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# Report On

Emergency Beacon Limited Testing of the  
Standard Communications Pty Limited  
MT403 / MT403FF - Non GPS EPIRB

Document 75901666 Report 02 Issue 4

January 2008



Product Service

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,  
Fareham, Hampshire, United Kingdom, PO15 5RL  
Tel: +44 (0) 1489 558100. Website: [www.tuvps.co.uk](http://www.tuvps.co.uk)

**REPORT ON**

Emergency Beacon Limited Testing of the  
Standard Communications Pty Limited  
MT403 / MT403FF - Non GPS EPIRB

Document 75901666 Report 02 Issue 4

January 2008

**PREPARED FOR**

Standard Communications Pty Limited  
6 Frank Street  
Gladesville  
NSW2111  
Australia

**PREPARED BY**

A handwritten signature in black ink, appearing to read 'N Bennett'.

**N Bennett**  
Administrator

**APPROVED BY**

A handwritten signature in black ink, appearing to read 'M J Hardy'.

**M J Hardy**  
Authorised Signatory

**DATED**

31 January 2008



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## **SECTION 1**

### **REPORT SUMMARY**

Emergency Beacon Limited Testing of the  
Standard Communications Pty Limited  
MT403 / MT403FF - Non GPS EPIRB



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Standard Communications PTY Limited MT403 / MT403FF to the requirements of T.007 Issue 4 – Rev 1 October 2006.

Objective	To perform emergency beacon testing to determine the Equipment Under Test's (EUT's) compliance with the test specification, for the series of tests carried out.
Manufacturer	Standard Communications Pty Limited
Model Number(s)	MT403 / MT403FF - Non GPS EPIRB
Serial Number(s)	33789 (Test Sample Number: 75901666_14)
Number of Samples Tested	One
Test Specification/Issue/Date	Cospas-Sarsat T.007 Issue 4 – Rev 1 October 2006
Date of Receipt of Test Samples	17 <sup>th</sup> October 2007
Order Number	PO # 52559
Date	20 <sup>th</sup> June 2007
Start of Test	22 <sup>nd</sup> October 2007
Finish of Test	3 <sup>rd</sup> November 2007
Name of Engineer(s)	R Henley R Hampton



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## 1.2 APPLICATION FORM

### 1.2.1 Beacon Manufacturer and Beacon Model

<b>Beacon Manufacturer</b>	Standard Communications Pty Ltd
<b>Beacon Model</b>	MT403 / MT403FF

### 1.2.2 Beacon Type and Operational Configurations

Beacon Type	Beacon used while:	Tick where appropriate
<b>EPIRB</b>	Floating in water or on deck or in a safety raft	<input checked="" type="checkbox"/>
<b>PLB</b>	On ground and above ground	<input type="checkbox"/>
	On ground and above ground and floating in water	<input type="checkbox"/>
<b>ELT Survival</b>	On ground and above ground	<input type="checkbox"/>
	On ground and above ground and floating in water	<input type="checkbox"/>
<b>ELT Auto Fixed</b>	Fixed ELT with aircraft external antenna	<input type="checkbox"/>
<b>ELT Auto Portable</b>	In aircraft with an external antenna	<input type="checkbox"/>
	On ground, above ground, or in a safety raft with an integrated antenna	<input type="checkbox"/>
<b>ELT Auto Deployable</b>	Deployable ELT with attached antenna	<input type="checkbox"/>
<b>Other (specify)</b>		<input type="checkbox"/>

### 1.2.3 Beacon Characteristics

Characteristic	Specification
Operating temperature range	Tmin = -20°C Tmax = +55°C
Operating lifetime	48+ hours
Battery chemistry	LiMnO <sub>2</sub> / Organic Electrolyte
Battery cell size and number of cells	5 batteries @ 2 cells CR2/3AH
Battery manufacturer	Varta
Battery pack manufacturer and part number	Standard Communications - 97MT403BAT or VARTA - 080022
Oscillator type (e.g. OCXO, MCXO, TCXO)	MCXO
Oscillator manufacturer	Standard Communications
Oscillator part name and number	N/A
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes



Characteristic	Specification
Antenna type (Integrated or External)	Integrated
Antenna manufacturer	N/A
Antenna part name and number	N/A
Navigation device type (Internal, External or None)	None
Features in beacon that prevent degradation to 406 MHz signal or beacon lifetime resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	N/A
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	N/A
Navigation device capable of supporting global coverage (Yes, No or N/A)	No
For Internal Navigation Devices	
- Geodetic reference system (WGS 84 or GTRF)	
- GNSS receiver cold start forced at every beacon activation (Yes or No)	
- Navigation device manufacturer	
- Navigation device model name and part Number	
- GNSS system supported (e.g. GPS, GLONASS, Galileo)	
For External Navigation Devices	
- Data protocol for GNSS receiver to beacon interface	N/A
- Physical interface for beacon to navigation device	N/A
- Electrical interface for beacon to navigation device	N/A
- Navigation device model and manufacturer (if beacon designed to use specific devices)	N/A



