



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-40°C)	(+21°C)	(+55°C)	
8(a). Self-test Mode						
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD						
Frame sync	011010000	P / F	P	P	P	For RLS-capable beacons
Format flag	1 / 0	bit value	1	1	1	
Single radiated burst	≤440 / 520 (±1%)	ms	520.633	520.672	520.703	
Default position data (if applicable)	correct	P / F	P	P	P	
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	P	P	P	
Provides for 15 Hex ID	correct	P / F	P	P	P	
121.5 MHz RF power (if applicable)	verify that RF power emitted	P / F	P	P	P	
406 MHz power	verify that RF power emitted	P / F	P	P	P	
Distinct indication of Self-Test	provided	Y / N	Y	Y	Y	See Battery Current measurements (section 2.9.6)
Distinct indication of RF power being emitted	provided	Y / N	Y	Y	Y	
Indication of Self-Test result	provided	Y / N	Y	Y	Y	
Distinct indication of insufficient battery capacity	provided	Y / N	Y			
Distinct indication if the beacon is coded with the RLS Location protocol (i.e. if the RLS function is enabled), and the RLS and RLM indicator(s) are operating as described in section 4.5.4 e) of document C/S T.001	provided	Y / N	N/A			
Maximum duration of Self-Test mode	≤ maximum duration of Self-Test	sec	32	32	32	
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	Y			



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin (-40°C)	Tamb (+21°C)	Tmax (+55°C)	
8 (b). GNSS Self-Test Mode (if applicable)						
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD						
Frame sync	011010000	P / F	P	P	P	Manufacturer specified value: 190
Format flag	1 / 0	bit value	1	1	1	
Radiated burst duration	≤ 520 (+1%) must be within 200 m of the actual horizontal position and 700 m of the altitude	ms	520.633	520.672	520.703	
Position data for ELT(DT)		P / F	P	P	P	
Design data showing how GNSS Self-test is limited in number of transmissions and duration	provided	Y / N	Y			
Single burst verification (if applicable)	one burst	P / F	P	P	P	
121.5 MHz RF power (if applicable)	verify that RF power is emitted	Y / N	Y	Y	Y	
406 MHz power (if applicable)	verify that RF power is emitted	Y / N	Y	Y	Y	
Maximum duration of GNSS Self-tests	Manufacturer to specify value	s	190	190	190	
Actual duration of Self-test with encoded location	Less than maximum duration	s	36	36	36	
Maximum number of GNSS Self-tests (only beacons with internal navigation devices)	Manufacturer to specify number	Number	60			Manufacturer specified number: 60
Distinct indication to register successful completion or failure of the GNSS self-test	must be provided	Y/N	Y	Y	Y	
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	must be provided	Y/N	Y			
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			
						See Battery Current measurements (section 2.9.6)

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

Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD

Frame sync	011010000	P / F	P	P	P	Manufacturer specified value: 190
Format flag	1 / 0	bit value	1	1	1	
Radiated burst duration	≤ 520 (+1%) must be within 200 m of the actual horizontal position and 700 m of the altitude	ms	520.633	520.672	520.703	
Position data for ELT(DT)		P / F	P	P	P	
Design data showing how GNSS Self-test is limited in number of transmissions and duration	provided	Y / N	Y			
Single burst verification (if applicable)	one burst	P / F	P	P	P	
121.5 MHz RF power (if applicable)	verify that RF power is emitted	Y / N	Y	Y	Y	
406 MHz power (if applicable)	verify that RF power is emitted	Y / N	Y	Y	Y	
Maximum duration of GNSS Self-tests	Manufacturer to specify value	s	190	190	190	
Actual duration of Self-test with encoded location	Less than maximum duration	s	36	36	36	
Maximum number of GNSS Self-tests (only beacons with internal navigation devices)	Manufacturer to specify number	Number	60			Manufacturer specified number: 60
Distinct indication to register successful completion or failure of the GNSS self-test	must be provided	Y/N	Y	Y	Y	
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	must be provided	Y/N	Y			
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			
See Battery Current measurements (section 2.9.6)						



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin	Tamb	Tmax	
			(-40°C)	(+21°C)	(+55°C)	
8(a). Self-test Mode						
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol						
Frame sync	011010000	P / F	P	P	P	For RLS-capable beacons
Format flag	1 / 0	bit value	1	1	1	
Single radiated burst	≤440 / 520 (±1%)	ms	520.609	520.672	520.703	
Default position data (if applicable)	correct	P / F	P	P	P	
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	P	P	P	
Provides for 15 Hex ID	correct	P / F	P	P	P	
121.5 MHz RF power (if applicable)	verify that RF power emitted	P / F	P	P	P	
406 MHz power	verify that RF power emitted	P / F	P	P	P	
Distinct indication of Self-Test	provided	Y / N	Y	Y	Y	See Battery Current measurements (section 2.9.6)
Distinct indication of RF power being emitted	provided	Y / N	Y	Y	Y	
Indication of Self-Test result	provided	Y / N	Y	Y	Y	
Distinct indication of insufficient battery capacity	provided	Y / N	Y			
Distinct indication if the beacon is coded with the RLS Location protocol (i.e. if the RLS function is enabled), and the RLS and RLM indicator(s) are operating as described in section 4.5.4 e) of document C/S T.001	provided	Y / N	N/A			
Maximum duration of Self-Test mode	≤ maximum duration of Self-Test	sec	32	32	32	
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	Y			



Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			Tmin (-40°C)	Tamb (+21°C)	Tmax (+55°C)	
8 (b). GNSS Self-Test Mode (if applicable)						
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol						
Frame sync	011010000	P / F	P	P	P	
Format flag	1 / 0	bit value	1	1	1	
Radiated burst duration	≤ 520 (+1%) must be within 200 m of the actual horizontal position and 700 m of the altitude	ms	520.609	520.672	520.711	
Position data for ELT(DT)	provided	P / F	P	P	P	
Design data showing how GNSS Self-test is limited in number of transmissions and duration	one burst	Y / N	Y			
Single burst verification (if applicable)	verify that RF power is emitted	P / F	P	P	P	
121.5 MHz RF power (if applicable)	verify that RF power is emitted	Y / N	Y	Y	Y	
406 MHz power (if applicable)	Manufacturer to specify value	s	190	190	190	
Maximum duration of GNSS Self-tests	Less than maximum duration	s	36	36	36	
Actual duration of Self-test with encoded location	Manufacturer to specify number	Number	60			
Maximum number of GNSS Self-tests (only beacons with internal navigation devices)	must be provided	Y/N	Y	Y	Y	
Distinct indication to register successful completion or failure of the GNSS self-test	must be provided	Y/N	Y			
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	verify automatic termination of GNSS self-test mode, irrespective of the switch position	Y/N	Y			
Automatic termination of the GNSS self-test mode upon completion of the GNSS self-test cycle and indication of the results						
Result: Pass						
Manufacturer specified value: 190						
Manufacturer specified number: 60						
See Battery Current measurements (section 2.9.6)						

Manufacturer specified value: 190

Manufacturer specified number: 60

See Battery Current measurements (section 2.9.6)



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
9. Thermal Shock				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Soak Temperature	50°C difference	°C	23	Not applicable to ELT(DT)
Measurement Temperature		°C	-30	
Transmitted Frequency			Min	
Nominal value			Max	
Short-term stability	C/S T.001 ≤ 2x10 ⁻⁹	MHz /100ms	406.0310337	
Medium-term stability – Slope	(-2 to +2)x10 ⁻⁹	/min	9.01E-11	
Medium-term stability – Residual frequency variation	≤ 3x10 ⁻⁹		N/A	
Transmitter power output	36 - 39	dBm	N/A	
Digital message	correct	P/F	37.45	
			37.71	
			P	
Result: Pass				

Note: the parameters above are to be met immediately after beacon activation and maintained for 2 hours.



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
10. Operating Lifetime at Minimum Temperature				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD				
Pre-test battery discharge duration (at 94mA) required		Hours	8.55	Result: Pass
Pre-test battery discharge duration (at 94mA)		Hours	7.62	
Duration	>370	min	1450.8 mins at Tmin = -40°C	
Effective Operating Lifetime duration	>370	min	1450.8 mins at Tmin = -40°C	
Transmitted Frequency			Min Max	Min/Max results are up to the manufacturer declared lifetime of 24hrs.
Nominal value	C/S T.001	MHz	406.0310727	
Short-term stability	$\leq 2 \times 10^{-9}$	/100ms	5.18E-11	
Medium-term stability – Slope	$(-1 \text{ to } +1) \times 10^{-9}$	/min	N/A	Not applicable to ELT(DT)
Medium-term stability – Residual frequency variation	$\leq 3 \times 10^{-9}$		N/A	
Transmitter power output	36 - 39	dBm	36.83	
PT _{EOL} is the minimum transmitter power output observed during the operating lifetime at minimum temperature test	36 - 39	dBm	36.83	
Digital message	correct	P/F	P	
Homer transmitter continuous operation during the lifetime test		hours	64.56*	*Calculated based on updated discharge required for F-E.2 (See Annex B.)
Homer frequency		MHz	Start of Test	End of test taken as 54h10m (Manufacturer declared worst case scenario (48hrs + 6h10m)).
Homer peak power level		dBm	121.6495	
Homer transmitter duty cycle		%	20.7	
			36.93	
			End of Test	
			121.6485	
			20.8	
			37.25	



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
11. Temperature Gradient (33°C/hr)				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Full Test				
Transmitted Frequency	C/S T.007 ≤ 2x10 ⁻⁹ (-1 to +1)x10 ⁻⁹ (-2 to +2)x10 ⁻⁹ ≤ 3x10 ⁻⁹ 36 – 39 correct	MHz	Min 406.0311122 8.72E-11 N/A N/A N/A 37.1	Max 406.0309778 1.83E-10 N/A N/A N/A 37.67
Nominal value		/100ms		
Short-term stability		/min		
Medium-term stability – Slope ¹		/min		
Medium-term stability – Residual frequency variation				
Transmitter power output		dBm		
Digital message		P/F	P	
12. Oscillator Aging				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0				
5-year carrier nominal frequency variation	C/S T.001, section 2.3.1	kHz	0.0203*	*See manufactures provided information: Exhibit 5i-vii Rev00 RTR112 E7913LF MTS 5-year prediction
MTS analysis	Must demonstrate compliance	Pass/Fail	N/A	Not Applicable to ELT(DT)s
13. Protection Against Continuous Transmission				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0				
Description	provided	Y / N	Y	Applicant's data, see Annex A for details
14. Satellite Qualitative Tests				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD				
Test Configuration	As per C/S T.007	Configuration 6		
Produce an alert with a complete valid beacon message at least once per minute for >90% of the time Encoded location provided accurate within 200m 2D for >90% of the alerts Encoded location provided by the MEOLUT as per the pass/fail criteria A.2.5 c) (i, ii, and iii) for altitude	≥ 90	%	Test 1 100	Test 2 100
	≥ 90	%	98.7	98.7
	≥ 90	%	100	100
	≥ 90	%	100	100



