
	Manufacturer : MARTEC. Beacon Model : Kannad Auto/Auto GPS/Manual/Manual GPS/Manual+/Manual+ GPS	INTESPACE Reference E6668-RTCM
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CHAPTER 1

ADMINISTRATION, GENERAL COMMENTS AND SUMMARY OF TESTS

	<p align="center">Manufacturer : MARTEC. B e a c o n M o d e l : Kannad Auto/Auto GPS/Manual/Manual GPS/Manual+/Manual+ GPS</p>	<p align="center">INTESPACE Reference E6668-RTCM</p>
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1.1 GENERAL COMMENTS

This document reports the procedures and results of certification tests on 406-MHz SARSAT beacons. The tests were conducted for the United States Coast Guard (USCG) by INTESPACE (ITS)

1.2 ADMINISTRATION

1.2.1 WORK ORDER

Manufacturer : MARTEC Serpe-Iesm.
Address : ZI DES Cinq Chemins 56520 GUIDEL FRANCE
Represented by : Mr Stephane JINCHELEAU

1.2.2 INTESPACE TEST CENTER

The test operations have been conducted by : Mr Gérard PEYROU

1.2.3 SCHEDULE

Start of test : 12 December 2005
End of test : 7 August 2006

1.2.4 WORK REFERENCE : E6668-RTCM

1.2.5 EQUIPEMENT UNDER TEST


The results from this test report concern only the equipment here after referenced :

Equipement Under Test (EUT)	Model	Beacon serial number	Float free system auto-release mechanism	Comments
UUT3	Kannad A./A.GPS M./M.GPS M.+/M.+GPS	54143		- Antenna disconnected - EPIRB 50 Ω fitted for C/S electrical tests
UUT4	Kannad A./A.GPS M./M.GPS M.+/M.+GPS	59374		- Normal EPIRB fitted for C/S Satellite and Antenna Tests
UUT5	Kannad A./A.GPS M./M.GPS M.+/M.+GPS	57990		- Normal EPIRB fitted for C/S Satellite and Antenna Tests
UUT6	Kannad Auto / Auto.GPS	61592	Container Martec Kannad Auto P/N 5104373	- Normal EPIRB fitted for complete RTCM Test Sequence and 406 MHz electrical tests
UUT7	Kannad Auto / Auto.GPS	38169	Container Martec Kannad Auto P/N 5104373	- Antenna disconnected - EPIRB 50 Ω fitted for C/S and RTCM electrical Tests

Note 1 : The name of the EPIRB project is “TOPAZE”.

Note 2 : For the Cospas/Sarsat Type Approval the models performed are KANNAD Auto / Auto GPS / Manual /Manual GPS / Manual+ / Manual+ GPS.

Note 3 : The KANNAD Auto GPS model is the most complete and the most representative of EPIRB’s models

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1.3 TEST FACILITIES

- ARGOS – COSPAS/SARSAT Certification Test Bench
- INTESPACE Enviromental Test Equipements
- Toulouse CNES MCC


1.4 STANDARDS AND TEST PROCEDURES APPLICABLES

- **COSPAS-SARSAT standards :**
 - "C/S T. 001- Issue 3 - Revision 7 – November 2005 "
 - "C/S T. 007- Issue 4 – November 2005"
- **RTCM Recommended Standards** for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRBs) - Version 2.1 - June 20, 2002-
- INTESPACE Radiobeacon Test Procedures

1.5 TEST SEQUENCE

1.5.1 SERIES OF TESTS RUN IN ORDER : (RTCM item)

- | | |
|--|----------|
| 1 - Initial Alivness Test | (A 1.0) |
| 2 - Dry Heat Test | (A 3.0) |
| 3 - Damp Heat Test | (A 4.0) |
| 4 - Vibration Test | (A 5.0) |
| 5 - Bump Test | (A 6.0) |
| 6 - Salt Fog Test | (A 7.0) |
| 7 - Drop Tests | (A 8.0) |
| 8 - Leakage and Immersion Tests | (A 9.0) |
| 9 - Spurious Emission Test | (A 10.0) |
| 10 - Thermal shock Tests | (A 11.0) |
| 11 - Cospas-Sarsat C/S T.007 Tests | (A 12.0) |
| 12 - Operational Life, Strobe Light and Self Tests | (A 13.0) |

