

Measurements highlighted **Blue** contain 3LD in PDF-2 and may be discarded from the results.

Measurements highlighted **Red** indicate that the encoded longitude and latitude are incorrect as the 2D Location error is greater than 200m.

Test 2 Summary: MEOLUT alerts with complete beacon message and 15 Hex ID at least 1/min for >90% of total test time: 100% - Pass

Encoded location provided by the MEOLUT accurate in the horizontal plane $\leq 200\text{m}$ for 90% of the alerts: 98.7% - Pass

Encoded location provided by the MEOLUT accurate in the vertical plane reported as correct altitude band: 100% Pass (Test location altitude = 40m above sea level. Reported altitude band = 0000 (altitude is between 0 and 400 m)).

MEO Satellites in view during test

LUT ID	Antenna Id	Sat ID	AOS	LOS
2275	1	431	04:52:00	12:58:45
2275	1	405	06:38:30	13:21:54
2275	1	403	09:13:30	14:23:26
2275	1	425	09:16:00	18:18:55
2275	1	433	10:02:00	13:12:49
2275	1	418	10:14:00	16:24:22
2275	1	410	10:41:00	16:50:22
2275	1	408	11:43:30	15:06:56
2275	1	436	12:57:52	21:19:52

Date of Tracking	Tracking Start Time	Tracking End Time	Sat ID	MEOLUT ID (2325) Antenna ID	Start of tracking session		End of tracking session		Max Elev
					AOS Az	AOS El	LOS Az	LOS El	
09/03/2022	11:09	12:09	433	1	64.86	22	43	22.6	23.95
09/03/2022	12:09	16:00	402	1	266.42	7.3	264.07	79	79.09
09/03/2022	12:03	14:03	408	5	325.52	15.4	286.41	19.5	23.74
09/03/2022	10:30	13:03	403	6	309.96	30.8	250.5	27.6	40.88
09/03/2022	13:03	13:36	425	6	296.36	72.8	328.79	82.9	83.08

Note: The raw results for the Satellite Qualitative test were provided by French MCC. However, as the French MEOLUT has an active antenna with no mechanical tracking they were unable to support the request to provide the starting and ending azimuth and elevation of each MEOSAR satellite tracked during the test. The starting and ending azimuth and elevation of each MEOSAR satellite tracked during the Satellite Qualitative test was provided by the UK MCC.



Test 3

Burst No.	Beacon TX Time	15 Hex ID	Complete Beacon Message	Encoded Location reported in the MEOLUT alert			2D Location Error (meters)	Valid altitude Band
				Latitude	Longitude	Altitude Band*		
1	18:06:49	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
2	18:06:54	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
3	18:06:59	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
4	18:07:04	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
5	18:07:09	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580FFFFF	50.869	-1.244	0000	46.8	Pass
6	18:07:14	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
7	18:07:18	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
8	18:07:23	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
9	18:07:28	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
10	18:07:33	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
11	18:07:38	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
12	18:07:43	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
13	18:07:48	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
14	18:07:53	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
15	18:07:58	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
16	18:08:03	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
17	18:08:07	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
18	18:08:12	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
19	18:08:17	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
20	18:08:22	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
21	18:08:27	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
22	18:08:32	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
23	18:08:37	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
24	18:08:42	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
25	18:08:52	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
26	18:08:57	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
27	18:09:02	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
28	18:09:11	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
29	18:09:21	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
30	18:09:31	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
31	18:09:41	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
32	18:09:51	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
33	18:09:56	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA5800452A622					
34	18:10:01	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
35	18:10:11	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
36	18:10:21	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
37	18:10:31	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
38	18:10:41	19327FFFFBFDFF	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass



Burst No.	Beacon TX Time	15 Hex ID	Complete Beacon Message	Encoded Location reported in the MEOLUT alert			2D Location Error (meters)	Valid altitude Band
				Latitude	Longitude	Altitude Band*		
39	18:10:50	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
40	18:10:56	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA5800452A622					
41	18:11:00	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
42	18:11:10	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
43	18:11:20	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
44	18:11:30	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
45	18:11:40	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
46	18:12:08	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
47	18:12:37	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
48	18:13:07	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
49	18:13:35	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
50	18:14:03	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
51	18:14:30	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
52	18:14:57	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
53	18:15:26	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
54	18:15:53	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
55	18:16:22	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
56	18:16:50	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
57	18:17:17	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
58	18:17:46	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
59	18:18:16	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
60	18:18:46	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
61	18:19:15	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
62	18:19:30	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA5800452A622					
63	18:19:44	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
64	18:20:13	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
65	18:20:41	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
66	18:21:10	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
67	18:21:40	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
68	18:22:08	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
69	18:22:36	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
70	18:23:03	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
71	18:23:30	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
72	18:23:59	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
73	18:24:26	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
74	18:24:55	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
75	18:25:23	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
76	18:25:51	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
77	18:26:19	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass
78	18:26:49	19327FFFFBFDFD	FFFE2F8C99000000CD0134FA580CFBEA427	50.869	-1.244	0000	46.8	Pass



Measurements highlighted **Blue** contain 3LD in PDF-2 and may be discarded from the results.

Test 3 Summary: MEOLUT alerts with complete beacon message and 15 Hex ID at least 1/min for >90% of total test time: 100% - Pass

Encoded location provided by the MEOLUT accurate in the horizontal plane $\leq 200\text{m}$ for 90% of the alerts: 100% - Pass

Encoded location provided by the MEOLUT accurate in the vertical plane reported as correct altitude band: 100% Pass (Test location altitude = 40m above sea level. Reported altitude band = 0000 (altitude is between 0 and 400 m)).

MEO Satellites in view during test

LUT ID	Antenna Id	Sat ID	AOS	LOS
2275	1	425	09:16:00	18:18:55
2275	1	402	11:58:30	20:03:48
2275	1	436	12:57:52	21:19:52
2275	1	430	14:52:52	21:23:47
2275	1	434	15:10:30	00:14:55
2275	1	404	17:30:22	19:15:35
2275	1	427	17:32:00	22:26:56
2275	1	415	17:33:30	02:22:26
2275	1	409	17:38:30	21:32:22
2275	1	405	18:19:00	00:01:30

Date of Tracking	Tracking Start Time	Tracking End Time	Sat ID	MEOLUT ID (2325) Antenna ID	Start of tracking session		End of tracking session		Max Elev
					AOS Az	AOS El	LOS Az	LOS El	
09/03/2022	17:27	19:34	404	2	54.91	5.3	17.69	5.1	11.13
09/03/2022	17:39	18:09	415	3	234.55	5.1	241.26	14.1	14.13
09/03/2022	17:36	20:00	430	4	286.41	57.2	215.44	30.3	60.17
09/03/2022	17:27	18:09	436	6	64.64	72.2	59.37	57.5	72.36
09/03/2022	18:39	21:03	409	6	84.08	15	36.65	17.4	24.84

Note: The raw results for the Satellite Qualitative test were provided by French MCC. However, as the French MEOLUT has an active antenna with no mechanical tracking they were unable to support the request to provide the starting and ending azimuth and elevation of each MEOSAR satellite tracked during the test. The starting and ending azimuth and elevation of each MEOSAR satellite tracked during the Satellite Qualitative test was provided by the UK MCC.

The cable loss of the cable fitted between the ELT and antenna was 1.81 dB.

Note: Please note that the starting and ending azimuth and elevation for Satellite IDs 410, 418, 427, 431 and 434 was not available in the information provided by UK MCC.



Summary

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



2.12 BEACON ANTENNA TEST

2.12.1 Specification

Cospas-Sarsat T.007, Clause A.2.6

2.12.2 Equipment Under Test and Modification State

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

2.12.3 Date of Test

25 January 2022 and 28 February 2022

2.12.4 Test Equipment Used

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

2.12.5 Laboratory Environmental Conditions

Ambient Temperature 3.6 – 5.1°C

Relative Humidity 84.3 - 89.4%

2.12.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Not Applied

EUT System Configuration

As per figure 2 of section 1.3.2

Without the RF splitter and GNSS Simulator

EUT Operating Mode

As described in section 1.3.3 'Operating (Active)'

Encoded Protocol

ELT DT Location Protocol

Configuration 2 – Raw Results with a cable loss of 0.69dB

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

Azimuth Angle (Degrees)	Elevation Angle (degrees)									
	10		20		30		40		50	
	EIRP (dBm)	Gain (dBi)	EIRP (dBm)	Gain (dBi)	EIRP (dBm)	Gain (dBi)	EIRP (dBm)	Gain (dBi)	EIRP (dBm)	Gain (dBi)
0	36.9	-0.1	40.0	3.0	41.2	4.2	40.0	3.0	38.1	1.1
30	37.1	0.1	40.0	3.0	41.2	4.2	39.8	2.8	37.9	0.9
60	37.6	0.6	40.2	3.2	41.4	4.4	40.0	3.0	37.6	0.6
90	37.6	0.6	40.3	3.3	41.2	4.2	40.0	3.0	37.4	0.4
120	37.7	0.7	40.3	3.3	41.2	4.2	40.0	3.0	37.4	0.4
150	37.6	0.6	40.3	3.3	41.1	4.1	40.3	3.3	37.4	0.4
180	37.4	0.4	40.4	3.4	41.3	4.3	40.4	3.4	37.5	0.5
210	37.6	0.6	40.3	3.3	41.4	4.4	40.4	3.4	37.5	0.5
240	37.6	0.6	40.4	3.4	41.3	4.3	40.4	3.4	37.6	0.6
270	37.4	0.4	40.4	3.4	41.3	4.3	40.0	3.0	37.8	0.8
300	37.3	0.3	40.3	3.3	41.4	4.4	40.2	3.2	38.1	1.1
330	37.0	0.0	40.2	3.2	41.3	4.3	39.9	2.9	38.2	1.2

