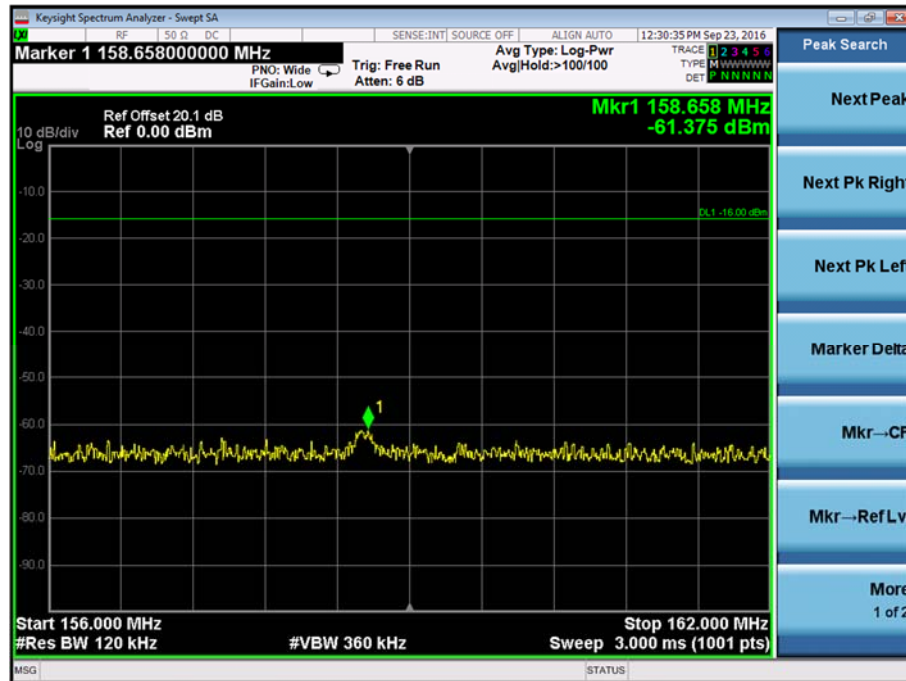
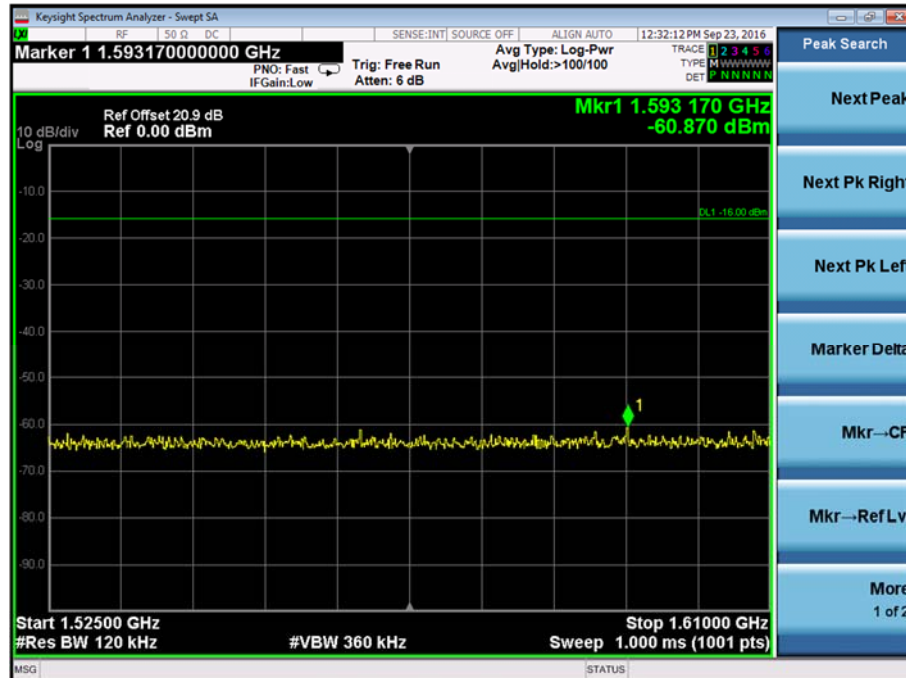




Product Service



156 MHz to 162 MHz

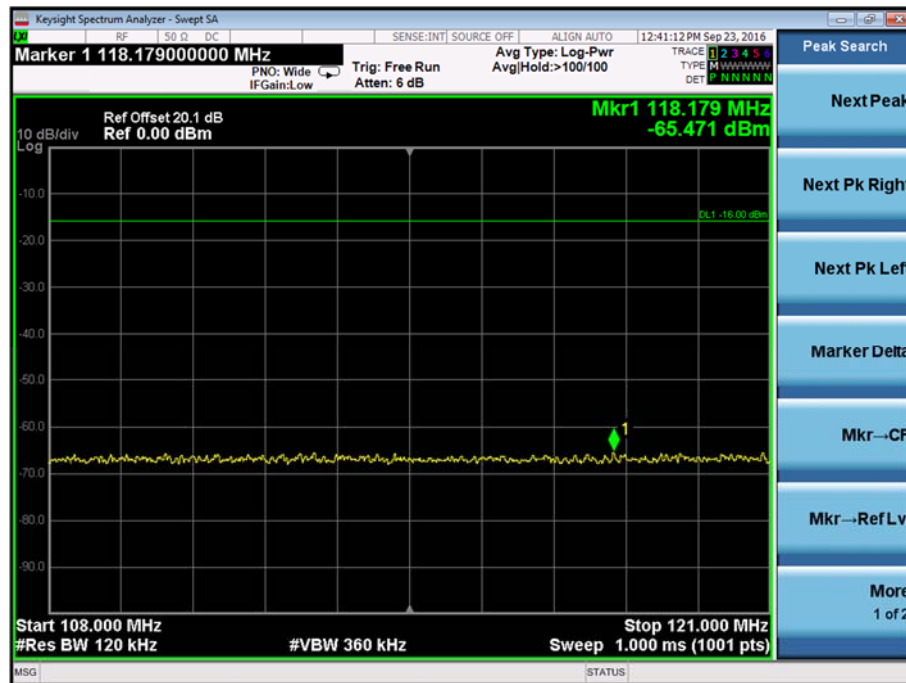


1525 MHz to 1610 MHz

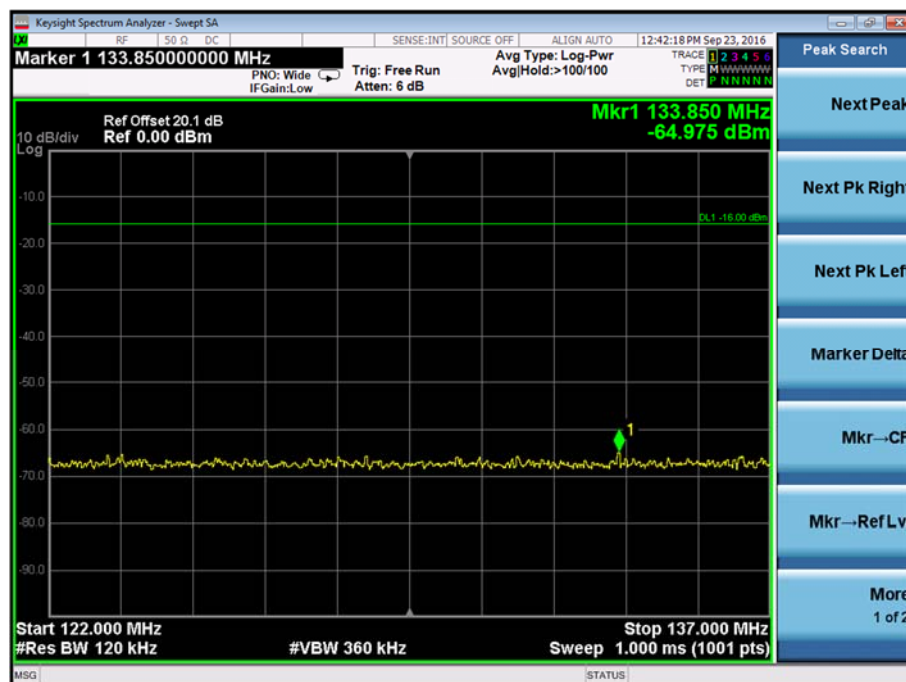


Product Service

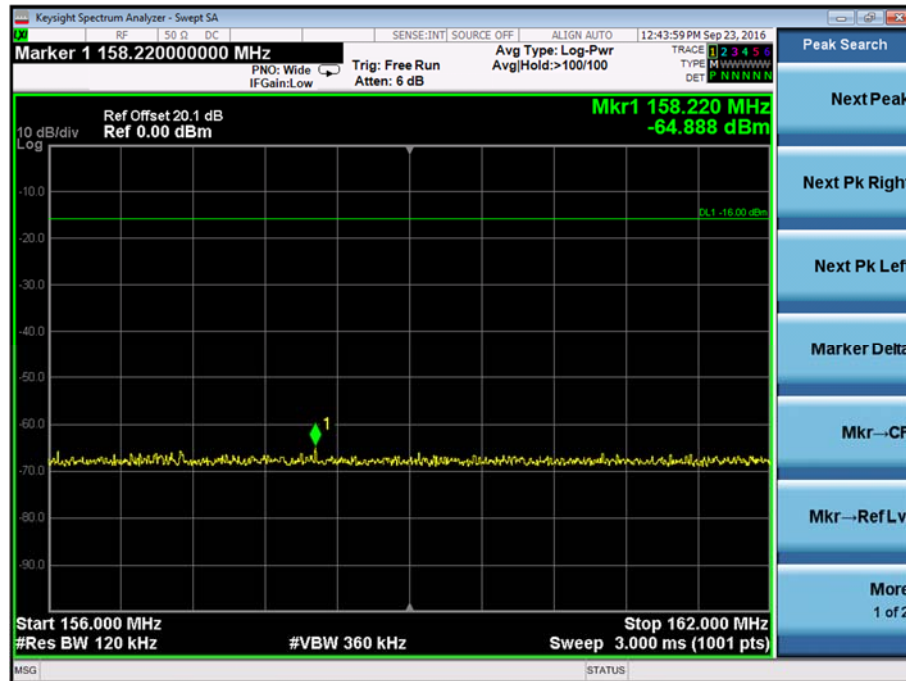
SOS-300 S/N: #1876 (75934030-TSR0003) [Iridium Port]



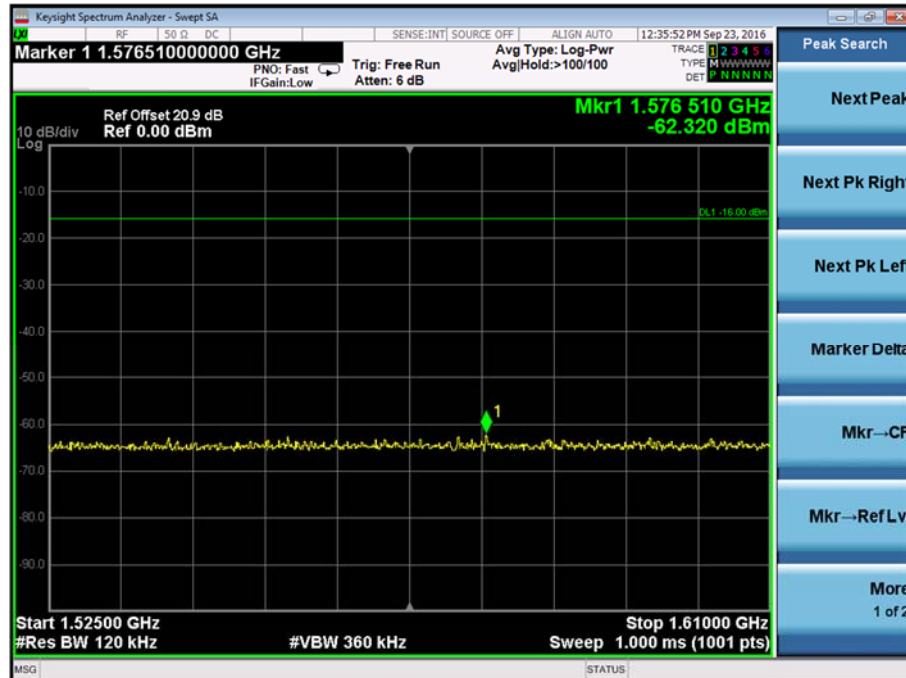
108 MHz to 121 MHz



122 MHz to 137 MHz



156 MHz to 162 MHz



1525 MHz to 1610 MHz



Product Service

## **2.12 OPERATIONAL LIFE AND SELF-TEST**

### **2.12.1 Specification Reference**

RTCM 11010.2, Clause A.13

### **2.12.2 Equipment Under Test and Modification State**

SOS-300 S/N: #1876 (75934030-TSR0003) – Modification State 0

### **2.12.3 Date of Test**

01 June 2017

### **2.12.4 Test Equipment Used**

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

### **2.12.5 Environmental Conditions**

|                          |      |
|--------------------------|------|
| Ambient Temperature (°C) | 21.5 |
| Relative Humidity (%)    | 60.5 |

### **2.12.6 Test Results**

#### Battery Conditioning

The customer stated a pre-test discharge operating time of 3.40 hours (see Annex B), a fresh battery was discharged by operating inside the EUT for 3.83 hours, this was considered over-test.

#### Mode of Maximum Current Draw

The mode of maximum current draw for the 406 MHz transmitter was determined to be as follows:

- On at SOS switch
- GNSS signals not applied (maximising GNSS search time)
- Iridium secondary (rechargeable) battery flat (insufficient charge for operation)
  - The customer stated that with charge in the iridium battery available, the GNSS circuitry would be powered from that battery, however without such charge, the GNSS circuitry would be powered by the primary (non-rechargeable) battery of the 406 MHz circuitry (worst case)
- Iridium circuitry not operational (insufficient battery charge, as above)

#### Temperature Conditioning

The EUT was stabilised at -20 °C for ≥ 2 h



Product Service

### Operating Lifetime

The test was run for 29 hours in order to afford some margin; no failures were observed throughout the entire test.

### Performance Testing

Test Parameters were monitored continuously throughout the test. Max/Min values are taken from the start of the test with the exception of Medium Term Stability parameters that ignore readings taken in the first 15 minutes as per C/S T.007 Clause A.2.3.

| Test Parameter                                      | Units    | Result (Note 1)                          | Limit         |
|-----------------------------------------------------|----------|------------------------------------------|---------------|
| Transmitter power output                            |          |                                          |               |
| Power output                                        | dBm      | 38.04 / 36.50                            | 35 - 39       |
| Power output rise time                              | ms       | *                                        | <5            |
| Power output 1 ms before burst                      | dBm      | *                                        | <-10          |
| Digital Message (bit numbers)                       |          |                                          |               |
| Full Hex (all)                                      | -        | FFFE2F8C9F70465FC<br>0FF01F754769F3C0672 | (Note 2)      |
| Bit sync (1-15)                                     | P/F      | P                                        | P             |
| Frame sync (16-24)                                  | P/F      | P                                        | P             |
| Format flag (25)                                    | (1 bit)  | 1                                        | (Note 2)      |
| Protocol flag (26)                                  | (1 bit)  | 0                                        | (Note 2)      |
| Identification / position data (27-85)              | P/F      | P                                        | P             |
| BCH code (86-106)                                   | P/F      | P                                        | P             |
| Emergency code / nation. use /suppl. data (107-112) | (6 bits) | 110110                                   | (Note 2)      |
| Additional data /BCH (if applicable) (113-144)      | P/F      | P                                        | P             |
| Position error (if applicable)                      | km       | N/A (Default encoded)                    | < 5           |
| Digital Message Generator                           |          |                                          |               |
| Bit rate and stability                              | bit/s    | 399.94 / 399.91                          | 396 - 404     |
| Modulation                                          |          |                                          |               |
| Biphase-L                                           | Y/N      | Y                                        | Y             |
| Rise time                                           | µs       | 232.3 / 178.3                            | 50 - 250      |
| Fall time                                           | µs       | 233.6 / 180.6                            | 50 - 250      |
| Phase deviation: positive                           | rad      | 1.1884 / 0.9861 **                       | +(1.0 to 1.2) |
| Phase deviation: negative                           | rad      | -1.1946 / -0.9879 **                     | -(1.0 to 1.2) |
| Symmetry measurement                                | -        | 0.0234                                   | ≤ 0.05        |



Product Service

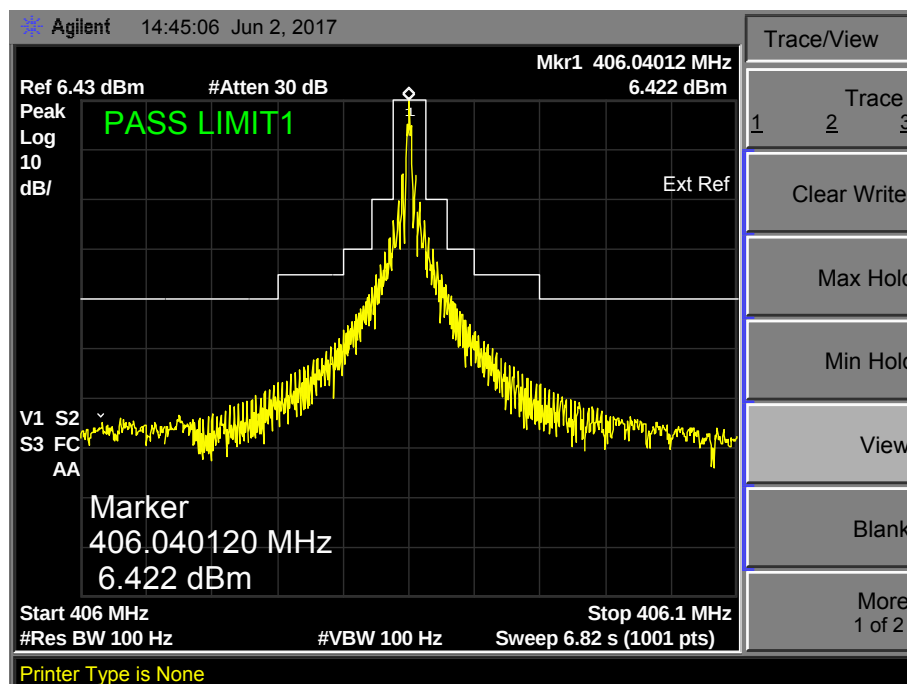
| Test Parameter                                       | Units   | Result (Note 1)           | Limit                                |
|------------------------------------------------------|---------|---------------------------|--------------------------------------|
| Transmitted frequency                                |         |                           |                                      |
| Nominal value                                        | MHz     | 406.0399912 / 406.0399848 | C/S T.001                            |
| Short Term Stability                                 | /100 ms | 16.278E-11 / 46.314E-12   | $\leq 2 \times 10^{-9}$              |
| Medium Term Stability - Slope                        | /min    | 96.126E-12 / -83.92E-12   | $(-1 \text{ to } +1) \times 10^{-9}$ |
| Medium Term Stability - Residual Frequency Variation | -       | 42.37E-11 / 57.211E-12    | $\leq 3 \times 10^{-9}$              |
| Spurious Output                                      |         |                           |                                      |
| Meets C/S T.001 mask                                 | Y / N   | Y                         | Y                                    |

Note 1: Where appropriate, results are displayed as Maximum / Minimum.

Note 2: The Encoded message was checked against the intended encoding and C/S T.007.

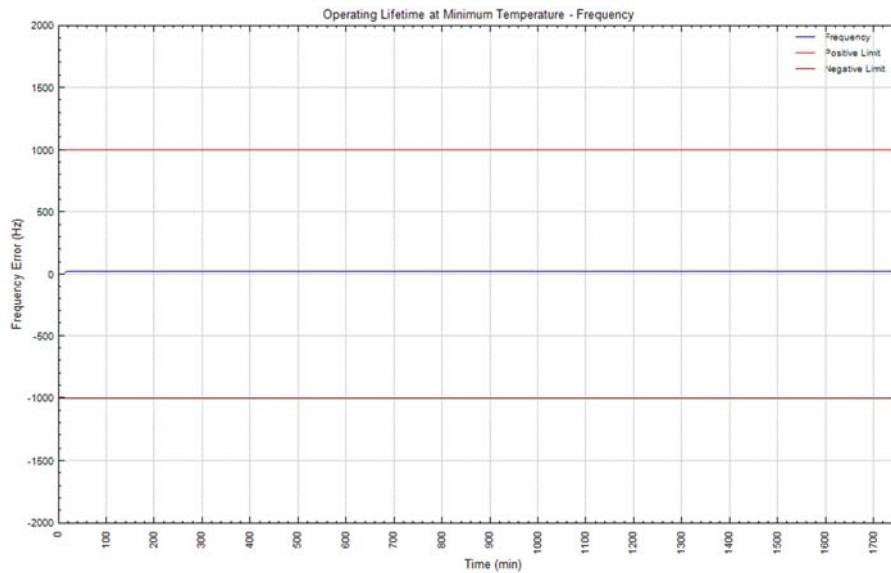
\* Due to the test system configuration, it was not possible to measure these parameters; this was considered satisfactory given the compliant performance of related parameters.

