



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
4. Modulation						
Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1						
Biphase-L		P / F		P		
	(maximum)	µs	N/T	110.3	N/T	
Rise time	(minimum)	µs	N/T	90.1	N/T	
	(maximum)	µs	N/T	147.5	N/T	
Fall time	(minimum)	µs	N/T	127.8	N/T	
	(maximum)	µs	N/T	1.154	N/T	
Phase deviation: positive	(minimum)	radians	N/T	1.055	N/T	
	(maximum)	radians	N/T	-1.200	N/T	
Phase deviation: negative	(minimum)	radians	N/T	-1.108	N/T	
Symmetry measurement		≤ 0.05	N/T	0.02248	N/T	
5. 406 MHz Transmitted Frequency						
Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1						
Nominal Value	(maximum)	C/S T.001	MHz	406.0310141	N/T	
	(minimum)			406.0310138	N/T	
Short-term stability	(maximum)	≤ 2x10 ⁻⁹	/100ms	5.65E-10	N/T	
	(minimum)			5.49E-10	N/T	
Medium-term stability – Slope	(maximum)	(-1 to +1)x10 ⁻⁹	/minutes	8.78E-11	N/T	
	(minimum)			-1.08E-11	N/T	
Medium-term stability – Residual frequency variation	(maximum)	≤ 3x10 ⁻⁹		4.76E-10	N/T	
	(minimum)			2.81E-10	N/T	
6. Spurious Emissions into 50ohms						
Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1						
In band (406.0 – 406.1 MHz)		C/S T.001 mask	P / F	P		N/T
Result: Pass						



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
7. 406 MHz VSWR Check						
Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1						
Nominal Value	(maximum) (minimum)	C/S T.001	MHz	N/T 406.0309196 406.0309193	N/T N/T	* At ambient temperature, the negative phase deviation falls outside of T.007. However, it is within the Test Facility limits stated in T.008.
Modulation rise time	(maximum) (minimum)	50-250	µs	108.9	N/T	
Modulation fall time	(maximum) (minimum)	50-250	µs	91.1	N/T	
	(maximum) (minimum)	50-250	µs	147.3	N/T	
Modulation phase deviation: positive	(maximum) (minimum)	50-250	µs	129.1	N/T	
	(maximum) (minimum)	+ (1.0 to 1.2) + (1.0 to 1.2)	radians radians	1.156 1.064	N/T N/T	
Modulation phase deviation: negative	(maximum) (minimum)	- (1.0 to 1.2)	radians	-1.203*	N/T	
Modulation symmetry measurement		- (1.0 to 1.2) ≤ 0.05	radians	-1.103 0.02232	N/T N/T	
Digital Message		correct	P / F	P	N/T	
Result: Non-Compliance						



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
8(a). Self-test Mode						
Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1						
Frame sync	011010000	P / F	N/T	P	N/T	
Format flag	1 / 0	bit value	N/T	1	N/T	
Single radiated burst	≤440 / 520 (±1%)	ms	N/T	519.469	N/T	
Default position data (if applicable)	correct	P / F	N/T	P	N/T	
Description	provided	Y / N		Y		
Design data on protection against repetitive self-test mode transmissions	provided	Y / N		Y		
Single burst verification	one burst	P / F	N/T	P	N/T	
Provides for 15 Hex ID	correct	P / F	N/T	P	N/T	
121.5 MHz RF power (if applicable)	verify that RF power emitted	P / F	N/T	P	N/T	
406 MHz power	verify that RF power emitted	P / F	N/T	P	N/T	
Distinct indication of Self-Test	provided	Y / N	N/T	Y	N/T	
Distinct indication of RF power being emitted	provided	Y / N	N/T	Y	N/T	
Indication of Self-Test result	provided	Y / N	N/T	Y	N/T	
Distinct indication of insufficient battery capacity	provided	Y / N		Y		
Maximum duration of Self-Test mode	≤ maximum duration of Self-Test	sec	N/T	14	N/T	
Automatic termination of Self-Test mode upon completion of Self-Test and indication of Self-Test results	verify automatic termination, irrespective of the switch position	Y / N	N/T	Y	N/T	
Result: Pass						

Result: Pass



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-20°C)	(+21°C)	(+55°C)	
8 (b). GNSS Self-Test Mode (if applicable)						
Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1						
Frame sync	011010000	P / F	N/T	P	N/T	Manufacturer specified value: 140 <

8 (b). GNSS Self-Test Mode (if applicable)

Model: EPIRB3, S/N: TA000005, TUV Ref: TSR2 and Modification State 1

Frame sync
Format flag
Radiated burst duration

Position data except for ELT (DT) (if applicable)

Position data for ELT(DT)

Design data showing how GNSS Self-test is limited in number of transmissions and duration
Single burst verification (if applicable)

121.5 MHz RF power (if applicable)

406 MHz power (if applicable)

Maximum duration of GNSS Self-tests

Actual duration of Self-test with encoded location

Maximum number of GNSS Self-tests (only beacons with internal navigation devices)

Distinct indication to register successful completion or failure of the GNSS self-test

Distinct indication that a maximum number of GNSS self-tests has been attained after GNSS self-test mode activation and without transmission of a test message or further GNSS receiver current drain



Automatic termination of the GNSS self-test mode upon completion of the GNSS self-test cycle and indication of the results	verify automatic termination of GNSS self-test mode, irrespective of the switch position	Y/N	Y
--	--	-----	---

Parameters to be Measured	Range of Specification	Units	Test Results				Comments
14. Satellite Qualitative Tests							
Model: EPIRB3, S/N: TA000013, TUV Ref: TSR3 and Modification State 1							
Test Configuration	As per C/S T.007	P / F %	Configuration				
15 Hex ID Decoded by LUT	correct		5	6	7	8	
Doppler Location results with error ≤ 5km	≥ 80		N/T	N/T	P	N/T	
15. Antenna Characteristics							
Model: EPIRB3, S/N: TA000013, TUV Ref: TSR3 and Modification State 0							
Test Configuration	As per C/S T.007	dB dBm dBm	Configuration				
Polarisation	linear or RHCP		1	2	3	4	
VSWR	≤ 1.5		Linear	N/T	N/T	Linear	
EIRP _{LOSS}	≤ 43*		N/A	N/T	N/T	N/A	
EIRP _{maxEOL}	≥ 32**		0.33	N/T	N/T	0.33	
EIRP _{minEOL}		42.9	N/T	N/T	40.6		
		33.4	N/T	N/T	32.1		
* ≤ 45 for PLB on PFD ** EIRP _{minEOL} limit decreases to 30 dBm for Configuration 4							



17. Navigation System				Result: Pass	
Model: EPIRB3, S/N: TA000013, TUV Ref: TSR3 and Modification State 1 (A.3.8.2.1)					
Model: EPIRB3, S/N: TA000013, TUV Ref: TSR3 and Modification State 2 (A.3.8.2.2)					
Location protocol	C/S T.001			Standard	
Configuration 7					
Position accuracy - A.3.8.2.1	C/S T.001	m		23.08	
Position Acquisition Time - A.3.8.2.1	<10/1	min		0.91	
Position accuracy - A.3.8.2.2	C/S T.001	m		35.53	
Position Acquisition Time - A.3.8.2.2	<10/1	min		0.93	



3.1 POWER OUTPUT

3.1.1 Specification

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

3.1.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000005 - Modification State 1

3.1.3 Date of Test

04 April 2022

3.1.4 Test Equipment Used

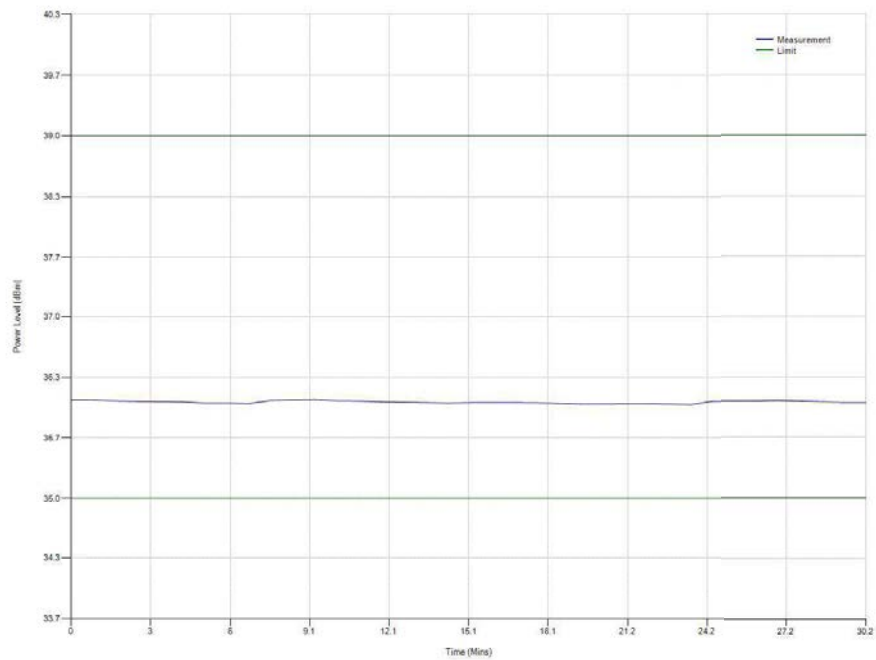
The major items of test equipment used for the above tests are identified in Section 4.1.