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
15. Antenna Characteristics (Raw Results)				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Test Configuration	As per C/S T.007		Configuration	
Polarisation	linear or RHCP		1 2 3 4	
VSWR	≤ 1.5		-	Detachable Antennas Only
EIRP _{Loss}		dB	-	
EIRP _{maxEOL}	≤ 45	dBm	-	Cable Loss = 0.69dB
EIRP _{minEOL}	≥ 34	dBm	-	Cable Loss = 0.69dB
Result: Pass				
15. Antenna Characteristics (Adjusted for Minimum Cable Loss)				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Test Configuration	As per C/S T.007		Configuration	
Polarisation	linear or RHCP		1 2 3 4	
VSWR	≤ 1.5		-	Detachable Antennas Only
EIRP _{Loss}		dB	-	
EIRP _{maxEOL}	≤ 45	dBm	-	Cable Loss = 0dB
EIRP _{minEOL}	≥ 34	dBm	-	Cable Loss = 0dB
Result: Pass				
15. Antenna Characteristics (Adjusted for Maximum Cable Loss)				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Test Configuration	As per C/S T.007		Configuration	
Polarisation	linear or RHCP		1 2 3 4	
VSWR	≤ 1.5		-	Detachable Antennas Only
EIRP _{Loss}		dB	-	
EIRP _{maxEOL}	≤ 45	dBm	-	Cable Loss = 1.8dB
EIRP _{minEOL}	≥ 34	dBm	-	Cable Loss = 1.8dB
Result: Pass				



16. Beacon Coding Software					Result: Pass	
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000005, TUV Ref: TSR8 and Modification State 0, Protocol: ELT DT Location Protocol and ELT DT Location Protocol with 3LD						
Sample message provide for each coding option of the applicable coding type	Correct	P/F	P	P	Applicant's data, see Annex A for details	
Sample self-test message provided for each coding option of the applicable coding types	Correct	P/F	P	P		



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
17. Navigation System				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000005, TUV Ref: TSR8 and Modification State 0, Protocol: ELT DT Location Protocol with 3LD (for position data encoding)				
Location protocol	C/S T.001 correct	P / F	P	*First burst encoded with Navigation data. This meets the position acquisition time of <3 seconds as the beacon checks position 2 seconds prior to transmission.
Position data default values	C/S T.001	P / F	P	
Freshness of the encoded position	<200	m	22.7	
Configuration 6	<3	sec	4.72*	See Annex K – Completed in ELT(DT) Location Protocol
Position accuracy - A.3.8.2.1	<200	m	35.7	
Position Acquisition Time - A.3.8.2.1	<3	sec	4.76*	
Position accuracy - A.3.8.2.2	>every burst cleared	P / F	P	** Limits stated in section A.3.8.5 of T.007
Position Acquisition Time - A.3.8.2.2	must be provided	P / F	P	
Encoded position data update interval	as per C/S T.001, section 4.5.5.6	P/F	P	
Position clearance after deactivation	<2 sec	P/F	P	Applicant's data, see Annex A for details
Information provided on manufacturers location data update scheme	5 – 5.25 min**	P/F	P	
Internal navigation device update intervals				
Position data input update interval (as applicable)				Applicant's data, see Annex A for details
Stored position cleared within interval				
External Input				
Position accuracy - A.3.8.2.1	<200	m	16.3	Applicant's data, see Annex A for details
Position Acquisition Time - A.3.8.2.1	<3	sec	4.81*	
Position accuracy - A.3.8.2.2	<200	m	60.1	
Position Acquisition Time - A.3.8.2.2	<3	Sec	4.74*	Applicant's data, see Annex A for details
Position data encoding	correct	P / F	P	
Retained last valid position after navigation input lost	240(±5)	min	240.25	
Default position data transmitted after 240(±5) minutes without valid position data	cleared	P / F	P	Applicant's data, see Annex A for details
Information on protection against beacon degradation due to navigation device, interface or signal failure or malfunction	provided	Y / N	Y	



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
18. Return Link Service (RLS)				Not Applicable
19. Prevention of Continuous Transmission				Not Applicable
20. Activation and Cancellation Message Test (ELT (DT)) only				Result: Pass
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Activation and De-activation Tests	Message Bits 107-108 comply with Table A.2	P/F	P	See test results section for details
Cancellation Message Tests	Comply with A.3.9.2	P/F	P	
Nominal transmitted frequency	C/S T.001	MHz	406.0309262	Note: The results presented in this summary section are samples measured during the test. For full details, see test results section.
Transmitter Output Power	36-39	dBm	37.93	
Modulation Rise Time (min and max)	maximum minimum	µsec	115.5 112.7	
Modulation Fall Time (min and max)	maximum minimum	µsec	112 109.9	
Phase Deviation: positive (min and max)	maximum minimum	radians	1.075 1.05	
Phase Deviation: negative (min and max)	maximum minimum	radians	-1.092 -1.066	
Modulation Symmetry	≤0.05		0.03417	
Digital Message	Correct	P/F	P	See test results section for details
Transmission of First Cancellation Message	Within 5 seconds of deactivation	P/F	P	
Number of Cancellation Messages	10	P/F	P	See test results section for details
Interval between Cancellation Messages	10 seconds ±0.5 seconds	P/F	10.001	
Reactivation Test	Comply with section A.3.9.3	P/F	P	



Parameters to be Measured	Range of Specification	Units	Test Results	Comments
21. Testing ELT(DT)s with External Power Source (if applicable)				
22. Testing Beacon Controls				
Model: KANNAD ULTIMA-DT-05, S/N: TO0010000002, TUV Ref: TSR1 and Modification State 0, Protocol: ELT DT Location Protocol				
Self-test controls	Comply with A.3.10.1 (i)	P/F	P	
GNSS self-test controls	Comply with A.3.10.1 (ii)	P/F	P	
Operational controls	Comply with A.3.10.2	P/F	P	

Not Applicable
Result: Pass



2.1 POWER OUTPUT

2.1.1 Specification

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

2.1.2 Equipment Under Test and Modification State

ULTIMA-DT-05 S/N: TO0010000002 - Modification State 0

2.1.3 Date of Test

28 January 2022, 31 January 2022, 01 February 2022, 03 February 2022 and 15 February 2022

2.1.4 Test Equipment Used

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

2.1.5 Laboratory Environmental Conditions

Ambient Temperature 21.5 - 25.6°C

Relative Humidity 22.7 - 34.5%

2.1.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 1 of section 1.3.2

EUT Operating Mode

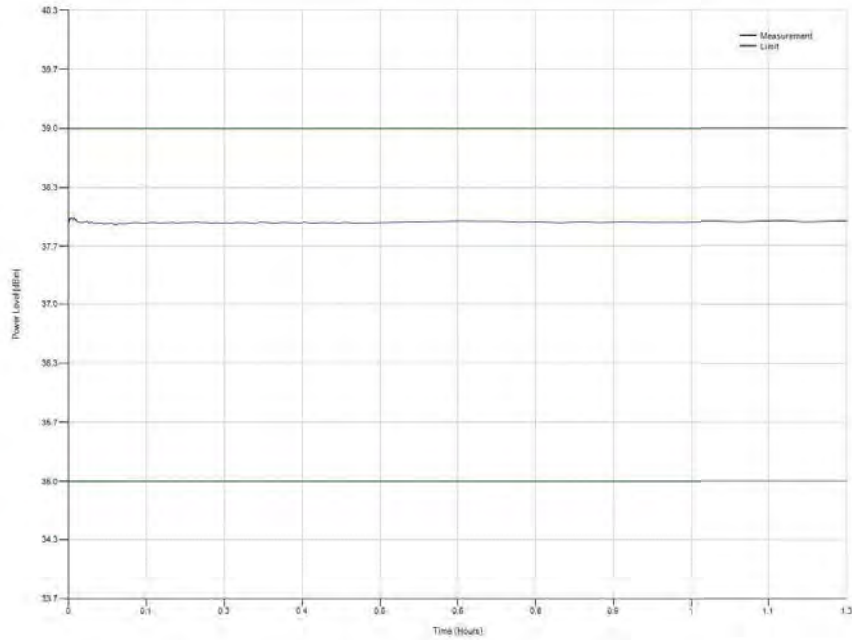
As described in section 1.3.3 'Operating (Active)'

Test Duration

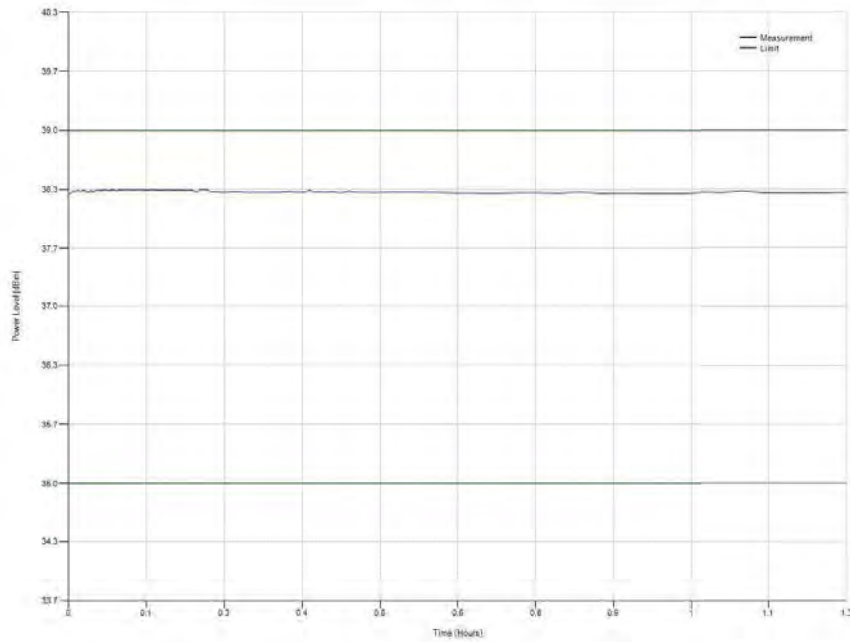
75 minutes (EUT encoded with 3LD)

30 minutes (EUT encoded with non 3LD)

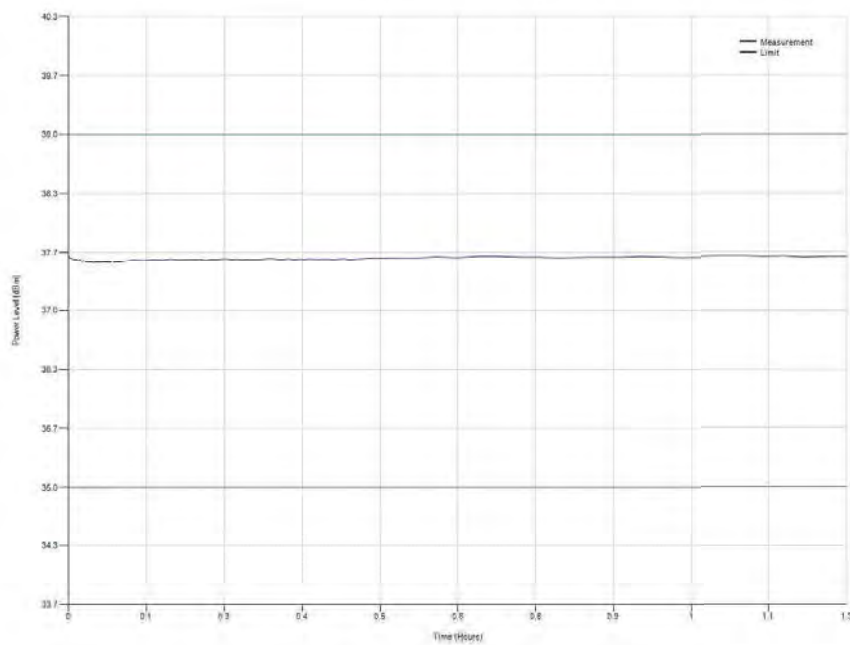
Ambient Temperature – ELT DT Location Protocol with 3LD



