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Report On

Emergency Beacons Testing of the
ACR Electronics SOS-300
In accordance with Cospas-Sarsat T.007

Document 75934030 Report 01 Issue 3 **October 2016**

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

REPORT ON

Emergency Beacons Testing of the
ACR Electronics
SOS-300

Document 75934030 Report 01 Issue 3

October 2016

PREPARED FOR

ACR Electronics
5757 Ravenswood Road
Ft. Lauderdale
USA

PREPARED BY

R Hampton
Test Engineer

APPROVED BY

Nic Forsyth
Authorised Signatory

DATED 7 October 2016

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

Emergency Beacons Testing of the
ACR Electronics
SOS-300

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Emergency Beacon Testing of the ACR Electronics SOS-300 to the requirements of Cospas-Sarsat T.007.

Objective	To perform Emergency Beacon Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	ACR Electronics
Model Number(s)	SOS-300
Serial Number(s)	#1876 (ACRTreuse in colour) #1762 (ACRTreuse in colour) #1768 (Black in colour) #1760 (Black in colour) 300434061224090 (Black in colour)
Number of Samples Tested	5
Test Specification/Issue/Date	Cospas-Sarsat T.007 Issue 4 - Rev 10 December 2015
Incoming Release Date	Application Form 19 February 2016
Date of Receipt of Test Samples	15 March 2016
Order Number Date	35914-00 04 March 2016
Start of Test	1 April 2016
Finish of Test	1 October 2016
Name of Engineer(s)	R Hampton M Hardy T Guy
Related Documents	Cospas-Sarsat T.001 Issue 3 Revision 16 December 2015 Cospas-Sarsat T.IP (TCXO) Issue 1 Revision 5 October 2013

1.2 APPLICATION FORM

G.1 INFORMATION PROVIDED BY THE BEACON MANUFACTURER

Beacon Manufacturer and Beacon Model

Beacon Manufacturer	ACR Electronics, Inc.
Beacon Model Name	SOS-300
Additional Beacon Model Names	SARLink SOS-300

Beacon Type and Operational Configurations

Beacon Type	**Beacon used while:**	**Tick where appropriate**
EPIRB Float Free	Floating in water or on deck or in a safety raft	
EPIRB Non-Float Free (automatic and manual activation)	Floating in water or on deck or in a safety raft	
EPIRB Non-Float Free (manual activation only)	Floating in water or on deck or in a safety raft	
EPIRB Float Free with VDR	Floating in water or on deck or in a safety raft	
PLB	On ground and above ground	X
	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	406.040 MHz
Operating temperature range	Tmin = -20 C Tmax= +55 C
Temperature, at which minimum duration of continuous operation is expected	-20 C
Operating lifetime	24 hours
Beacon power supply type (internal non-rechargeable, internal re-chargeable, external, combined, other)	Internal
External power supply parameters (AC/DC and nominal voltage)	N/A
Is external power supply needed to energise the beacon or its ancillary devices in any of operational modes (N/A or Yes or No)	No
Battery cell chemistry	LiMnO2
Battery cell model name, cell size, number of cells in a battery pack, and details of the battery pack electrical configuration	CR-123A, 2/3A, 3 cells
Battery cell manufacturer	Panasonic
Battery pack manufacturer and part number	ACR P/N A3-06-2770
Beacon manufacturers declared maximum allowed cell shelf-life (from date of cell manufacture to date of battery pack installation in the beacon)	.25 years
Declared beacon battery replacement period (from date of installation in the beacon to expiry date marked on the beacon)	7 _years
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO
Oscillator manufacturer	RAKON, Made in New Zealand
Oscillator model name/ part number	ACR P/N A1-11-0940 RAKON P/N E5344LF
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	ACR Electronics, Inc.
Antenna part name and part number	Antenna Assy, A3-06-2911-1
Antenna cable assembly min/max RF- losses at 406 MHz, if applicable	N/A
Navigation device type (Internal, External or None)	Internal
Features in beacon that prevent degradation to 406 MHz signal or beacon lifetime	

Characteristic	Specification
resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	Yes
Features in beacon that ensure 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
Encoded position update capability (Yes, No, N/A) and	Yes
Encoded position update interval value (range)	20 min to 4 hours
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	U-BLOX
– Navigation device model name and part Number	ACR P/N A1-11-1037 (U-BLOX P/N MAX-7Q-0)
– Internal navigation device antenna type(integrated, internal, external, passive/active) , manufacturer and model	ACR P/N A3-06-2917 (JIAXING GLEAD ELECT. CO. P/N DAM1575J2NO_ST03_P120mm)
– GNSS system supported (e.g. GPS, GLONASS, Galileo)	GPS
For External Navigation Devices	N/A
– Data protocol for GNSS receiver to beacon interface	
– Physical interface for beacon to navigation device	
– Electrical interface for beacon to navigation device	
– Part number of the external navigation interface device (if applicable)	
– Navigation device model and manufacturer (if beacon designed to use specific devices)	

Self-Test Mode Characteristics:	Self-Test Mode	Optional GNSS Self-test Mode
– Activated by a separate switch/ separate switch position (Yes or No)	Yes	N/A
– Self-test/GNSS self-test mode switch automatically returns to normal position when released (Yes or No)	Yes	N/A
– Self-test/ GNSS self-test activation can cause an operational mode transmission (Yes or No)	No	N/A
– Results in transmission of a single self-test burst only, regardless of how long the self-test activation mechanism is applied (Yes or No)	Yes	N/A
– Results of self-test/ GNSS self-test are indicated by (provide details, e.g. Pass / Fail indicator light, strobe light, etc.)	LED	N/A
– The content of the encoded position data fields of the self-test message has default values	Yes	N/A
– Performs an internal check and indicates that RF-power is being emitted at 406 MHz and 121.5 MHz, if beacon includes a 121.5 Hz homer (Yes or No)	Yes	N/A
– Self-test results in transmission of a signal other than at 406 MHz (Yes & details or No)	NO	N/A
– Self-test can be activated directly at beacon (Yes or No)	Yes	N/A
– List of Items checked by self-test	Battery, 406 PWR, Lock detect, Non-Volatile Memory	N/A
– Self-test/ GNSS self-test 406 MHz burst duration (440 or 520 ms)	440 ms	N/A
– Self-test message length format flag in bit 25, ("0" or "1")	1	N/A
– Maximum duration of a self-test mode, sec	10 s	N/A
– Maximum recommended number of self-tests during battery pack replacement period	60	N/A
– Distinct indication of self-test start (Yes or No)	Yes	N/A
– Indication of self-test results(Yes or No)	Yes	N/A
– Distinct indication of insufficient battery capacity (Yes or No)	Yes	N/A
– Automatic termination of self-test mode immediately after completion of the self-test cycle (Yes or No)	Yes	N/A
– Maximum number of GNSS Self Tests (beacons with internal navigation devices only)	N/A	N/A

Self-Test Mode Characteristics:	Self-Test Mode	Optional GNSS Self-test Mode
– GNSS Self-test results in transmission of a single burst, irrespectively of the test result (Yes or No)	N/A	N/A
– Maximum number of self-tests during battery pack replacement period	N/A	N/A
– Self-test/ GNSS self-test can be activated from beacon remote activation points (Yes & details or No)	N/A	N/A
– List all methods of Self-test mode and GNSS Self-test modes activation. Provide details on a separate sheet to describe	Details on separate sheet	N/A

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)	X	EPIRB with MMSI
	X	EPIRB with Serial Number
	X	ELT with 24-bit Address
	X	ELT with Aircraft Operator Designator
	X	ELT with Serial Number
	X	PLB with Serial Number
National Location Protocol (tick where appropriate)	X	National Location: EPIRB
	X	National Location: ELT
	X	National Location: PLB

RLS Location Protocol (tick where appropriate) [1]		EPIRB
		ELT
		PLB
User Location Protocol (tick where appropriate)	X	Maritime with MMSI
	X	Maritime with Radio Call Sign
		EPIRB Float Free with Serial Number
	X	EPIRB Non Float Free with Serial Number
	X	Radio Call Sign
	X	Aviation
	X	ELT with Serial Number
	X	ELT with Aircraft Operator and Serial Number
	X	ELT with Aircraft 24-bit Address
	X	PLB with Serial Number
Beacon includes a homer transmitter(s) (Yes or No) - homer transmitter(s) frequency - homer transmitter(s) power		NO N/A N/A
– homer transmitter(s) duty cycle – duty cycle of homer swept tone		N/A % N/A %
Beacon includes a high intensity flashing light (e.g. Strobe)		NO
- light intensity		N/A cd
- flash rate		N/A flashes per 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.		Iridium portion of the beacon
Beacon includes automatic activation mechanism (Yes or No). Specify type of automatic beacon activation mechanism		No
Beacon includes features and functions not listed above, related or non-related to 406 MHz (Yes or No) List features and use a separate sheet if insufficient space		Yes

Product Service

Beacon model hardware part number (P/N) and version	ACR Treuse color: A3-06-2918-1, Rev F Black color: A3-06-2918-2, Rev F
Beacon model software/firmware P/N, version, date of issue/releases	K3-01-0110, Rev C (Ver 2.6), Release 02/10/2016
Beacon model printed circuit board P/N and version	A3-07-0434 Rev D
Known non-compliances with C/S T,001 requirements(Yes or No) If Yes, provide details (or use a separate sheet if insufficient space)	No
Beacon Manufacturer Point of Contact (POC) for this Type Approval application:	Name and Job Title: Mr. Dan Stankovic, Director of Certification and Test Phone: 954-981-3333 X 2175 E-mail: dan.stankovic@acrartex.com

Dated:..02/19/2016..... Signed:.....

.....

Mr. Dan Stankovic, Director of Certification and Test

1.2.1 Information Provided by the Cospas-Sarsat Accepted Test Facility

Name and Location of Beacon Test Facility: TÜV SÜD Product Service, United Kingdom

Date of Submission for Testing: March 2016

Applicable C/S Standards:

Document	Issue	Revision	Date
C/S T.001	3	16	Dec-15
C/S T.007	4	10	Dec-15
IP (TCXO)	-	5	Oct-13

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) **with the exception** of deviations and non-compliances stated below:

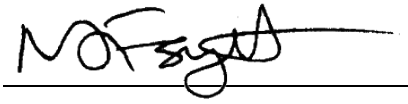
Non-compliances:

Test A.2.6 (Beacon Antenna Test) $EIRP_{minEOL}$ outside limits of T.007, but within Test Facility Accuracy stated in section A.1 of T.007.

Test A.3.6 (Self-Test) No apparent indication that RF is being emitted.

Deviations:

Encoded position data update interval test (A.3.8.3) was performed to document C/S T.007 Issue 4 Rev .8, October 2013

Signed: 

Name: Nic Forsyth

Position Held: Authorised Signatory

Date: 7 October 2016

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was an ACR Electronics SOS-300 as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

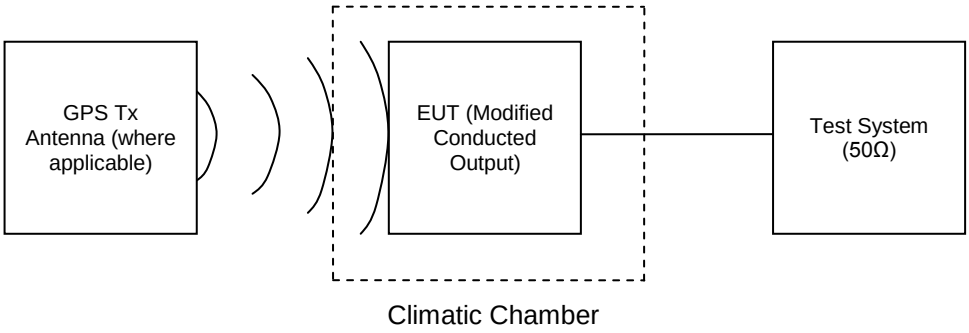
1.3.2 Physical Test Configuration

The Equipment Under Test (EUT) was operated using its own power source (internal battery). One EUT was configured so that the antenna port was connected to the 50Ω test system using a coaxial cable. The test configuration for all tests is identical with the exception of Antenna Characteristics, Satellite Qualitative and Position Accuracy Time and Position Accuracy.

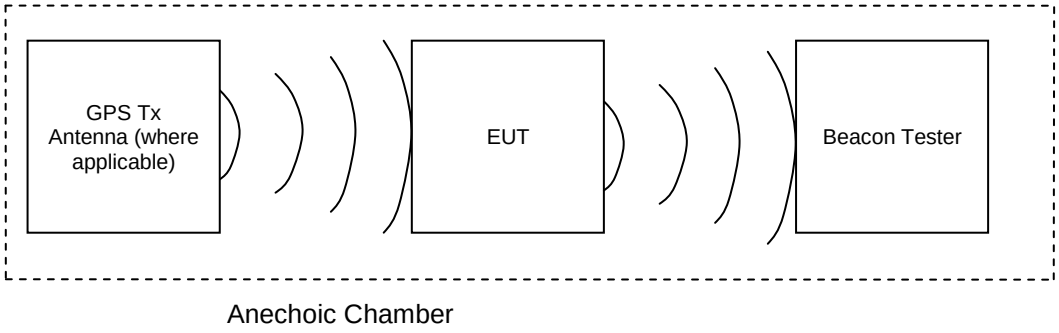
The second EUT was a fully packaged beacon, similar to the proposed production beacons equipped with its proper antenna. This EUT was used to perform Antenna Characteristics, Satellite Qualitative and Position Acquisition Time and Position Accuracy. The test configuration for these tests is a function of the beacon type and the operational environments supported by the beacon, as declared by the manufacturer.

System Configurations

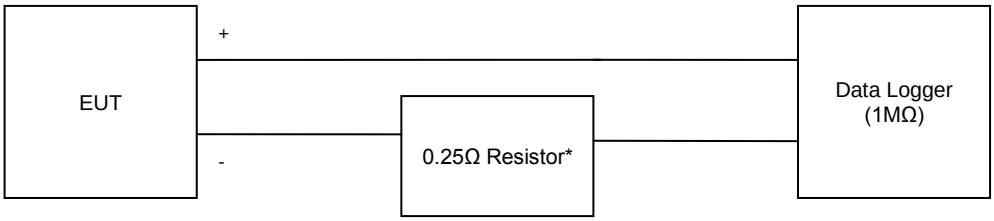
Conducted Laboratory Tests



A.3.8.3 Navigation Test



Battery Current Measurements



Note: The resistor in series with negative line of battery

* Removed for Standby mode measurements

For other Navigation, Satellite and Antenna test configurations, see photographs in section 5 of this report.

Further Information

As well as being a standard PLB, the EUT is fitted with an Iridium device, for use with the Iridium Satellite system. This device is used for Iridium distress alerting, 2 way text messaging and GPS tracking. It is electrically isolated from the 406 PLB and is powered by an independent rechargeable battery. Full details of the Iridium device can be found in the Manufacturer's documentation. Battery current measurements (see 'Operating lifetime', section 2.7) concluded that the 'worst case' (highest current) operating mode of the PLB was with the Iridium device battery fully discharged (Iridium device not functional). All tests were carried out in this mode.
The EUT is fitted with a TCXO. The model and serial number of this oscillator used for this Type Approval is: Model: E5344, S/No. MW8433.

The EUT is fitted with an internal GPS receiver. From cold start, without GPS signal data present, the duty cycle of the receiver is as described in the manufacturer information (see Annex A). After a 15 minute warm up, electrical and functional tests were carried out for 30 minutes to ensure that measurements were made during periods when the GPS receiver was active and inactive.

1.3.3 Modes of Operation

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

Off/Standby Mode

- Main switch to “OFF” position
- No apparent activity

Self-test

- Press the  for 1 second
- List of items checked as per Customer Supplied Information (Application Form)
- Navigation data applied at ambient temperature only

Operating

- Press and hold the  for 3 – 4 seconds (follow on screen instructions if available)*
- GPS operating in normal duty cycle for the following navigation input conditions
- No navigation data applied

* If the Iridium battery has charge, the LCD will display further options to the user, such as the reason for the emergency. Regardless of user interaction with the LCD display (or if there is no display available due to the iridium battery being flat), the EUT’s normal 406 distress is not affected and can only be stopped by pressing the SOS button for 3 seconds (as declared by the manufacturer).

1.4 TEST LOCATIONS

Antenna Characteristics: Hursley EMC Services Ltd. Hursley, Hampshire, UK
Satellite Qualitative and A.3.8.2.1: Daedalus Airfield, Lee-on-the-Solent, Hampshire, UK
All other tests: Octagon House Laboratory, Fareham, Hampshire, UK

1.5 MODIFICATIONS

Modification 0 - No modifications were made to the test sample during testing.

