

## **Annex C**

### **Correspondence with US Coastguard**



Commandant  
United States Coast Guard

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16714/161.011/GEN  
22 February 1999

Mr. Morton Flom  
M. Flom Associates, Inc.  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85224-3100

Dear Mr. Flom:

We have completed the review of the material you sent on the Jotron 40S satellite EPIRB. We use a checklist for these reviews, with the Federal Communications Commission (FCC) rules and the applicable requirements from the Radio Technical Commission for Maritime Services (RTCM) in the left column, and the status of our review in the right column. As you can see, there are numerous items which were not covered in the submitted material. Most of these outstanding items should be self-explanatory, but others are discussed below.

The FCC has not yet formally incorporated the new RTCM satellite EPIRB standard into its regulations. However, in that the new version of the standard incorporates the "second-generation" water-activated switch, which we believe to be far superior to earlier switch arrangements, we are encouraging use of the new switch standard. In that the Jotron 40S includes the water-activation feature, the new RTCM switch requirements apply. We found three problems with the current switch arrangement:

1. The reed switch in proximity to the magnet in the bracket overrides the "ON" switch, preventing operation of the EPIRB when it is in the bracket. The RTCM committee had extensive discussions about this, and concluded that all satellite EPIRBs should be able to be operated in the bracket, even though shielding from the vessel structure might degrade the signal. This confirmed a similar requirement in the older (1987) RTCM standard. Therefore, this arrangement does not comply with either version of the RTCM satellite EPIRB standard. The circuit needs to be reconfigured so that the "ON" position overrides the reed switch.
2. The spring-loaded switch turns the EPIRB to the "ON" position when the safety pin is removed. This does not meet the requirement for two separate actions to activate the EPIRB. Unless we do not understand how the seal works, breaking or removing the seal is not counted as one of those actions, since these often go missing. In any case, the seal is mentioned only in the "Manual Operation" section of the manual, and is not described or



Subj: JOTRON 40S SATELLITE EPIRB

illustrated elsewhere in the package, so far as we could determine. Removing the EPIRB from the bracket is also not one of the actions, because the EPIRB must be able to be operated in the bracket. (See item 1.) Therefore, the switch needs to have the spring assist removed, and a detent added at the "ON" position, and possibly at other switch positions.

3. The "OFF" switch position needs to be identified as "READY." We found that in first generation EPIRBs, the term "OFF" was frequently misunderstood. It was originally meant to be a position that overrode all other switch settings, making the EPIRB completely dead. In the Jotron 40S design, the EPIRB in the "OFF" position is actually armed or "READY." We no longer permit the use of the term "OFF" except in connection with a well-guarded switch or switch position which completely deactivates a malfunctioning EPIRB.

The RTCM standard testing was either not done or not reported. We presumed that this was what Jotron had contracted M. Flom Associates to do. Some of the COSPAS SARSAT testing duplicates the RTCM tests, and to the extent that this is the case, that testing completed by CNES or DERA can be accepted, as long as it does not involve the RTCM sequenced tests.

In addition to the above, everything identified as needed or not reported in the checklist could not be found in the material submitted, and is required for acceptance of the unit. Please feel free to contact us for any assistance or clarifications you may require.

Sincerely,



R. L. MARKLE

Chief, Lifesaving and Fire Safety Standards Division  
Office of Design and Engineering Standards  
By direction of the Commandant

Encl: (1) Satellite EPIRB review checklist

Copy: FCC Equipment Authorization

**MARINE TYPE APPROVALS**

DERA Fraser, Fort Cumberland Road,  
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**FACSIMILE MESSAGE**

<b>To</b>		<b>From</b>	
Name	<b>R L MARKLE</b>	Name	<b>Peter Goddard</b>
Address	United States Coast Guard	Contact Number --	01705 334507
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Subject/Ref. . .	USCG Type Approval of Jotron 40S EPIRBs.	No of Pages (Inc.)	9
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Dear Bob

29-9-99

Following our telephone conversation on Friday, I have spoken to Jotron Electronics AS of Norway and they have agreed to conduct as much testing as necessary to the new Version 2 of the RTCM Specification (1997).

I have therefore prepared a test plan for the Jotron TRON 40S EPIRB beacon. A copy is attached for your information.

I believe that I have followed the guidelines of Clauses A1.0 & A2.0 correctly and the tests marked "to be conducted" will where appropriate follow the defined sequence of A2.0. An "aliveness" test as detailed in Clause A1.0 will be conducted at the appropriate point of all tests. All testing proposed will be conducted in the COSPAS-SARSAT approved, DERA Fraser EPIRB test laboratory.

Could I ask you to let me know if you agree the test plan as proposed or if you have any additional requirements.