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1.5.2 SERIES OF TESTS RUN ANY TIME DURING THE SEQUENCE :

- Automatic Release Mechanism & Automatic Activation Tests (A 14.0)
- Stability & Buoyancy Test (A 15.0)
- Inadvertent Activation Test (A 16.0)
- Auxillary Radio-Locating Device Transmitter Test (A 17.0)
- Humidity Test (A 18.0)
- Orientation Test (A 19.0)


All beacon electronic are identical

14.1RESULTS


See following pages Summary of Test results and following chapters Test Result Reports (data and graphs)

General remark :


The tests have been conducted in two time: One for the application of the Cospas/Sarsat Type Approval Certificate and the other for the application of the USCG Type Approval. Regarding the issue of the measurement results performed on the certification test bench, due to the numbering of the computer data sheets, the beacon serial number alters from one curve to the other although the same beacon is concerned.

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SUMMARY OF TESTS

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS				COMMENTS	
			T min. (± 3 °C) (-30 °C)	T amb. (± 3 °C) (22 °C)		T max. (± 3 °C) (+ 70 to + 55 °C)		
1. INITIAL ALIVENESS TEST (A2.0) * Carrier Frequency * Power Output * Data Message	406.028 ± 0.001 35 - 39 must be correct	MHz dBm √		UUT6 406.0278413 38.0 √	UUT7 406.0278750 38.3 √		Chapter 2 18 May 2006 .)	
2. DRY HEAT CYCLE (A3.0) • Aliveness Test (during 2 hour period) * Carrier Frequency * Power Output * Data Message • Aliveness Test (at end of 2 hour period) * Carrier Frequency * Power Output * Data Message	406.028 ± 0.001 35 - 39 must be correct 406.028 ± 0.001 35 - 39 must be correct	MHz dBm √ MHz dBm √				UUT6 406.0278826 38.0 √ 406.0278824 38.0 √	UUT7 / / √ / / √	Chapter 3 19 &20 May 2006

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS		COMMENTS
			T min. (± 3 °C) (-30 to -20 °C)	T max. (± 3 °C) (+40 °C)	
3. DAMP HEAT CYCLE (A4.0) • Aliveness Test (during 2 hour period) * Carrier Frequency * Power Output * Data Message • Aliveness Test (end of 2 hour period) * Carrier Frequency * Power Output * Data Message	 406.028 ± 0.001 35 - 39 must be correct 406.028 ± 0.001 35 - 39 must be correct	 MHz dBm √ MHz dBm √		UUT6 406.0278887 38.2 √ 406.0278524 38.0 √	UUT7 / / √ / / √
Chapter 4 21 &22 May 2006					

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) ($\text{---}^{\circ}\text{C}$)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) ($+40^{\circ}\text{C}$)	
4. VIBRATION TEST (A5.0) • Exterior Mechanical Inspection • UUT6 Aliveness Test * Carrier Frequency * Power Output * Data Message • UUT7 Aliveness Test * Carrier Frequency * Power Output * Data Message	No damage 406.028 ± 0.001 35 - 39 must be correct 406.028 ± 0.001 35 - 39 must be correct	√ MHz dBm √ MHz dBm √		√ 406.0278507 38.05 √ 406.0278208 36.9 √		Chapter 5 12-14 may, 2006