\*\* Measurements outside the limit by less than the Test Facility Accuracy Limit of C/S T.008 were accepted as satisfactory as per C/S T.007 Clause A.1.

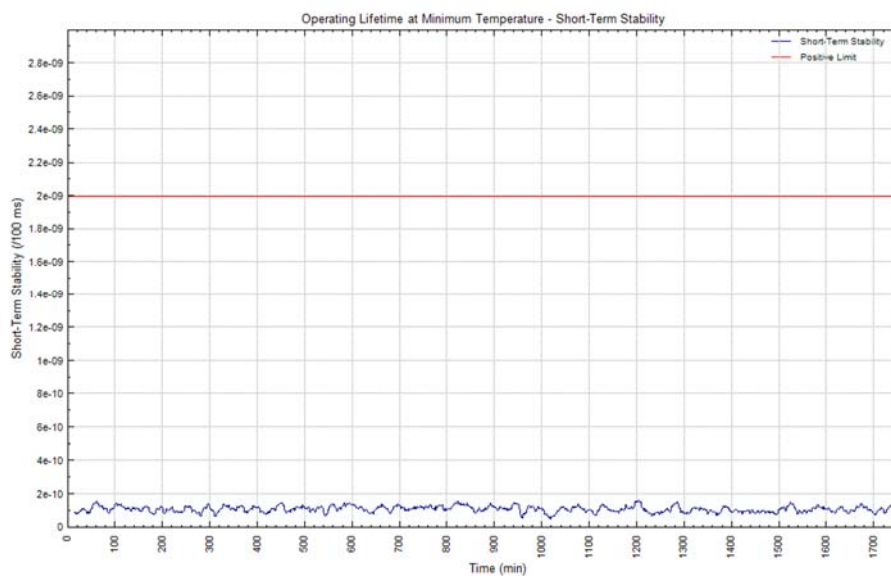


Spurious Output

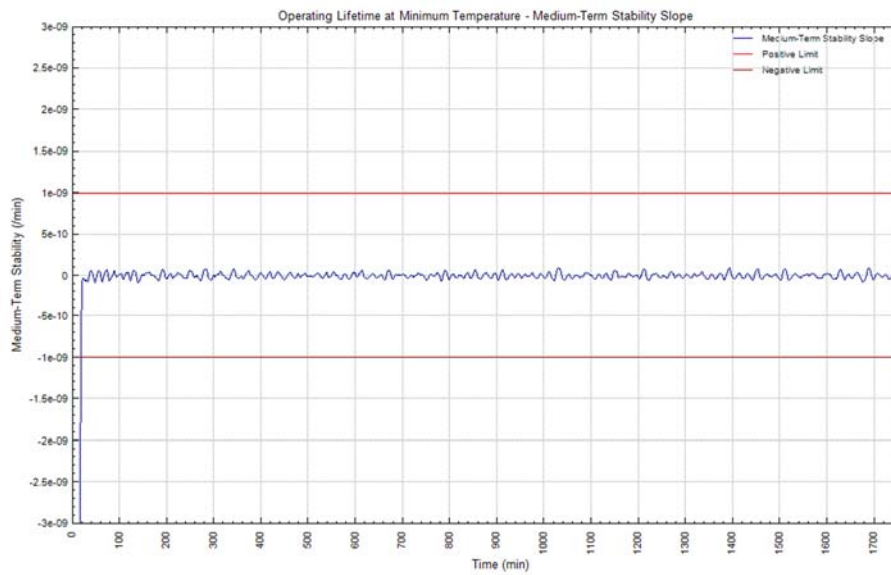
## Performance Testing Plots



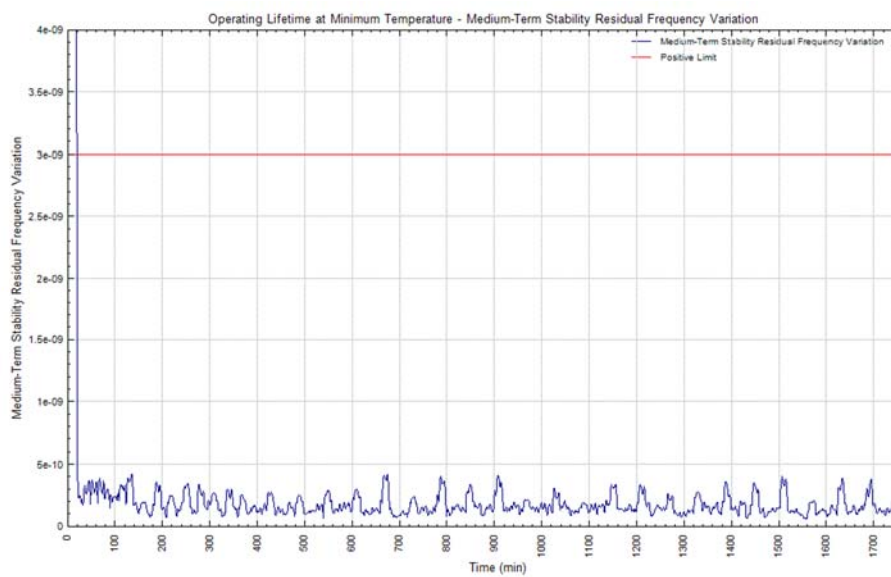
## Nominal Frequency



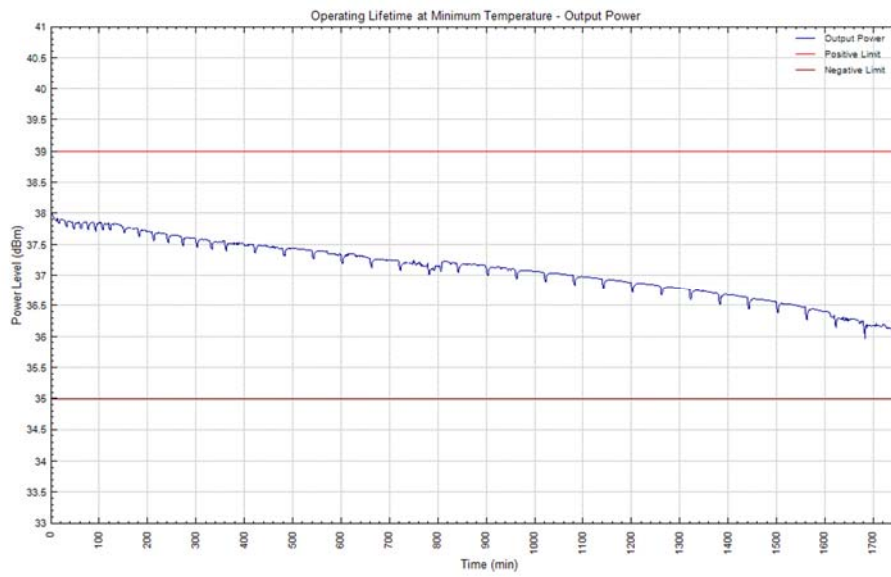
## Short Term Stability



Medium Term Stability – Mean Slope



Medium Term Stability – Residual Frequency Variation



Output Power



Product Service

## **2.13 (LIMITED) COSPAS-SARSAT TYPE APPROVAL TEST PROCEDURE**

### **2.13.1 Specification Reference**

RTCM 11010.2, Clause A.14

### **2.13.2 Equipment Under Test and Modification State**

SOS-300 S/N: #1763 (75934030-TSR0002) – Modification State 0

### **2.13.3 Date of Test**

10 June 2017 - 19 June 2017

### **2.13.4 Test Equipment Used**

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

### **2.13.5 Environmental Conditions**

|                          |             |
|--------------------------|-------------|
| Ambient Temperature (°C) | 17.3 – 22.1 |
| Relative Humidity (%)    | 44.8 – 67.8 |

### **2.13.6 Test Results**

Full Cospas-Sarsat testing was carried out prior to the RTCM 11010.2 sequence of test as requested by ACR Electronics, Inc. A limited number of Cospas-Sarsat tests were repeated in order to demonstrate continuing compliance. The summary of results of the limited test campaign which was carried out as required by the sequence of tests can be found in annex A.

EUT tested in accordance with Cospas-Sarsat T.001 Issue 3 Revision 15 October 2014 and Cospas-Sarsat T.007 Issue 4 Revision 9 October 2015 and results of the full test campaign were submitted to Cospas-Sarsat Secretariat for approval.

Cospas-Sarsat Type Approval Certificate: 280

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



Product Service

## **2.14 SOLAR RADIATION**

### **2.14.1 Specification Reference**

RTCM 11010.2, Clause A.17

### **2.14.2 Test Results**

Refer to TÜV SÜD PSB Pte. Ltd. Test Report: 7191160592-CHM17-CCK

## **2.15 OIL RESISTANCE**

### **2.15.1 Specification Reference**

RTCM 11010.2, Clause A.18

### **2.15.2 Equipment Under Test and Modification State**

SOS-300 IMEI: 300434060816170 (75934030-TSR0046) – Modification State 0

SOS-300 IMEI: 300434060627250 (75934030-TSR0047) – Modification State 0

### **2.15.3 Date of Test**

14 July 2017

### **2.15.4 Test Equipment Used**

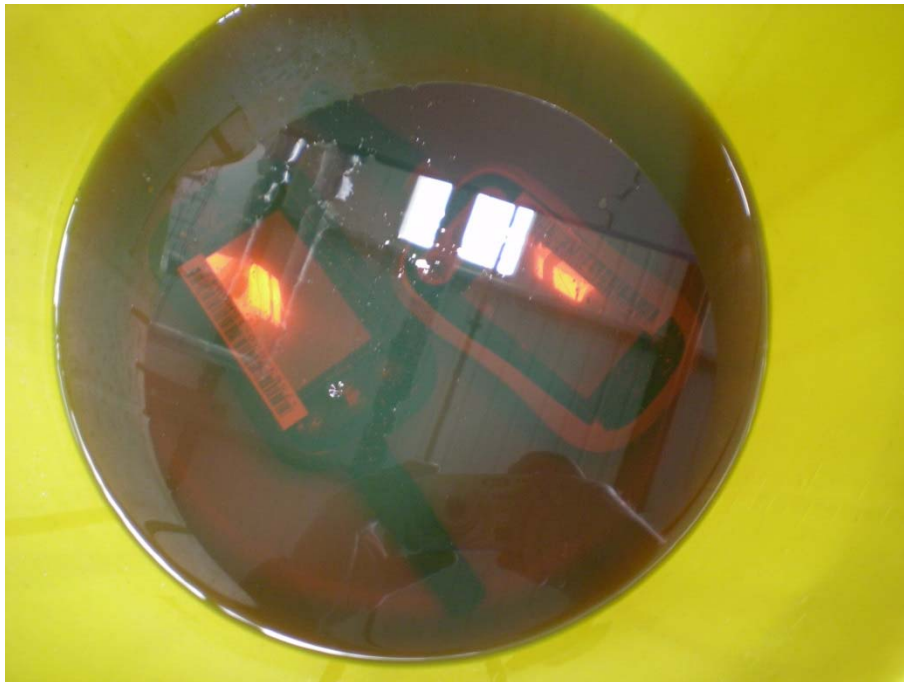
The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.15.5 Environmental Conditions**

Ambient Temperature (°C) 22.2 - 23.9

Relative Humidity (%) 37.4 - 41.0

### **2.15.6 Test Setup**



Test Setup

### 2.15.7 Test Method

- EUT configured as complete assembly with normal labelling
  - o Any storage cases (not part of EUT) removed
  - o Covers or similar raised (open)
- EUT immersed at  $19\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  for 3 h in mineral oil as follows:
  - o Aniline point:  $120\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$
  - o Flashpoint: Minimum  $240\text{ }^{\circ}\text{C}$
  - o Viscosity: (10 – 25) cST at  $99\text{ }^{\circ}\text{C}$
- Cleaned EUT as per manufacturer's instructions
- Inspect EUT visually for signs of any damage
- Performance Check

### 2.15.8 Test Results

The test method was completed satisfactorily.

#### Inspection

On completion of the test the EUT was subjected to an inspection. No sign of damage was found.

#### **SOS-300 IMEI: 300434060816170 (75934030-TSR0046)**

##### Performance Check

| Test Parameter                       | Units | Result     | Limit               |
|--------------------------------------|-------|------------|---------------------|
| Transmitted frequency (single burst) | MHz   | 406.040030 | $406.040 \pm 0.001$ |
| Digital message correctness          | Y/N   | Y          | Y                   |

#### **SOS-300 IMEI: 300434060627250 (75934030-TSR0047)**

##### Performance Check

| Test Parameter                       | Units | Result     | Limit               |
|--------------------------------------|-------|------------|---------------------|
| Transmitted frequency (single burst) | MHz   | 406.039967 | $406.040 \pm 0.001$ |
| Digital message correctness          | Y/N   | Y          | Y                   |

## 2.16 CORROSION

### 2.16.1 Specification Reference

RTCM 11010.2, Clause A.8

### 2.16.2 Equipment Under Test and Modification State

SOS-300 S/N: #1761 (75934030-TSR0005) – Modification State 0

SOS-300 S/N: #1765 (75934030-TSR0008) – Modification State 0

### 2.16.3 Date of Test

21 September 2016 to 19 October 2016

### 2.16.4 Test Equipment Used

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

### 2.16.5 Environmental Conditions

Ambient Temperature (°C) 25.6

Relative Humidity (%) 32.0

### 2.16.6 Test Setup



Spray Test Setup



Storage Test Setup

#### 2.16.7 Test Method

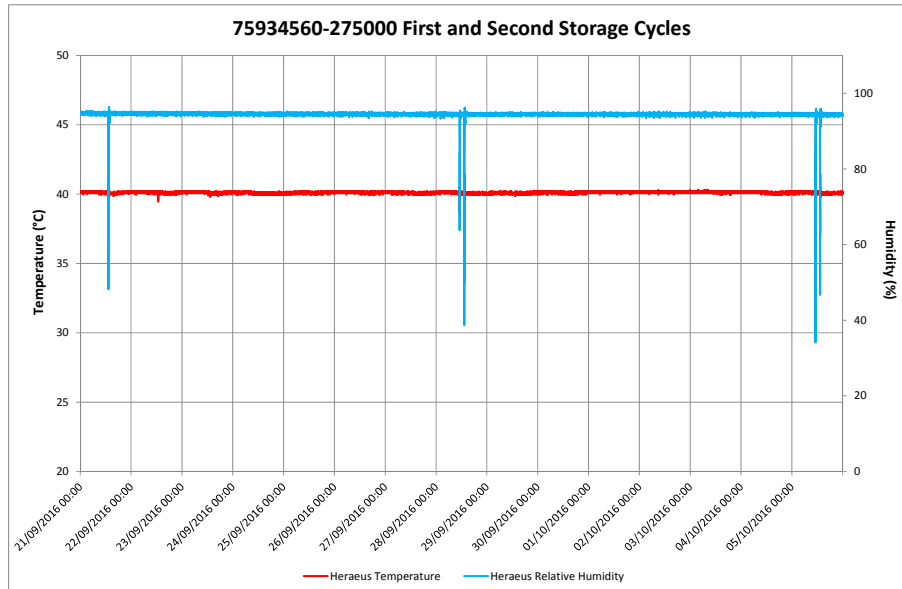
- EUT configured as complete assembly with normal labelling
  - Any storage cases (not part of EUT) removed
  - Covers or similar raised (open)
- EUT subjected to four spray/storage cycles as follows:
  - EUT placed in chamber and sprayed with a salt solution for 2 h at normal temperature
    - Salt solution ( $5 \pm 1$ ) parts by weight of sodium chloride (NaCl) in 95 parts by weight of distilled or demineralized water
  - At end of spraying period, EUT placed chamber maintained at  $40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ , 90 % to 95 % relative humidity for 7 days
- Inspect EUT visually for signs of any damage
- Performance Check

#### 2.16.8 Test Results

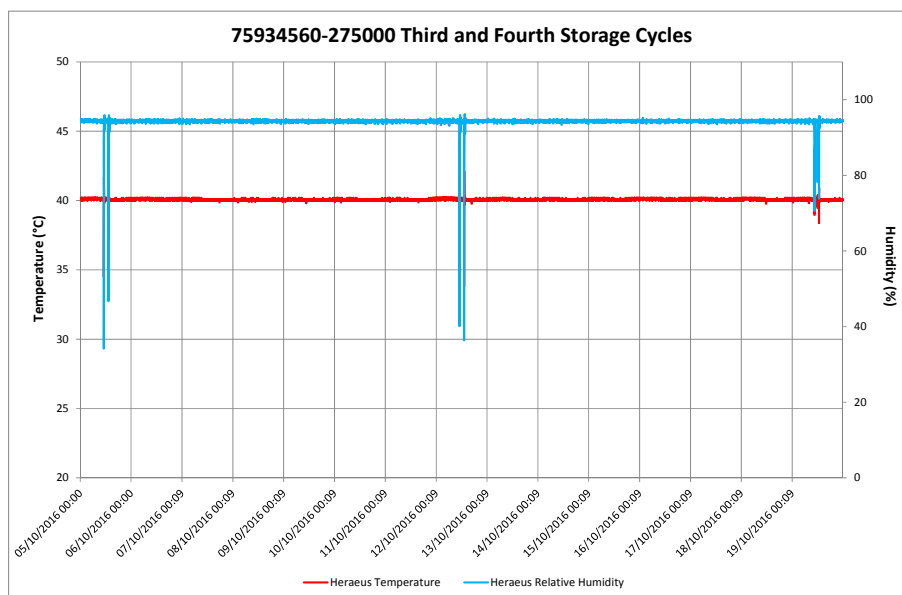
The test method was completed satisfactorily



Product Service



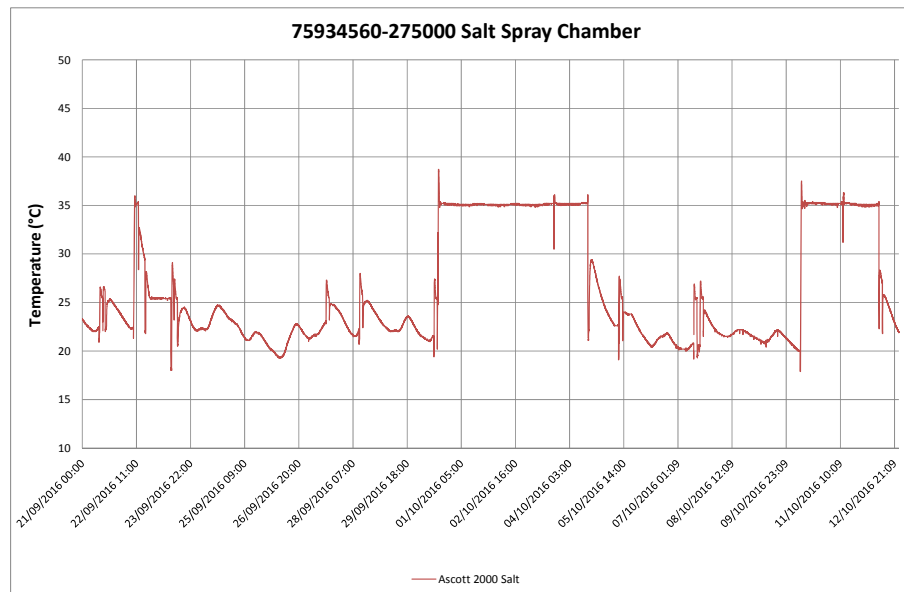
Temperature Plot (First and Second Storage)



Temperature Plot (Third and Fourth Storage)



Product Service



Salt Spray Chamber Plot

#### Inspection

On completion of the test the EUT was subjected to an inspection. No sign of corrosion was found.

#### **SOS-300 S/N#1761 (75934030-TSR0005)**

##### Performance Check

| Test Parameter                       | Units | Result     | Limit           |
|--------------------------------------|-------|------------|-----------------|
| Transmitted frequency (single burst) | MHz   | 406.039943 | 406.040 ± 0.001 |
| Digital message correctness          | Y/N   | Y          | Y               |

#### **SOS-300 S/N #1765 (75934030-TSR0008)**

##### Performance Check

| Test Parameter                       | Units | Result     | Limit           |
|--------------------------------------|-------|------------|-----------------|
| Transmitted frequency (single burst) | MHz   | 406.039882 | 406.040 ± 0.001 |
| Digital message correctness          | Y/N   | Y          | Y               |



Product Service

## **2.17 COMPASS SAFE DISTANCE**

### **2.17.1 Specification Reference**

RTCM 11010.2, Clause A.19

### **2.17.2 Equipment Under Test and Modification State**

SOS-300 IMEI: 300434060810280 (75934030-TSR0048) – Modification State 0

### **2.17.3 Date of Test**

05 April 2017

### **2.17.4 Test Equipment Used**

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

### **2.17.5 Environmental Conditions**

Ambient Temperature 14.5°C

Relative Humidity 36%

### **2.17.6 Test Method**

A wooden table aligned E-W was used with a compass set in the centre, aligned to read zero. The table was marked to give a graduated scale of distance. The EUT was moved towards the compass until a standard deviation of 0.3° was obtained.

