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Report On

Emergency Beacons Limited Testing of the
McMurdo Limited E5 SMARTFIND
In accordance with Cospas-Sarsat T.007 Issue 4 - Rev 4 October 2009

Document 75911555 Report 03 Issue 1 January 2011

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REPORT ON

Emergency Beacons Limited Testing of the
McMurdo Limited
E5 SMARTFIND

Document 75911555 Report 03 Issue 1

January 2011

PREPARED FOR

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PREPARED BY

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Telecoms Test Engineer

APPROVED BY

M Jenkins
Authorised Signatory

DATED 04 January 2011

UKAS TESTING 0141

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

Emergency Beacons Limited Testing of the
McMurdo Limited
E5 SMARTFIND

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Emergency Beacon Limited Testing of the McMurdo Limited E5 SMARTFIND to the requirements of Cospas-Sarsat T.007 Issue 4 - Rev 4 October 2009.

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	McMurdo Limited
Model Number(s)	E5 SMARTFIND
Serial Number(s)	Unique ID: 993D40018C00F9D
Number of Samples Tested	1
Test Specification/Issue/Date	Cospas-Sarsat T.007 Issue 4 - Rev 4 October 2009
Incoming Release Date	Application Form 15 November 2010
Date of Receipt of Test Samples	18 November 2010
Order Number Date	PC0004329 29 October 2010
Start of Test	18 November 2010
Finish of Test	18 November 2010
Name of Engineer(s)	M P Hardy
Related Documents	Cospas-Sarsat T.001 Issue 3 - Rev 10 October 2009

1.2 APPLICATION FORM

1.2.1 Beacon Manufacturer and Beacon Model

Beacon Manufacturer	McMurdo Ltd
Beacon Model	E5 SMARTFIND Smartfind Plus (a) & (m)
Other Model Names	SE406II (a) & (m), EP50:AUTO & EP50:MAN, A5 Smartfind (m), Kannad Marine Automatic EPIRB & Kannad Marine Manual EPIRB, Kannad Marine Sport

1.2.2 Beacon Type and Operational Configurations

Beacon Type	Beacon used while:	Tick where appropriate
EPIRB	Floating in water or on deck or in a safety raft	☒
PLB	On ground and above ground	☐
	On ground and above ground and floating in water	☐
ELT Survival	On ground and above ground	☐
	On ground and above ground and floating in water	☐
ELT Auto Fixed	Fixed ELT with aircraft external antenna	☐
ELT Auto Portable	In aircraft with an external antenna	☐
	On ground, above ground, or in a safety raft with an integrated antenna	☐
ELT Auto Deployable	Deployable ELT with attached antenna	☐
Other (specify)		☐

1.2.3 Beacon Characteristics

Characteristic	Specification
Operating frequency	406.040 MHz
Operating temperature range	Tmin = -20 °C Tmax = +55 °C
Operating lifetime	48 hours
Battery chemistry	Lithium Manganese Dioxide
Battery cell model name, size and number of cells	CR 2/3AH (3x3) or CR123A (3x3)
Battery cell manufacturer	Varta/Panansonic
Battery pack manufacturer and part number	Varta/Panasonic 82-939D
Battery pack replacement period	8 years

Characteristic	Specification
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO
Oscillator manufacturer	Rakon
Oscillator part name and number	E5344LF
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes
Antenna type: Integral or Other (e.g. External, Detachable – specify type)	Integral
Antenna manufacturer	Doig/Pressco
Antenna part name and number	82-909
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)	
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	
Navigation device capable of supporting global coverage (Yes, No or N/A)	
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	
- Physical interface for beacon to navigation device	
- Electrical interface for beacon to navigation device	
- Part number of the external navigation interface device (if applicable)	
- Navigation device model and manufacturer (if beacon designed to use specific devices)	

Characteristic	Specification	
Self-Test Mode Characteristics	Self-Test Mode	Optional GNSS Self-Test Mode
- 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)	Yes	
- Results of self-test indicated by (e.g. Pass / Fail Indicator Light, Strobe Light, etc.)	Pass/Fail LED	
- 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 121.5MHz	
- Self-test can be activated directly at beacon (Yes or No)	Yes	
- List of Items checked by self-test	406.040MHz/ 121.5MHz Power, PLL Lock	
- Self-test transmission burst duration (440 or 520 ms)	440 ms	
- Self-test format bit (“0” or “1”)	0	
- Maximum duration of Self Test / GNSS Self-test		
- Maximum number of GNSS Self Tests (beacons with internal navigation devices only)	N/A	
- Self-test results in transmission of a single burst, irrespectively of the test result (Yes or No)	N/A	
- Maximum number of self-tests during battery pack replacement period	96	N/A