3.1.5 Laboratory Environmental Conditions

Ambient Temperature 23.6°C
Relative Humidity 38.0%

3.1.6 Test Results

Ambient Temperature



Summary

The EUT complies with clause A.3.2.2 of Cospas-Sarsat T.007.



3.2 DIGITAL MESSAGE

3.2.1 Specification

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

3.2.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000005 - Modification State 1

3.2.3 Date of Test

04 April 2022

3.2.4 Test Equipment Used

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

3.2.5 Laboratory Environmental Conditions

Ambient Temperature 23.6°C
Relative Humidity 38.0%

3.2.6 Test Results

Test Duration: 30 minutes
No. of bursts: 37

Ambient Temperature

Burst 1 Decoded Beacon Message

Hexadecimal code: **FFFE2F8C9DFE7018DFEFF8129DF861F0FABE**

The code consists of 36 hexadecimal characters representing a first generation beacon message with the format flag set to Long including bit and frame synchronization pattern prefix (24 bits) as defined by T.001 Issue 4 - Rev.6.

Unique identifier:
193BFCE031BFDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-15	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 15-bit positions	True
16-24	000101111	Frame Synchronization Pattern	Normal beacon operation
25	1	Format Flag	Long Message
26	0	Protocol Flag	Location, further information provided in "Protocol Code"
27-36	0011001001	Country code: For associated SAR Points of Contact (SPOC) related to Albania - 201 ;	Albania - 201 Search Contact list here
37-40	1101	Protocol Code	RLS Location Protocol
41-42	11	Beacon type	RLS Test Location
43-46	1111	Identification type	RLS protocol coded with MMSI last 6 digits
47-66	1001110000 0001100011	Last 6 digits MMSI	639075
67-75	0111111111	Latitude	Default - no location (Default - no location)
76-85	0111111111	Longitude	Default - no location (Default - no location)
86-106	0000001001 0100111011 1	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107	1	Encoded position source	Encoded position data is provided by an internal navigation device
108	1	121.5 Mhz Homing Device	Included in beacon
109	1	Beacon capability to process and automatically generated RLM Type-1	Capable to process an automatically generated RLM Type-1
110	0	Beacon capability to process a manually generated RLM Type-1 RLM Type-2	Not capable to process a manually generated RLM Type-2
111	0	Beacon Feedback on receipt of RLM Type-1	RLM Type-1 (automatic) not received by this beacon
112	0	Beacon Feedback on receipt of RLM Type-2	RLM Type-2 (manual) not received by this beacon
113-114	01	RLS Provider Identification	GALILEO Return Link Service Provider
115-123	100001111	Latitude offset	Default value
124-132	100001111	Longitude offset	Default value
133-144	1010101111 10	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field



Summary

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



3.3 MODULATION

3.3.1 Specification

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

3.3.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000005 - Modification State 1

3.3.3 Date of Test

04 April 2022

3.3.4 Test Equipment Used

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

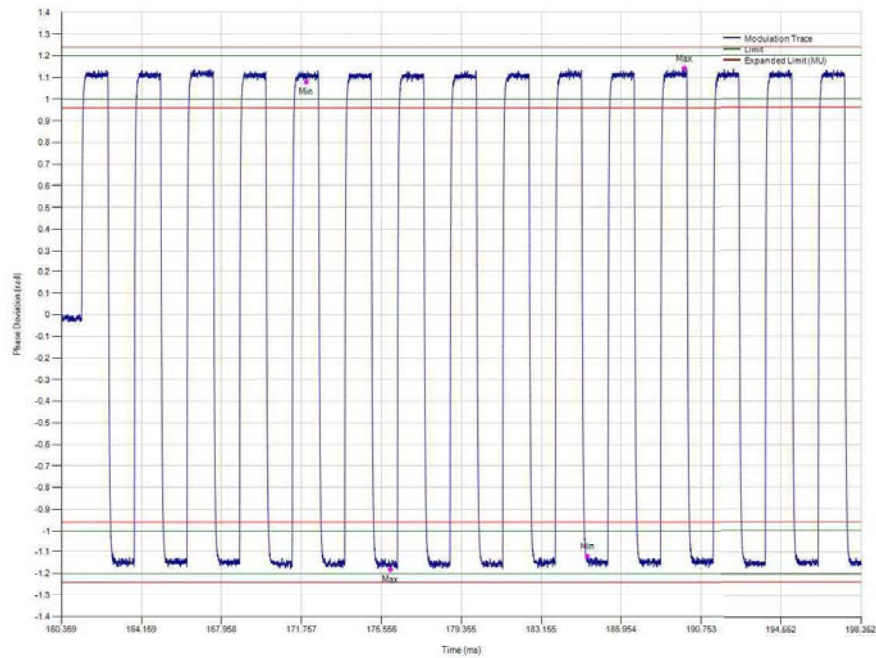
3.3.5 Laboratory Environmental Conditions

Ambient Temperature 23.6°C
Relative Humidity 38.0%

3.3.6 Test Results

Test Duration: 30 minutes
No. of bursts: 37

Ambient Temperature



Summary

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



3.4 406 MHZ TRANSMITTED FREQUENCY

3.4.1 Specification

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

3.4.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000005 - Modification State 1

3.4.3 Date of Test

04 April 2022

3.4.4 Test Equipment Used

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

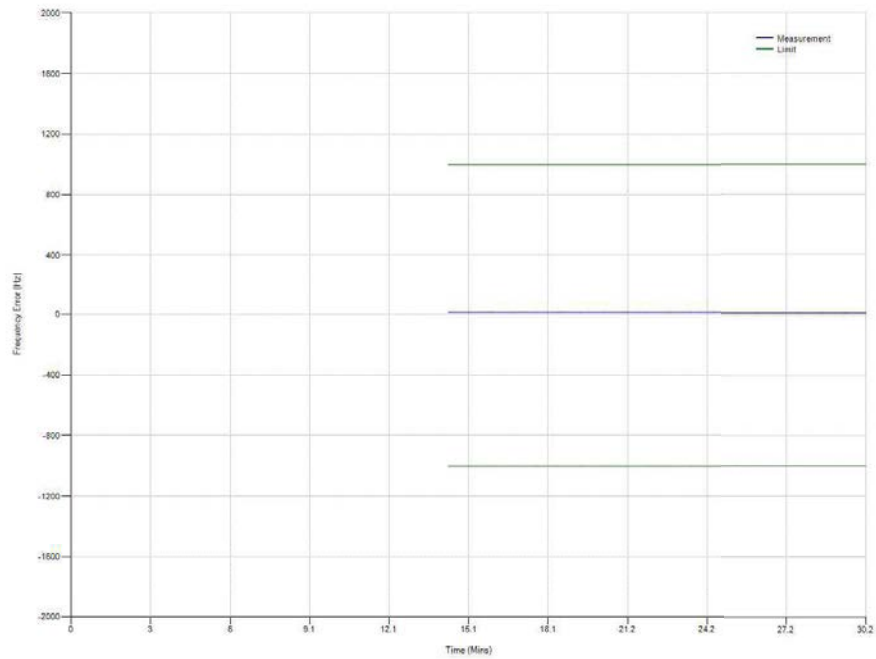
3.4.5 Laboratory Environmental Conditions

