

PUBLIC ENTERPRISE TESTING CENTER «OMEGA»

**Approved by
acting director**

PE TC «OMEGA»

Bogach S.V.

February 25, 2009



TEST REPORT No. 10/27

Issue 1

**on type approval of COSPAS-SARSAT
Emergency Position Indicating Radio Beacon (EPIRB)
SafeSea model E100 class 2,
Manufacturer Coverise Ltd.,
Great Britain**

Volume 1

**Sevastopol
2010**

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Certificate of Accreditation of Testing Laboratory No. AKP.0304-14 PMΦ dated 06.02.2004 issued by Ministry of transport of the Russian Federation	E-mail: : stcomega@stel.sebastopol.ua
Certificate of Accreditation POCC UA.0001.21MO98 dated 08.08.2005 issued by Federal Agency on Technical Regulating and Metrology of the Russian Federation	
Certificate of Accreditation of Testing Laboratory No.07.61177.184 dated 21.08.2007 issued by Russian Maritime Register of Shipping	

Basis	Contract No. 10–512/20–697	
Equipment under test	Emergency Position Indicating Radio Beacon (EPIRB) 406 MHz COSPAS–SARSAT	
Manufacturer	Coverise Ltd., Great Britain, registered office 27 New Dover Road, Canterbury, Kent, CT1 3DN	
Applicant	Coverise Ltd., Great Britain, registered office 27 New Dover Road, Canterbury, Kent, CT1 3DN	
Test commencement date	25.01.10	
Test completion date	11.02.10	
Test reports shall be delivered to:	Coverise Ltd. (for submission to COSPAS-SARSAT Secretariat for consideration)	copy 1
	PE TC “Omega”	copy 2

The results of this report shall be applied only to the tested samples

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Introduction
<p>The test report EPIRB model SAFESEA E100 CLASS 2 consists of the two volumes.</p> <p>Volume 1 - The tests of EPIRB model SAFESEA E100 CLASS 2 (report No.10/27);</p> <p>Volume 2 - The technical documentation of EPIRB model SAFESEA E100 CLASS 2 submitted by the Manufacturer for testing (Report No.10/27)</p>

Report Issue History		
No	Data of issue	Report reissue reason
1	25. 02. 2010	The initial issue.

1. EQUIPMENT UNDER TEST

1.1 Equipment category	Emergency Position Indicating Radio Beacon (EPIRB) 406 MHz COSPAS–SARSAT
1.2 Equipment trade mark	SAFESEA E100 CLASS 2
1.3 Equipment type	EPIRB Float-free
1.4 Equipment model	SAFESEA E100 CLASS 2
1.5 Equipment class	Class 2 (operating temperature range minus 20 °C to +55 °C)
1.6 Equipment serial numbers	No. 0001200011I, No. 0001200012I
1.7 Equipment destination	Alarm message transmission of distressed accident vessels, aircrafts and other objects via COSPAS- SARSAT satellites system
1.8 Firmware	Test date
Issue 00.00.23	CSConfig