Azimuth Angle (Degrees)	Elevation Angle (degrees)									
	10		20		30		40		50	
	μVv	μVh	μVv	μVh	μVv	μVh	μVv	μVh	μVv	μVh
0	105.6	80.8	108.2	83.8	108.7	68.7	106.4	85.5	103.0	82.1
30	105.7	85.6	108.3	73.7	108.7	89.9	106.1	92.0	102.6	90.0
60	106.1	89.9	108.3	88.0	108.7	96.3	105.9	97.3	101.3	96.4
90	106.1	91.1	108.5	89.7	108.5	95.9	106.0	97.1	100.7	97.3
120	106.2	90.5	108.5	88.1	108.5	94.7	106.1	95.5	101.0	96.5
150	106.2	88.1	108.5	83.4	108.6	91.1	106.6	91.0	102.0	91.7
180	106.1	79.6	108.6	83.7	108.8	75.0	106.8	88.1	102.4	83.1
210	106.2	75.0	108.4	91.7	108.8	92.0	106.5	95.9	101.9	92.9
240	106.2	84.5	108.5	94.8	108.6	95.6	106.2	98.8	100.9	97.5
270	106.0	86.4	108.4	95.9	108.5	97.0	105.5	99.5	100.6	98.6
300	105.9	86.4	108.4	94.9	108.8	94.8	106.0	97.7	101.6	97.2
330	105.6	81.1	108.3	90.3	108.8	85.7	106.2	91.0	102.8	92.1
Min (μVv-μVh)	15.0		12.5		11.6		6.1		2.0	

$$\text{EIRP}_{\text{LOSS}} = \text{Pt}_{\text{ambient}} - \text{Pt}_{\text{EOL}} = 38.00 - 36.83 = 1.17\text{dB}$$

$$\text{EIRP}_{\text{maxEOL}} = \text{Max}[\text{EIRP}_{\text{max}}, (\text{EIRP}_{\text{max}} - \text{EIRP}_{\text{LOSS}})] = \text{Max}[41.4, (41.4 - 1.17)] = 41.4\text{dBm}$$

$$\text{EIRP}_{\text{minEOL}} = \text{Min}[\text{EIRP}_{\text{min}}, (\text{EIRP}_{\text{min}} - \text{EIRP}_{\text{LOSS}})] = \text{Min}[36.9, (36.9 - 1.17)] = 35.73\text{dBm}$$

Adjusted for Minimum Cable Loss (0dB)

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	37.6	-0.1	40.7	3.0	41.9	4.2	40.7	3.0	38.8	1.1
30	37.8	0.1	40.7	3.0	41.9	4.2	40.5	2.8	38.6	0.9
60	38.3	0.6	40.8	3.2	42.1	4.4	40.7	3.0	38.3	0.6
90	38.3	0.6	41.0	3.3	41.9	4.2	40.7	3.0	38.1	0.4
120	38.4	0.7	41.0	3.3	41.9	4.2	40.7	3.0	38.1	0.4
150	38.3	0.6	41.0	3.3	41.8	4.1	40.9	3.3	38.1	0.4
180	38.1	0.4	41.1	3.4	42.0	4.3	41.1	3.4	38.2	0.5
210	38.3	0.6	41.0	3.3	42.1	4.4	41.1	3.4	38.2	0.5
240	38.3	0.6	41.1	3.4	42.0	4.3	41.1	3.4	38.3	0.6
270	38.1	0.4	41.1	3.4	42.0	4.3	40.7	3.0	38.5	0.8
300	38.0	0.3	41.0	3.3	42.1	4.4	40.9	3.2	38.7	1.1
330	37.7	0.0	40.9	3.2	41.9	4.3	40.6	2.9	38.9	1.2

$$\text{EIRP}_{\text{LOSS}} = P_{\text{tambient}} - P_{\text{tEOL}} = 38.00 - 36.83 = 1.17\text{dB}$$

$$\text{EIRP}_{\text{maxEOL}} = \text{Max}[\text{EIRP}_{\text{max}}, (\text{EIRP}_{\text{max}} - \text{EIRP}_{\text{LOSS}})] = \text{Max}[42.1, (42.1 - 1.17)] = 42.1\text{dBm}$$

$$\text{EIRP}_{\text{minEOL}} = \text{Min}[\text{EIRP}_{\text{min}}, (\text{EIRP}_{\text{min}} - \text{EIRP}_{\text{LOSS}})] = \text{Min}[37.6, (37.6 - 1.17)] = 36.5\text{dBm}$$

Adjusted for Maximum Cable Loss (1.8dB)

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	35.8	-0.1	38.9	3.0	40.1	4.2	38.9	3.0	37.0	1.1
30	36.0	0.1	38.9	3.0	40.1	4.2	38.7	2.8	36.8	0.9
60	36.5	0.6	39.0	3.2	40.3	4.4	38.9	3.0	36.5	0.6
90	36.5	0.6	39.2	3.3	40.1	4.2	38.9	3.0	36.3	0.4
120	36.6	0.7	39.2	3.3	40.1	4.2	38.9	3.0	36.3	0.4
150	36.5	0.6	39.2	3.3	40.0	4.1	39.1	3.3	36.3	0.4
180	36.3	0.4	39.3	3.4	40.2	4.3	39.3	3.4	36.4	0.5
210	36.5	0.6	39.2	3.3	40.3	4.4	39.3	3.4	36.4	0.5
240	36.5	0.6	39.3	3.4	40.2	4.3	39.3	3.4	36.5	0.6
270	36.3	0.4	39.3	3.4	40.2	4.3	38.9	3.0	36.7	0.8
300	36.2	0.3	39.2	3.3	40.3	4.4	39.1	3.2	36.9	1.1
330	35.9	0.0	39.1	3.2	40.1	4.3	38.8	2.9	37.1	1.2

$$\text{EIRP}_{\text{LOSS}} = P_{\text{tambient}} - P_{\text{tEOL}} = 38.00 - 36.83 = 1.17\text{dB}$$

$$\text{EIRP}_{\text{maxEOL}} = \text{Max}[\text{EIRP}_{\text{max}}, (\text{EIRP}_{\text{max}} - \text{EIRP}_{\text{LOSS}})] = \text{Max}[40.3, (40.3 - 1.17)] = 40.3\text{dBm}$$

$$\text{EIRP}_{\text{minEOL}} = \text{Min}[\text{EIRP}_{\text{min}}, (\text{EIRP}_{\text{min}} - \text{EIRP}_{\text{LOSS}})] = \text{Min}[35.8, (35.8 - 1.17)] = 34.7\text{dBm}$$

Notes

The EUT's antenna VSWR was measured at the input of the antenna using a Network Analyser. The VSWR measurement was performed with the antenna mounted in Configuration 2 and the antenna's VSWR was measured at the nominal value of the transmitted frequency in the 406.0 – 406.1 MHz frequency band. The value at 406.031 was measured as 1.1223.

Summary

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



2.13 NAVIGATION SYSTEM TEST

2.13.1 Specification

Cospas-Sarsat T.007, Clause A.2.7

2.13.2 Equipment Under Test and Modification State

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

2.13.3 Date of Test

19 January 2022, 20 January 2022, 17 February 2022, 18 February 2022, 19 February 2022, 21 February 2022, 22 February 2022 and 10 March 2022

2.13.4 Test Equipment Used

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

2.13.5 Laboratory Environmental Conditions

Ambient Temperature 16.3°C
Relative Humidity 30.6 – 54.7%

2.13.6 Test Results

Navigation Data status during test:

External Navigation Data Input: Applied

GNSS Simulator Navigation Data: Applied

EUT System Configuration

As per figure 1 of section 1.3.2 unless stated otherwise.

As per figure 2 of section 1.3.2 for A.3.8.3 (Annex K)

EUT Operating Mode

As described in section 1.3.3 'Operating (Active)'

Encoded Protocol

ELT DT Location Protocol with 3LD (except for A.3.8.3)



ELT(DT) Location Protocol with 3LD

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

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

36 Hex Message	Message Count
FFFE2F8C990000001FEFFE6E1B0F61F0FF01	90
FFFE2F8C990000001FEFFE6E1B0F0452AC6E (ELT DT Location Protocol with 3LD in PDF-2)	10

Location Freshness:

Time	Message
0	FFFE2F8C990000000CF022D1C200CECA26FE
4.9	FFFE2F8C990000000CF022D1C2000452A622
9.801	FFFE2F8C990000000CF022D1C200CECA26FE
14.702	FFFE2F8C990000000CF022D1C2008ECA38C3
19.603	FFFE2F8C990000000CF022D1C2008ECA38C3
24.504	FFFE2F8C990000000CF022D1C2000452A622
29.405	FFFE2F8C990000000CF022D1C2008ECA38C3
34.306	FFFE2F8C990000000CF022D1C2008ECA38C3
39.207	FFFE2F8C990000000CF022D1C2008ECA38C3
44.108	FFFE2F8C990000000CF022D1C2000452A622
49.009	FFFE2F8C990000000CF022D1C2008ECA38C3
53.911	FFFE2F8C990000000CF022D1C2008ECA38C3
58.812	FFFE2F8C990000000CF022D1C2008ECA38C3
63.713	FFFE2F8C990000000CF022D1C2000452A622
68.614	FFFE2F8C990000000CF022D1C2008ECA38C3
73.516	FFFE2F8C990000000CF022D1C2004ECA30F6
78.416	FFFE2F8C990000000CF022D1C2004ECA30F6
83.317	FFFE2F8C990000000CF022D1C2000452A622
88.218	FFFE2F8C990000000CF022D1C2004ECA30F6
93.119	FFFE2F8C990000000CF022D1C2004ECA30F6
98.021	FFFE2F8C990000000CF022D1C2004ECA30F6
102.921	FFFE2F8C990000000CF022D1C2000452A622
107.822	FFFE2F8C990000000CF022D1C2004ECA30F6
112.723	FFFE2F8C990000000CF022D1C2004ECA30F6

Colour Code: Location data less than 2 seconds old
 Location data >2 sec, <60 sec old
 Location data >60 sec old
 ELT DT Location Protocol with 3LD in PDF-2

Navigation data removed at Timestamp: 10 seconds.



