

# Report on the Testing of the Ocean Signal Limited EPIRB3 Pro Emergency Position Indicating Radio Beacon

In accordance with RTCM 11000.5

Prepared for: Ocean Signal Ltd  
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## COMMERCIAL-IN-CONFIDENCE

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Authorised Signatory	Martin Hardy	20 October 2022	A handwritten signature of "M. I. Hardy" in black ink.

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with the limited clauses tested to RTCM 11000.5



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## 1 Report Summary

### 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	20 October 2022

**Table 1**



## 1.2 Introduction

Applicant / Manufacturer	Ocean Signal Limited
Model Number(s) Under Test	EPIRB3 Pro, EPIRB3 (limited clauses)
Manufacturer Declared Variant*	EPIRB2 Pro, EPIRB2
Serial Number(s)	TA000004 TA000013 TA000010 TA000015 TA000011 TA000019 TA000020 TA000021
Number of Samples Tested	8
Test Specification/Issue/Date	RTCM 11000.5 Oct 11, 2021~
Order Number	PO 37718
Date	11-April-2022
Date of Receipt of EUT	30-March-2022
Start of Test	16-March-2022
Finish of Test	07-September-2022
Related Document(s)	IEC 60945 RTCM 11000.5 IEC 61097-2:2021/COR1:2021
Name of Engineer(s)	Matt Sellers, Matt Bushell, Chris Bland, Shaun Carter, Paul Adams, Tony Fominson, Stuart Mooney, Tony Castle, Frank Van Niekerk and Colin Hedley

\*Refer to Manufacturer document 5.(q) Differences Between Beacon Model Variants.pdf.

~The RTCM 11000.5 Oct 11, 2021 standard is based upon the IEC 61097-2 Edition 4.0 standard and the majority of the RTCM requirements align with this standard. This document covers the additions, exceptions and changes to the IEC61097-2 standard as required by RTCM 11000.5 and includes the cross references where applicable to necessary relevant test data from the base standard.



### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with RTCM 11000.5 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
2.1	2.1	Operational Requirements	-	-
2.2	2.2	General	-	-
2.3	2.2.1	Self-test	-	-
2.4	2.2.2	GNSS self-test (Group 1 only)	-	Applicable to EPIRB2 Pro and EPIRB2 only.
2.5	2.2.3	Float free mechanism	-	-
2.6	2.2.4	Documentation	Satisfactory	
2.7	2.2.5	Labelling	Satisfactory	
2.8	2.2.6	VDRs	N/A	VDR not supported.
2.9	3.1	Summary of Technical Characteristics Requirements	-	-
2.10	3.2	Electrical Performance details (IEC 61097-2 Ed 4, Clause 5)	-	-
2.11	3.2.1	406 MHz digital message (IEC 61097-2 Ed 4, Clause 5.4)	-	-
2.12	3.2.2.1	Auxiliary radio-locating device – 121.5 MHz homing signal	-	-
2.13	3.3.2.2	Auxiliary radio-locating device – AIS locating signal	-	-
2.14	3.2.3	Message content and timing	-	-
2.15	3.2.4	406 MHz emissions limitations	-	-
2.16	Annex A	Annex A – Environmental and Operational Performance test procedure for approval of 406 MHz EPIRBs	-	-
2.17	A.1	Annex A – Documentation	Satisfactory	-
2.18	A.2	Annex A – Labelling	Satisfactory	-
2.19	A.3	Annex A – Spurious emissions	-	-
2.20	Annex C	Standard for a 406 MHz EPIRB without a float free mechanism	-	-
2.21	D.1	Internal and external navigation devices – External navigation devices	N/A	-
2.22	D.2	Internal and external navigation devices – Internal navigation devices	-	-

Table 2



## 1.4 Application Form

Beacon* Manufacturer and Beacon Model	
Beacon Manufacturer	Ocean Signal Ltd, ACR Electronics Inc.
Beacon Manufacturer's Address	Ocean Signal Ltd, Unit 4 Ocivan Way, Margate, Kent, CT9 4NN, UK ACR Electronics Inc, 5757 Ravenswood Road, Fort Lauderdale, FL 33312, USA
AIS Beacon Model Name	RLB-44 , EPIRB3 Pro, EPIRB3
Additional AIS Beacon Model Names	GlobalFix V5, SafeSea EPIRB3 Pro, rescueME EPIRB3
Non-AIS Beacon Model Name	RLB-43 , RLB-45, EPIRB2 Pro, EPIRB2
Additional Non-AIS Beacon Model Names	GlobalFix V6, GlobalFix V6 (Manual), rescueME EPIRB2 Pro, rescueME EPIRB2

**\*Note:** Unless stated otherwise, the term "Beacon" applies to both AIS and Non-AIS variants

Beacon Type and Operational Configurations		
Beacon Type	Beacon Used While	Tick Where Appropriate (X)
EPIRB Float Free	Floating in water or on deck or in a safety raft	X
EPIRB Non-Float Free (automatic and manual activation)	Floating in water or on deck or in a safety raft	X
EPIRB Non-Float Free (manual activation only)	Floating in water or on deck or in a safety raft	
EPIRB Float Free with VDR	Floating in water or on deck or in a safety raft	
PLB	On ground and above ground	
	On ground and above ground and floating in water	
	On ground, above ground, and on a personal floatation device**	
ELT Survival	On ground and above ground	
	On ground and above ground and floating in water	
ELT Auto Fixed	Fixed ELT with aircraft external antenna	



ELT(DT)	Distress Tracking ELT with aircraft external antenna	
ELT Auto Portable	In aircraft with an external antenna	
ELT Auto Deployable	On ground, above ground, or in a safety raft with an integrated antenna	
Other (specify)	Deployable ELT with attached antenna	N/A

\*\* Applicable only to PLBs with integral antennas operated while attached to personal flotation devices (e.g. lifejackets) where the PLB and its antenna are mounted on PFD in such a position, that, in the nominal mode of operation, they are kept above water.