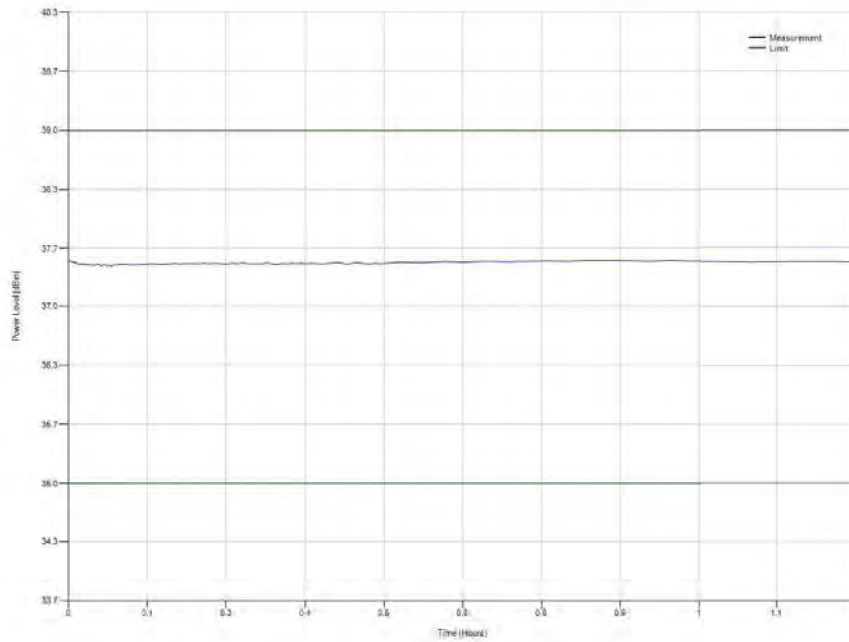
Low Temperature – ELT DT Location Protocol with 3LD



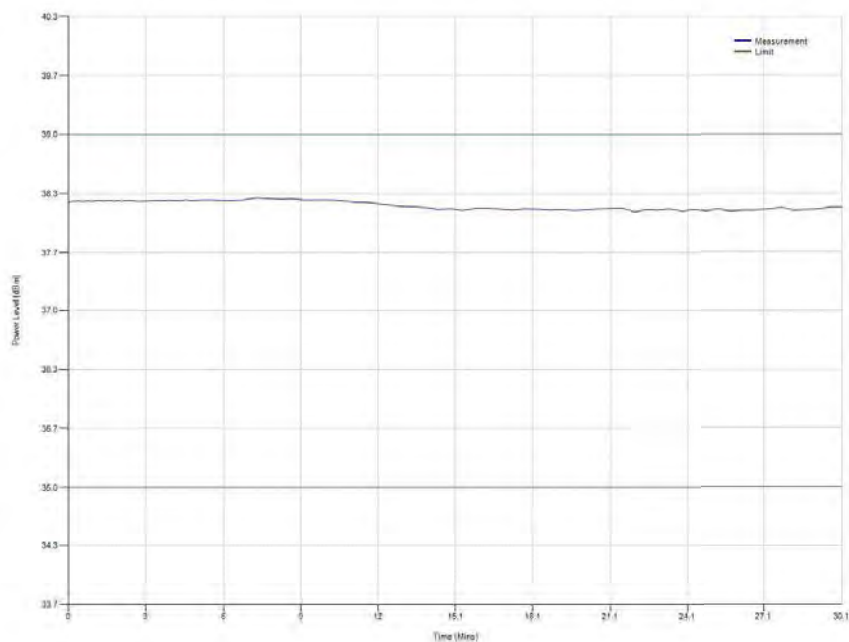
High Temperature – ELT DT Location Protocol with 3LD



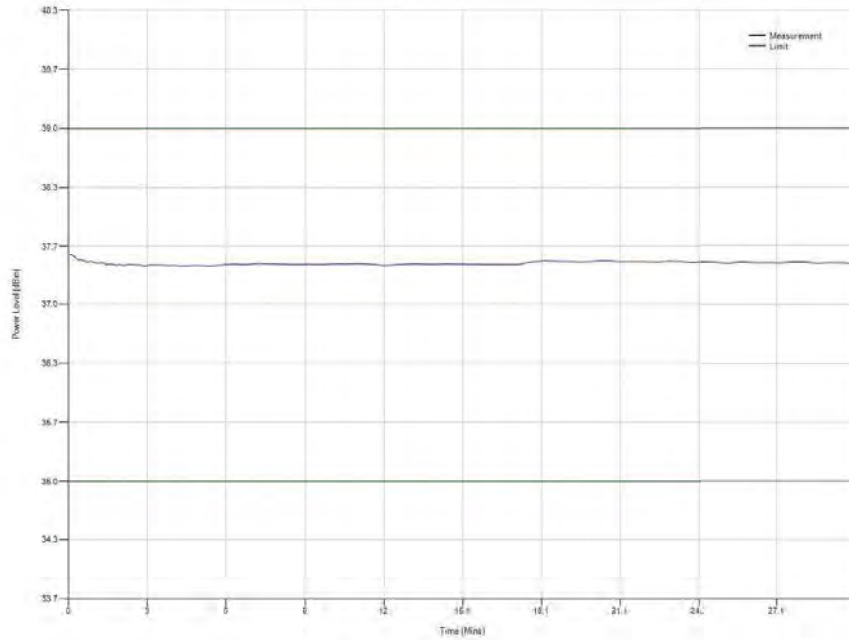
Ambient Temperature – ELT DT Location Protocol



Low Temperature – ELT DT Location Protocol



High Temperature – ELT DT Location Protocol



Summary

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



2.2 DIGITAL MESSAGE

2.2.1 Specification

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

2.2.2 Equipment Under Test and Modification State

ULTIMA-DT-05 S/N: TO0010000002 - Modification State 0

2.2.3 Date of Test

27 January 2022, 28 January 2022, 31 January 2022 and 01 February 2022

2.2.4 Test Equipment Used

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

2.2.5 Laboratory Environmental Conditions

Ambient Temperature 23.1 - 26.6°C

Relative Humidity 22.7 - 31.3%

2.2.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 1 of section 1.3.2

EUT Operating Mode

As described in section 1.3.3 'Operating (Active)'

Test Duration

75 minutes (EUT encoded with 3LD)

30 minutes (EUT encoded with non 3LD)

Note: For the results presented in the table below, example decodes have been provided.



Message	Temperature	Activation Method	Protocol
FFFE2F8C99000000147648E3D395E00F0F75 ¹	Ambient	Crash Sensor	ELT DT Location Protocol with 3LD – Normal Message
FFFE2F8C99000000147648E3D395E00F0F75 ¹	Low		
FFFE2F8C99000000147648E3D395E00F0F75 ¹	High		
FFFE2F8C99000000147648E3D3950452A17E ²	Ambient	Crash Sensor	ELT DT Location Protocol with 3LD – 3LD Message
FFFE2F8C99000000147648E3D3950452A17E ²	Low		
FFFE2F8C99000000147648E3D3950452A17E ²	High		
FFFE2F8C99000000147648E3D385E00F02FA ³	Ambient	Manual Activation	ELT DT Location Protocol with 3LD – Normal Message
FFFE2F8C99000000147648E3D385E00F02FA ³	Low		
FFFE2F8C99000000147648E3D385E00F02FA ³	High		
FFFE2F8C99000000147648E3D3850452ACF ¹⁴	Ambient	Manual Activation	ELT DT Location Protocol with 3LD – 3LD Message
FFFE2F8C99000000147648E3D3850452ACF ¹⁴	Low		
FFFE2F8C99000000147648E3D3850452ACF ¹⁴	High		
FFFE2F8C99000000147648E3D395E00F0F75 ¹	Ambient	Crash Sensor	ELT DT Location Protocol – Normal Message
FFFE2F8C99000000147648E3D395E00F0F75 ¹	Low		
FFFE2F8C99000000147648E3D395E00F0F75 ¹	High		
FFFE2F8C99000000147648E3D385E00F02FA ³	Ambient	Manual Activation	ELT DT Location Protocol – Normal Message
FFFE2F8C99000000147648E3D385E00F02FA ³	Low		
FFFE2F8C99000000147648E3D385E00F02FA ³	High		

Message¹

Decoded Beacon Message

Hexadecimal code: FFFE2F8C99000000147648E3D395E00F0F75

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:
19320000003FDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-16	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 16-bit positions	True
16-24	000101111	Frame Synchronization Pattern	Correct, Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT identity Type	Aircraft 24 bit address
43-86	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-86 are all 0 or All 1, designates Test Protocol
87-75	010100011	Latitude	81.5 Degrees North (81.5)
76-86	1011001001	Longitude	100.5 Degrees West (-100.5)
88-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	01	means of activation	automatic activation by the beacon
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9186 ft)
113-114	11	Encoded location freshness or PDF-2 rotating field indicator	Encoded location in message is current (i.e., the encoded location freshness is less or equal to 2 seconds)
115-123	100000000	Latitude offset	0.0 minutes 0.0 seconds (positive)
124-132	011110000	Longitude offset	15.0 minutes 0.0 seconds (negative)
133-144	1111011101 01	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.500 -100.250

Message²

Decoded Beacon Message

Hexadecimal code: FFFE2F8C99000000147648E3D3950452A17E

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:
19320000003FDFF

* WARNING: Location is a coarse position only, and hence has less resolution/accuracy than a message without the rotating field

Binary Range	Binary Content	Field Name	Decoded Value
1-16	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 16-bit positions	True
18-24	000101111	Frame Synchronization Pattern	Correct. Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-66	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-66 are all 0 or All 1, designates Test Protocol
67-76	010100011	Latitude	81.6 Degrees North (81.6)
76-86	1011001001	Longitude	100.6 Degrees West (-100.6)
86-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	01	means of activation	automatic activation by the beacon
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9186 ft)
113-114	00	Encoded location freshness or PDF-2 rotating field indicator	PDF-2 rotating field indicator
115-117	000	Aircraft operator 3LD designator or Spare	Aircraft operator 3LD designation
118-132	1000101001 01010	Aircraft operator 3LD	ZLR
133-144	0001011111 10	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.600 -100.600

Message³

Decoded Beacon Message

Hexadecimal code: FFFE2F6C99000000147648E3D385E00F02FA

The code consists of 38 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:
19320000003FDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-16	1111111111111111	Bit-synchronization pattern consisting of 1's shall occupy the first 16-bit positions	True
16-24	000101111	Frame Synchronization Pattern	Correct Operational Message
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	1001	Protocol Code	ELT - Location; ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-88	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-88 are all 0 or All 1, designates Test Protocol
89-75	010100011	Latitude	81.5 Degrees North (81.5)
76-85	1011001001	Longitude	100.5 Degrees West (-100.5)
88-106	0001110001 1110100111 0	BCH-1 error-correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	00	means of activation	manual activation by user
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9186 ft)
113-114	11	Encoded location freshness or PDF-2 rotating field indicator	Encoded location in message is current (i.e., the encoded location freshness is less or equal to 2 seconds)
115-123	100000000	Latitude offset	0.0 minutes 0.0 seconds (positive)
124-132	011110000	Longitude offset	15.0 minutes 0.0 seconds (negative)
133-144	0010111110 10	BCH-2 error-correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.500 -100.250