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Characteristic	Specification
Self-Test Mode Characteristics	
- Self-test has separate switch position (Yes or No)	Yes
- Self-test switch automatically returns to normal position when released (Yes or No)	Yes
- Self-test activation can cause an operational mode transmission (Yes or No)	No
- Self-test causes a single beacon self-test message burst only regardless of how long the self-test activation mechanism applied (Yes or No)	No
- Results of self-test indicated by (e.g. Pass / Fail Indicator Light, Strobe Light, etc.)	Visual & Audible indication
- Self-test can be activated from beacon remote activation points (Yes or No)	No
- Self-test performs an internal check and indicates that RF power emitted at 406 MHz and 121.5 MHz if beacon includes a 121.5 MHz homer (Yes or No)	Yes
- Self-test transmits a signal(s) other than at 406 MHz (Yes & details or No)	Yes, unmodulated 121.5MHz carrier
- Self-test can be activated directly at beacon (Yes or No)	Yes
- List of Items checked by self-test	battery voltage, RF output, PLL lock, firmware checksum, 406 message checksum
- Self-test transmission burst duration (440 or 520 ms)	440 ms
- Self-test format bit ("0" or "1")	1
Beacon includes a homer transmitter (if yes identify frequency of transmission)	121.5MHz
-Homer Transmit Power	17dBm
-Homer Duty Cycle	>96%
-Duty Cycle of Homer Swept Tone	37%





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Characteristic	Specification
Beacon includes a strobe light (Yes or No)	Yes
- Strobe light intensity	>0.75cd
- Strobe light flash rate	20~21/min
Beacon transmission repetition period satisfies C/S T.001 requirement that two beacon's repetition periods are not synchronised closer than a few seconds over 5 minute period, and the time intervals between transmissions are randomly distributed on the interval 47.5 to 52.5 seconds (Yes or No)	Yes
Other ancillary devices (e.g. voice transceiver). List details on a separate sheet if insufficient space to describe.	No
Beacon includes automatic activation mechanism (Yes or No)	Yes

#### 1.2.4 Information Provided by the Cospas-Sarsat Accepted Test Facility

Name and Location of Beacon Test Facility: TUV Product Service Ltd, United Kingdom

Date of Submission for Testing: 17<sup>th</sup> October 2007

##### Applicable C/S Standards:

Document	Issue	Revision	Date
C/S T.001	3	7	Nov-05
C/S T.007	4	1	Oct-06

I hereby confirm that the 406 MHz beacon described above has been successfully tested in accordance with the Cospas-Sarsat Type Approval Standard (C/S T.007) and complies with the Specification for Cospas-Sarsat 406 MHz Distress Beacons (C/S T.001) as demonstrated in the attached report.

Signed:

M Hardy

Name:

M J Hardy

Position Held:

Authorised Signatory

Date:

31 January 2008



Product Service

### 1.2.5 Applicant Details

Company Name	Standard Communications Pty Ltd		
Address	6 Frank Street Gladesville NSW Australia		
Category of Applicant	<input checked="" type="checkbox"/> Manufacturer	<input type="checkbox"/> Importer	
	<input type="checkbox"/> Distributor	<input type="checkbox"/> Agent	
Contact Name	Craig DUNCAN	Telephone	+ 61 (0)2 9844 6666
Email	cduncan@gme.net.au	Facsimile	+61 (0)2 9844 6600

### 1.2.6 Manufacturer Details

Company Name	Same as above		
Address			
Contact Name		Telephone	
Email		Facsimile	

### 1.2.7 Declaration of Build Status

Hardware Version	1
- PCB Revision	B
- Battery Model	97MT403BAT (Varta)
Software Version	na
Firmware Version	OS0012.1.03
Other (Specify)	na

### 1.2.8 Applicant's Declaration

I hereby declare that I am entitled to sign on the behalf of the applicant and that the information supplied is correct and complete

Signed:

Name:

Craig Duncan

Position Held:

Project Engineering Manager

Date:

09/08/2007

### 1.3 PRODUCT INFORMATION

#### 1.3.1 Technical Description

The Equipment Under Test (EUT) was a Standard Communications Pty Limited MT403 (Non GPS EPIRB) as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test

#### 1.3.2 Physical Test Configuration

The EUT was operated using its own power source. The EUT was configured so that the antenna port was connected to the test system using a coaxial cable terminated by 50-Ohm load for all tests except Antenna Characteristics, Satellite Qualitative and Position Acquisition Time and Position Accuracy where the EUT was fitted with its antenna.



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#### **1.4 MODIFICATIONS**

No modifications were made to the test sample during testing.

#### **1.5 REPORT MODIFICATION RECORD**

Issue 1 – First Issue

Issue 2 – Issue 2 includes modifications to the application form as per applicant's request.

Issue 3 – Revised as per COSPAS-SARSAT worksheet 2007-44 (12 December 2007).

Issue 4 – Modifications made in accordance with Worksheet 2 (2007-44: CHN to TAC-139).  
EUT name and details were changed in the following sections: Satellite Qualitative  
Tests and Beacon Coding Software.