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

Locations:

A.3.8.2.1:	50° 52.142 'N	1° 14.680'W	①
	50° 52' 83994"N	1° 14' 40.5594W	②
A.3.8.2.2:	50° 48.8584'N	1° 12.1056'W	①
	50° 49' 5.88"N	1° 11' 51"W	②

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	Correct Altitude Band	Time to Acquire Position (sec)	Location Error in metres	Correct Altitude Band
Configuration 6 ①	4.72	22.7	Pass	4.76	35.7	Pass
Input from External navigation Device ②	4.81	16.3	Pass	4.74	60.1	Pass

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

- ① GPS Site Survey – Live Location
- ② Input from External Navigation via ARINC interface connected to EUT

Encoded Position Data Update Interval (C/S T.007 A.3.8.3 in accordance with Annex K):

Altitude Band Key

Bin	> m	<= m
0000	0	400
0001	400	800
0010	800	1200
0011	1200	1600
0100	1600	2200
0101	2200	2800
0110	2800	3400
0111	3400	4000
1000	4000	4800
1001	4800	5600
1010	5600	6600
1011	6600	7600
1100	7600	8800
1101	8800	10000
1110	10000	100000
1111	n/a	n/a



Test 1: Navigation data from Internal Navigation Device

Burst No.	Burst TX Time	Encoded Location reported in the beacon message			Best-matching simulated location between P(t0) and P(t0-2)			2D location error (meters)	Altitude error (meters)
		Latitude	Longitude	Altitude Band	Latitude	Longitude	Altitude		
1	14:19:06.273	13.28333	40.91667	0000	13.283	40.917	-92.81	51.737598937	In Range
2	14:19:11.172	13.28333	40.91667	0000	13.28302	40.917	-91.32	50.141637786	In Range
3	14:19:16.075	13.28333	40.91667	0000	13.28338	40.917	-64.64	36.480207888	In Range
4	14:19:20.973	13.28556	40.91667	0000	13.28556	40.917	96.09	36.085982763	In Range
5	14:19:25.878	13.28889	40.91667	0000	13.28887	40.917	340.71	36.136626556	In Range
6	14:19:30.775	13.29333	40.91667	0001	13.29334	40.917	670.4	36.083852376	In Range
7	14:19:35.676	13.29889	40.91667	0010	13.29893	40.917	1083.39	36.317685902	In Range
8	14:19:40.580	13.30444	40.91667	0011	13.30438	40.917	1486.54	36.750984577	In Range
9	14:19:45.483	13.31333	40.91667	0100	13.31337	40.917	2107.99	36.266417383	In Range
10	14:19:50.385	13.32222	40.91667	0101	13.32232	40.917	2641.91	37.608364408	In Range
11	14:19:55.287	13.33222	40.91667	0110	13.3322	40.917	3164.95	36.159433659	In Range
12	14:20:00.190	13.34444	40.91667	0111	13.34442	40.917	3744	36.153099668	In Range
13	14:20:05.090	13.35556	40.91667	1000	13.35555	40.917	4223.19	36.075318536	In Range
14	14:20:09.990	13.37	40.91667	1001	13.36995	40.917	4792.03	36.461999339	-7.97
15	14:20:14.893	13.38556	40.91667	1001	13.38555	40.917	5372.62	36.071178805	In Range
16	14:20:19.787	13.4	40.91667	1010	13.39998	40.917	5908.98	36.151411673	In Range
17	14:20:24.691	13.41556	40.91667	1010	13.4156	40.917	6490.48	36.446269846	In Range
18	14:20:29.592	13.42889	40.91667	1011	13.42882	40.917	6982.88	36.829880554	In Range
19	14:20:34.498	13.44333	40.91667	1011	13.44324	40.917	7520.44	37.530469038	In Range
20	14:20:39.393	13.45889	40.91667	1100	13.45886	40.917	8103.25	36.236069040	In Range
21	14:20:44.301	13.47333	40.91667	1100	13.47327	40.917	8621.47	36.730846591	In Range
22	14:20:49.198	13.48889	40.91667	1101	13.48889	40.917	9091.56	36.055829877	In Range
23	14:20:54.097	13.50444	40.91667	1101	13.5045	40.917	9461.96	36.612269677	In Range
24	14:21:04.000	13.53222	40.91667	1101	13.53214	40.917	9873.13	37.310840247	In Range
25	14:21:13.900	13.56222	40.91667	1101	13.56218	40.917	9981.73	36.301400176	In Range
26	14:21:23.801	13.59222	40.91667	1101	13.59223	40.917	9998.75	36.064068453	In Range
27	14:21:33.709	13.62222	40.91667	1110	13.62229	40.917	10017.51	36.711043301	In Range
28	14:21:43.606	13.65222	40.91667	1110	13.65233	40.91678	10031.39	17.032351933	In Range
29	14:21:53.503	13.66667	40.89444	1101	13.66622	40.89454	9387.28	50.560039848	In Range



30	14:22:03.408	13.64222	40.88	1100	13.64249	40.87962	8562.92	50.890447204	In Range
31	14:22:13.314	13.63222	40.85444	1100	13.6324	40.8544	7733.81	20.143127006	In Range
32	14:22:23.205	13.65889	40.84778	1011	13.65897	40.84792	6928.63	17.587375301	In Range
33	14:22:33.115	13.68333	40.83667	1010	13.68293	40.8364	6148.09	53.431551817	In Range
34	14:22:43.017	13.67	40.81444	1001	13.67008	40.814	5366.55	48.350814939	In Range
35	14:22:52.917	13.64889	40.79667	1000	13.64854	40.79659	4546.3	40.131104369	In Range
36	14:23:02.815	13.66667	40.77667	0111	13.66658	40.77682	3747.66	19.106786506	In Range
37	14:23:12.717	13.69556	40.77778	0110	13.69569	40.77792	2945.18	21.716120179	In Range
38	14:23:22.622	13.69778	40.75111	0100	13.69778	40.75117	2146.1	6.628674050	In Range
39	14:23:32.517	13.67222	40.73778	0011	13.67241	40.73767	1338.84	23.919452974	In Range
40	14:23:42.421	13.67778	40.71111	0001	13.67793	40.71121	535.96	20.446990690	In Range
41	14:23:52.326	13.69778	40.71333	0000	13.69361	40.71091	107.4	532.151419908	In Range
42	14:24:21.071	13.69333	40.71111	0000	13.69361	40.71091	107.4	38.224114184	In Range
43	14:24:48.499	13.69333	40.71111	0000	13.69361	40.71091	107.4	38.224114184	In Range

Results in **RED** are outside the reported altitude band, but within the allowance of reporting the adjacent altitude band.
Position Error for burst 41 highlighted red occurs at the moment of impact and can be disregarded.



Test 2: Navigation data from Internal and External Navigation Device

Burst No.	Burst TX Time	Encoded Location reported in the beacon message			Best-matching simulated location between P(t0) and P(t0-2)			2D location error (meters)	Altitude error (meters)
		Latitude	Longitude	Altitude Band	Latitude	Longitude	Altitude		
1	16:16:17.800	13.28333	40.91667	0000	13.283	40.917	-92.81	51.737598937	In Range
2	16:16:22.703	13.28333	40.91667	0000	13.28303	40.917	-90.96	49.782630441	In Range
3	16:16:27.602	13.28333	40.91667	0000	13.28363	40.917	-46.52	48.673091976	In Range
4	16:16:32.511	13.28556	40.91667	0000	13.28551	40.917	92.37	36.464608018	In Range
5	16:16:37.402	13.28889	40.91667	0000	13.28864	40.917	323.87	45.255381799	In Range
6	16:16:42.310	13.29333	40.91667	0001	13.29303	40.917	648	49.235766030	In Range
7	16:16:47.204	13.29889	40.91667	0010	13.29867	40.917	1064.79	43.260531863	In Range
8	16:16:52.113	13.30556	40.91667	0011	13.30557	40.917	1574.29	36.112322638	In Range
9	16:16:57.011	13.31333	40.91667	0100	13.31372	40.917	2130.24	55.826744349	In Range
10	16:17:01.908	13.32333	40.91667	0101	13.32312	40.917	2686.42	43.449366525	In Range
11	16:17:06.816	13.33333	40.91667	0110	13.33377	40.917	3242.87	60.235694604	In Range
12	16:17:11.717	13.34556	40.91667	0111	13.34567	40.917	3799.71	38.243085740	In Range
13	16:17:16.613	13.35778	40.91667	1000	13.35882	40.917	4356.98	121.798629505	In Range
14	16:17:21.523	13.37222	40.91667	1001	13.37323	40.917	4914.81	117.596946115	In Range
15	16:17:26.418	13.38667	40.91667	1001	13.38525	40.917	5361.45	161.470358192	In Range
16	16:17:31.322	13.40222	40.91667	1010	13.40328	40.917	6031.94	123.414902920	In Range
17	16:17:36.223	13.41667	40.91667	1010	13.4153	40.917	6479.29	155.981157616	In Range
18	16:17:41.122	13.43	40.91667	1011	13.43032	40.917	7038.86	50.957027996	In Range
19	16:17:46.028	13.44111	40.91667	1011	13.44234	40.917	7486.83	141.222460181	In Range
20	16:17:50.929	12.46	41.91667	1100	12.46036	41.917	8159.31	53.845046039	In Range
21	16:17:55.827	12.47556	41.91667	1101	12.47537	41.917	8690.56	41.534389640	-109.44
22	16:18:00.726	12.49	41.91667	1101	12.49039	41.917	9131.51	56.243486134	In Range
23	16:18:05.624	12.50556	41.91667	1101	12.5054	41.917	9480.29	39.984854572	In Range
24	16:18:15.532	12.53222	41.91667	1110	12.53244	41.917	9875.88	43.315657089	-124.12
25	16:18:25.431	12.56222	41.91667	1110	12.56248	41.917	9981.9	46.436975404	-18.10
26	16:18:35.331	12.59222	41.91667	1110	12.59254	41.917	9998.93	50.196577527	-1.07
27	16:18:45.237	12.62222	41.91667	1110	12.62259	41.917	10017.7	54.279643768	In Range
28	16:18:55.137	12.65222	41.91667	1110	12.65262	41.9167325	10030.05	45.000951176	In Range