Each orientation of the EUT was tested in this manner with the measurement distance between the compass centre and the EUT being noted.

The test was repeated with readings taken when the compass gave a steering deviation of 0.9°.

The local area Magnetic Flux density (H) at the site of testing was 19.91uT.

The above testing was performed three times with the EUT as follows:

- a. Unpowered.
- b. Normalised.
- c. Power applied.

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

The test was applied in accordance with the test method requirements of IEC 61097-2.

The test was performed with the EUT in both idle (Standby) and active (Operating) modes.



Product Service

## 2.17.7 Test Results

|                                      |     |
|--------------------------------------|-----|
| Standard Compass safe distance (mm)  | 350 |
| Emergency Compass safe distance (mm) | 250 |

|                                                     |             |           |
|-----------------------------------------------------|-------------|-----------|
| Horizontal maximum flux density, Magnetic North (H) | H           | 19.8      |
| Standard compass deviation limit (degrees)          | $5.4/H = A$ | $A = 0.3$ |
| Emergency compass deviation limit (degrees)         | $18/H = B$  | $B = 0.9$ |

| Orientation of the EUT | Un-powered State                                   |                                                    | Normalised                                         |                                                    | Powered Up                                         |                                                    |
|------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
|                        | Distance From Compass Centre (mm) at A° deflection | Distance From Compass Centre (mm) at B° deflection | Distance From Compass Centre (mm) at A° deflection | Distance From Compass Centre (mm) at B° deflection | Distance From Compass Centre (mm) at A° deflection | Distance From Compass Centre (mm) at B° deflection |
| Front                  | 330                                                | 190                                                | 310                                                | 185                                                | 310                                                | 185                                                |
| Top                    | 170<br>0.2° deflection                             | 170<br>0.2° deflection                             | 170<br>0.2° deflection                             | 170<br>0.2° deflection                             | 180                                                | 170<br>0.4° deflection                             |
| Left Hand Side         | 330                                                | 175                                                | 340                                                | 200                                                | 325                                                | 250                                                |
| Right Hand Side        | 315                                                | 180                                                | 300                                                | 190                                                | 320                                                | 250                                                |
| Underside              | 250                                                | 175                                                | 280                                                | 175                                                | 315                                                | 175                                                |
| Rear                   | 320                                                | 230                                                | 300                                                | 240                                                | 330                                                | 210                                                |



Product Service

## **2.18 MISCELLANEOUS TESTS**

### **2.18.1 Specification Reference**

RTCM 11010.2, Clause A.20

### **2.18.2 Equipment Under Test and Modification State**

SOS-300 IMEI: 300434061229130 (75934030-TSR0008) – Modification State 0  
A1-20-1661B Rev B: Label, battery replacement date  
A1-20-1843BDASH Rev B: Battery expiration label, SARLink  
A1-20-1844BDASH Rev B: Activation label, SARLink SOS-300  
A1-20-1845A Rev A: GPS label, SARLink SOS-300  
A1-20-1847B Rev B: Label, HEXID, SARLink SOS-300  
A1-20-1926T1 Rev T1: Registration label, SARLink  
Y1\_03\_0304\_B\_SARLink\_SOS300\_User Manual Rev B: User Manual  
A1-20-1928A Rev A: Label, SARLink cloth  
A3-06-2976A Rev A: SARlink Pouch  
A1-26-0680A Rev A: Display sleeve SARLink SOS-300  
A1-20-1847B Rev B: Label, Hex ID, SARLink SOS-300

Subsequent versions of the above document(s) were supplied and where these fulfilled a further requirement a note has been made:

Y1\_03\_0332\_A\_SARLink\_SOS300\_User Manual Rev A: User Manual

Y1\_03\_0332\_A\_SARLink\_SOS300\_User Manual Rev A: User Manual (supplied 17/07/17).

### **2.18.3 Date of Test**

14 July 2017 – 17 July 2017

### **2.18.4 Test Equipment Used**

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

### **2.18.5 Environmental Conditions**

Ambient Temperature 25°C - 28°C

Relative Humidity 35% - 38%



Product Service

## 2.18.6 Test Results

| A.20 Miscellaneous             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub clause                     | Statement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| A.20.1 Controls and Indicators |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                | <p>The PLB shall be inspected to ensure that all the requirements of paragraph 4.4.1 are met.</p> <p>All controls shall be operated by a person wearing gloves or mittens from an IMO SOLAS 13 compliant immersion suit. The inspection shall ensure that if there is a tamper proof seal it is not counted as one of the two independent actions required to activate the PLB. The means to indicate that the PLB may have been previously activated shall be checked either visually or by operation of the device in accordance with the manufacturer's instructions, a clear means of visible or audible indication shall be apparent.</p> | <p>The EUT was operated by a TUV SUD engineer wearing an immersion suit glove.</p> <p>The EUT is activated by firstly pushing the plastic slider covering the SOS button, and then the user is required to press and hold the SOS button. There is no tamper proof seal however once the EUT is activated for the first time, the device includes electronic software counters which show the user the amount of time the EUT has been activated to date (via the <i>406 config menu</i>).</p> |

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.4.1 | Controls and Indicators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4.4.1 | <p>All controls shall be clearly and durably marked. They shall be designed to prevent inadvertent activation and shall require the use of not less than two simple, independent mechanical actions for manual activation of the [the PLB].</p> <p>Activation of the [the PLB] shall not require the use of two hands.</p> <p>The [PLB] shall be provided with a means to indicate that it has been activated.</p> <p>The controls should be few in number and the function of each control shall be kept simple to permit ease of operation of the [PLB].</p> <p>All controls shall be so designed that they can be used by personnel wearing gloves or mittens.</p> <p>[The PLB] shall have, as a minimum, integral manual controls to operate the device in the following modes:<br/> OFF In the OFF mode, the [the PLB] is deactivated.<br/> ON In the ON mode, the [the PLB] is activated.<br/> TEST</p> <p>The various modes of the PLB shall be readily apparent by visual observation. A positive visual and/or audible indication that the PLB is activated shall be provided.</p> <p>The EUT has three physical buttons: 406 test button, SOS (406 activation button) and Power. Additional options are available via the touch screen, depending on the screen activated.</p>  <p>The two independent actions for activation are:</p>  <p>1. Move slider to left      2. Press for 3 seconds</p> <p>It is possible to activate the EUT with one hand.</p> <p>The physical controls relating to the 406 MHz feature of the device are few in number (as per above). Further controls / buttons / options are available by the numerous touchscreen options.</p> <p>The EUT was operated by a TUV SUD engineer wearing an immersion suit glove.</p> <p>The three physical buttons on the EUT correspond as follows:<br/> 406 test button: TEST<br/> SOS: ON<br/> Power: OFF</p> |



| A.20.2 Self-test and GNSS Self Test Function |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | <p>The self-test mode of the PLB shall be activated. The automatic reset of the test facility and the indication of the self-test mode shall be checked by inspection. The manufacturer's declaration as to the functioning of the self-test mode shall be checked for compliance with paragraph 4.4.2. a), b) and c).</p> <p>If applicable the GNSS Self Test function as defined in paragraph 4.4.2 shall be checked by inspection to ensure that it is operated by a Distinct Operation, prevents Inadvertent Operation, is provided with Distinct Pass and Fail indicators.</p> <p>Also if applicable the manufacturer's declaration as to the functioning of the GNSS Self Test mode shall be checked for compliance with paragraph 4.4.2. c), d), e) and f).</p>                                                                                                                                                                                                                       | <p>The EUT includes a 406MHz test mode. See TUV SUD document 75934030 Report 1 for Cospas Sarsat Type Approval testing (including testing of the Self Test).</p> <p>Further details are provided in the Manufacturers documentation in Annex B</p> <p>GNSS Self Test is not supported by the EUT.</p> |
| A.20.3 Battery                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                       |
|                                              | <p>The manufacturer shall provide evidence that the primary battery used to power the PLB is not hazardous to personnel as required by paragraph 4.4.3. The manufacturer shall provide evidence that the design of the PLB includes measures to protect the batteries from reversal of polarity, shorting, self heating, cell-to-cell charging and forced discharging. The manufacturer shall declare the useful life of the battery and its expiration date and provide evidence to support these as required by paragraph 4.4.3. The battery shall be inspected to ensure that all the labelling requirements of paragraph 4.5.2.1 are met. The manufacturer shall provide evidence that the battery and the cells making up the battery are either exempt from testing or have been tested to the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth Revised Edition, PART III, Section 38.3 (ST/SG/AC.10/11/Rev.4) as amended.</p> | <p>The Manufacturer provided document Panasonic CR123A Spec 091015 w SDR Plot.pdf in support of this clause.</p>                                                                                                                                                                                      |



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| 4.4.3 | Battery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4.4.3 | <p>The PLB shall have its own primary (non-rechargeable) battery and shall not depend upon any external source of power for its operation when activated. The battery shall be an integral part of the equipment. Replacement of the battery, if user-replaceable, should be possible with relative ease, and any interface connections required shall be such as to prevent reversed polarity or incorrect installation. Provision shall be made to ensure watertight integrity upon replacement of the battery.</p> <p>The PLB shall not be hazardous to personnel handling it, operating it, or performing manufacturer-approved servicing of it nor shall it release toxic or corrosive products outside the PLB case during or subsequent to storage at temperatures between -55 and +75 C and:</p> <ul style="list-style-type: none"> <li>a) During a full or partial discharge at any rate up to and including an external short circuit.</li> <li>b) During a charge or forced discharge of a cell or cells by another cell or cells within the battery.</li> <li>c) After a full or partial discharge.</li> </ul> <p>All PLBs shall include measures to protect the batteries from reversal of polarity, shorting, and the effects of self-heating, cell-to-cell charging, and forced discharging.</p> <p>The PLB manufacturer shall establish a useful life and an expiration date for batteries. The useful life is defined as the period of time after the date of battery manufacture that the battery will continue to meet the input power requirements of the PLB. The following losses must be included (at a temperature of +20C ±5C):</p> <ul style="list-style-type: none"> <li>a) Testing, as recommended by the manufacturer, including GNSS Self Tests if applicable, or as required by the regulatory authority, whichever is the more demanding.</li> <li>b) Self-discharge of the battery pack.</li> <li>c) Standby loads.</li> </ul> <p>The battery expiration date shall be the date of battery cell manufacture plus no more than 1/2 of the useful life of the battery. The battery cells shall be no older than 2 years when first fitted in the PLB.</p> | <p>The device has its own primary non rechargeable battery source for the 406 MHz feature</p> <p>The battery pack is an integral part of the EUT.</p> <p>The battery pack is not user replaceable (see below for related label).</p> <p>The Manufacturer provided document Panasonic CR123A Spec 091015 w SDR Plot.pdf with respect to battery chemistry / handling etc.</p> <p>The battery pack connector is keyed and as such can only be connected to the EUT in the correct orientation.</p> <p>See also Annex B for Manufacturer supplied battery conditioning information and Verification document.</p> <p>The Manufacturer advises the following in relation to the battery life:</p> <p><i>ACR Electronics has declared that the batteries, at the time being installed in the device are not more than .25 years (3 months).</i></p> <p><i>Panasonic CR123 batteries have a declared self-discharge of 1% per year.</i></p> <p><i>ACR has established through testing, that Panasonic CR123 batteries of useful life is 7 years after being installed in the device and marks the batteries with that date as the date of expiry.</i></p> <p><i>SarLink SOS 300 performance, at declared end of battery life, was performed to Cospas Sarsat T.007 standard with passing results. Therefore, SarLink meets the intent of RTCM 11010.2 section 4.4.3.</i></p> |

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| 4.5.2.1                     | Battery Labelling                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4.5.2.1                     | <p>The battery shall be marked indelibly and legibly with the battery type (chemical composition), voltage, expiration date (month and year) and as appropriate, precautions associated with its use, handling and disposal.</p> | <p>The battery is not user accessible.</p> <p>However, on inspection of the battery pack, the following information was noted:</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;">   </div> <div style="flex: 1; padding-left: 20px;"> <p>Battery type,<br/>Voltage,<br/>Expiration date</p> </div> </div> |
| A.20.4 General Construction |                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                             | <p>The PLB shall be inspected to ensure that it has no sharp edges or points, likely to cause injury to persons or damage to inflatables or similar survival equipment.</p>                                                      | <p>The EUT was inspected with a Sharp Edge tester. The result indicated that there were no sharp edges present.</p>                                                                                                                                                                                                                                                                                                                                                                                      |



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| A.20.5 Exterior Finish |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                  |
|                        | The PLB shall be inspected to ensure that the exterior finish complies with the requirements of paragraph 4.5.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | See below.                                                                                                                                                                                                                                       |
| 4.5.1                  | Exterior Finish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                  |
| 4.5.1                  | The PLB case shall be predominantly a highly-visible yellow/orange color.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | There are two models of the EUT available. One is the ACRTreuse colour (standard ACR Electronics yellow / green colour used for their range of products (EPIRBs, PLBs etc). The second is a black version.                                       |
| A.20.6 Labelling       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                  |
|                        | <p>The labelling of the exterior of the PLB and any labelling permanently attached to the PLB shall be inspected to ensure that they comply with the requirements of paragraphs 4.5.2.2 to 4.5.2.2.4.</p> <p>All labelling on the exterior of the PLB shall be tested for abrasion resistance by the manufacturer who shall present evidence of the suitability of the labelling to last for at least the stated battery shelf life of the beacon, ideally this should be in the form of test results obtained using a recognized abrasion test method.</p> <p>Instructions for operating the PLB and any pictographs not already commonly in use shall be tested for comprehension in accordance with an appropriate internationally recognized testing procedure (i.e.: ISO, ANSI, ASTM) or a manufacturer may demonstrate the comprehensibility of the instruction or pictograph by the success of at least 4 out of a set of 5 randomly selected naive test subjects demonstrating compliance with or understanding of, as appropriate, the instructions.</p> | <p>See Annex B for Manufacturer Supplied Abrasion Test declaration.</p> <p>The following operating instructions and pictographs are provided (via adhesive labels) on the EUT:</p> <div data-bbox="938 630 1516 1015" data-label="Image"> </div> |



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| 4.5.2.2 | PLB Labelling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4.5.2.2 | <p>All labelling on the exterior of the PLB shall be resistant to deterioration by prolonged exposure to sunlight, not unduly affected by seawater or oil, and abrasion resistant.</p> <p>All labelling essential to the safe and effective operation of the PLB shall be in high contrast to the background of the text or pictograph. Labelling and Pictograph instructions essential to the safe and effective operation of the PLB shall be sized such that they are readable by persons having 20/20 normal vision at a minimum viewing distance of 150 mm with illumination no greater than 0.3 Lux.</p> <p>Items a) through h) in 4.5.2.2.1 below and any other information required for the safe and effective operation of the PLB shall be visible on the PLB, or their location identified and accessible by a single simple action on the part of the operator (e.g. lifting or removing a protective cover over the control panel). Such information shall not be hidden by any permanent or semi-permanent accessory or ancillary devices normally attached to or installed on or around the body of the PLB.</p> <p>(A separate storage case from which the PLB can be easily removed with one hand for activation is not included in this requirement.)</p> <p>Solar Radiation: Refer to TÜV SÜD PSB Pte. Ltd. Test Report: 7191160592-CHM17-CCK</p> <p>Corrosion: see section 2.16 of the present document.</p> <p>Oil Resistance: see section 2.15 of the present document.</p> <p>The operating instructions on the EUT provide white text on a black background (label):</p> <div data-bbox="952 523 1617 1077"> </div> <p>Additional instructions are provided in ACRTreuse on a black background (label):</p> <p>The GPS antenna location label is located on the top of the device:</p> <div data-bbox="952 1177 1135 1342"> </div> <p>Both the black and ACRTreuse models have the same labelling.</p> |



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| 4.5.2.2   | All labelling essential to the safe and effective operation of the PLB shall be in high contrast to the background of the text or pictograph. Labelling and Pictograph instructions essential to the safe and effective operation of the PLB shall be sized such that they are readable by persons having 20/20 normal vision at a minimum viewing distance of 150 mm with illumination no greater than 0.3 Lux.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>It was not possible to read all of the essential operating instructions when in a darkened room with illumination no greater than 0.3 Lux. The pictograph was mostly visible.</p> <p>The Manufacturer advises that the product is not available for general sale and as such all users will be fully trained with the operation of the device. See section 1.6 for further details relating to the FCC Waiver Docket (referencing type of equipment / end users / 121.5 MHz homing transmitter).</p>                                                                                                                                                                                                                                                                                                                            |
| 4.5.2.2.1 | <p><b>Labelling on the PLB</b></p> <p>The outside of the PLB shall be marked indelibly and legibly with the following:</p> <p>a) Concise, unambiguous instructions for operating and testing of the PLB that shall be understandable by untrained personnel.</p> <p>b) The warning, or equivalent:<br/>WARNING USE ONLY IN SITUATIONS OF GRAVE AND IMMINENT DANGER</p> <p>c) The warning, or equivalent:<br/>NOTICE TO THE PUBLIC<br/>DO NOT MOVE IF FOUND<br/>REPORT POSITION TO AUTHORITIES</p> <p>d) Space for 15 characters shall be provided on a label with text identifying this as the "Beacon Identification Code." This is the hexadecimal representation of bits 26 through 85 of the digital message. This unique identifier number, the 15 Hex ID, shall be inserted on the label when the PLB is programmed.</p> <p>e) The serial number of the PLB.</p> | <p>The following label items / instructions were identified on the EUT (a label guide SOS-300 Photos – see Annex B) was provided to identify the label placement:</p> <p>a) basic operating instructions for emergency mode activation (see label pictograph above).</p> <p>b) The warning: WARNING: USE ONLY IN SITUATIONS OF GRAVE AND IMMINENT DANGER (see label pictograph above).</p> <p>c) The warning, or equivalent: NOTICE TO THE PUBLIC: IF FOUND DO NOT MOVE. REPORT POSITION TO AUTHORITIES (see label pictograph above).</p> <p>d) The unique identification label shown below can be found on the back of the EUT:</p> <div data-bbox="967 850 1462 1000" data-label="Image"> </div> <p>e) The serial number of the device: the serial number label of the EUT can be found on the back of the EUT, (see above).</p> |



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| 4.5.2.2.1 | <p>f) Instructions to register the PLB with the appropriate authority and the contact details of the authority.</p> <p>g) Space for any required registration sticker.</p> <p>h) The battery expiration date determined in accordance with section 4.4.3.</p> | <p>f, g) Instructions to register the device with the appropriate authority and the contact details of the authority and (g) Space for any required registration sticker: the registration label can be found on the back of the EUT:</p>  <p>h) The battery expiration date determined in accordance with section 4.4.3: the battery expiration date label (field to be completed) can be found on the bottom of the EUT:</p>  |
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| 4.5.2.2.2 | Attached labelling                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4.5.2.2.2 | <p>The following instructions shall be marked indelibly and legibly on the outside of the PLB or permanently attached to the PLB. If permanently attached, the placard including the instructions(s) shall be conspicuously marked adjacent to the attachment point: "DO NOT REMOVE"</p> <p>a) The identification of the manufacturer.</p> | <p>The following label items / instructions are identified on the EUT. A permanently attached pouch is supplied with the EUT; inside the pouch is a napkin made microfiber cloth containing instructions in multiple languages. Note: only the details written in English were reviewed). A note instructing not to remove the lanyard can be found on the back of the EUT.</p>  <p>An additional note on the pouch can also be seen:</p>  <p><b>BACK VIEW</b></p> <p>a) The Manufacturer name, ACR, can be identified on the front of the EUT. The full name ACR Electronics Inc, and the address are provided on the back of the EUT.</p> |