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## **SECTION 2**

### **TEST DETAILS**

Emergency Beacons Limited Testing of the  
Standard Communications Pty Limited  
MT403 / MT403FF - Non GPS EPIRB



Product Service

### TEST RESULTS TABLE

Parameter	Limits	Units	Test Results			Comments	
			T <sub>min</sub>	T <sub>amb</sub>	T <sub>max</sub>		
			(-20°C)	(23.2°C)	(+55°C)		
2. Digital Message Coding		Bit Numbers				Test Sample: 75901666_14 Mod State: 0 <b>Result: Pass</b>	
Bit Sync	1 - 15	15 bits "1"	P / F	P	P	P	Decoded Message: Page 17 to 19
Frame sync	16 - 24	"000101111"	P / F	P	P	P	
Format flag	25	1 bit	bit value	0	0	0	
Protocol flag	26	1 bit	bit value	1	1	1	
Identification / position data		59 bits	P / F	P	P	P	
BCH code	86 -106	21 bits	P / F	P	P	P	
Emerg. Code/nat. use/supplem. Data		6 bits	bit value	010000	010000	010000	
Additional data / BCH (if applicable)		32 bits	P / F	N/A	N/A	N/A	
Position Error (if applicable)		< 5	km	N/A	N/A	N/A	
3. Digital Message Generator						Test Sample: 75901666_14 Mod State: 0 <b>Result: Fail</b>	
Repetition rate TR:							Fails minimum requirement for Repetition Rate at ambient temperature. See Retests shown below
Average TR	48.5 ≤ TRavg ≤ 51.5	seconds		49.772	50.162	49.929	
Minimum TR	47.5 ≤ TRmin ≤ 48.0	seconds		47.562	48.031	47.656	
Maximum TR	52.0 ≤ TRmax ≤ 52.5	seconds		52.422	52.328	52.359	
Standard deviation	0.5 - 2.0	seconds		1.363	1.215	1.321	
Bit rate							
Minimum fb	≥ 396	bits/sec		399.586	399.607	399.593	
Maximum fb	≤ 404	bits/sec		399.610	399.625	399.613	
Total transmission time							
Short message	435.6 - 444.4	ms		440.977	438.160	437.978	
Long message	514.8 - 525.2	ms		N/A	N/A	N/A	
Unmodulated carrier							Passes minimum requirement for Unmodulated Carrier within Measurement Uncertainty
Minimum T1	≥ 158.4	ms		160.814	157.99	157.776	
Maximum T1	≤ 161.6	ms		160.855	158.046	157.897	
First burst delay	≥ 47.5	seconds		64	64	64	Self Test after approximately 2 seconds



Product Service

Parameter	Limits	Units	Test Results			Comments
			T <sub>min</sub>	T <sub>amb</sub>	T <sub>max</sub>	
			(-20°C)	(23.2°C)	(+55°C)	
3. Digital Message Generator – 1st Retest						
Test Sample: 75901666_14 Mod State: 0 Result: Fail						
Repetition rate TR:						
Average TR	$48.5 \leq TR_{avg} \leq 51.5$	seconds	N/A	50.367	N/A	
Minimum TR	$47.5 \leq TR_{min} \leq 48.0$	seconds	N/A	48.313	N/A	
Maximum TR	$52.0 \leq TR_{max} \leq 52.5$	seconds	N/A	52.375	N/A	
Standard deviation	0.5 - 2.0	seconds	N/A	1.192	N/A	
Bit rate						
Minimum fb	$\geq 396$	bits/sec	N/A	399.600	N/A	
Maximum fb	$\leq 404$	bits/sec	N/A	399.629	N/A	
Total transmission time						
Short message	435.6 - 444.4	ms	N/A	438.140	N/A	
Long message	514.8 - 525.2	ms	N/A	N/A	N/A	
Unmodulated carrier						
Minimum T1	$\geq 158.4$	ms	N/A	157.982	N/A	
Maximum T1	$\leq 161.6$	ms	N/A	158.138	N/A	
First burst delay	$\geq 47.5$	seconds	N/A	64	N/A	



Product Service

Parameter	Limits	Units	Test Results			Comments
			T <sub>min</sub>	T <sub>amb</sub>	T <sub>max</sub>	
			(-20°C)	(23.2°C)	(+55°C)	
3. Digital Message Generator – 2nd Retest						
Test Sample: 75901666_14 Mod State: 0 Result: Pass						
Repetition rate TR:						
Average TR	$48.5 \leq TR_{avg} \leq 51.5$	seconds	N/A	49.894	N/A	
Minimum TR	$47.5 \leq TR_{min} \leq 48.0$	seconds	N/A	47.672	N/A	
Maximum TR	$52.0 \leq TR_{max} \leq 52.5$	seconds	N/A	52.297	N/A	
Standard deviation	0.5 - 2.0	seconds	N/A	1.458	N/A	
Bit rate						
Minimum fb	$\geq 396$	bits/sec	N/A	399.604	N/A	
Maximum fb	$\leq 404$	bits/sec	N/A	399.640	N/A	
Total transmission time						
Short message	435.6 - 444.4	ms	N/A	438.147	N/A	
Long message	514.8 - 525.2	ms	N/A	N/A	N/A	
Unmodulated carrier						
Minimum T1	$\geq 158.4$	ms	N/A	157.992	N/A	Passes minimum requirement for Unmodulated Carrier within Measurement Uncertainty
Maximum T1	$\leq 161.6$	ms	N/A	158.043	N/A	
First burst delay	$\geq 47.5$	seconds	N/A	64	N/A	Self Test after approximately 2 seconds