29	16:19:05.040	12.66556	41.89333	1101	12.66585	41.8933675	9354.39	33.126020930	In Range
30	16:19:14.941	12.64111	41.87889	1100	12.64111	41.87902417	8521.18	14.689895191	In Range
31	16:19:24.839	13.63333	40.85333	1100	13.633	40.853333883	7701.68	36.914554219	In Range
32	16:19:34.738	13.66	40.84778	1011	13.65985	40.848121	6904.75	40.676006842	In Range
33	16:19:44.643	13.68333	40.83667	1010	13.68243	40.83784683	6188.3	162.597481559	In Range
34	16:19:54.542	13.66889	40.81333	1001	13.67008	40.814004	5366.55	150.645707415	In Range
35	16:20:04.440	13.64889	40.79444	1000	13.64845	40.79321433	4457.2	141.544234542	In Range
36	16:20:14.340	13.66889	40.77667	0111	13.66985	40.777315	3660.17	128.147986197	In Range
37	16:20:24.246	13.69667	40.77667	0110	13.69569	40.777923	2945.18	173.845811507	In Range
38	16:20:34.142	13.69778	40.75111	0100	13.69757	40.75095633	2137.83	28.588866836	In Range
39	16:20:44.051	13.67222	40.73667	0011	13.6717	40.736673	1306	57.701446390	In Range
40	16:20:53.953	13.67889	40.71111	0001	13.67902	40.71067283	504.33	49.405496364	In Range
41	16:21:03.853	13.69444	40.71111	0000	13.69361	40.7109075	107.4	94.918777238	In Range
42	16:21:30.949	13.69333	40.71111	0000	13.69361	40.7109075	107.4	38.224114184	In Range
43	16:22:00.033	13.69333	40.71111	0000	13.69361	40.7109075	107.4	38.224114184	In Range

Results in **RED** are outside the reported altitude band, but within the allowance of reporting the adjacent altitude band.
Results in **BLUE** indicate when the encoded position data switched to External Navigation Input.

Simulator level set to -123dB for this test.



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

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

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

Position 1: 81° 30.000' N 100° 15.000' W ①

Position 2: 71° 30.000' N 100° 15.000' W ①

① Input from External Navigation via ARINC interface connected to EUT

Position Acquisition/Retention:

Action	Time (mm:ss)	Interval (mm:ss)	Comments/Message
Position 1 applied	00:00.0	-	-
Beacon activated	00:10	-	Position 1 still active to ensure acquisition
First message acquired	00:14.5	-	For comparison with next encoded message to ensure new acquisition (not repetition)
Position 1 encoded	✓		FFFE2F8C99000000147648E3D385E00F02FA
Beacon deactivated	00:16	-	-
Position 1 removed	00:30	-	-
Position 2 applied	00:31	-	-
Position 2 removed	00:33.5	00:02.5	Target: 2-3 s ; to test acquisition within 2 s
Beacon activated	05:23.5	04:50	Target: 4:45-5:00 m ; to test retention
First message acquired	05:28	-	Limit: Position 2 encoded
Position 2 encoded	✓		FFFE2F8C9900000011F648731845E00F02FA

Position Clearance:

Action	Time (mm:ss)	Interval (mm:ss)	Comments/Message
Beacon deactivated	05:30	-	Timer continued from Acquisition/Retention test
Position 1 applied	05:40	-	-
Position 1 removed	05:42.5	00:02.5	Target: 2-3 s ; to ensure acquisition
Beacon activated	10:47.5	05:05	Target: 5:00-5:15 m ; to test clearance
First message acquired	10:52	-	Limit: Default Position encoded
Default Position encoded	✓		FFFE2F8C990000001FEFFE6E1B0F61F0FF01



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

Location: N 50° 51'36" W 1° 14'24" ①		
Data Acquired at	08:02:49	FFFE2F8C990000000CD0134FA585D0DE62F3
GPS Signal Navigation Data Removed		
Last Message with Encoded Data	12:02:35	FFFE2F8C990000000CD0134FA58550DE61C2
Data Updated at	12:03:03	FFFE2F8C9900000001FEFFE6E1B0F61F0FF01
Last Valid Position Held	240 min 15 sec	
Return to Default Position	✓	

① Input from External Navigation via ARINC interface connected to EUT

Location: N 51° 22'36" W 1° 49'52" ②		
Data Acquired at	09:17:03	FFFE2F8C990000000CF022D1C200CECA26FE
GPS Signal Navigation Data Removed		
Last Message with Encoded Data	13:16:51	FFFE2F8C990000000CF022D1C2004ECA25CF
Data Updated at	13:17:19	FFFE2F8C9900000001FEFFE6E1B0F61F0FF01
Last Valid Position Held	240 min 16 sec	
Return to Default Position	✓	

② Input from Internal Navigation via GNSS Simulator connected to EUT

Summary

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



2.14 METHODS OF ACTIVATION AND CANCELLATION MESSAGE TEST

2.14.1 Specification

Cospas-Sarsat T.007, Clause A.3.9

2.14.2 Equipment Under Test and Modification State

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

2.14.3 Date of Test

07 February 2022 and 08 February 2022

2.14.4 Test Equipment Used

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

2.14.5 Laboratory Environmental Conditions

Ambient Temperature 20.5 – 23.4°C

Relative Humidity 26.5 – 30.1%

2.14.6 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)'

Encoded Protocol

ELT DT Location Protocol

Test No.	Control Lines			Message Bits Status		ELT(DT) Status†	Pass/Fail
	Auto Activation by beacon ¹	Auto Activation by external means ^{2,3,4}	Manual Activation ^{5,6}	Bit 107	Bit 108		
1	Disabled	Disabled	Disabled	N/A	N/A	ARMED	N/A
2	Disabled	Enabled	Disabled	1	0	ON	Pass
3	Disabled	Enabled	Enabled	0	0	ON	Pass
4	Disabled	Disabled	Enabled	0	0	ON	Pass
5	Disabled	Disabled	Disabled	N/A	N/A	ARMED	Pass
6	Disabled	Enabled	Disabled	1	0	ON	Pass
7	Disabled	Disabled	Disabled	N/A	N/A	ARMED	Pass
8	Disabled	Disabled	Enabled	0	0	ON	Pass
9	Disabled	Enabled	Enabled	1	0	ON	Pass
10	Disabled	Enabled	Disabled	1	0	ON	Pass
11	Disabled	Disabled	Disabled	N/A	N/A	ARMED	Pass
12	Disabled	Disabled	Enabled	0	0	ON	Pass
13	Disabled	Disabled	Disabled	N/A	N/A	ARMED	Pass
14	Enabled	Disabled	Disabled	0	1	ON	Pass
15	Enabled	Disabled	Enabled	0	0	ON	Pass
16	Enabled	Enabled	Enabled	1	0	ON	Pass
17	Enabled	Disabled	Enabled	0	0	ON	Pass
18a	Disabled	Disabled	Disabled	N/A	N/A	ARMED	Pass
18b	Enabled	Disabled	Disabled	0	1	ON	N/A
19	Disabled	Disabled	Disabled	N/A	N/A	ARMED	N/A
20	Enabled	Disabled	Disabled	0	1	ON	Pass
21	Enabled	Enabled	Disabled	1	0	ON	Pass
22	Enabled	Enabled	Enabled	0	0	ON	Pass
23	Enabled	Enabled	Disabled	1	0	ON	Pass
24a	Disabled	Disabled	Disabled	N/A	N/A	ARMED	Pass
24b	Enabled	Disabled	Disabled	0	1	ON	N/A
25	Disabled	Disabled	Disabled	N/A	N/A	ARMED	N/A

For the tests presented in this document, the following activation methods were used where applicable:

- ¹ EUT activated via Crash Sensor
- ² EUT activated via Arinc Label
- ³ EUT activated via Arinc Loss
- ⁴ EUT activated via 28V Loss
- ⁵ EUT activated via EUT front panel
- ⁶ EUT activated via Remote panel switch

Bit 107 and Bit 108 that were monitored during testing behaved the same for all combinations of activation methods listed above.

Tests 18b and 24b were not applicable as the beacon doesn't have a separate means of resetting the "automatic activation by the beacon". Therefore tests 19 and 25 were also not applicable as the beacon was already in the ARMED state.

Following the above test sequence demonstrates that the EUT can only be deactivated via the same means used for activation, with the exception of the Crash Sensor which does not have its own means for deactivation.

The results tables below show the maximum and minimum values measured over the 10 cancellation bursts in each case.