Beacon Characteristics		
Characteristic	Declared Value	
Operating frequency (406 MHz operating channel = 406.nnn)	406. <b>031</b> MHz	
Operating temperature range	Tmin = <b>-20</b> °C	Tmax= <b>55</b> °C
Temperature, at which minimum duration of continuous operation is expected (Submit C/S T.007 Section 5, part s, if applicable)	Tmin ✓	OR Other (-20°C) N/A
Manufacturer-declared Minimum Operating Lifetime*	No Yes No No N/A	24 hours, or 48 hours, or 168 hours, or Other hours Other hours, (specify)
* this value is specified by National Administrations or International Organisations		
Beacon power supply type (internal non-rechargeable, internal re-chargeable, external, combined, other)	Internal non-rechargeable	
External power supply parameters (AC/DC, nominal voltage, nominal minimum and nominal maximum voltage)	Current (AC / DC): Nominal Voltage (V): Nominal Minimum Voltage (V): Nominal Maximum Voltage (V):	N/A N/A N/A N/A
Is external power supply needed to energise the beacon or its ancillary devices in any of operational modes (N/A or Yes or No)	No	
Battery cell chemistry	Lithium Iron Disulphide	
Battery cell model name, cell size, number of cells in a battery pack, and details of the battery pack electrical configuration	Cell Model Name: Cell Size: Number of Cells in Battery Pack: Details of the battery pack electrical configuration:	L91 50.5mm x 14.5mm dia 6 3 series packs of 2 cells in series (6 cells in series)



Battery cell manufacturer	Energizer	
Battery pack manufacturer and part number	Battery Pack Manufacturer Name:	Ocean Signal Ltd and/or ACR Electronics Inc
	Battery Pack Part Number:	901S-03925
Beacon manufacturers declared maximum allowed cell shelf-life (from date of cell manufacture to date of battery pack installation in the beacon)	2	years
Declared beacon battery replacement period (from date of installation in the beacon to expiry date marked on the beacon)	10.5	years
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO	
Oscillator manufacturer	Rakon	
Oscillator model name/ part number	Model Name:	E6907LF
	Part Number:	E6907LF
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes	
Beacon Antenna type: Integral or Other (e.g. External, Detachable – specify type)	Integral	
Beacon Antenna manufacturer	Ocean Signal Ltd and/or ACR Electronics Inc	
Beacon Antenna part name and part number (OEM, if applicable, and beacon manufacturer's)	OEM Model Name:	N/A
	OEM Part Number:	N/A
	Beacon Manufacturer's Model Name:	130S-03877 (RLB-43, RLB-44, RLB-45) / 130S-03273 (EPIRB3 Pro, EPIRB2 Pro) / 130S-01404 (EPIRB3, EPIRB2)
	Beacon Manufacturer's Part Number:	130S-03877 (RLB-43, RLB-44, RLB-45) / 130S-03273 (EPIRB3 Pro, EPIRB2 Pro) / 130S-01404 (EPIRB3, EPIRB2)
Beacon Antenna cable assembly min/max RF- losses at 406 MHz, if applicable	Minimum loss (dB):	N/A
	Maximum loss (dB):	N/A
Navigation device type (Internal, External or None)	Internal	
Features in beacon that prevent degradation to 406 MHz signal or other beacon performances resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	Yes	
Features in beacon that ensure erroneous position data is not encoded into the beacon message (Yes, No or N/A)	Yes	
Navigation device capable of supporting global coverage (Yes, No or N/A)	Yes	
Encoded position update capability (Yes, No, N/A) and	Yes	
Encoded position update interval value (range)	3:57.5 to 15:00	minutes:seconds
For Internal Navigation Devices		



Geodetic reference system (WGS 84 or GTRF)	WGS 84	
GNSS receiver cold start forced at every beacon activation (Yes or No)	Yes	
Navigation device manufacturer	Ublox	
Navigation device model name and part Number	Model Name:	MAX-M8Q
	Part Number:	MAX-M8Q
Internal navigation device antenna type(integrated, internal, external, passive/active), manufacturer and model	Internal, AEL Crystals Ltd, DAE1575R1820A	
GNSS system supported (e.g. GPS, GLONASS, Galileo)	GPS, Galileo	
For External Navigation Devices		
Data protocol for GNSS receiver to beacon interface	N/A	
Physical interface for beacon to navigation device	N/A	
Electrical interface for beacon to navigation device	N/A	
Part number of the external navigation interface device (if applicable)	N/A	
Navigation device model and manufacturer (if beacon designed to use specific devices)	N/A	
Self-Test Mode Characteristics:	Self-Test Mode	Optional GNSS Self-test Mode
Activated by a separate switch/ separate switch position (Yes or No)	Yes	Yes
Self-test/GNSS self-test mode switch automatically returns to normal position when released (Yes or No)	Yes	Yes
Self-test/ GNSS self-test activation can cause an operational mode transmission (Yes or No)	No	No
Results in transmission of a single self-test burst only, regardless of how long the self-test activation mechanism is applied (Yes or No)	Yes	Yes
Results of self-test / GNSS self-test are indicated by (provide details, e.g. Pass / Fail indicator light, strobe light, etc.)	Indicator LED / Strobe	Indicator LED / Strobe
The content of the encoded position data fields of the self-test message has default values	Yes	No
Performs an internal check and indicates that RF-power is being emitted at 406 MHz and 121.5 MHz, if beacon includes a 121.5 Hz homer (Yes or No)	Yes	No
Self-test results in transmission of a signal other than at 406 MHz (Yes & details or No)	Yes, 121.5MHz for 1sec, AIS(where applicable)	Yes, AIS(where applicable)
Self-test can be activated directly at beacon (Yes or No)	Yes	Yes