1.9 Submitted Documentation

item	Documentation
1.	APPLICATION FOR A COSPAS-SARSAT 406 MHZ BEACON TYPE APPROVAL CERTIFICATE SIGNED BY THE MANUFACTURER TO CONFIRM THE TECHNICAL DETAILS OF THE BEACON
2.	Analysis and calculations the pre-test battery discharge at ambient temperature before the operating lifetime at minimum temperature test
3.	THE MANUFACTURER'S DECLARATION ABOUT OPERATOR SELECTABLE MODE OF OPERATION (THAT DRAWS THE MAXIMUM BATTERY ENERGY AND THE MAXIMUM PULSE CURRENT)
4.	Beacon operating instructions and a technical data sheet
5.	THE MANUFACTURER'S DECLARATION ABOUT ALL OPERATION CONFIGURATIONS
6.	The technical data sheet for the battery cells used in the beacon and the electric diagram of the beacon's battery pack
7.	Copy the of EPIRB's labels
8.	Technical data sheet of the reference oscillator
9.	Descriptionsto demonstrate that the design protection against continuous transmission
10.	DESCRIPTIONS TO DEMONSTRATE THAT THE DESIGN MEETS THE FREQUENCY STABILITY REQUIREMENTS OVER 5 YEARS
11.	DESCRIPTIONS TO DEMONSTRATE THAT THE DESIGN PROVIDES PROTECTION FROM REPETITIVE SELF-TEST MODE TRANSMISSIONS
12.	A TECHNICAL DESCRIPTION THAT CONFIRMS THE NOMINAL OUTPUT IMPEDANCE OF THE BEACON POWER AMPLIFIER IS 50 OHMS AND THE BEACON ANTENNA INPUT IMPEDANCE IS 50 OHMS
13.	The Beacon quality assurance plan
14.	DESCRIPTION OF THE GNSS RECEIVER OPERATION CYCLE AND ITS PHASES, INCLUDING DURATION AND AVERAGE BATTERY CURRENT MEASURED FOR EACH PHASE
15.	DECLARATION OF ALL MANUALLY SELECTABLE OPERATION MODES
16.	NAVIGATION SYSTEM TEST RESULTS WITH TEST SCRIPTS WHICH REPLICATE THE LOCATION INFORMATION CONDUCTED BY MANUFACTURER

See these documents in Report No.10/27 Volume 2.

2. TEST CONDITIONS AND METHODS

Procedure, conditions and methods of testing correspond to requirements and methods of C/S T.001 (Issue 3 – Revision 10 October 2009) and C/S T.007 (Issue 4 – Revision 4 October 2009) standards.

3. TEST PROGRAM

item	Test name	Requirements item of standard C/S T.001	Methods item of standard C/S T.007
1.	Performance measurements at normal temperature +20 °C	4.2.1, 2.2, 2.3	Annex A section A.2.1
2.	Performance measurements at maximum declared temperature +55 °C	4.2.1, 2.2, 2.3	Annex A section A.2.1
3.	Performance measurements at minimum declared temperature minus 20 °C	4.2.1, 2.2, 2.3	Annex A section A.2.1
4.	Self-test mode	4.5.4	Annex A section A.3.6
5.	Beacon coding software	3.2, Annex A	Annex A section A.2.8, A.3.1.4
6.	Current consumption	4.5.1	Annex A section A.2.3
7.	Satellite qualitative test	2.1.3, Annex A section A.2.5	Annex A section A.2.5

4. TEST SHEDULE

item	Test name	Date
1.	Performance measurements at normal temperature +20 °C	25.01.2010
2.	Performance measurements at maximum declared temperature +55 °C	25.01.2010
3.	Performance measurements at minimum declared temperature minus 20 °C	26.01.2010
4.	Self-test mode	25.01.2010-26.01.2010
5.	Beacon coding software	26.01.2010
6.	Current consumption	27.01.2010
7.	Satellite qualitative test	11.02.2010

5. TEST RESULT

item	Test name	Pass/No
1.	Performance measurements at normal temperature +20 °C	Pass
2.	Performance measurements at maximum declared temperature +55 °C	Pass
3.	Performance measurements at minimum declared temperature minus 20 °C	Pass
4.	Self-test mode	Pass
5.	Beacon coding software	Pass
6.	Current consumption	Pass
7.	Satellite qualitative test	Pass

6. CONCLUSION

Name and Location of Beacon Test Facility: **PUBLIC ENTERPRISE TESTING CENTER «OMEGA»,
99053, Sevastopol, ul. Vakulenchuka, 29, Ukraine**

Date of Submission for Testing: **25 February 2010**

Applicable C/S Standards:

Document	Issue	Revision
C/S T.001	3	10
C/S T.007	4	4

I hereby confirm that the 406 MHz beacon described above has been successfully tested in accordance with the Cospas-Sarsat 406 MHz Beacon 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.