Cancellation Messages for Combination 1,2,5

Test No. 5

A	Nominal Frequency (max/min)	MHz	406.0309262	406.0309222
B	Power (max/min)	dBm	37.93	37.92
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	112.7
	Modulation Fall Time (max/min)	µs	112	109.9
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.092	-1.066
	Mod Symmetry		0.03417	
E	First Cancellation message delay	seconds	4.66	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 7

A	Nominal Frequency (max/min)	MHz	406.0309242	406.0309212
B	Power (max/min)	dBm	37.94	37.94
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.3	113.3
	Modulation Fall Time (max/min)	µs	112.2	109.6
	Phase Deviation + (max/min)	Radians	1.076	1.05
	Phase Deviation - (max/min)	Radians	-1.092	-1.065
	Mod Symmetry		0.03441	
E	First Cancellation message delay	seconds	4.19	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 11

A	Nominal Frequency (max/min)	MHz	406.0309226	406.0309218
B	Power (max/min)	dBm	37.92	37.90
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.3	112.6
	Modulation Fall Time (max/min)	µs	112.8	109.1
	Phase Deviation + (max/min)	Radians	1.077	1.049
	Phase Deviation - (max/min)	Radians	-1.094	-1.065
	Mod Symmetry		0.03454	
E	First Cancellation message delay	seconds	4.33	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 13

A	Nominal Frequency (max/min)	MHz	406.0309211	406.0309185
B	Power (max/min)	dBm	37.92	37.88
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.7	113
	Modulation Fall Time (max/min)	µs	112.6	109.2
	Phase Deviation + (max/min)	Radians	1.076	1.05
	Phase Deviation - (max/min)	Radians	-1.095	-1.067
	Mod Symmetry		0.03459	
E	First Cancellation message delay	seconds	4.58	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Test No. 18a

A	Nominal Frequency (max/min)	MHz	406.0309189	406.0309178
B	Power (max/min)	dBm	37.88	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	113.4
	Modulation Fall Time (max/min)	µs	112.3	109.4
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.095	-1.066
	Mod Symmetry		0.03463	
E	First Cancellation message delay	seconds	4.43	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 24a

A	Nominal Frequency (max/min)	MHz	406.0309177	406.0309159
B	Power (max/min)	dBm	37.89	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.3	113
	Modulation Fall Time (max/min)	µs	112.5	109.7
	Phase Deviation + (max/min)	Radians	1.076	1.05
	Phase Deviation - (max/min)	Radians	-1.093	-1.068
	Mod Symmetry		0.03462	
E	First Cancellation message delay	seconds	4.22	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Cancellation Messages for Combination 1,2,6

Test No. 5

A	Nominal Frequency (max/min)	MHz	406.0309168	406.030914
B	Power (max/min)	dBm	37.89	37.86
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.6	113.1
	Modulation Fall Time (max/min)	µs	112.2	109.7
	Phase Deviation + (max/min)	Radians	1.078	1.049
	Phase Deviation - (max/min)	Radians	-1.093	-1.068
	Mod Symmetry		0.03492	
E	First Cancellation message delay	seconds	4.56	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 7

A	Nominal Frequency (max/min)	MHz	406.0309182	406.0309158
B	Power (max/min)	dBm	37.90	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.4	113.3
	Modulation Fall Time (max/min)	µs	112.4	109.6
	Phase Deviation + (max/min)	Radians	1.076	1.048
	Phase Deviation - (max/min)	Radians	-1.092	-1.068
	Mod Symmetry		0.03473	
E	First Cancellation message delay	seconds	4.14	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Test No. 11

A	Nominal Frequency (max/min)	MHz	406.0309172	406.0309142
B	Power (max/min)	dBm	37.89	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.6	113.3
	Modulation Fall Time (max/min)	μs	112.4	109.5
	Phase Deviation + (max/min)	Radians	1.074	1.049
	Phase Deviation - (max/min)	Radians	-1.093	-1.067
	Mod Symmetry		0.03473	
E	First Cancellation message delay	seconds	4.32	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 13

A	Nominal Frequency (max/min)	MHz	406.0309175	406.0309154
B	Power (max/min)	dBm	37.90	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.5	113.1
	Modulation Fall Time (max/min)	μs	112.3	109.9
	Phase Deviation + (max/min)	Radians	1.074	1.051
	Phase Deviation - (max/min)	Radians	-1.091	-1.068
	Mod Symmetry		0.03509	
E	First Cancellation message delay	seconds	4.64	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 18a

A	Nominal Frequency (max/min)	MHz	406.0309165	406.0309144
B	Power (max/min)	dBm	37.89	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.5	112.9
	Modulation Fall Time (max/min)	μs	112.1	108.9
	Phase Deviation + (max/min)	Radians	1.074	1.049
	Phase Deviation - (max/min)	Radians	-1.092	-1.067
	Mod Symmetry		0.03477	
E	First Cancellation message delay	seconds	4.58	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.003	9.999
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 24a

A	Nominal Frequency (max/min)	MHz	406.0309156	406.0309133
B	Power (max/min)	dBm	37.90	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.6	113.2
	Modulation Fall Time (max/min)	μs	111.9	109.3
	Phase Deviation + (max/min)	Radians	1.075	1.049
	Phase Deviation - (max/min)	Radians	-1.09	-1.067
	Mod Symmetry		0.03541	
E	First Cancellation message delay	seconds	4.38	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Cancellation Messages for Combination 1,3,5

Test No. 5

A	Nominal Frequency (max/min)	MHz	406.031031	406.031028
B	Power (max/min)	dBm	37.90	37.88
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.4	113.1
	Modulation Fall Time (max/min)	µs	112.6	110
	Phase Deviation + (max/min)	Radians	1.075	1.049
	Phase Deviation - (max/min)	Radians	-1.094	-1.062
	Mod Symmetry		0.03461	
E	First Cancellation message delay	seconds	4.65	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 7

A	Nominal Frequency (max/min)	MHz	406.031032	406.0310298
B	Power (max/min)	dBm	37.90	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	113.2
	Modulation Fall Time (max/min)	µs	112.1	109.3
	Phase Deviation + (max/min)	Radians	1.074	1.05
	Phase Deviation - (max/min)	Radians	-1.092	-1.067
	Mod Symmetry		0.0351	
E	First Cancellation message delay	seconds	4.15	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 11

A	Nominal Frequency (max/min)	MHz	406.0310284	406.0310267
B	Power (max/min)	dBm	37.87	37.85
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.6	112.9
	Modulation Fall Time (max/min)	µs	112.3	109.6
	Phase Deviation + (max/min)	Radians	1.073	1.05
	Phase Deviation - (max/min)	Radians	-1.091	-1.067
	Mod Symmetry		0.03491	
E	First Cancellation message delay	seconds	4.21	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	9.999
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 13

A	Nominal Frequency (max/min)	MHz	406.031028	406.031026
B	Power (max/min)	dBm	37.88	37.86
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.6	113
	Modulation Fall Time (max/min)	µs	112.2	109.4
	Phase Deviation + (max/min)	Radians	1.078	1.048
	Phase Deviation - (max/min)	Radians	-1.093	-1.063
	Mod Symmetry		0.03483	
E	First Cancellation message delay	seconds	4.60	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.003	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Test No. 18a

A	Nominal Frequency (max/min)	MHz	406.0310249	406.031022
B	Power (max/min)	dBm	37.87	37.85
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	113
	Modulation Fall Time (max/min)	µs	112.3	109.5
	Phase Deviation + (max/min)	Radians	1.076	1.046
	Phase Deviation - (max/min)	Radians	-1.093	-1.066
	Mod Symmetry		0.03524	
E	First Cancellation message delay	seconds	4.51	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 24a

A	Nominal Frequency (max/min)	MHz	406.0310241	406.0310223
B	Power (max/min)	dBm	37.86	37.85
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.6	112.1
	Modulation Fall Time (max/min)	µs	113	109.8
	Phase Deviation + (max/min)	Radians	1.077	1.051
	Phase Deviation - (max/min)	Radians	-1.093	-1.065
	Mod Symmetry		0.03506	
E	First Cancellation message delay	seconds	4.19	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Cancellation Messages for Combination 1,3,6

Test No. 5

A	Nominal Frequency (max/min)	MHz	406.0310245	406.0310208
B	Power (max/min)	dBm	37.85	37.83
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.6	112.9
	Modulation Fall Time (max/min)	µs	111.9	109.4
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.097	-1.068
	Mod Symmetry		0.03484	
E	First Cancellation message delay	seconds	4.66	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 7

A	Nominal Frequency (max/min)	MHz	406.0310259	406.0310238
B	Power (max/min)	dBm	37.85	37.83
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.4	113.2
	Modulation Fall Time (max/min)	µs	112.1	109.6
	Phase Deviation + (max/min)	Radians	1.075	1.049
	Phase Deviation - (max/min)	Radians	-1.092	-1.068
	Mod Symmetry		0.03476	
E	First Cancellation message delay	seconds	4.16	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Test No. 11

A	Nominal Frequency (max/min)	MHz	406.0310245	406.0310215
B	Power (max/min)	dBm	37.86	37.83
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.4	113
	Modulation Fall Time (max/min)	μs	112.3	109.4
	Phase Deviation + (max/min)	Radians	1.075	1.048
	Phase Deviation - (max/min)	Radians	-1.093	-1.067
	Mod Symmetry		0.03473	
E	First Cancellation message delay	seconds	4.28	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 13

A	Nominal Frequency (max/min)	MHz	406.0310261	406.0310237
B	Power (max/min)	dBm	37.86	37.84
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.6	113.1
	Modulation Fall Time (max/min)	μs	112.1	109.6
	Phase Deviation + (max/min)	Radians	1.074	1.049
	Phase Deviation - (max/min)	Radians	-1.094	-1.066
	Mod Symmetry		0.03464	
E	First Cancellation message delay	seconds	4.56	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 18a

A	Nominal Frequency (max/min)	MHz	406.0310248	406.0310214
B	Power (max/min)	dBm	37.85	37.82
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.3	113.1
	Modulation Fall Time (max/min)	μs	112.2	109.5
	Phase Deviation + (max/min)	Radians	1.076	1.05
	Phase Deviation - (max/min)	Radians	-1.094	-1.066
	Mod Symmetry		0.0348	
E	First Cancellation message delay	seconds	4.58	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 24a

A	Nominal Frequency (max/min)	MHz	406.0310236	406.0310211
B	Power (max/min)	dBm	37.84	37.82
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.3	112.8
	Modulation Fall Time (max/min)	μs	111.8	109.1
	Phase Deviation + (max/min)	Radians	1.076	1.048
	Phase Deviation - (max/min)	Radians	-1.093	-1.069
	Mod Symmetry		0.03525	
E	First Cancellation message delay	seconds	4.12	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.003	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Cancellation Messages for Combination 1,4,5

Test No. 5

A	Nominal Frequency (max/min)	MHz	406.0310255	406.0310199
B	Power (max/min)	dBm	37.93	37.91
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	114.9	113
	Modulation Fall Time (max/min)	µs	112.1	109.9
	Phase Deviation + (max/min)	Radians	1.077	1.051
	Phase Deviation - (max/min)	Radians	-1.09	-1.065
	Mod Symmetry		0.03426	
E	First Cancellation message delay	seconds	4.60	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 7

A	Nominal Frequency (max/min)	MHz	406.0310275	406.031025
B	Power (max/min)	dBm	37.91	37.90
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	113
	Modulation Fall Time (max/min)	µs	111.9	109.5
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.092	-1.066
	Mod Symmetry		0.03454	
E	First Cancellation message delay	seconds	4.37	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 11