Message⁴

Decoded Beacon Message

Hexadecimal code: FFFE2F8C99000000147648E3D3850452ACF1

The code consists of 38 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 5

Unique identifier:
1932000003FDFF

- WARNING: Location is a coarse position only, and hence has less resolution/accuracy than a message without the rotating field

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	Correct: Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-66	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-66 are all 0 or All 1; designates Test Protocol
67-75	010100011	Latitude	81.5 Degrees North (81.5)
76-85	1011001001	Longitude	100.5 Degrees West (-100.5)
86-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	00	means of activation	manual activation by user
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9188 ft)
113-114	00	Encoded location freshness or PDF-2 rotating field indicator	PDF-2 rotating field indicator
115-117	000	Aircraft operator 3LD designator or Spare	Aircraft operator 3LD designation
118-132	1000101001 01010	Aircraft operator 3LD	ZLR
133-144	1100111100 01	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location:	81.500 -100.500

Summary

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



2.3 MODULATION

2.3.1 Specification

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

2.3.2 Equipment Under Test and Modification State

ULTIMA-DT-05 S/N: TO0010000002 - Modification State 0

2.3.3 Date of Test

27 January 2022, 28 January 2022, 31 January 2022, 01 February 2022 and 03 February 2022

2.3.4 Test Equipment Used

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

2.3.5 Laboratory Environmental Conditions

Ambient Temperature 23.1 - 26.6°C

Relative Humidity 22.7 - 32.3%

2.3.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 1 of section 1.3.2

EUT Operating Mode

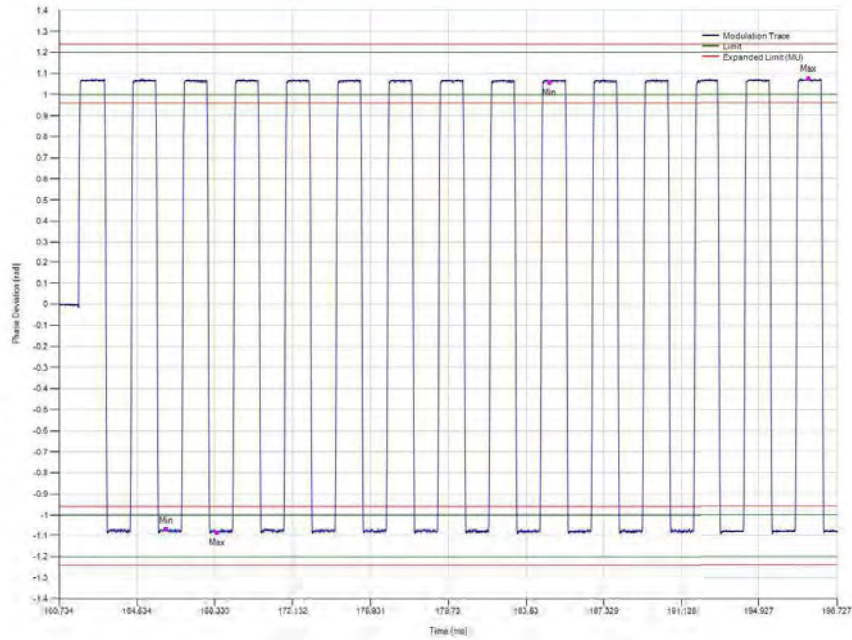
As described in section 1.3.3 'Operating (Active)'

Test Duration

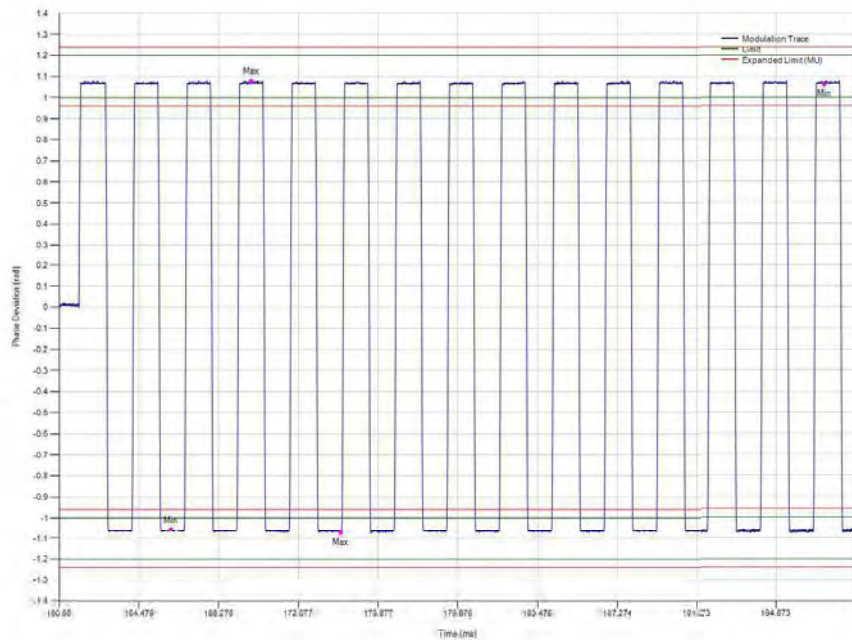
75 minutes (EUT encoded with 3LD)

30 minutes (EUT encoded with non 3LD)

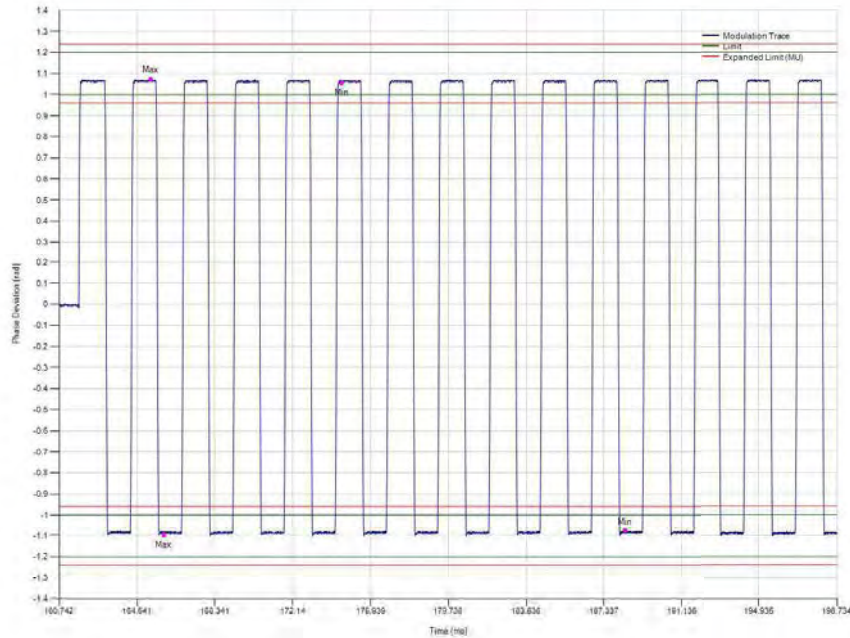
Ambient Temperature – ELT DT Location Protocol with 3LD



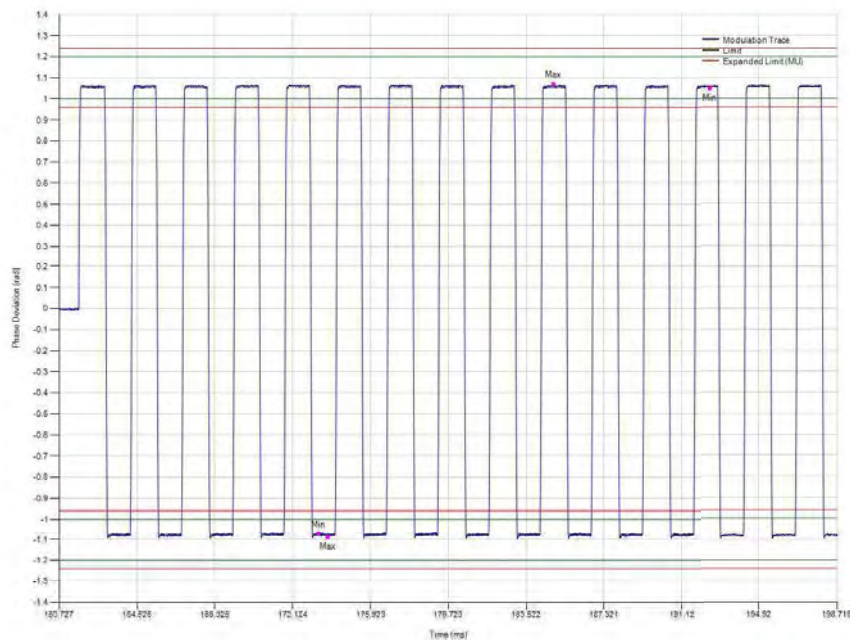
Low Temperature – ELT DT Location Protocol with 3LD



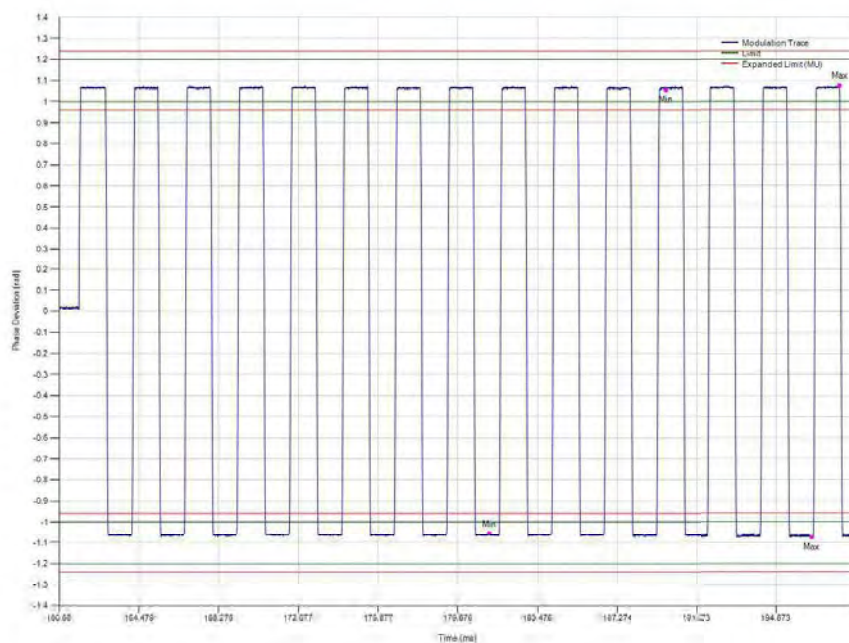
High Temperature – ELT DT Location Protocol with 3LD