Deputy Head of test department



A.V. Spector

(Name, Position and Signature of Cospas-Sarsat Accepted Test Facility Representative)

TABLE F.1: OVERALL SUMMARY OF 406 MHZ “SAFESEA E100 CLASS 2” BEACON TEST RESULTS

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			T _{min} (minus 20 °C)	T _{amb} (+20 °C)	T _{max} (+55 °C)	
1. Power Output						Annex 1
– transmitter power output	35-39	dBm	37.25-37.49	37.89-38.16	37.97-38.04	
– power output rise time	<5	ms	0.70	0.55	0.60	
– power output 1 ms before burst	<-10 dBm	√ ¹	√	√	√	
2. Digital Message	Bits number					Annex 1
– bit sync	1-15	15 bits “1”	√	√	√	
– frame sync	16-24	“000101111”	√	√	√	
– format flag	25	1 bit	0	0	0	
– protocol flag	26	1 bit	1	1	1	
– identification / position data	27-85	59 bit	√	√	√	
– BCH code	86-106	21 bits	√	√	√	
– emerg. code / nat. use / suppl. data	107-112	6 bits	010000	010000	010000	
– additional data / BCH (if applicable)	113-144	32 bits	√	√	√	
– position error (if applicable)	<5	km	—	—	—	
3. Digital Message Generator						Annex 1
– repetition rate T _R :						
• average T _R	48.5-51.5	sec	49.60	49.60	49.61	
• min T _R	47.5≤T _R ≤48.0	sec	47.80	47.80	47.81	
• max T _R	52.0≤T _R ≤52.5	sec	52.51	52.51	52.51	Result conform with slight extra margin according to item A.1 T.007
• standard deviation	0.5-2.0	sec	1.41	1.41	1.41	
– bit rate:						
• min f _b	≥396	bit/sec	399.91	399.83	399.93	
• max f _b	≤404	bit/sec	400.07	400.08	400.06	
– total transmission time:						
• short message	435.6-444.4	ms	438.65-438.85	439.00-439.15	439.05-439.15	
• long message	514.8-525.2	ms	—	—	—	
– unmodulated carrier:						
• min T ₁	≥158.4	ms	160.10	160.10	160.10	
• max T ₁	≤161.6	ms	160.12	160.12	160.13	
– first burst delay	≥47.5	sec	51,28-51,65	51,19-51,63	51.28-51.51	

¹ Indicate that testing demonstrated conformance to requirements by placing the √ symbol in Table F.1.