Ambient Temperature 23.6°C
Relative Humidity 38.0%

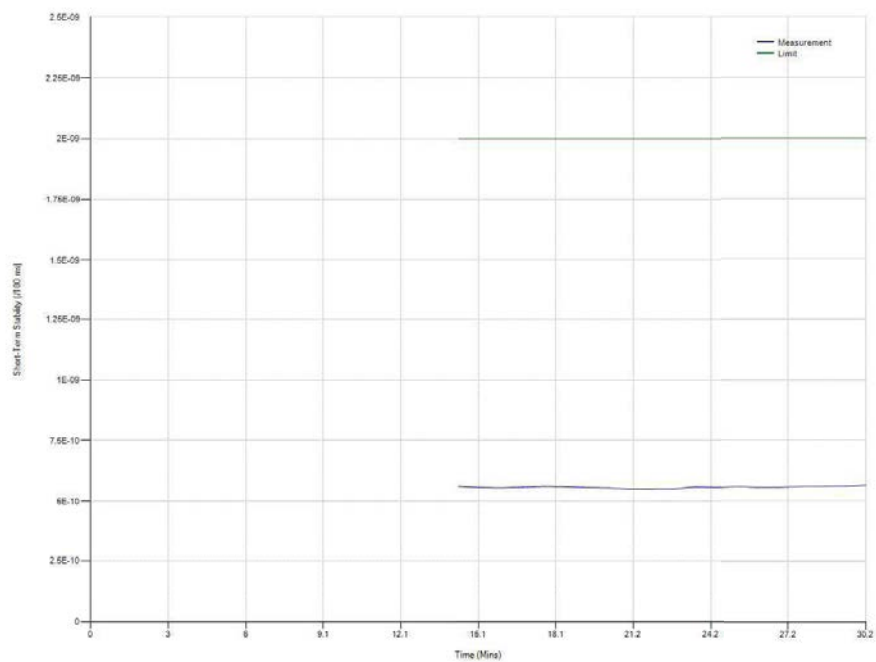
3.4.6 Test Results

Ambient Temperature

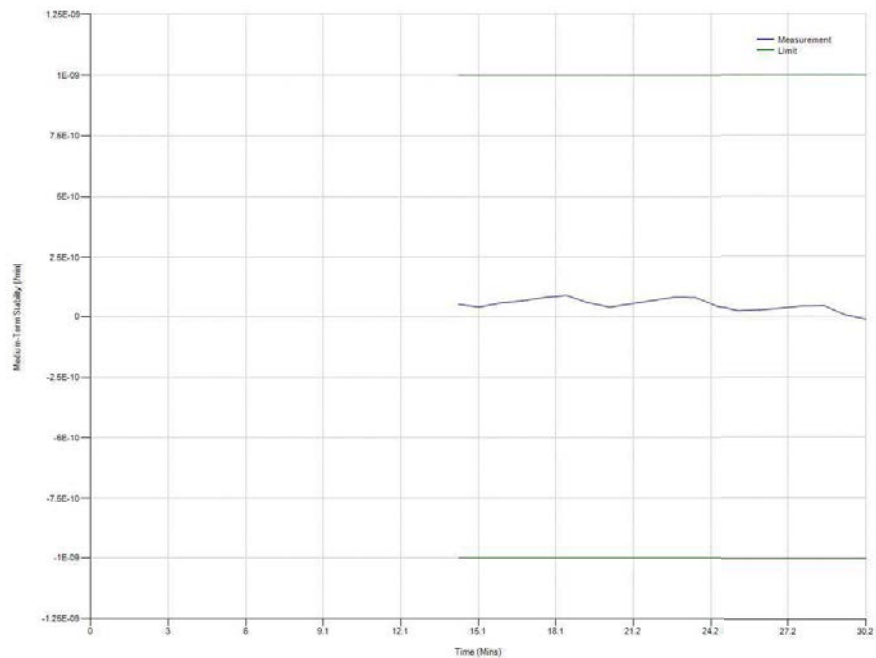
Nominal Frequency



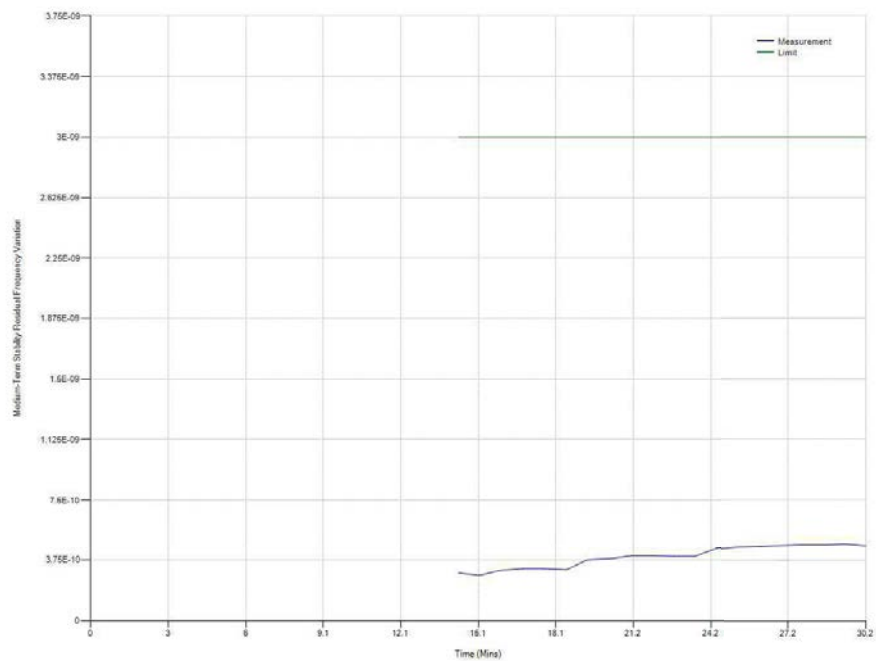
Short Term Stability



Medium Term Stability – Slope



Medium Term Stability – Residual Frequency Variation





Summary

The EUT complies with clause A.3.2.1 of Cospas-Sarsat T.007.



3.5 SPURIOUS EMISSIONS INTO 50 OHMS

3.5.1 Specification

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

3.5.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000005 - Modification State 1

3.5.3 Date of Test

05 April 2022

3.5.4 Test Equipment Used

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

3.5.5 Laboratory Environmental Conditions

Ambient Temperature 23.6°C

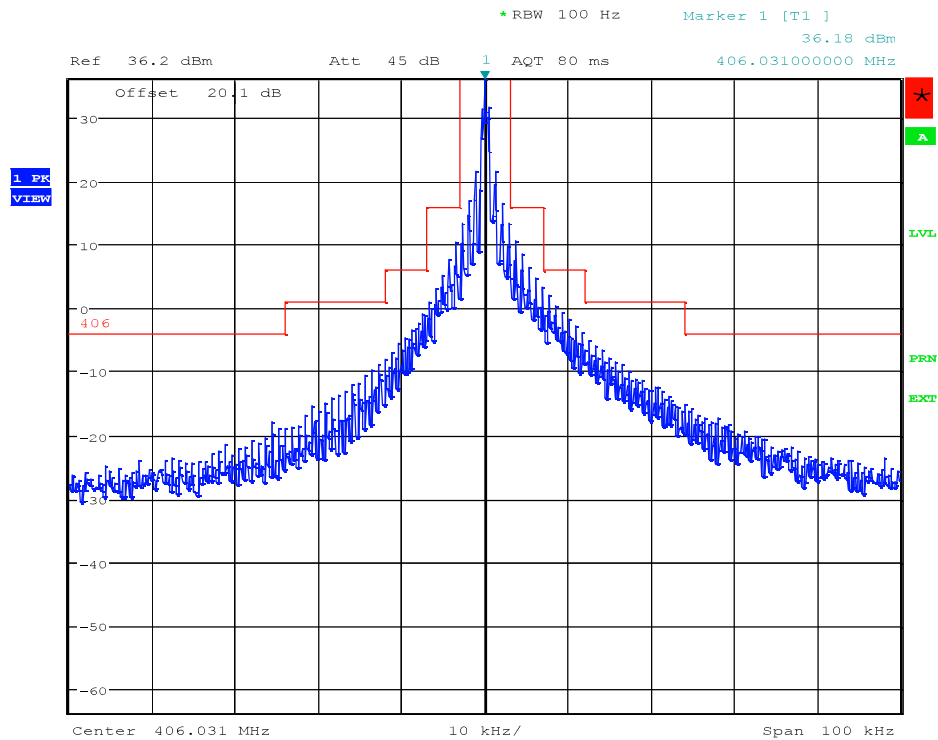
Relative Humidity 38.0%

3.5.6 Test Results

Test Duration: 30 minutes

No. of bursts: 37

Ambient Temperature



Date: 5.APR.2022 14:19:51

Summary

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



3.6 406 MHZ VSWR CHECK

3.6.1 Specification

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

3.6.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000005 - Modification State 1