List of Items checked by self-test	406 Freq Generation & RF Power, AIS Freq Generation & RF Power (where applicable), 121.5 RF Power, Battery Status, GNSS Module status		GNSS, AIS(where applicable)*,406* *(The GNSS self-test is limited to checking operation of the internal GNSS receiver; if a fix is acquired during the test the beacon shall encode the position and perform a burst of 8 AIS test transmissions followed by a 406MHz test transmission. If a fix is not obtained the beacon shall not perform any transmission).
Self-test/ GNSS self-test 406 MHz burst duration (440 or 520 ms)	520ms	520ms	
Self-test message length format flag in bit 25, ("0" or "1")	1	1	
Maximum duration of a self-test mode, sec	16	140	
Maximum recommended number of self-tests / GNSS self-tests during battery pack replacement period (as applicable)	120	60	
Distinct indication of self-test start (Yes or No)	Yes	Yes	
Indication of self-test results (Yes or No)	Yes	Yes	
Distinct indication of insufficient battery capacity (Yes or No)	Yes	N/A	
Automatic termination of self-test mode immediately after completion of the self-test cycle (Yes or No)	Yes	Yes	
GNSS Self-test results in transmission of a single burst, irrespectively of the test result (Yes or No)	N/A	No	
Self-test / GNSS self-test can be activated from beacon remote activation points (Yes & details or No)	No	No	
List all methods of Self-test mode and GNSS Self-test modes activation. Provide details on a separate sheet to describe	Test key only		Test key only
Repetitive Automated Interrogation of a Beacons Status (Yes & details per section 5.1, item (y), or No)	No		
Message Coding Protocols	Protocol Option	Tick Where Appropriate (X)	
User Protocol	Maritime with MMSI		
	Maritime with Radio Call Sign		
	EPIRB Float Free with Serial Number		
	EPIRB Non Float Free with Serial Number		
	Radio Call Sign		
	Aviation		
	ELT with Serial Number		



	ELT with Aircraft Operator and Serial Number	
	ELT with Aircraft 24-bit Address	
	PLB with Serial Number	
	National (Short Message Format)	
	National (Long Message Format)	
Standard Location Protocol	EPIRB with MMSI	X
	EPIRB with Serial Number	X
	ELT with 24-bit Address	
	ELT with Aircraft Operator Designator	
	ELT with Serial Number	
	PLB with Serial Number	
National Location Protocol	National Location: EPIRB	
	National Location: ELT	
	National Location: PLB	
ELT(DT) Location Protocol	ELT with Serial Number	
	ELT with Aircraft Operator and Serial Number	
	ELT with Aircraft 24-bit Address	
	ELT with Serial Number and 3LD in PDF-2	
	ELT with Aircraft 24-bit Address and 3LD in PDF-2	
RLS Location Protocol (TAC or NRN and Serial Number)	EPIRB	X
	ELT	
	PLB	
RLS Location Protocol (MMSI)	EPIRB	X
	PLB	
User Location Protocol	Maritime with MMSI	
	Maritime with Radio Call Sign	
	EPIRB Float Free with Serial Number	
	EPIRB Non Float Free with Serial Number	
	Radio Call Sign	
	Aviation	
	ELT with Serial Number	
	ELT with Aircraft Operator and Serial Number	
	ELT with Aircraft 24-bit Address	