1.6 REPORT MODIFICATION RECORD

Issue 1 – First Issue

Issue 2 – Changes affecting test results: Operating lifetime calculations of battery discharge and operating duration corrected in Test Results Table and Section 2.7. Addition of Section 3 (limited testing of the SOS-300 with black enclosure). Corresponding changes made to Test Equipment and Photographs sections. Annex B supplementary testing results added.
Changes not affecting test results: Minor typographical corrections throughout. Model name changed to SOS-300. Manufacturer documentation (Annex A) updated as supplied by the Manufacturer. Added IP (TCXO) reference to Section 1.2.1. Comments added throughout regarding date of specification for testing to A.3.8.3. Clarifications made to comments in Section 1.3.3. Definition added for “Battery Conditioning” in Section 2.7

Issue 3 – Minor formatting changes and addition of Section 3.4 with corresponding changes to Test Results Table for Section 3 and addition of sample information to Section 1.1

SECTION 2

TEST DETAILS

Emergency Beacons Testing of the
ACR Electronics
SOS-300

TEST RESULTS TABLE

Parameters to be Measured		Range of Specification	Units	Test Results			Comments
				Tmin	Tamb	Tmax	
				(-20°C)	(+21°C)	(+55°C)	
1. Power Output							**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**							
Transmitter power output	(maximum)	35 - 39	dBm	38.18	38.15	37.79	
	(minimum)			38.03	38.14	37.77	
Power output rise time	(maximum)	< 5	ms	0.15	0.11	0.08	
	(minimum)			0.12	0.09	0.07	
Power output 1 ms before burst	(maximum)	< -10	dBm	-25.60	-25.60	-25.41	
	(minimum)			-30.62	-31.52	-30.52	
2. Digital Message Coding							**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**							
Bit Sync	1 - 15	15 bits “1”	P / F	P	P	P	
Frame sync	16 - 24	“000101111”	P / F	P	P	P	
Format flag	25	1 bit	bit value	1	1	1	
Protocol flag	26	1 bit	bit value	0	0	0	
Identification / position data	27 - 85	59 bits	P / F	P	P	P	
BCH code	86 -106	21 bits	P / F	P	P	P	
Emerg. Code/nat. use/supplem. Data	107 - 112	6 bits	bit value	110110	110110	110110	
Additional data / BCH (if applicable)	112 - 144	32 bits	P / F	P	P	P	
Position Error (if applicable)		< 5	km	N/A	N/A	N/A	

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
3. Digital Message Generator						**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**						
Repetition rate, T_R:						Ambient First Burst Delay includes 1.4 s activation time Low First Burst Delay includes 1.4 s activation time High First Burst Delay includes 1.3 s activation time
Average T_R	48.5 ≤ T_{Ravg} ≤ 51.5	seconds	49.833	49.934	49.868	
Minimum T_R	47.5 ≤ T_{Rmin} ≤ 48.0	seconds	47.674	47.581	47.799	
Maximum T_R	52.0 ≤ T_{Rmax} ≤ 52.5	seconds	52.307	52.213	52.182	
Standard deviation	0.5 - 2.0	seconds	1.26	1.25	1.13	
Bit rate						
Minimum fb	≥ 396	bits/sec	399.91	399.92	399.92	
Maximum fb	≤ 404	bits/sec	399.93	399.93	399.93	
Total transmission time						
Short message (maximum)	435.6 - 444.4	ms	N/A	N/A	N/A	
Short message (minimum)			N/A	N/A	N/A	
Long message (maximum)	514.8 - 525.2	ms	520.12	520.12	520.12	
Long message (minimum)			520.07	520.07	520.07	
Unmodulated carrier						
Minimum T1	≥ 158.4	ms	160.10	160.11	160.10	
Maximum T1	≤ 161.6	ms	160.16	160.16	160.15	
First burst delay	≥ 47.5	seconds	61.6	61.8	61.8	

Parameters to be Measured		Range of Specification	Units	Test Results			Comments
				Tmin	Tamb	Tmax	
				(-20°C)	(+21°C)	(+55°C)	
4. Modulation							**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**							
Biphase-L		P / F	P / F	P	P	P	
Rise time	(maximum)	50 - 250	µs	217.3	208.4	198.4	
	(minimum)	50 - 250	µs	182.4	185.3	176.4	
Fall time	(maximum)	50 - 250	µs	219.6	208.6	201.7	
	(minimum)	50 - 250	µs	183.7	181.7	178.6	
Phase deviation: positive	(maximum)	+(1.0 to 1.2)	radians	1.1669	1.1520	1.1523	
	(minimum)	+(1.0 to 1.2)	radians	1.0086	1.0303	1.0315	
Phase deviation: negative	(maximum)	-(1.0 to 1.2)	radians	-1.1740	-1.1559	-1.1491	
	(minimum)	-(1.0 to 1.2)	radians	-1.0092	-1.0390	-1.0392	
Symmetry measurement		≤ 0.05		0.0210	0.0206	0.0198	
5. 406 MHz Transmitted Frequency							**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**							
Nominal Value	(maximum)	C/S T.001	MHz	406.0400001	406.0399621	406.0399443	
	(minimum)			406.0400001	406.0399619	406.0399442	
Short-term stability	(maximum)	≤ $2x10^{-9}$	/100 ms	14.260E-11	87.857E-12	95.863E-12	
	(minimum)			11.013E-11	60.414E-12	68.270E-12	
Medium-term stability – Slope	(maximum)	(-1 to +1)$x10^{-9}$	/minutes	42.048E-12	17.319E-12	34.530E-12	
	(minimum)			-61.010E-12	-59.033E-12	30.438E-13	
Medium-term stability – Residual frequency variation	(maximum)	≤ $3x10^{-9}$		30.327E-11	13.282E-11	13.963E-11	
	(minimum)			13.437E-11	63.583E-12	94.767E-12	
6. Spurious Emissions into 50 ohms							**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**							
In band (406.0 – 406.1 MHz)		C/S T.001 mask	P / F	P	P	P	

Parameters to be Measured		Range of Specification	Units	Test Results			Comments
				Tmin	Tamb	Tmax	
				(-20°C)	(+21°C)	(+55°C)	
7. 406 MHz VSWR Check							**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**							
Nominal transmitted frequency (max/min)		C/S T.001	MHz	406.0400003 / 406.0399998	406.0399620 / 406.0399618	406.0399317 / 406.0399309	
Modulation rise time	(maximum)	50-250	µs	222.3	208.4	199.3	
	(minimum)	50-250	µs	184.3	183.3	178.4	
Modulation fall time	(maximum)	50-250	µs	215.7	204.6	201.6	
	(minimum)	50-250	µs	185.7	184.7	176.6	
Modulation phase deviation: positive	(maximum)	+ (1.0 to 1.2)	radians	1.1713	1.1513	1.1429	
	(minimum)	+ (1.0 to 1.2)	radians	1.0015	1.0370	1.0321	
Modulation phase deviation: negative	(maximum)	- (1.0 to 1.2)	radians	-1.1848	-1.1536	-1.1592	
	(minimum)	- (1.0 to 1.2)	radians	-1.0083	-1.0362	-1.0407	
Modulation symmetry measurement		≤ 0.05		0.0214	0.0202	0.0194	
Digital Message		correct	P / F	P	P	P	

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
8(a). Self-test Mode						**Result: Non-compliance**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**						
Frame sync	011010000	P / F	P	P	P	
Format flag	1 / 0	bit value	1	1	1	
Single radiated burst	≤440 / 520 (±1%)	ms	440.09	440.08	440.10	
Default position data (if applicable)	correct	P / F	P	P	P	
Description	provided	Y / N	-			
Design data on protection against repetitive self-test mode transmissions	provided	Y / N	-			
Single burst verification	one burst	P / F	P	P	P	
Provides for 15 Hex ID	correct	P / F	P	P	P	
121.5 MHz RF power (if applicable)	verify that RF power emitted	P / F	N/A	N/A	N/A	
406 MHz power	verify that RF power emitted	P / F	P	P	P	
Distinct indication of Self-Test	provided	Y / N	Y	Y	Y	Green LED flash to indicate start of test
Distinct indication of RF power being emitted	provided	Y / N	N	N	N	There was no apparent real-time indication, however an indication that RF was emitted was provided as below. (I.e. indication was provided after RF burst, not during)
Indication of Self-Test result	provided	Y / N	Y	Y	Y	A sequence of LED flashes indicate self-test result In this case: Red = Battery witness fail (beacon active for more than 1 hour) Green = 406 and battery level OK Green = memory, checksum, beacon ID and GPS OK Red x 4 = Overall test fail – return to manufacturer.
Maximum duration of Self-Test mode	≤ maximum duration of Self-Test	sec	7	7	7	
Automatic termination of Self-Test mode upon completion of Self-Test and indication of Self-Test results	verify automatic termination	Y / N	Y	Y	Y	

Parameters to be Measured	Range of Specification	Units	Test Results		Comments
9. Thermal Shock					**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**					
Soak Temperature	30 °C difference	°C	10.0		
Measurement Temperature		°C	-20.0		
Transmitted Frequency			Min	Max	
Nominal value	C/S T.001	MHz	406.0399997	406.0399972	
Short-term stability	≤ $2x10^{-9}$	/100 ms	14.250E-11	74.992E-12	
Medium-term stability – Slope	(-2 to +2)$x10^{-9}$	/min	-13.091E-11	25.889E-11	
Medium-term stability – Residual frequency variation	≤ $3x10^{-9}$		12.965E-11	78.540E-11	
Transmitter power output	35 - 39	dBm	37.91	38.46	
Digital message	correct	P/F	P		
10. Operating Lifetime at Minimum Temperature					**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**					
Pre-test battery discharge duration (operating) required		hours	5.00		No pre-test discharge was carried out, see extension factor below
Pre-test battery discharge duration (operating)		hours	0.00		
Duration	>24	hours	38.97 hours at Tmin = -20 °C		Time to first failure (power output)
Effective Operating Lifetime duration	>24	hours	33.97 hours at Tmin = -20 °C		Extension factor = 5.00 h
Transmitted Frequency			Min	Max	MTS results exclude first 30 minutes of data. All results up to 24 hours.
Nominal value	C/S T.001	MHz	406.0400026	406.0400112	
Short-term stability	≤ $2x10^{-9}$	/100 ms	5.90E-11	1.59E-10	
Medium-term stability – Slope	(-1 to +1)$x10^{-9}$	/min	-5.63E-11	6.39E-11	
Medium-term stability – Residual frequency variation	≤ $3x10^{-9}$		4.86E-11	3.66E-10	
Transmitter power output	35 - 39	dBm	36.51	38.18	
Digital message	correct	P/F	P		
Homer transmitter continuous operation during the lifetime test		hours	N/A		
			Start of Test	End of Test	
Homer frequency		MHz	N/A	N/A	
Homer peak power level		dBm	N/A	N/A	
Homer transmitter duty cycle		%	N/A	N/A	

Parameters to be Measured	Range of Specification	Units	Test Results		Comments
11. Temperature Gradient (5 °C/hr)					**Result: Pass**
Model: SOS-300**, S/N: #1876, TUV Ref: TSR3 and Modification State 0**					
Up Ramp					
Transmitted Frequency			Min	Max	
Nominal value	C/S T.007	MHz	406.0399273	406.0399994	
Short-term stability	≤ $2x10^{-9}$	/100 ms	40.719E-12	12.905E-11	
Medium-term stability – Slope[1]	(-1 to +1)$x10^{-9}$	/min	-5.56E-11	5.05E-11	Data for points A to B and C+15 to D
	(-2 to +2)$x10^{-9}$	/min	-3.53E-10	1.21E-10	Data for points B to C+15 min
Medium-term stability – Residual frequency variation	≤ $3x10^{-9}$		38.790E-12	28.961E-11	
Transmitter power output	35 – 39	dBm	37.55	38.33	
Digital message	correct	P/F	P		
Down Ramp					
Transmitted Frequency			Min	Max	
Nominal value	C/S T.007	MHz	406.0399346	406.0400019	
Short-term stability	≤ $2x10^{-9}$	/100 ms	50.870E-12	12.952E-11	
Medium-term stability – Slope[1]	(-1 to +1)$x10^{-9}$	/min	-2.24E-11	1.16E-10	Data for points C to D, E + 15 min to F
	(-2 to +2)$x10^{-9}$	/min	-1.66E-11	3.01E-10	Data for points D to E+15 min
Medium-term stability – Residual frequency variation	≤ $3x10^{-9}$		49.255E-12	56.322E-11	
Transmitter power output	35 – 39	dBm	37.27	38.42	
Digital message	correct	P/F	P		
12. Oscillator Aging					
Data	provided	Y / N	Y		Applicant's data, see Annex A for details
13. Protection Against Continuous Transmission					
Description	provided	Y / N	Y		Applicant's data, see Annex A for details

Parameters to be Measured	Range of Specification	Units	Test Results				Comments
14. Satellite Qualitative Tests							**Result: Pass**
Model: SOS-300**, S/N: #1762, TUV Ref: TSR6 and Modification State 0**							
Test Configuration	As per C/S T.007		Configuration				
			5	6	7	8	
15 Hex ID Decoded by LUT	correct	P / F	-	-	P	P	
Doppler Location results with error ≤ 5 km	≥ 80	%	-	-	91.6	100	
15. Antenna Characteristics							**Result: Non-compliance**
Model: SOS-300**, S/N: #1762, TUV Ref: TSR6 and Modification State 0**							
Test Configuration	As per C/S T.007		Configuration				* Result outside limit of T.007. However the result is within the measurement uncertainty stated in clause A.1 of T.007
			1	2	3	4	
Polarisation	linear or RHCP		-	-	Linear	Linear	
VSWR	≤ 1.5		-	-	N/A	N/A	Detachable Antennas Only
$EIRP_{LOSS}$		dB	-	-	1.3	1.3	Configuration 3 EIRPminEOL outside limits of T.007, but within the allowable measurement uncertainty stated in T.007 clause A.1 of Annex A
$EIRP_{maxEOL}$	≤ 43	dBm	-	-	42.7	39.1	
$EIRP_{minEOL}$	≥ 32	dBm	-	-	31.7*	30.2	$EIRP_{minEOL}$ limit decreases to 30 dBm for Configuration 4

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
17. Navigation System						**Result: Pass**
Model: SOS-300**, S/N: #1762, TUV Ref: TSR6 and Modification State 0**						
Location protocol	C/S T.001		National	Standard	User	
Configuration 7						
Position accuracy - A.3.8.2.1	C/S T.001	m	36.48	36.47	1597.43	
Position Acquisition Time - A.3.8.2.1	<10/1	min	1.02	1.02	1.02	
Position accuracy - A.3.8.2.2	C/S T.001	m	31.32	31.32	1553.32	
Position Acquisition Time - A.3.8.2.2	<10/1	min	1.02	1.02	1.02	
Configuration 8						
Position accuracy - A.3.8.2.1	C/S T.001	m	36.48	36.47	1597.43	
Position Acquisition Time - A.3.8.2.1	<10/1	min	1.02	1.02	1.02	
Position accuracy - A.3.8.2.2	C/S T.001	m	31.32	31.32	1553.32	
Position Acquisition Time - A.3.8.2.2	<10/1	min	1.02	1.02	1.02	
Encoded position data update interval	>20	min	15.02	25.35	15.6	
Position clearance after deactivation	cleared	P / F	P	P	P	
Position data input update interval (as applicable)	20/1	Min	N/A	N/A	N/A	
Position data encoding	correct	P / F	P	P	P	A.3.8.7 - Manufacturer Supplied Data - See Annex A
Retained last valid position after navigation input lost	240(±5)	min	241.8	241.07	240.72	
Default position data transmitted after 240(±5) minutes without valid position data	cleared	P / F	P	P	P	
Information on protection against beacon degradation due to navigation device, interface or signal failure or malfunction	provided	Y / N	Y			Applicant's data, see Annex A for details

Parameters to be Measured	Range of Specification	Units	Test Results	Comments
16. Beacon Coding Software				**Result: Pass**
Model: SOS-300**, S/N: , N/A TUV Ref: TSR N/A and Modification State N/A**				
Sample message for each coding option of the applicable coding types	correct	P / F	P	Applicant's data, see Annex A for details
Sample self-test message for each coding option of the applicable coding types	correct	P / F	P	Applicant's data, see Annex A for details

2.1 DIGITAL MESSAGE

2.1.1 Specification

Cospas-Sarsat T.007, Clause A.2.1 (b)

2.1.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.1.3 Date of Test

8 April 2016, 11 April 2016 & 13 April 2016

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

2.1.5 Environmental Conditions

Ambient Temperature 22.0 - 22.8 °C
Relative Humidity 35.5 - 39.3 %

2.1.6 Test Results

Test Duration: 30 minutes
No. of bursts: 38

Ambient Temperature

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Low Temperature

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

High Temperature

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Summary

The EUT complies with clause A.3.1.4 of Cospas-Sarsat T.007

2.2 MODULATION

2.2.1 Specification

Cospas-Sarsat T.007, Clause A.2.1 (d)

2.2.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.2.3 Date of Test

8 April 2016, 11 April 2016, 12 April 2016 & 13 April 2016

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

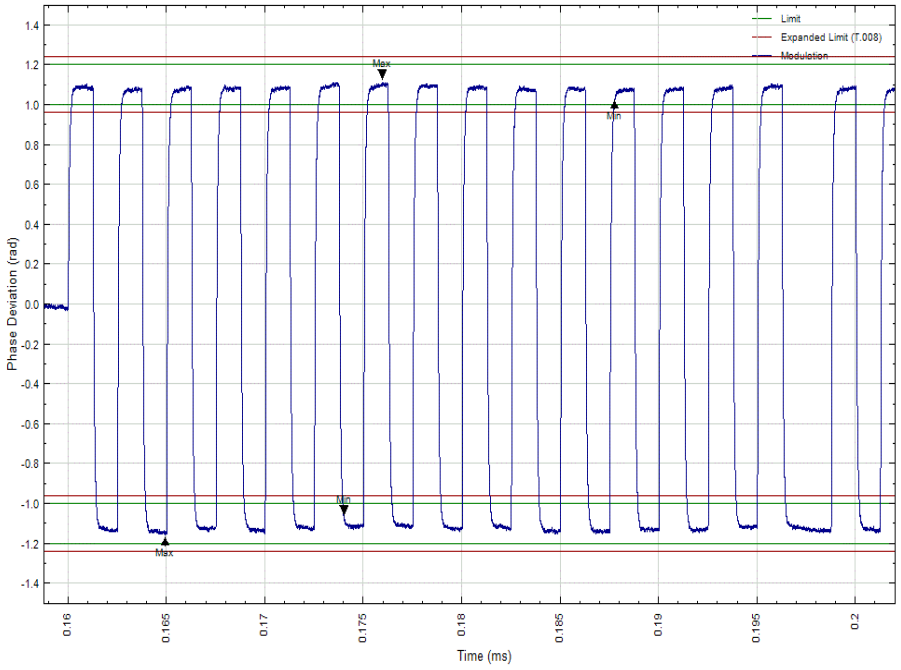
2.2.5 Environmental Conditions

Ambient Temperature 22.0 - 22.8 °C
Relative Humidity 31.4 - 39.3 %

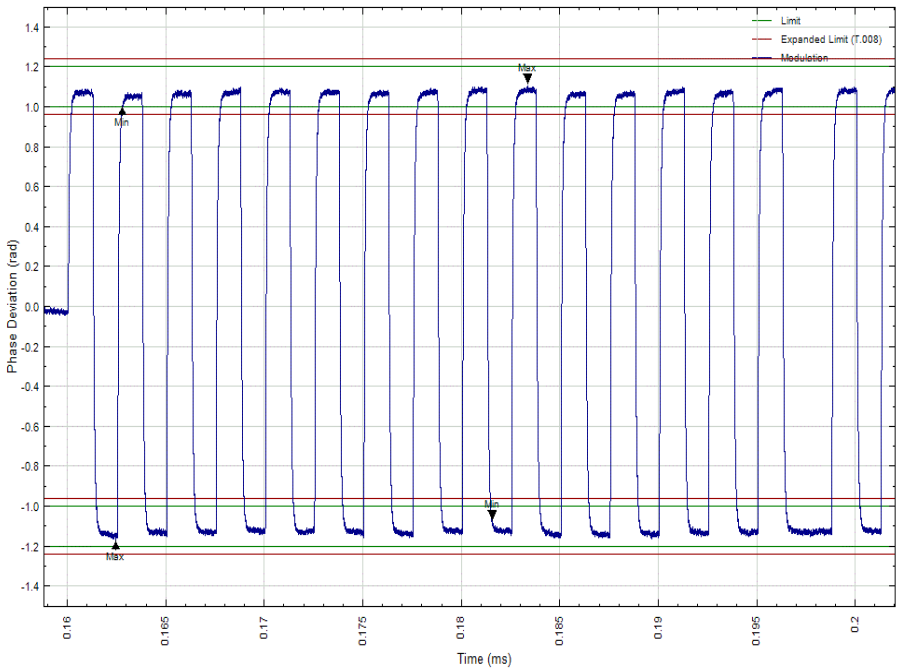
2.2.6 Test Results

Test Duration: 30 minutes
No. of bursts: 38

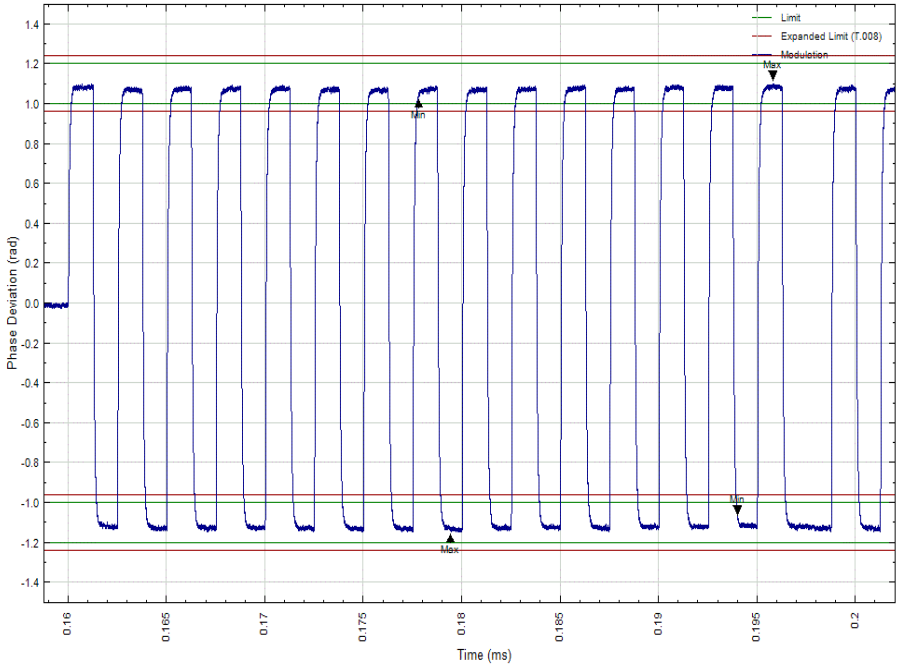
Ambient Temperature



Low Temperature



High Temperature



Summary

The EUT complies with clause A.3.2.3 of Cospas-Sarsat T.007

2.3 SPURIOUS EMISSION INTO 50 OHMS

2.3.1 Specification

Cospas-Sarsat T.007, Clause A.2.1 (f)