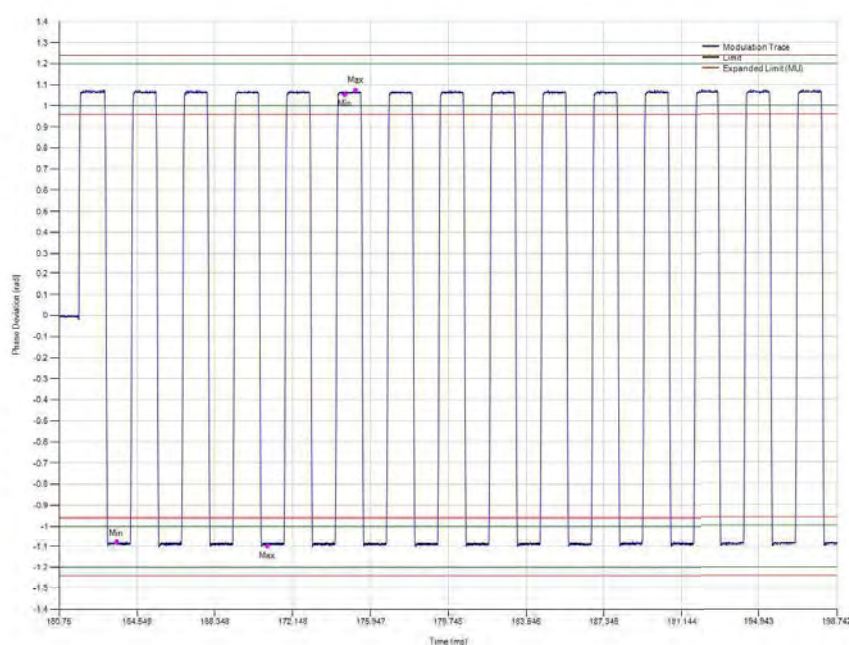
Ambient Temperature – ELT DT Location Protocol



Low Temperature – ELT DT Location Protocol



High Temperature – ELT DT Location Protocol



Summary

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



2.4 406 MHZ TRANSMITTED FREQUENCY

2.4.1 Specification

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

2.4.2 Equipment Under Test and Modification State

ULTIMA-DT-05 S/N: TO0010000002 - Modification State 0

2.4.3 Date of Test

27 January 2022, 28 January 2022, 31 January 2022, 01 February 2022 and 03 February 2022

2.4.4 Test Equipment Used

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

2.4.5 Laboratory Environmental Conditions

Ambient Temperature 23.1 - 25.6°C

Relative Humidity 22.7 - 32.3%

2.4.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 1 of section 1.3.2

EUT Operating Mode

As described in section 1.3.3 'Operating (Active)'

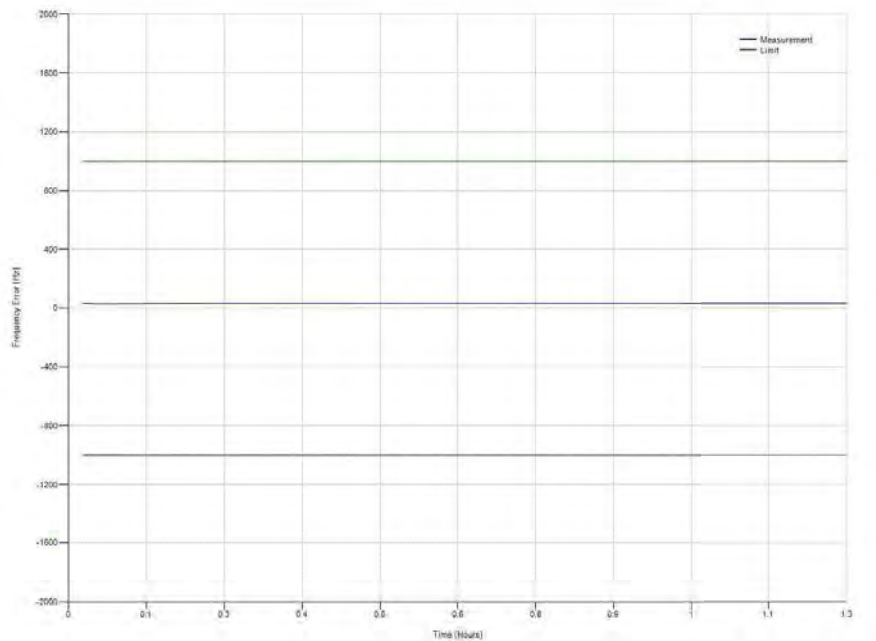
Test Duration

75 minutes (EUT encoded with 3LD)

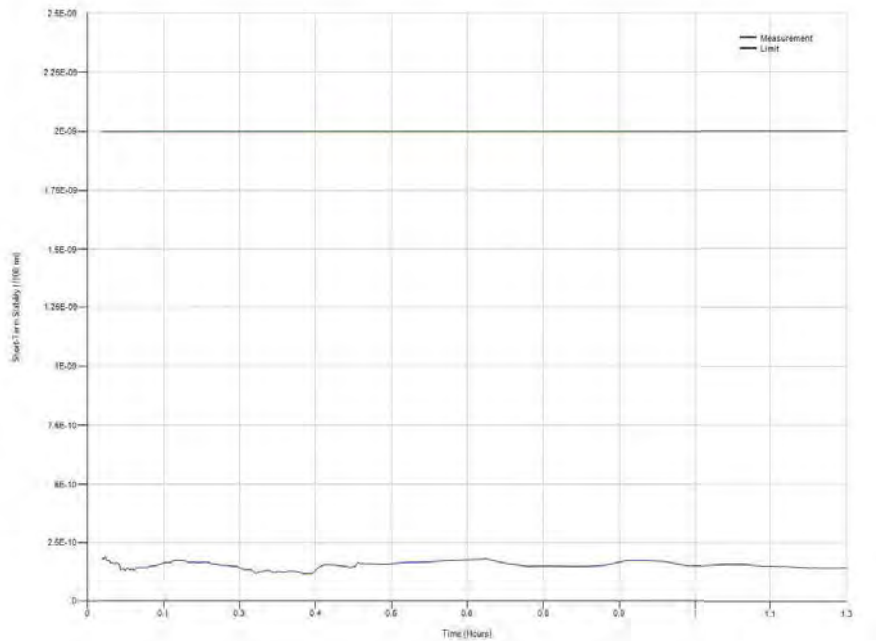
30 minutes (EUT encoded with non 3LD)