	PLB with Serial Number																							
Other Declarations	Declared Value																							
Beacon includes a homer transmitter(s) (Yes or No)	Yes																							
- homer transmitter(s) frequency and power	<table border="1"> <tr> <td>Frequency</td> <td>Power (dBm)</td> <td>Yes / No</td> </tr> <tr> <td>121.5 MHz</td> <td>16dBm ±2dBm</td> <td>Yes</td> </tr> <tr> <td>243.0 MHz</td> <td>N/A</td> <td>No</td> </tr> <tr> <td>AIS(where applicable)</td> <td>31.5 ±0.5dBm</td> <td>Yes</td> </tr> <tr> <td>Other (MHz)</td> <td>N/A</td> <td>No</td> </tr> <tr> <td>N/A</td> <td>N/A</td> <td>No</td> </tr> <tr> <td>Description:</td> <td>N/A</td> <td></td> </tr> </table>	Frequency	Power (dBm)	Yes / No	121.5 MHz	16dBm ±2dBm	Yes	243.0 MHz	N/A	No	AIS(where applicable)	31.5 ±0.5dBm	Yes	Other (MHz)	N/A	No	N/A	N/A	No	Description:	N/A			
Frequency	Power (dBm)	Yes / No																						
121.5 MHz	16dBm ±2dBm	Yes																						
243.0 MHz	N/A	No																						
AIS(where applicable)	31.5 ±0.5dBm	Yes																						
Other (MHz)	N/A	No																						
N/A	N/A	No																						
Description:	N/A																							
homer transmitter(s) duty cycle	50 - 98 (121.5MHz)	%																						
duty cycle of homer swept tone	35 (121.5MHz)	%																						
Beacon includes a high intensity flashing light (e.g. Strobe)	Yes																							
- light intensity	>0.5	cd																						
- flash rate	24	flashes per minute																						
Beacon transmission repetition period satisfies C/S T.001 requirement that two beacon's repetition periods are not synchronised closer than a few seconds over 5 minute period, and the time intervals between transmissions are randomly distributed on the interval 47.5 to 52.5 seconds (Yes or No)	Yes																							
Other ancillary devices (e.g. voice transceiver, remote control, external audio and light indicators, external activation device). List details on a separate sheet if insufficient space to describe.	Yes, non-visible IR strobe																							
Beacon includes automatic activation mechanism (Yes or No). Specify type of automatic beacon activation mechanism	<table border="1"> <tr> <td>Yes / No :</td> <td>Yes (except RLB-45)</td> </tr> <tr> <td>Description:</td> <td>Water contacts (except RLB-45)</td> </tr> </table>	Yes / No :	Yes (except RLB-45)	Description:	Water contacts (except RLB-45)																			
Yes / No :	Yes (except RLB-45)																							
Description:	Water contacts (except RLB-45)																							
Beacon includes a voice-transceiver (Yes or No), and if Yes specify:	<table border="1"> <tr> <td>Yes / No :</td> <td>No</td> </tr> </table>	Yes / No :	No																					
Yes / No :	No																							
Voice transmitter nominal output power	If Yes, specify: (dBm)	N/A																						
Voice transmitter operating frequencies	If Yes, specify: (MHz)	N/A																						
- provides prevention against continuous operation of voice transmitter (Yes or No), and if Yes specify:	Yes / No :	N/A																						
- maximum continuous voice-transmission operation ("time-out timer")	"Time-out timer" (minutes):	N/A																						
- maximum cumulative transmit-mode on-time ("On time")	On time (hours : minutes):	N/A																						
Beacon includes features and functions not listed above, related or non-related to 406 MHz (Yes or No). List features and use a separate sheet if insufficient space	<table border="1"> <tr> <td>Yes</td> <td></td> </tr> <tr> <td>Description:</td> <td>Near-Field Communication (NFC)</td> </tr> </table>	Yes		Description:	Near-Field Communication (NFC)																			
Yes																								
Description:	Near-Field Communication (NFC)																							



AIS Beacon model hardware part number (P/N) and version	900S-03858 Issue 01.00 (RLB-44, GlobalFix V5), 900S-03887 Issue 01.00 (EPIRB3 Pro, SafeSea EPIRB3 Pro), 900S-03886 Issue 01.00 (EPIRB3, rescueME EPIRB3)	
Non-AIS Beacon model hardware part number (P/N) and version	RLB-43: 900S-03888 Issue 01.00, RLB-45: 900S-03889 Issue 01.00, EPIRB2 Pro: 900S-03485 Issue 01.00, EPIRB2: 900S-03483 Issue 01.00	
Beacon model firmware P/N, version, date of issue/releases	500S-03885 Issue 00.03.00, Release date 07/04/2022 Tested Version. Production version Issue 01.00 01/06/2022	
Beacon model software P/N, version, date of issue/releases	N/A	
Beacon model printed circuit board P/N and version	101S-03721 Issue 01.00	
Beacon model multiple programmable options, except message coding protocols (Yes/No)	<p>No</p> <p>If Yes, List all programmable options associated with this type-approval application:</p> <hr/> <hr/> <hr/> <hr/>	
Known non-compliances with C/S T.001 requirements (Yes or No). If Yes, provide details (Submit C/S T.007 Section 5, part t, if applicable)	No	
Beacon Manufacturer Point of Contact (POC) for this Type Approval application:		
Name and Job Title:	Mark Newton / Approvals Manager	
Phone:	+44 1843 808028	
E-mail:	<a href="mailto:mark.newton@oceansignal.com">mark.newton@oceansignal.com</a>	

Dated(*)	06-10-2022
Signed(*)	A handwritten signature in black ink, appearing to read "Mark Newton".
(Name, Position and Signature of Beacon Manufacturer Representative)	Mark Newton / Approvals Manager

## 1.5 Product Information

### 1.5.1 Technical Description

The Equipment Under Test (EUT) was an Ocean Signal Ltd EPIRB3 Pro as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



**Figure 1 - Equipment Under Test**

The EUT was powered by the battery packs which form part of the equipment (901S-03925) as per IEC 61097-2 clause 6.1.3.

During the IEC 61097-2 testing the conducted test samples were configured so that the antenna port was connected to the  $50\Omega$  test system using a coaxial cable. Radiated samples were fully packaged beacons, similar to the proposed production beacons equipped with its proper antenna, and the homing frequency was offset to 121.65 MHz.