Parameters to be Measured	Range of Specification	Units	Test Results			Comments
			T _{min} (minus 20 °C)	T _{amb} (+20 °C)	T _{max} (+55 °C)	
4. Modulation						Annex 1
– biphas-L		✓	✓	✓	✓	
– rise time	50-250	μsec	149.19-151.63	145.56-148.75	143.70-149.62	
– fall time	50-250	μsec	164.94-167.91	160.57-163.49	156.76-164.28	
– phase deviation: positive	+(1.0 to 1.2)	radians	1.09 to 1.11	1.08 to 1.11	1.08 to 1.11	
– phase deviation: negative	-(1.0 to 1.2)	radians	-1.09 to -1.12	-1.09 to -1.11	-1.10 to -1.12	
– symmetry measurement	≤0.05	✓	✓	✓	✓	
5. 406 MHz Transmitted Frequency						Annex 1
– nominal value	C/S T.001	MHz	406036.928-406036.934	406036.947-406036.962	406036.900-406036.901	
– short-term stability	≤2×10 ⁻⁹	MHz	(0.025 to 0.057)×10 ⁻⁹	(0.034 to 0.063)×10 ⁻⁹	(0.034 to 0.056)×10 ⁻⁹	
– medium-term stability slope	(-1 to +1) ×10 ⁻⁹	/100 ms	(-0.527 to -0.039)×10 ⁻⁹	(-0.800 to -0.134)×10 ⁻⁹	(-0.020 to 0.036)×10 ⁻⁹	
– medium-term stability residual frequency variation	≤3×10 ⁻⁹	/min	(0.042 to 1.989)×10 ⁻⁹	(0.035 to 0.344)×10 ⁻⁹	(0.043 to 0.093)×10 ⁻⁹	
6. Spurious Emissions into 50 Ohms (406.0 – 406.1 MHz) ¹	C/S T.001 mask	✓	Annex 1.3	Annex 1.1	Annex 1.2	
7. 406 MHz VSWR Check						Annex 1
– nominal transmitted frequency	C/S T.001	MHz	406036.927	406036.942-406036.944	406036.900	
– modulation rise time	50-250	μsec	148.94-151.02	146.20-149.45	145.23-147.21	
– modulation fall time	50-250	μsec	165.22-166.75	159.82-165.36	158.55-161.92	
– modulation phase deviation +φ	+(1.0 to 1.2)	radians	1.09 to 1.11	1.10 to 1.11	1.09 to 1.11	
– modulation phase deviation -φ	-(1.0 to 1.2)	radians	-1.10 to -1.12	-1.10 to -1.11	-1.10 to -1.12	
– modulation symmetry measurement	≤0.05	✓	✓	✓	✓	
– digital message	correct	✓	✓	✓	✓	

¹ Include spectral plots of the 406.0-406.1 MHz band showing the transmit signal and the emission mask as defined in document C/S T.001.

Parameters to be Measured	Range of Specification	Units	Test Results	Comments
8. Self-test Mode <ul style="list-style-type: none"> – frame sync – format flag – single radiated burst – default position data (if applicable) – description provided – design data provided on protection against repetitive self-test mode transmissions – single burst verification – provides for 15 Hex ID – 121.5 MHz RF power (if applicable) – 406 MHz RF power 	“011010000” 1/0 $\leq 440/520$ ($\pm 1\%$) must be correct one burst correct self-test checks that RF power emitted self-test checks that RF power emitted	✓ bit value ms ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ 0 439.00 ✓ description provided ✓ ✓ ✓ ✓	Annex 1
9. Oscillator Aging (data provided)	C/S T.001	Hz	$\leq \pm 3.0$ ppm by 10 years	volume 2
10. Protection Against Continuous Transmission description provided	<45	sec	✓	volume 2
11. Satellite Qualitative Test (results provided) ²	15 Hex ID provided by LUT and position within 5 km 80% of time	✓	The received digital message corresponds to the encoded radio beacon ID The message is accepted by a satellite, is coordinates are determined (successfully located by satellites) At 8 satellite pass 11.02.2010 distances between the position of EPIRB and coordinates calculated by COSPAS-SARSAT system were in the range from 0.17 km to 0.72 km.	Annex 8

¹ Attach graphs depicting test results.

² Attach a satellite qualitative test summary report (Appendix A to Annex F) for each test configuration.

Parameters to be Measured	Range of Specification	Units	Test Results	Comments
12. Beacon Coding Software ¹ sample message provided for each coding option of the applicable coding types	correct	√	FFFE2F4C9418618618668A26F190 FFFE2F4C9526F6F06B268C679110 FFFE2F4C96A000C6007CED45E1D0 FFFE2F4C972000C6007CE8871250 FFFE2F4C9DBDBC1A55468D215510	Annex 6 Per Table F-D.2
sample self-test message provided for each coding option of the applicable coding types	correct	√	FFFED04C9418618618668A26F190 FFFED04C9526F6F06B268C679110 FFFED04C96A000C6007CED45E1D0 FFFED04C972000C6007CE8871250 FFFED04C9DBDBC1A55468D215510	Per Table F-D.2

¹ Attach examples of each requested coding option as per Appendix D to Annex F.