Product Service

Parameter	Limits	Units	Test Results			Comments
			T <sub>min</sub>	T <sub>amb</sub>	T <sub>max</sub>	
			(-20°C)	(23.2°C)	(+55°C)	
6. Spurious Emission on 50ohms						
In band (406.0 – 406.1 MHz)	C/S T.001 mask	P / F	P	P	P	Test Sample: 75901666_14 Mod State: 0 <b>Result: Pass</b> Spectrum plot: Page 20
8. Self-test Mode						
Frame sync	011010000	P / F	P	P	P	Decoded Message: Page 21  Refer to GPS report – 75901666 Report 01
Format flag	1 / 0	bit value	0	0	0	
Single radiated burst	≤440 / 520 (±1%)	ms	440.9360	440.6624	440.6629	
Default position data (if applicable)	correct	P / F	N/A	N/A	N/A	
Description provided		Y / N		Y		
Design data on protection against repetitive self-test mode transmissions	provided	Y / N		Y		
Single burst verification	one burst	P / F	P	P	P	
Provides for 15 Hex ID	correct	P / F	P	P	P	
121.5 MHz RF power (if applicable)	self-test checks that RF power emitted	P / F	P	P	P	
406 MHz power	self-test checks that RF power emitted	P / F	P	P	P	
14. Satellite Qualitative Tests						
Test Configuration	C/S T.007	Figure	B.4	B.5		Test Sample: 75901666_14 Mod State: 0 <b>Result: Pass</b> Test Data: Page 22 and 23
15 Hex ID Decoded by LUT	correct	P / F	P	P		
Doppler Location results with error ≤5km	≥80	%	82.4	91.67		
16. Beacon Coding Software						
Sample message for each coding option of the applicable coding types	correct	P / F	P			Test Data: Page 24
Sample self-test message for each coding option of the applicable coding types	correct	P / F	P			



## 2.1 DIGITAL MESSAGE CODING

### 2.1.1 Equipment Under Test

MT403 / MT403FF - Non GPS EPIRB, Serial Number: 33789

### 2.1.2 Date of Test

22<sup>nd</sup> October 2007

### 2.1.3 Test Equipment Used

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

### 2.1.4 Test Results

#### Digital Message at Ambient Temperature

Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112  
 15 Hex (Bits 26- 85) = 992E420FF400F9D 992E420FF400F9D Default\_Id  
 36 Hex (Bits 1-144) = FFFE2F4C972107FA007CEA520F5000000000

```

    26  30  34  38  42  46  50  54  58  62  66  70  74  78  82
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
0 1001 1001 0010 1110 0100 0010 0000 1111 1111 0100 0000 0000 1111 1001 1101
    0100 1010 0100 0001 1110 1010 0000 0000 0000 0000 0000 0000 0000 0000 0000 000
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
    86  90  94  98  102 106 110 114 118 122 126 130 134 138 142
  
```

Field Name	Bit Pos	Value Decode	Bits
Format Flag	25	0 Short Message	0
Protocol Flag	26	1 User	1
MID	27- 36	201 ALBANIA	0011 0010 01
User Protocol	37- 39	3 Serialized	011
Beacon type	40- 42	4 Non Fl/Free EPIRB	100
Certification type	43	1 Cospas-Sarsat	1
Serial Number	44- 63	33789	0000 1000 0011 1111 1101
Cosp-Sar Spare	64- 73	0	0000 0000 00
Cosp-Sar Cert #	74- 83	999	1111 1001 11
Homing	84- 85	1 121.5	01
BCH Encoded	86-106	Errors=0	0100 1010 0100 0001 1110 1
BCH Generated	86-106		0100 1010 0100 0001 1110 1
Emergency Cd Flag	107	0 National Use	0
Beacon Activation	108	1 Both Automatic and Manual	1
National Use	109-112		0000



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Digital Message at Minimum Temperature

Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112  
 15 Hex (Bits 26- 85) = 992E420FF400F9D 992E420FF400F9D Default\_Id  
 36 Hex (Bits 1-144) = FFFE2F4C972107FA007CEA520F5000000000

```

    26  30  34  38  42  46  50  54  58  62  66  70  74  78  82
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
0 1001 1001 0010 1110 0100 0010 0000 1111 1111 0100 0000 0000 1111 1001 1101
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
  0100 1010 0100 0001 1110 1010 0000 0000 0000 0000 0000 0000 0000 0000 000
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
    86  90  94  98  102 106 110 114 118 122 126 130 134 138 142
  
```

Field Name	Bit Pos	Value Decode	Bits
Format Flag	25	0 Short Message	0
Protocol Flag	26	1 User	1
MID	27- 36	201 ALBANIA	0011 0010 01
User Protocol	37- 39	3 Serialized	011
Beacon type	40- 42	4 Non FI/Free EPIRB	100
Certification type	43	1 Cospas-Sarsat	1
Serial Number	44- 63	33789	0000 1000 0011 1111 1101
Cosp-Sar Spare	64- 73	0	0000 0000 00
Cosp-Sar Cert #	74- 83	999	1111 1001 11
Homing	84- 85	1 121.5	01
BCH Encoded	86-106	Errors=0	0100 1010 0100 0001 1110 1
BCH Generated	86-106		0100 1010 0100 0001 1110 1
Emergency Cd Flag	107	0 National Use	0
Beacon Activation	108	1 Both Automatic and Manual	1
National Use	109-112		0000