Ambient Temperature – ELT DT Location Protocol with 3LD

Nominal Frequency

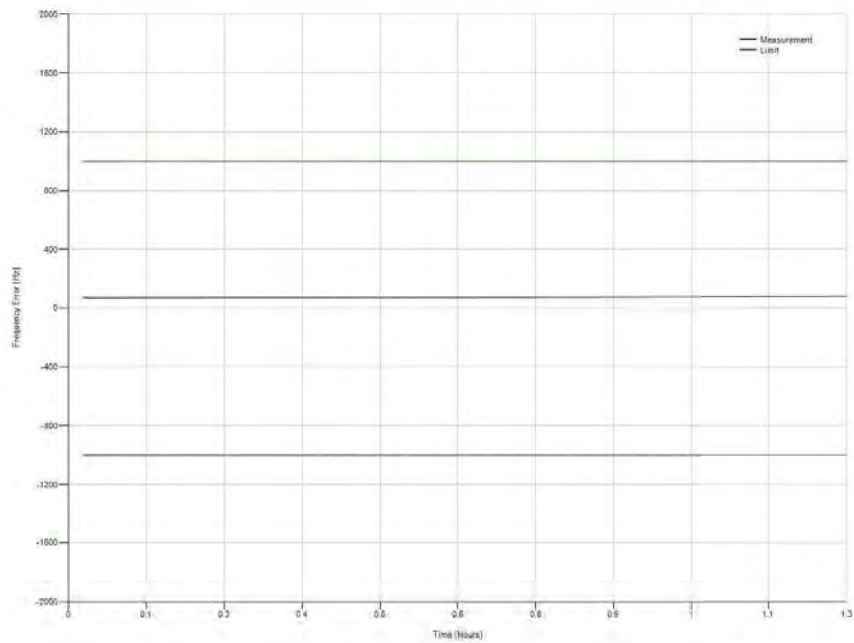


Short Term Stability

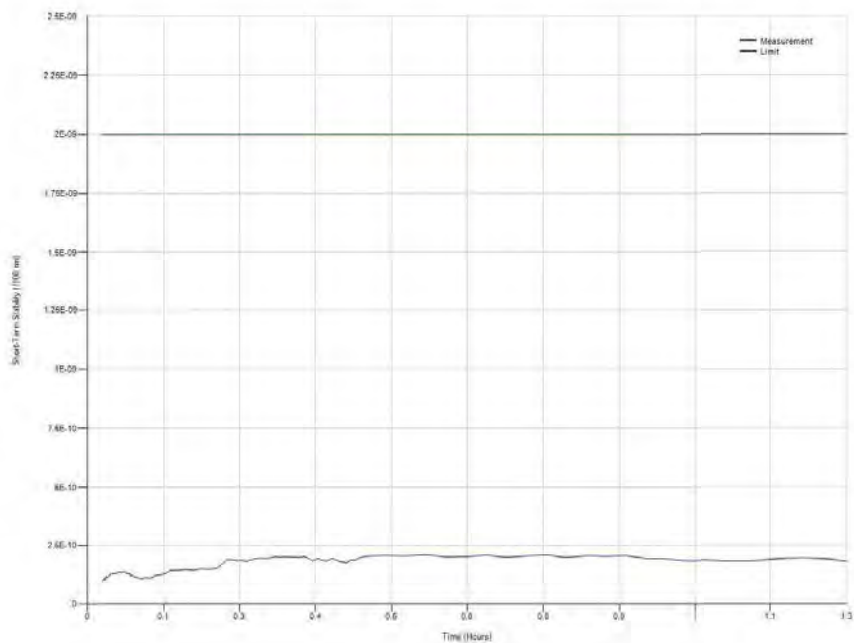


Low Temperature – ELT DT Location Protocol with 3LD

Nominal Frequency

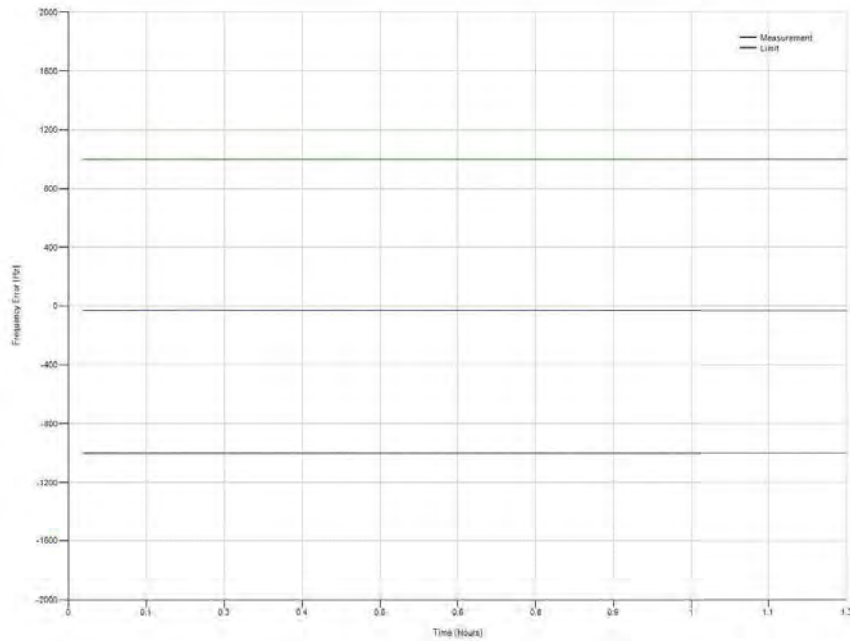


Short Term Stability

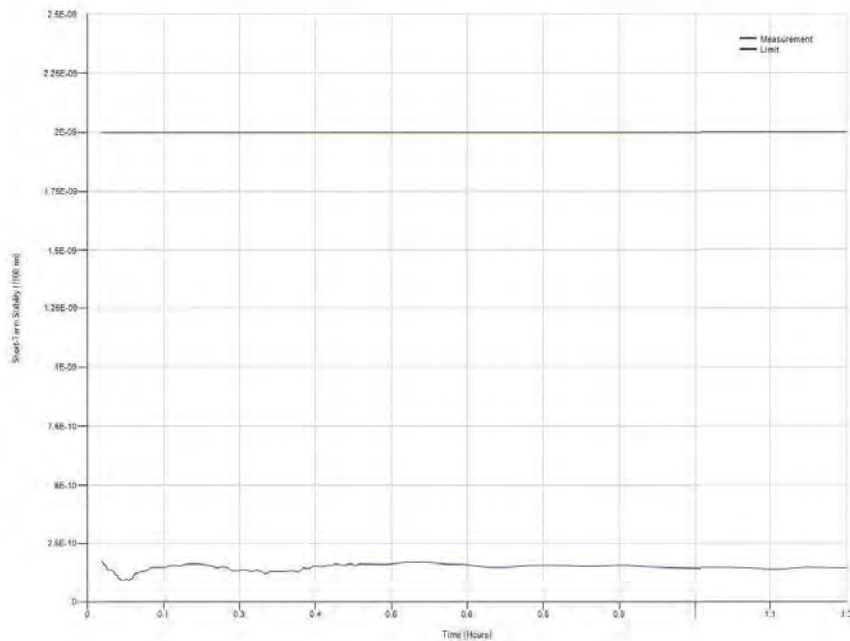


High Temperature – ELT DT Location Protocol with 3LD

Nominal Frequency

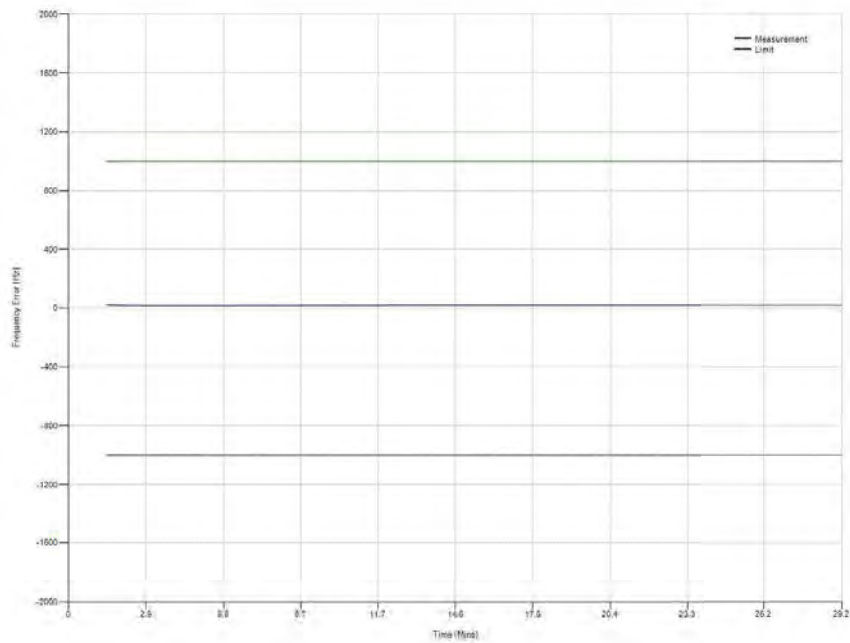


Short Term Stability

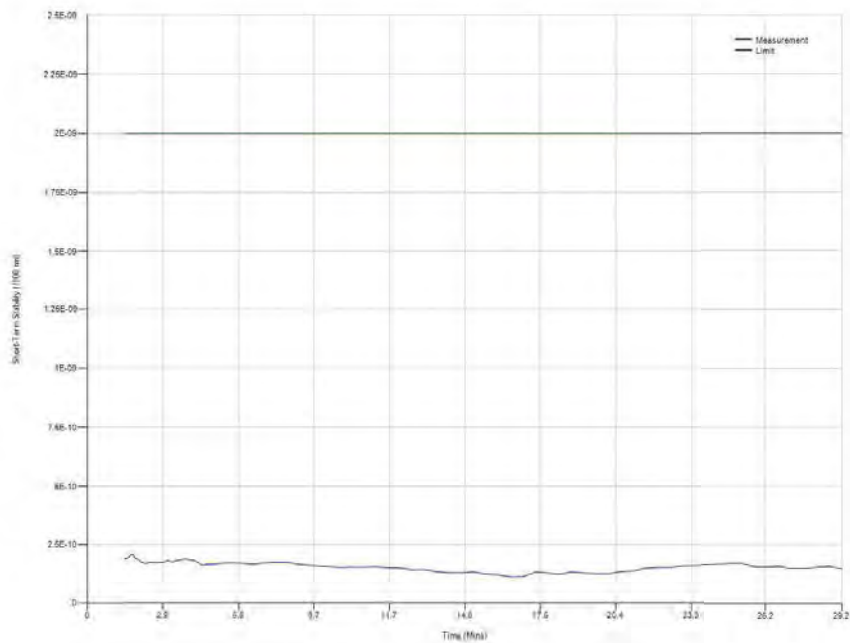


Ambient Temperature – ELT DT Location Protocol

Nominal Frequency

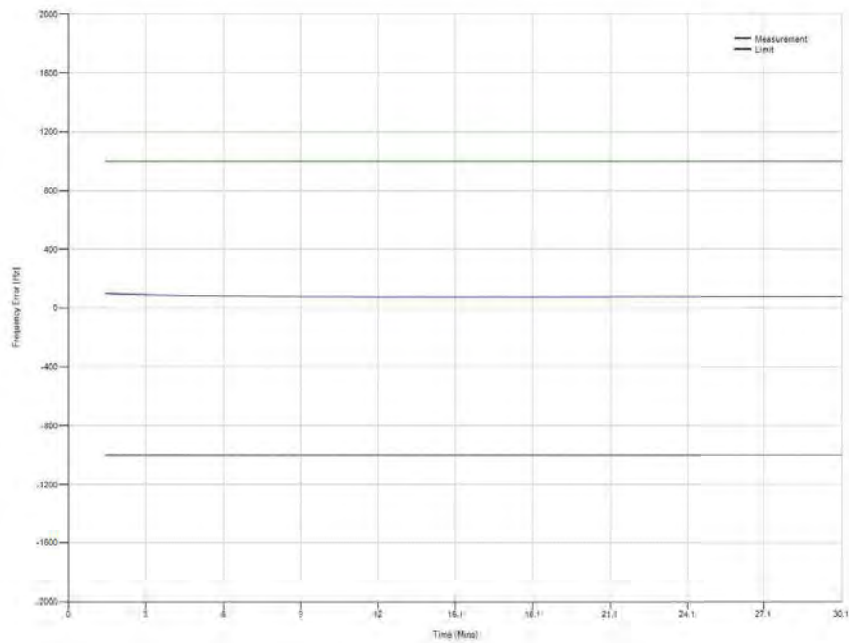


Short Term Stability

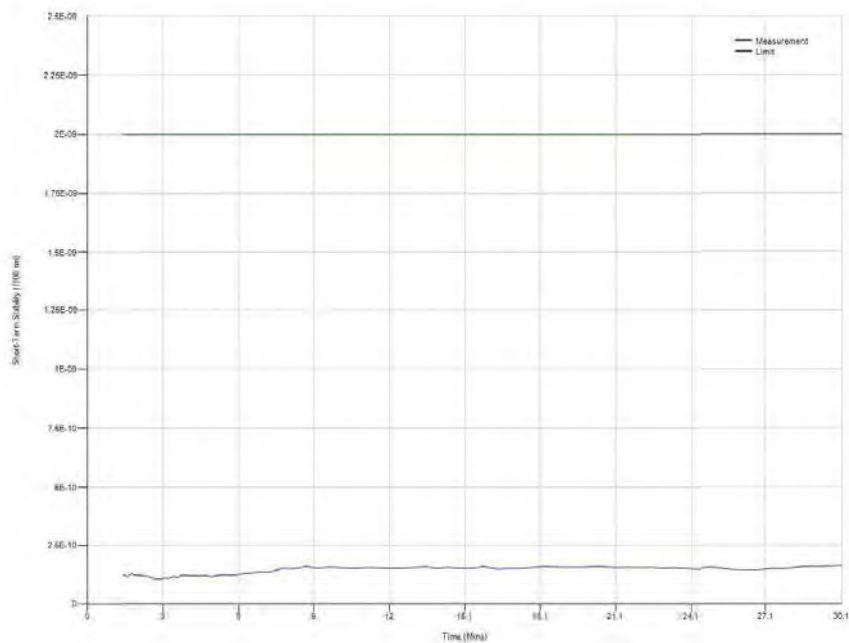


Low Temperature – ELT DT Location Protocol

Nominal Frequency

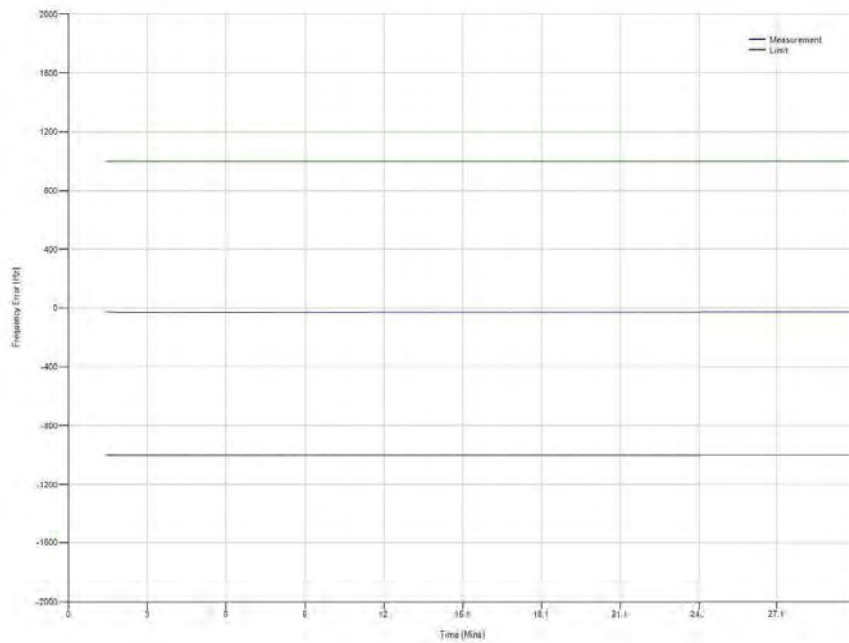


Short Term Stability

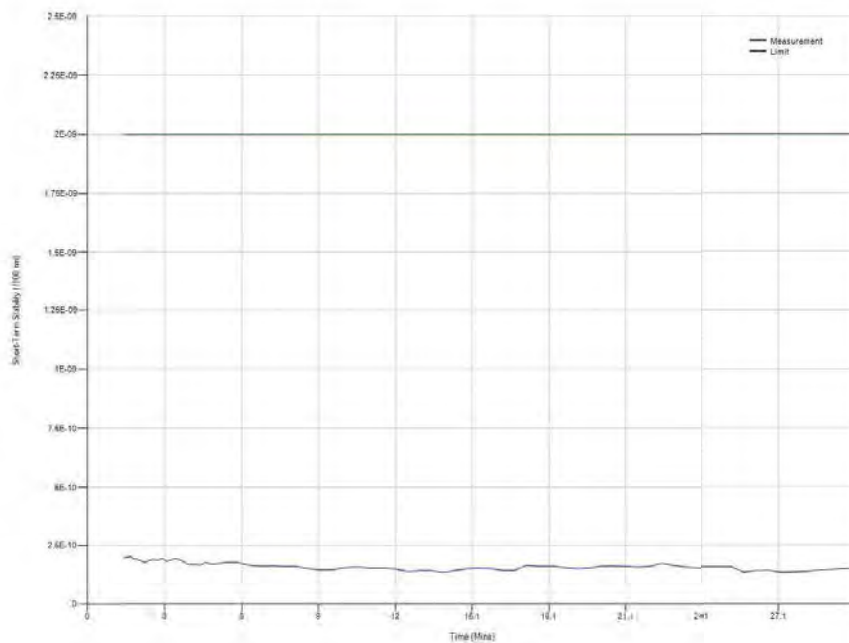


High Temperature – ELT DT Location Protocol

Nominal Frequency



Short Term Stability



Summary

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



2.5 SPURIOUS EMISSION INTO 50 OHMS

2.5.1 Specification

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

2.5.2 Equipment Under Test and Modification State

ULTIMA-DT-05 S/N: TO0010000002 - Modification State 0

2.5.3 Date of Test

28 January 2022 and 31 January 2022

2.5.4 Test Equipment Used

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

2.5.5 Laboratory Environmental Conditions