A	Nominal Frequency (max/min)	MHz	406.0310266	406.031023
B	Power (max/min)	dBm	37.89	37.86
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.3	113.1
	Modulation Fall Time (max/min)	µs	112.2	109.3
	Phase Deviation + (max/min)	Radians	1.076	1.05
	Phase Deviation - (max/min)	Radians	-1.092	-1.066
	Mod Symmetry		0.03495	
E	First Cancellation message delay	seconds	4.46	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 13

A	Nominal Frequency (max/min)	MHz	406.0310276	406.0310253
B	Power (max/min)	dBm	37.89	37.87
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	113.1
	Modulation Fall Time (max/min)	µs	112.2	109.6
	Phase Deviation + (max/min)	Radians	1.076	1.05
	Phase Deviation - (max/min)	Radians	-1.092	-1.062
	Mod Symmetry		0.0344	
E	First Cancellation message delay	seconds	4.51	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Test No. 18a

A	Nominal Frequency (max/min)	MHz	406.0310215	406.0310181
B	Power (max/min)	dBm	37.86	37.84
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.7	113.4
	Modulation Fall Time (max/min)	µs	111.9	109.5
	Phase Deviation + (max/min)	Radians	1.077	1.049
	Phase Deviation - (max/min)	Radians	-1.092	-1.066
	Mod Symmetry		0.0349	
E	First Cancellation message delay	seconds	4.64	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 24a

A	Nominal Frequency (max/min)	MHz	406.0310207	406.0310187
B	Power (max/min)	dBm	37.85	37.82
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.4	113
	Modulation Fall Time (max/min)	µs	111.9	109.3
	Phase Deviation + (max/min)	Radians	1.075	1.048
	Phase Deviation - (max/min)	Radians	-1.094	-1.063
	Mod Symmetry		0.03482	
E	First Cancellation message delay	seconds	4.58	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Cancellation Messages for Combination 1,4,6

Test No. 5

A	Nominal Frequency (max/min)	MHz	406.0310213	406.0310177
B	Power (max/min)	dBm	37.87	37.84
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.5	112.8
	Modulation Fall Time (max/min)	µs	111.8	109.6
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.094	-1.066
	Mod Symmetry		0.03507	
E	First Cancellation message delay	seconds	4.60	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 7

A	Nominal Frequency (max/min)	MHz	406.0310226	406.0310205
B	Power (max/min)	dBm	37.86	37.85
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	µs	115.7	113.2
	Modulation Fall Time (max/min)	µs	112	109.6
	Phase Deviation + (max/min)	Radians	1.077	1.049
	Phase Deviation - (max/min)	Radians	-1.092	-1.066
	Mod Symmetry		0.03495	
E	First Cancellation message delay	seconds	4.47	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



Test No. 11

A	Nominal Frequency (max/min)	MHz	406.0310214	406.0310183
B	Power (max/min)	dBm	37.86	37.83
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.5	112.6
	Modulation Fall Time (max/min)	μs	112.7	109.5
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.094	-1.064
	Mod Symmetry		0.03493	
E	First Cancellation message delay	seconds	4.53	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 13

A	Nominal Frequency (max/min)	MHz	406.0310222	406.0310202
B	Power (max/min)	dBm	37.86	37.84
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.9	113
	Modulation Fall Time (max/min)	μs	112.4	109.3
	Phase Deviation + (max/min)	Radians	1.075	1.05
	Phase Deviation - (max/min)	Radians	-1.094	-1.066
	Mod Symmetry		0.03503	
E	First Cancellation message delay	seconds	4.58	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 18a

A	Nominal Frequency (max/min)	MHz	406.0310214	406.031018
B	Power (max/min)	dBm	37.67	37.65
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.2	113.2
	Modulation Fall Time (max/min)	μs	112.6	109.9
	Phase Deviation + (max/min)	Radians	1.074	1.049
	Phase Deviation - (max/min)	Radians	-1.094	-1.065
	Mod Symmetry		0.03488	
E	First Cancellation message delay	seconds	4.60	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.001	10.001
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	

Test No. 24a

A	Nominal Frequency (max/min)	MHz	406.031025	406.0310214
B	Power (max/min)	dBm	37.91	37.88
C	Digital Message		FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	
D	Modulation Rise Time (max/min)	μs	115.7	113
	Modulation Fall Time (max/min)	μs	112.2	110.1
	Phase Deviation + (max/min)	Radians	1.077	1.049
	Phase Deviation - (max/min)	Radians	-1.093	-1.068
	Mod Symmetry		0.03445	
E	First Cancellation message delay	seconds	4.47	
F	Cancellation Message Count		10	
	Cancellation Message Interval (max/min)	seconds	10.002	10
G	EUT stops transmitting after 10 cancellation messages	Pass/Fail	Pass	



A.3.9.3 Reactivation Tests

The EUT was activated via the front panel. The cancellation procedure was then initiated via the front panel. After approximately 50 seconds the EUT was reactivated by the Arinc Label. Distress alerts were transmitted within 5 seconds of reactivation:

Message	Rep Rate
FFFE2F8C99000000147648E3D385E00F02FA	4.901
FFFE2F8C99000000147648E3D385E00F02FA	4.901
FFFE2F8C99000000147648E3D385E00F02FA	4.901
FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	5.73
FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	10.001
FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	10.001
FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	10.001
FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	10.001
FFFE2F8C990000003F5FD4BAA3CF1E0F01EE	10.001
FFFE2F8C99000000147648E3D3A5A00F07D9	4.822*
FFFE2F8C99000000147648E3D3A5A00F07D9	4.901
FFFE2F8C99000000147648E3D3A5A00F07D9	4.901

* Note: The EUT was reactivated approximately 1.5 seconds after the previous burst. Therefore, distress transmissions restarted after approximately $4.82 - 1.5 = 3.32$ seconds.

Summary

The EUT complies with clause A.3.9 of C/S T.007



2.15 TESTING BEACON CONTROLS

2.15.1 Specification

Cospas-Sarsat T.007, Clause A.3.10

2.15.2 Equipment Under Test and Modification State

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

2.15.3 Date of Test

21 February 2022

2.15.4 Test Equipment Used

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

2.15.5 Laboratory Environmental Conditions

Ambient Temperature 20.3°C

Relative Humidity 32.8%

2.14.6 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)'/ 'Self-test'/' GNSS Self-test' as required

Encoded Protocol

ELT DT Location Protocol



Testing Self-Test Controls

The EUT has a common Self-Test and GNSS Self-Test control, however the differentiation between these modes is that a Self-Test is activated by holding down and releasing the test switch between 5 and 10 seconds, while the GNSS Self-Test is activated by holding it down for longer than 10 seconds.

In accordance with C/S T.007, section A.3.10, the EUT was tested as follows (the results are presented in a table of bursts captured):

Test 1

The Self-Test controls were operated and maintained in the activation mode for a period of X-1 seconds. X being the time to trigger a GNSS Self-Test. Therefore, the test button was held for 9 seconds:

Burst	Message
1	FF FED08C990000001FEFFE6E1B0F61F0FF01

The EUT transmitted a single 406 burst and self-terminated.

Test 2

The GNSS Self-Test controls were operated and maintained in the activation mode for a period of at least 5 minutes longer than the maximum duration of the GNSS Self-Test.

Burst	Message
1	FF FED08C990000001FEFFE6E1B0F61F0FF01

The EUT transmitted a single 406 burst and self-terminated.

Testing Operational Controls

Test 1

The EUT was activated by holding the ON switch at the front panel and was held for 3 minutes longer than the declared time to transmit the first 406MHz distress message:

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.901	4.9

The EUT activates and transmits 406MHz distress messages. The beacon does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.



Test 2

The EUT was activated by holding the ON switch on the remote-control panel and was held for 3 minutes longer than the declared time to transmit the first 406MHz distress message:

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.901	4.89

The EUT activates and transmits 406MHz distress messages. The beacon does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.

Test 3

The EUT was activated by triggering a self-test from the front panel. 2 Seconds later the ON switch was then activated and held down for 3 minutes longer than the declared time to transmit the first 406MHz distress message.

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.902	4.89

The EUT did not transmit a self-test. It switched to its normal operating mode and does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.

Test 4

The EUT was activated by holding down the ON switch. After 5 seconds the TEST switch was then activated and held down. Both switches were held for 3 minutes longer than the declared time to transmit the first 406MHz distress message.

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.902	4.89

The EUT did not transmit a self-test. It stayed in its normal operating mode and does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.



Crash Sensor Activation

Test 1

The EUT was activated via the Crash Sensor and then holding the ON switch at the front panel and was held for 3 minutes longer than the declared time to transmit the first 406MHz distress message:

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.903	4.89

The EUT activates and transmits 406MHz distress messages. The beacon does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.

Test 2

The EUT was activated via the Crash Sensor and then holding the ON switch on the remote-control panel and was held for 3 minutes longer than the declared time to transmit the first 406MHz distress message:

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.902	4.89

The EUT activates and transmits 406MHz distress messages. The beacon does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.

Test 3

The EUT was activated via the Crash Sensor. The self-test switch was then held for 5 seconds and then a following 2 seconds the ON switch was then held down for 3 minutes longer than the declared time to transmit the first 406MHz distress message.

Burst Count	31	
Message 1	FFFE2F8C99000000147648E3D395E00F0F75	
Message 2	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.902	4.9

The EUT did not transmit a self-test. The first normal burst encoded bits 107-108 as 01, before changing 00 when the manual switch was held. The EUT does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.

Test 4

The EUT was activated via the Crash Sensor. The ON switch was held down and after 5 seconds the TEST switch was then held down. Both switches were held for 3 minutes longer than the declared time to transmit the first 406MHz distress message.

Burst Count	31	
Message	FFFE2F8C99000000147648E3D385E00F02FA	
Rep Rate (Max/Min) (seconds)	9.901	4.891



No self-test message was transmitted. The EUT activated in normal operating mode and does not transmit more frequently than the repetition period defined in C/S T.001 Section 2.2.1.

