

Table C2. SUMMARY OF 406MHz BEACON TEST RESULTS

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T _{min} (-20 ° C)	T _{amb} (20 ° C)	T _{max} (55 ° C)	
1. POWER OUTPUT						
• Transmitter power output	35 - 39	dBm	36.09	36.12	36.20	
• power output rise time	<5	ms	0.15	0.15	0.15	
• power output 1 ms before burst	must be <-10 dBm	✓	✓	✓	✓	
2. DIGITAL MESSAGE						
• bit sync	15 bits "1"	✓	✓	✓	✓	
• frame sync	9 bits (000101111)	✓	✓	✓	✓	
• format flag	1 bit	data bit	1	1	1	
• protocol flag	1 bit	data bit	0	0	0	
• Identification/position data	59 bits	✓	✓	✓	✓	
• BCH code	21 bits	✓	✓	✓	✓	
• emerg. code/nat. use/supplm. data	6 bits	data bits	110101	110101	110101	
• additional data/BCH (if applicable)	32 bits	✓	✓	✓	✓	External GPS
• position error (if applicable)	< 5	km	N/A	N/A	N/A	RCVR dependent

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3. DIGITAL MESSAGE GENERATOR						
• repetition rate**: minimum T_R	47.5	seconds	48.3	48.5	48.3	
• maximum T_R	52.5	seconds	51.7	51.4	51.8	
• bit rate: minimum f_b	396	bits/sec.	399.4	399.4	399.4	
• maximum f_b	404	bits/sec.	399.5	399.5	399.5	
• total transmission time: short message =	435.6 – 444.4	ms	N/A	N/A	N/A	
• long message (optional) =	514.8 – 525.2	ms	520.9 min 520.9 max	521.0 min 521.1 max	521.2 min 521.2 max	
• unmodulated carrier minimum T_1	158.4	ms	159.1	159.2	159.3	
• maximum T_1	161.6	ms	159.1	159.2	159.3	
• first burst delay	>47.5	seconds	64.0	66.0	66.0	

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			T _{min} (-20 °C)	T _{amb} (20 °C)	T _{max} (55 °C)	
4. MODULATION						
• Biphase-L		✓	✓	✓	✓	
• rise time	50 – 250	μs	128.2	127.6	136.3	
• fall time	50 – 250	μs	123.8	123.8	124.5	
• phase deviation: positive	+(1.0 to 1.2)	radians	1.04	1.16	1.12	
• phase deviation: negative	-(1.0 to 1.2)	radians	-1.12	-1.18	-1.16	
• symmetry measurement	≤0.05	✓	✓	✓	✓	
5. 406 MHz TRANSMITTED FREQUENCY						
• nominal value	406.023 – 406.027 or 406.027 – 406.029***)	MHz	406.025211	406.025213	406.025295	
• short-term stability	≤2 x 10 ⁻⁹	/100ms	2.4 x 10 ⁻¹⁰	1.97 x 10 ⁻¹⁰	1.35 x 10 ⁻¹⁰	
• medium-term stability - slope	(-1 to +1) x 10 ⁻⁹	/minute	-2.6 x 10 ⁻¹¹	-9.18 x 10 ⁻¹¹	-1.18 x 10 ⁻¹⁰	
- residual frequency variation	≤3 x 10 ⁻⁹		3.5 x 10 ⁻¹⁰	5.27 x 10 ⁻¹⁰	2.53 x 10 ⁻¹⁰	
6. SPURIOUS EMISSIONS*** (into 50 ohms)						
• in-band (406.0 – 406.1 MHz)	see spurious emission mask in C/S T.001	✓	✓	✓	✓	