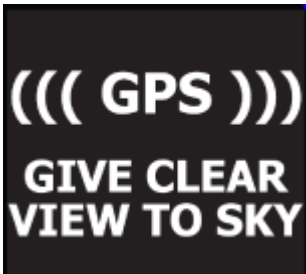
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| 4.5.2.2.2 | <p>b) The PLB type number or model identification under which it was type tested.</p> <p>c) The temperature operating range in degrees Celsius and Fahrenheit of the PLB.</p> <p>d) An appropriate Dangerous Goods transportation statement together with the applicable date</p> | <p>b) The name SARLink can be identified on the front of the EUT. The attached napkin also refers to SARLink SOS-300:</p> <div data-bbox="974 416 1825 687"><div><ul style="list-style-type: none"><li>• <b>In the U.S., call 1-800-851-3051 to report an inadvertent activation. Outside the U.S., contact your national authority.</b></li><li>• <b>Air Travel: This product contains small Lithium metal batteries (&lt;2g) that comply with IATA SP 188-PI 970 Air Cargo. Always check with air carriers for concerns regarding any additional restrictions.</b></li><li>• <b>In order to transmit a distress alert - Ensure the SARLink SOS-300 antenna is facing upright and has an unobstructed view to the sky.</b></li></ul></div><div><ul style="list-style-type: none"><li>• <b>Class 2 – This device may not operate below -20°C.</b></li><li>• <b>Category 2 – Will Not Float.</b></li><li>• <b>Check travel restrictions.</b></li><li>• <b>Compass safe distance 3.3ft/1m.</b></li><li>• <b>Deliberate misuse may incur a severe penalty.</b></li><li>• <b>Warranty void if SARLink SOS-300 is opened.</b></li></ul></div></div>  <p>c) The operating and storage temperatures can be found on the back of the EUT in both degrees Celsius and Fahrenheit.</p> <p>d) Air travel information is provided however no applicable date could be seen: see above. Please also refer to section 1.6. The Manufacturer advises that the product is not available for general sale and as such all users will be fully trained with the operation of the device (including shipment / air travel). See section 1.6 for further details relating to the FCC Waiver Docket (referencing type of equipment / end users / 121.5 MHz homing transmitter).</p> |
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| 4.5.2.2.2 | <p>e) If there exists a condition or operating circumstance which has been identified by the manufacturer or regulating authorities that could substantially affect the alerting or self locating performance of the PLB, then information appropriate to prevent this occurring shall appear in a conspicuous location appropriate to the prevention or remediation by the operator of said condition or operating circumstance (e.g. the necessity to orient the antenna vertically upward if orientation of the antenna is adjustable).</p> <p>f) The phone number(s) to be used to report inadvertent activation negating the need for the distress alert.</p> | <p>e) If there exists a condition or operating circumstance which has been identified by the manufacturer or regulating authorities that could substantially affect the alerting or self locating performance of the EUT, then information appropriate to prevent this occurring shall appear in a conspicuous location appropriate to the prevention or remediation by the operator of said condition or operating circumstance (e.g. the necessity to orient the antenna vertically upward if orientation of the antenna is adjustable): a GPS antenna label can be found on the top of the EUT, indicating that the area must have <i>clear view to sky</i>:</p> <div data-bbox="945 496 1252 770"></div> <p>Additionally the napkin provides the following information:</p> <ul style="list-style-type: none"><li>• <b>In order to transmit a distress alert - Ensure the SARLink SOS-300 antenna is facing upright and has an unobstructed view to the sky.</b></li></ul> <p>Additionally another label on the back of the EUT indicates that the device does not float:</p> <div data-bbox="945 967 1789 1169"></div> <p>f) The phone number(s) to be used to report inadvertent activation negating the need for the distress alert: None identified.: a phone number for the US is provided on the napkin (and details for other Countries):</p> <ul style="list-style-type: none"><li>• <b>In the U.S., call 1-800-851-3051 to report an inadvertent activation. Outside the U.S., contact your national authority.</b></li></ul> |
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| 4.5.2.2.3 | For Category 2 PLBs<br>The outside of the PLB shall be marked indelibly and legibly with a warning label that states "WILL NOT FLOAT."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | A label on the back of the EUT includes the wording "Will Not Float" notice (see above).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4.5.2.2.4 | Integral GNSS Receiver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 4.5.2.2.4 | <p>a) The location of the GNSS antenna shall be marked on the exterior of the PLB in a manner and location that shall be clearly viewable to the operator activating the beacon together with concise, unambiguous instructions to orient the GNSS antenna towards the sky and a warning not to obstruct the antenna.</p> <p>b) A positive visual and/or audible indication that the GNSS receiver has acquired a location.</p> <p>c) Instructions on or permanently attached to the PLB shall guide the operator towards maximizing self-locating performance. If permanently attached, the placard including the instructions(s) shall be conspicuously marked adjacent to the attachment point: "DO NOT REMOVE"</p> | <p>A GPS label can be found on the top of the EUT, indicating that the area must have <i>clear view to sky</i>:</p>  <p>There is no specific warning not to obstruct the area, however the napkin notes:</p> <ul style="list-style-type: none"> <li>• <b>In order to transmit a distress alert - Ensure the SARLink SOS-300 antenna is facing upright and has an unobstructed view to the sky.</b></li> </ul> <p>No further information is provided on the EUT labelling relating to the GPS receiver, however the user manual identifies the following screen information relating to the GPS antenna:</p> <div>  <p>Denotes the GPS receiver is off. The GPS receiver is always kept off to preserve battery life until time, date or position information is needed.</p> </div> <div>  <p>Denotes the GPS receiver is on with real-time satellite acquisition status represented by the number of vertical bars. One bar represents valid time and date fix, two bars represent dead reckoning, three bars represent 2-D fix, and four bars represent 3-D fix. Although the SARLink SOS-300 GPS receiver can often obtain a location fix when the antenna is partially blocked (near buildings, in a room next to a window, etc.), it is recommended that the antenna must have a clear view of the sky to minimize acquisition time and better position accuracy.</p> </div> |



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| A.20.7 Documentation |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|                      | <p>The manufacturer shall supply a copy of the operation manual and this shall be inspected to ensure that it complies with the requirements of paragraph 4.5.3.</p> <p>The manufacturer shall supply a copy of the end user (consumer) packaging (or the labelling for the packaging) and this shall be inspected to ensure that it complies with the requirements of paragraph 4.5.4.</p> | <p>The following documents / labels were briefly reviewed with respect to clause A.20.7 (note: the inspection was provided to confirm the presence of the required information. The accuracy of the instructions was not checked):</p> <p>A1-20-1661B Rev B: Label, battery replacement date<br/>A1-20-1843BDASH Rev B: Battery expiration label, SARLink<br/>A1-20-1844BDASH Rev B: Activation label, SARLink SOS-300<br/>A1-20-1845A Rev A: GPS label, SARLink SOS-300<br/>A1-20-1847B Rev B: Label, HEXID, SARLink SOS-300<br/>A1-20-1926T1 Rev T1: Registration label, SARLink<br/>Y3_03_0304_B_SARLink_SOS300_User Manual Rev B: User Manual<br/>A1-20-1928A Rev A: Label SARLink cloth<br/>A3-06-2976A Rev A: SARLink Pouch<br/>A1-20-1036HFORM 406 Registration and<br/>A1-20-1367A Registration Reminder</p> <p>Subsequent versions of the above document(s) were supplied and where these fulfilled a further requirement a note has been made:<br/>Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual<br/>Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual (supplied 17/07/17)</p> <p>See details below.</p> |



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| 4.5.3 | Documentation                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4.5.3 | <p>The manufacturer shall provide an operation manual which includes the following:</p> <p>a) Complete instructions for operating the PLB.</p> <p>b) Cautions and recommendations to prevent false alerts.</p> <p>c) A warning paragraph with, at a minimum, the information in 4.5.2.2 and the fact that misuse of a PLB is subject to a fine.</p> | <p>The User Manual was briefly inspected as per clause 4.5.3 and the following was noted with respect to the applicable sub clauses (note: the inspection was provided to confirm the presence of the required information. The accuracy of the instructions was not checked):</p> <p>a) A brief pictograph and further detailed 'Emergency Activation' operating instructions.</p> <p>b) Cautions or recommendations to prevent false alerts are provided (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual).</p> <p>c) The following conditions of 4.5.2.2 (and the following sub clauses) where met in the User Manual (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual (supplied 17/07/17):</p> <ul style="list-style-type: none"> <li>Operating instructions</li> <li>Warnings (see below)</li> <li>Registration information</li> <li>Identification of the Manufacturer</li> <li>Device model name and name under which it was tested</li> <li>Operating temperature range in degrees Celsius and Fahrenheit</li> <li>Dangerous goods transportation information (no applicable date)</li> <li>Antenna optimization information (clear view to sky, not to hold the device via the antenna, positioning of the device etc)</li> <li>Phone number to report inadvertent activation (toll / toll free status unclear). Please refer to section 1.6.</li> <li>The warning: Not designed to float</li> <li>Location of the GPS antenna, screen information advising of GPS status (off / real time satellite acquisition, etc)</li> </ul> <p>The user manual also includes a warning to only use in situations of grave and imminent danger, and that deliberate misuse may incur a severe penalty (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual).</p> <p>There is a note in the user manual, warning the public not to move if found (as per sub para 4.5.2.2.1 c). Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual (supplied 17/07/17)</p> <p> <b>Warning: Do not move if found.</b></p> <p>An additionally supplied napkin warns the user that :</p> <ul style="list-style-type: none"> <li>▪ <b>Deliberate misuse may incur a severe penalty.</b></li> </ul> <p>Additionally, the napkin provides information relating to inadvertent activation.</p> |

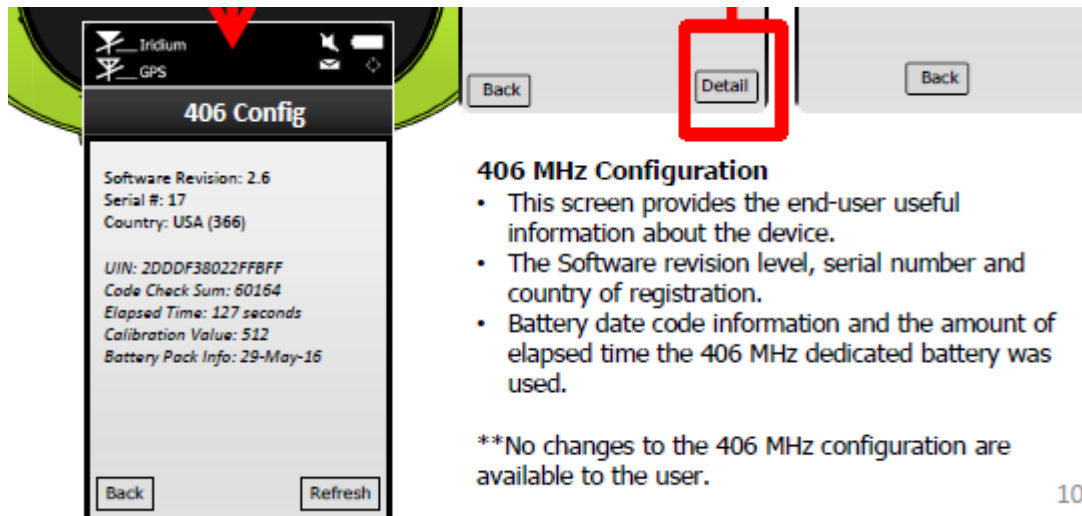


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| 4.5.3                    | d) General battery information (e.g., battery replacement instructions, battery type, safety information regarding battery use and disposal). | d) Basic battery information (for the 406 MHz feature) is provided:<br><br><b>406 FEATURES</b><br><br><table><tr><td>Battery</td><td>Dedicated Lithium Battery for Distress Alerting</td></tr><tr><td>Battery Replacement</td><td>7 years</td></tr><tr><td>Power Output</td><td>5W</td></tr><tr><td>Frequencies</td><td>406.040 MHz</td></tr><tr><td>406 Emergency Activation</td><td>Manual Activation – Slide SOS cover left, Press SOS button</td></tr><tr><td>Testing</td><td>Self-Test</td></tr></table> <div><p> <b>WARNING: Battery contains lithium</b><br/>To avoid possible fire, explosion, leakage or burn hazard, do not open, recharge, disassemble or heat beacon above +70°C (+158°F) or incinerate.</p><p>If this beacon is kept above room temperature for prolonged periods of time, the Battery Capacity will be degraded. This will need the battery to be replaced at a date earlier than stated on the beacon or the quoted operating life of the beacon (24 hours) may be reduced. The effect is more pronounced as temperature increases. In tropical regions this could reduce the battery life by a year. In hot desert regions, this could be two years.</p><p>Note: Storage in lower temperatures (below ambient) does not extend battery life longer than the replacement date on the unit.</p></div> | Battery | Dedicated Lithium Battery for Distress Alerting | Battery Replacement | 7 years | Power Output | 5W | Frequencies | 406.040 MHz | 406 Emergency Activation | Manual Activation – Slide SOS cover left, Press SOS button | Testing | Self-Test |
| Battery                  | Dedicated Lithium Battery for Distress Alerting                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                 |                     |         |              |    |             |             |                          |                                                            |         |           |
| Battery Replacement      | 7 years                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                 |                     |         |              |    |             |             |                          |                                                            |         |           |
| Power Output             | 5W                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                 |                     |         |              |    |             |             |                          |                                                            |         |           |
| Frequencies              | 406.040 MHz                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                 |                     |         |              |    |             |             |                          |                                                            |         |           |
| 406 Emergency Activation | Manual Activation – Slide SOS cover left, Press SOS button                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                 |                     |         |              |    |             |             |                          |                                                            |         |           |
| Testing                  | Self-Test                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                                                 |                     |         |              |    |             |             |                          |                                                            |         |           |

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| 4.5.3 | <p>d) General battery information (e.g., battery replacement instructions, battery type, safety information regarding battery use and disposal).</p> <p>e) Instructions for the safe transportation or shipping of the PLB or the location where such information can be obtained on the Internet or by mail by the consumer.</p> | <p>Further warnings and information relating to the battery are provided (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual):</p> <p> <b>CAUTION:</b> Contains lithium batteries. Do not incinerate, puncture, deform, short-circuit or recharge (the 406 MHz battery may not be recharged but the Iridium battery can be recharged).</p> <p> <b>Disposal:</b> Remove the battery or batteries. Dispose of the used battery or batteries in accordance with local waste disposal regulations.</p> <p>CAUTION: Contains lithium batteries (batteries meet the UN Classification for non-dangerous goods – Class 2 non-hazmat lithium batteries). Prior to shipping beacon for service, alert your carrier about the batteries contained in this equipment to make sure they properly label your package. Call ACR's Technical Service department at +1 (954) 981-3333 for proper shipping instructions or visit the ACR website in the Support section entitled "Hazmat, MSDS Sheets, &amp; Info". Do not incinerate, puncture, deform, or short-circuit. Do not recharge 406 MHz battery. Dispose of the used SARLink SOS-300 with the batteries removed in accordance with local waste disposal regulations. If this beacon is kept above room temperature for prolonged periods of time, the Battery Capacity will be degraded. This will need the 406 MHz battery to be replaced at a date earlier than stated on the beacon or the quoted operating life of the beacon (24 hours) may be reduced. The effect is more pronounced as temperature increases. In tropical regions this could reduce the battery life by a year. In hot desert regions, this could be two years. Note: Storage in lower temperatures (below ambient) does not extend battery life longer than the replacement date on the unit.</p> <p>23</p> <p>e) The following (in addition to above) information for the safe transportation or shipping of the EUT is provided (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual):</p> <p> <b>Air Travel:</b> Product contains small lithium metal batteries that comply with IATA SP 188-PI 970 Air Cargo. Always check with air carrier about concerns for any additional restrictions.</p> |
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| <p>4.5.3</p> | <p>f) Information regarding the need to replace the battery after activation of the PLB and how to determine if the PLB has been activated or the battery needs to be replaced.</p> <p>g) Information related to the requirements of preventive maintenance.</p> | <p>f) There is a note indicating that the 406 MHz lithium battery should be replaced after activation. See below:</p> <p><b>**The dedicated 406 MHz Lithium battery should be replaced after any 406 MHz Emergency Distress Activation, or on or before the 406 MHz Lithium battery expiry date.</b></p> <p>It is also possible to see the Elapsed Time (on time) for the 406 MHz feature of the device, via the touch screen menu:</p> <div data-bbox="745 493 1823 1011">  <p><b>406 MHz Configuration</b></p> <ul style="list-style-type: none"> <li>• This screen provides the end-user useful information about the device.</li> <li>• The Software revision level, serial number and country of registration.</li> <li>• Battery date code information and the amount of elapsed time the 406 MHz dedicated battery was used.</li> </ul> <p><b>**No changes to the 406 MHz configuration are available to the user.</b></p> </div> <p>g) Instructions relating to preventative maintenance are provided in the <i>Beacon Maintenance</i> section (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual).</p> |
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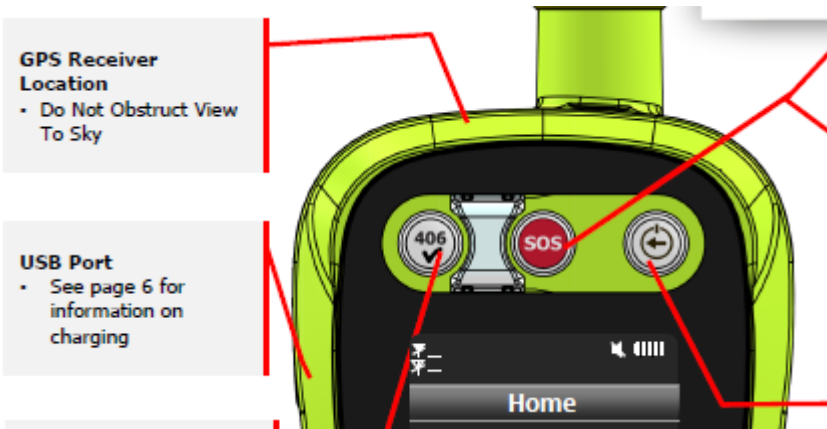