In accordance with IEC 61097-2 clause 6.1.6: EUT does not support external navigation data. The EUT supports RFID when in standby mode only and requires manual interrogation. This has been considered during the EMC testing (refer to TUV SUD document 75952867 report 04 (EMC)). Whilst the EUT supports RLS functionality, the protocol of the EUT was standard location test throughout the environmental testing due to the need to coordinate with more than one authority, however the RLS functionality loading on the battery was assessed during the Cospas-Sarsat testing (A.2.12): refer to TUV SUD document 75952867 Report 01.



#### **1.6 Deviations from the Standard**

Refer to TUV SUD document 75952867 report 06.

#### **1.7 EUT Modification Record**

Refer to TUV SUD document 75952867 report 06.

#### **1.8 Test Location**

Refer to TUV SUD document 75952867 report 06.



## 2 Test Details

### 2.1 Operational Requirements

#### 2.1.1 Specification Reference

RTCM 11000.5, Clause 2.1

*The requirements of IEC 61097-2 Ed 4.0 Clause 4 Performance Requirements shall apply apart from the exception, additional and changes as per clauses 2.1 – 2.2.6 of RTCM 11000.5.*

For IEC 61097-2 assessment refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report for the EPIRB3 Pro and EPIRB3 (where applicable)).

For C/S T.007 assessment refer to:

TUV SUD document 75952867 report 01 (C/S T.007 for the EPIRB3 Pro and EPIRB3) and

TUV SUD document 75952867 report 02 (C/S T.007 for the EPIRB2 Pro and EPIRB2).

For the exceptions, additions and changes as per clauses 2.1 – 2.2.6 of RTCM 11000.5 refer to section 2.2 – 2.8 of the present documents.



## 2.2 General

### 2.2.1 Specification Reference

RTCM 11000.5, Clause 2.2

The Manufacturer advised of the following beacon models and their associated equipment categories:

Model	Category	Class	Group
EPIRB3 Pro	Category 1: float free	Class 2	Group 3 (AIS and 121.5 MHz)
EPIRB3	Category 2: manual	Class 2	Group 3 (AIS and 121.5 MHz)
EPIRB2 Pro	Category 1: float free	Class 2	Group 1 (no AIS)
EPIRB2	Category 2: manual	Class 2	Group 1 (no AIS)

**Table 3**

Refer to Manufacturer document 5.(q) Differences Between Beacon Model Variants.pdf.



## 2.3 Self-Test

### 2.3.1 Specification Reference

RTCM 11000.5, Clause 2.2.1

*In addition to the requirements of IEC 61097-2 clause 4.3.4 the following additional requirements shall also apply to the self test function:*

- *Group 1 EPIRBs shall transmit a 121.5 MHz homing signal in addition to a 406 MHz signal.*
- *Group 2 EPIRBs shall transmit an AIS locating signal in addition to a 406 MHz signal.*
- *Group 3 EPIRBs shall transmit a 121.5 MHz homing signal and an AIS locating signal in addition to a 406 MHz signal.*

*The number of self-tests shall as a minimum be sufficient to meet the manufacturer recommended frequency of self-tests over the life of the battery and this figure shall be used to calculate the self-test current consumption of the EPIRB Operating Lifetime test.*

The EUT is provided as a Group 1 or Group 3 EPIRB.

For IEC 61097-2 assessment (including Self-Test and Battery Capacity Test) refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report).

For Cospas-Sarsat (C/S) T.007 and self-test refer to:

TUV SUD document 75952867 report 02 (C/S type approval for the EPIRB2 Pro / EPIRB2).

TUV SUD document 75952867 report 01 (C/S type approval for the EPIRB3 Pro / EPIRB3).



## 2.4 GNSS Self-Test (Group 1 Only)

### 2.4.1 Specification Reference

RTCM 11000.5, Clause 2.2.2

The EPIRB2 Pro and EPIRB 2 are both group 1 EPIRBs and do not transmit an AIS burst as part of a successful GNSS Self test.

For Cospas-Sarsat (C/S) T.007 type approval and relevant transmitters:

TUV SUD document 75952867 report 02 (C/S type approval for the EPIRB2 Pro / EPIRB2).



## 2.5 Float Free Mechanism

### 2.5.1 Specification Reference

RTCM 11000.5, Clause 2.2.3

*In addition to the requirements of IEC 61097-2 clause 4.5 the following additional requirements shall also apply:*

*The hydrostatic release unit used to meet this specification shall also be of a type approved by the US Coast Guard [(USCG)] under approval series 160.162.*

For IEC 61097-2 assessment (with tests including the float free mechanism):

TÜV SUD document 75952867 report 06 (IEC 61097-2 report).

For USCG approval refer to:

Refer to Coast Guard Approval Number: 160.162/14/0.

Refer to Manufacturer supplied document: HR1E-USCG-160-162-2020.



## 2.6 Documentation

### 2.6.1 Specification Reference

RTCM 11000.5, Clause 2.2.4

*In addition to the requirements of IEC 61097-2 clause 4.11 the EPIRB manual shall also contain the following:*

- For 406 MHz EPIRBs sold in the USA, a NOAA EPIRB Registration Form together with instructions on how to register, clearly stating that the preferred method of registration is online at [www.beaconregistration.noaa.gov](http://www.beaconregistration.noaa.gov).
- For 406 MHz EPIRBs sold in the USA, manufacturers shall include a 5 Digit check sum on the registration forms originally supplied with the EPIRB... Note the 5 Digit check sum is not required to be marked on the EPIRB itself.