Summary

The EUT does not transmit more than one 406MHz burst in Self-Test or GNSS Self-Test mode as required by C/S T.001.

The EUT does not transmit more frequently than the repetition rate defined by C/S T.001.

The EUT complies with clause A.3.10 of Cospas-Sarsat T.007.



SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT

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

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Expiry Date
Section 2.12 Beacons - Antenna Characteristics					
LHCP Antenna (Conical Log, 200MHz-1GHz)	EMCO	3101	490	24	25-Feb-2023
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
Antenna 400-404 MHz	Cobham	MHA3-402R-S1/007	5010	12	12-Jan-2023
Network Analyser	Keysight Technologies	E5063A	5018	12	30-Jul-2022
30m LMR-300-DB COAXIAL CABLE	IntelliConnect Limited	C-NPNP-LMR300DB-30M	5588	12	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5743	24	03-Feb-2022
Section 2.9 Beacons - Battery Current Measurements					
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Multimeter	Fluke	8840A	930	12	25-Aug-2022
High resolution data logger	Pico Technology Ltd	PicoLog ADC20	5594	12	23-Aug-2022
Section 2.1 – 2.4 Beacons - Constant Temperature Tests					
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Hygrometer	Rotronic	I-1000	2891	12	04-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
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3783	12	24-Jun-2022
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	30-Apr-2022
USB Peak and Average Power Sensor	Keysight Technologies	U2042XA	4993	12	26-Apr-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2022



Section 2.7 Beacons - GNSS Self-test					
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Hygrometer	Rotronic	I-1000	2891	12	04-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
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3783	12	24-Jun-2022
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	30-Apr-2022
GPS Simulator	Spirent	GSS7000	4978	12	21-Jul-2022
USB Peak and Average Power Sensor	Keysight Technologies	U2042XA	4993	12	26-Apr-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2022
Section 2.13 Beacons - Navigation System					
Power Meter	Hewlett Packard	436A	83	12	10-Mar-2022
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Attenuator (10dB, 75W)	Bird	8308-100	469	12	19-Mar-2022
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Termination (50ohm, 15W)	Diamond Antenna	DL-30N	3098	12	03-Aug-2022
Antenna (DRG Horn)	ETS-Lindgren	3115	3125	12	15-Oct-2022
Power Sensor	Agilent Technologies	8482A	3289	12	24-Aug-2022
Power Divider	Weinschel	1506A	3345	12	20-Jan-2023
Rubidium Frequency ELT DT Location Protocol	Symmetricon	8040C	3490	12	27-May-2022
Hygrometer	Rotronic	HP21	3718	0	14-Apr-2022
Combiner/Splitter	Weinschel	1506A	3877	12	09-Aug-2022
Multi-GNSS Simulator (GPS)	Spirent	GSS6700	4596	12	20-Aug-2022
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	30-Apr-2022
GPS Simulator	Spirent	GSS7000	4978	12	21-Jul-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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	5035	-	O/P Mon
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	5357	12	18-Jan-2023
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU
Data Logger	Pico Technology Ltd	PicoLog 1012	5526	12	09-Dec-2022
Desktop Stopwatch	Radio Spares	RS Pro	5570	12	27-Aug-2022
Desktop Stopwatch	Radio Spares	RS Pro	5571	12	16-Jul-2022
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5743	24	03-Feb-2022
Section 2.9 Beacons - Operating Lifetime					
Signal Generator	Marconi	2031	53	12	23-Dec-2022
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Multimeter	Fluke	8840A	930	12	25-Aug-2022



Spectrum Analyser	Agilent Technologies	E4407B	1154	12	20-Dec-2022
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Termination (50ohm, 6W)	Micronde	R404613	3074	12	02-Dec-2022
8 Channel Datalogger + Terminal Board	Pico Technology Ltd	ADC-16	3287	12	11-Jan-2023
Power Divider	Weinschel	1506A	3345	12	20-Jan-2023
ESA-E Series Spectrum Analyser	Agilent Technologies	E4402B	3348	12	12-Jan-2023
Rubidium Frequency ELT DT Location Protocol	Symmetricom	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
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
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4510	12	24-Jan-2023
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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	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
Tester (Beacon)	WS Technologies	BT200-1100Y	5394	-	TU
Climatic Chamber	Rotronic	DY110C	5448	-	O/P Mon
RF distribution box	TUV SUD		5626	-	O/P Mon
RF distribution box	TUV SUD		5904	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
USB Power Sensor	Boonton	RTP5008	5820	12	10-May-2022
Section 2.11 Beacons - Satellite Qualitative Test					
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Tester (Beacon)	WS Technologies	BT200-1100Y	5395	-	TU
Desktop Stopwatch	Radio Spares	RS Pro	5570	12	27-Aug-2022
Section 2.7 Beacons - Self Test					
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Hygrometer	Rotronic	I-1000	2891	12	04-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
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	30-Apr-2022
GPS Simulator	Spirent	GSS7000	4978	12	21-Jul-2022
USB Peak and Average Power Sensor	Keysight Technologies	U2042XA	4993	12	26-Apr-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-1000	5027	-	O/P Mon
Cable (18 GHz)	Rosenberger	LU7-036-2000	5035	-	O/P Mon
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2022
Section 2.5 Beacons - Spurious Emissions					
Attenuator (10dB, 75W)	Bird	8308-100	469	12	19-Mar-2022
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3783	12	24-Jun-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
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5743	24	03-Feb-2022
Section 2.10 Beacons - Temperature Gradient Combined					
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Power Divider	Weinschel	1506A	3345	12	20-Jan-2023
Rubidium Frequency ELT DT Location Protocol	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
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3783	12	24-Jun-2022
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4510	12	24-Jan-2023
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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	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
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
USB Power Sensor	Boonton	RTP5008	5820	12	10-May-2022
Section 2.8 Beacons - Thermal Shock					
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Termination (50ohm, 6W)	Micronde	R404613	3074	12	02-Dec-2022
Rubidium Frequency ELT DT Location Protocol	Symmetricon	8040C	3490	12	27-May-2022
Hygrometer	Rotronic	HP21	3718	0	14-Apr-2022
Thermocouple Data Logger	Pico Technology Ltd	TC-08	3783	12	24-Jun-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
Section 2.6 Beacons - VSWR					
Signal Generator	Marconi	2031	2015	12	31-Mar-2022
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Hygrometer	Rotronic	I-1000	2891	12	04-Nov-2022
Termination (50ohm, 2W)	Omni-Spectra	3001-6100	3081	12	18-Feb-2022
Termination (50ohm, 15W)	Diamond Antenna	DL-30N	3098	12	03-Aug-2022
Short Circuit	TUV SUD	Short Circuit	3272	-	TU
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
1 MHz / 10 MHz reference	Quartzlock	E10-X	4973	12	30-Apr-2022



USB Peak and Average Power Sensor	Keysight Technologies	U2042XA	4993	12	26-Apr-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5026	-	O/P Mon
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
RF distribution box	TUV SUD		5626	-	O/P Mon
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2022
Section 2.14 Beacons – Activation and Cancellation Messages					
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
RF distribution box	TUV SUD		5626	-	O/P Mon
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	LU7-036-1000	5026	-	O/P Mon
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	5357	12	18-Jan-2023
Rubidium Frequency ELT DT Location Protocol	Symmetricon	8040C	3490	12	27-May-2022
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Desktop Stopwatch	Radio Spares	RS Pro	5570	12	27-Aug-2022
Section 2.15 Beacons – Testing Beacon Controls					
Signal Analyzer	Keysight Technologies	N9020B-ATO-43105	5742	12	03-Feb-2023
RF distribution box	TUV SUD		5626	-	O/P Mon
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	LU7-036-1000	5026	-	O/P Mon
Hygrometer	Rotronic	I-1000	2829	12	06-Apr-2022
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	5357	12	18-Jan-2023
Rubidium Frequency ELT DT Location Protocol	Symmetricon	8040C	3490	12	27-May-2022
Dual Power Supply Unit	Hewlett Packard	6253A	271	-	O/P Mon
Desktop Stopwatch	Radio Spares	RS Pro	5570	12	27-Aug-2022

O/P Mon – Output Monitored using calibrated equipment
TU – Traceability Unscheduled



3.2 MEASUREMENT UNCERTAINTY

Table Values

The following table shows the measurement uncertainties for two signal analysers that are supported by DBT1.

Parameter	R&S FPL	Keysight MXA	C/S T.008 Requirement	Unit of Measurement
Repetition Time	1.134	1.134	± 10.0	ms
Total Transmission Time	0.012	0.009	± 1.0	ms
Fist Burst Delay	1.134	1.134	± 10.0	ms
CW Preamble	0.001	0.009	± 1.0	ms
Bit Rate	0.010	0.100	± 0.6	bps
Nominal frequency	34.00	1.70	± 100.0	Hz
Frequency stability	0.05	0.05	< 0.1	ppb
Transmitted Power	0.26	0.26	± 0.5	dB
Spurious Power Level	1.17	0.92	± 2.0	dB
Power Output Rise time	0.012	0.009	± 0.2	ms
Power Level 1 ms before Burst	1.17	0.92	± 2.0	dB
Modulation Rise	0.924	9.238	± 25.0	µs
Modulation Symmetry	0.005	0.002	< 0.01	-
Phase Modulation	0.004	0.006	± 0.04	rad

Parameter	Height	Distance (d)	C/S T.008 Requirement	Unit of Measurement
EIRP Antenna Setup Measurement Distances	0.6	0.2	± 1	%

Parameter	R&S FPL	Keysight MXA	C/S T.008 Requirement	Unit of Measurement
First Burst Delay (automatic activation)	1.134	1.134	± 10.0	ms

Parameter	R&S FPL	Keysight MXA	C/S T.008 Requirement	Unit of Measurement
Internal Navigation Timing	85.1	85.1	Up to 1 hour ±1 sec	ms
Internal Navigation Timing	340.2	340.2	> 1 hour ±10 sec	ms