Product Service

Digital Message at Maximum Temperature

Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112  
 15 Hex (Bits 26- 85) = 992E420FF400F9D 992E420FF400F9D Default\_Id  
 36 Hex (Bits 1-144) = FFFE2F4C972107FA007CEA520F5000000000

```

    26  30  34  38  42  46  50  54  58  62  66  70  74  78  82
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
0 1001 1001 0010 1110 0100 0010 0000 1111 1111 0100 0000 0000 1111 1001 1101
    0100 1010 0100 0001 1110 1010 0000 0000 0000 0000 0000 0000 0000 0000 000
    |  |  |  |  |  |  |  |  |  |  |  |  |  |
    86  90  94  98  102 106 110 114 118 122 126 130 134 138 142
  
```

Field Name	Bit Pos	Value Decode	Bits
Format Flag	25	0 Short Message	0
Protocol Flag	26	1 User	1
MID	27- 36	201 ALBANIA	0011 0010 01
User Protocol	37- 39	3 Serialized	011
Beacon type	40- 42	4 Non FI/Free EPIRB	100
Certification type	43	1 Cospas-Sarsat	1
Serial Number	44- 63	33789	0000 1000 0011 1111 1101
Cosp-Sar Spare	64- 73	0	0000 0000 00
Cosp-Sar Cert #	74- 83	999	1111 1001 11
Homing	84- 85	1 121.5	01
BCH Encoded	86-106	Errors=0	0100 1010 0100 0001 1110 1
BCH Generated	86-106		0100 1010 0100 0001 1110 1
Emergency Cd Flag	107	0 National Use	0
Beacon Activation	108	1 Both Automatic and Manual	1
National Use	109-112		0000



Product Service

## 2.2 SPURIOUS EMISSIONS

### 2.2.1 Equipment Under Test

MT403 / MT403FF - Non GPS EPIRB, Serial Number: 33789

### 2.2.2 Date of Test

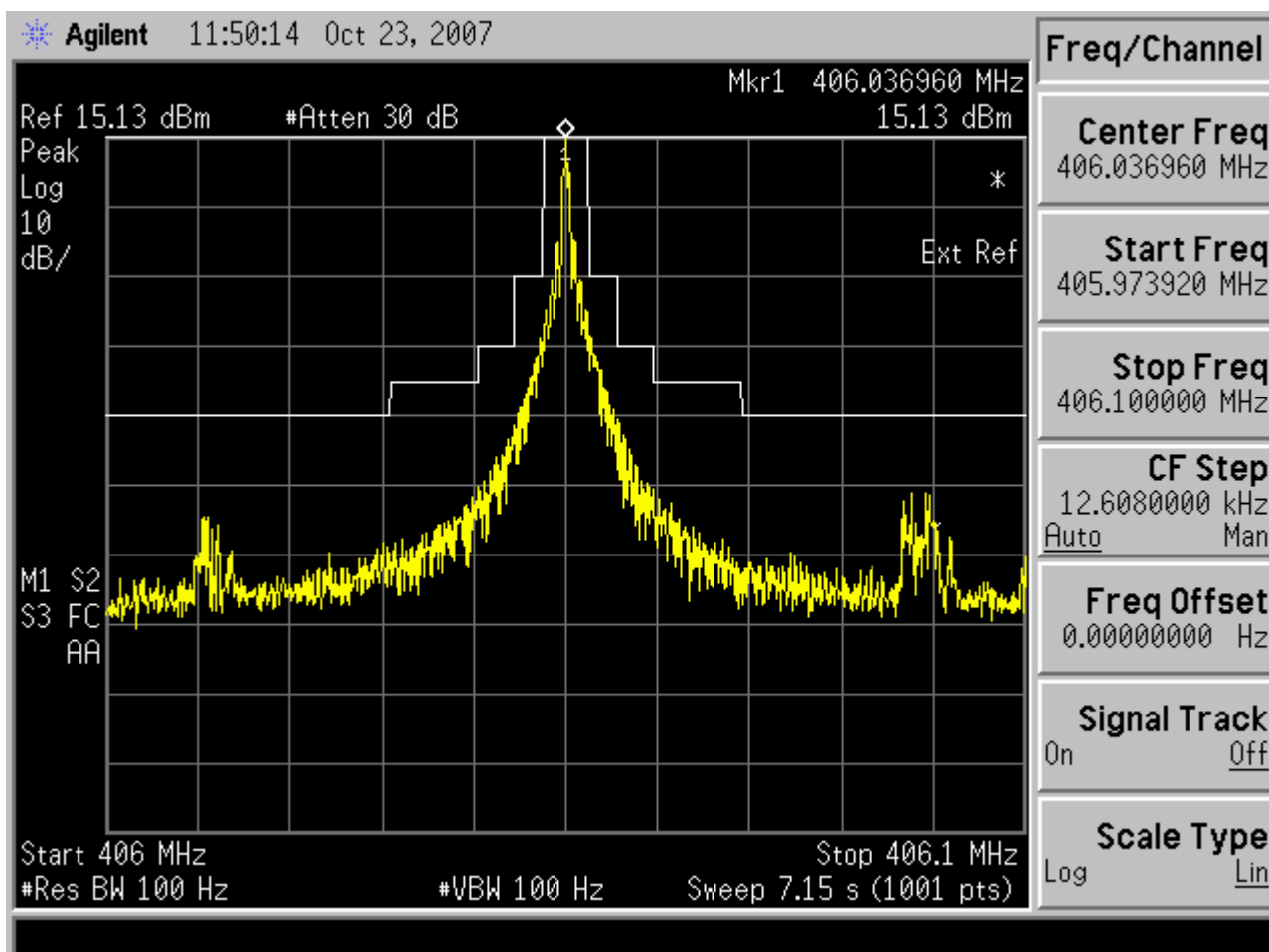
22<sup>nd</sup> – 23<sup>rd</sup> October 2007