3.6.3 Date of Test

05 April 2022

3.6.4 Test Equipment Used

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

3.6.5 Laboratory Environmental Conditions

Ambient Temperature 24.6°C

Relative Humidity 34.7%

3.6.6 Test Results

Test Duration: 30 minutes

No. of bursts: 37

Ambient Temperature

Burst 1 Decoded Beacon Message

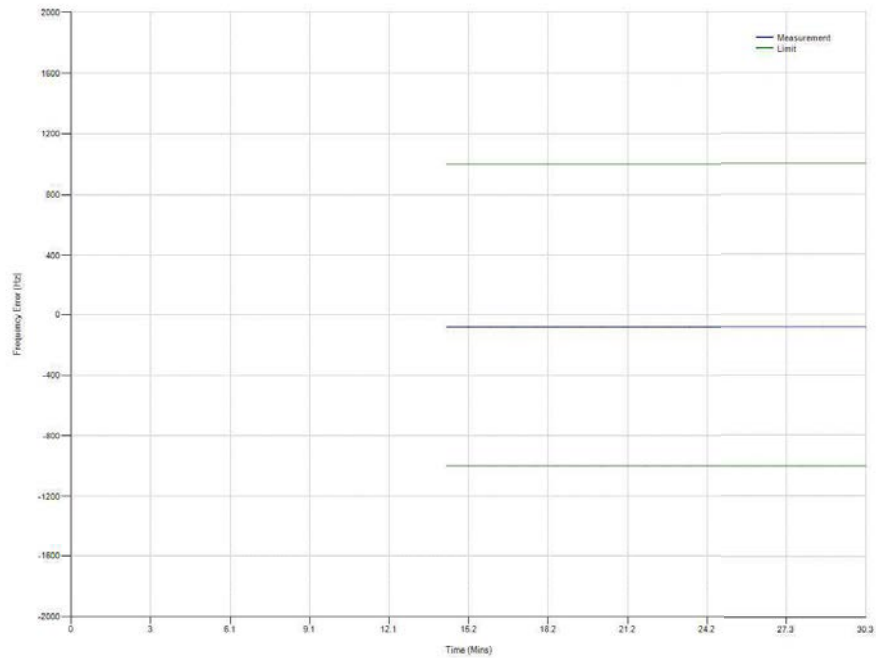
Hexadecimal code: **FFFE2F8C9DFE7018DFEFF8129DF861F0FABE**

The code consists of 36 hexadecimal characters representing a first generation beacon message with the format flag set to Long including bit and frame synchronization pattern prefix (24 bits) as defined by T.001 Issue 4 - Rev.6.

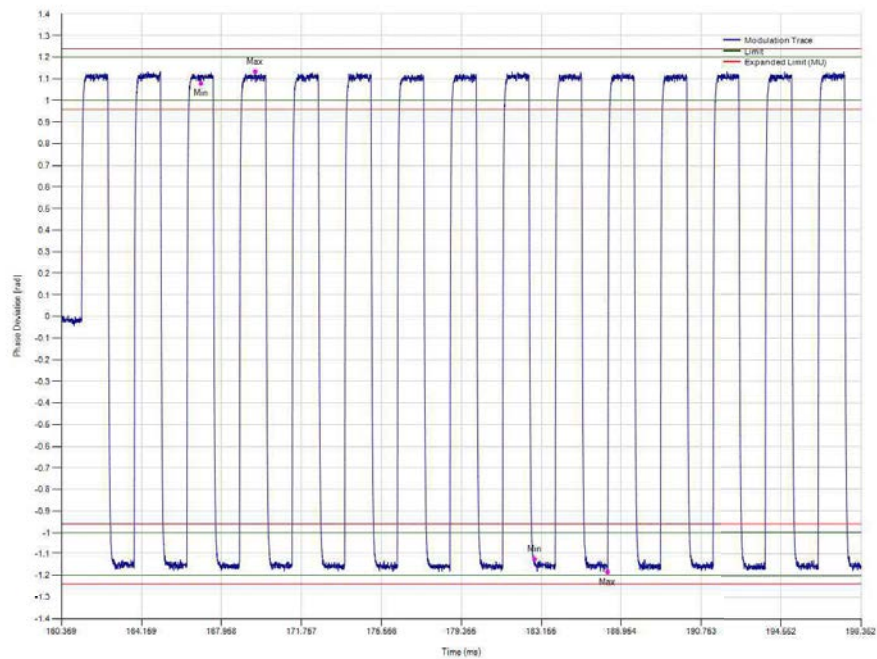
Unique Identifier:
193BFCE031BFDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-15	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 15-bit positions	True
16-24	000101111	Frame Synchronization Pattern	Normal beacon operation
25	1	Format Flag	Long Message
26	0	Protocol Flag	Location, further information provided in "Protocol Code"
27-36	0011001001	Country code:	Albania - 201
		For associated SAR Points of Contact (SPOC) related to Albania - 201 :	Search Contact list here
37-40	1101	Protocol Code	RLS Location Protocol
41-42	11	Beacon type	RLS Test Location
43-46	1111	Identification type	RLS protocol coded with MMSI last 6 digits
47-66	1001110000 0001100011	Last 6 digits MMSI	639075
67-75	011111111	Latitude	Default - no location (Default - no location)
76-85	0111111111	Longitude	Default - no location (Default - no location)
86-106	0000001001 0100111011 1	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107	1	Encoded position source	Encoded position data is provided by an internal navigation device
108	1	121.5 Mhz Homing Device	Included in beacon
109	1	Beacon capability to process and automatically generated RLM Type-1	Capable to process an automatically generated RLM Type-1
110	0	Beacon capability to process a manually generated RLM Type-1 RLM Type-2	Not capable to process a manually generated RLM Type-2
111	0	Beacon Feedback on receipt of RLM Type-1	RLM Type-1 (automatic) not received by this beacon
112	0	Beacon Feedback on receipt of RLM Type-2	RLM Type-2 (manual) not received by this beacon
113-114	01	RLS Provider Identification	GALILEO Return Link Service Provider
115-123	100001111	Latitude offset	Default value
124-132	100001111	Longitude offset	Default value
133-144	1010101111 10	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field

Frequency Plot



Modulation Plot





Summary

The EUT fails to comply* with clause A.3.3 of Cospas-Sarsat T.007.

* At ambient temperature, the negative phase deviation falls outside the limits in T.007. However, it is within the Test Facility limits stated in T.008.



3.7 SELF-TEST MODES

3.7.1 Specification

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

3.7.2 Equipment Under Test and Modification State

EPIRB3 Pro S/N: TA000005 - Modification State 1

3.7.3 Date of Test

06 April 2022

3.7.4 Test Equipment Used

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

3.7.5 Laboratory Environmental Conditions

Ambient Temperature 24.6°C

Relative Humidity 34.7%

3.7.6 Test Results

Note: Self-test at ambient temperature was carried out with navigation data applied. The EUT was activated and allowed to obtain a fix. It was then deactivated and a Self-test was performed to show the EUT encoded default values. This is shown from the decoded message below.

Self-test Mode

Ambient Temperature

Burst 1 Decoded Beacon Message

Hexadecimal code: **FFFE2F8C9DFE7018CCF024AD44F84ECA2A3C**

The code consists of 36 hexadecimal characters representing a first generation beacon message with the format flag set to Long including bit and frame synchronization pattern prefix (24 bits) as defined by T.001 Issue 4 - Rev.6.