Parameter	Fluke 51 Digital Thermometer	C/S T.008 Requirement	Unit of Measurement
Temperature (near beacon)	0.84	± 2°C	°C

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



SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



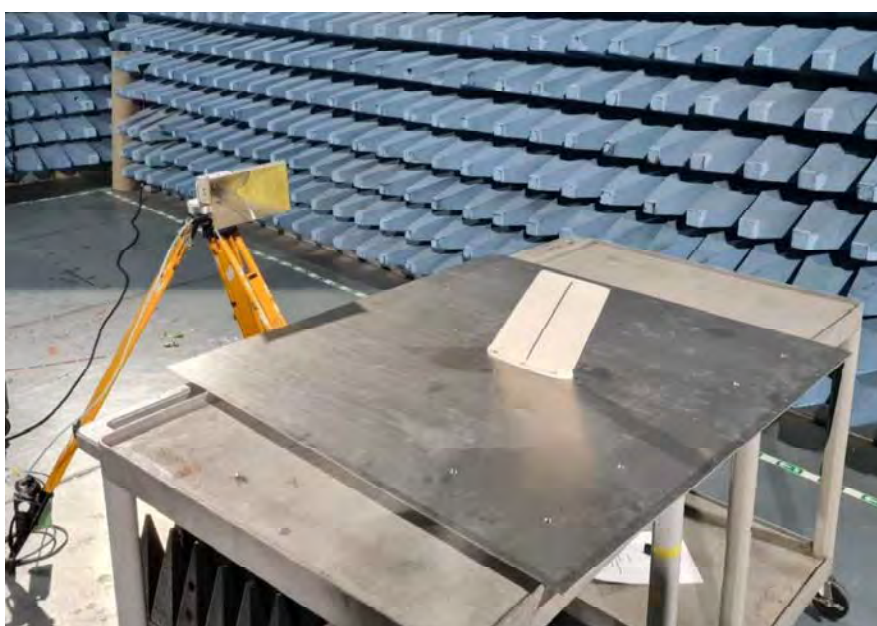
Antenna Characteristics – Configuration 2 Dipole



Position Acquisition Time and Position Accuracy Test (A.3.8.2.2) Configuration 6



Satellite Qualitative Test and Acquisition Time and Position Accuracy Test (A.3.8.2.1) – Configuration 6



Navigation Test (Annex K)



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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ANNEX A

MANUFACTURER SUPPLIED INFORMATION

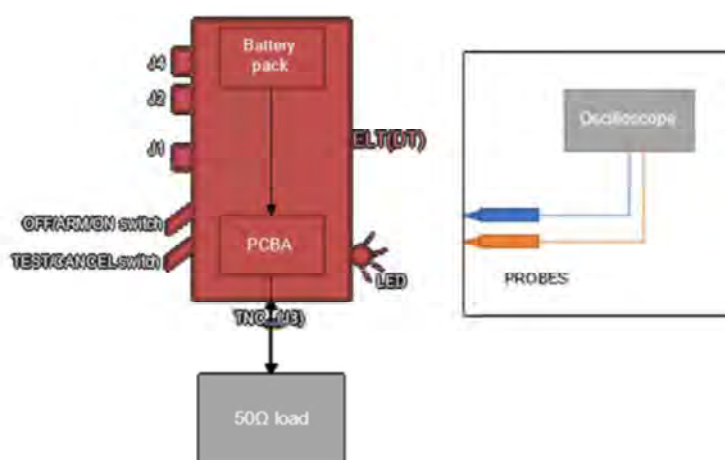
Exhibit 5j-i – Protection Against Continuous Transmission

C/S T.007 Issue 5 Rev 7 June 2021 section 5.j

j. Statements and descriptions, complete with diagrams as necessary, to demonstrate that the design:

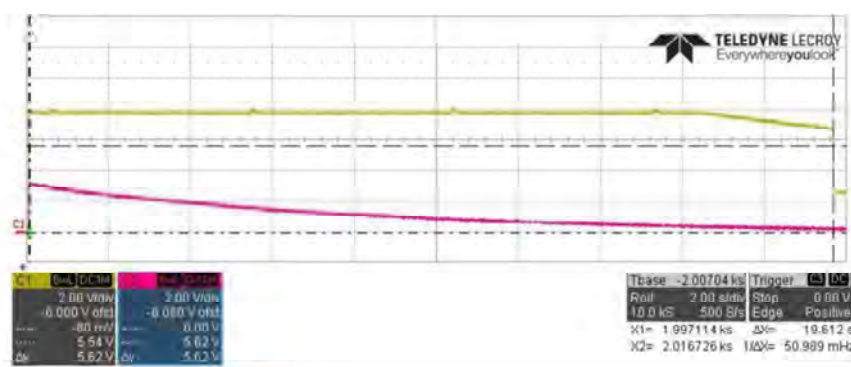
i. Provides protection against continuous transmission (see section A.3.4)

This test aims at checking that the ELT(DT) limits any inadvertent continuous 406MHz transmission to a maximum of 45 seconds.



A specific firmware is used to set the 406MHz signal continuously transmitting.

On the screenshot below, the 406MHz signal driver is checked (C1 yellow curve)



Conclusion:

The 406MHz signal driver stops transmitting after 19.612 sec even if the 406MHz transmission is continuously forced

The beacon design provides protection against continuous transmission (see section A.3.4)



Exhibit 5j-ii – Self-test Characteristics

C/S T.007 Issue 5 Revision 7 June 2021 sections 5.j

j. Statements and descriptions, complete with diagrams as necessary, to demonstrate that the design:

ii. provides protection from repetitive self-test mode transmissions (see section A.3.6.1),

Protection against repetitive self-tests

The beacon can perform three different self-test sequences:

1. an automatic check called EBIT
2. a short duration standard self-test, and
3. a long duration GNSS self-test on the internal position device

EBIT

The EBIT sequence is initiated by pressing, holding, then releasing the TEST button less than 5 seconds. The FPGA monitors the duration of the TEST button presses; looking for firm, continuous requests, thus avoiding accidental self-tests. Once EBIT is initiated the beacon executes a linear code function that runs just once. During EBIT, beacon integrity is checked but no RF transmissions occurs. It is not possible to restart the EBIT function during the test sequence

When entering in EBIT mode, the TEST LED single flash confirms that EBIT has been initiated. If EBIT has passed the TEST LED flashes green for 3 seconds. If EBIT fails, then the TEST LED flashes in red 3 times then N times, depending the defect. After completing the self-test indications, the beacon returns in ARM mode.

Self-test

The self-test sequence is initiated by pressing, holding, then releasing the TEST button after 5 seconds and less than 10 seconds. The FPGA monitors the duration of the TEST button presses; looking for firm, continuous requests, thus avoiding accidental self-tests. Once self-test is initiated the beacon executes a linear code function that runs just once. The RF transmissions can occur only once per self-test. It is not possible to restart the self-test function during the test sequence.

When entering in self-test mode, the TEST LED double flash confirms that self-test has been initiated and 406MHz burst will be emitted. If self-test has passed the TEST LED flashes green for 3 seconds. If self-test fails, then the TEST LED flashes in red 3 times then N times, depending the defect. After completing the self-test indications, the beacon returns in ARM mode.

GNSS Self-test

The GNSS self-test sequence is initiated by pressing, holding the TEST button for more than 10 seconds. The FPGA monitors the duration of the TEST button presses; looking for firm, continuous requests, thus avoiding accidental GNSS self-tests. Once GNSS self-test is initiated the beacon executes a linear code function that runs just once. The



RF transmissions can occur only once per GNSS self-test. It is not possible to restart the self-test function during the test sequence.

When entering in GNSS self-test mode, the TEST LED triple flash confirms that GNSS self-test has been initiated. The beacon checks if the number of GNSS self-tests limit have been reached. If the limit is reached, the beacon indicates a specific red flash pattern on the TEST LED.

When a position fix is acquired, a 406 MHz transmission is sent containing the encoded location. If no position is acquired in 180 seconds (+10 seconds of TEST button pressing) after GNSS self-test sequence, a 406MHz transmission is sent, containing the default position.

After 406MHz transmission, GNSS self-test result is displayed on TEST LED in the same way than self-test: 3 seconds solid green for test OK, and 4 red flashes + N flashes when test is KO.

After completing the GNSS self-test indications, the beacon returns in ARM mode.



Exhibit 5j-iv – Location Coding Protection

C/S T.007 Issue 5 Revision 7 June 2021 section 5.j

j. Statements and descriptions, complete with diagrams as necessary, to demonstrate that the design:

- iv. for location protocol beacons, provides protection against degradation in beacon 406 MHz performance due to faulty operation or failure in operation of internal or external navigation device and against invalid position encoding into the beacon message (see section 4.5.5 of C/S T.001);*

Supporting Statements and Description

The internal navigation device is a u-blox NEO-M8N GNSS receiver. There is no interface for an external navigation device.

Software Protection

The positional data are sent from the GNSS receiver in serial NMEA format. These data are checked for integrity using NMEA CRC and they are checked for validity by examining the message field quality bit and calculated HDOP (Horizontal Dilution Of Precision) figure. The quality bit is calculated by the GNSS receiver to determine the quality of the position fix and requires three or more satellites with good signal to noise ratios. The HDOP figure is calculated from the relative geometry of the satellites used to determine the position fix. The smaller the figure the better the positional accuracy. The software rejects position fixes with a HDOP figure greater than 20. A fix is only encoded in a 406 message when the GNSS receiver has been able to acquire data from at least 4 satellites.

These checks ensure that valid position data is encoded in the 406 MHz message.

If no valid position fix is available, the beacon will revert to transmitting default position values after 4 hours.

Hardware Protection

The serial NMEA data is input to the microcontroller. This input is connected to the GNSS receiver as a logic level signal. Output ports are protected using series resistors to limit current; a fault on the NMEA line will not inhibit normal operation of the beacon.

The power state of the GNSS receiver is controlled by a separate control line connected directly between the microcontroller and GNSS receiver. This is used to power on the GNSS receiver only when a new position fix is required.