### 2.2.3 Test Equipment Used

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

### 2.2.4 Test Results

Spurious Emissions at Combined Temperatures – Ambient, +55°C and -20°C





## 2.3 SELF-TEST MODE – DECODED MESSAGE

### 2.3.1 Equipment Under Test

MT403 / MT403FF - Non GPS EPIRB, 75901666\_14 (S/N 33789)

### 2.3.2 Date of Test

22<sup>nd</sup> October 2007

### 2.3.3 Test Equipment Used

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

### 2.3.4 Test Results

#### Digital Message

Beacon Id Format..... 22 Hex Id, Short Message, Bits 25-112  
 15 Hex (Bits 26- 85) = 992E420FF400F9D 992E420FF400F9D Default\_Id  
 36 Hex (Bits 1-144) = FFFED04C972107FA007CEA520F5000000000

```

    26  30  34  38  42  46  50  54  58  62  66  70  74  78  82
    |   |   |   |   |   |   |   |   |   |   |   |   |   |
0 1001 1001 0010 1110 0100 0010 0000 1111 1111 0100 0000 0000 1111 1001 1101
   0100 1010 0100 0001 1110 1010 0000 0000 0000 0000 0000 0000 0000 0000 0000 000
   |   |   |   |   |   |   |   |   |   |   |   |   |   |
   86  90  94  98 102 106 110 114 118 122 126 130 134 138 142
  
```

Field Name	Bit Pos	Value Decode	Bits
Format Flag	25	0 Short Message	0
Protocol Flag	26	1 User	1
MID	27- 36	201 ALBANIA	0011 0010 01
User Protocol	37- 39	3 Serialized	011
Beacon type	40- 42	4 Non Fl/Free EPIRB	100
Certification type	43	1 Cospas-Sarsat	1
Serial Number	44- 63	33789	0000 1000 0011 1111 1101
Cosp-Sar Spare	64- 73	0	0000 0000 00
Cosp-Sar Cert #	74- 83	999	1111 1001 11
Homing	84- 85	1 121.5	01
BCH Encoded	86-106	Errors=0	0100 1010 0100 0001 1110 1
BCH Generated	86-106		0100 1010 0100 0001 1110 1
Emergency Cd Flag	107	0 National Use	0
Beacon Activation	108	1 Both Automatic and Manual	1
National Use	109-112		0000



## 2.4 SATELLITE QUALITATIVE TESTS

### 2.4.1 Equipment Under Test

Table 1 – MT403 Serial Number: 33789, Antenna Part/Model Number: Integrated

Table 2 – MT403 Serial Number: 33789, Antenna Part/Model Number: Integrated

### 2.4.2 Date of Test

Table 1 – 29<sup>th</sup> to 30<sup>th</sup> October 2007

Table 2 – 2<sup>nd</sup> to 3<sup>rd</sup> November 2007

### 2.4.3 Test Equipment Used

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

### 2.4.4 Test Results

Table 1

Beacon Model:

Actual location of the test beacon:

Beacon test configuration (e.g. on dry ground floating in water etc):

MT403 (NON GPS)

Latitude: 050° 49.091' N

Longitude: 001° 11.870' W

C/S T.007 Figure B.4

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg)	Location Error (km)
S9	27732	193C0 00000 FFBFF	50.82120	-1.19372	-135.17	22:45:42	-12.408	0.442
S11	5273	193C0 00000 FFBFF	50.82330	-1.19125	-131.94	22:02:49	-10.990	0.733
S9	27731	193C0 00000 FFBFF	50.82644	-1.20921	-133.09	21:05:20	3.283	1.216
S11	5272	193C0 00000 FFBFF	50.82813	-1.21060	-130.51	20:22:25	4.623	1.423
S9	27730	193C0 00000 FFBFF	50.82537	-1.20584	-135.44	19:26:22	17.084	0.977
S11	5271	193C0 00000 FFBFF	50.85550	-0.41202	-132.57	18:43:20	17.759	55.303
S7	49128	193C0 00000 FFBFF	50.84348	-1.28560	-134.11	17:49:46	-11.715	6.771
S7	49127	193C0 00000 FFBFF	50.82481	-1.19917	-131.46	16:09:30	3.868	0.742
S8	36552	193C0 00000 FFBFF	50.82319	-1.18804	-132.13	16:24:34	-7.453	0.884
S8	36551	193C0 00000 FFBFF	50.82144	-1.20631	-131.16	14:43:55	7.895	0.697
S9	27740	193C0 00000 FFBFF	50.81846	-1.19399	-136.52	12:35:16	14.962	0.272
S10	12537	193C0 00000 FFBFF	50.82556	-1.20562	-132.58	12:17:39	6.038	0.985
S11	5281	193C0 00000 FFBFF	50.81472	-1.19599	-134.75	11:54:02	13.818	0.406
S10	12532	193C0 00000 FFBFF	50.81866	-1.19844	-134.46	04:06:20	14.568	0.068
S7	49136	193C0 00000 FFBFF	50.85761	-1.11963	-136.05	07:39:01	14.453	7.022
S8	36560	193C0 00000 FFBFF	50.81517	-1.19617	-134.11	06:21:28	10.880	0.355
S8	36559	193C0 00000 FFBFF	50.80539	-1.15225	-134.83	04:41:07	-4.043	3.502