For IEC 61097-2 assessment (including documentation) refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report).

For additional documentation requirements refer to:

912S-03968 EPIRB3 Pro User Manual v00.20:

### 8.2 Country Specific Registration Information

USA

NOAA-Sarsat, USMCC, NSOF, E/SPO53, 1315 East West Hwy, Silver Spring, MD, 20910  
Fax: (1,301) 8174565, Tel: (1,301) 8174515 (1,888) 2127283  
Email: [beacon.registration@noaa.gov](mailto:beacon.registration@noaa.gov), Web: [www.beaconregistration.noaa.gov/](http://www.beaconregistration.noaa.gov/)

912S-03967 EPIRB3 User Manual v00.20:

### 8.2 Country Specific Registration Information

USA

NOAA-Sarsat, USMCC, NSOF, E/SPO53, 1315 East West Hwy, Silver Spring, MD, 20910  
Fax: (1,301) 8174565, Tel: (1,301) 8174515 (1,888) 2127283  
Email: [beacon.registration@noaa.gov](mailto:beacon.registration@noaa.gov), Web: [www.beaconregistration.noaa.gov/](http://www.beaconregistration.noaa.gov/)

912S-01358 Iss 01.02 {NOAA EPIRB registration form}:



The form is titled 'Official 406 MHz EPIRB Registration Form'. It includes sections for 'EPIRB Information', 'Purpose of EPIRB Registration', and 'Owner/Operator Information'. The 'EPIRB Information' section contains fields for 'Beacon ID (Unique Identification Number)' (15-digit hexadecimal ID), 'Checksum' (5-digit check sum), and 'Category' (Category I or II). The 'Purpose of EPIRB Registration' section includes checkboxes for 'New Registration', 'Renewal of Registration', 'Change of Ownership', 'Change of Registration Information', 'Replacement for a previously registered EPIRB', and 'Replacement of Decal Only'. The 'Owner/Operator Information' section has a field for 'Please enter the old unique ID number' with a 15-digit hex input field.

Figure 2

Spaces are provided for the *Checksum* in the registration document. The Manufacturer advised that the checksum and 15 hex ID are both inserted into the blank registration form when the beacon is configured for USA at the production configuration stage.



## 2.7 Labelling

### 2.7.1 Specification Reference

RTCM 11000.5, Clause 2.2.5

*In addition to the requirements of IEC 61097-2 clause 4.12 the EPIRB shall also carry the following additional labelling applied to the exterior of the EPIRB:*

- *Operating temperature range in degrees C and F*
- *For EPIRBs registered in the USA, an outlined or otherwise identifiable space sized to accommodate the NOAA proof-of-registration decal (26mm H x 51 mm W) is required on the case of the EPIRB with the text "Affix NOAA Registration DECAL Here." This space shall be located so that the decal is visible without having to remove the EPIRB from its bracket (Note that it is acceptable to have to remove the float-free cover to view this decal). The decal may NOT cover the two spaces for the name of the vessel and 15-Hex ID.*
- *A notice stating "in the event of a false activation in the USA call toll free 855 406 USCG (855 406 8724).*

For IEC 61097-2 assessment (including labelling) refer to:

TÜV SUD document 75952867 report 06 (IEC 61097-2 report).

For additional labelling requirements refer to:

EPIRB3 (Pro) PRINTED MATERIAL v01.10.



USA Config option (2) Left Side:

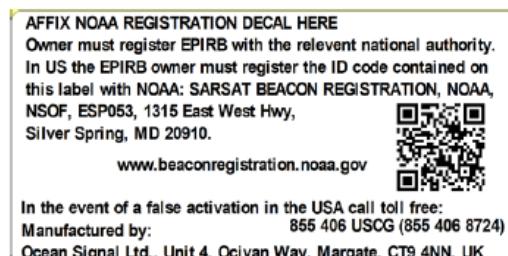
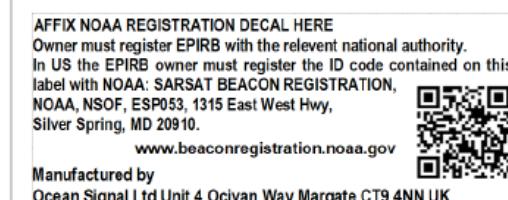
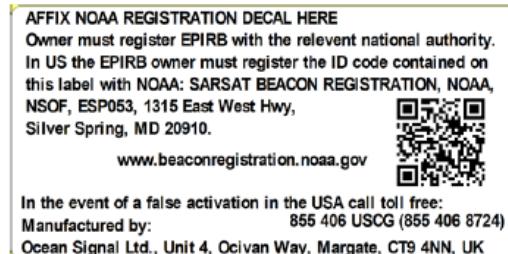


Figure 3



## 2.8 VDRs

### 2.8.1 Specification Reference

RTCM 11000.5, Clause 2.2.6

This is not applicable due to the EUT not supporting VDR.



## 2.9 Summary of Technical Characteristics Requirements

### 2.9.1 Specification Reference

RTCM 11000.5, Clause 3.1

*The EPIRB shall comply with the relevant technical characteristics for the appropriate EPIRB Group as defined within the RTCM 11000.5 and in IEC 61097-2 Ed 4 standard.*

For IEC 61097-2 assessment refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report).

For the exceptions, additions and changes as per clauses 3.2 – 3.2.4 of RTCM 11000.5 refer to section 2.9 – 2.15 of the present document.