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			T _{min} (-20 °C)	T _{amb} (20 °C)	T _{max} (55 °C)	
7. 406 MHz VSWR CHECK after open circuit, short circuit, then while VSWR is 3:1, measure:						
• nominal transmitted frequency	406.023 – 406.027 or 406.027 – 406.029***)	MHz	406.025211	406.025214	406.025295	
Modulation:						
• rise time	50 – 250	μs	128.2	130.2	136.3	
• fall time	50 – 250	μs	123.8	122.5	124.5	
• phase deviation: positive	±(1.0 to 1.2)	radians	1.04	1.16	1.12	
• phase deviation: negative	-(1.0 to 1.2)	radians	-1.12	-1.18	-1.16	
• symmetry measurement	≤0.05	✓	✓	✓	✓	
• digital message	must be correct	✓	✓	✓	✓	

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8. SELF-TEST MODE (if applicable) - frame sync - format flag - single radiated burst - default position data (if applicable) - description provided	9 bits (011010000) 1/0 ≤440/520 (+1%) must be correct	✓ bit ms ✓ ✓	✓ 1 441.0 ✓ ✓	
9. THERMAL SHOCK **** (30° C change) - Soak temperature - Measurement temperature The following parameters are to be met within 15 minutes of beacon turn on and maintained for 2 hours: - transmitted frequency: - nominal value - short-term stability: - medium-term stability: - slope - residual frequency variation - transmitter power output - digital message	406.023 – 406.027 or 406.027 – 406.029****) ≤2 x 10⁻⁹ (-1 to +1) x 10⁻⁹ ≤3 x 10⁻⁹ 35 - 39 must be correct	MHz /100ms /minute dBm ✓	406.025230 2.5 x 10⁻¹⁰ -1.0 x 10⁻¹⁰ to 2.0 x 10⁻¹⁰ 4.0 x 10⁻¹⁰ 36.09 ✓	T_{soak} = -20 °C T_{meas} = 10 °C

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10. OPERATING LIFETIME AT MINIMUM TEMPERATURE**** • duration • transmitted frequency: • nominal value • short-term stability: • medium-term stability: - slope - residual frequency variation • transmitter power output • digital message	>24 406.023 – 406.027 or 406.027 – 406.029**** $\leq 2 \times 10^{-9}$ $(-1 \text{ to } +1) \times 10^{-9}$ $\leq 3 \times 10^{-9}$ 35 - 39 must be correct	hours MHz /100ms /minute dBm ✓	24 hours at $T_{min} = -20^{\circ}\text{C}$ 406.025240 3.0×10^{-10} -1.0×10^{-10} to 2.0×10^{-10} 7.0×10^{-10} 36.61 ✓	
11. TEMPERATURE GRADIENT**** (5° C/hr) • transmitted frequency: • nominal value • short-term stability: • medium-term stability: - slope - residual frequency variation • transmitter power output • digital message	406.023 – 406.027 or 406.027 – 406.029**** $\leq 2 \times 10^{-9}$ $(-1 \text{ to } +1) \times 10^{-9}$ $\leq 3 \times 10^{-9}$ 35 - 39 must be correct	MHz /100ms /minute dBm ✓	406.025220 3.2×10^{-10} -3.0×10^{-10} to 8.0×10^{-10} 1.5×10^{-9} 36.02 to 36.43 ✓	

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12. LONG-TERM FREQUENCY STABILITY	406.20 – 406.030 or 406.23 – 406.30***)	MHz	✓	See TAB E of original packet
• data provided		✓		
13. PROTECTION AGAINST CONTINUOUS TRANSMISSION	≤45	seconds	✓	See TAB E of original packet
• description provided		✓		
14. SATELLITE QUALITATIVE TESTS****	successfully located by satellites/LUT	✓	✓	
• results provided		✓		
15. ANTENNA CHARACTERISTICS	linear or RHCP	✓	✓	
• polarization		✓		
• VSWR	≤ 1.5		N/A	
• ERP _{max} EOL	≤ 20	watts	4.498	
• ERP _{min} EOL	≥ 1.6	watts	1.074	
• azimuth gain variation at 40° elevation angle	≤ 3	dB	2.17	
16. BEACON CODING SOFTWARE	must be correct (attach to report)	✓	✓	
• sample message provided for each coding option of the applicable coding protocol types				
• sample message provided, if applicable, with encoded positions at least 5 km apart	must be correct (attach to report)	✓	✓	