Ratio of Successful Solutions =  $\frac{\text{number of Doppler solutions within 5km with } 1^\circ < \text{CTA} < 21^\circ}{\text{number of satellite passes over test duration with } 1^\circ < \text{CTA} < 21^\circ}$

$$= \frac{14}{17} = 82.4 \%$$



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**Table 2**

Beacon Model: MT403  
 Beacon 15 Hex ID: 993C000000000000  
 Actual location of the test beacon: Latitude: 052° 14.447' N  
 Longitude: 001° 43.970' W  
 Beacon test configuration (e.g. on dry ground floating in water etc): C/S T.007 Figure B.5

Satellite ID	Satellite Pass Number	15 Hex ID Provided by LUT	Doppler Latitude	Doppler Longitude	Mean Rx Power (dBm)	TCA	CTA (deg)	Location Error (km)
S9	27846	993C0 00000 00000	52.24348	-1.71864	-128.31	23:01:24	-14.504	1.011
S11	5387	993C0 00000 00000	52.24189	-1.71840	-126.28	22:38:09	-16.098	0.990
S9	27844	993C0 00000 00000	52.24828	-1.72968	-124.94	19:41:34	14.548	0.860
S11	5385	993C0 00000 00000	52.24935	-1.73075	-126.96	19:17:45	13.280	0.963
S11	5381	993C0 00000 00000	52.24485	-1.71843	-129.00	12:48:05	19.228	1.079
S7	49242	993C0 00000 00000	52.24807	-1.74746	-126.70	17:59:23	-12.952	1.283
S7	49241	993C0 00000 00000	52.24698	-1.71768	-119.57	16:18:58	2.269	1.240
S8	36665	993C0 00000 00000	52.24702	-1.72053	-122.86	16:31:41	-8.184	1.087
S8	36664	993C0 00000 00000	52.24597	-1.72826	-123.33	14:50:56	6.752	0.655
S7	49240	993C0 00000 00000	52.24387	-1.72550	-125.05	14:39:56	15.742	0.606
S8	36663	993C0 00000 00000	52.24138	-1.73307	-125.66	13:11:33	19.203	0.068
S10	12637	993C0 00000 00000	52.24390	-1.72084	-128.14	14:27:20	-13.700	0.887
S9	27840	993C0 00000 00000	52.23514	-1.72696	-132.60	13:12:35	18.395	0.744
S10	12636	993C0 00000 00000	52.24840	-1.72029	-126.37	12:45:57	1.697	1.202
S9	27839	993C0 00000 00000	52.26725	-1.52800	-123.93	11:33:47	5.700	14.241
S8	36679	993C0 00000 00000	52.24453	-1.72621	-124.57	16:19:51	-6.349	0.614
S7	49255	993C0 00000 00000	52.28065	-1.67602	-125.14	15:55:13	5.669	5.879
S7	49254	993C0 00000 00000	52.24208	-1.72656	-122.60	14:16:30	18.479	0.451
S8	36678	993C0 00000 00000	52.24698	-1.72516	-125.12	14:39:16	8.387	0.864
S10	12651	993C0 00000 00000	52.24537	-1.71930	-127.08	14:16:48	-12.083	1.053
S8	36677	993C0 00000 00000	52.24731	-1.73023	-131.07	13:00:03	20.407	0.747
S9	27854	993C0 00000 00000	52.24170	-1.72622	-129.17	12:49:52	15.738	0.461
S10	12650	993C0 00000 00000	52.24995	-1.72263	-126.13	12:35:34	3.217	1.233
S10	12649	993C0 00000 00000	52.24803	-1.73079	-123.47	10:55:44	16.546	0.817
S10	12645	993C0 00000 00000	52.24495	-1.71772	-127.13	04:23:24	15.608	1.128
S9	27853	993C0 00000 00000	52.24009	-1.72243	-125.71	11:10:47	2.271	0.712
S11	5394	993C0 00000 00000	52.23961	-1.72214	-122.16	10:48:39	3.760	0.739
S9	27852	993C0 00000 00000	52.23567	-1.72342	-129.90	09:30:19	-12.978	0.856
S11	5393	993C0 00000 00000	52.23579	-1.72554	-125.06	09:08:11	-11.405	0.744
S7	49250	993C0 00000 00000	52.26643	-1.72762	-129.04	07:47:45	14.510	2.872
S8	36673	993C0 00000 00000	52.23991	-1.71848	-126.25	06:27:46	10.594	0.981
S8	36672	993C0 00000 00000	52.23905	-1.72289	-125.02	04:47:24	-3.837	0.703
S7	49248	993C0 00000 00000	52.18074	-1.70594	-127.52	04:28:03	-14.513	6.919
S8	36671	993C0 00000 00000	52.23723	-1.72309	-126.77	03:05:35	-19.409	0.772
S10	12644	993C0 00000 00000	52.24020	-1.71762	-125.66	02:43:28	2.057	1.037
S10	12643	993C0 00000 00000	52.23746	-1.72733	-128.27	01:02:06	-13.327	0.526