Characteristic	Specification	
Message Coding Protocols:	(x) Tick the boxes below against the intended protocol options	
User Protocol (tick where appropriate)	☒	Maritime with MMSI
	☒	Maritime with Radio Call Sign
	☒	EPIRB Float Free with Serial Number
	☒	EPIRB Non Float Free with Serial Number
	☒	Radio Call Sign
	☐	Aviation
	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
	☐	PLB with Serial Number
	☐	National (Short Message Format)
	☐	National (Long Message Format)
Standard Location Protocol (tick where appropriate)	☐	EPIRB with MMSI
	☐	EPIRB with Serial Number
	☐	ELT with 24-bit Address
	☐	ELT with Aircraft Operator Designator
	☐	ELT with Serial Number
	☐	PLB with Serial Number
National Location Protocol (tick where appropriate)	☐	National Location: EPIRB
	☐	National Location: ELT
	☐	National Location: PLB
User Location Protocol (tick where appropriate)	☐	Maritime with MMSI
	☐	Maritime with Radio Call Sign
	☐	EPIRB Float Free with Serial Number
	☐	EPIRB Non Float Free with Serial Number
	☐	Radio Call Sign
	☐	Aviation
	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
	☐	PLB with Serial Number

Characteristic	Specification
Beacon includes a homer transmitter (if yes identify frequency of transmission)	121.5 MHz
-Homer Transmit Power	17 dBm
-Homer Duty Cycle	Continuous %
-Duty Cycle of Homer Swept Tone	36 %
Beacon includes a strobe light (Yes or No)	Yes
- Strobe light intensity	>0.75cd
- Strobe light flash rate	21
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, remote control, external audio and light indicators, external activation device). List details on a separate sheet if insufficient space to describe.	N/A
Beacon includes automatic activation mechanism (Yes or No) Specify type of automatic beacon activation mechanism	Yes. Sea water switch contacts
Beacon includes software or hardware features and functions not listed above and non-related to 406 MHz (Yes or No) List features and use a separate sheet if insufficient space	No

1.2.4 Information Provided by the Cospas-Sarsat Accepted Test Facility

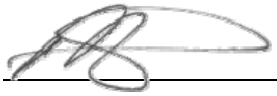
Name and Location of Beacon Test Facility: TÜV Product Service Ltd, United Kingdom

Date of Submission for Testing: November 2010

Applicable C/S Standards:

Document	Issue	Revision	Date
C/S T.001	3	10	Oct-09
C/S T.007	4	4	Oct-09

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: 

Name: M Jenkins

Position Held: Authorised Signatory

Date: 04 January 2010

1.2.5 Applicant Details

Company Name	McMurdo Ltd		
Address	Silver Point Airport Service Road Portsmouth Hampshire, PO3 5PB		
Category of Applicant	☒ Manufacturer	☐ Importer	
	☐ Distributor	☐ Agent	
Contact Name	Neil Jordan	Telephone	+44(0)2392623934
Email	neiljordan@mcmurdo.co.uk	Facsimile	+44(0)2392623997

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	
- PCB Revision	Issue 1
- Battery Model	Varta CR 2/3AH /Panasonic CR123A
Software Version	N/A
Firmware Version	1.3.220
Other (Specify)	

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: Neil Jordan

Position Held: Engineering Manager

Date: 15th November 2010

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a McMurdo Limited E5 SMARTFIND 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 Equipment Under Test (EUT) was operated using its own power source (internal battery). The EUT was representative of a fully packaged beacon, similar to the proposed production beacons equipped with its proper antenna. This EUT was used to perform the Satellite Qualitative test. The test configuration for this test is a function of the beacon type and the operational environments supported by the beacon, as declared by the manufacturer.

1.3.3 Modes of Operation

Modes of operation of the EUT during testing were as follows:

Off/Standby Mode

- Main switch to “OFF/0” position
- No apparent activity

Self-test

- Separate “Test” button held for approximately 2 seconds
- List of items checked as per Customer Supplied Information (Application Form)

Operating

- Switch to “ON” position
- 121 Homer active and offset
- Physical configuration as below

All modes

All mode descriptions are applicable to all tests unless otherwise stated. Additional method of activation includes:

- Water contact

1.4 MODIFICATIONS

Modification 0 - No modifications were made to the test sample during testing.