Senior Engineer



A.V.Baydachniy

ANNEX 1

ELECTRICAL AND FUNCTIONAL PERFORMANCE MEASUREMENTS AT CONSTANT TEMPERATURE

(ANNEX A.2.1 C/S T.007)

Electrical and Functional Tests at Constant Temperature

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test conditions:

- laboratory ambient temperature +20 °C;
- normal operating temperature +20 °C;
- maximum operating temperature +55 °C;
- minimum operating temperature minus 20 °C;
- the repetition period duration for Spurious output test is 50 seconds;
- the duration of Spurious output test is 2 hour (150-155 burst);
- active load value for VSWR test is 17 Ohm;
- matching network was not used.

The list of protocols

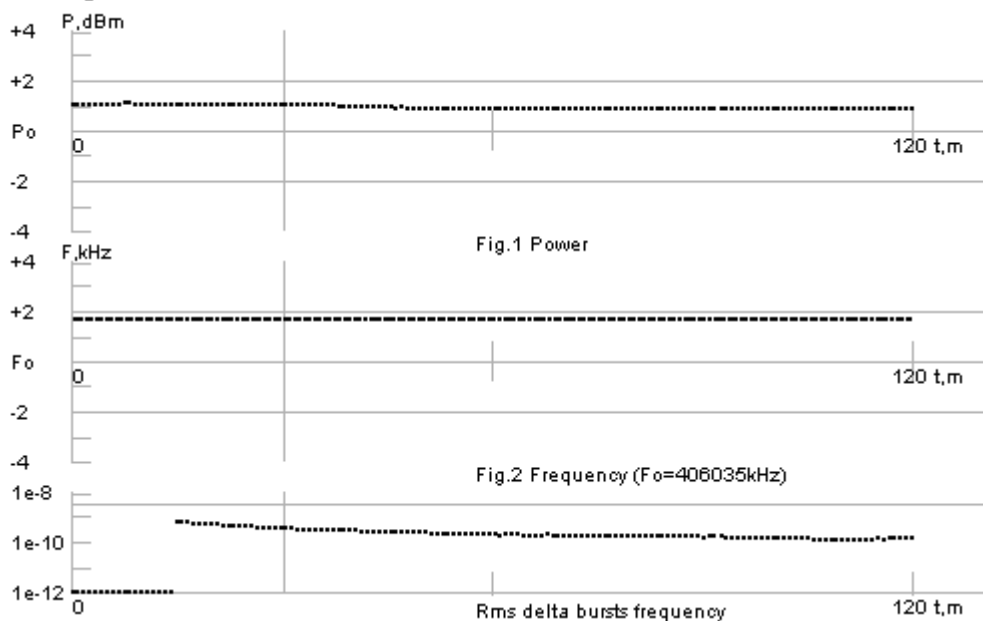
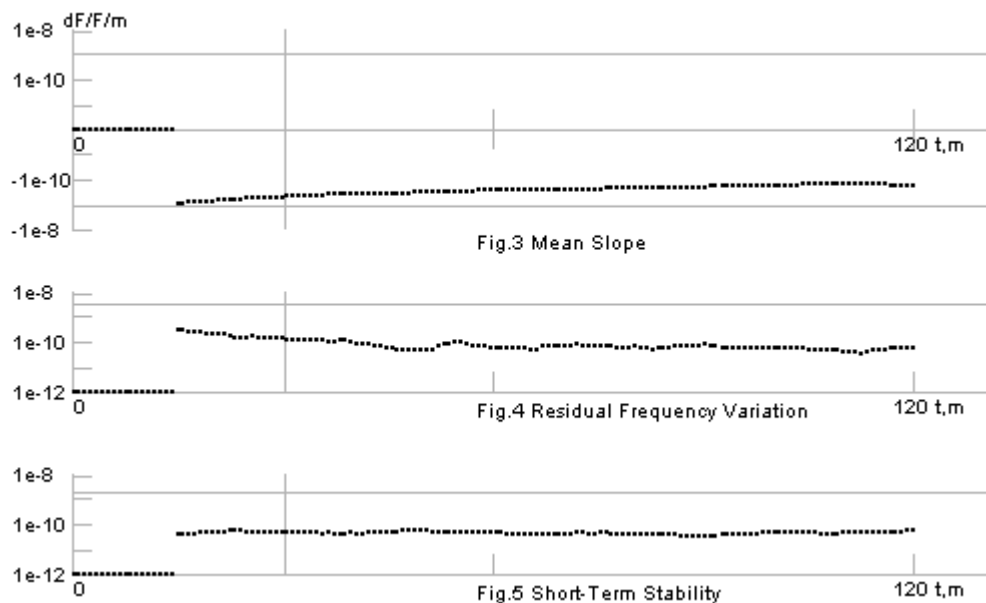
Parameter tested	Operating temperature		
	+20 °C	+55 °C	minus 20 °C
	Protocol No (page No)		
Transmitter power output			
Transmitter power output	1 (17)	8 (29)	15 (41)
Maximum and minimum value of output power during operating	5 (19)	12 (31)	19 (43)
Output power rise time	21	33	45
Power output 1 ms before burst	21	33	45
Messages			
Message contents	20	32	44
Digital message generator			
First burst delay	22	34	46
Average repetition rate and standard deviation	22	34	46
Minimal and maximal value of digital message generator parameters	5 (19)	12 (31)	19 (43)
Modulation			
Modulation index	3 (18)	10 (30)	17 (42)
Modulation rise and fall times	3 (18)	10 (30)	17 (42)
View of modulation 3 first bit message	4 (18)	11 (30)	18 (42)
Maximum and minimum value during operating	5 (19)	12 (31)	19 (43)
Transmitted frequency			
Nominal value	1 (17)	8 (29)	15 (41)
Medium /short term frequency stability	2 (17)	9 (29)	16 (41)
Maximum and minimum value during operating	5 (19)	12 (31)	19 (43)
Spurious emissions			
Spurious emissions	23	35	47
VSWR test			
Transmitter nominal frequency	6 (24)	13 (36)	20 (48)
Digital message content	25	37	49
The modulation parameters	6 (24)	13 (36)	20 (48)
Self-test mode			
Duration of the burst	7 (26)	14 (38)	21 (50)
Digital message content (frame synchronization, format flag)	27	39	51
The Output power, frequency and modulation parameters of the self- test burst	7 (26)	14 (38)	21 (50)