Ratio of Successful Solutions =  $\frac{\text{number of Doppler solutions within 5km with } 1^\circ < \text{CTA} < 21^\circ}{\text{number of satellite passes over test duration with } 1^\circ < \text{CTA} < 21^\circ}$

$$= \frac{33}{36} = 91.67 \%$$





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## 2.5 BEACON CODING SOFTWARE

### 2.5.1 Equipment Under Test

MT403 / MT403FF - Non GPS EPIRB, 75901666\_14 (S/N 33789)

### 2.5.2 Date of Test

25<sup>th</sup> October 2007

### 2.5.3 Test Equipment Used

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

Note: For the purposes of encoding the beacon with the various protocols the “GME Message Encoder”, TÜV Product Service Ltd designation 75901666\_18, was utilised. This is customer supplied equipment and does not appear in Section 3.1.

### 2.5.4 Test Results

#### Examples of User Protocol Beacon Messages

Protocol	Operational Message (in hexadecimal including bit and frame synchronisation bits)	Self-Test Message (in hexadecimal including bit and frame synchronisation bits)
Maritime User Protocol with MMSI	FFFE2F4C94186186186E8B2C2CD0	FFFED04C94186186186E8B2C2CD0
Maritime User Protocol with Radio Call Sign	FFFE2F4C95BDBC1ACC8E8907FC50	FFFED04C95BDBC1ACC8E8907FC50
Radio Call Sign User Protocol	FFFE2F4C9DBDBC1A554E8C2B8840	FFFED04C9DBDBC1A554E8C2B8840
Serial User: Float Free EPIRB with Serial Number	FFFE2F4C96A107FA007CEF90FCD0	FFFED04C96A107FA007CEF90FCD0
Serial User: Non Float Free EPIRB with Serial Number	FFFE2F4C972107FA007CEA520F50	FFFED04C972107FA007CEA520F50
Aviation User Protocol	N/A	N/A
Serial User: ELT with Serial Number	N/A	N/A
Serial User: ELT with Aircraft Operator Designator & Serial Number	N/A	N/A
Serial User: ELT with Aircraft 24- bit address	N/A	N/A
Serial User: PLB with Serial Number	N/A	N/A
National User (Short)	FFFE2F4C98000000000000526140	FFFED04C98000000000000526140
National User (Long)	N/R	N/R



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## **SECTION 3**

### **TEST EQUIPMENT USED**



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### 3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No	TE Number	Calibration Due
<b>Parameters 2, 3 and 8 of Results Table - Constant Temperature Tests</b>				
Power Meter	Hewlett Packard	436A	47	9-Jul-2008
Power Meter	Hewlett Packard	436A	83	11-Aug-2008
Climatic Chamber	Heraeus Votsch	VM 04/100	85	O/P Mon
Rubidium Frequency Standard	Quartzlock	A10-B	92	22-Dec-2007
Signal Generator	Hewlett Packard	8644A	96	11-Jan-2008
Load (50ohm)	Diamond	DL-30N	341	5-Sep-2008
Load (50ohm)	Diamond	DL-30N	392	28-Aug-2008
Beacon RF Unit	TUV	N/A	3066	TU
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Termination (50ohm, 6W)	Micronde	R404613	3074	24-Feb-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	30-May-2008
Attenuator (3dB, 20W)	Aeroflex / Weinschel	23-3-34	3161	30-May-2008
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
Bandpass Filter	Trilithic	5BE406/35-1-AA	3205	28-Jul-2008
Time Interval Analyser	Yokogawa	TA720 704510	3253	4-Nov-2007
Scope Corder	Yokogawa	DL750 701210	3254	9-Nov-2007
RF Short Circuit	TUV	Short Circuit	3268	TU
Power Sensor	Agilent	8482A	3289	15-Nov-2007
Power Sensor	Agilent	8482A	3290	14-Nov-2007
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	16-Apr-2008
Cable (1m, N Type)	Rhophase	NPS-1601-1000-NPS	3354	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	18-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3359	18-Apr-2008



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Instrument	Manufacturer	Type No	TE Number	Calibration Due
<b>Section 2.5 - Beacon Coding Software</b>				
Beacon Tester	WS Technologies	BT 100S	87	TU
<b>Section 2.2 Beacons - Spurious Emissions</b>				
Climatic Chamber	Heraeus Votsch	VM 04/100	85	O/P Mon
Rubidium Frequency Standard	Quartzlock	A10-B	92	22-Dec-2007
Hygrometer	Rotronic	I-1000	3068	25-Apr-2008
Attenuator (20dB, 10W)	Aeroflex / Weinschel	23-20-34	3160	30-May-2008
Thermocouple Thermometer	Fluke	51	3172	18-Jun-2008
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	16-Apr-2008
Cable (2m, N Type)	Rhophase	NPS-1601-2000-NPS	3356	18-Apr-2008

TU – Traceability Unscheduled

OP MON – Output Monitored with Calibrated Equipment



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## **SECTION 4**

### **PHOTOGRAPHS**

#### 4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)



MT403 – Front View



MT403 – Side View



Satellite Qualitative – Floating in Water





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## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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