2.3.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.3.3 Date of Test

8 April 2016 & 12 April 2016

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

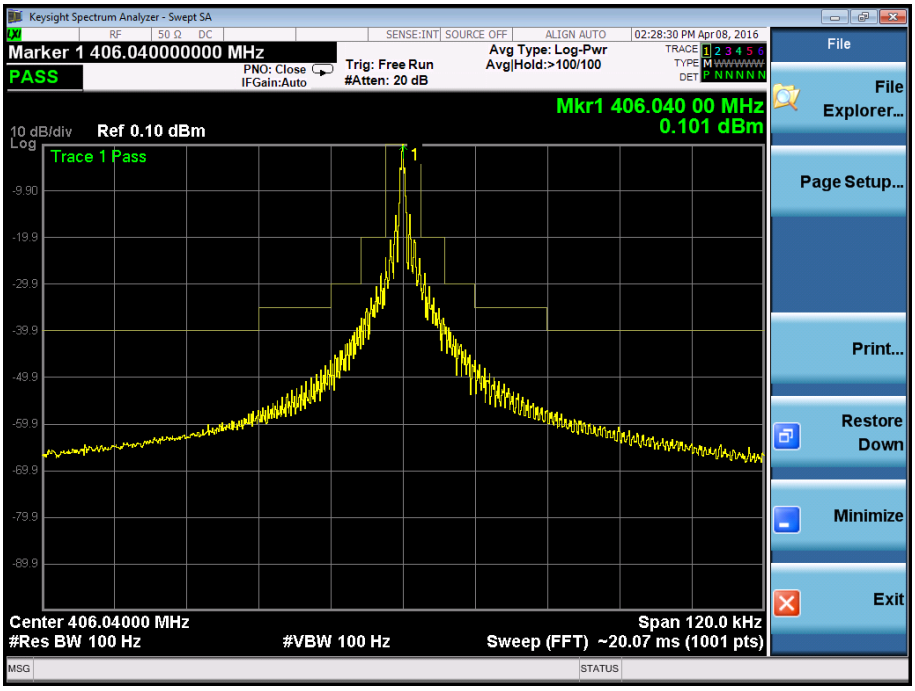
2.3.5 Environmental Conditions

Ambient Temperature 22.4 - 22.8 °C
Relative Humidity 34.1 - 44.0 %

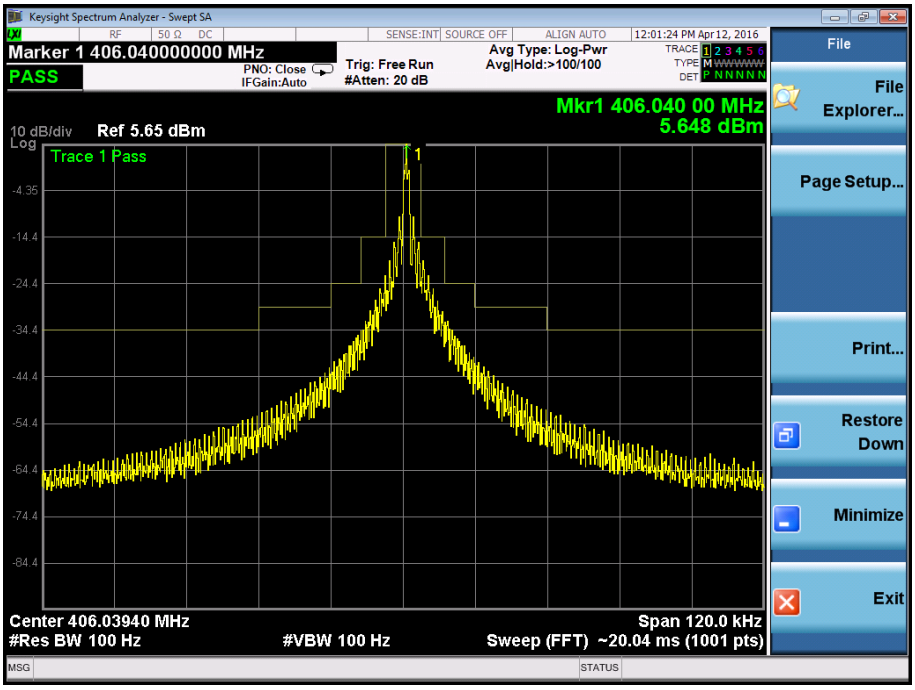
2.3.6 Test Results

Test Duration: 30 minutes
No. of bursts: 38 nominal

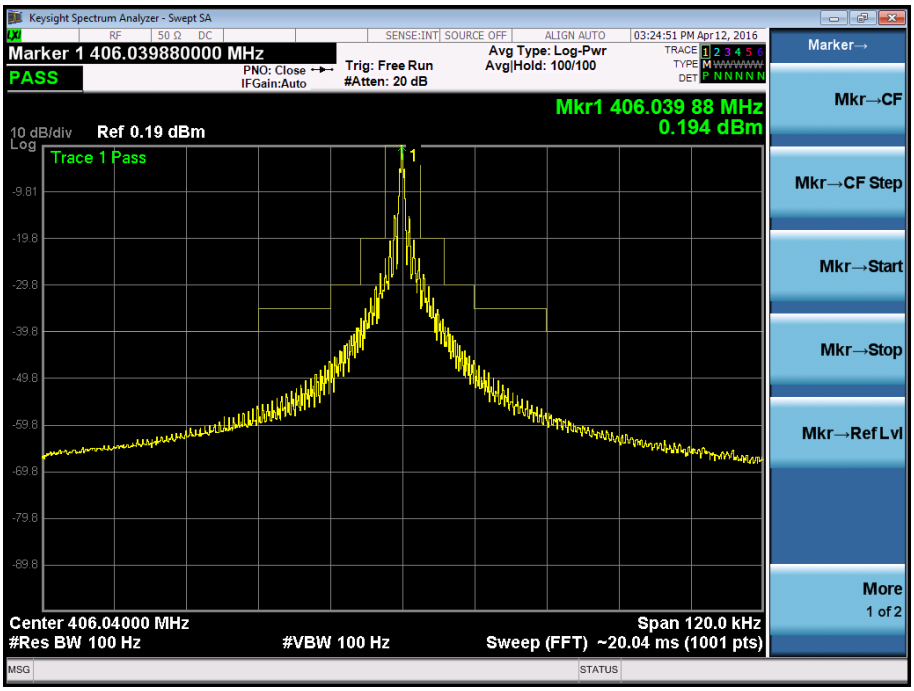
Ambient Temperature



Low Temperature



High Temperature



Summary

The EUT complies with clause A.3.2.2.4 of Cospas-Sarsat T.007

2.4 406 MHz VSWR CHECK

2.4.1 Specification

Cospas-Sarsat T.007, Clause A.2.1 (g)

2.4.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.4.3 Date of Test

8 April 2016, 11 April 2016 & 12 April 2016

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

2.4.5 Environmental Conditions

Ambient Temperature 21.6 - 22.8 °C
Relative Humidity 31.7 - 35.5 %

2.4.6 Test Results

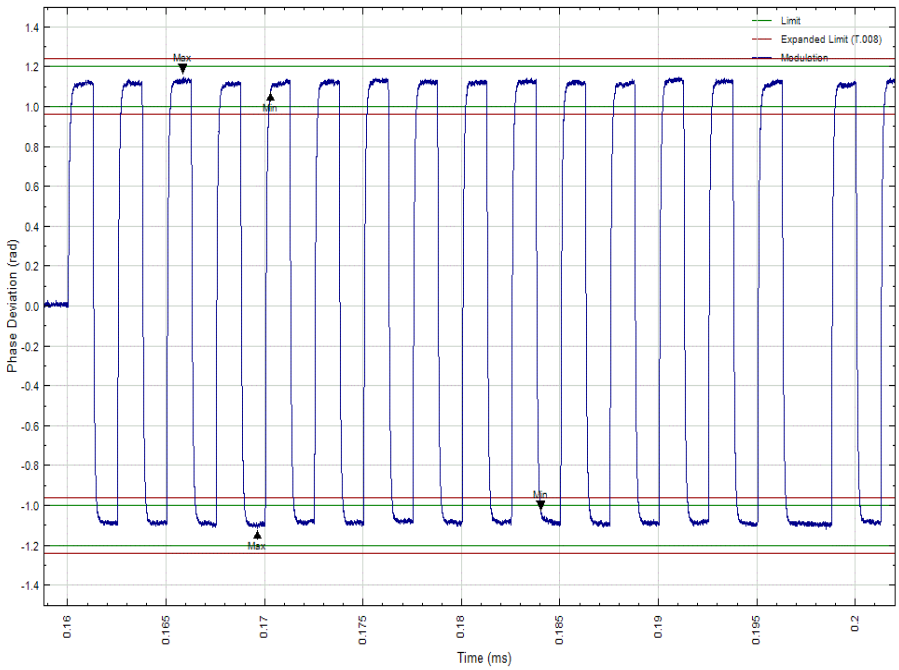
Test Duration: 30 minutes
No. of bursts: 38

Ambient Temperature

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Modulation Plot

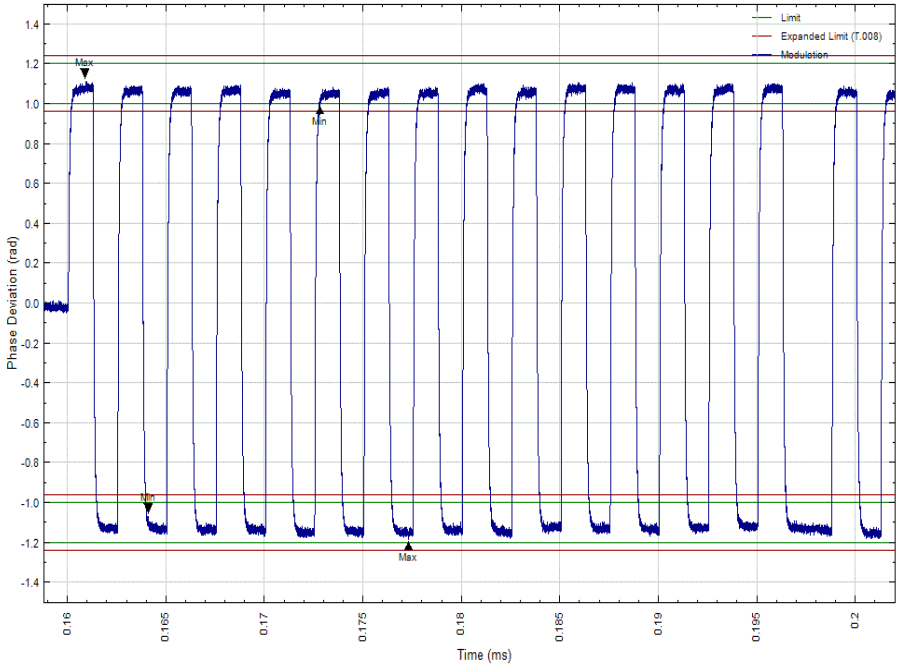


Low Temperature

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Modulation Plot

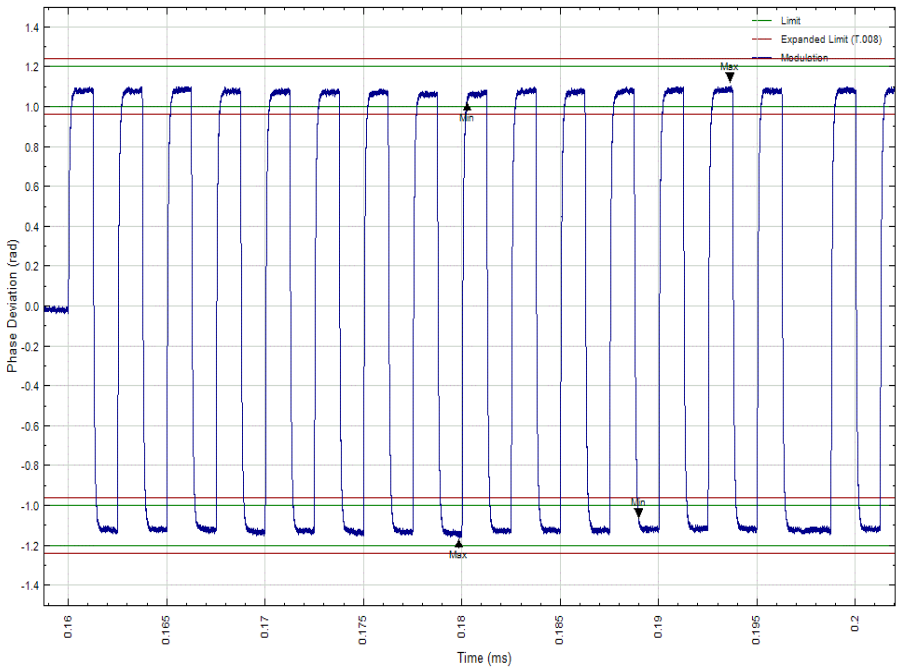


High Temperature

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Modulation Plot



Summary

The EUT complies with clause A.3.3 of Cospas-Sarsat T.007

2.5 SELF-TEST MODES

2.5.1 Specification

Cospas-Sarsat T.007, Clause A.2.1 (h)

2.5.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.5.3 Date of Test

8 April 2016 & 12 April 2016

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

2.5.5 Environmental Conditions

Ambient Temperature 22.4 - 22.8 °C
Relative Humidity 36.8 - 37.5 %

2.5.6 Test Results

Self-test Mode

Ambient Temperature

Full 36 hex message	FFFED08C9EF9C0637FDFF83D15B6

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111101000101010110
BCH 1 Calculated:	N/A	00000111101000101010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Note: Self-test at ambient temperature was carried out with navigation data applied.

Low Temperature

Full 36 hex message	FFFED08C9EF9C0637FDFF83D15B6

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

High Temperature

Full 36 hex message	FFFED08C9EF9C0637FDFF83D15B6

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	11111001110000000011000 11
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111101000101011 0
BCH 1 Calculated:	N/A	00000111101000101011 0
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Summary

The EUT fails to comply with clause A.3.6 of Cospas-Sarsat T.007 (No indication that RF is being emitted during test).

2.6 THERMAL SHOCK

2.6.1 Specification

Cospas-Sarsat T.007, Clause A.2.2

2.6.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.6.3 Date of Test

13 April 2016

2.6.4 Test Equipment Used

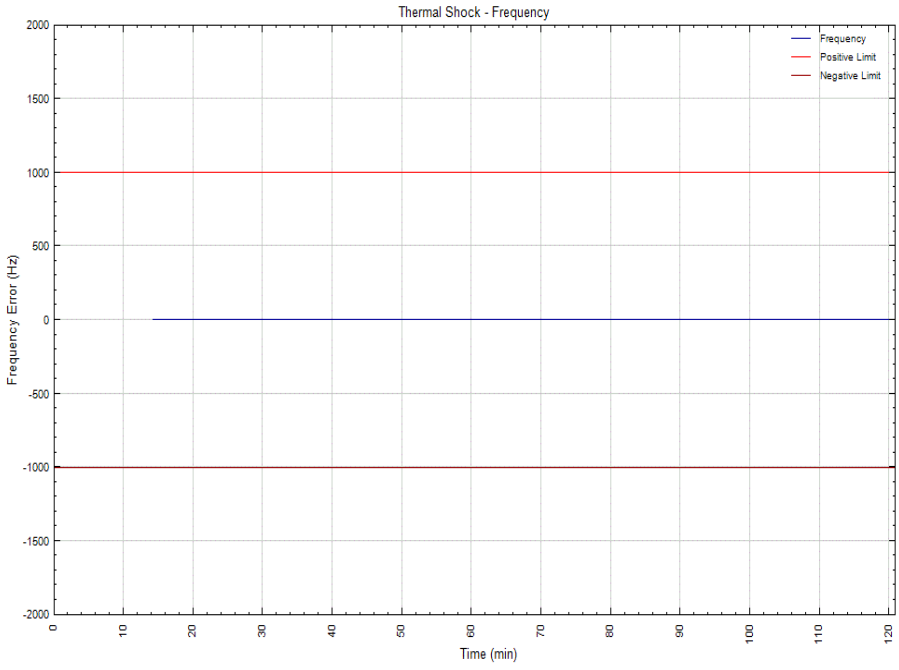
The major items of test equipment used for the above tests are identified in Section 4.1.