Product Service

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| 4.5.3                    | h) Minimum operating lifetime and operating and stowage temperature ranges.                                                                                                                  | <div>h) The following specification details are provided (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual):</div> <div><h2>Product Specifications</h2><div><div>FEATURES</div><table><tr><td>Dimensions</td><td>8.12" x 3.12" x 1.5" (20.62 x 7.92 x 3.81 cm)</td></tr><tr><td>Weight</td><td>12.52 oz (355 g)</td></tr><tr><td>Waterproof Rating</td><td>IP-67</td></tr><tr><td>Operating Temperature</td><td>-20°C to +55°C (-4°F to +131°F)</td></tr><tr><td>Storage Temperature</td><td>-30°C to +70°C (-22°F to +158°F)</td></tr><tr><td>Material</td><td>High Performance Engineered Polymer</td></tr><tr><td>Display</td><td>LCD Touch Screen</td></tr><tr><td>Display Dimensions</td><td>3 inch diagonal</td></tr><tr><td>GPS Receiver</td><td>U-BLOX MAX-7Q-0</td></tr><tr><td>Receiver Type</td><td>L1, C/A, 50-channel</td></tr><tr><td>Receiver Update Rate</td><td>Up to 4 Hz</td></tr></table><div><div>IRIDIUM FEATURES</div><table><tr><td>Iridium Module</td><td>Iridium 9603</td></tr><tr><td>Battery Type</td><td>Rechargeable Lithium Ion</td></tr><tr><td>Rechargeable Cycles</td><td>500 times</td></tr><tr><td>Battery Voltage</td><td>3.7V</td></tr><tr><td>I/O Interface</td><td>Mini USB Adapter</td></tr><tr><td>GPS Tracking</td><td>Send and/or save waypoints</td></tr><tr><td>GPS Tracking Intervals</td><td>Between once per minute and once per day</td></tr><tr><td>SMS Texting</td><td>Canned or Custom Messages</td></tr><tr><td>SMS Communication</td><td>Two-Way (satellite to cell)</td></tr><tr><td>SOS Emergency Activation</td><td>1. Manual Activation – Slide SOS cover left, Press SOS button (406 MHz and Iridium Distress)<br/>2. Manual Activation – Press Iridium SOS Icon – under Utilities menu (Iridium Distress Only)</td></tr></table><div><div>406 FEATURES</div><table><tr><td>Battery</td><td>Dedicated Lithium Battery for Distress Alerting</td></tr><tr><td>Battery Replacement</td><td>7 years</td></tr><tr><td>Battery Shelf Life</td><td>.25 years</td></tr><tr><td>Power Output</td><td>5W</td></tr><tr><td>Frequencies</td><td>406.040 MHz</td></tr><tr><td>Testing</td><td>Self-Test</td></tr><tr><td>406 Emergency Activation</td><td>Manual Activation – Slide SOS cover left, Press SOS button (406 MHz and Iridium Distress). 24 hours of operating lifetime.</td></tr></table></div></div></div></div> | Dimensions | 8.12" x 3.12" x 1.5" (20.62 x 7.92 x 3.81 cm) | Weight | 12.52 oz (355 g) | Waterproof Rating | IP-67 | Operating Temperature | -20°C to +55°C (-4°F to +131°F) | Storage Temperature | -30°C to +70°C (-22°F to +158°F) | Material | High Performance Engineered Polymer | Display | LCD Touch Screen | Display Dimensions | 3 inch diagonal | GPS Receiver | U-BLOX MAX-7Q-0 | Receiver Type | L1, C/A, 50-channel | Receiver Update Rate | Up to 4 Hz | Iridium Module | Iridium 9603 | Battery Type | Rechargeable Lithium Ion | Rechargeable Cycles | 500 times | Battery Voltage | 3.7V | I/O Interface | Mini USB Adapter | GPS Tracking | Send and/or save waypoints | GPS Tracking Intervals | Between once per minute and once per day | SMS Texting | Canned or Custom Messages | SMS Communication | Two-Way (satellite to cell) | SOS Emergency Activation | 1. Manual Activation – Slide SOS cover left, Press SOS button (406 MHz and Iridium Distress)<br>2. Manual Activation – Press Iridium SOS Icon – under Utilities menu (Iridium Distress Only) | Battery | Dedicated Lithium Battery for Distress Alerting | Battery Replacement | 7 years | Battery Shelf Life | .25 years | Power Output | 5W | Frequencies | 406.040 MHz | Testing | Self-Test | 406 Emergency Activation | Manual Activation – Slide SOS cover left, Press SOS button (406 MHz and Iridium Distress). 24 hours of operating lifetime. |
| Dimensions               | 8.12" x 3.12" x 1.5" (20.62 x 7.92 x 3.81 cm)                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Weight                   | 12.52 oz (355 g)                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Waterproof Rating        | IP-67                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Operating Temperature    | -20°C to +55°C (-4°F to +131°F)                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Storage Temperature      | -30°C to +70°C (-22°F to +158°F)                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Material                 | High Performance Engineered Polymer                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Display                  | LCD Touch Screen                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Display Dimensions       | 3 inch diagonal                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| GPS Receiver             | U-BLOX MAX-7Q-0                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Receiver Type            | L1, C/A, 50-channel                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Receiver Update Rate     | Up to 4 Hz                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Iridium Module           | Iridium 9603                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Battery Type             | Rechargeable Lithium Ion                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Rechargeable Cycles      | 500 times                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Battery Voltage          | 3.7V                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| I/O Interface            | Mini USB Adapter                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| GPS Tracking             | Send and/or save waypoints                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| GPS Tracking Intervals   | Between once per minute and once per day                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| SMS Texting              | Canned or Custom Messages                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| SMS Communication        | Two-Way (satellite to cell)                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| SOS Emergency Activation | 1. Manual Activation – Slide SOS cover left, Press SOS button (406 MHz and Iridium Distress)<br>2. Manual Activation – Press Iridium SOS Icon – under Utilities menu (Iridium Distress Only) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Battery                  | Dedicated Lithium Battery for Distress Alerting                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Battery Replacement      | 7 years                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Battery Shelf Life       | .25 years                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Power Output             | 5W                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Frequencies              | 406.040 MHz                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| Testing                  | Self-Test                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |
| 406 Emergency Activation | Manual Activation – Slide SOS cover left, Press SOS button (406 MHz and Iridium Distress). 24 hours of operating lifetime.                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                               |        |                  |                   |       |                       |                                 |                     |                                  |          |                                     |         |                  |                    |                 |              |                 |               |                     |                      |            |                |              |              |                          |                     |           |                 |      |               |                  |              |                            |                        |                                          |             |                           |                   |                             |                          |                                                                                                                                                                                              |         |                                                 |                     |         |                    |           |              |    |             |             |         |           |                          |                                                                                                                            |



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| <p>4.5.3</p> | <p>i) Information explaining the requirement and procedure for licensing and registering PLBs, as appropriate, and encouragement to do so promptly.</p> <p>j) Instructions on actions to be taken in the case of false alerts, including toll and toll – free phone numbers for contacts and including instructions that in the case of accidental activation of the PLB, the user should de-activate the PLB and notify the appropriate search and rescue authorities at the earliest possible time.</p> <p>k) For Category 2 PLB, a warning that states "THIS PLB WILL NOT FLOAT" and, if applicable, the information that when used around water it must be installed in a provided auxiliary flotation device, its tested depth and time rating (e.g. waterproof to x meters for x minutes/hours) and that the PLB is not designed to float and transmit a distress signal and that the PLB may not be substituted for a required EPIRB on a vessel.</p> <p>l) For Category 1 PLB, information that the PLB is appropriate for use in or around water and, its tested depth and time rating (e.g. waterproof to x meters for x minutes/hours) and as appropriate, either: The PLB is buoyant (but is not designed to float in an upright position and transmit a distress signal) and that the PLB may not be substituted for a required EPIRB on a vessel. Or the PLB will float without support in an upright position and transmit a distress signal and that the PLB may not be substituted for a required EPIRB on a vessel.</p> | <p>i) A 406 MHz <i>Registration</i> section is provided, including further contact details (beacon registration website, NOAA mail address (including fax number), (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual).</p> <p>j) Instructions or actions to be taken in the case of false alert are provided. One contact phone number for the United States is provided (toll / toll free status unknown). (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual). Please refer to section 1.6.</p> <p>There is no note, in the case of inadvertent activation, to de activate the device (via reference to another section of the user manual). (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual (supplied 17/07/17).</p> <p>k) The User Manual notes the following (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual)*:</p> <div data-bbox="748 619 1762 740"><p> <b>Warning: Not designed to float</b></p><hr/><p> <b>Warning: Not a substitute for a required EPIRB on a vessel</b></p></div> <p>There are no further references to use around water or use with personal flotation devices, however a waterproof rating is provided.</p> <p>*Note: the instructions on the supplied napkin state that the device is <i>Category 2 – Will Not Float</i>.</p> <p>l) This sub clause is only applicable to Category 1 PLBs.</p> |
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| <p>4.5.3</p> | <p>m) Information to guide the operator towards maximizing self-locating performance including a warning not to obstruct the GNSS antenna's view of the sky and to ensure the GNSS antenna is not submersed in water.</p> | <p>m) A brief note indicating the GPS Receiver Location is provided:</p>  <p>The following details are also provided:</p>  <p>Denotes the GPS receiver is off. The GPS receiver is always kept off to preserve battery life until time, date or position information is needed.</p> <p>Denotes the GPS receiver is on with real-time satellite acquisition status represented by the number of vertical bars. One bar represents valid time and date fix, two bars represent dead reckoning, three bars represent 2-D fix, and four bars represent 3-D fix. Although the SARLink SOS-300 GPS receiver can often obtain a location fix when the antenna is partially blocked (near buildings, in a room next to a window, etc.), it is recommended that the antenna must have a clear view of the sky to minimize acquisition time and better position accuracy.</p> <p>No further GPS receiver / antenna information is provided relating to maximizing performance.</p> |
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Product Service

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| 4.5.3 | <p>n) If the 121.5 MHz signal is transmitted during the Self-test, information noting that the Self test shall be performed only within the first 5 minutes of any hour.</p> <p>o) An overview and explanation of how the Cospas-Sarsat system operates.</p> <p>p) Beacon registration materials and information</p> <p>q) For PLBs with the capability to be connected to an external GNSS receiver the manufacturer shall provide instructions for connecting and setting up the external GNSS receiver in the equipment manual. This information shall include:</p> <ol style="list-style-type: none"> <li>1) A list of all the GNSS receivers that have been tested with the PLB to ensure correct operation of the interface;</li> <li>2) Details of the electrical and/or data connections to the PLB;</li> <li>3) The specification of the interface (e.g. IEC 61162-1);</li> <li>4) Details of the communications protocol to be used (e.g. Baud Rate, Data Bits, Parity Bits etc);</li> <li>5) A list of the NMEA messages that the PLB can handle (e.g. GGA, GLL, RMC etc) and;</li> <li>6) Instructions on the key settings and parameters of the GNSS Receiver (e.g. Map Datum (WGS84/GTRF), I/O Formats, Mode of Operation etc).</li> </ol> | <p>n) This sub clause is not applicable as the EUT does not include a 121.5 MHz homing transmitter. See DA-15-1395A1 for FCC Waiver relating to the 121.5 MHz homing transmitter, in Annex B.</p> <p>o) An overview and explanation of the how the Cospas Sarsat system works is provided in the <i>Anatomy Of A Rescue</i> section of the user manual.</p> <p>p) The user manual does not contain any beacon registration documents, however a link to the beacon registration website is provided. The Manufacturer supplied the following documents with respect to this clause: A1-20-1036HFORM 406 Registration and A1-20-1367A Registration Reminder.</p> <p>q) The EUT is not capable of being connected to an external GNSS receiver.</p> |
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| 4.5.4 | Packaging Labelling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4.5.4 | <p>End user (consumer) packaging shall include the following information in a conspicuous location, readily readable and visible to the purchaser without opening the packaging:</p> <p>a) The Category of the PLB:</p> <p>If Category 2, the additional information that the PLB will not float and is not recommended for use on or in the water and that THIS PLB IS NOT AN ELT or an EPIRB and does not meet the regulatory requirements for an ELT or an EPIRB or if applicable, the additional information that the PLB will not float and is not recommended for use on or in the water unless it is fitted with the provided auxiliary flotation device, its tested depth and time rating (e.g. waterproof to x meters for x minutes/hours) and that THIS PLB IS NOT AN ELT or an EPIRB and does not meet the regulatory requirements for an ELT or an EPIRB. This PLB is buoyant when fitted with the provided auxiliary flotation device, but will not float in an upright position.</p> <p>Or, if applicable, the additional information that the PLB will not float and is not recommended for use on or in the water unless it is installed into the provided auxiliary flotation device, its tested depth and time rating (e.g. waterproof to x meters for x minutes/hours) and that THIS PLB IS NOT AN ELT or an EPIRB and does not meet the regulatory requirements for an ELT or an EPIRB. This PLB will float in an upright position when installed into the provided auxiliary flotation device and transmit a distress signal once manually activated.</p> | <p>The following documents were briefly reviewed with respect to clause 4.5.4 (note: the inspection was provided to confirm the presence of the required information. The accuracy of the instructions was not checked):</p> <p>A1-26-0680A Rev A: Display Sleeve, SARLink SOS-300</p> <p>The packaging states that the device:<br/> <i>meets all regulatory requirements of a SEND Device: 406 MHz: GPS Location Beacons incorporate all PLB functionality except THIS DEVICE DOES NOT INCLUDE A 121.5 MHz HOMER, Category 2 SEND – Will not float...</i></p> <p>It should be noted that the regulatory testing details in the present document <b>does not</b> include any regulatory testing / test data relating to any SEND device specifications.</p> <p>The following items were included with respect to each sub clause:</p> <p>a) The device is a category 2 PLB; however the conditions of the FCC Waiver indicate that the device cannot be called a PLB (refer to section 1.6 of the present document). The packaging identifies the device as a Category 2 SEND (no reference to a Category 2 PLB).</p> <p>It is noted on the display sleeve packaging that the device will not float and that it is not recommended for use on or in the water (this note is with respect to a SEND device). There is no information relating to use with a floatation device or any note of waterproof rating (note: the user manual does note a waterproof rating of IP-67). (Y1_03_0332_A_SARLink_SOS300_User Manual Rev A: User Manual).</p> <p>It is also noted on the display sleeve packaging that the device is not an ELT, EPIRB or PLB and does not meet the regulatory requirements of an ELT, EPIRB or PLB.</p> |



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|       |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| 4.5.4 | <p>b) The temperature operating range in degrees Celsius and Fahrenheit of the PLB.</p> <p>c) The expiration date of the battery.</p> <p>d) The Country that is coded into the 15 Hex ID</p> <p>e) If the Country Code or unique national characteristics cannot be readily changed in the field at nominal cost to another Country Code due to the configuration of the PLB, a warning to that effect.</p> | <p>b) The operating temperature range is noted in Celsius and Fahrenheit (this note is with respect to a SEND device): the conditions of the FCC waiver are such that the device should not be called a PLB (refer to section 1.6 of the present document).</p> <p>c) A field is available for the expiry date of the battery.</p> <p>d) The Manufacturer presented document A1-20-1847 indicating the field for the Country code.</p> <p>Fields for the HEX ID and serial number are provided.</p> <p>e) A note that the Country code cannot be reprogrammed in the field is provided.</p> |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Product Service

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| A.20.8 Altitude |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |
|                 | <p>With the PLB test specimen coded using the test user protocol, activation switch in the OFF mode and under normal test conditions, place the test specimen in the altitude test chamber and reduce the chamber pressure to an altitude equivalent of 25,000 feet (7,620 meters), <math>\pm 5\%</math>. The rate of pressure change should not exceed 1.5 inches of Hg per minute (5 kPa/min). Hold the chamber at this pressure for a minimum of two hours. Increase pressure in the test chamber at a rate not to exceed 1.5 inches of Hg per minute (5 kPa/min) until the chamber pressure is equal to the ambient pressure. Carry out a self-test and verify that the self-test passes. The test specimen passes if it does not activate during the pressure changes and hold time at altitude and the self-test response is correct on completion of the test.</p> | <p>See section 2.9 of this report.</p> |
| Annex G         | Internal Navigation Device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | See section 2.19 of this report.       |

## 2.19 ANNEX G INTERNAL NAVIGATION DEVICE TEST (LAND AND MARITIME SCENARIOS)

### 2.19.1 Specification Reference

RTCM 11010.2, Annex G

### 2.19.2 Equipment Under Test and Modification State

SOS-300 S/N: #1761 (75934030-TSR0005) – Modification State 0

### 2.19.3 Date of Test

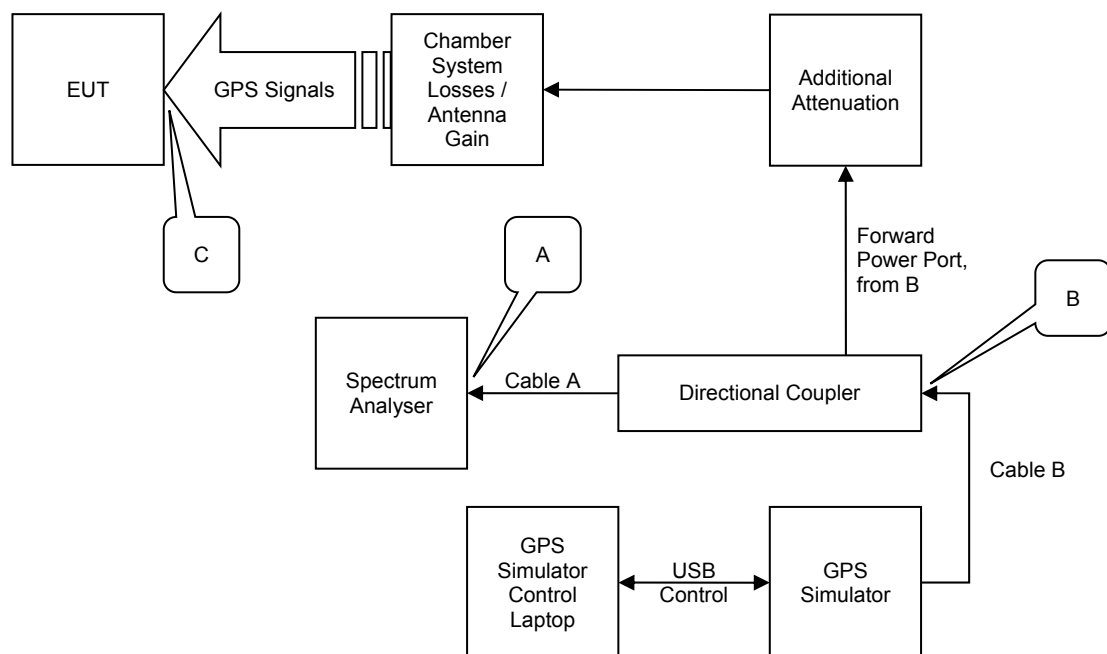
24 March 2017 and 25 March 2017

### 2.19.4 Test Equipment Used

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

### 2.19.5 Test Method

#### Field Calibration



Field Calibration Schematic

The basic premise of the Field Calibration procedure is that Received Signal Strength ( $P_{RSS}$ ) at C equals  $P_{RSS}$  at B minus the loss from B to C (calibrated), where the  $P_{RSS}$  at B equals the power measured at A plus the loss B to A.

Resultant  $P_{RSS}$  at C is recorded for each scenario at the test results section, below.



Product Service

#### 2.19.6 Environmental Conditions

Ambient Temperature 23.3 – 23.5 °C

Relative Humidity 28.5 - 36.2 %

#### 2.19.7 Test Results

##### Result Summary

Pass / Fail Analysis (Table G.8):

|                                                                                                  | Pass / Fail |
|--------------------------------------------------------------------------------------------------|-------------|
| Land TTFF Success Rate $\geq 70\%$                                                               | Pass        |
| Land Location Accuracy Pass Rate $\geq 70\%$                                                     | Pass        |
| Maritime TTFF Success Rate $\geq 70\%$                                                           | Pass        |
| Maritime Location Accuracy Pass Rate $\geq 70\%$                                                 | Pass        |
| All four results must be a "Pass" for the EUT to pass, any one or more "Fails" indicates failure |             |



Product Service

## Land Scenarios

Scenario  $P_{RSS}$  Summary Table:

| Scenario # | Number of SVs | Required RSS [dBm] | Actual RSS [dBm] |
|------------|---------------|--------------------|------------------|
| 1          | 3             | -123               | -123.80          |
| 2          | 3             | -130               | -130.45          |
| 3          | 3             | -137               | -137.65          |
| 4          | 3             | -123               | -123.29          |
| 5          | 3             | -130               | -130.05          |
| 7          | 3             | -123               | -123.31          |
| 8          | 3             | -130               | -130.60          |
| 13         | 4             | -123               | -123.68          |
| 14         | 4             | -130               | -130.11          |
| 15         | 4             | -137               | -137.90          |
| 16         | 4             | -123               | -123.46          |
| 17         | 4             | -130               | -130.25          |
| 19         | 4             | -123               | -123.89          |
| 20         | 4             | -130               | -130.25          |
| 25         | 5             | -123               | -123.32          |
| 26         | 5             | -130               | -130.87          |
| 27         | 5             | -137               | -137.27          |
| 28         | 5             | -123               | -123.94          |
| 29         | 5             | -130               | -130.22          |
| 31         | 5             | -123               | -123.05          |
| 32         | 5             | -130               | -130.32          |
| 34         | 6             | -123               | -123.30          |
| 35         | 6             | -130               | -130.52          |
| 36         | 6             | -137               | -137.53          |
| 37         | 4             | -130               | -130.84          |
| 38         | 4             | -130               | -130.87          |
| 39         | 4             | -130               | -130.85          |
| 40         | 4             | -130               | -130.92          |
| 41         | 4             | -130               | N/T              |
| 42         | 4             | -130               | -130.93          |



Product Service

Land Scenarios Test Results (G.4):

| Scenario # | TTFF<br>(min : sec) | Simulator<br>Location               | Transmitted<br>Location      | Location<br>Error<br>(m) |
|------------|---------------------|-------------------------------------|------------------------------|--------------------------|
| 1          | 05:50               | 39° 36' N, 119° 35' W               | N 39° 35' 28" W 119° 35' 32" | 1037.49                  |
| 2          | 05:51               | 39° 36' N, 119° 35' W               | N 39° 35' 28" W 119° 35' 32" | 1037.49                  |
| 3          | 05:49               | 39° 36' N, 119° 35' W               | N 39° 35' 28" W 119° 35' 32" | 1037.49                  |
| 4          | 06:43               | 39° 36' N, 119° 35' W               | N 39° 35' 28" W 119° 35' 4"  | 987.48                   |
| 5          | 06:47               | 39° 36' N, 119° 35' W               | N 39° 35' 32" W 119° 35' 4"  | 864.26                   |
| 7          | Fail                | 39° 36' N, 119° 35' W               | N/A                          | N/A                      |
| 8          | Fail                | 39° 36' N, 119° 35' W               | N/A                          | N/A                      |
| 13         | 00:51               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 14         | 00:49               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 15         | 05:48               | 39° 36' N, 119° 35' W               | N 39° 36' 12" W 119° 35' 12" | 389.06                   |
| 16         | 00:48               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 17         | 01:40               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 19         | 00:51               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 20         | 06:38               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 25         | 00:50               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 26         | 01:41               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 27         | 05:01               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 28         | 00:48               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 29         | 01:49               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 31         | 03:01               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 32         | 03:00               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 34         | 00:48               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 35         | 01:42               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 36         | 04:58               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 37         | 00:52               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 0.00                     |
| 38         | 11:40               | 23° 42.01668' S<br>133° 53.83336' E | S 23° 42' 0" E 133° 52' 52"  | 249.23                   |
| 39         | 00:52               | 71° 37.56666' N<br>128° 52.06668' E | N 71° 37' 36" E 128° 52' 4"  | 61.68                    |
| 40         | 00:49               | 71° 37.56666' N<br>128° 52.06668' E | S 23° 42' 0" E 133° 52' 52"  | 10590795.87              |
| 41         | N/T                 | 71° 37.56666' N<br>128° 52.06668' E | N/T                          | N/T                      |
| 42         | 01:42               | 39° 36' N, 119° 35' W               | N 39° 36' 0" W 119° 35' 0"   | 1764869.14               |



Product Service

Land Scenarios Results Analysis (Table G.6):

| Criteria                               | Limit / Condition                                                                               | Result |
|----------------------------------------|-------------------------------------------------------------------------------------------------|--------|
| No. of Successful Tests                | $\text{TTF} \leq 13 \text{ minutes}$                                                            | 27     |
| Total No. of Land Scenarios            | 30                                                                                              | N/A    |
| TTF Percentage Success Rate            | $(\text{No. Successful Tests} / 30) \times 100$                                                 | 90.0   |
| TTF Pass / Fail Limit                  | $\geq 70\%$                                                                                     | N/A    |
| No of Locations with Errors            | $\leq 650 \text{ m}$                                                                            | 20     |
| No of Scenarios with Locations         | Enter result                                                                                    | 24     |
| Location Accuracy Percentage Pass Rate | $(\text{No Locations Errors} \leq 30 \text{ m} / \text{No Scenarios with Location}) \times 100$ | 83.3 % |
| Location Accuracy Pass / Fail Limit    | $\geq 70\%$                                                                                     | N/A    |



Product Service

### Maritime Scenarios

General Note: The standard contains some contradictions, specifically regarding simulated positions. Testing was carried out in accordance with the Maritime Scenario Tables (G.11) because they are most accurate when compared to the official scenarios downloaded from the Spirent website. Where changes were made to the result templates, original values are stricken out.