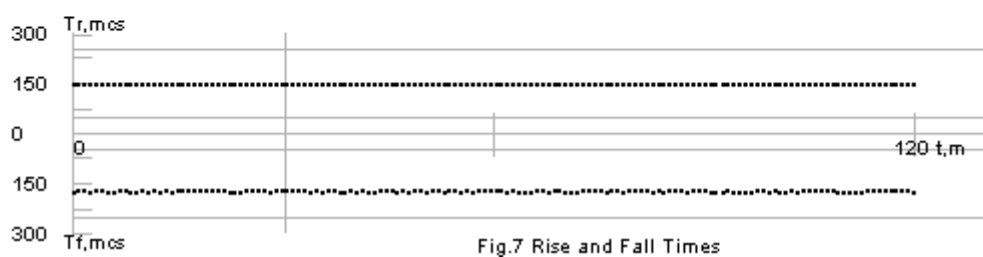
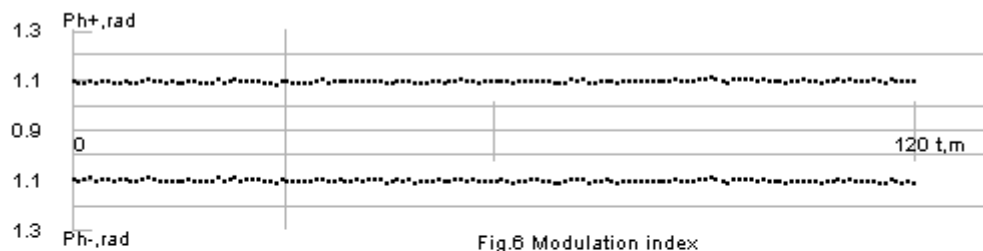
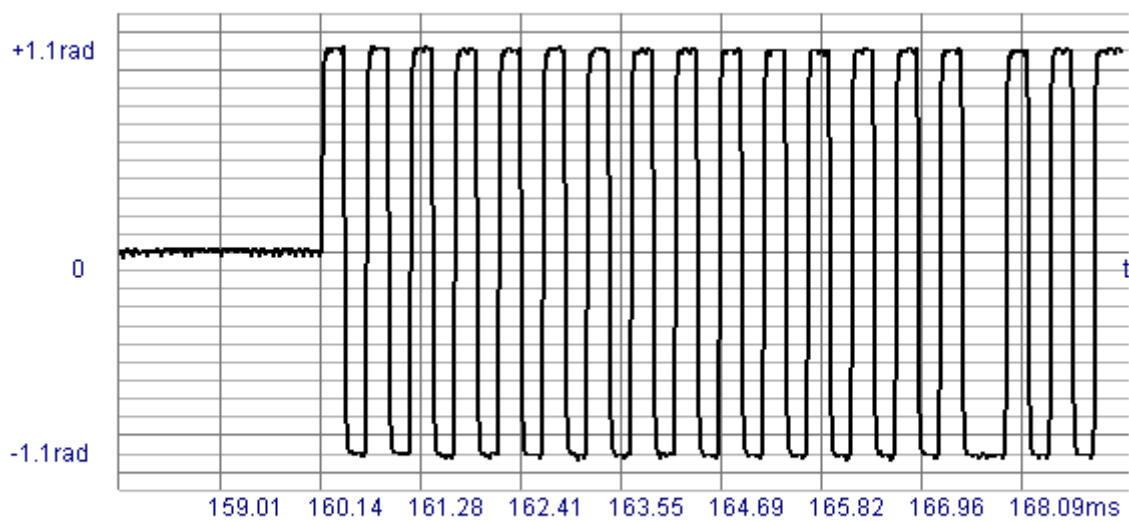
ANNEX 1.1