Unique identifier:
193BFCE031BFDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-15	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 15-bit positions	True
16-24	000101111	Frame Synchronization Pattern	Normal beacon operation
25	1	Format Flag	Long Message
26	0	Protocol Flag	Location, further information provided in "Protocol Code"
27-36	0011001001	Country code:	Albania - 201
		For associated SAR Points of Contact (SPOC) related to Albania - 201 :	Search Contact list here
37-40	1101	Protocol Code	RLS Location Protocol
41-42	11	Beacon type	RLS Test Location
43-46	1111	Identification type	RLS protocol coded with MMSI last 6 digits
47-66	1001110000 0001100011	Last 6 digits MMSI	639075
67-75	001100111	Latitude	51.5 Degrees North (51.5)
76-85	1000000100	Longitude	2.0 Degrees West (-2.0)
86-106	1001010110 1010001001 1	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107	1	Encoded position source	Encoded position data is provided by an internal navigation device
108	1	121.5 Mhz Homing Device	Included in beacon
109	1	Beacon capability to process and automatically generated RLM Type-1	Capable to process an automatically generated RLM Type-1
110	0	Beacon capability to process a manually generated RLM Type-1 RLM Type-2	Not capable to process a manually generated RLM Type-2
111	0	Beacon Feedback on receipt of RLM Type-1	RLM Type-1 (automatic) not received by this beacon
112	0	Beacon Feedback on receipt of RLM Type-2	RLM Type-2 (manual) not received by this beacon
113-114	01	RLS Provider Identification	GALILEO Return Link Service Provider
115-123	001110110	Latitude offset	7.0 minutes 24.0 seconds (negative)
124-132	010100010	Longitude offset	10.0 minutes 8.0 seconds (negative)
133-144	1010001111 00	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	51.377 -1.831

Burst 3 Decoded Beacon Message

Hexadecimal code: **FFED08C9DFE7018DFE7F8129DF861F0FABE**

The code consists of 36 hexadecimal characters representing a first generation beacon message with the format flag set to Long including bit and frame synchronization pattern prefix (24 bits) as defined by T.001 Issue 4 - Rev.6.

Unique Identifier:
193BFCE031BFDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-15	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 15-bit positions	True
16-24	011010000	Frame Synchronization Pattern	Test protocol message coded for non-operational use
25	1	Format Flag	Long Message
26	0	Protocol Flag	Location, further information provided in "Protocol Code"
27-36	0011001001	Country code:	Albania - 201
		For associated SAR Points of Contact (SPOC) related to Albania - 201 :	Search Contact list here
37-40	1101	Protocol Code	RLS Location Protocol
41-42	11	Beacon type	RLS Test Location
43-46	1111	Identification type	RLS protocol coded with MMSI last 6 digits
47-66	1001110000001100011	Last 6 digits MMSI	639075
67-75	0111111111	Latitude	Default - no location (Default - no location)
76-85	0111111111	Longitude	Default - no location (Default - no location)
86-106	000000100101001110111	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107	1	Encoded position source	Encoded position data is provided by an internal navigation device
108	1	121.5 Mhz Homing Device	Included in beacon
109	1	Beacon capability to process and automatically generated RLM Type-1	Capable to process an automatically generated RLM Type-1
110	0	Beacon capability to process a manually generated RLM Type-1 RLM Type-2	Not capable to process a manually generated RLM Type-2
111	0	Beacon Feedback on receipt of RLM Type-1	RLM Type-1 (automatic) not received by this beacon
112	0	Beacon Feedback on receipt of RLM Type-2	RLM Type-2 (manual) not received by this beacon
113-114	01	RLS Provider Identification	GALILEO Return Link Service Provider
115-123	100001111	Latitude offset	Default value
124-132	100001111	Longitude offset	Default value
133-144	101010111110	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field

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

Table F-E.3: Self-test Mode Actions and Indications

No.	Action/Indication	Time-stamp (HH:MM:SS)	Description of action/indication	Duration of action/indication (sec)	Notes
1	Self-Test mode initiation (distinct action)	00:00:00	Hold the 'Test' button in until the red LED starts flashing, then release	3 Sec	
2	Distinct indication of the Self-test initiation	00:00:04	LED flashes white	1 Sec	
3	Self-test single burst transmission	00:00:05		520mS	Observed on Spectrum Analyser
4	Self-test message default values	00:00:05	Self-test message structure and bit values confirmed correct		Decoded using TUV test system
5	Distinct indication of RF transmission	00:00:05	None	1 Sec 1 Sec 1 sec	121.5 MHz AIS 406 MHz
6	Distinct indication of the Self-test PASS result	00:00:06	A series of Blue LED flashes (if RLS) or Green LED flashes (if NON RLS)	Up to 10 Sec	Dependent on number of flashes. See manufacturers user manual for description of self-test indications.
7	Distinct indication of the Self-test FAIL result	00:00:06	A series of Magenta (if RLS) or Orange (if non RLS) LED flashes	Up to 10 Sec	Dependent on number of flashes. See manufacturers user manual for description of self-test indications.
8	Distinct indication of Insufficient Battery Energy	00:00:06	A series of Magenta (if RLS) or Orange (if non RLS) LED flashes	Up to 10 Sec	Dependent on number of flashes. See manufacturers user manual for description of self-test indications.
9	Automatic termination of the Self-test mode, irrespectively of the switch position		'Test' button held in	21 seconds	If the 'Test' button is held in, the EUT turns off. The EUT ceases to draw residual current after this. See battery current measurements for details.
10	Duration of the Self-test mode				The potential maximum duration that the manufacturer has declared is 16s but it is dependent on the number of flashes. See manufacturers user manual for description of self-test indications.

GNSS Self-test mode

General

All duration measurements below include activation method time, i.e. they start from test switch press and include any “hold for x seconds” requirement and they end when all visual and audible activity appeared to cease.

All positional accuracy values below were calculated using the Haversine Formula; the Earth’s radius was taken as 6367 km.

Decodes are shown only for RLS Location Protocol at ambient temperature.

GNSS Self-test Observations

Parameter	Actual	Declared
GNSS Self-test count	N/T	60
GNSS Self-test maximum duration (s) incl. activation method	114	140
Indication of GNSS Self-test activation/completion	A GNSS self-test activation is activated by holding the TEST button in until the red LED stops flashing and becomes steady. It should then be released. If navigation data is detected, the LED will flash green a number of times. If no navigation data is detected, the LED will flash red a number of times. The number of flashes indicates the number of GNSS Self-Tests remaining, up to a maximum of 10 times. The test result will then be repeated after 2 seconds.	
Indication of GNSS Self-test count limit reached	If there are no tests remaining the LED will either flash green or red 13 times depending on whether the GNSS Self-Test was successful.	

Summary: GNSS Self-test with Valid Navigation Input

Protocol	RLS Location Protocol		
Temperature (°C)	-20	+22	+55
Frame sync verification	N/T	011010000	N/T
Format Flag (1 bit)	N/T	1	N/T
Single Radiated burst (ms)	N/T	519.477	N/T
Position data	N/T	P	N/T
Single burst verification	N/T	P	N/T
Actual duration (s) incl. activation method	N/T	72	N/T
Position Input Latitude	N 51° 22' 35"		
Position Input Longitude	W 1° 49' 50"		
Position Output Latitude	N/T	N 51° 22' 36"	N/T
Position Output Longitude	N/T	W 1° 49' 52"	N/T
Position Error (m)	N/T	49.3	N/T

Summary: GNSS Self-test without Valid Navigation Input

Protocol	RLS Location Protocol		
Temperature (°C)	-20	+22	+55
Frame sync verification	N/A	N/A	N/A
Format Flag (1 bit)	N/A	N/A	N/A
Single Radiated burst (ms)	N/A	N/A	N/A
Default Position data	N/A	N/A	N/A
Single burst verification	N/A	N/A	N/A
Actual duration (s) incl. activation method	N/T	114	N/T

Full Hex Messages	
RLS Protocol with Navigation data applied	
Ambient	FFFE08C9DFE7018CCF024AD44F84ECA2A3C
RLS Protocol without Navigation data applied	
Ambient	N/A

Decoded Message for RLS Location Protocol at Ambient Temperature

Decoded Beacon Message

Hexadecimal code: **FFED08C9DFE7018CCF024AD44F84ECA2A3C**

The code consists of 36 hexadecimal characters representing a first generation beacon message with the format flag set to Long including bit and frame synchronization pattern prefix (24 bits) as defined by T.001 Issue 4 - Rev.6.