## **2.10 Electrical Performance Details**

### **2.10.1 Specification Reference**

RTCM 11000.5, Clause 3.2

The requirements of IEC 61097-2 Ed 4.0 Clause 5 Technical Characteristics shall apply apart from the following exceptions as per section 2.11 – 2.15.

For IEC 61097-2 assessment refer to:

TÜV SUD document 75952867 report 06 (IEC 61097-2 report)

For the exceptions, additions and changes as per clauses 3.2 of RTCM 11000.5 refer to section 2.11 – 2.15 of the present document.



## 2.11 406 MHz Digital Message

### 2.11.1 Specification Reference

RTCM 11000.5, Clause 3.2.1

*This section is in addition to the text in IEC 61097-2 Ed 4.0 Clause 5.4.*

*Beacon coding methods for EPIRBs coded with a USA Country Code are defined in Annex E to this standard.*

For IEC 61097-2 assessment refer to:

TÜV SUD document 75952867 report 06 (IEC 61097-2 report).

For additional requirements refer to:

Manufacturer supplied document: AIS EPIRB RTCM 11000.5 Annex E\_USA Declaration of Compliance Issue 1



## 2.12 Auxiliary Radio-Locating Device – 121.5 MHz Homing Signal

### 2.12.1 Specification Reference

RTCM 11000.5, Clause 3.2.2.1

*This requirement applies to Group 1 and Group 3 EPIRBs.*

*In addition to the requirements of IEC 61097-2 Ed 4.0 Clause 5.5 the following additional requirements shall apply to the 121.5 MHz transmitter.*

*For Group 1 EPIRBs the 121.5 MHz homing signal is not interrupted for the transmission of any AIS signals...*

For IEC 61097-2 assessment (including 121.5 MHz homing signal and spurious emissions) refer to:

TÜV SUD document 75952867 report 06 (IEC 61097-2 report).

NOTE: The emission mask outlined in IEC 61097-2:2021 fulfils the emission mask requirement of RTCM11000.5 Figure 1.

For Cospas-Sarsat (C/S) T.007 and transmitter information refer to:

TÜV SUD document 75952867 report 01 (C/S type approval for the EPIRB3 Pro / EPIRB3).

TÜV SUD document 75952867 report 02 (C/S type approval for the EPIRB2 Pro / EPIRB2).



## 2.13 Auxiliary Radio-Locating Device – AIS Locating Signal

### 2.13.1 Specification Reference

RTCM 11000.5, Clause 3.2.2.2

*This requirement applies to Group 2 and Group 3 EPIRBs. The requirements IEC 61097-2 Ed 4.0 Clause 5.6 shall apply.*

For IEC 61097-2 assessment (including AIS locating signal) refer to:

TÜV SUD document 75952867 report 06 (IEC 61097-2 report).

Note: the EUT is either a Group 1 or Group 3 EPIRB – see section 2.2.1.



## 2.14 Message Content and Timing

### 2.14.1 Specification Reference

RTCM 11000.5, Clause 3.2.3

*Message content related to the identity of the EPIRB and / or vessel for EPIRBs registered in the USA shall be encoded into the beacon message according to one of the methods specific in Annex E [of RTCM 11000.5].*

*First Generation (FGB) EPIRBs designed to meet this standard shall be encoded with either National Location or Standard Location Protocols, unless they include RLS functionality in which case they shall be encoded with the RLS Location Protocol.*

*First Generation EPIRBs encoded with the User Location Protocol or any other User Protocol shall not be permitted, except for EPIRBs coded with the National User protocol which shall only be permitted when assigned by NOAA/NESDIS.*

*Second Generation (SGB) EPIRBs...*

*EPIRBs for installation on vessels of other flag stats administration should be encoded according to relevant local requirements. Further guidance can be found in document C/S T.007.*

For Cospas-Sarsat (C/S) T.007 type approval refer to:

TUV SUD document 75952867 report 01 (C/S type approval for the EPIRB3 Pro / EPIRB3).  
TUV SUD document 75952867 report 02 (C/S type approval for the EPIRB2 Pro / EPIRB2).

For additional requirements refer to:

Manufacturer supplied document: AIS EPIRB RTCM 11000.5 Annex E\_USA Declaration of Compliance Issue 1



## 2.15 406 MHz Emissions Limitations

### 2.15.1 Specification Reference

RTCM 11000.5, Clause 3.2.4

In addition to the requirements of IEC 61097-2 Ed 4.0 Clause 5 the transmitter power output spectrum shall remain within the limits of the emission mask shown in Figure 2 [of RTCM 11000.5]:

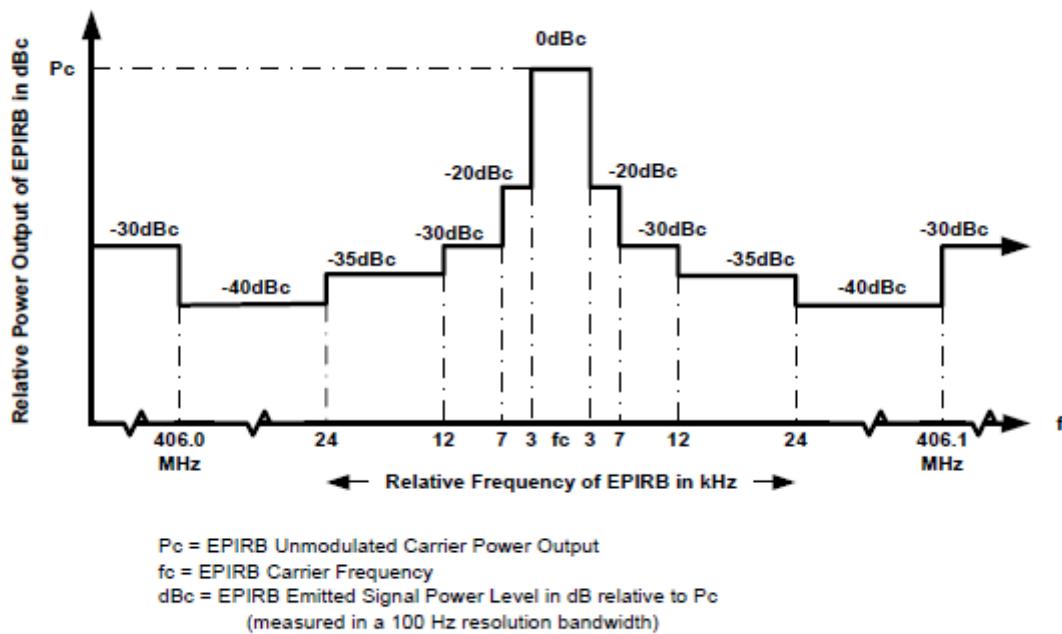


Figure 2 – Emission Mask for FGB EPIRB at 406 MHz<sup>5</sup> <sup>6</sup>

<sup>5</sup> This emission mask also complies with US FCC 47 CFR Part 80.211(e)

<sup>6</sup> This mask is compatible with the mask in C/S T.001 Fig. 2.3 it simply extends the frequency coverage beyond that of C/S to meet US FCC requirements.

Figure 4

For IEC 61097-2 assessment refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report).

For FCC 47 CFR Part 80.211 assessment refer to:

TUV SUD document 75952867 report 05 (FCC 47 CFR Part 2, FCC 47 CFR Part 80, ISED RSS-182, ISED RSS-287 and ISED RSS-GEN report)

NOTE: The emission mask outlined in IEC 61097-2:2021 fulfils the emission mask requirements of RTCM11000.5.



**2.16 Annex A - Environmental and Operational Performance Test Procedure for Approval of 406 MHz EPIRBs**

**2.16.1 Specification Reference**

RTCM 11000.5, Annex A

The requirements of IEC 61097-2 Ed 4.0 Clause 6 Methods of testing and required test results shall apply apart from the following exceptions, additions and changes.

For IEC 61097-2 assessment refer to:

TÜV SUD document 75952867 report 06 (IEC 61097-2 report).

For the exception, additions and changes as per clauses A.1 – A.3 of RTCM 11000.5 refer to section 2.17 – 2.19 of the present document.



## 2.17 Annex A - Documentation

### 2.17.1 Specification Reference

RTCM 11000.5, Annex A.1

*In addition to the requirements of IEC 61097-2 Ed 4.0 Clause 6.11 the EPIRB manual shall also comply with the requirements of section 2.2.4 [of RTCM 11000.5].*

For documentation assessment refer to section 2.6.



## 2.18 Annex A - Labelling

### 2.18.1 Specification Reference

RTCM 11000.5, Annex A.2

*In addition to the requirements of IEC61097-2 Ed 4.0 Clause 6.12 the EPIRB labelling shall also comply with requirements of Section 2.2.5 [of RTCM 11000.5].*

For documentation assessment refer to section 2.7.



## 2.19 Annex A – Spurious Emissions

### 2.19.1 Specification Reference

RTCM 11000.5, Annex A.3

When testing to the requirements of IEC 61097-2 Ed 4.0 Clause 6.19 the relevant Spurious Emissions figure from section 3.2.4 of [RTCM 11000.5] shall be used for 406 MHz emissions. If the test in IEC61097-2 is also combined with the 121.5 MHz spurious emissions test in IEC 61097-2 Annex D.3 f, then in addition Figure 1 from section 3.2.2 of [RTCM 11000.5] shall be used instead of D.1 of IEC 61097-2.

For spurious emissions assessment refer to section 2.15.



## 2.20 Standard for a 406 MHz EPIRB Without a Float Free Mechanism

### 2.20.1 Specification Reference

RTCM 11000.5, Annex C

*IEC 61097-2 Ed 4.0 Annex C shall apply to all Category 2 EPIRBs.*

For float free mechanism assessment refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report).



## **2.21 Internal and External Navigation Devices – External Navigation Devices**

### **2.21.1 Specification Reference**

RTCM 11000.5, Clause D.1

This is not applicable due to the EUT supporting an internal navigation device only.



## **2.22 Internal and External Navigation Devices – Internal Navigation Devices**

### **2.22.1 Specification Reference**

RTCM 11000.5, Annex D.2

IEC 61097-2 Ed 4.0 Annexes B.3 and B.4 shall apply to all EPIRBs.

For internal navigation device assessment (IEC 61097-2, B.3 and B.4) refer to:

TUV SUD document 75952867 report 06 (IEC 61097-2 report).



### 3 Photographs

#### 3.1 Equipment Under Test (EUT)



Figure 5 - EPIRB3 Pro



**Figure 6 - EPIRB3 (antenna stowed)**