2.6.5 Environmental Conditions

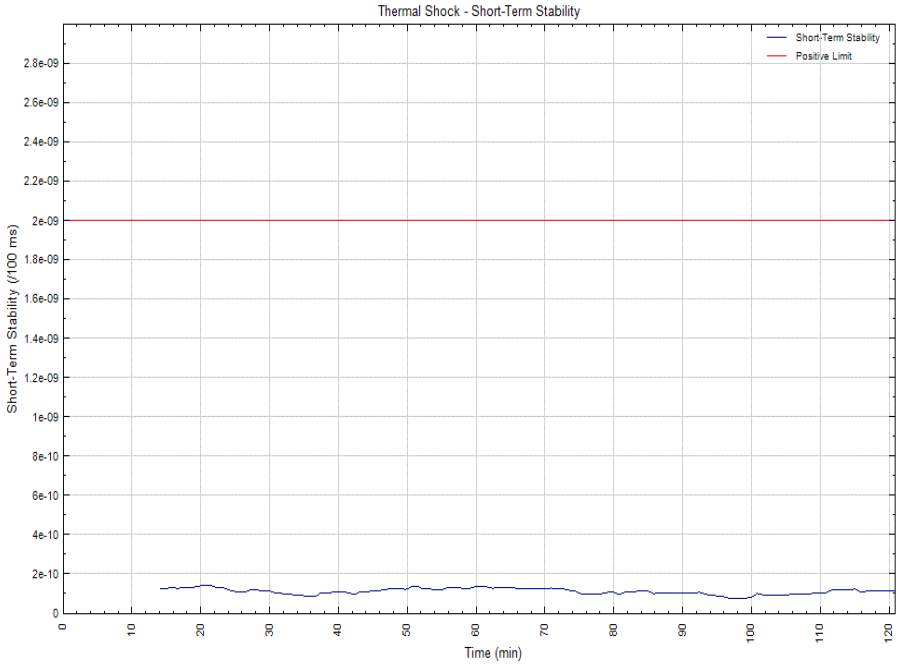
Ambient Temperature 22.1 - 22.4 °C
Relative Humidity 34.3 - 44.2 %

2.6.6 Test Results

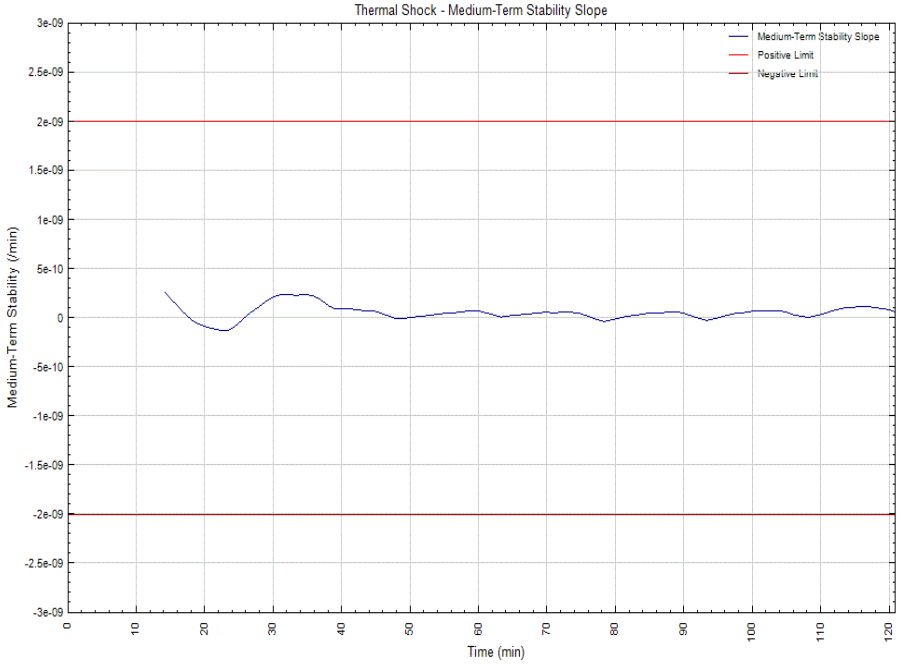
Nominal Frequency



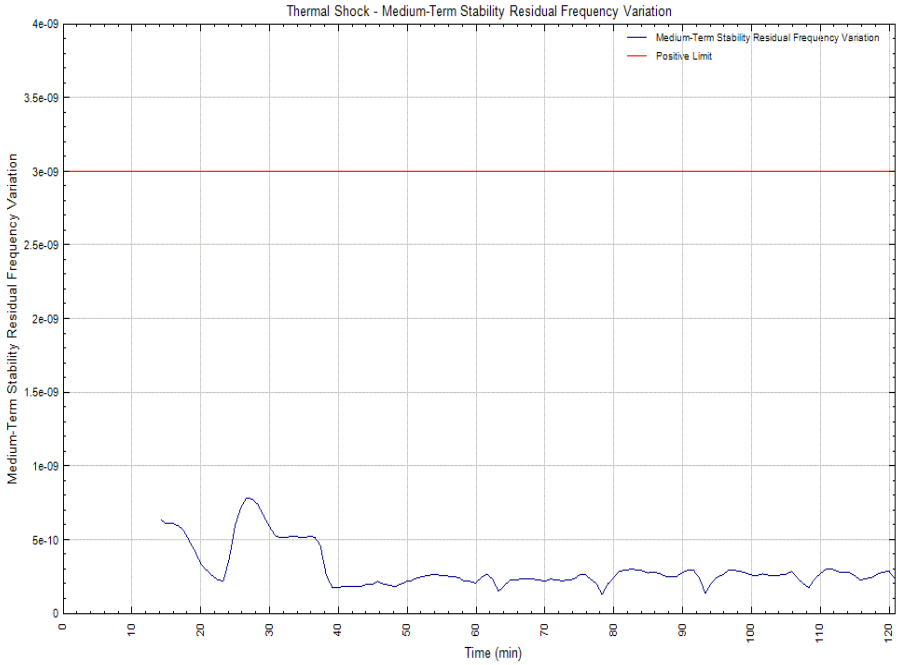
Short Term Stability



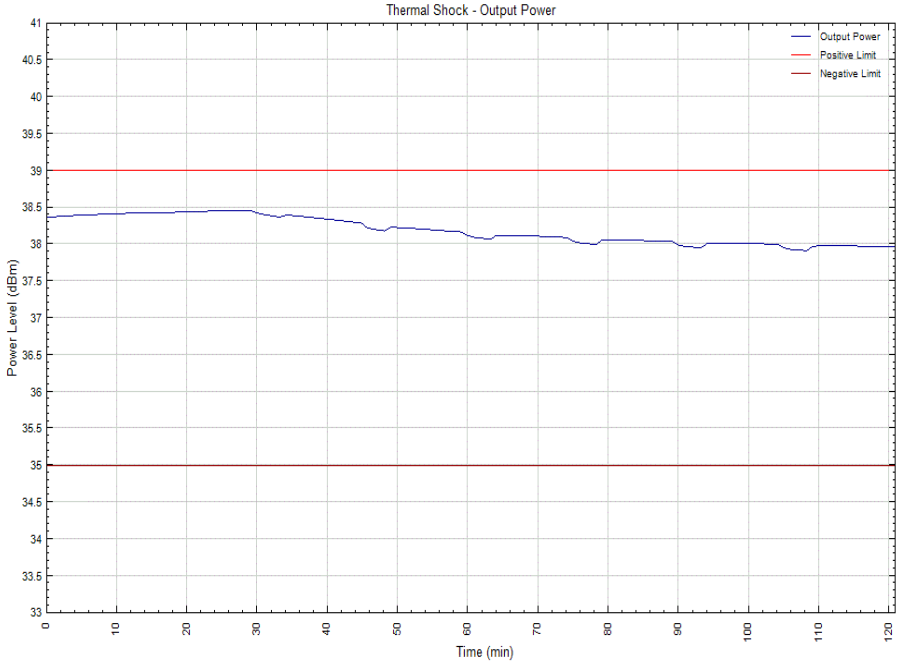
Medium Term Stability, Mean Slope



Medium Term Stability, Residual Frequency Variation



Output Power



Digital Message

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	11111001110000000011100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111101000101011O
BCH 1 Calculated:	N/A	00000111101000101011O
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Summary

The EUT complies with clause A.2.2 of Cospas-Sarsat T.007

2.7 OPERATING LIFETIME AT MINIMUM TEMPERATURE

2.7.1 Specification

Cospas-Sarsat T.007, Clause A.2.3

2.7.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.7.3 Date of Test

12 & 13 May 2016

2.7.4 Test Equipment Used

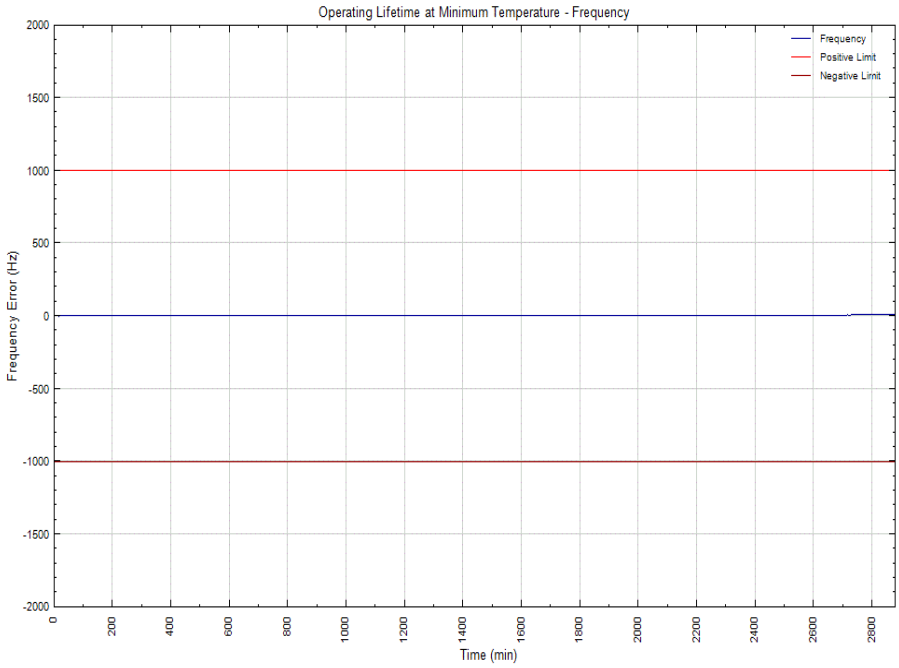
The major items of test equipment used for the above tests are identified in Section 4.1.

2.7.5 Environmental Conditions

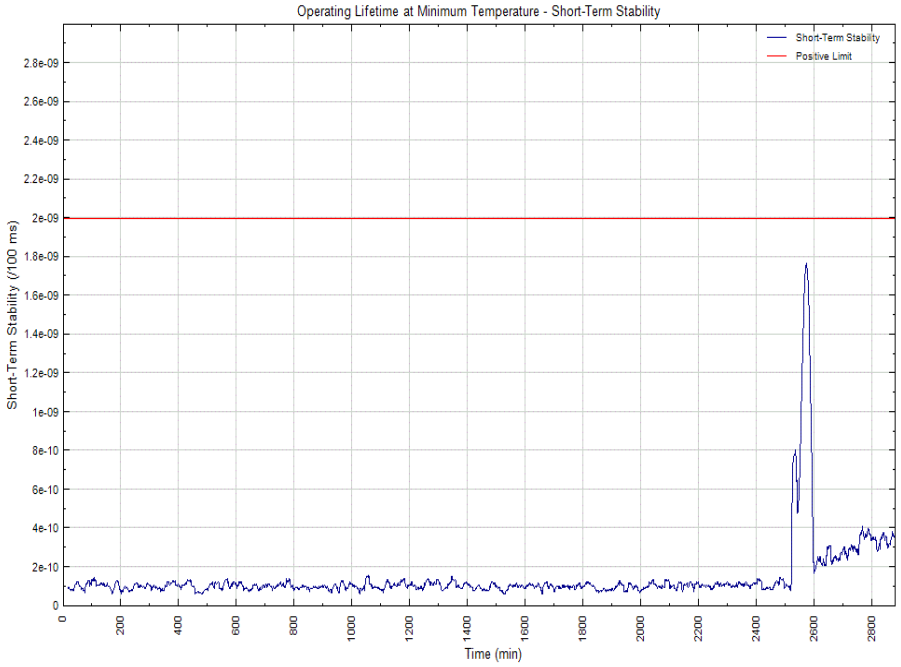
Ambient Temperature 22.4 - 22.5 °C
Relative Humidity 34.1 - 39.1 %

2.7.6 Test Results

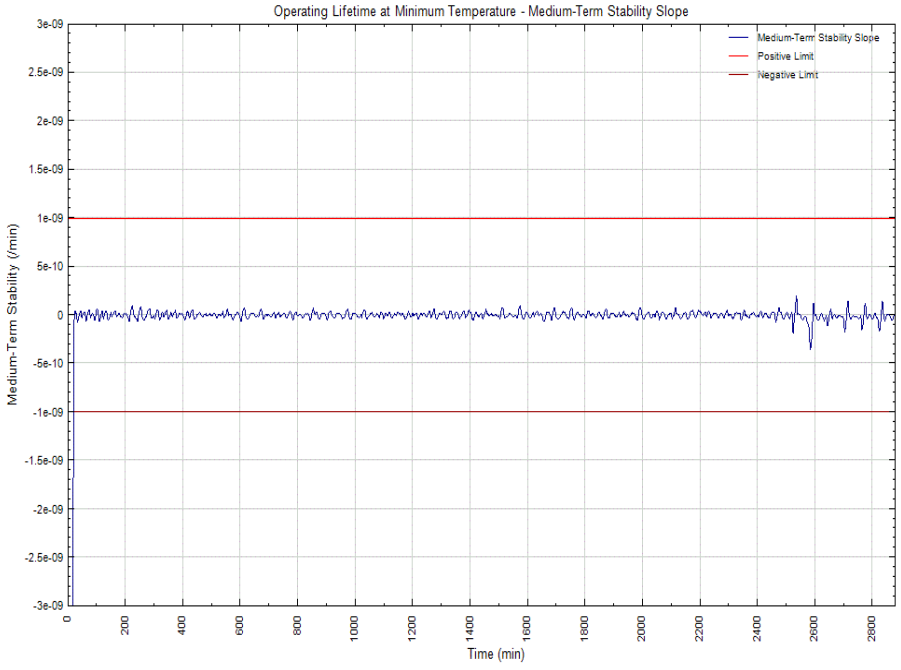
Nominal Frequency



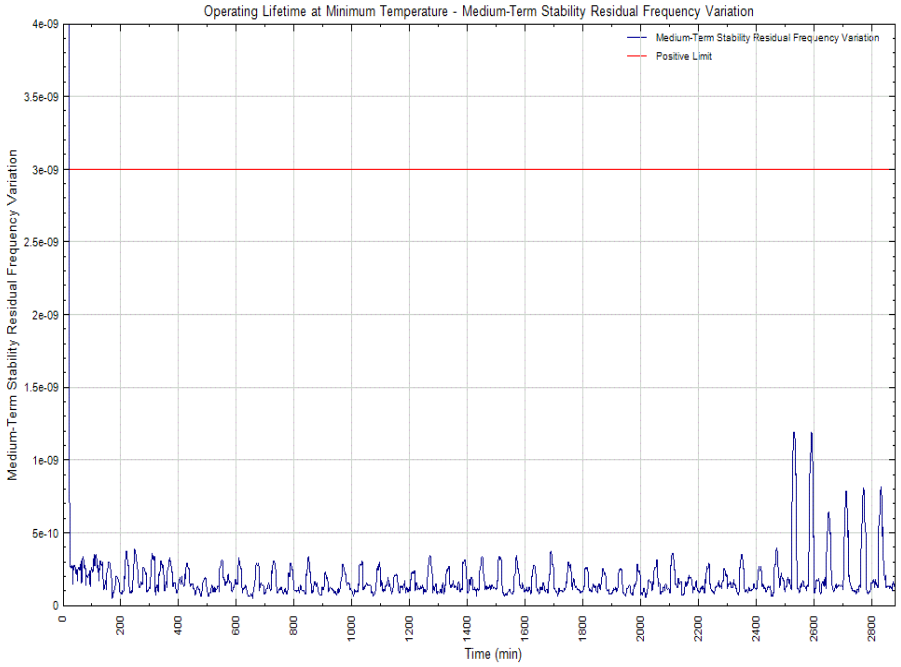
Short Term Stability



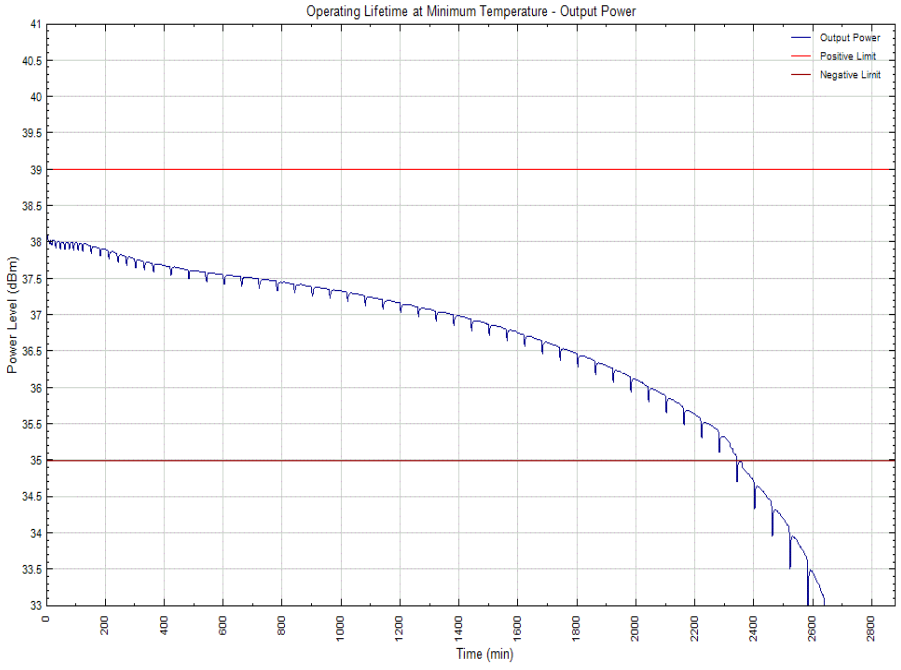
Medium Term Stability, Mean Slope



Medium Term Stability, Residual Frequency Variation



Output Power



Product Service

Digital Message

Full 36 hex message	FFFE2F8C9F70465FC0FF01F754769F3C0672

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: National Location - Test	37-40	1111
Serial Number: 114969	41-58	011100000100011001
Latitude Flag: default	59	0
Latitude (Degrees): default	60-66	1111111
Latitude (Minutes): default	67-71	00000
Longitude Flag: default	72	0
Longitude (Degrees): default	73-80	11111111
Longitude (Minutes): default	81-85	00000
BCH 1 Encoded:	86-106	00111101110101010001
BCH 1 Calculated:	86-106	00111101110101010001
Fixed bits (110): Pass	107-109	110
Bits 113 - 132 provides offset data location	110	1
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Loc. Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-115	00
Latitude Offset Seconds: default	116-119	1111
Longitude Offset Sign: default	120	1
Longitude Offset Minutes: default	121-122	00
Longitude Offset Seconds: default	123-126	1111
Additional Id (Nat Use)	127-132	000000
BCH 2 Encoded:	133-144	011001110010
BCH 2 Calculated:	N/A	011001110010
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193EE08CBF81FE0

Test Data (0 min - 30 min)