Scenario  $P_{RSS}$  Summary Table:

| Scenario # | Number of SVs | Required RSS [dBm] | Actual RSS [dBm] |
|------------|---------------|--------------------|------------------|
| 1          | 7             | -130               | -130.80          |
| 2          | 7             | -130               | -130.75          |
| 6          | 7             | -130               | -130.61          |
| 7          | 7             | -130               | -130.60          |
| 8          | 7             | -130               | -130.56          |
| 9          | 7             | -130               | -130.72          |
| 12         | 6             | -130               | -130.21          |
| 13         | 6             | -130               | -130.57          |
| 14         | 6             | -130               | -130.63          |
| 16         | 6             | -130               | -130.75          |
| 17         | 6             | -130               | -130.65          |
| 18         | 6             | -130               | -130.60          |
| 20         | 7             | -130               | -130.23          |
| 22         | 7             | -130               | -130.88          |
| 24         | 7             | -130               | -130.40          |
| 26         | 7             | -130               | -130.24          |
| 28         | 7             | -130               | -130.37          |
| 30         | 7             | -130               | -130.84          |
| 32         | 7             | -130               | -130.69          |
| 33         | 7             | -135               | -135.25          |
| 34         | 7             | -135               | -135.63          |
| 35         | 7             | -135               | -135.76          |
| 36         | 7             | -135               | -135.70          |
| 37         | 7             | -130               | -130.70          |
| 38         | 7             | -130               | -130.75          |
| 39         | 7             | -130               | -130.14          |



Product Service

Maritime Scenarios Test Results G.5):

| Scenario # | TTFF<br>(min : sec) | Simulator<br>Location | Transmitted<br>Location  | Location<br>Error<br>(m) |
|------------|---------------------|-----------------------|--------------------------|--------------------------|
| 1          | 00:51               | 0° 0' N, 0° 0' E      | N 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 2          | 00:50               | 0° 0' N, 0° 0' E      | S 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 6          | 00:50               | 0° 0' N, 0° 0' E      | N 80° 0' 0" W 0° 0' 0"   | 0.00                     |
| 7          | 00:51               | 0° 0' N, 0° 0' E      | S 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 8          | 00:52               | 0° 0' N, 0° 0' E      | N 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 9          | 00:49               | 0° 0' N, 0° 0' E      | N 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 12         | 00:50               | 80° 0' N, 0° 0' E     | N 80° 0' 0" W 0° 0' 0"   | 0.00                     |
| 13         | 00:51               | 80° 0' N, 0° 0' E     | N 80° 0' 0" E 0° 0' 0"   | 0.00                     |
| 14         | 01:41               | 80° 0' N, 0° 0' E     | N 80° 0' 0" E 0° 0' 0"   | 0.00                     |
| 16         | 00:50               | 80° 0' N, 0° 0' E     | N 80° 0' 0" W 0° 0' 0"   | 0.00                     |
| 17         | 00:41               | 80° 0' N, 0° 0' E     | N 80° 0' 0" E 0° 0' 0"   | 0.00                     |
| 18         | 00:51               | 80° 0' N, 0° 0' E     | N 80° 0' 0" W 0° 0' 0"   | 0.00                     |
| 20         | 00:50               | 0° 0' N, 0° 0' E      | N 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 22         | 01:40               | 0° 0' N, 0° 0' E      | S 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 24         | 00:50               | 0° 0' N, 0° 0' E      | S 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 26         | 00:51               | 0° 0' N, 0° 0' E      | N 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 28         | 00:50               | 0° 0' N, 0° 0' E      | S 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 30         | 01:42               | 0° 0' N, 0° 0' E      | S 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 32         | 01:40               | 0° 0' N, 0° 0' E      | S 0° 0' 0" W 0° 0' 0"    | 0.00                     |
| 33         | 00:50               | 0° 0' N, 0° 0' E      | S 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 34         | 01:42               | 0° 0' N, 0° 0' E      | N 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 35         | 01:44               | 0° 0' N, 0° 0' E      | N 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 36         | 01:40               | 0° 0' N, 0° 0' E      | S 0° 0' 0" E 0° 0' 0"    | 0.00                     |
| 37         | 00:48               | 44° 0' S, 175° 0' E   | S 44° 3' 0" E 174° 9' 0" | 0.00                     |
| 38         | 00:49               | 47° 0' N, 8° 0' E     | N 47° 21' 0" W 8° 27' 0" | 0.00                     |
| 39         | 00:52               | 0° 0' N, 0° 0' E      | S 0° 0' 0" W 0° 0' 0"    | 0.00                     |



Product Service

Maritime Scenarios Results Analysis (G.7):

| Criteria                               | Limit / Condition                                                           | Result |
|----------------------------------------|-----------------------------------------------------------------------------|--------|
| No. of Successful Tests                | TTFF $\leq$ 13 minutes                                                      | 26     |
| Total No. of Maritime Scenarios        | 26                                                                          | N/A    |
| TTFF Percentage Success Rate           | (No. Successful Tests / 26) $\times$ 100                                    | 100    |
| TTFF Pass / Fail Limit                 | $\geq$ 70%                                                                  | N/A    |
| No of Locations with Errors            | $\leq$ 650 m                                                                | 26     |
| No of Scenarios with Locations         | Enter result                                                                | 26     |
| Location Accuracy Percentage Pass Rate | (No Locations Errors $\leq$ 30 m / No Scenarios with Location) $\times$ 100 | 100    |
| Location Accuracy Pass / Fail Limit    | $\geq$ 70%                                                                  | N/A    |



Product Service

## **SECTION 3**

### **TEST EQUIPMENT**



Product Service

### 3.1 TEST EQUIPMENT

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

| Instrument                                          | Manufacturer            | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|-----------------------------------------------------|-------------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.1 Beacons - Initial Aliveness Test</b> |                         |                    |        |                             |                 |
| Power Meter                                         | Hewlett Packard         | 436A               | 47     | 12                          | 14-Jul-2016     |
| Beacon Tester                                       | WS Technologies         | BT 100S            | 87     | -                           | TU              |
| Beacon RF Unit                                      | TUV SUD Product Service | N/A                | 97     | -                           | TU              |
| RF Shielded Enclosure                               | Rittal                  | AE1380             | 162    | -                           | TU              |
| Signal Generator (100kHz to 2.6GHz)                 | Hewlett Packard         | 8663A              | 1063   | 12                          | 13-Apr-2017     |
| Spectrum Analyser                                   | Agilent Technologies    | E4407B             | 1154   | 12                          | 14-Aug-2016     |
| Hygrometer                                          | Rotronic                | I-1000             | 2829   | 12                          | 4-Nov-2016      |
| Termination (50ohm, 6W)                             | Micronde                | R404613            | 3074   | 12                          | 6-Apr-2017      |
| Attenuator (20dB, 10W)                              | Aeroflex / Weinschel    | 23-20-34           | 3160   | 12                          | 10-Jun-2017     |
| Attenuator (3dB, 20W)                               | Aeroflex / Weinschel    | 23-03-34           | 3162   | 12                          | 24-Nov-2016     |
| Bandpass filter                                     | Trilithic               | 5BE406/35-1-AA     | 3206   | 12                          | 14-Sep-2016     |
| Beacon Tester                                       | WS Technologies         | BT100S             | 3263   | -                           | TU              |
| Power Sensor                                        | Agilent Technologies    | 8482A              | 3290   | 12                          | 18-Jan-2017     |
| ESA-E Series Spectrum Analyser                      | Agilent Technologies    | E4402B             | 3348   | 12                          | 15-Sep-2017     |
| Rubidium Frequency Standard                         | Symmetricon             | 8040C              | 3490   | 12                          | 22-Apr-2017     |
| Time Interval Analyser                              | Yokogawa                | TA720              | 4550   | 12                          | 7-Mar-2017      |
| Oscilloscope                                        | Yokogawa                | DL750              | 4552   | 12                          | 6-Apr-2017      |
| Bandpass Filter (1MHz)                              | KR Electronics          | 3219-SMA           | 4601   | 12                          | 10-Jul-2016     |
| 2 metre N-Type Cable                                | Florida Labs            | NMS-235SP-78.8-NMS | 4622   | 12                          | 12-Aug-2016     |



Product Service

| Instrument                             | Manufacturer            | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|----------------------------------------|-------------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.2 Climatic – Dry Heat</b> |                         |                    |        |                             |                 |
| Power Meter                            | Hewlett Packard         | 436A               | 47     | 12                          | 14-Jul-2016     |
| Beacon Tester                          | WS Technologies         | BT 100S            | 87     | -                           | TU              |
| Rubidium Frequency Standard            | Quartzlock              | A10-B              | 92     | 12                          | 18-Feb-2017     |
| Signal Generator                       | Hewlett Packard         | 8644A              | 96     | 12                          | 27-Apr-2017     |
| RF Shielded Enclosure                  | Rittal                  | AE1380             | 162    | -                           | TU              |
| 3dB/10W Attenuator                     | Texscan                 | HFP-50N            | 475    | 12                          | 4-Apr-2017      |
| Signal Generator                       | Hewlett Packard         | 8663A              | 765    | 12                          | 9-Nov-2016      |
| Spectrum Analyser                      | Agilent Technologies    | E4407B             | 1154   | 12                          | 14-Aug-2016     |
| Climatic Chamber                       | Climatec                | Climatec 1         | 2124   | 12                          | 25-Nov-2016     |
| Distress Beacon RF Unit                | TUV SUD Product Service | -                  | 2445   | -                           | TU              |
| Spectrum Analyser                      | Rohde & Schwarz         | FSU26              | 2747   | 12                          | 29-Jan-2017     |
| Climatic Chamber                       | Climatec                | CLIMATEC 3         | 2846   | 12                          | 1-Jul-2017      |
| Termination (50ohm, 15W)               | Diamond Antenna         | DL-30N             | 3098   | 12                          | 29-Mar-2017     |
| Attenuator (20dB, 10W)                 | Aeroflex / Weinschel    | 23-20-34           | 3159   | 12                          | 10-Jun-2017     |
| Bandpass Filter                        | Trilithic               | 5BE406/35-1-AA     | 3207   | 12                          | 17-Sep-2016     |
| Time Interval Analyser                 | Yokogawa                | TA720 704510       | 3253   | 12                          | 12-Nov-2016     |
| ScopeCorder                            | Yokogawa                | DL750 701210       | 3254   | 12                          | 10-Nov-2016     |
| Beacon Tester                          | WS Technologies         | BT100S             | 3263   | -                           | TU              |
| Power Sensor                           | Agilent Technologies    | 8482A              | 3290   | 12                          | 18-Jan-2017     |
| ESA-E Series Spectrum Analyser         | Agilent Technologies    | E4402B             | 3348   | 12                          | 15-Sep-2017     |
| Cable (2m, N Type)                     | Rhophase                | NPS-1601-2000-NPS  | 3355   | 12                          | 9-Dec-2016      |
| Rubidium Frequency Standard            | Symmetricom             | 8040C              | 3490   | 12                          | 22-Apr-2017     |
| 2 metre SMA Cable                      | Florida Labs            | SMS-235SP-78.8-SMS | 4518   | 12                          | 16-Feb-2017     |
| Bandpass Filter (1MHz)                 | KR Electronics          | 3219-SMA           | 4602   | 12                          | 12-Jul-2017     |
| PXA Signal Analyser                    | Keysight Technologies   | N9030A             | 4653   | 12                          | 8-Oct-2016      |



Product Service

| Instrument                                                 | Manufacturer            | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|------------------------------------------------------------|-------------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.3 Climatic – Damp Heat</b>                    |                         |                    |        |                             |                 |
| Beacon Tester                                              | WS Technologies         | BT 100S            | 87     | -                           | TU              |
| Rubidium Frequency Standard                                | Quartzlock              | A10-B              | 92     | 12                          | 18-Feb-2017     |
| RF Shielded Enclosure                                      | Rittal                  | AE1380             | 162    | -                           | TU              |
| Termination (50ohm)                                        | Diamond Antenna         | DL-30N             | 391    | 12                          | 16-Feb-2017     |
| Climatic Chamber                                           | Climatec                | Climatec 1         | 2124   | 12                          | 11-Nov-2017     |
| Distress Beacon RF Unit                                    | TUV SUD Product Service | -                  | 2445   | -                           | TU              |
| Beacon Tester                                              | WS Technologies         | BT100S             | 3263   | -                           | TU              |
| ESA-E Series Spectrum Analyser                             | Agilent Technologies    | E4402B             | 3348   | 12                          | 15-Sep-2017     |
| Cable (2m, N Type)                                         | Rhophase                | NPS-1601-2000-NPS  | 3355   | 12                          | 9-Dec-2016      |
| 2 metre SMA Cable                                          | Florida Labs            | SMS-235SP-78.8-SMS | 4518   | 12                          | 16-Feb-2017     |
| <b>Section 2.4 Climatic - Low Temperature (Functional)</b> |                         |                    |        |                             |                 |
| Power Meter                                                | Hewlett Packard         | 436A               | 47     | 12                          | 14-Jul-2017     |
| Beacon Tester                                              | WS Technologies         | BT 100S            | 87     | -                           | TU              |
| Rubidium Frequency Standard                                | Quartzlock              | A10-B              | 92     | 12                          | 18-Feb-2017     |
| Signal Generator                                           | Hewlett Packard         | 8644A              | 96     | 12                          | 27-Apr-2017     |
| 3dB/10W Attenuator                                         | Texscan                 | HFP-50N            | 475    | 12                          | 4-Apr-2017      |
| Climatic Chamber                                           | Climatec                | Climatec 1         | 2124   | 12                          | 11-Nov-2017     |
| Temperature Chamber                                        | Instron                 | 906                | 2128   | 12                          | 17-Oct-2016     |
| Distress Beacon RF Unit                                    | TUV SUD Product Service | -                  | 2445   | -                           | TU              |
| Attenuator (20dB, 10W)                                     | Aeroflex / Weinschel    | 23-20-34           | 3159   | 12                          | 10-Jun-2017     |
| Bandpass Filter                                            | Trilithic               | 5BE406/35-1-AA     | 3207   | 12                          | 17-Sep-2016     |
| Time Interval Analyser                                     | Yokogawa                | TA720 704510       | 3253   | 12                          | 12-Nov-2016     |
| ScopeCorder                                                | Yokogawa                | DL750 701210       | 3254   | 12                          | 10-Nov-2016     |
| Power Sensor                                               | Agilent Technologies    | 8482A              | 3290   | 12                          | 18-Jan-2017     |
| ESA-E Series Spectrum Analyser                             | Agilent Technologies    | E4402B             | 3348   | 12                          | 7-Sep-2016      |
| Cable (2m, N Type)                                         | Rhophase                | NPS-1601-2000-NPS  | 3355   | 12                          | 9-Dec-2016      |
| Signal Analyser                                            | Rohde & Schwarz         | FSQ 26             | 3545   | 12                          | 19-Aug-2016     |
| 2 metre SMA Cable                                          | Florida Labs            | SMS-235SP-78.8-SMS | 4518   | 12                          | 16-Feb-2017     |
| Bandpass Filter (1MHz)                                     | KR Electronics          | 3219-SMA           | 4602   | 12                          | 12-Jul-2017     |



Product Service

| Instrument                               | Manufacturer         | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|------------------------------------------|----------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.5 Vibration</b>             |                      |                    |        |                             |                 |
| Vibration Table                          | MTS                  | 840                | 2287   | 6                           | 11-Sep-2016     |
| Isotron Accelerometer                    | Endevco              | 256-10             | 3393   | 12                          | 7-Jul-2017      |
| Charge Amplifier                         | Endevco              | 133                | 3478   | 12                          | 12-Apr-2017     |
| Accelerometer                            | PCB Piezotronic      | 352C03             | 4329   | 0                           | 27-Dec-2016     |
| Antenna (Double Ridge Guide, 1GHz-18GHz) | EMCO                 | 3115               | 35     | 12                          | 27-Nov-2016     |
| Beacon Tester                            | WS Technologies      | BT 100S            | 87     | -                           | TU              |
| Rubidium Frequency Standard              | Quartzlock           | A10-B              | 92     | 12                          | 18-Feb-2017     |
| Antenna (Double Ridge Guide, 1GHz-18GHz) | EMCO                 | 3115               | 235    | -                           | 2-Dec-2017      |
| Spectrum Analyser                        | Agilent Technologies | E4407B             | 1154   | 12                          | 26-Aug-2017     |
| LDS 984                                  | Ling                 | 984LS/DPAK130      | 2513   | 6                           | 16-Sep-2016     |
| Vibration System                         | Ling Dynamic Systems | LDS V964           | 2515   | 6                           | 3-Jul-2017      |
| Antenna (DRG Horn)                       | ETS-Lindgren         | 3115               | 3125   | 12                          | 25-Jul-2017     |
| Charge Amplifier                         | Endevco              | 133                | 3188   | 12                          | 29-Nov-2017     |
| Beacon Tester                            | WS Technologies      | BT100S             | 3263   | -                           | TU              |
| ESA-E Series Spectrum Analyser           | Agilent Technologies | E4402B             | 3348   | 12                          | 7-Sep-2016      |
| Cable (1m, N Type)                       | Rhophase             | NPS-1601-1000-NPS  | 3354   | 12                          | 6-May-2017      |
| Isotron Accelerometer                    | Endevco              | 256-10             | 3376   | 6                           | 16-Dec-2016     |
| Accelerometer                            | Endevco              | 256-10             | 3433   | 6                           | 15-Aug-2017     |
| Signal Analyser                          | Rohde & Schwarz      | FSQ 26             | 3545   | 12                          | 19-Aug-2016     |
| Vibration Controller (8 Ch)              | m + p International  | VibPilot 8         | 3777   | 12                          | 24-Jun-2017     |
| Vibration Controller (8 Ch)              | m + p International  | VibPilot 8         | 3778   | 12                          | 9-Sep-2017      |
| Vibration Controller (8 Ch)              | m + p International  | VibPilot 8         | 3780   | 12                          | 8-Sep-2017      |
| Isotron Accelerometer                    | Endevco              | 256-10             | 3789   | 6                           | 13-Jan-2017     |
| Isotron Accelerometer                    | Endevco              | 256-10             | 3803   | 6                           | 12-Jan-2017     |
| Accelerometer                            | Meggitt Endevco      | 256-10             | 4274   | 6                           | 17-Dec-2016     |
| Accelerometer                            | PCB Piezotronic      | 352C03             | 4330   | 6                           | 4-Jul-2017      |
| Accelerometer                            | PCB Piezotronic      | 352C03             | 4336   | 6                           | 17-Jul-2017     |
| 1 metre N-Type Cable                     | Florida Labs         | NMS-235SP-39.4-NMS | 4511   | 12                          | 2-Mar-2017      |
| 2 metre SMA Cable                        | Florida Labs         | SMS-235SP-78.8-SMS | 4518   | 12                          | 16-Feb-2017     |
| Beacon Tester                            | WS Technologies      | BT100S             | 4790   | 24                          | 22-Sep-2018     |