Unique identifier:
193BFCE031BFDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-15	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 15-bit positions	True
16-24	011010000	Frame Synchronization Pattern	Test protocol message coded for non-operational use
25	1	Format Flag	Long Message
26	0	Protocol Flag	Location, further information provided in "Protocol Code"
27-36	0011001001	Country code:	Albania - 201
		For associated SAR Points of Contact (SPOC) related to Albania - 201 :	Search Contact list here
37-40	1101	Protocol Code	RLS Location Protocol
41-42	11	Beacon type	RLS Test Location
43-46	1111	Identification type	RLS protocol coded with MMSI last 6 digits
47-66	1001110000 0001100011	Last 6 digits MMSI	639075
67-75	001100111	Latitude	51.5 Degrees North (51.5)
76-85	1000000100	Longitude	2.0 Degrees West (-2.0)
86-106	1001010110 1010001001 1	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107	1	Encoded position source	Encoded position data is provided by an internal navigation device
108	1	121.5 Mhz Homing Device	Included in beacon
109	1	Beacon capability to process and automatically generated RLM Type-1	Capable to process an automatically generated RLM Type-1
110	0	Beacon capability to process a manually generated RLM Type-1 RLM Type-2	Not capable to process a manually generated RLM Type-2
111	0	Beacon Feedback on receipt of RLM Type-1	RLM Type-1 (automatic) not received by this beacon
112	0	Beacon Feedback on receipt of RLM Type-2	RLM Type-2 (manual) not received by this beacon
113-114	01	RLS Provider Identification	GALILEO Return Link Service Provider
115-123	001110110	Latitude offset	7.0 minutes 24.0 seconds (negative)
124-132	010100010	Longitude offset	10.0 minutes 8.0 seconds (negative)
133-144	1010001111 00	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	51.377 -1.831

Table F-E.4: GNSS Self-test Mode Actions and Indications

No.	Action/Indication	Time-stamp (HH:MM:SS)	Description of action/indication	Duration of action/indication (sec)	Notes
1	GNSS Self-test mode initiation (distinct action)	00:00:00	Hold the 'TEST' button in and when the red LED stops flashing and becomes steady, release the 'TEST' button	7 sec	
2	Distinct indication of the GNSS Self-test initiation	00:00:07	The LED will flash green once and then goes into it's LED sequence	1 sec	
3	GNSS Self-test single burst transmission			520ms (with Nav input)	Observed on spectrum analyser
4	GNSS Self-test message position encoding		GNSS self-test message structure and bit values confirmed correct	1 sec (with Nav input)	Decode using TUV test system
5	Distinct indication of the GNSS Self-test PASS result	00:00:56	The LED flashes green to indicate a pass result and how many GNSS Self-Tests remain	15 sec	406 MHz burst with navigation acknowledgment
6	Distinct indication of the GNSS Self-test FAIL result	00:01:39	The LED flashes red twice and then goes into it's normal LED sequence for a failed result	14 sec	
7	Distinct indication that the manufacturer-declared limited number of GNSS Self-tests is attained				The LED will either flash green or red 13 times depending on whether the GNSS Self-Test was successful.
8	Automatic termination of the Self-test mode, irrespectively of the switch position		'Test' button held in	21 sec	If the 'Test' button is held in, the EUT turns off. The EUT ceases to draw residual current after this. See battery current measurements for details.
9	Duration of the GNSS Self-test mode	00:01:12 (with Nav input) 00:01:54 (without Nav input)			

Summary

The EUT complies with clause A.3.6 of Cospas-Sarsat T.007.



3.8 SATELLITE QUALITATIVE TESTS

3.8.1 Specification

Cospas-Sarsat T.007, Clause A.2.5

3.8.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000013 - Modification State 1

3.8.3 Date of Test

29 March 2022 & 30 March 2022

3.8.4 Test Equipment Used

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

3.8.5 Laboratory Environmental Conditions

Ambient Temperature 15.7 – 17.7°C

Relative Humidity 51.7 – 58.6%

3.8.6 Test Results



Configuration 7

Test Start: 15:50
 Test End: 09:05
 15 Hex ID: 193DF380C665C05

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

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	TCA	CTA (deg)	Location Error (km)
12	67720	193DF380C665C05*	50.817	-1.199	2022-03-29 17:51:41	9.473	0.357
13	49442	193DF380C665C05*	50.817	-1.2	2022-03-29 19:19:56	13.377	0.324
12	67721	193DF380C665C05*	50.817	-1.205	2022-03-29 19:32:10	-5.679	0.376
10	86885	193DF380C665C05*	50.817	-1.201	2022-03-29 19:45:48	14.811	0.304
13	49443	193DF380C665C05*	50.812	-1.21	2022-03-29 20:59:28	-1.168	0.633
13	49444	193DF380C665C05*	50.798	-1.205	2022-03-29 22:40:25	-17.106	1.826
10	86887	193DF380C665C05*	50.817	-1.203	2022-03-29 23:07:07	-15.461	0.312
114	14211	193DF380C665C05*	50.814	-1.2	2022-03-30 02:43:35	-8.886	0.128
114	14205	193DF380C665C05*	50.833	-1.196	2022-03-29 16:13:49	-18.866	2.116
114	14212	193DF380C665C05*	50.815	-1.206	2022-03-30 04:23:38	6.536	0.308
114	14213	193DF380C665C05*	50.798	-1.176	2022-03-30 06:02:18	19.665	2.560
12	67728	193DF380C665C05*	50.815	-1.202	2022-03-30 07:48:39	-5.889	0.079

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

$$\begin{aligned}
 \text{Ratio of Successful Solutions} &= \frac{\text{number of Doppler solutions within 5 km with } 1^\circ < \text{CTA} < 21^\circ}{\text{number of satellite passes over test duration with } 1^\circ < \text{CTA} < 21^\circ} \\
 &= \frac{12}{12} \\
 &= 100\%
 \end{aligned}$$

*NOTE: Hex ID is provided with encoded location - the Hex ID with default values is 193DF380C6FFBFF.



Summary

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



3.9 NAVIGATION SYSTEM TEST

3.9.1 Specification

Cospas-Sarsat T.007, Clause A.2.7

3.9.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000013 - Modification State 1 (A.3.8.2.1)

EPIRB3 S/N: TA000013 - Modification State 2 (A.3.8.2.2)

3.9.3 Date of Test

31 March 2022 & 12 April 2022

3.9.4 Test Equipment Used

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

3.9.5 Laboratory Environmental Conditions

Ambient Temperature 5.8 – 17.9°C

Relative Humidity 53.9 – 60.1%

3.9.6 Test Results

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

Locations:

A.3.8.2.1: 50° 52.1423' N 1° 14.6799' W ①

A.3.8.2.2: 50° 48.8584' N 1° 12.1056' W ①

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

Configuration as per C/S T.007	C/S T.007 Section A.3.8.2.1		C/S T.007 Section A.3.8.2.2	
	Time to Acquire Position (sec)	Location Error in metres	Time to Acquire Position (sec)	Location Error in metres
Configuration 7	55	23.08	56	35.53

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

① GPS Site Survey – Live Location



Summary

The EUT complies with clause A.2.7 of Cospas-Sarsat T.007.



3.10 BEACON ANTENNA TEST

3.10.1 Specification

Cospas-Sarsat T.007, Clause A.2.6

3.10.2 Equipment Under Test and Modification State

EPIRB3 S/N: TA000013 - Modification State 0

3.10.3 Date of Test

13 January 2022 & 14 January 2022

3.10.4 Test Equipment Used

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

3.10.5 Laboratory Environmental Conditions

Ambient Temperature 5.7 – 11.6°C

Relative Humidity 53.6 – 70.5%

3.10.6 Test Results

Configuration 1

Legend: **Strikeout** **Under-range** **Over-range** **Vv-Vh < 10 dB**

Azimuth Angle (Degrees)	Elevation Angle (degrees)									
	10		20		30		40		50	
	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	40.8	4.7	41.8	5.7	42.7	6.6	41.3	5.2	35.1	-1.0
30	40.5	4.4	41.7	5.7	42.7	6.6	41.0	4.9	35.2	-0.9
60	40.7	4.6	41.9	5.8	42.8	6.7	41.0	4.9	34.9	-1.2
90	41.0	4.9	42.2	6.1	42.6	6.5	40.6	4.5	34.5	-1.6
120	40.9	4.8	42.2	6.2	42.9	6.8	40.8	4.7	35.6	-0.5
150	40.6	4.5	42.1	6.0	43.2	7.1	41.3	5.2	35.3	-0.8
180	40.5	4.5	42.1	6.1	43.4	7.0	41.5	5.4	34.5	-1.6
210	40.8	4.7	42.2	6.1	43.0	6.9	41.4	5.3	34.7	-1.4
240	41.2	5.1	42.3	6.2	42.7	6.6	41.2	5.1	34.8	-1.3
270	41.0	4.9	42.4	6.3	42.3	6.2	41.2	5.1	33.7	-2.4
300	40.5	4.4	42.2	6.1	42.2	6.1	41.4	5.3	34.9	-1.2
330	40.3	4.2	42.1	6.0	42.4	6.3	41.5	5.4	35.3	-0.8