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (_____ $^{\circ}\text{C}$)	T amb. ($\pm 3^{\circ}\text{C}$) (22°)	T max. ($\pm 3^{\circ}\text{C}$) (_____ $^{\circ}\text{C}$)	
5. BUMP TEST (A6.0) • Exterior Mechanical Inspection • UUT6 Aliveness Test * Carrier Frequency * Power Output * Data Message • UUT7 Aliveness Test * Carrier Frequency * Power Output * Data Message	No damage 406.028 \pm 0.001 35 - 39 must be correct 406.028 \pm 0.001 35 - 39 must be correct	\checkmark MHz dBm \checkmark MHz dBm \checkmark		\checkmark 406.0278536 38.0 \checkmark 406.0278202 36.9 \checkmark		Chapter 6 14-15 june, 2006
6. SALT FOG TEST (A7.0) 1st Period : following RTCM Standard • Exterior Mechanical Inspection • UUT6 Aliveness Test * Carrier Frequency * Power Output * Data Message • UUT7 Aliveness Test * Carrier Frequency * Power Output * Data Message 2nd Period : following ETS/IEC Stds • Exterior Mechanical Inspection • Self Test	No damage 406.028 \pm 0.001 35 - 39 must be correct 406.028 \pm 0.001 35 - 39 must be correct No damage must be correct	\checkmark MHz dBm \checkmark MHz dBm \checkmark \checkmark \checkmark		\checkmark 406.0278668 38.11 \checkmark 406.0278246 37.3 \checkmark \checkmark		Chapter 7 15 june to 21 june, 2006 21 june to 12 july, 2006

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (- 30 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (_____ °C)	
7-A. DROP TEST On Hard Surface (A8.1) <ul style="list-style-type: none"> Exterior Mechanical Inspection Aliveness Test * Carrier Frequency * Power Output * Data Message	No damage 406.028 \pm 0.001 35 - 39 must be correct	√ MHz dBm √	UUT6 √ 406.027841 37.2 √			Chapter 8 13 july 2006
7-B. DROP TEST In Water (A8.2) <ul style="list-style-type: none"> Exterior Mechanical Inspection Aliveness Test * Carrier Frequency * Power Output * Data Message	No damage 406.028 \pm 0.001 35 - 39 must be correct	√ MHz dBm √		UUT6 √ 406.027828 37.2 √		Chapter 8 13 july 2006


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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (-20 $^{\circ}\text{C}$)	T amb. ($\pm 3^{\circ}\text{C}$) (22 $^{\circ}\text{C}$)	T max. ($\pm 3^{\circ}\text{C}$) (55 $^{\circ}\text{C}$)	
8. LEAKAGE AND IMMERSION TEST (A9.0) <ul style="list-style-type: none"> • Aliveness Test <ul style="list-style-type: none"> * Carrier Frequency * Power Output * Data Message • Interior Inspection 	406.028 \pm 0.001 35 - 39 must be correct No water	MHz dBm √ √		UUT6 406.027831 37.7 √ √		Chapter 9 13 to 17 july 2006
9. SPURIOUS EMISSION TEST (A10.0) <ul style="list-style-type: none"> • 406 MHz • 121.5 MHz 	Figure 2-1 Figure 2-5	√ (attach graphs) √ (attach graphs)		UUT3 √ √		Chapter 10 and Chapter 12 (C/S T.A. Tests Results)


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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (- 30°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (+ 70°C)	
10. THERMAL SHOCK TEST (A11.0) <ul style="list-style-type: none"> Self-activation in water Aliveness Test : <ul style="list-style-type: none"> *Carrier Frequency * Power Output * Data Message Frequency Stability <ul style="list-style-type: none"> * Short term stability * Medium term stability : <ul style="list-style-type: none"> mean slope residual frequency variation 	≤ 5 406.028 ± 0.001 35 - 39 must be correct ≤ 0.002 ≤ 0.001 ≤ 0.002 C/S T.001 & T.007 Stds→ ≤ 0.003	minutes MHz dBm √ parts/ million in 100 ms parts/ million /minute parts/ million	UUT7 - $31^{\circ} \rightarrow 0.1^{\circ}\text{C}$ < 0.1 406.0277819 37.0 √ ≤ 0.0002 < 0.0013 < 0.002		UUT6 $+70^{\circ} \rightarrow +31^{\circ}\text{C}$ < 0.1 406.0278369 38.6 √ ≤ 0.00014 < 0.0006 < 0.0005	Chapter 11 17-19 july 2006 Ok with Cospas / Sarsat T.001 & T.007 Standards