Product Service

| Instrument                               | Manufacturer         | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|------------------------------------------|----------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.6 Bump</b>                  |                      |                    |        |                             |                 |
| Beacon Tester                            | WS Technologies      | BT 100S            | 87     | -                           | TU              |
| Antenna (Double Ridge Guide, 1GHz-18GHz) | EMCO                 | 3115               | 235    | -                           | 2-Dec-2017      |
| Spectrum Analyser                        | Agilent Technologies | E4407B             | 1154   | 12                          | 26-Aug-2017     |
| Charge Amp                               | Endevco              | 133                | 2500   | 12                          | 26-Nov-2016     |
| Antenna (DRG Horn)                       | ETS-Lindgren         | 3115               | 3125   | 12                          | 25-Jul-2017     |
| Vibration System                         | Ling Dynamic Systems | 875                | 3170   | 6                           | 23-Nov-2016     |
| Cable (1m, N Type)                       | Rhophase             | NPS-1601-1000-NPS  | 3354   | 12                          | 6-May-2017      |
| Vibration Controller                     | m + p International  | Vibpilot 8         | 3771   | 12                          | 14-Jun-2017     |
| 1 metre N-Type Cable                     | Florida Labs         | NMS-235SP-39.4-NMS | 4511   | 12                          | 2-Mar-2017      |
| Isotron Accelerometer                    | PCB Piezotronic      | M353B18            | 4563   | 12                          | 11-Jan-2017     |
| Thermal Isotron Accelerometer            | PCB Piezotronic      | M353B18            | 4568   | 6                           | 1-Jul-2017      |
| Isotron Accelerometer                    | PCB Piezotronic      | M353B18            | 4582   | 12                          | 14-Jul-2017     |
| Isotron Accelerometer                    | PCB Piezotronic      | M353B18            | 4591   | 12                          | 11-Jan-2017     |
| Beacon Tester                            | WS Technologies      | BT100S             | 4790   | 24                          | 22-Sep-2018     |
| <b>Section 2.7 - Drop / Topple</b>       |                      |                    |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz) | EMCO                 | 3115               | 235    | -                           | 2-Dec-2017      |
| Spectrum Analyser                        | Agilent Technologies | E4407B             | 1154   | 12                          | 26-Aug-2017     |
| Montford F43                             | Montford             | 4FT CUBED          | 2126   | 12                          | 25-Nov-2017     |
| Lansmont                                 | Lansmont             | PDT 56E            | 2291   | -                           | TU              |
| Cable (1m, N Type)                       | Rhophase             | NPS-1601-1000-NPS  | 3354   | 12                          | 6-May-2017      |
| Tape Measure                             | Stanley              | Powerlock 33-443   | 4305   | -                           | TU              |
| Beacon Tester                            | WS Technologies      | BT100S             | 4790   | 24                          | 22-Sep-2018     |
| Montford F43                             | Montford             | 4FT CUBED          | 2126   | 12                          | 25-Nov-2017     |
| Lansmont                                 | Lansmont             | PDT 56E            | 2291   | -                           | TU              |
| Hardwood Block                           | Unknown              | ELM                | 2650   | -                           | TU              |
| 5m Tape Measure                          | Stanley              | Fatmax 5m          | 4024   | -                           | TU              |
| 10 meter Tape Measure                    | Stanley              | Fatmax 10m/33'     | 4072   | -                           | TU              |



Product Service

| Instrument                                       | Manufacturer          | Type No.             | TE No. | Calibration Period (months) | Calibration Due |
|--------------------------------------------------|-----------------------|----------------------|--------|-----------------------------|-----------------|
| <b>Section 2.8 Climatic - Thermal Shock</b>      |                       |                      |        |                             |                 |
| Montford F43                                     | Montford              | 4FT CUBED            | 2126   | 12                          | 25-Nov-2017     |
| Thermometer                                      | Digitron              | T208                 | 2340   | 12                          | 7-Nov-2017      |
| Thermocouple Data Logger                         | Pico Technology Ltd   | USB TC-08            | 3912   | 12                          | 13-Dec-2017     |
| Bench Scales                                     | Kern-Sohn             | CKE16K0.05           | 4647   | 12                          | 14-Mar-2018     |
| Climatic Chamber                                 | Aralab                | Aralab 1, 1000 ECP75 | 4718   | 12                          | OP MON          |
| Type T PFA Insulated Thermocouple                | TC Limited            | Type-T               | 4739   | 12                          | 24-Jun-2017     |
| <b>Section 2.9 Climatic - Altitude</b>           |                       |                      |        |                             |                 |
| Weiss Technik (T)                                | Weiss Technik         | WEISS ALT            | 2133   | 12                          | 10-Jan-2018     |
| <b>Section 2.10 Climatic - Immersion</b>         |                       |                      |        |                             |                 |
| Montford F43                                     | Montford              | 4FT CUBED            | 2126   | 12                          | 25-Nov-2017     |
| Thermometer                                      | Digitron              | T208                 | 2340   | 12                          | 7-Nov-2017      |
| 940 litre Tank                                   | Unknown               | 940 litre            | 3574   | -                           | TU              |
| 5m Tape Measure                                  | Stanley               | Fatmax 5m            | 4024   | -                           | TU              |
| Stop Watch                                       | Radio Spares          | Model 694 (974)      | 4026   | 0                           | 19-Sep-2017     |
| Bench Scales                                     | Kern-Sohn             | CKE16K0.05           | 4647   | 12                          | 14-Mar-2018     |
| Type T PFA Insulated Thermocouple                | TC Limited            | Type-T               | 4739   | 12                          | 24-Jun-2017     |
| <b>Section 2.11 Beacons - Spurious Emissions</b> |                       |                      |        |                             |                 |
| Climatic Chamber                                 | Heraeus Votsch        | VMT 04/30            | 40     | -                           | O/P Mon         |
| Digital Temperature Indicator + T/C              | Fluke                 | 51                   | 412    | 12                          | 2-Mar-2017      |
| Hygrometer                                       | Rotronic              | I-1000               | 2829   | 12                          | 4-Nov-2016      |
| Attenuator (20dB, 10W)                           | Aeroflex / Weinschel  | 23-20-34             | 3160   | 12                          | 10-Jun-2017     |
| Network Analyser                                 | Rohde & Schwarz       | ZVA 40               | 3548   | 12                          | 15-Sep-2017     |
| 1 metre N-Type Cable                             | Florida Labs          | NMS-235SP-39.4-NMS   | 4511   | 12                          | 2-Mar-2017      |
| PXA Signal Analyser                              | Keysight Technologies | N9030A               | 4653   | 12                          | 8-Oct-2016      |



Product Service

| Instrument                                       | Manufacturer            | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|--------------------------------------------------|-------------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.12 Beacons – Operating Lifetime</b> |                         |                    |        |                             |                 |
| Power Meter                                      | Hewlett Packard         | 436A               | 47     | 12                          | 14-Jul-2016     |
| 3dB/10W Attenuator                               | Texscan                 | HFP-50N            | 475    | 12                          | 4-Apr-2017      |
| Signal Generator                                 | Hewlett Packard         | 8663A              | 765    | 12                          | 9-Nov-2016      |
| Distress Beacon RF Unit                          | TUV SUD Product Service | -                  | 2445   | -                           | TU              |
| Termination (50ohm, 15W)                         | Diamond Antenna         | DL-30N             | 3098   | 12                          | 29-Mar-2017     |
| Attenuator (20dB, 10W)                           | Aeroflex / Weinschel    | 23-20-34           | 3159   | 12                          | 10-Jun-2017     |
| Bandpass Filter                                  | Trilithic               | 5BE406/35-1-AA     | 3207   | 12                          | 17-Sep-2016     |
| Time Interval Analyser                           | Yokogawa                | TA720 704510       | 3253   | 12                          | 12-Nov-2016     |
| ScopeCorder                                      | Yokogawa                | DL750 701210       | 3254   | 12                          | 10-Nov-2016     |
| Power Sensor                                     | Agilent Technologies    | 8482A              | 3290   | 12                          | 18-Jan-2017     |
| Cable (2m, N Type)                               | Rhophase                | NPS-1601-2000-NPS  | 3355   | 12                          | 9-Dec-2016      |
| Rubidium Frequency Standard                      | Symmetricom             | 8040C              | 3490   | 12                          | 22-Apr-2017     |
| 2 metre SMA Cable                                | Florida Labs            | SMS-235SP-78.8-SMS | 4518   | 12                          | 16-Feb-2017     |
| Bandpass Filter (1MHz)                           | KR Electronics          | 3219-SMA           | 4602   | 12                          | 12-Jul-2017     |



Product Service

| Instrument                                               | Manufacturer            | Type No.          | TE No. | Calibration Period (months) | Calibration Due |
|----------------------------------------------------------|-------------------------|-------------------|--------|-----------------------------|-----------------|
| <b>Section 2.13 Beacons - Constant Temperature Tests</b> |                         |                   |        |                             |                 |
| Power Meter                                              | Hewlett Packard         | 436A              | 83     | 12                          | 23-Sep-2017     |
| Rubidium Frequency Standard                              | Quartzlock              | A10-B             | 92     | 12                          | 27-Feb-2018     |
| Beacon RF Unit                                           | TUV SUD Product Service | N/A               | 97     | -                           | TU              |
| Termination (50ohm)                                      | Meca                    | 405-1             | 362    | 12                          | 14-Feb-2018     |
| Signal Generator (100kHz to 2.6GHz)                      | Hewlett Packard         | 8663A             | 1063   | 12                          | 17-Apr-2018     |
| Spectrum Analyser                                        | Agilent Technologies    | E4407B            | 1154   | 12                          | 26-Aug-2017     |
| Stop Clock                                               | R.S Components          | RS328 061         | 2674   | 12                          | 4-Jul-2017      |
| Hygrometer                                               | Rotronic                | I-1000            | 2829   | 12                          | 24-Nov-2017     |
| Attenuator (20dB, 10W)                                   | Aeroflex / Weinschel    | 23-20-34          | 3159   | 12                          | OP MON          |
| Attenuator (3dB, 20W)                                    | Aeroflex / Weinschel    | 23-03-34          | 3162   | 12                          | 14-Dec-2017     |
| Bandpass Filter                                          | Trilithic               | 5BE406/35-1-AA    | 3207   | 12                          | 19-Sep-2017     |
| Time Interval Analyser                                   | Yokogawa                | TA720 704510      | 3253   | 12                          | 15-Nov-2017     |
| ScopeCorder                                              | Yokogawa                | DL750 701210      | 3254   | 12                          | 10-Nov-2017     |
| Power Sensor                                             | Agilent Technologies    | 8482A             | 3290   | 12                          | 18-Jan-2018     |
| Cable (1m, N type)                                       | Rhophase                | NPS-1601-1000-NPS | 3350   | 12                          | 9-May-2018      |
| 'N' - 'N' RF Cable (1m)                                  | Rhophase                | NPS-1803-1000-NPS | 3701   | 12                          | 2-Mar-2018      |
| <b>Section 2.13 Beacons - Navigation System</b>          |                         |                   |        |                             |                 |
| Beacon Tester                                            | WS Technologies         | BT 100S           | 87     | -                           | TU              |
| Copper GRP                                               | TUV SUD Product Service | 27cm Diameter     | 3538   | -                           | TU              |
| Digital thermo Hygrometer                                | Radio Spares            | 1260              | 4300   | 12                          | 23-Aug-2017     |
| <b>Section 2.13 Beacons - Satellite Qualitative Test</b> |                         |                   |        |                             |                 |
| Beacon Tester                                            | WS Technologies         | BT 100S           | 87     | -                           | TU              |
| Copper GRP                                               | TUV SUD Product Service | 27cm Diameter     | 3538   | -                           | TU              |
| Digital thermo Hygrometer                                | Radio Spares            | 1260              | 4300   | 12                          | 23-Aug-2017     |
| <b>Section 2.15 - Oil Resistance</b>                     |                         |                   |        |                             |                 |
| Temperature Logger                                       | Digitron                | 2098T             | 2479   | 12                          | 26-Oct-2017     |
| Thermocouple                                             | TC Limited              | Type-T            | 4739   | 12                          | 24-Jul-2017     |
| Beacon Tester                                            | WS Technologies         | BT100S            | 4790   | 24                          | 22-Sep-2018     |



Product Service

| Instrument                                      | Manufacturer         | Type No.         | TE No. | Calibration Period (months) | Calibration Due |
|-------------------------------------------------|----------------------|------------------|--------|-----------------------------|-----------------|
| <b>Section 2.16 Climatic - Corrosion</b>        |                      |                  |        |                             |                 |
| Spectrum Analyser                               | Agilent Technologies | E4407B           | 1154   | 12                          | 26-Aug-2017     |
| Chamber                                         | Heraeus              | HC 4033          | 2174   | 12                          | 6-Jul-2017      |
| Balance                                         | Geniweigher          | GM-11K           | 2334   | 12                          | 21-Mar-2017     |
| pH Meter                                        | Jenway               | 3310             | 2335   | -                           | TU              |
| Data Logging Thermometer                        | Digitron             | 2098T            | 2348   | 12                          | 22-Oct-2016     |
| Measuring cylinder                              | Unknown              | 50mL             | 3136   | -                           | TU              |
| Beacon Tester                                   | WS Technologies      | BT100S           | 3263   | -                           | TU              |
| Receptacle (100mm dia Nominal)                  | Embee                | 100mm            | 3321   | -                           | TU              |
| Bench Scales                                    | Kern-Sohn            | CKE16K0.05       | 4647   | 12                          | 21-Mar-2017     |
| Hydrometer                                      | Brannen              | 1.00-1.05 g/ml   | 4672   | 12                          | 30-Oct-2016     |
| Salt Spray Test Chamber                         | Ascott               | S2000IS          | 4725   | 12                          | 30-Mar-2017     |
| Type T PFA Insulated Thermocouple               | TC Limited           | Type-T           | 4739   | 12                          | 24-Jun-2017     |
| <b>Section 2.17 EMC - Compass Safe Distance</b> |                      |                  |        |                             |                 |
| Sussex Helmholtz Coil                           | Various              | 88771            | 327    | -                           | TU              |
| Amplifier (1MHz-1GHz)                           | Amp Research         | 10W1000          | 331    | -                           | TU              |
| Magnetometer                                    | Bartington           | MAG01            | 671    | 36                          | 24-Feb-2018     |
| Marine Binacle Compass with Repeater Display    | Cassens & Plath      | Compass: Type 11 | 3834   | -                           | TU              |
| <b>Section 2.18 - Miscellaneous Tests</b>       |                      |                  |        |                             |                 |
| Sharp Edge Tester                               | TES TEC GmbH         | SET-50           | 2792   | -                           | TU              |



Product Service

| Instrument                                          | Manufacturer         | Type No.           | TE No. | Calibration Period (months) | Calibration Due |
|-----------------------------------------------------|----------------------|--------------------|--------|-----------------------------|-----------------|
| <b>Section 2.19 Beacons - GNSS - RTCM Scenarios</b> |                      |                    |        |                             |                 |
| Antenna (Double Ridge Guide)                        | EMCO                 | 3115               | 34     | 12                          | 2-Dec-2017      |
| Attenuator (10dB, 10W)                              | Texscan              | HFP-50N            | 468    | 12                          | 28-Jun-2018     |
| Spectrum Analyser                                   | Agilent Technologies | E4407B             | 1154   | 12                          | 26-Aug-2017     |
| Attenuator (10dB, 10W)                              | Trilithic            | HFP-50N            | 1377   | 12                          | 25-Oct-2017     |
| Hygrometer                                          | Rotronic             | I-1000             | 2882   | 12                          | 24-Nov-2017     |
| GPS/SBAS Simulator                                  | Spirent              | STR4500            | 3056   | 0                           | 30-Sep-2017     |
| Attenuator (20dB, 10W)                              | Aeroflex / Weinschel | 23-20-34           | 3158   | 12                          | 11-Jul-2018     |
| Beacon Tester                                       | WS Technologies      | BT100S             | 3263   | -                           | TU              |
| 0.92 to 2.2 GHz Coupler                             | Narda                | 3042B              | 4472   | 12                          | 8-Dec-2017      |
| 2 metre N-Type Cable                                | Florida Labs         | NMS-235SP-78.8-NMS | 4622   | 12                          | 12-Oct-2017     |

There was no applicable test equipment for section(s): 2.14

Note: some tests took place over one or more days and consequently it may appear that some of the test equipment could have been outside of the valid calibration period at the time of testing. However, we confirm that all equipment held a valid and in-date calibration when used, and we hold this information on record.

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



Product Service

## **SECTION 4**

### **PHOTOGRAPHS**

#### 4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



Front View



Back View



Product Service

## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

## **5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT**

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Product Service

## **ANNEX A**

### **LIMITED C/S TESTING (SUMMARY OF RESULTS)**



Product Service

## 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: #1763, TUV Ref: TSR0002 and Modification State 0 |                        |             |              |         |         |              |  |
| Transmitter power output                                              | (maximum)              | 35 - 39     | dBm          | N/T     | 37.72   | N/T          |  |
|                                                                       | (minimum)              |             |              | N/T     | 37.68   | N/T          |  |
| Power output rise time                                                | (maximum)              | < 5         | ms           | N/T     | 0.13    | N/T          |  |
|                                                                       | (minimum)              |             |              | N/T     | 0.10    | N/T          |  |
| Power output 1ms before burst                                         | (maximum)              | < -10       | dBm          | N/T     | -37.10  | N/T          |  |
|                                                                       | (minimum)              |             |              | N/T     | -38.35  | N/T          |  |
| 2. Digital Message Coding                                             |                        |             |              |         |         | Result: Pass |  |
| Model: SOS-300, S/N: #1763, TUV Ref: TSR0002 and Modification State 0 |                        |             |              |         |         |              |  |
| Bit Sync                                                              | 1 - 15                 | 15 bits “1” | P / F        | N/T     | P       | N/T          |  |
| Frame sync                                                            | 16 - 24                | “000101111” | P / F        | N/T     | P       | N/T          |  |
| Format flag                                                           | 25                     | 1 bit       | bit value    | N/T     | 1       | N/T          |  |
| Protocol flag                                                         | 26                     | 1 bit       | bit value    | N/T     | 0       | N/T          |  |
| Identification / position data                                        | 27 - 85                | 59 bits     | P / F        | N/T     | P       | N/T          |  |
| BCH code                                                              | 86 -106                | 21 bits     | P / F        | N/T     | P       | N/T          |  |
| Emerg. Code/nat. use/supplem. Data                                    | 107 - 112              | 6 bits      | bit value    | N/T     | 110110  | N/T          |  |
| Additional data / BCH (if applicable)                                 | 112 - 144              | 32 bits     | P / F        | N/T     | P       | N/T          |  |
| Position Error (if applicable)                                        |                        | < 5         | km           | N/T     | N/A     | N/T          |  |



Product Service

| 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: #1763, TUV Ref: TSR0002 and Modification State 0 |                                 |               |              |         |         |              |
| Repetition rate, T <sub>R</sub> :                                     |                                 |               |              |         |         |              |
| Average T <sub>R</sub>                                                | 48.5 ≤ T <sub>Ravg</sub> ≤ 51.5 | seconds       | N/T          | 49.795  | N/T     |              |
| Minimum T <sub>R</sub>                                                | 47.5 ≤ T <sub>Rmin</sub> ≤ 48.0 | seconds       | N/T          | 47.736  | N/T     |              |
| Maximum T <sub>R</sub>                                                | 52.0 ≤ T <sub>Rmax</sub> ≤ 52.5 | seconds       | N/T          | 52.338  | N/T     |              |
| Standard deviation                                                    | 0.5 - 2.0                       | seconds       | N/T          | 1.41    | N/T     |              |
| Bit rate                                                              |                                 |               |              |         |         |              |
| Minimum fb                                                            | ≥ 396                           | bits/sec      | N/T          | 399.92  | N/T     |              |
| Maximum fb                                                            | ≤ 404                           | bits/sec      | N/T          | 399.93  | N/T     |              |
| Total transmission time                                               |                                 |               |              |         |         |              |
| Short message                                                         | (maximum)                       |               | N/T          | N/T     | N/T     |              |
|                                                                       | (minimum)                       | 435.6 - 444.4 | ms           | N/T     | N/T     | N/T          |
| Long message                                                          | (maximum)                       |               | N/T          | 520.12  | N/T     |              |
|                                                                       | (minimum)                       | 514.8 - 525.2 | ms           | N/T     | 520.08  | N/T          |
| Unmodulated carrier                                                   |                                 |               |              |         |         |              |
| Minimum T1                                                            | ≥ 158.4                         | ms            | N/T          | 160.10  | N/T     |              |
| Maximum T1                                                            | ≤ 161.6                         | ms            | N/T          | 160.15  | N/T     |              |
| First burst delay                                                     | ≥ 47.5                          | seconds       | N/T          | N/T     | N/T     |              |