Azimuth Angle (Degrees)	Elevation Angle (degrees)									
	10		20		30		40		50	
	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh	Vv	Vh
0	108.9	82.2	109.5	68.6	109.7	81.8	107.2	80.9	99.5	77.9
30	108.6	77.2	109.4	81.0	109.7	69.2	106.9	82.0	99.4	85.8
60	108.8	74.8	109.6	85.7	109.7	79.9	106.8	88.1	98.7	90.3
90	109.1	73.5	109.9	86.9	109.6	83.9	106.4	89.1	97.9	92.2
120	109.0	74.0	109.9	85.4	109.9	84.8	106.7	87.9	99.2	91.8
150	108.7	60.6	109.8	83.3	110.2	80.6	107.2	84.4	99.3	89.3
180	108.6	78.8	109.8	77.6	110.1	78.7	107.4	80.1	98.8	84.2
210	108.9	86.0	109.8	57.6	109.9	86.4	107.3	83.1	99.1	77.9
240	109.3	88.3	109.9	77.6	109.6	89.3	107.1	88.4	99.1	80.6
270	109.1	87.8	110.1	82.5	109.3	90.2	107.0	89.6	97.9	84.6
300	108.5	86.6	109.9	83.6	109.2	89.6	107.2	89.5	99.2	84.0
330	108.4	86.0	109.8	82.6	109.4	86.4	107.4	86.7	99.6	81.3
Min (Vv-Vh)	21.0		23.0		19.1		17.3		5.7	

$$\text{EIRP}_{\text{LOSS}} = \text{Pt}_{\text{ambient}} - \text{Pt}_{\text{EOL}} = 36.09 - 35.76 = 0.33 \text{ dB}$$

$$\text{EIRP}_{\text{maxEOL}} = \text{Max}[\text{EIRP}_{\text{max}}, (\text{EIRP}_{\text{max}} - \text{EIRP}_{\text{LOSS}})] = \text{Max}[42.9, 42.6] = 42.9 \text{ dBm}$$

$$\text{EIRP}_{\text{minEOL}} = \text{Min}[\text{EIRP}_{\text{min}}, (\text{EIRP}_{\text{min}} - \text{EIRP}_{\text{LOSS}})] = \text{Min}[33.7, 33.4] = 33.4 \text{ dBm}$$

Configuration 4

Legend: **Strikeout** **Under-range** **Over-range** $V_v - V_h < 10 \text{ dB}$

Azimuth Angle (Degrees)	Elevation Angle (degrees)									
	10		20		30		40		50	
	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi	EIRP dBm	Ant dBi
0	37.6	1.5	40.6	4.5	38.6	2.5	36.8	0.7	30.0	-6.0
90	38.0	1.9	40.6	4.5	39.2	3.1	37.5	1.4	32.5	-3.6
180	37.6	1.5	40.4	4.3	39.5	3.4	38.4	2.3	34.8	-1.3
270	37.8	1.7	40.5	4.4	39.3	3.2	37.8	1.7	33.8	-2.3

$$\text{EIRP}_{\text{LOSS}} = P_{\text{tambient}} - P_{\text{tEOL}} = 36.09 - 35.76 = 0.33 \text{ dB}$$

$$\text{EIRP}_{\text{maxEOL}} = \text{Max}[\text{EIRP}_{\text{max}}, (\text{EIRP}_{\text{max}} - \text{EIRP}_{\text{LOSS}})] = \text{Max}[40.6, 40.3] = 40.6 \text{ dBm}$$

$$\text{EIRP}_{\text{minEOL}} = \text{Min}[\text{EIRP}_{\text{min}}, (\text{EIRP}_{\text{min}} - \text{EIRP}_{\text{LOSS}})] = \text{Min}[32.5, 32.1] = 32.1 \text{ dBm}$$

Summary

The EUT complies with clause A.2.6 of Cospas-Sarsat T.007.



SECTION 4

TEST EQUIPMENT USED

4.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Section 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 Beacons - Constant Temperature Tests					
Signal Generator	Marconi	2031	53	12	23-Dec-2022
Load (50ohm/30W)	Weinschel	50T-054	285	12	26-Jul-2022
Attenuator (20dB, 10W)	Weinschel	37-20-34	482	12	17-Jan-2023
Signal Generator (100kHz to 2.6GHz)	Hewlett Packard	8663A	1063	12	19-Jan-2023
Distress Beacon RF Unit	TUV SUD	-	2445	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	11-Mar-2023
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Termination (50ohm, 6W)	Micronde	R404613	3074	12	02-Dec-2022
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	10-May-2022
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	19-Aug-2022
Time Interval Analyser	Yokogawa	TA720 704510	3253	12	23-Nov-2022
Short Circuit	TUV SUD	Short Circuit	3272	-	TU
ESA-E Series Spectrum Analyser	Agilent Technologies	E4402B	3348	12	12-Jan-2023
Rubidium Frequency Standard	Symmetricon	8040C	3490	12	27-May-2022
Power Meter	Rohde & Schwarz	NRP	3491	12	29-Nov-2022
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	29-Nov-2022
Termination (50ohm)	Meca	405-1	3518	-	TU
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4510	12	24-Jan-2023
Oscilloscope	Yokogawa	DL750	4552	12	07-Apr-2022
Multi-GNSS Simulator (GPS)	Spirent	GSS6700	4596	12	20-Aug-2022
Bandpass Filter (1MHz)	KR Electronics	3219-SMA	4601	12	07-Sep-2022
Type T PFA Insulated Thermocouple	TC Limited	Type-T	4739	12	26-Jul-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5027	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-2000	5035	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-2000	5037	-	O/P Mon
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	5357	12	18-Jan-2023
Climatic Chamber	Rotronic	DY110C	5448	-	O/P Mon
Digital Timer	Radio Spares	RS Pro	5602	12	26-Aug-2022
RF distribution box	TUV SUD		5626	12	Class 1 (Int)
Thermocouple Data Logger	Pico Technology Ltd	TC-08 + Type T Thermocouple	5740	12	04-Mar-2023
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5743	24	10-Feb-2024
Humidity & Temperature meter	Rotronic	HP31 HygroPalm	5902	12	17-Feb-2023
Section 2.8 Beacons - Thermal Shock					
Attenuator (20dB, 10W)	Weinschel	37-20-34	482	12	17-Jan-2023
Signal Generator (100kHz to 2.6GHz)	Hewlett Packard	8663A	1063	12	19-Jan-2023
Distress Beacon RF Unit	TUV SUD	-	2445	-	TU

Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	10-May-2022
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	19-Aug-2022
Time Interval Analyser	Yokogawa	TA720 704510	3253	12	23-Nov-2022
Rubidium Frequency Standard	Symmetricon	8040C	3490	12	27-May-2022
Power Meter	Rohde & Schwarz	NRP	3491	12	29-Nov-2022
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	29-Nov-2022
Oscilloscope	Yokogawa	DL750	4552	12	07-Apr-2022
Multi-GNSS Simulator (GPS)	Spirent	GSS6700	4596	12	20-Aug-2022
Bandpass Filter (1MHz)	KR Electronics	3219-SMA	4601	12	07-Sep-2022
Type T PFA Insulated Thermocouple	TC Limited	Type-T	4739	12	26-Jul-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5027	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-2000	5035	-	O/P Mon
Climatic Chamber	Rotronic	DY110C	5448	-	O/P Mon
Digital Timer	Radio Spares	RS Pro	5602	12	26-Aug-2022
Section 2.9, 3.8 Beacons – Satellite Qualitative					
Copper GRP	TUV SUD	27cm Diameter	3538	-	TU
Non Conductive Standoff Box	TUV SUD	Non Conductive Standoff Box	4966	-	TU
Tester (Beacon)	WS Technologies	BT200-1100Y	5394	-	TU
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU
Humidity & Temperature meter	Rotronic	HP31 HygroPalm	5902	12	17-Feb-2023
Section 2.10 Beacons - Operating Lifetime and Battery Current Measurements					
Rubidium Frequency Standard	Quartzlock	A10-B	92	12	15-Mar-2023
Load (50ohm/30W)	Weinschel	50T-054	285	12	26-Jul-2022
Attenuator (20dB, 10W)	Weinschel	37-20-34	482	12	17-Jan-2023
Power Splitter	Weinschel	1506A	606	12	20-Jul-2022
Signal Generator	Marconi	2031	2015	12	31-Mar-2023
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	11-Mar-2023
Hygrometer	Rotronic	I-1000	2891	12	04-Nov-2022
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	10-May-2022
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	19-Aug-2022
Power Meter	Rohde & Schwarz	NRP	3491	12	29-Nov-2022
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	29-Nov-2022
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3783	12	24-Jun-2022
Fused 100ohm Resistor Pack	TUV SUD	n/a	3823	-	O/P Mon
Multi-GNSS Simulator (GPS)	Spirent	GSS6700	4596	12	20-Aug-2022
GPS Simulator	Spirent	GSS7000	4978	12	21-Jul-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5027	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-1000	5029	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-2000	5037	-	O/P Mon
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	5357	12	18-Jan-2023
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU
Environmental Chamber	ACS	DY110TC	5589	-	O/P Mon
High resolution data logger	Pico Technology Ltd	PicoLog ADC20	5594	12	23-Aug-2022
Digital Timer	Radio Spares	RS Pro	5602	12	26-Aug-2022