Thank you very much for your consideration, I await your reply. My fax number is +44 1705 830017.

Best regards

Peter J Goddard  
Senior Consultant/Engineer – Type Approvals

CC Eirik Storjordet / Bjørn Allum - Jotron A/S — Copy for INFORMATION

RTCM - TEST PLAN  
 Jotron Electronics AS - TRON 40S EPIRB

The Comments column is used to show each of the tests to be conducted U S Coastguard (RTCM) approval. Tests already conducted and identical show date of test.

TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min.</sub> (...°C)	T <sub>amb.</sub> (+20 °C)	T <sub>max.</sub> (+40 °C)	
1. INITIAL ALIVENESS TEST (A1.0) - Carrier Frequency - Power Output	406.025 ± 0.002 35 - 39	MHz dBm		406.0248		A near identical test was conducted as part of a "Performance Check" during/after each test marked as Conducted
2. DRY HEAT CYCLE (A3.0) - Aliveness Test (during 2 hour period): - Carrier Frequency - Power Output - Aliveness Test (at end of 2 hour period): - Carrier Frequency - Power Output	406.025 ± 0.002 35 - 39  406.025 ± 0.002 35 - 39	MHz dBm  MHz dBm			406.0246  406.0246	Raised to +70°C and maintained for >10 hours. Temperature then lowered to +55°C Measurement at +55°C <b>Identical Test Conducted</b> On 07-01-97
3. DAMP HEAT CYCLE (A4.0) - Aliveness Test (during 2 hour period): - Carrier Frequency - Power Output - Aliveness Test (at end of 2 hour period): - Carrier Frequency - Power Output	406.025 ± 0.002 35 - 39  406.025 ± 0.002 35 - 39	MHz dBm  MHz dBm			406.0245  406.0245	Raised to +40°C and maintained for >10 hours. Temperature then maintained at +40°C Measurement at +40°C <b>Identical Test Conducted</b> On 13-01-97

TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (...°C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (+40 °C)	
<p>4. VIBRATION TEST (A5.0)</p> <ul style="list-style-type: none"> <li>- Exterior Mechanical Inspection</li> <li>- Aliveness Test:</li> <li>- Carrier Frequency</li> <li>- Power Output</li> <li>- Activation</li> </ul>	<p>No damage</p> <p>406.025 ± 0.002</p> <p>35 - 39</p> <p>No activation during test</p>	<p>MHz</p> <p>dBm</p>				<p><b>Test to be Conducted</b></p> <p>The EUT will be vibrated in the hydrostatic mount.</p>
<p>5. BUMP TEST (A6.0)</p> <ul style="list-style-type: none"> <li>- Exterior Mechanical Inspection</li> <li>- Aliveness Test:</li> <li>- Carrier Frequency</li> <li>- Power Output</li> <li>Activation</li> </ul>	<p>No Damage</p> <p>406.025 ± 0.002</p> <p>35 - 39</p> <p>No activation during test</p>	<p>MHz</p> <p>dBm</p>				<p><b>Test to be Conducted</b></p> <p>The EUT will be bumped in the hydrostatic mount.</p>
<p>6. SALT FOG TEST (A7.0)</p> <ul style="list-style-type: none"> <li>- Exterior Mechanical Inspection</li> <li>- Aliveness test:</li> <li>- Carrier Frequency</li> <li>Power Output</li> </ul>	<p>No damage</p> <p>406.025 ± 0.002</p> <p>35 - 39</p>	<p>MHz</p> <p>dBm</p>				<p><b>Test to be Conducted</b></p> <p>The EUT will be in hydrostatic mount.</p>

TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (... °C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (+40 °C)	
<b>7-A. DROP TEST (A8.1)</b> <b>On Hard Surface</b> <ul style="list-style-type: none"> <li>- Exterior Mechanical Inspection</li> <li>- Aliveness Test:</li> <li>- Carrier Frequency</li> <li>- Power Output</li> <li>- Activation</li> </ul>	No damage  $406.025 \pm 0.002$ 35 - 39 No activation during test	MHz dBm				<b>Test to be Conducted</b>
<b>7-B DROP TEST (A8.2)</b> <b>In Water</b> <ul style="list-style-type: none"> <li>- Exterior Mechanical Inspection</li> <li>- Aliveness test:</li> <li>- Carrier frequency</li> <li>Power Output</li> </ul>	No damage  $406.025 \pm 0.002$ 35 - 39	MHz dBm		406.0248		This test was conducted satisfactory, three drops were made each from 20M above the water surface. Beacon upright Beacon horizontal Beacon inverted  <b>Identical Test Conducted</b>  On 04-12-96
<b>8. LEAKAGE AND IMMERSION TEST (A9.0)</b> <ul style="list-style-type: none"> <li>- Aliveness Test:</li> <li>- Carrier Frequency</li> <li>- Power Output</li> <li>- Interior Inspection</li> </ul>	$406.025 \pm 0.002$ 35 - 39 No water	MHz dBm				<b>Test to be Conducted</b>

TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (...°C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (+40 °C)	
9. SPURIOUS EMISSIONS TEST (A10.0) - 406 MHz  - 121.5 MHz	Figure 2-1  Figure 2-6	(attach graphs)  (attach graphs)				<b>Test to be Conducted</b>
10. THERMAL SHOCK (A11.0) - Self-activation in water - Aliveness Test: - Carrier Frequency - Power Output - Frequency Stability - short term stability  - medium term stability mean slope residual frequency variation	≤ 5  406.025 ± 0.002 35 - 39  ≤ 0.002  ≤ 0.001  ≤ 0.001	minutes  MHz dBm  PPM in 100ms PPM/minute  PPM				<b>Test to be Conducted</b>
11. COSPAS-SARSAT TYPE APPROVAL TESTS (A12.0)	C - S Certificate (attach test report)					<b>Identical Test Conducted</b>  Testing was conducted by CNES in France.  See Test Report CNES CT/RT/AD/LM No 96-399



TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (...°C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (+40 °C)	
<p>12. OPERATIONAL LIFE, STROBE LIGHT AND SELF TESTS (A13.0)</p> <p>Operational Life</p> <ul style="list-style-type: none"> <li>- Frequency</li> <li>- Nominal Carrier</li> <li>- Short term stability</li> <li>- Medium-term stability</li> <li>- Mean slope</li> <li>- Residual variation</li> <li>- RF output power</li> <li>- Strobe flash rate</li> <li>- Auxiliary radio-locating Peak envelope output power</li> </ul>	<p>406.025 ± 0.002</p> <p>≤ 0.002</p> <p>≤ 0.001</p> <p>≤ 0.003</p> <p>35 -39</p> <p>20 - 30</p> <p>14 – 20</p>	<p>MHz</p> <p>PPM in 100ms</p> <p>PPM/minute</p> <p>PPM</p> <p>dBm</p> <p>/min</p> <p>dBm</p>	<p>21</p>			<p><b>Test to be Conducted</b></p>
<p>13. STROBE LIGHT TEST (A13.2)</p> <ul style="list-style-type: none"> <li>- Flash rate</li> <li>- Effective intensity</li> <li>- Pulse duration</li> </ul>	<p>20 – 30</p> <p>≥ 0.75</p> <p>10<sup>-6</sup> to 10<sup>-2</sup></p>	<p>/min</p> <p>Cd</p> <p>s</p>	<p>21</p>	<p>22</p> <p>0.99 to 1.4</p>	<p>21</p>	<p><b>Test Conducted</b></p> <p>Strobe light tests were conducted under DERA Fraser control by BSI testing at Hemel Hampstead</p> <p>BSI Report available</p>

TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (...°C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (+40 °C)	
14. SELF TEST (A13.3) <ul style="list-style-type: none"> <li>- RF pulse duration</li> <li style="padding-left: 20px;">Frame synchronization pattern</li> <li>- Number of RF bursts</li> </ul>	≤ 0.444 0 1101 0000 1-burst					<b>Test to be Conducted</b>
15. AUTOMATIC RELEASE MECHANISM TEST (A14.0) <ul style="list-style-type: none"> <li>- Normal mounted orientation</li> <li>- Rolling 90° starboard</li> <li>- Rolling 90° port</li> <li>- Rolling 90° bow down</li> <li>- Rolling 90° stern down</li> <li>Upside down</li> </ul>	Release and float free before 4 meters; automatic activation					<b>Identical Test Conducted</b> On 04-12-96 The EPIRB in its Hydrostatic Bracket was lowered into the 5 metre test tank for each of the stated orientations. For two additional tests the EPIRB in Bracket was cooled/heated to -30°C and +65°C before test.
16. STABILITY AND BUOYANCY TEST (A15.0) <ul style="list-style-type: none"> <li>- Time to upright</li> <li>- Reserve buoyancy</li> <li>- Float upright; Antenna base</li> </ul>	≤ 2 ≥ 5 > 4	s % cm				<b>Test to be Conducted</b>

TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (...°C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (+40 °C)	
17. INADVERTENT ACTIVATION TEST (A16.0) - Activation release	EUT should not release from bracket or automatically activate					<b>Identical Test Conducted</b> On 29-04-97 EPIRB Beacon in Hydrostatic bracket was mounted vertically on a wall and subjected to a water jet of approximately 2300 L/m from a 63.5mm Dia Nozzle.
18. AUXILIARY RADIO-LOCATING DEVICE TRANSMITTER TEST (A17.0) - Carrier frequency - PERP - Duty Cycle - Modulation - Frequency - Direction - Duty cycle - Factor - Sweep repetition rate	121.5 ± 0.006 (see comment) 14 – 20 100 ≥ 700 Hz within range of 300 – 1600 Hz Upward 33 – 55 0.85 – 1.0 2 – 4	MHz dBm % Hz % # Hz		121.65 100 383.5 - 1408.5 2.6		A test of the 121 MHz homing signal was conducted to the UK MPT 1256 specification. <b>Test is to a similar to RTCM 1987. Conducted</b> On 01-04-97 The modulation sweep direction was noted as downward Notes: The transmitter frequency is offset to 121.65 MHz
- Antenna - Pattern - Polarization VSWR	Omnidirectional Vertical ≤ 1.5:1			Integral antenna		

PARAMETERS TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T <sub>min</sub> (... °C)	T <sub>amb</sub> (+20 °C)	T <sub>max</sub> (... °C)	
19. HUMIDITY TEST (A18.0) - Aliveness Test: - Carrier Frequency - Power Output	406.025 ± 0.002 35 - 39	MHz dBm				<b>Test to be Conducted</b>
20. 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	406.025 ± 0.002 35 - 39  406.025 ± 0.002 35 - 39  406.025 ± 0.002 35 - 39	MHz dBm  MHz dBm  MHz dBm				<b>Test to be Conducted</b>

**SUMMARY OF TESTS:-**

**Tests considered already tested and complete:-**

**A3.0, A4.0, A8.2, A13.2, A14.0, A16.0 & A17.0**

**A12.0 (Full COSPAS-SARSAT tests detailed in CNES Report CT/RT/AD/LM No 96-399)**

**Tests to be conducted specifically for USCG Report to RTCM Specification Ver 2:-**

**In Sequence; A5.0, A6.0, A7.0, A8.1, A9.0, A10.0, A11.0, A13.1, A13.3**

**As convenient; A15.0, A18.0 & A19.0**

U.S. Department  
of Transportation

United States  
Coast Guard



**Lifesaving and Fire Safety Stds Division  
United States Coast Guard (G-MSE-4)**

<b>TO:</b> Mr. Peter J. Goddard / DERA Fraser	+44 1705 830017
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<b>DATE:</b> 8 November, 1999	

**TOTAL PAGES INCLUDING THIS PAGE: 1**

**SUBJECT: JOTRON 40S EPIRB**

I'm sorry to be so late getting back to you. I did receive the page you faxed to ENS Rydzewski at my request. Unfortunately, it was page 3, rather than page 4. The original report you sent me had two page 3s and no page 4, so I now have 3 copies of page 3, and none of page 4.

Nevertheless, I think I can address the basic issue. The RTCM tests identified as numbers 1 - 14 on the test forms (A1 -A13) are designed to be conducted cumulatively on a single test unit. Therefore, selected tests in this series done previously on a different unit could not be credited. (See sec. A2.0 and figure A-1 in the RTCM standard.)

We can agree to credit the following tests as you proposed:

15 (A14.0) - The automatic release mechanism on the U.S. version will apparently be the same as the one you tested.

17 (A16.0) - (Same comment as above.)

18 (A17.0) - Note however that the U.S. version will be required to have an upward swept homing beacon. You will need to confirm this.

U.S. Department  
of Transportation  
United States  
Coast Guard



**Lifesaving and Fire Safety Stds Division  
United States Coast Guard (G-MSE-4)**

<b>TO: Mr. Peter J. Goddard / DERA Fraser</b>	+44 1705 830017
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<b>DATE: 10 November, 1999</b>	

**TOTAL PAGES INCLUDING THIS PAGE: 1**

**SUBJECT: JOTRON 40S EPIRB**

Page 4 turned out to be critical, I see.

The RTCM test series 1-12 in paragraph A2.0, requires only an aliveness test at the conclusion of each environmental test; i.e., measurement of power, carrier frequency, and data message. This aliveness test is the minimum test to show that the beacon is still operating at the conclusion of each environmental test. We envisioned that the C-S testing would then ensure that the stressed beacon would still meet the complete beacon spec, after completing all of the environmental tests.

We think that the whole series 1-12 needs to be completed, but we will agree to an abridged version of the COSPAS-SARSAT testing, at test 11. Test 11 should consist of the C-S T.007 data message generator and modulation tests. These tests will ensure that the data message --at the end of the environmental tests -- still meet the specifications, including modulation rise/fall times, etc.

I trust that will be satisfactory, and explains our rationale adequately.