1.5 REPORT MODIFICATION RECORD

Issue 1 – First Issue

SECTION 2

TEST DETAILS

Emergency Beacons Limited Testing of the
McMurdo Limited
E5 SMARTFIND

TEST RESULTS TABLE

Parameters to be Measured	Range of Specification	Units	Test Results				Comments
14. Satellite Qualitative Tests							**Result: Pass**
Test Sample: SmartFind E5 SMARTFIND - NON GPS S/N: Unique ID: 993D40018C00F9D (TUV #1) Mod State: 0							
Test Configuration	As per C/S T.007		Configuration				
			5	6	7	8	
15 Hex ID Decoded by LUT	correct	P / F	-	-	P	-	Test Data: 18
Doppler Location results with error ≤5km	≥80	%	-	-	95.23	-	

2.1 SATELLITE QUALITATIVE TESTS

2.1.1 Equipment Under Test and Modification State

E5 SMARTFIND Smartfind 406 EPIRB S/N: Unique ID: 993D40018C00F9D - Modification State 0

2.1.2 Date of Test

18 November 2010

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 Environmental Conditions

Ambient temperature 6 °C
Relative Humidity 56 %

2.1.5 Test Results

Configuration 7

Test Start: 14:30:04
Test End: 10:23:40
15 Hex ID: 993D40018C00F9D

Actual location of the test beacon: 50.818263
(Daedalus Airfield, Lee-on-the-Solent, West) -1.197454

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)
S11	21185	993D4 0018C 00F9D	39.74054	-48.07207	-130.38	22:27:49	18.709	3793.922
S7	65076	993D4 0018C 00F9D	50.81964	-1.19385	-120.08	17:21:53	-12.948	0.323
S9	43672	993D4 0018C 00F9D	50.83317	-1.18982	-129.52	22:04:01	-19.552	1.758
S9	43671	993D4 0018C 00F9D	50.83274	-1.18337	-126.28	20:22:58	-3.618	1.910
S11	21183	993D4 0018C 00F9D	50.80140	-1.21776	-119.65	19:08:06	14.708	2.332
S8	52365	993D4 0018C 00F9D	50.83202	-1.19684	-125.03	18:59:22	-5.505	1.539
S9	43670	993D4 0018C 00F9D	50.83244	-1.21916	-128.19	18:43:23	11.294	2.180
S8	52364	993D4 0018C 00F9D	50.83122	-1.21338	-127.92	17:18:54	9.620	1.814
S7	65075	993D4 0018C 00F9D	50.83100	-1.20252	-126.79	15:41:32	2.753	1.462
S10	28322	993D4 0018C 00F9D	50.82694	-1.18687	-128.94	15:23:25	-18.712	1.241
S9	43679	993D4 0018C 00F9D	50.80902	-1.20091	-126.15	10:13:22	7.600	1.041
S11	21191	993D4 0018C 00F9D	50.80656	-1.20502	-127.34	08:59:10	-12.124	1.387
S9	43678	993D4 0018C 00F9D	50.80611	-1.20253	-127.18	08:33:25	-7.745	1.382
S8	52372	993D4 0018C 00F9D	50.81013	-1.21124	-127.91	07:15:55	-6.062	1.299
S7	65083	993D4 0018C 00F9D	50.81208	-1.15937	-122.53	05:31:47	1.077	2.784
S10	28330	993D4 0018C 00F9D	50.80904	-1.21265	-129.88	05:18:58	19.962	1.454
S12	9176	993D4 0018C 00F9D	50.80891	-1.20616	-126.76	04:09:44	15.115	1.185
S7	65082	993D4 0018C 00F9D	50.80807	-1.20118	-128.61	03:51:17	-14.744	1.148
S10	28329	993D4 0018C 00F9D	50.80987	-1.20631	-126.27	03:39:33	6.932	1.099
S10	28328	993D4 0018C 00F9D	50.80911	-1.20647	-127.43	01:58:43	-8.547	1.177
S12	9174	993D4 0018C 00F9D	50.80394	-1.20500	-131.86	00:48:13	-15.145	1.661

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

$= \frac{20}{21}$

$= 95.23\%$

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 Beacons - Satellite Qualitative					
Hygrometer	Rotronic	I-1000	3068	12	10-Jul-2011
Beacon Tester	WS Technologies	BT100S	3263	-	TU
Copper GRP	TUV	27cm Diameter	3538	-	TU

TU – Traceability Unscheduled

SECTION 4

PHOTOGRAPHS

4.1 PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Front View

Rear View

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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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).