Product Service

| 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: #1763, TUV Ref: TSR0002 and Modification State 0 |                        |                             |              |         |             |                  |     |
| Biphase-L                                                             | P / F                  | P / F                       | N/T          | P       | N/T         |                  |     |
| (maximum)                                                             | 50 - 250               | µs                          | N/T          | 200.3   | N/T         |                  |     |
| Rise time                                                             | (minimum)              | 50 - 250                    | µs           | N/T     | 180.3       |                  | N/T |
| (maximum)                                                             | 50 - 250               | µs                          | N/T          | 196.7   | N/T         |                  |     |
| Fall time                                                             | (minimum)              | 50 - 250                    | µs           | N/T     | 180.6       |                  | N/T |
| (maximum)                                                             | +(1.0 to 1.2)          | radians                     | N/T          | 1.1458  | N/T         |                  |     |
| Phase deviation: positive                                             | (minimum)              | +(1.0 to 1.2)               | radians      | N/T     | 1.0513      |                  | N/T |
| (maximum)                                                             | -(1.0 to 1.2)          | radians                     | N/T          | -1.1474 | N/T         |                  |     |
| Phase deviation: negative                                             | (minimum)              | -(1.0 to 1.2)               | radians      | N/T     | -1.0528     |                  | N/T |
| Symmetry measurement                                                  | ≤ 0.05                 |                             | N/T          | 0.0202  | N/T         |                  |     |
| 5. 406 MHz Transmitted Frequency                                      |                        |                             |              |         |             | Result: Pass     |     |
| Model: SOS-300, S/N: #1763, TUV Ref: TSR0002 and Modification State 0 |                        |                             |              |         |             |                  |     |
| Nominal Value                                                         | (maximum)              | C/S T.001                   | MHz          | N/T     | 406.0399454 | N/T              |     |
|                                                                       | (minimum)              |                             |              | N/T     | 406.0399454 | N/T              |     |
| Short-term stability                                                  | (maximum)              | ≤ 2x10 <sup>-9</sup>        | /100ms       | N/T     | 77.192E-12  | N/T              |     |
|                                                                       | (minimum)              |                             |              | N/T     | 63.069E-12  | N/T              |     |
| Medium-term stability – Slope                                         | (maximum)              | (-1 to +1)x10 <sup>-9</sup> | /minutes     | N/T     | 36.179E-12  | N/T              |     |
|                                                                       | (minimum)              |                             |              | N/T     | 19.388E-12  | N/T              |     |
| Medium-term stability – Residual frequency variation                  | (maximum)              | ≤ 3x10 <sup>-9</sup>        |              | N/T     | 20.027E-11  | N/T              |     |
|                                                                       | (minimum)              |                             |              | N/T     | 18.176E-11  | N/T              |     |
| 6. Spurious Emissions into 50ohms                                     |                        |                             |              |         |             | Result: Pass     |     |
| Model: SOS-300, S/N: #15, TUV Ref: TSR0058 and Modification State 0   |                        |                             |              |         |             |                  |     |
| In band (406.0 – 406.1 MHz)                                           | C/S T.001 mask         | P / F                       | N/T          | P       | N/T         | See Section 2.11 |     |



Product Service

| Parameters to be Measured                                                             | Range of Specification                                                                   | Units  | Test Results  |     |             |     | Comments     |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------|---------------|-----|-------------|-----|--------------|
| 9. Thermal Shock                                                                      |                                                                                          |        |               |     |             |     | Result: Pass |
| Model: SOS-300, S/N: #1763, TUV Ref: TSR0002 and Modification State 0                 |                                                                                          |        |               |     |             |     |              |
| Soak Temperature                                                                      | 30°C difference                                                                          | °C     | +10           |     |             |     |              |
| Measurement Temperature                                                               |                                                                                          | °C     | -20           |     |             |     |              |
| Transmitted Frequency                                                                 | C/S T.001<br>≤ 2x10 <sup>-9</sup><br>(-2 to +2)x10 <sup>-9</sup><br>≤ 3x10 <sup>-9</sup> | MHz    | Max           |     | Min         |     |              |
| Nominal value                                                                         |                                                                                          |        | 406.0399860   |     | 406.0399841 |     |              |
| Short-term stability                                                                  |                                                                                          | /100ms | 13.895E-11    |     | 71.053E-12  |     |              |
| Medium-term stability – Slope                                                         |                                                                                          | /min   | 35.492E-11    |     | -85.203E-12 |     |              |
| Medium-term stability – Residual frequency variation                                  |                                                                                          |        | 97.712E-11    |     | 48.850E-11  |     |              |
| Transmitter power output                                                              | 35 - 39                                                                                  | dBm    | 38.05         |     | 37.42       |     |              |
| Digital message                                                                       | correct                                                                                  | P/F    | P             |     |             |     |              |
| 14. Satellite Qualitative Tests                                                       |                                                                                          |        |               |     |             |     | Result: Pass |
| Model: SOS-300, S/N: IMEI: 300434060816170, TUV Ref: TSR0046 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  | N/T           | N/T | N/T         | P   |              |
| Doppler Location results with error ≤ 5km                                             | ≥ 80                                                                                     | %      | N/T           | N/T | N/T         | 100 |              |

## **ANNEX B**

### **MANUFACTURER SUPPLIED INFORMATION**

Clause 4.3.1.3.3 Internal navigation device performance – IEC 61108 1 Waiver



May 25, 2017

Subject: SOS-300, marketed as SARLink SOS-300 Waiver Information

To Whom It May Concern:

ACR Electronics, Inc. hereby declares that GNSS circuitry used in SOS-300 is also used in previously tested and certified RLB-42, reference TUV test report 75928177 Report 05 per IEC 61108-1.

Based on the above information, ACR Electronics, Inc. requests that the IEC 61108-1 Internal Navigation Device Performance test be waived.

Please feel free to contact me if additional information is required.

Signed on behalf of ACR Electronics, Inc.

A handwritten signature in blue ink, appearing to read 'D. Stankovic'.

**Dan Stankovic**  
Director of Certification and Test  
T: +1 (954) 862-2175  
[Dan.Stankovic@acrartex.com](mailto:Dan.Stankovic@acrartex.com)

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### Battery Conditioning Information

| Parameter                            | Unit  | Value    | Limit    |
|--------------------------------------|-------|----------|----------|
| Operating current at -20 °C          | mA    | 32.6     |          |
| Rated life                           | h     | 24       |          |
| Required battery capacity            | mAh   | 782.4    |          |
| Nominal battery capacity             | mAh   | 1400     |          |
| Overhead                             | mAh   | 617.6    |          |
| Self-test Current                    | mA    | 102.68   |          |
| Self-test duration                   | s     | 10       |          |
| Self-tests per annum                 | -     | 12       |          |
| Self-test consumption per annum      | mAh   | 3.42     |          |
| GNSS Self-test Current               | mA    | 0        |          |
| GNSS Self-test duration              | s     | 0        |          |
| GNSS Self-tests per annum            | -     | 0        |          |
| GNSS Self-test consumption per annum | mAh   | 0.00     |          |
| Battery Self discharge               | %     | 1        |          |
| Battery Self discharge per annum     | mAh   | 14.00    |          |
| Standby current                      | A     | 4.32E-08 |          |
| Standby drain per annum              | mAh   | 0.38     |          |
| Total drain per annum                | mAh   | 17.80    |          |
| Useful Life                          | years | 34.70    |          |
| Expiry Date                          | years | 7        |          |
| Useful Life to Expiry Date ratio     | -     | 4.96     | $\geq 2$ |
| Loss over Expiry Date                | mAh   | 124.61   |          |
| Operating current (at Ambient)       | mA    | 36.60    |          |
| Extension factor, F (at Ambient)     | h     | 3.40     |          |

## Declarations

### ACR SOS-300: Verification of Compliance to Section 4.4.2 of RTCM 11010.2 (PLB Standard)

This document provides evidence that ACR Electronics has verified that the SOS-300 complies with Section 4.4.2 a), b), c), d), e) and f) of the RTCM Standard 11010.2 for 406 MHz Satellite Personal Locator Beacons (PLBs) dated June 9, 2014.

In particular, the following items have been verified at the minimum, ambient, and maximum operating temperatures on production units awaiting final approval for shipment.

#### *4.4.2 a) The PLB battery experiences full-load current drain during the Self-test:*

The current was measured during the self-test and compared to the current during a live transmission; the currents were found to be identical.

#### *4.4.2 b) Each self-test pass/fail indicator correctly identifies a fail condition when a failure in the monitored function has been induced:*

Each Self-Test failure condition was tested to ensure that a failure in that test would produce a Self-Test fail indication: a red LED flashed at the end of the test. The tests are briefly summarized below:

1. 406 MHz RF power – Tested by placing a wrong component in the circuit thus inducing a power mismatch in the 406 RF circuit and by disconnecting the 406 RF power input into the micro.
2. PLL Lock Detect – Tested by disconnecting a component in the PLL lock detect circuit so the signal oscillated and never locked.
3. Non-Volatile Memory (NVM) – Tested by writing the wrong checksum for the 406 message data into NVM.
4. GPS Module – Tested by both disconnecting the GPS module without any NMEA message injected on the GPS data line into the micro and disconnecting the GPS module and injecting the wrong NMEA message header into the micro's GPS data line.

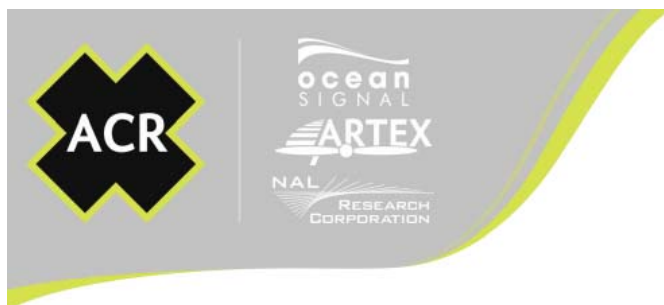
#### *4.4.2 c) Any transmission in either self-test mode is limited to one burst:*

Self-test or GNSS Self-Test runs only once and transmits only one 406 message. This was confirmed by running each test and picking up the Self-Test 406 transmission with the FPR-300 data logger and confirming that only one 406 transmission was detected; the unit power was also monitored and the unit turned off as expected after both Self-Tests.

#### *4.4.2 d) GNSS Self-Test mode is not provided with this beacon.*

#### *4.4.2 e) GNSS Self-Test mode is not provided with this beacon.*

#### *4.4.2 f) GNSS Self-Test mode is not provided with this beacon.*



 A Brand Of  
Drew Marine  
ACR Electronics, Inc.  
5757 Ravenswood Road  
Fort Lauderdale, FL 33312

## **ACR RTCM 11010.2 A.20.6 declaration**

July 6, 2017

Subject Print Labelling for SarLink SOS 300

Please be advised that labels used on the exterior of SarLink SOS 300 were passed testing for abrasion resistance, per RTCM 11010.2 (A.20.6), by ACR Electronics Inc. The same label printing process was widely used on numerous ACR products over many years without exhibiting degradation.

ACR Electronics Inc., hereby declares that the labels used on SarLink SOS 300 fully comply with the requirements of RTCM 11010.2, section A.20.6.

Thank you,

A handwritten signature in blue ink, appearing to read 'D. Stankovic'.

Dan Stankovic  
Director of Certification and Test  
ACR Electronics, Inc.

Photos

## SOS-300 Photos



Before the  
Federal Communications Commission  
Washington, D.C. 20554

|                                          |   |                     |
|------------------------------------------|---|---------------------|
| In the Matter of                         | ) |                     |
|                                          | ) |                     |
| ACR Electronics, Inc.                    | ) | WT Docket No. 15-85 |
|                                          | ) |                     |
| Request for Waiver of Section 95.1402(b) | ) |                     |

ORDER

Adopted: December 8, 2015

Released: December 8, 2015

By the Deputy Chief, Mobility Division, Wireless Telecommunications Bureau:

1. *Introduction.* On March 5, 2015, ACR Electronics, Inc. (ACR), filed a request for waiver of Section 95.1402(b) of the Commission's Rules<sup>1</sup> to permit equipment authorization and use of its 2-Way Communicator Personal Locator Beacon (SARLink), an emergency alerting device that is intended to provide a means for individuals in remote areas to alert others of an emergency situation and to aid search and rescue (SAR) personnel to locate those in distress.<sup>2</sup> As discussed below, we grant the waiver request subject to the conditions set forth herein.

2. *Background.* The SARLink provides two-way text messaging and tracking capability through the Iridium satellite system, and distress alerting on the 406-406.1 MHz (406 MHz) COSPAS-SARSAT satellite system.<sup>3</sup> In its waiver request, ACR characterizes the device as a Personal Locator Beacon (PLB).<sup>4</sup> PLBs are emergency radiobeacons intended for use by individuals in remote areas, which transmit a distress signal on 406 MHz for communication with the COSPAS-SARSAT satellite system and a lower-powered signal on frequency 121.5 MHz that is used by SAR personnel as a homing beacon to help locate persons in distress. PLBs must conform to the Radio Technical Commission for Maritime Services (RTCM) standard that contains minimum requirements for PLBs' functional and technical performance.<sup>5</sup>

<sup>1</sup> 47 C.F.R. § 95.1402(b).

<sup>2</sup> Request for Waiver, filed March 5, 2015, by ACR Electronics, Inc. (Request).

<sup>3</sup> COSPAS-SARSAT is an international satellite-based SAR system established by Canada, France, Russia, and the United States. COSPAS is an acronym for a Russian phrase meaning space system for search and distress vessels; SARSAT stands for Search and Rescue Satellite Aided Tracking.

<sup>4</sup> See Request at 1.

<sup>5</sup> Section 95.1402 requires PLBs to meet the requirements in RTCM Recommended Standards for 406 MHz Satellite Personal Locator Beacons (PLBs), Version 1.1, RTCM Paper 76-2002/SC110-STD, dated June 19, 2002, but RTCM has revised the standard and the Commission has proposed to amend the rule to require PLBs to meet the requirements in RTCM Standard 11010.2 for 406 MHz Satellite Personal Locator Beacons, with Amendment 1 and Amendment 2, dated June 8, 2012 (RTCM 11010.2). See Amendment of the Commission's Rules Regarding Maritime Radio Equipment and Related Matters, *Notice of Proposed Rulemaking*, WT Docket No. 14-36, 29 FCC Red 2516, 2521 ¶ 13 (2014). ACR states that the SARLink complies with the RTCM 11010.2 standard.

3. ACR requests a waiver of Section 95.1402(b) because the SARLink does not include a 121.5 MHz beacon. ACR asserts that two-way text messaging capability will provide better distress alerting and locating assistance than a 121.5 MHz homing beacon because SARLink users will be able to text SAR personnel directly and provide location such as physical landmarks and obstacles, and provide important details regarding the emergency, such as the number of people involved and the number and nature of any injuries.<sup>6</sup> ACR argues that certification and use of the SARLink will save lives and reduce the cost of rescues, and is therefore in the public interest.<sup>7</sup>

4. The U.S. Coast Guard and the U.S. SARSAT Program (USCG/SARSAT) submitted joint comments expressing concerns about the waiver request.<sup>8</sup> They state that the lack of a 121.5 MHz homing signal is only mitigated by the text messaging and continuous tracking capability of the Iridium device, and therefore does not increase risk to the safety of the user, when users are highly trained and the distress text messages are routed to a command center with full-time staffing.<sup>9</sup> Consequently, USCG/SARSAT request that the SARLink be approved for use only by government (Federal, State, or local) agencies and high-risk commercial industry entities where potential users are certified and highly trained with an organized support activity or call center to manage and respond to distress calls.<sup>10</sup>

5. In response, ACR explained that the SARLink was developed in conjunction with Federal agencies and high-risk industry representatives to meet the requirements of the performance of their duties, in which case SARLink users would be highly trained and text messages would be routed to a center with full-time staffing.<sup>11</sup> The regular day-to-day use of the device consists of tracking and messaging via the Iridium satellite system, which are predicated on the use of an enterprise back-end platform that is managed through a command and control center.<sup>12</sup> The SARLink adds a 406 MHz COSPAS-SARSAT distress beacon to these functions for use in emergencies.<sup>13</sup>

6. ACR concurs with USCG/SARSAT that sale and use of the SARLink should be limited to government (Federal, State, or local) agencies and high-risk industry entities where potential users are properly trained and where there is an organized support activity or call center to manage and respond to calls, but requests that non-governmental organizations (NGOs) be included among the permitted users.<sup>14</sup> In addition, to ensure that users realize that the device lacks a 121.5 MHz homing beacon, ACR offers to label the device with, and include in the packaging and manual, a notice that the device does not include a

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<sup>6</sup> See Request at 2-3.

<sup>7</sup> *Id.* at 2.

<sup>8</sup> See Comments of the United States Coast Guard and the United States SARSAT Program, received August 18, 2015 (USCG/SARSAT Comments). The Wireless Telecommunications Bureau's Mobility Division sought comment on the ACR waiver request. See Wireless Telecommunication Bureau Seeks Comment on ACR Electronics, Inc. Request for Waiver to Permit Certification and Use of Personal Locator Beacon with Texting Capability in Lieu of 121.5 MHz Homing Signal, *Public Notice*, WT Docket No. 15-85, 30 FCC Rcd 2924 (WTB MD 2015). USCG/SARSAT filed the only comments. ACR filed reply comments. See ACR Electronics, Inc. Reply to Comments dated August 19, 2015 (ACR Reply Comments); and Reply to Comments dated October 16, 2015 (ACR Supplemental Reply Comments).

<sup>9</sup> See USCG/SARSAT Comments at 1-2.

<sup>10</sup> *Id.* at 3.

<sup>11</sup> See ACR Reply Comments at 1-2; ACR Supplemental Reply Comments at 2.

<sup>12</sup> See ACR Supplemental Reply Comments at 2.

<sup>13</sup> *Id.*

<sup>14</sup> See ACR Reply Comments at 2-3; ACR Supplemental Reply Comments at 2.

121.5 MHz homing beacon.<sup>15</sup> ACR also agrees not to market or otherwise offer the SARLink as a PLB,<sup>16</sup> and that it will not sell it via any retail outlets.<sup>17</sup>

7. *Discussion.* Section 1.925 of the Commission's Rules provides that we may grant a waiver if it is shown that (a) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and grant of the requested waiver would be in the public interest; or (b) in light of unique or unusual circumstances, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative.<sup>18</sup> We conclude that ACR has met the first prong.

8. The 121.5 MHz homing beacon is intended to help locate persons in distress. While the SARLink does not include the homing beacon, the global communications capabilities of the Iridium transceiver in the SARLink will allow SAR personnel to receive location information, including physical landmarks and obstacles directly, from the user. In addition, the SARLink will be sold directly by ACR to government agencies and high-risk entities, and will not be sold to the general public via retail outlets. Finally, all users will be required to have a trained organized support activity or call center. We believe that these circumstances render the device a safe and reliable alternative to a PLB.

9. We therefore grant the requested waiver to permit use of the SARLink, subject to the following conditions:

- Eligibility is limited to government (Federal, State and local) agencies and high-risk commercial industry (including NGOs) where potential users are certified and trained, and with an organized support activity or call center to manage and respond to messages. Any offer for sale or lease of the SARLink will state these eligibility limits.
- The SARLink will be labeled with a notice that the device does not include a 121.5 MHz homing beacon. Such a notice also will be included in the packaging and manual.
- The SARLink will not be marketed or otherwise offered as a Personal Locator Beacon or PLB, and will not be sold via retail outlets.

10. ACR must obtain equipment authorization for the SARLink. A copy of this *Order* shall be submitted with the equipment authorization application.

11. *Conclusion.* We therefore grant the request of ACR Electronics, Inc. for waiver of Section 95.1402(b) to permit the equipment authorization and use of its SARLink device, subject to the conditions set forth above.

12. Accordingly, IT IS ORDERED, pursuant to Sections 4(i) and 303(i) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(i), and Section 1.925 of the Commission's Rules, 47 C.F.R. § 1.925, that the waiver request filed by ACR Electronics, Inc. on March 5, 2015 IS GRANTED SUBJECT TO THE CONDITIONS set forth in paragraph 9.

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<sup>15</sup> See ACR Reply Comments at 2.

<sup>16</sup> *Id.*

<sup>17</sup> See ACR Supplemental Reply Comments at 2.

<sup>18</sup> 47 C.F.R. § 1.925(b)(3); see also *WAIT Radio v FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

13. This action is taken under delegated authority pursuant to Sections 0.131 and 0.331 of the Commission's Rules, 47 C.F.R. §§ 0.131, 0.331.

FEDERAL COMMUNICATIONS COMMISSION

Scot Stone  
Deputy Chief, Mobility Division  
Wireless Telecommunications Bureau