Burst	Power (dBm)	Frequency (MHz)	STS (/100 ms)	MTS-Slope (/min)	MTS-Var.	Time (h)
1	38.17	-	-	-	-	0.00
2	38.17	-	-	-	-	0.01
3	38.12	-	-	-	-	0.03
4	38.09	-	-	-	-	0.04
5	38.06	-	-	-	-	0.06
6	38.05	-	-	-	-	0.07
7	38.03	-	-	-	-	0.08
8	38.02	-	-	-	-	0.10
9	38.01	-	-	-	-	0.11
10	38.01	-	-	-	-	0.12
11	38	-	-	-	-	0.14
12	37.99	-	-	-	-	0.15
13	37.99	-	-	-	-	0.17
14	37.98	-	-	-	-	0.18
15	37.98	-	-	-	-	0.19
16	38.03	-	-	-	-	0.21
17	38.04	-	-	-	-	0.22
18	38	406.0400031	8.72E-11	-5.24E-09	1.15E-08	0.24
19	37.98	406.0400015	8.92E-11	-4.47E-09	1.16E-08	0.25
20	37.97	406.04	9.21E-11	-3.65E-09	1.12E-08	0.26
21	37.96	406.0399987	9.52E-11	-2.82E-09	1.01E-08	0.28
22	37.96	406.0399975	9.43E-11	-2.03E-09	8.55E-09	0.29
23	38.02	406.0399966	9.51E-11	-1.31E-09	6.61E-09	0.30
24	38.03	406.0399959	9.87E-11	-7.04E-10	4.31E-09	0.32
25	38.03	406.0399954	9.51E-11	-2.75E-10	1.94E-09	0.33
26	38.03	406.0399952	8.54E-11	-7.09E-11	7.14E-10	0.35
27	38.03	406.0399951	8.46E-11	-7.47E-12	4.36E-10	0.36
28	38.03	406.0399951	8.34E-11	1.94E-11	3.16E-10	0.37
29	38.03	406.0399951	8.76E-11	3.36E-11	2.86E-10	0.39
30	38.03	406.0399951	8.41E-11	3.95E-11	2.69E-10	0.40
31	38.02	406.0399951	7.68E-11	3.74E-11	2.73E-10	0.42
32	38.02	406.0399951	8.37E-11	3.08E-11	2.73E-10	0.43
33	38.02	406.0399951	8.35E-11	1.58E-11	2.65E-10	0.44
34	38.02	406.0399951	8.33E-11	1.81E-11	2.60E-10	0.46
35	38.02	406.0399951	8.40E-11	1.79E-11	2.60E-10	0.47
36	37.98	406.0399951	8.31E-11	1.22E-11	2.70E-10	0.49
37	37.94	406.0399951	8.44E-11	-1.05E-11	2.80E-10	0.50

Beacon Operating Current

System Configuration/Operating Mode Matrix (SCOMM):

System Configuration →	A	B	C	D	E	F
Rechargeable Battery:	Charged	Charged	Charged	Discharged	Discharged	Discharged
Charging Cable:	Disconnected	Connected	Connected	Disconnected	Connected	Connected
Charging Cable Power:	Off	Off	On	Off	Off	On
Charging status: / **Operational Mode ↓**	Not Charging	Not Charging	Minimal / Trickle Charging	Not Charging	Not Charging	Charging
1, Standby, Iridium Off	A1	B1	C1	D1	E1	F1
2, Standby, Iridium On, GPS Off	A2	B2	C2	N/A	N/A	F2
3, Standby, Iridium On, GPS On	A3	B3	C3	N/A	N/A	F3
4, Self-test, Iridium Off, GPS Off	A4	B4	C4	D4	E4	F4
5, Self-test, Iridium Off, GPS On	A5	B5	C5	D5	E5	F5
6, Self-test, Iridium On, GPS Off	A6	B6	C6	N/A	N/A	F6
7, Self-test, Iridium On, GPS On	A7	B7	C7	N/A	N/A	F7
8, Operating, Iridium Off, GPS Off	N/A	N/A	N/A	D8	E8	N/A
9, Operating, Iridium Off, GPS On	N/A	N/A	N/A	D9	E9	N/A
10, Operating, Iridium On, GPS Off	A10	B10	C10	N/A	N/A	F10
11, Operating, Iridium On, GPS On	A11	B11	C11	N/A	N/A	F11

Notes:

“GPS On” = GPS signals applied to the EUT, minimising the GPS Search mode
“GPS Off” = GPS signals removed from EUT, maximising the GPS Search mode

SCOMM Results as per C/S T.007 Table F-E.1:

Beacon Operating Mode	Mode: Manually selectable or Automatic	Measurement interval, sec	Average Current, mA	Peak Current, mA
A1	Manually	900	0.000000049	0.000002120
B1	Manually	900	0.000000238	0.000009380
C1	Manually	900	0.000000903	0.000235000
D1	Manually	900	0.000000077	0.000002120
E1	Manually	900	0.000000222	0.000006650
F1	Manually	900	0.000002072	0.000278300
A2	Manually	900	0.000000040	0.000002720
B2	Manually	900	0.000000320	0.000009070
C2	Manually	900	0.000003722	0.000366900
F2	Manually	900	0.000004306	0.000289200
A3	Manually	900	0.000000140	0.000003630
B3	Manually	900	0.000000259	0.000009070
C3	Manually	900	0.000000872	0.000234700
F3	Manually	900	-0.000001008	0.000276500
A4	Manually	20	46.3	1734
B4	Manually	20	46.26	1730
C4	Manually	20	43.35	1704
D4	Manually	20	47.07	1754
E4	Manually	20	47	1747
F4	Manually	20	45.4	1732
A5	Manually	20	47	1752
B5	Manually	20	45.42	1735
C5	Manually	20	44.75	1712
D5	Manually	20	46.34	1781
E5	Manually	20	46.36	1789
F5	Manually	20	42.15	1748
A6	Manually	20	44.16	1711
B6	Manually	20	43.98	1716
C6	Manually	20	43.53	1716
F6	Manually	20	45.91	1748
A7	Manually	20	45.49	1762
B7	Manually	20	44.97	1715
C7	Manually	20	45.44	1721
F7	Manually	20	44.36	1752
D8	Manually	1800	34.80	1873

Beacon Operating Mode	Mode: Manually selectable or Automatic	Measurement interval, sec	Average Current, mA	Peak Current, mA
E8	Manually	1800	33.90	1859
D9	Manually	1800	27.88	1848
E9	Manually	1800	27.19	1854
A10	Manually	1800	26.45	1849
B10	Manually	1800	26.65	1813
C10	Manually	1800	25.29	1764
F10	Manually	1800	25.44	1824

The sampling interval was a nominal 80 ms for all measurements.

Observations: In all standby modes, the measured results were considered noise as opposed to valid measurements. This was verified by moving items around in the test area, connecting and disconnecting the test laptop's power supply and seeing an impact on the noise. Connecting the charging unit to the EUT produced little impact on the noise until it was also connected to the mains (even when electrically isolated) when introduced a large amount of noise (see Peak current values). The noise in most cases caused a positive trend that was taken as the final result but in some cases (see F3) there was a negative trend at the 15 minute time (if the test duration was shortened to 4 minutes, the average current became 2 nA). The negative value was taken as the final value for consistency but the overall conclusion was that then the 406 was off, there was zero current consumption from the primary battery.

Note: Measurement modes A4 to F7 inclusive were made over 20 seconds in each case. This was to ensure that any residual currents were captured. The manufacturer has declared that the maximum Self-Test duration is 10 seconds. To allow for this, the average current measured during the interval of 20 second has been adjusted in Table F-E.2 by halving the measurement time to 10 seconds, but doubling the average current measured.

Worst Case System Configurations / Operating Modes:

"Lifetime in service" drains (highest average current):

Standby: F2 – Rechargeable Battery: Discharged, Charging Cable: Connected, Charging Cable Power: On, Charging Status: Charging – Standby, Iridium On, GPS Off

Self-test: D4 – Rechargeable Battery: Discharged, Charging Cable: Disconnected, Charging Cable Power: Off, Charging Status: Not Charging – Self-test, Iridium Off, GPS Off

Operating mode during the Lifetime test (highest average current)

D8 – Rechargeable Battery: Discharged, Charging Cable: Disconnected, Charging Cable Power: Off, Charging Status: Not Charging – Operating, Iridium Off, GPS Off

Conditions during Lifetime test

GNSS Signals: None applied

Operating mode used for battery conditioning calculations (lowest average current)

E9 – Rechargeable Battery: Discharged, Charging Cable: Connected, Charging Cable Power: Off, Charging Status: Not Charging – Operating, Iridium Off, GPS Off

Operating mode used for actual battery conditioning (equal or higher average current than above mode):

D8 – Rechargeable Battery: Discharged, Charging Cable: Disconnected, Charging Cable Power: Off, Charging Status: Not Charging – Operating, Iridium Off, GPS Off

Conditions during battery conditioning:

Temperature: -20 °C

GNSS Signals: None applied

Note: Battery conditioning is a flexible term used to mean either pre-test discharge or extension time as appropriate, see Pre-test Battery Discharge, below.

Product Service

Pre-test Battery Discharge Calculations

As per C/S T.007 Table F-E.2:

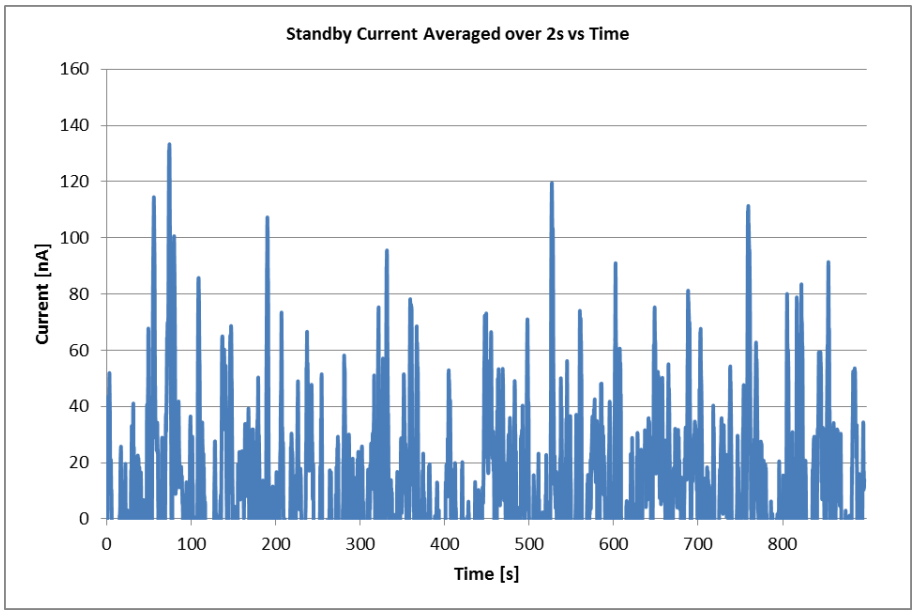
Characteristic	Designation	Units	Value	Comments
Beacon manufacturers declared maximum allowed cell shelf-life (from date of cell manufacture to date of battery pack installation in the beacon)	T_{CS} or TCS	Years	0.25	
Declared beacon battery replacement period (from date of installation in the beacon to expiry date marked on the beacon)	T_{BR} or TBR	Years	7	
Battery pack electrical configuration	-	-	Series	
Cell model and cell chemistry	-	-	CR123A, 2/3A, $LiMnO_2$	
Nominal cell capacity	-	Ah	1.4	
Nominal battery pack capacity	C_{BN}	Ah	1.4	
Annual battery cell capacity loss (self-discharge) due to aging, as specified by cell manufacturer at ambient temperature	L_{SDC}	%	1	
Calculated battery pack capacity loss due to self-discharge: $L_{CBN} = C_{BN} - [C_{BN} * (1 - L_{SDC}/100)^{TBR+TCS}]$	L_{CBN}	Ah	0.0984	
Number of self-tests per year	N_{ST}	-	12	
Average battery current during a self-test	I_{ST}	mA	94.1	
Maximum duration of a self-test	T_{ST}	s	10	
Calculated battery pack capacity loss due to self-tests during battery replacement period: $L_{ST} = I_{ST} * T_{ST} * T_{BR} * (N_{ST} / 3600)$	L_{ST}	mAh	21.96	
Maximum Number of GNSS self-tests between battery replacements	N_{GST}	-	N/A	No GNSS Self-test declared
Average battery current during a GNSS self-test of maximum duration	I_{GST}	mA	N/A	
Maximum duration of a GNSS self-test	T_{GST}	s	N/A	
Calculated battery pack capacity loss due to GNSS self-tests during battery replacement period: $L_{GST} = I_{GST} * T_{GST} * (N_{GST} / 3600)$	L_{GST}	mAh	N/A	
Average stand-by battery pack current	I_{SB}	mA	0.000004283	
Other Capacity Losses	L_{OTH}	mAh	0	None declared
Battery pack capacity loss due to constant operation of circuitry prior to beacon activation: $L_{ISB} = I_{SB} * T_{BR} * 8760$	L_{ISB}	mAh	0.2626	
Calculated value of the battery pack pre-test discharge $L_{CDC} = L_{CBN} + 1.65((L_{ST} + L_{GST} + L_{ISB})/1000) + (L_{OTH}/1000)$	L_{CDC}	Ah	0.1350	

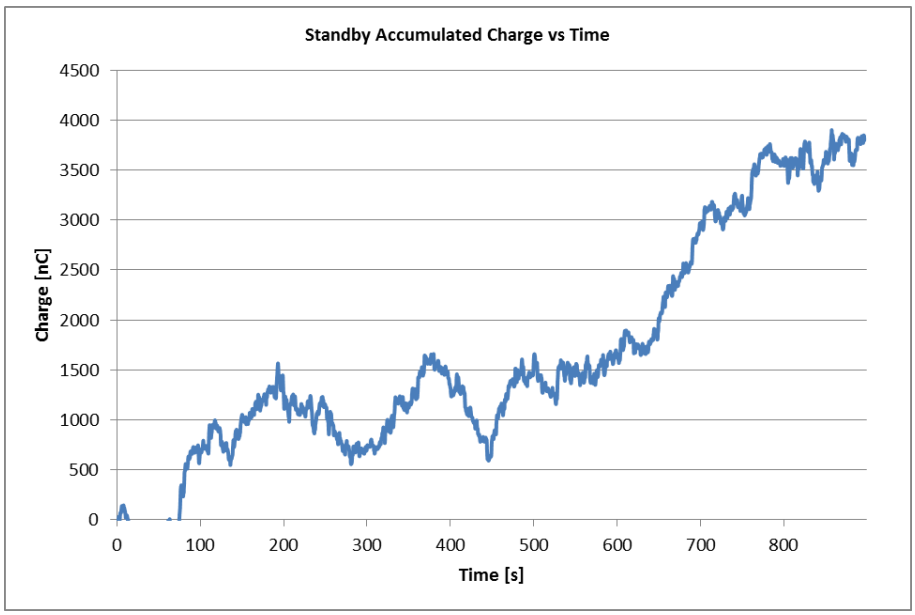
Pre-test Battery Discharge

No pre-test discharge was carried out before the test, hence, and extension factor was deducted from the final duration to determine the Effective Operating Lifetime duration as follows:

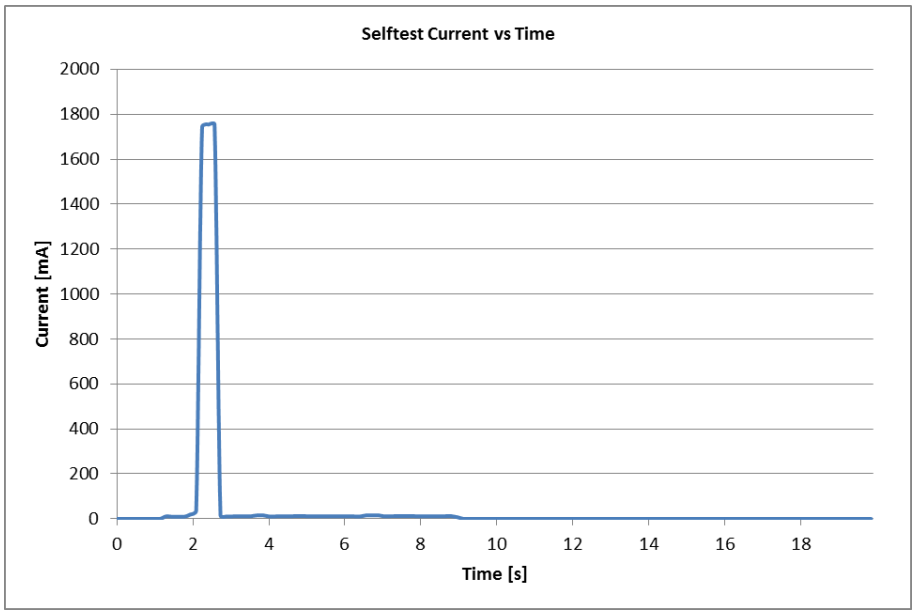
Required pre-test discharge time	= 135.0 mAh
Operating mode (lowest current)	= 27.19 mA
Extension factor	= 135.0 / 27.19
	= 5.00 h