Page 13/17 of chapter 1

	Manufacturer : MARTEC. Beacon Model : Kannad Auto/Auto GPS/Manual/Manual GPS/Manual+/Manual+ GPS	INTESPACE Reference E6668-RTCM
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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (- 20°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (55°C)	
13. STROBE LIGHT TEST (A13.2) 13.1 S.L.T Results during RTCM campaign on UUT7 • Flash rate • Effective intensity • Pulse duration • Visibility 13.2 S.L.T Results after RTCM Test campaign with modified S.L pulse duration on UUT8 • Flash rate • Effective intensity • Pulse duration • Visibility	20-30 0.75 10^{-6} to 1	/min Cd S √	22 2.9	22 3.0 0.101 √	22 3.1	Chapter 13 and Chapter 12 (C/S Elec. & Funct Test at min, amb, and max Temp.) .
	20-30 0.75 10^{-6} to 1	/min Cd S √	22 0.78 0.03	22 0.86 0.031 √	22 0.93	.

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (- 30°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (70°C)	
14. AUTOMATIC RELEASE MECHANISM TEST (A14.0) <ul style="list-style-type: none"> • Normal mounted orientation • Rolling 90° starboard • Rolling 90° port • Rolling 90° bow down • Rolling 90° stern down • Upside down 	Release and float free before 4 meters ; automatic activation	√ √ √ √ √ √	UUT6 √	UUT6 √ √ √ √ √ √	UUT7 √	Chapter 14 2 august 2006 Just acceptable at lower stowage temperature
15. BUOYANCY AND STABILITY TEST (A15.0) <ul style="list-style-type: none"> • Time to upright • Reserve buoyancy • Float upright ; Antenna base 	≤ 2 ≥ 5 > 4	s % cm		UUT6 1 40 > 6		Chapter 15 1 to 2 August 2006
16. INADVERTENT ACTIVATION TEST (A16.0)° <ul style="list-style-type: none"> • EUT not release from bracket • EUT not automatically activate 		√ √		UUT6 √ √		Chapter 16 17 july 2006

	Manufacturer : MARTEC. Beacon Model : Kannad Auto/Auto GPS/Manual/Manual GPS/Manual+/Manual+ GPS	INTESPACE Reference E6668-RTCM
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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (-40 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (55 °C)	
17. HOMING DEVICE TRANSMITTER TEST • Carrier frequency • Output Power (50 Ω) • Duty Cycle • Modulation * Frequency * Direction * Duty cycle * Factor * Sweep repetition rate • Antenna * EIRP * Pattern * Polarization * VSWR	121.5 ± 0.006 14-20 100 ≤ 700 Hz within range of 300-1600 Hz Upward 33-55 0.85-1.0 2 - 4 14 dBm ≤ EIRP ≤ 20 dBm Omnidirectional Vertical ≤ 1.5:1	MHz dBm % Hz √ % # Hz √ √ √	121.5042 19.5 100 490 → 1310 √ 50 > 0.85 3.1	UUT3, UUT4 & UUT7 121.5023 19.3 100 480 → 1320 √ 50 > 0.85 3.1 14.5 √ √ NA	121.5019 18.9 100 490 → 13200 √ 50 > 0.85 3.1	Chapter 17 and Chapter 12 (C/S T.A. Tests Results) December 2005 to July 2006 December 13 th , 2005 Not checked (Integrated Antenna)

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PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (- 30°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (40°C)	
18. HUMIDITY TEST (A18.0) • Aliveness Test : * Carrier frequency * Power Output	406.028 ± 0.001 35-39	MHz dBm		UUT7	406.025080 37.9	Chapter 18 11 august 2006
19. ORIENTATION TEST (A19.0) VERTICAL • Aliveness Test : * Carrier frequency * Power Output UPSIDE DOWN • Aliveness Test : * Carrier frequency * Power Output HORIZONTAL • Aliveness Test : * Carrier frequency * Power Output	406.028 ± 0.001 35-39 406.028 ± 0.001 35-39 406.028 ± 0.001 35-39	MHz dBm MHz dBm MHz dBm		UUT7 406.027875 38.3 406.027825 37.3 406.027820 36.9		Chapter 19 18 may 2006 12 june 2006 15 june 2006