Ambient Temperature 22.6 - 25.5°C

Relative Humidity 22.3 - 27.0%

2.5.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 1 of section 1.3.2

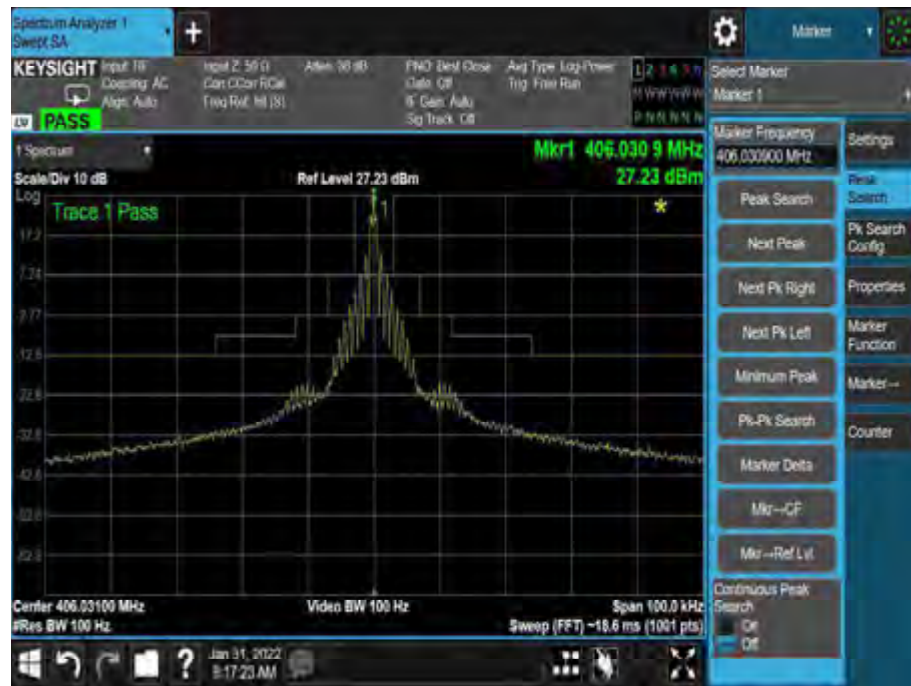
EUT Operating Mode

As described in section 1.3.3 'Operating (Active)'

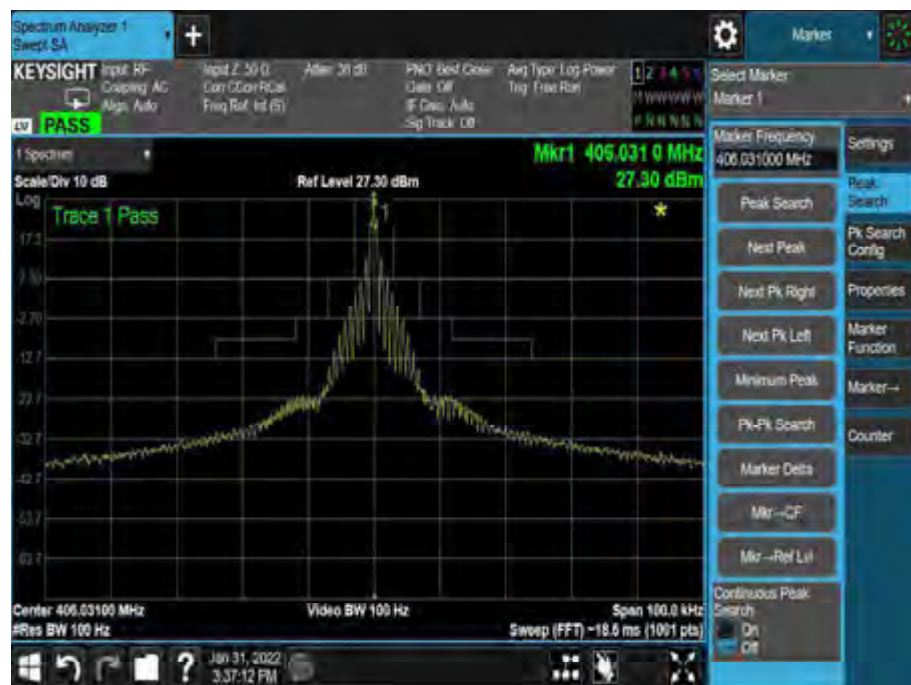
Test Duration

30 minutes

Ambient Temperature – ELT DT Location Protocol with 3LD



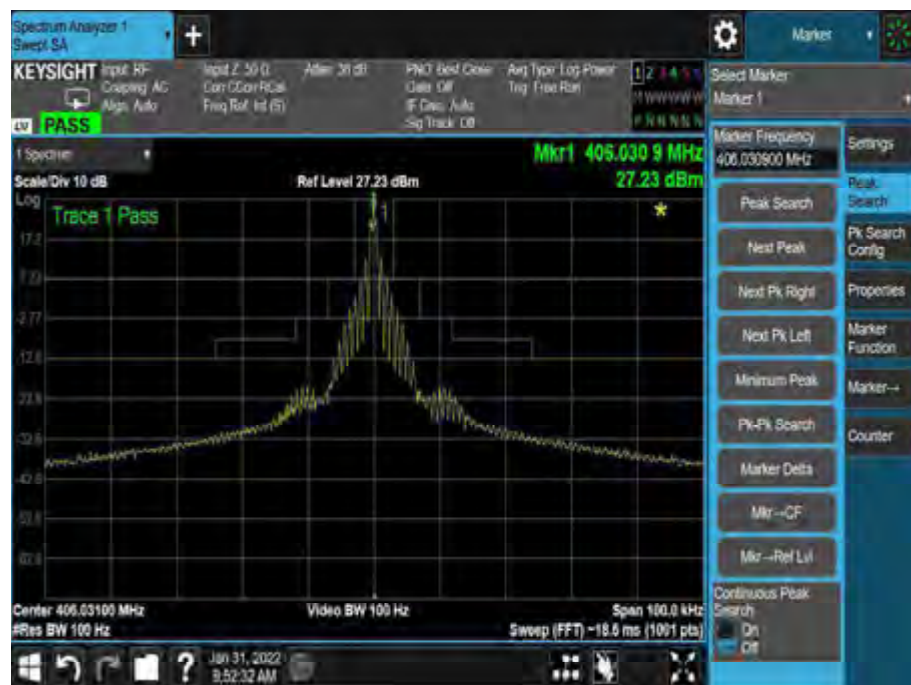
Low Temperature – ELT DT Location Protocol with 3LD



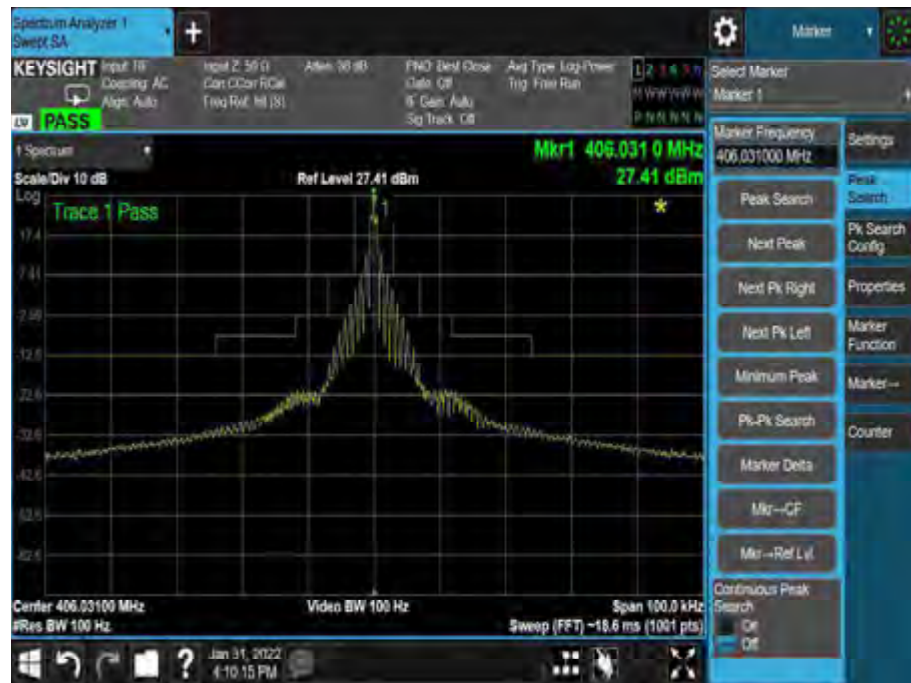
High Temperature – ELT DT Location Protocol with 3LD



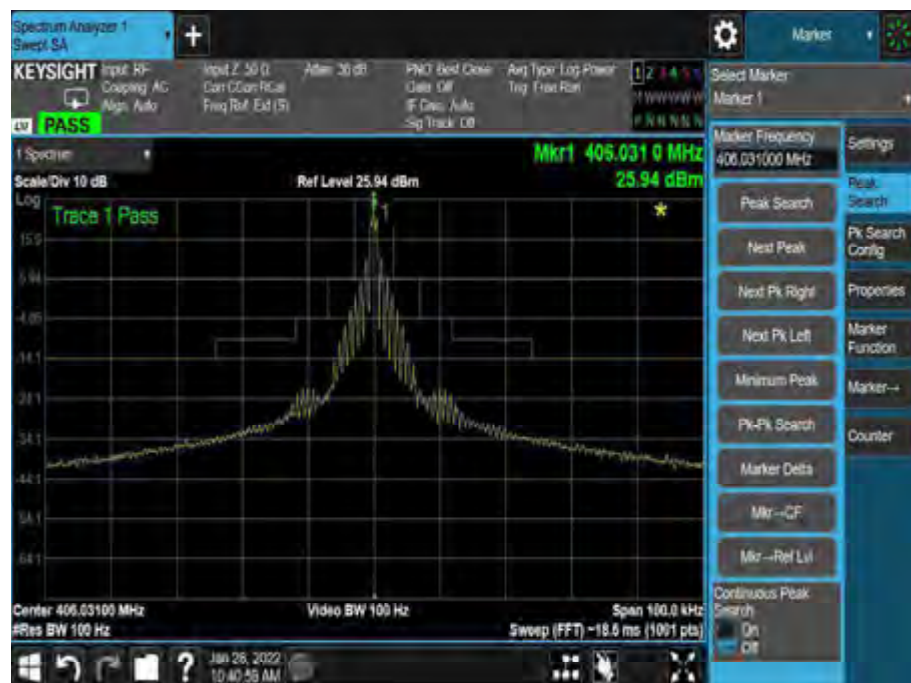
Ambient Temperature – ELT DT Location Protocol



Low Temperature – ELT DT Location Protocol



High Temperature – ELT DT Location Protocol



Summary

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



2.6 406 MHZ VSWR CHECK

2.6.1 Specification

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

2.6.2 Equipment Under Test and Modification State

ULTIMA-DT-05 S/N: TO0010000002 - Modification State 0

2.6.3 Date of Test

21 January 2022, 27 January 2022, 28 January 2022 and 01 February 2022

2.6.4 Test Equipment Used

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

2.6.5 Laboratory Environmental Conditions

Ambient Temperature 23.9 - 27.0°C

Relative Humidity 18.5 - 31.3%

2.6.6 Test Results

Note – 3:1 load made using two T-splitter connectors and two 50ohm termination loads.