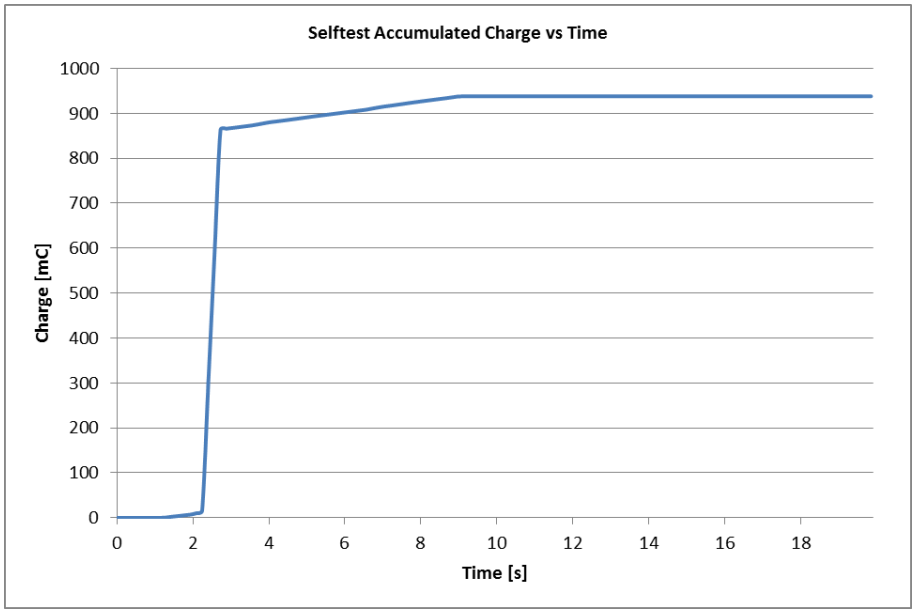
Standby Mode Plots



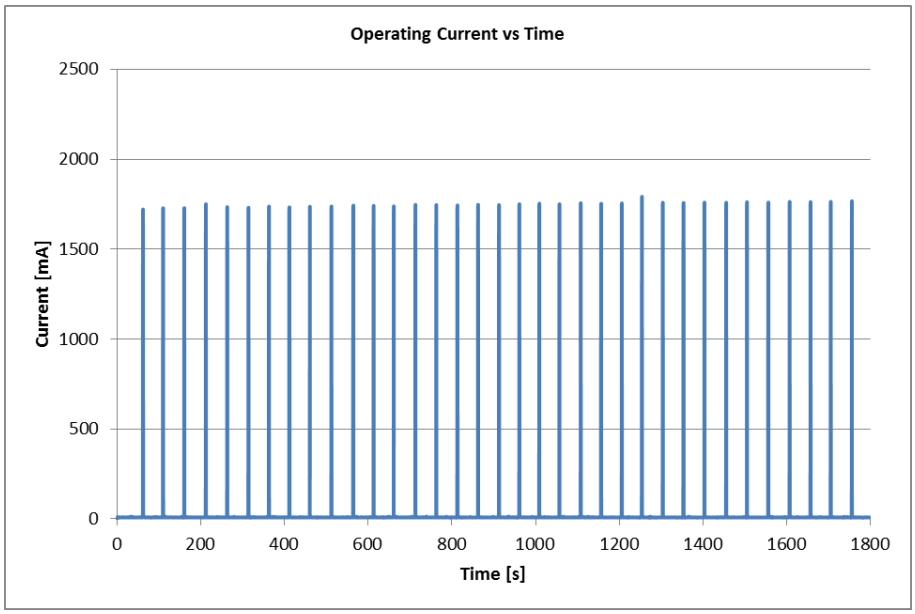


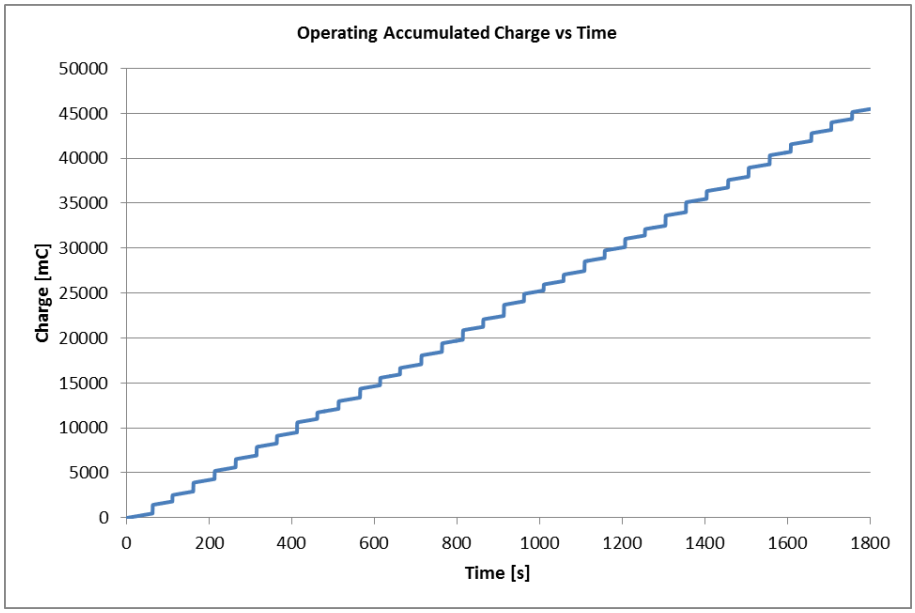
Self-test Mode Plots





Operating Mode Plots





Summary

The EUT complies with clause A.2.3 of Cospas-Sarsat T.007

2.8 FREQUENCY STABILITY TEST WITH TEMPERATURE GRADIENT

2.8.1 Specification

Cospas-Sarsat T.007, Clause A.2.4

2.8.2 Equipment Under Test and Modification State

SAR Link S/N: #1876 - Modification State 0

2.8.3 Date of Test

8 April 2016, 9 April 2016 & 10 April 2016

2.8.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

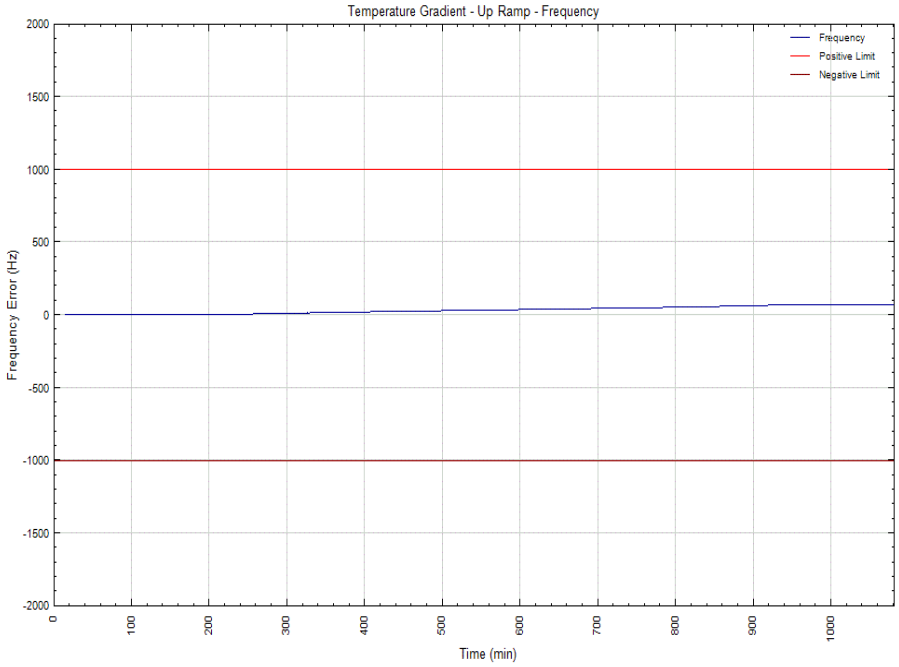
2.8.5 Environmental Conditions

Ambient Temperature 22.4 - 22.5 °C
Relative Humidity 33.8 - 42.8 %

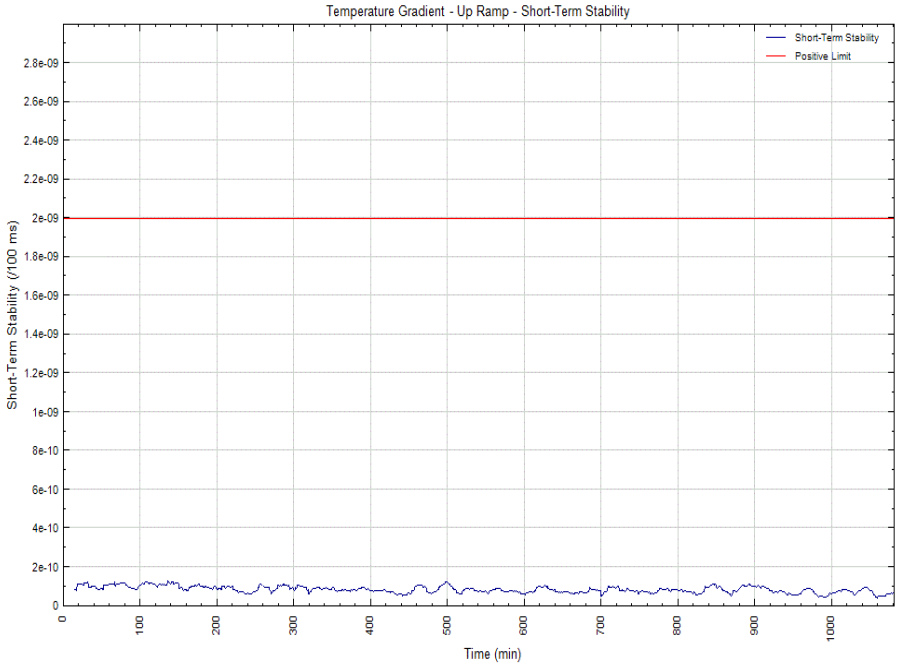
2.8.6 Test Results

Up Ramp

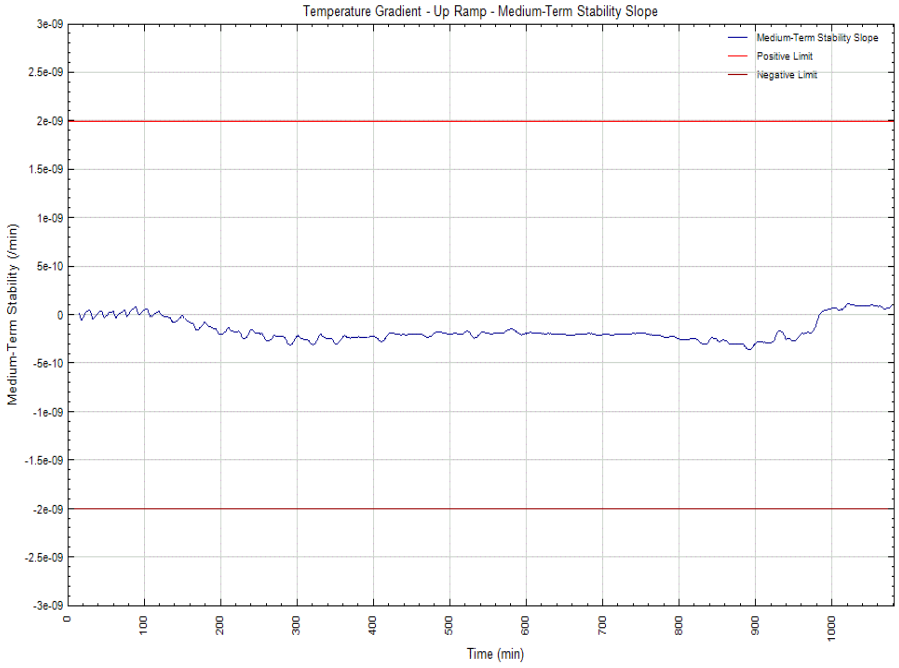
Nominal Frequency



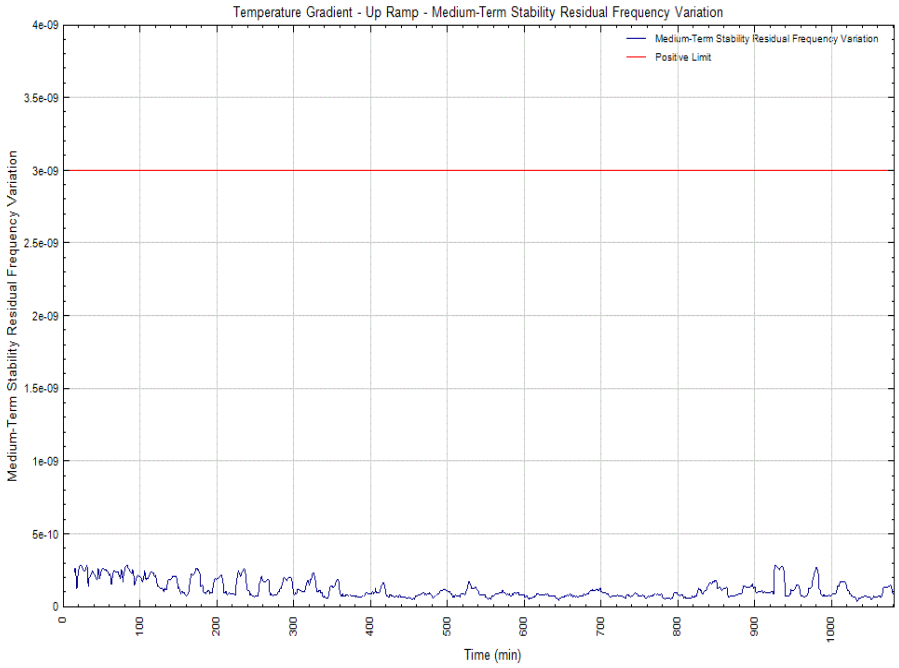
Short Term Stability



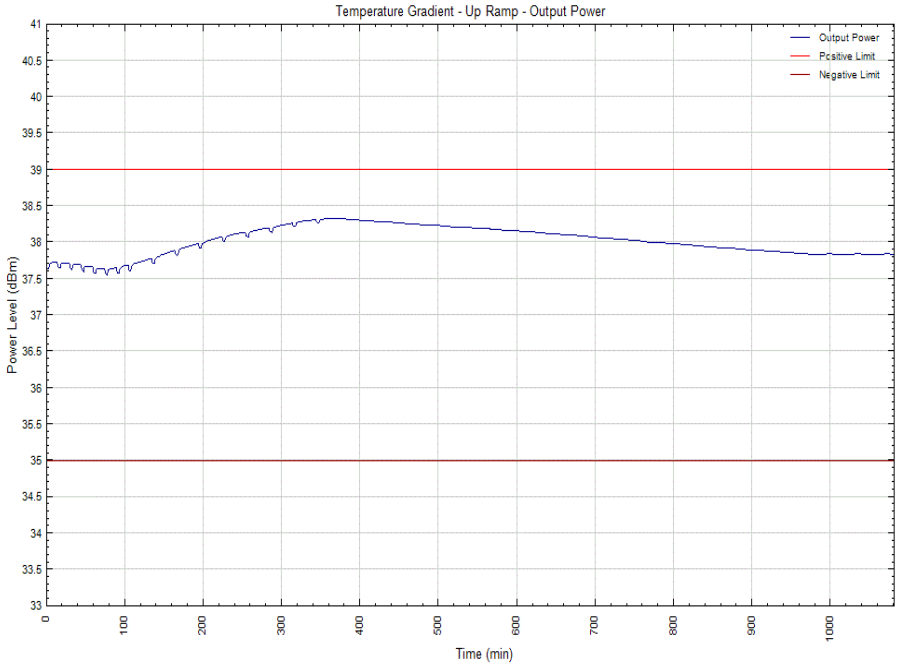
Medium Term Stability, Mean Slope



Medium Term Stability, Residual Frequency Variation



Output Power



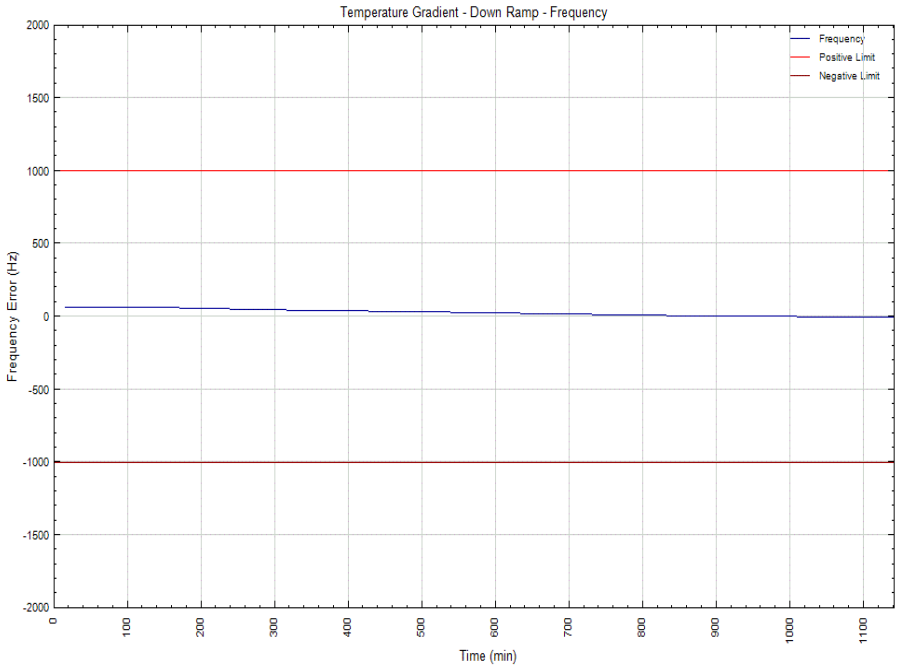
Digital Message

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

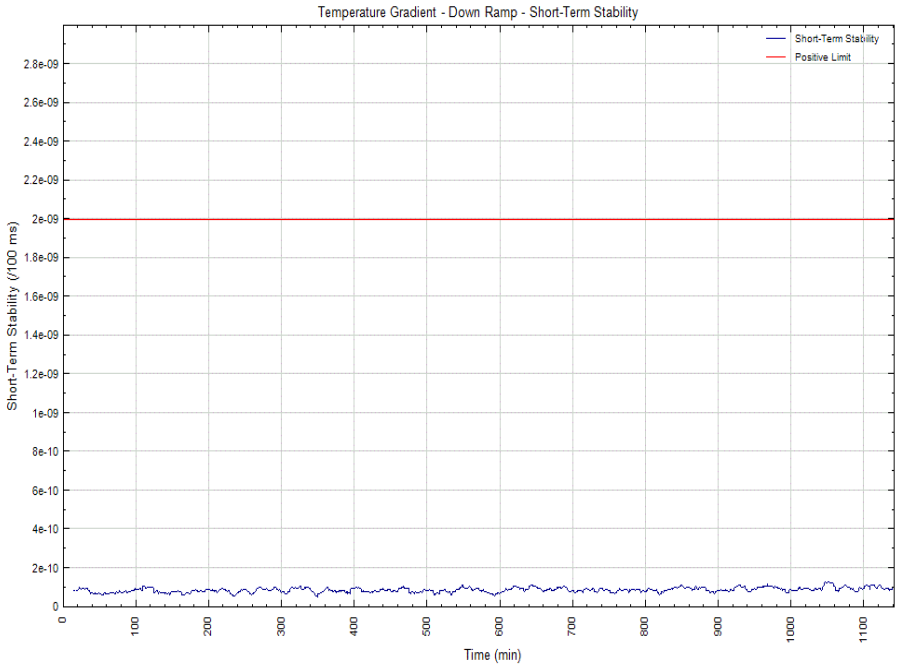
ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Down Ramp

