation Test					
Antenna (Double Ridge Guide)	EMCO	3115	34	12	22-Jul-2012
Spectrum Analyser	Rohde & Schwarz	FSEM	37	12	18-Apr-2012
Power Meter	Hewlett Packard	436A	94	12	12-Oct-2012
Termination (50Ω)	Diamond Antenna	DL-30N	337	12	16-Sep-2012
Load (50ohm, 30W)	Weinschel	50T-054	350	12	9-Jun-2012
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	21-Jul-2012
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	13-Mar-2012
Power Sensor	Hewlett Packard	8481A	1338	12	22-Dec-2011
Screened Room (8)	Rainford	Rainford	1548	-	TU
Stop Clock	R.S Components	RS328 061	2674	12	TU
GPS/SBAS Simulator	Spirent	STR4500	3056	-	TU
Beacon Tester	WS Technologies	BT100S	3263	-	TU
Cable (3m, N-type)	Rhophase	NPS-1601-3000-NPS	3361	12	20-Apr-2012
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
DC - 4 GHz Attenuator	Narda	766F-3	3962	12	24-Jun-2012
Directional Coupler	Narda	3022	3998	12	6-Oct-2012

TU – Traceability Unscheduled

SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Front View

Rear View

Antenna Extended

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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

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

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