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 1 of section 1.3.2

EUT Operating Mode

As described in section 1.3.3 'Operating (Active)'

Test Duration

7.5 minutes Open Circuit

7.5 minutes Closed Circuit

20 minutes with 3:1 load

Ambient Temperature – ELT DT Location Protocol with 3LD Normal Message

Decoded Beacon Message

Hexadecimal code: FFFE2F8C99000000147648E3D385E00F02FA

The code consists of 38 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:

19320000003FDFF

Binary Range	Binary Content	Field Name	Decoded Value
1-16	1111111111111111	Bit-synchronization pattern consisting of "1"s shall occupy the first 16-bit positions	True
16-24	000101111	Frame Synchronization Pattern	Correct: Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-86	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-86 are all 0 or All 1, designates Test Protocol
87-76	010100011	Latitude	81.5 Degrees North (81.5)
76-86	1011001001	Longitude	100.5 Degrees West (-100.5)
86-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	00	means of activation	manual activation by user
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9186 ft)
113-114	11	Encoded location freshness or PDF-2 rotating field indicator	Encoded location in message is current (i.e., the encoded location freshness is less or equal to 2 seconds)
115-123	100000000	Latitude offset	0.0 minutes 0.0 seconds (positive)
124-132	011110000	Longitude offset	15.0 minutes 0.0 seconds (negative)
133-144	0010111110 10	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.500 -100.250

Ambient Temperature – ELT DT Location Protocol with 3LD 3LD Message

Decoded Beacon Message

Hexadecimal code: FFFE2F8C99000000147648E3D3850452ACF1

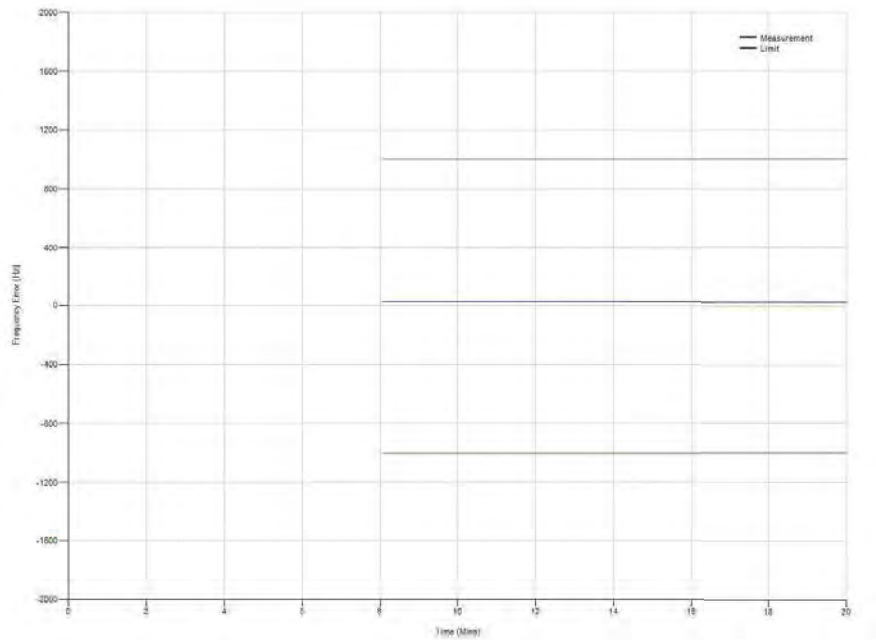
The code consists of 36 hexadecimal characters representing a first generation beacon message with the format flag set to Long including bit and frame synchronization pattern prefix (24 bits) as defined by T.001 Issue 4 - Rev.6.

Unique identifier:
19320000003FDFF

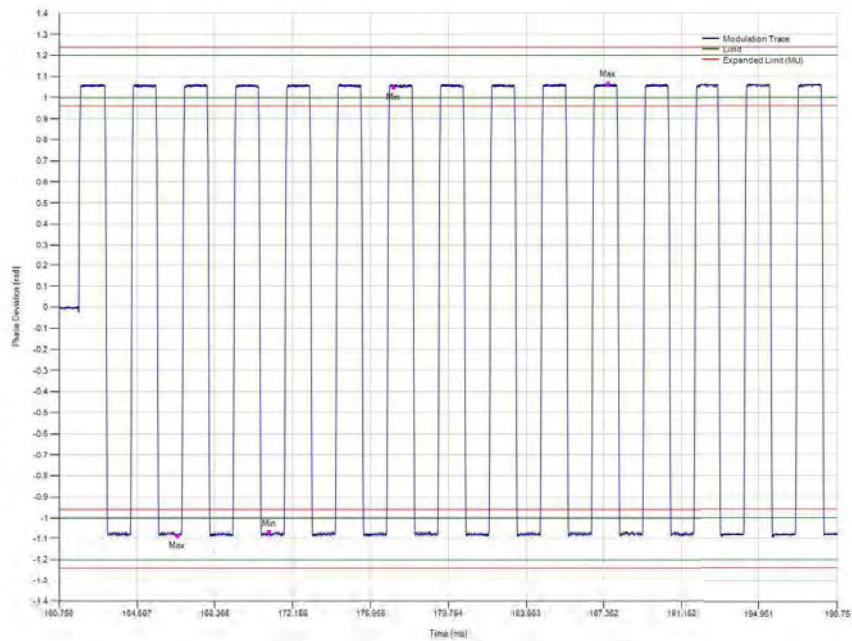
- **WARNING:** Location is a coarse position only, and hence has less resolution/accuracy than a message without the rotating field

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	Correct. Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-66	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-66 are all 0 or All 1, designates Test Protocol
67-75	010100011	Latitude	81.5 Degrees North (81.5)
76-85	1011001001	Longitude	100.5 Degrees West (-100.5)
86-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	00	means of activation	manual activation by user
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9186 ft)
113-114	00	Encoded location freshness or PDF-2 rotating field indicator	PDF-2 rotating field indicator
115-117	000	Aircraft operator 3LD designator or Spare	Aircraft operator 3LD designation
118-132	1000101001 01010	Aircraft operator 3LD	ZLR
133-144	1100111100 01	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.500 -100.500

Frequency Plot



Modulation Plot



Low Temperature – ELT DT Location Protocol with 3LD Normal Message

Decoded Beacon Message

Hexadecimal code: **FFFE2F8C99000000147648E3D385E00F02FA**

The code consists of 38 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:
19320000003FDFF

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	0001011111	Frame Synchronization Pattern	Correct Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-68	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-68 are all 0 or All 1, designates Test Protocol
67-75	010100011	Latitude	81.5 Degrees North (81.5)
76-85	1011001001	Longitude	100.5 Degrees West (-100.5)
86-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	00	means of activation	manual activation by user
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9186 ft)
113-114	11	Encoded location freshness or PDF-2 rotating field indicator	Encoded location in message is current (i.e., the encoded location freshness is less or equal to 2 seconds)
115-123	10000000	Latitude offset	0.0 minutes 0.0 seconds (positive)
124-132	011110000	Longitude offset	15.0 minutes 0.0 seconds (negative)
133-144	0010111110 10	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.500 -100.250

Low Temperature – ELT DT Location Protocol with 3LD 3LD Message

Decoded Beacon Message

Hexadecimal code: FFFE2F8C99000000147648E3D3850452ACF1

The code consists of 38 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.5

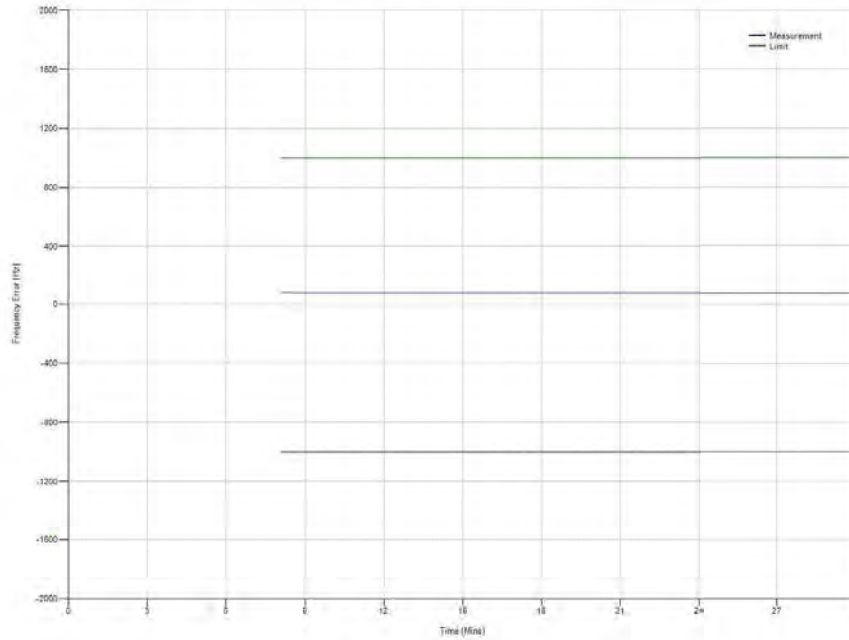
Unique identifier:

19320000003FDFF

- WARNING: Location is a coarse position only, and hence has less resolution/accuracy than a message without the rotating field

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	Correct: Operational Message
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	1001	Protocol Code	ELT - Location: ELT-DT Location Protocol
41-42	00	ELT Identity Type	Aircraft 24 bit address
43-88	0000000000 0000000000 0000	ELT(DT) test beacon	Test beacon type since bits 43-88 are all 0 or All 1, designates Test Protocol
89-75	010100011	Latitude	81.5 Degrees North (81.5)
76-85	1011001001	Longitude	100.5 Degrees West (-100.5)
86-106	0001110001 1110100111 0	BCH-1 error correcting code	BCH-1 code in message matches the recalculated BCH-1 from the PDF-1 field
107-108	00	means of activation	manual activation by user
109-112	0101	encoded altitude	Altitude is greater than 2200 m (7218 ft) up to and including 2800 m (9188 ft)
113-114	00	Encoded location freshness or PDF-2 rotating field indicator	PDF-2 rotating field indicator
115-117	000	Aircraft operator 3LD designator or Spare	Aircraft operator 3LD designation
118-132	1000101001 01010	Aircraft operator 3LD	ZLR
133-144	1100111100 01	BCH-2 error correcting code	BCH-2 code in message matches the recalculated BCH-2 from the PDF-2 field
		Composite location	81.500 -100.500

Frequency Plot



Modulation Plot