RF distribution box	TUV SUD		5626	12	Class 1 (Int)
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5743	24	10-Feb-2024
Section 2.11 Beacons - Temperature Gradient Combined					
Attenuator (20dB, 10W)	Weinschel	37-20-34	482	12	17-Jan-2023
Signal Generator (100kHz to 2.6GHz)	Hewlett Packard	8663A	1063	12	19-Jan-2023
Distress Beacon RF Unit	TUV SUD	-	2445	-	TU
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	10-May-2022
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	12	19-Aug-2022
Time Interval Analyser	Yokogawa	TA720 704510	3253	12	23-Nov-2022
Rubidium Frequency Standard	Symmetricon	8040C	3490	12	27-May-2022
Power Meter	Rohde & Schwarz	NRP	3491	12	29-Nov-2022
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	29-Nov-2022
Oscilloscope	Yokogawa	DL750	4552	12	07-Apr-2022
Multi-GNSS Simulator (GPS)	Spirent	GSS6700	4596	12	20-Aug-2022
Bandpass Filter (1MHz)	KR Electronics	3219-SMA	4601	12	07-Sep-2022
Vector Signal Generator	Keysight Technologies	ESG E4438C	4731	12	10-Feb-2023
Type T PFA Insulated Thermocouple	TC Limited	Type-T	4739	12	26-Jul-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5027	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-2000	5035	-	O/P Mon
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	5357	12	18-Jan-2023
Climatic Chamber	Rotronic	DY110C	5448	-	O/P Mon
Digital Timer	Radio Spares	RS Pro	5602	12	26-Aug-2022
RF distribution box	TUV SUD		5626	12	Class 1 (Int)
Section 2.12, 3.9 Beacons - Navigation System					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	35	12	01-Apr-2022
RF Shielded Enclosure	Rittal	AE1380	162	-	TU
Termination (50ohm)	Meca	405-1	364	12	15-Dec-2022
Termination	Meca	405-1	374	12	Class 1 (Int)
Attenuator (10dB, 10W)	Weinschel	23-10-34	470	12	17-Feb-2023
Directional Coupler	Narda	3022	1323	12	08-Jul-2022
Hygrometer	Rotronic	I-1000	1897	12	26-Nov-2022
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3159	12	19-Apr-2022
ESA-E Series Spectrum Analyser	Agilent Technologies	E4402B	3348	12	12-Jan-2023
Termination (50ohm)	Meca	405-1	3518	-	TU
Copper GRP	TUV SUD	27cm Diameter	3538	-	TU
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3701	12	05-Aug-2022
Multi-GNSS Simulator (GPS)	Spirent	GSS6700	4596	12	20-Aug-2022
Non Conductive Standoff Box	TUV SUD	Non Conductive Standoff Box	4966	-	TU
Cable (18 GHz)	Rosenberger	LU7-036-2000	5039	12	20-Oct-2022
Cable (18 GHz)	Rosenberger	LU7-071-1000	5096	12	20-Oct-2022
Tester (Beacon)	WS Technologies	BT200-1100Y	5394	-	TU
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU



Desktop Stopwatch	Radio Spares	RS Pro	5571	12	16-Jul-2022
Humidity & Temperature meter	Rotronic	HP31 HygroPalm	5902	12	17-Feb-2023
Section 2.13, 3.10 Beacons - Antenna Characteristics					
Roberts Antenna 406MHz	Compliance Design		1860	24	13-Jul-2022
Hygrometer	Rotronic	HP21	3718	0	14-Apr-2022
Inclinometer, Digital	Radio Spares	01-900-020003 (RS 667-3916)	4125	12	16-Nov-2022
30m LMR-300-DB COAXIAL CABLE	IntelliConnect Limited	C-NPNP-LMR300DB-30M	5588	12	07-Jul-2023
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5743	24	03-Feb-2022
Section 2.15 Beacons – RLM Reception Verification					
Non Conductive Standoff Box	TUV SUD	Non Conductive Standoff Box	4966	-	TU
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU
Humidity & Temperature meter	Rotronic	HP31 HygroPalm	5902	12	17-Feb-2023
Section 2.16 Marine – Testing Operator Controls					
Rubidium Frequency Standard	Quartzlock	A10-B	92	12	15-Mar-2023
Signal Generator	Hewlett Packard	8644A	96	12	06-May-2022
Beacon RF Unit	TUV SUD	N/A	97	-	TU
Attenuator: 10dB/20W	Narda	766-10	480	12	03-Aug-2022
Attenuator (10dB/100W)	Bird	8343-100	495	12	01-Sep-2022
Hygrometer	Rotronic	I-1000	2891	12	04-Nov-2022
Termination (50ohm, 6W)	Micronde	R404613	3074	12	02-Dec-2022
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	10-May-2022
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-03-34	3162	12	02-Jul-2022
ScopeCorder	Yokogawa	DL750 701210	3254	12	16-Nov-2022
Power Meter	Rohde & Schwarz	NRP	3491	12	29-Nov-2022
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	29-Nov-2022
Time Interval Analyser	Yokogawa	TA720	4550	12	17-Mar-2023
Bandpass Filter (1MHz)	KR Electronics	3219-SMA	4602	12	07-Sep-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5025	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-1000	5032	-	O/P Mon
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU
Desktop Stopwatch	Radio Spares	RS Pro	5571	12	16-Jul-2022

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

OP MON – Output Monitored with Calibrated Equipment



4.2 MEASUREMENT UNCERTAINTY

Summary of Uncertainty Values

Measured Parameter	C/S Required Uncertainty	Calculated Lab Uncertainty
Repetition Time	± 0.01 seconds	± 0.0006 seconds CL 95%
Total Transmission Time	± 1.0 ms	± 0.062 ms CL 95%
CW Preamble	± 1.0 ms	± 0.062 ms CL 95%
Bit Rate	± 0.6 bps	± 0.0014 bps CL 95%
Nominal frequency	± 100 Hz	± 1.24 Hz CL 95%
Short-Term Stability	$\pm 1 * 10^{-10}$	$\pm 0.79 * 10^{-10}$ CL 95%
Medium-Term Stability – MS	$\pm 1 * 10^{-10}$	$\pm 2.04 * 10^{-11}$ CL 95%
Medium-Term Stability – RFV	$\pm 1 * 10^{-10}$	$\pm 3.34 * 10^{-11}$ CL 95%
Conducted Transmitted Power	± 0.5 dB	± 0.49 dB CL 95%
Carrier Power Rise Time	± 0.5 ms	± 0.051 ms CL 95%
Modulation Rise / Fall Time	± 25 μ s	± 4.32 μ s CL 95%
Modulation Symmetry	± 0.01	± 0.0014 CL 95%
Modulation Phase Deviation	± 0.04 radians	± 0.0384 radians CL 95%

All uncertainty calculations were carried out in accordance with UKAS M3003.



SECTION 5

PHOTOGRAPHS

5.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



EPIRB3 Pro – Radiated Sample



EPIRB3 Pro – Conducted Sample



EPIRB3 – Radiated Sample



Antenna Characteristics – Configuration 1



Antenna Characteristics – Configuration 4



Satellite Qualitative Test – Configuration 5



Satellite Qualitative Test – Configuration 7



Satellite Qualitative Test – Configuration 8



Position Acquisition Time and Position Accuracy Test – Configuration 5 – A.3.8.2.2



Position Acquisition Time and Position Accuracy Test – Configuration 7 – A.3.8.2.1



Position Acquisition Time and Position Accuracy Test – Configuration 8 – A.3.8.2.2



Moffset Test – Configuration 8