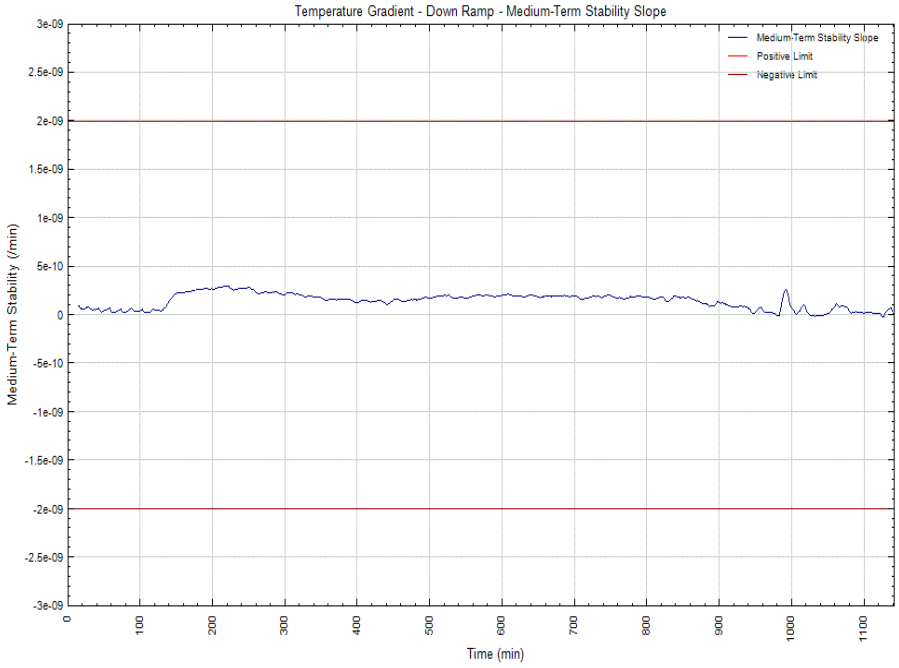
Nominal Frequency



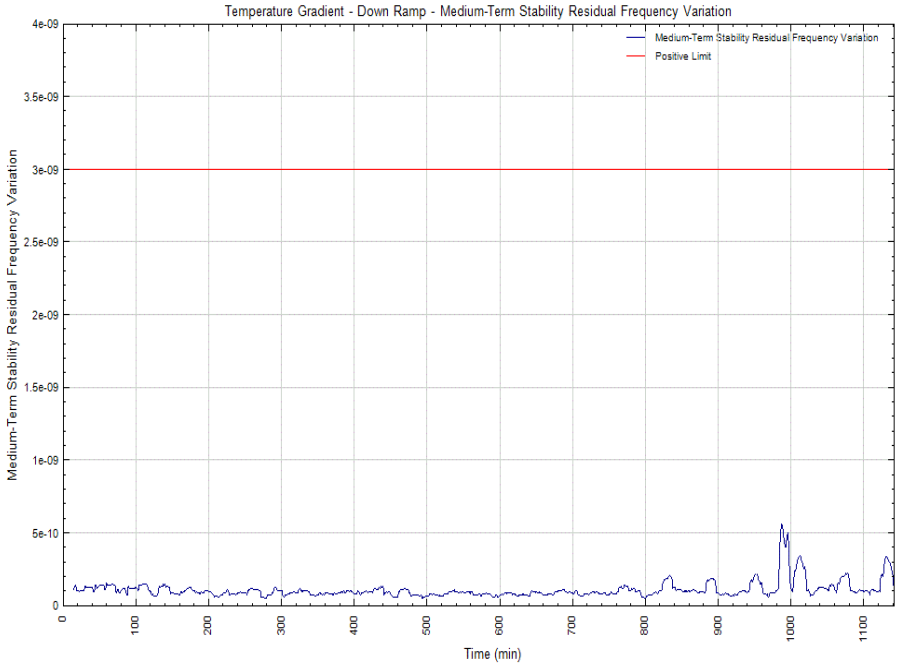
Short Term Stability



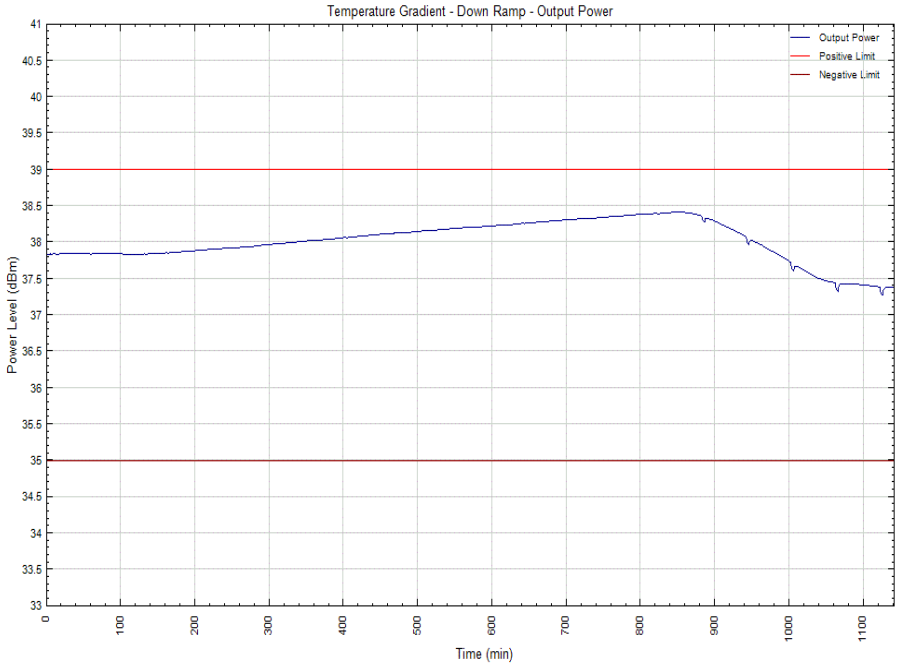
Medium Term Stability, Mean Slope



Medium Term Stability, Residual Frequency Variation



Output Power



Digital Message

Full 36 hex message	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E

ITEM	BITS	VALUE
Message format: long format	25	1
Protocol: Location Protocol	26	0
Country code: 201 - **Albania**	27-36	0011001001
Type of location protocol: Standard Location - Test	37-40	1110
Test Protocol: Test Protocol (No Decode information in bits 41 to 64)	41-64	111110011100000001100011
Latitude Sign: default	65	0
Latitude Degrees: default	66-72	1111111
Latitude Minutes: default	73-74	11
Longitude Sign: default	75	0
Longitude Degrees: default	76-83	11111111
Longitude Minutes: default	84-85	11
BCH 1 Encoded:	86-106	00000111010001010110
BCH 1 Calculated:	N/A	00000111010001010110
Fixed bits (1101): Pass	107-110	1101
Position Data: Encoded Position Data Source From Internal Navigation Device	111	1
Aux Device: No 121.5 MHz homer	112	0
Latitude Offset Sign: default	113	1
Latitude Offset Minutes: default	114-118	00000
Latitude Offset Seconds: default	119-122	1111
Longitude Offset Sign: default	123	1
Longitude Offset Minutes: default	124-128	00000
Longitude Offset Seconds: default	129-132	1111
BCH 2 Encoded:	133-144	000000001110
BCH 2 Calculated:	N/A	000000001110
Composite Latitude: default	N/A	Composite Longitude: default
15 Hex ID:	N/A	193DF380C6FFBFF

Summary

The EUT complies with clause A.2.4 of Cospas-Sarsat T.007

Interim TCXO Procedure Results

Up Ramp

Table A-2: Point-By-Point Analysis

MTS Characteristic	Time (h)	Temp. (°C)	tot	osc	beacon_wc	MAX-OSC	beacon_max	Ageing factor	beacon_5 year	Limit	Result
Residual	15.43	51.7	2.866E-10	2.898E-10	2.866E-10	2.00E-09	2.020E-09	2.00E-10	2.220E-09	3.0E-09	Pass
Static Positive Mean Slope	0.68	-19.9	2.938E-11	-7.146E-11	7.726E-11	7.00E-10	7.043E-10	1.00E-10	8.043E-10	1.0E-09	Pass
Static Negative Mean Slope	0.29	-20.0	-5.565E-11	2.430E-11	-6.072E-11	-7.00E-10	-7.026E-10	-1.00E-10	-8.026E-10	-1.0E-09	Pass
Gradient Positive Mean Slope	17.00	55.0	1.177E-10	3.266E-11	1.131E-10	1.70E-09	1.704E-09	1.00E-10	1.804E-09	2.0E-09	Pass
Gradient Negative Mean Slope	14.86	49.0	-3.527E-10	4.700E-11	-3.558E-10	-1.70E-09	-1.737E-09	-1.00E-10	-1.837E-09	-2.0E-09	Pass

Down Ramp

Table A-2: Point-By-Point Analysis

MTS Characteristic	Time (h)	Temp. (°C)	tot	osc	beacon_wc	MAX-OSC	beacon_max	Ageing factor	beacon_5 year	Limit	Result
Residual	16.45	-20.0	5.632E-10	3.181E-10	4.648E-10	2.00E-09	2.053E-09	2.00E-10	2.253E-09	3.0E-09	Pass
Static Positive Mean Slope	17.70	-20.0	1.157E-10	-1.230E-11	1.163E-10	7.00E-10	7.096E-10	1.00E-10	8.096E-10	1.0E-09	Pass
Static Negative Mean Slope	1.47	53.1	6.366E-11	1.552E-10	-1.415E-10	-7.00E-10	-7.142E-10	-1.00E-10	-8.142E-10	-1.0E-09	Pass
Gradient Positive Mean Slope	3.64	42.2	3.009E-10	-4.747E-11	3.047E-10	1.70E-09	1.727E-09	1.00E-10	1.827E-09	2.0E-09	Pass
Gradient Negative Mean Slope	2.06	50.2	5.164E-11	1.360E-10	-1.258E-10	-1.70E-09	-1.705E-09	-1.00E-10	-1.805E-09	-2.0E-09	Pass

2.9 SATELLITE QUALITATIVE TESTS

2.9.1 Specification

Cospas-Sarsat T.007, Clause A.2.5

2.9.2 Equipment Under Test and Modification State

SAR Link S/N: #1762 - Modification State 0

2.9.3 Date of Test

18 April 2016 & 19 April 2016

2.9.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

2.9.5 Environmental Conditions

Ambient Temperature 10.4 - 12.5 °C
Relative Humidity 47.3 - 54.7%

2.9.6 Test Results

Configuration 7

Test Start: 4/18/16 7:00:28 AM
Test End: 4/18/16 8:02:00 PM
15 Hex ID: 193DF380C6FFBFF

Actual location of the test beacon: 50.814333
(Daedalus Airfield, Lee-on-the-Solent) -1.2017389

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg.)	Location Error (km)
S10	56235	193DF 380C6 FFBFF	50.82684	-1.19468	-128.86	18:34:32	-13.172	1.476
S11	49283	193DF 380C6 FFBFF	50.82557	-1.20974	-130.52	18:45:24	17.682	1.369
S7	93253	193DF 380C6 FFBFF	50.81846	-1.18704	-132.30	18:58:13	-17.457	1.129
S13	18599	193DF 380C6 FFBFF	50.82430	-1.21911	-133.16	19:36:35	11.025	1.647
S11	49284	193DF 380C6 FFBFF	50.82149	-1.20493	-127.51	20:24:27	4.035	0.826
S11	49285	193DF 380C6 FFBFF	50.82042	-1.19495	-127.48	22:04:54	-11.617	0.827
S13	18600	193DF 380C6 FFBFF	50.82361	-1.19839	-125.02	21:16:20	-3.895	1.057
S12	37080	193DF 380C6 FFBFF	50.84499	-1.31861	-126.62	02:08:29	-12.029	8.882
S12	37081	193DF 380C6 FFBFF	50.80979	-1.20032	-127.85	03:49:36	3.789	0.515
S10	56241	193DF 380C6 FFBFF	50.80162	-1.20729	-130.52	05:09:36	-14.503	1.466
S7	93259	193DF 380C6 FFBFF	50.80361	-1.21123	-129.13	05:27:11	-10.533	1.365
S10	56242	193DF 380C6 FFBFF	50.79814	-1.18231	-127.46	06:50:54	1.397	2.258

Location Errors greater than 5 km are marked in red text.

$$\text{Ratio of Successful Solutions} = \frac{\text{number of Doppler solutions within 5 km with } 1° < CTA < 21°}{\text{number of satellite passes over test duration with } 1° < CTA < 21°}$$

$$= \frac{11}{12}$$

$$= 91.6\%$$

Configuration 8

Test Start: 4/19/16 6:26:12 AM
Test End: 4/19/16 7:53:26 PM
15 Hex ID: 193DF380C6FFBFF

Actual location of the test beacon: 50.814333
(Daedalus Airfield, Lee-on-the-Solent) -1.2017389

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg.)	Location Error (km)
S10	56249	193DF 380C6 FFBFF	50.82509	-1.19461	-125.17	18:22:50	-11.290	1.296
S7	93267	193DF 380C6 FFBFF	50.82729	-1.18836	-127.00	18:33:00	-13.462	1.719
S13	18613	193DF 380C6 FFBFF	50.82632	-1.22348	-130.16	19:16:07	13.812	2.026
S11	49297	193DF 380C6 FFBFF	50.81622	-1.20757	-115.25	18:25:06	20.079	0.460
S11	49298	193DF 380C6 FFBFF	50.82145	-1.21189	-125.43	20:03:51	7.088	1.065
S11	49299	193DF 380C6 FFBFF	50.81925	-1.19806	-125.63	21:44:00	-8.303	0.604
S13	18615	193DF 380C6 FFBFF	50.82028	-1.19680	-132.08	22:36:29	-16.564	0.746
S12	37094	193DF 380C6 FFBFF	50.81920	-1.24035	-120.38	01:57:00	-13.815	2.764
S12	37095	193DF 380C6 FFBFF	50.80846	-1.18872	-126.73	03:38:16	2.074	1.123
S7	93273	193DF 380C6 FFBFF	50.79900	-1.20224	-128.24	05:02:02	-14.525	1.704
S12	37096	193DF 380C6 FFBFF	50.81979	-1.19730	-116.65	05:18:06	16.091	0.682
S10	56255	193DF 380C6 FFBFF	50.81316	-1.20344	-117.68	04:57:51	-16.383	0.177

Location Errors greater than 5 km are marked in red text.

$$\text{Ratio of Successful Solutions} = \frac{\text{number of Doppler solutions within 5 km with } 1° < CTA < 21°}{\text{number of satellite passes over test duration with } 1° < CTA < 21°}$$

$$= \frac{12}{12}$$

$$= 100\%$$

Summary

The EUT complies with clause A.2.5 of Cospas-Sarsat T.007

2.10 BEACON ANTENNA TEST

2.10.1 Specification

Cospas-Sarsat T.007, Clause A.2.6

2.10.2 Equipment Under Test and Modification State

SAR Link S/N: #1762 - Modification State 0

2.10.3 Date of Test

1 April 2016

2.10.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

2.10.5 Environmental Conditions

Ambient Temperature 13.0 - 16.0 °C
Relative Humidity 35.5 - 50.9%

2.10.6 Test Results

Configuration 3

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	38.1	0.0	41.7	3.6	42.6	4.5	37.4	-0.7	~~32.4~~	-5.7
30	37.9	-0.2	41.9	3.8	42.6	4.5	37.1	-1.0	~~32.2~~	-5.9
60	37.8	-0.3	41.9	3.8	42.6	4.5	37.2	-0.9	~~32.1~~	-6.0
90	38.0	-0.1	41.7	3.6	42.6	4.5	37.4	-0.7	~~32.5~~	-5.6
120	37.9	-0.2	41.8	3.7	42.7	4.6	37.6	-0.5	~~32.7~~	-5.4
150	38.2	0.1	41.6	3.5	42.6	4.5	38.0	-0.1	33.1	-5.0
180	38.1	0.0	41.6	3.5	42.6	4.5	38.3	0.2	33.4	-4.7
210	37.9	-0.2	41.4	3.3	42.4	4.3	38.1	0.0	33.2	-4.9
240	37.8	-0.3	41.4	3.3	42.4	4.3	38.0	-0.1	33.3	-4.8
270	37.6	-0.5	41.5	3.4	42.5	4.4	37.9	-0.2	33.3	-4.8
300	37.7	-0.4	41.4	3.3	42.4	4.3	37.6	-0.5	~~32.7~~	-5.4
330	37.7	-0.4	41.8	3.7	42.6	4.5	37.4	-0.7	33.0	-5.1

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh
0	110.0	97.3	113.4	91.5	113.5	96.2	107.2	91.7	100.8	79.6
30	109.8	96.9	113.6	89.8	113.5	96.1	107.0	89.2	100.6	78.0
60	109.7	96.4	113.6	88.9	113.5	95.7	107.0	91.5	100.5	78.4
90	109.9	97.8	113.4	88.9	113.5	95.5	107.2	91.6	100.9	81.1
120	109.7	97.9	113.5	90.0	113.6	94.4	107.4	93.6	101.0	82.7
150	110.1	98.0	113.3	90.3	113.5	95.8	107.7	94.7	101.4	86.5
180	109.9	98.4	113.3	90.4	113.5	96.0	108.0	95.5	101.7	87.4
210	109.7	98.3	113.1	90.9	113.3	96.0	107.7	96.9	101.5	84.0
240	109.6	98.3	113.1	90.9	113.3	95.8	107.7	95.8	101.6	83.4
270	109.4	97.7	113.2	90.1	113.4	95.7	107.6	95.5	101.7	82.8
300	109.5	97.5	113.1	90.1	113.3	95.6	107.3	94.8	101.1	79.0
330	109.6	97.3	113.5	90.4	113.5	95.7	107.2	92.2	101.4	78.3
Min (Vv-Vh)	11.3		21.9		17.3		10.8		14.3	

$EIRP_{LOSS} = Pt_{ambient} - Pt_{EOL} =$ 38.1 - 36.8 = 1.3 dB

$EIRP_{maxEOL} = Max[EIRP_{max}, (EIRP_{max} - EIRP_{LOSS})] =$ Max[42.7, 41.4]= 42.7 dBm

$EIRP_{minEOL} = Min[EIRP_{min}, (EIRP_{min} - EIRP_{LOSS})] =$ Min[33.0, 31.7]= 31.7 dBm

Configuration 4

	Elevation Angle (degrees)									
	10		20		30		40		50	
Azimuth Angle (Degrees)	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	34.9	-3.2	39.1	1.0	36.1	-2.0	35.2	-2.9	32.6	-5.5
90	34.8	-3.3	38.9	0.8	35.8	-2.3	34.3	-3.8	31.5	-6.6
180	34.5	-3.6	38.7	0.6	35.7	-2.4	34.0	-4.1	31.5	-6.6
270	34.7	-3.4	38.8	0.7	35.9	-2.2	34.7	-3.4	32.5	-5.6

$EIRP_{LOSS} = Pt_{ambient} - Pt_{EOL} =$ 38.1 - 36.8 = 1.3 dB

$EIRP_{maxEOL} = Max[EIRP_{max}, (EIRP_{max} - EIRP_{LOSS})] =$ Max[39.1, 37.8]= 39.1 dBm

$EIRP_{minEOL} = Min[EIRP_{min}, (EIRP_{min} - EIRP_{LOSS})] =$ Min[31.5, 30.2]= 30.2 dBm

Summary

The EUT fails to comply with clause A.2.6 of Cospas-Sarsat T.007 (Configuration 3 $EIRP_{minEOL}$ below limit).

However, the results for Configuration 3 are within the measurement uncertainty allowance stated in section A.1 of Cospas-Sarsat T.007.

2.11 NAVIGATION SYSTEM TEST

2.11.1 Specification

Cospas-Sarsat T.007, Clause A.2.7

2.11.2 Equipment Under Test and Modification State

SAR Link S/N: #1762 - Modification State 0

2.11.3 Date of Test

26 April 2016, 27 April 2016 & 28 April 2016

2.11.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.1.

2.11.5 Environmental Conditions

Ambient Temperature 18.5 - 21.6 °C
Relative Humidity 32.4 - 35.8 %

2.11.6 Test Results

National Protocol

Position Data Default Values (C/S T.007 A.3.8.1):

No position data was provided for > 4 hours before the test started. The beacon was activated and operated for 30 minutes without providing data. Message content was checked for all bursts during this period.

36 Hex Message	Message Count
36 Hex Message	35

Position Acquisition Time and Position Accuracy (C/S T.007 A.3.8.2)

Locations:

A.3.8.2.1:	N 50° 48.860’	W 1° 12.104’	①
A.3.8.2.2:	N 50° 52.121’	W 1° 14.685’	①

The appropriate position was applied, the EUT activated and time to first message containing valid position data timed.

Configuration as per C/S T.007	C/S T.007 Section A.3.8.2.1		C/S T.007 Section A.3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Configuration 7	61	36.48	61	31.32
Configuration 8	61	36.48	61	31.32

Positional accuracy was calculated using the Haversine Formula, The Earth’s radius was taken as 6367 km.

① GPS Site Survey – Live Location

Encoded Position Data Update Interval (C/S T.007 A.3.8.3):

Location: N 51° 22.583’ W 1° 49.833’ ①		
Data Acquired at	10:18:31	FFFE2F8C9F70464CD701CD50AA7692080439
Location: N 50° 48.683’ W 1° 37.417’ ①		
Data Updated at	10:33:32	FFFE2F8C9F70464CB1019895F5B6942409AF
Data Update Interval	15 min 01 s	

① Input from GPS simulator

Note 1: Position 2 applied to the EUT immediately after acquisition of position 1 at 10:18:31
Note 2: Encoded position data update interval test (A.3.8.3) was performed to C/S T.007 Issue 4 Revision 8, October 2013.

Position Clearance After Deactivation (C/S T.007 A.3.8.4)

Following the Encoded Position Data Update Interval test, the beacon was deactivated and reactivated without providing navigation data. The Digital Message output was encoded with the default position data.

Position Data Input Update Interval (C/S T.007 A.3.8.5)

EUT does not accept external position input, test is not applicable.

Last Valid Position (C/S T.007 A.3.8.6)

Location: N 50° 52.121' W 1° 14.685' ①		
Data Acquired at	10:09:22	FFFE2F8C9F70464CB5013B22B6B685280C8F
GPS Signal Navigation Data Removed		
Data Updated at	14:11:10	FFFE2F8C9F70465FC0FF01F754769F3C0672
Last Valid Position Held	241 min 48 s	
Return to Default Position	✓	

① GPS Site Survey – Live Location

Standard Protocol

Position Data Default Values (C/S T.007 A.3.8.1):

No position data was provided for > 4 hours before the test started. The beacon was activated and operated for 30 minutes without providing data. Message content was checked for all bursts during this period.

36 Hex Message	Message Count
FFFE2F8C9EF9C0637FDFF83D15B683E0F00E	35

Position Acquisition Time and Position Accuracy (C/S T.007 A.3.8.2)

Locations:

A.3.8.2.1:	N 50° 48.860'	W 1° 12.104'	①
A.3.8.2.2:	N 50° 52.121'	W 1° 14.685'	①

The appropriate position was applied, the EUT activated and time to first message containing valid position data timed.

Configuration as per C/S T.007	C/S T.007 Section A.3.8.2.1		C/S T.007 Section A.3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Configuration 7	61	36.47	61	31.32
Configuration 8	61	36.47	61	31.32

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

① GPS Site Survey – Live Location

Encoded Position Data Update Interval (C/S T.007 A.3.8.3):

Location: N 51° 22.583' W 1° 49.833' ①		
Data Acquired at	10:46:33	FFFE2F8C9EF9C06333A03ECA66761DA4D2B2
Location: N 50° 48.683' W 1° 37.417' ①/②		
Data Updated at	11:09:54	FFFE2F8C9EF9C06332E0311EC7768EA76F33
Data Update Interval	25 min 21 s	

① GPS Site Survey – Live Location

Note 1: Position 2 applied to the EUT immediately after acquisition of position 1 at 10:46:33
Note 2: Encoded position data update interval test (A.3.8.3) was performed to C/S T.007 Issue 4 Revision 8, October 2013.

Position Clearance After Deactivation (C/S T.007 A.3.8.4)

Following the Encoded Position Data Update Interval test, the beacon was deactivated and reactivated without providing navigation data. The Digital Message output was encoded with the default position data.

Position Data Input Update Interval (C/S T.007 A.3.8.5)

EUT does not accept external position input, test is not applicable.

Last Valid Position (C/S T.007 A.3.8.6)

Location: N 51° 22.583' W 1° 49.833' ①		
Data Acquired at	01:51:59	FFFE2F8C9EF9C06333A03ECA66761DA4D2B2
GPS Signal Navigation Data Removed		
Data Updated at	5:53:03	FFFE2F8C9EF9C0637FDFF83D15B683E0F00E
Last Valid Position Held	241 min 04 s	
Return to Default Position	✓	

① Input from GPS simulator

User Protocol

Position Data Default Values (C/S T.007 A.3.8.1):

No position data was provided for > 4 hours before the test started. The beacon was activated and operated for 30 minutes without providing data. Message content was checked for all bursts during this period.

36 Hex Message	Message Count
FFFE2FCC9E2000C6007CE5E56E2FE0FF0146	36

Position Acquisition Time and Position Accuracy (C/S T.007 A.3.8.2)

Locations:

A.3.8.2.1:	N 50° 48.860’	W 1° 12.104’	①
A.3.8.2.2:	N 50° 52.121’	W 1° 14.685’	①

The appropriate position was applied, the EUT activated and time to first message containing valid position data timed.

Configuration as per C/S T.007	C/S T.007 Section A.3.8.2.1		C/S T.007 Section A.3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Configuration 7	61	1597.43	61	1553.32
Configuration 8	61	1597.43	61	1553.32

Positional accuracy was calculated using the Haversine Formula, The Earth’s radius was taken as 6367 km.

① GPS Site Survey – Live Location

Encoded Position Data Update Interval (C/S T.007 A.3.8.3):

Location: N 51° 22.583’ W 1° 49.833’ ①		
Data Acquired at	11:22:17	FFFE2FCC9E2000C6007CE5E56E266D01C026
Location: N 50° 48.683’ W 1° 37.417’ ①		
Data Updated at	11:37:53	FFFE2FCC9E2000C6007CE5E56E265901967F
Data Update Interval	15 min 36 s	

① Input from GPS simulator

Note 1: Position 2 applied to the EUT immediately after acquisition of position 1 at 11:22:17
Note 2: Encoded position data update interval test (A.3.8.3) was performed to C/S T.007 Issue 4 Revision 8, October 2013.

Position Clearance After Deactivation (C/S T.007 A.3.8.4)

Following the Encoded Position Data Update Interval test, the beacon was deactivated and reactivated without providing navigation data. The Digital Message output was encoded with the default position data.

Position Data Input Update Interval (C/S T.007 A.3.8.5)

EUT does not accept external position input, test is not applicable.

Last Valid Position (C/S T.007 A.3.8.6)

Location: N 51° 22.583' W 1° 49.833' ①		
Data Acquired at	09:47:56	FFFE2FCC9E2000C6007CE5E56E266D01C026
GPS Signal Navigation Data Removed		
Data Updated at	13:48:39	FFFE2FCC9E2000C6007CE5E56E2FE0FF0146
Last Valid Position Held	240 min 43 s	
Return to Default Position	✓	

① Input from GPS simulator

SECTION 3

TEST DETAILS

Limited Emergency Beacons Testing of the
ACR Electronics
SOS-300 (black enclosure)

TEST RESULTS TABLE

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
6. Spurious Emissions into 50 ohms						**Result: Pass**
Model: SOS-300, S/N: #1768, TUV Ref: TSR1 and Modification State 0						
In band (406.0 – 406.1 MHz)	C/S T.001 mask	P / F	P	P	P	
14. Satellite Qualitative Tests						**Result: Pass**
Model: SOS-300, S/N: #1760, TUV Ref: TSR7 and Modification State 0						
Test Configuration	As per C/S T.007		Configuration			
			5	6	7	8
15 Hex ID Decoded by LUT	correct	P / F	-	-	P	P
Doppler Location results with error ≤ 5 km	≥ 80	%	-	-	93.3	100
15. Antenna Characteristics						**Result: Pass**
Model: SOS-300, S/N: #1762, TUV Ref: TSR7 and Modification State 0						
Test Configuration	As per C/S T.007		Configuration			
			1	2	3	4
Polarisation	linear or RHCP		-	-	Linear	N/A	Not applicable for Configuration 4 (no Vv-Vh analysis)
VSWR	≤ 1.5		-	-	N/A	N/A	Detachable Antennas Only
$EIRP_{LOSS}$		dB	-	-	1.32	1.32	Calculated using figures from the ACRTreuse-in-colour samples (Section 2)
$EIRP_{maxEOL}$	≤ 43	dBm	-	-	42.0	36.8	
$EIRP_{minEOL}$	≥ 32	dBm	-	-	33.3	30.2	$EIRP_{minEOL}$ limit decreases to 30 dBm for Configuration 4

17. Navigation System						**Result: Pass**
Model: SOS-300, S/N: 300434061224090, TUV Ref: TSR38 and Modification State 0						
Location protocol	C/S T.001		National	Standard	User	
Configuration 7						
Position accuracy - A.3.8.2.1	C/S T.001	m	N/R	32.8	N/R	N/R: Not requested
Position Acquisition Time - A.3.8.2.1	<10/1	min	N/R	1.03	N/R	
Position accuracy - A.3.8.2.2	C/S T.001	m	N/R	36.1	N/R	
Position Acquisition Time - A.3.8.2.2	<10/1	min	N/R	1.03	N/R	
Configuration 8						
Position accuracy - A.3.8.2.1	C/S T.001	m	N/R	32.8	N/R	
Position Acquisition Time - A.3.8.2.1	<10/1	min	N/R	1.03	N/R	
Position accuracy - A.3.8.2.2	C/S T.001	m	N/R	45.8	N/R	
Position Acquisition Time - A.3.8.2.2	<10/1	min	N/R	1.03	N/R	
Encoded position data update interval	>20	min	N/R	N/R	N/R	
Position clearance after deactivation	cleared	P / F	N/R	N/R	N/R	
Position data input update interval (as applicable)	20/1	Min	N/A	N/A	N/A	
Position data encoding	correct	P / F	N/R	N/R	N/R	
Retained last valid position after navigation input lost	240(±5)	min	N/R	N/R	N/R	
Default position data transmitted after 240(±5) minutes without valid position data	cleared	P / F	N/R	N/R	N/R	
Information on protection against beacon degradation due to navigation device, interface or signal failure or malfunction	provided	Y / N	N/R			

3.1 SPURIOUS EMISSION INTO 50 OHMS

3.1.1 Specification

Cospas-Sarsat T.007, Clause A.2.1 (f)

3.1.2 Equipment Under Test and Modification State

SAR Link S/N: #1768 - Modification State 0

3.1.3 Date of Test

18 June 2016

3.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.2.

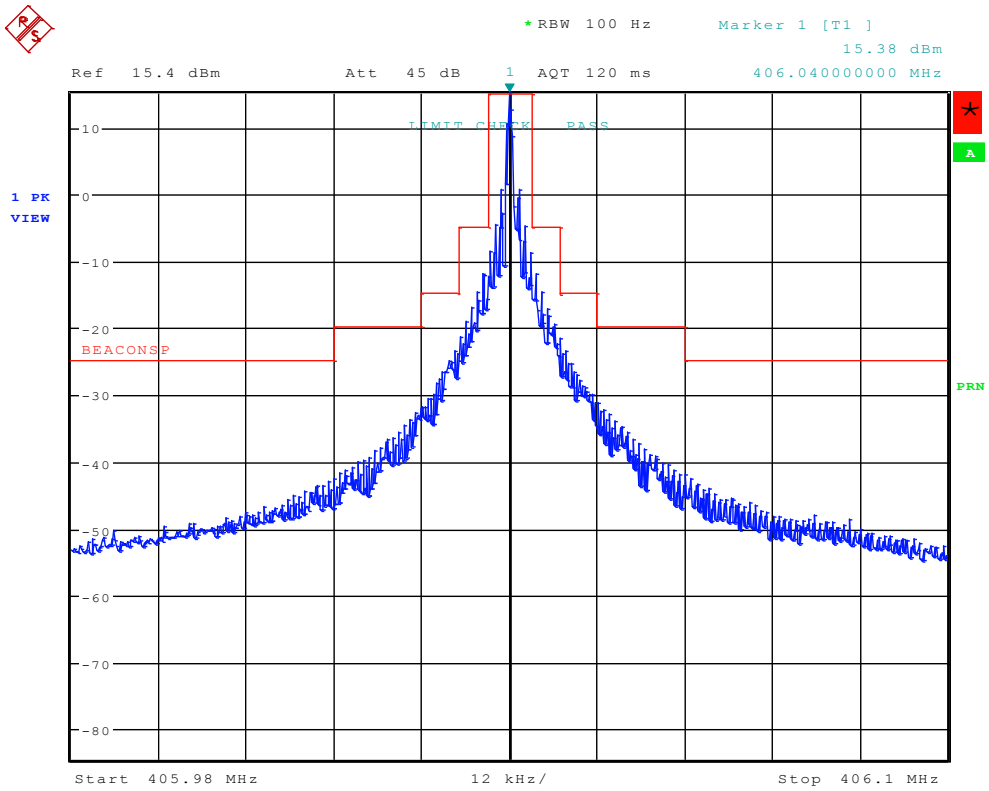
3.1.5 Environmental Conditions

Ambient Temperature 20.8 °C
Relative Humidity 44.4 %

3.1.6 Test Results

Test Duration: 30 minutes (each temp)
No. of bursts: 36 nominal

Combined Ambient, Low and High Temperature



Summary

The EUT complies with clause A.3.2.2.4 of Cospas-Sarsat T.007

3.2 SATELLITE QUALITATIVE TESTS

3.2.1 Specification

Cospas-Sarsat T.007, Clause A.2.5

3.2.2 Equipment Under Test and Modification State

SAR Link S/N: #1760 - Modification State 0

3.2.3 Date of Test

17 June 2016 – 18 June 2016
18 June 2016 – 19 June 2016

3.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.2.

3.2.5 Environmental Conditions

Ambient Temperature 16.1 - 19.3 °C
Relative Humidity 61.1 - 74.8 %

3.2.6 Test Results

Configuration 7

Test Start: 2016-06-17 17:23:38z
Test Finish: 2016-06-18 07:09:43z
Hex ID: 193DF380C6FFBFF

Actual location of the test beacon: 50.814333
(Daedalus Airfield, Lee-on-the-Solent, Centre) -1.2017389

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg.)	Location Error (km)
S13	19453	193DF 380C6 FFBFF	50.82001	-1.19403	-134.36	22:15:49	-13.219	0.831
S11	50137	193DF 380C6 FFBFF	50.82232	-1.19076	-127.57	21:23:16	-5.037	1.176
S13	19452	193DF 380C6 FFBFF	50.81743	-1.21883	-130.62	20:35:14	2.541	1.248
S13	19451	193DF 380C6 FFBFF	50.81711	-1.20840	-129.27	18:56:03	16.463	0.560
S11	50136	193DF 380C6 FFBFF	50.82471	-1.21764	-126.94	19:43:24	10.024	1.605
S7	94108	193DF 380C6 FFBFF	50.82797	-1.18703	-129.98	19:03:09	-17.611	1.834
S10	57082	193DF 380C6 FFBFF	50.82573	-1.19697	-127.79	18:44:18	-13.181	1.310
S7	94107	193DF 380C6 FFBFF	50.80836	-0.84870	-120.03	17:22:26	-1.938	24.798
S7	94115	193DF 380C6 FFBFF	50.81578	-1.20560	-121.25	07:12:08	5.133	0.315
S10	57089	193DF 380C6 FFBFF	50.79974	-1.18135	-128.42	07:00:38	1.406	2.163
S12	37929	193DF 380C6 FFBFF	50.82008	-1.19623	-125.21	05:51:49	19.505	0.747
S7	94114	193DF 380C6 FFBFF	50.80149	-1.20796	-128.82	05:32:06	-10.374	1.493
S10	57088	193DF 380C6 FFBFF	50.79833	-1.20866	-129.55	05:19:21	-14.494	1.844
S12	37928	193DF 380C6 FFBFF	50.81609	-1.20124	-118.58	04:12:23	6.367	0.198
S12	37927	193DF 380C6 FFBFF	50.80720	-1.21275	-128.23	02:31:33	-9.157	1.107

Location Errors greater than 5 km are marked in red text.

$$\text{Ratio of Successful Solutions} = \frac{\text{number of Doppler solutions within 5 km with } 1° < \text{CTA} < 21°}{\text{number of satellite passes over test duration with } 1° < \text{CTA} < 21°}$$

$$= \frac{14}{15}$$

$$= 93.3\%$$

Configuration 8

Test Start: 2016-06-18 17:26:21z
Test Finish: 2016-06-19 07:27:07z
Hex ID: 193DF380C6FFBFF

Actual location of the test beacon: 50.814333
(Daedalus Airfield, Lee-on-the-Solent, Centre) -1.2017389

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg.)	Location Error (km)
S7	94122	193DF 380C6 FFBFF	50.81671	-1.19491	-118.64	18:37:54	-13.611	0.547
S11	50152	193DF 380C6 FFBFF	50.81689	-1.19630	-127.58	22:43:30	-17.717	0.476
S13	19467	193DF 380C6 FFBFF	50.82342	-1.19309	-130.84	21:54:54	-9.900	1.178
S11	50151	193DF 380C6 FFBFF	50.82183	-1.19127	-125.91	21:02:29	-1.788	1.111
S13	19466	193DF 380C6 FFBFF	50.82386	-1.21284	-127.77	20:14:36	5.627	1.315
S13	19465	193DF 380C6 FFBFF	50.81676	-1.21033	-128.01	18:35:43	18.941	0.661
S11	50150	193DF 380C6 FFBFF	50.82213	-1.21514	-126.96	19:22:55	12.855	1.279
S10	57096	193DF 380C6 FFBFF	50.82398	-1.19577	-126.35	18:32:35	-11.298	1.151
S10	57102	193DF 380C6 FFBFF	50.81273	-1.20591	-120.64	05:07:35	-16.376	0.343
S7	94129	193DF 380C6 FFBFF	50.79903	-1.17517	-127.37	06:47:19	1.409	2.524
S12	37943	193DF 380C6 FFBFF	50.80574	-1.20589	-126.93	05:40:39	18.199	0.998
S7	94128	193DF 380C6 FFBFF	50.80254	-1.20953	-129.27	05:06:56	-14.375	1.420
S12	37942	193DF 380C6 FFBFF	50.80945	-1.19915	-126.63	04:01:04	4.687	0.572
S12	37941	193DF 380C6 FFBFF	50.80935	-1.20963	-128.14	02:20:04	-10.990	0.783

Location Errors greater than 5 km are marked in red text.

$$\text{Ratio of Successful Solutions} = \frac{\text{number of Doppler solutions within 5 km with } 1° < CTA < 21°}{\text{number of satellite passes over test duration with } 1° < CTA < 21°}$$

$$= \frac{14}{14}$$

$$= 100\%$$

3.3 BEACON ANTENNA TEST

3.3.1 Specification

Cospas-Sarsat T.007, Clause A.2.6

3.3.2 Equipment Under Test and Modification State

SAR Link S/N: #1762 - Modification State 0

3.3.3 Date of Test

01 August 2016

3.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 4.2.

3.3.5 Environmental Conditions

Ambient Temperature 17.6 - 20.6 °C
Relative Humidity 59.7 - 81.7%