PERFORMANCE MEASUREMENTS AT NORMAL TEMPERATURE 20 °C

TEST DURATION 2 HOURS

(Annex A.2.1 C/S T.007)

Model: Safesea E100 class 2**Serial number:** 0001200012I**Firmware:** Issue 00.00.23**EPIRB Float-free****Test Date:** 25.01.2010Protocol N 1Date 25.01.2010 Conditions Normal temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: **FFFE2F 4C972000C6007CE887125 0**Protocol N 2Date 25.01.2010 Conditions Normal temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: **FFFE2F 4C972000C6007CE887125 0**

Protocol N 3Date 25.01.2010 Conditions Normal temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0Protocol N 4Date 25.01.2010 Conditions Normal temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0

Phase+ = 62.65 ° TRise+ = 147.7 mcs

Phase- = -63.53 ° TFall- = 162.1 mcs

Protocol N 5Date 25.01.2010 Conditions Normal temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Test duration 2 h 0 m	Bursts received 147	BCH error 0	Self-Test 0		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	406036.947	406036.947	406036.962
+Phase deviation, rad	1.00	1.20	1.08	1.09	1.11
-Phase deviation, rad	-1.00	-1.20	-1.09	-1.11	-1.11
Phase time rise, mcs	50.00	250.00	145.56	147.68	148.75
Phase time fall, mcs	50.00	250.00	160.57	162.06	163.49
Power, Wt	3.16	7.94	6.15	6.15	6.55
Power rise, ms	0.00	0.00	0.00	0.55	0.00
Bit Rate, bps	396.00	404.00	399.83	399.98	400.08
Asymmetry, %	0.00	5.00	0.36	0.41	0.55
CW Preamble, ms	158.40	161.60	160.10	160.11	160.12
Total burst duration, ms	435.60	444.40	439.00	439.05	439.15
Repetition period, s	47.50	52.50	47.80	49.30	52.51
Repetition period mean, s				49.60	
Repetition period rms, s				1.41	
Delta Rep. period, s	4.00			4.70	4.70
Slope(E-9)	-1.00	1.00	-0.800	-0.153	-0.134
Residual variations (E-9)	0.00	3.00	0.035	0.057	0.344
Short term variations (E-9)	0.00	2.00	0.034	0.063	0.063

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500617	Low Sweep Frequency, Hz	351
Power, mW	79.0	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	825
Modulation Index, %	100		

Message	
Contents (full)	:FFFE2F 4C972000C6007CE887125 0

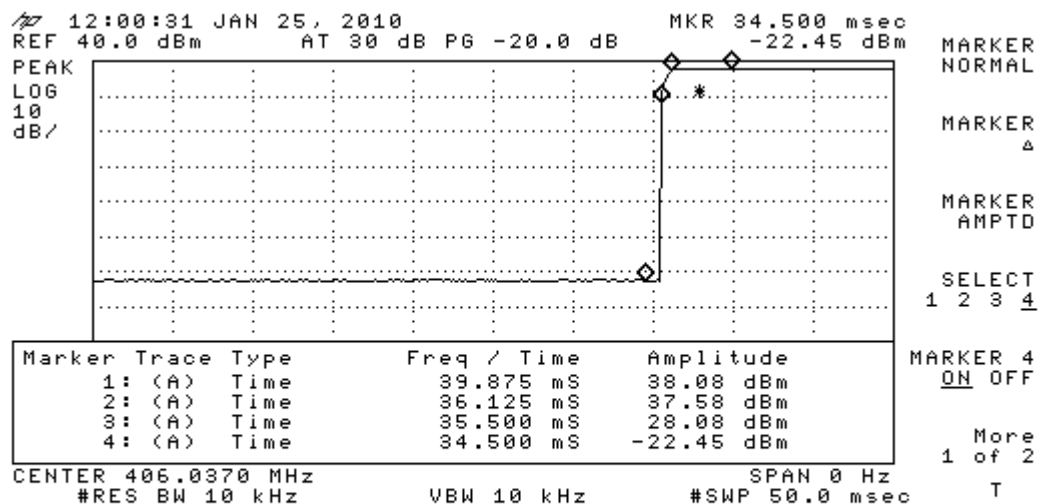
Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

**Check of power output rise time of output signal 406,037 MHz
(item A.3.2.2.2 C/S T.007)**

Model: Safesea E100 class 2**Serial number:** 0001200012I**Firmware:** Issue 00.00.23**EPIRB Float-free****Test Date:** 25.01.2010

Plot after 2 hours operating at normal temperature +20 °C



**Measurement of time interval
from the moment of beacon activation till the first (operating) burst**

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Test conditions:

- room ambient temperature: +19 °C;
- normal climatic operating EPIRB Survival temperature: +20 °C;
- time of beacon exposure at maximum specified operating temperature , before measurement: 2 hours;
- beacon mode during exposure: turned off;
- number of measurements: 3

Requirement of C/S T.007 (Table F.1, section 3, the last paragraph):

first burst delay shall exceed 47,5 seconds for all climatic conditions

	Measurement commencement time	Time interval, sec
		from the moment of beacon activation till the first (operating) burst
1 st measurement	13:50	51,63
2 ^d measurement	13:52	51,19
3 ^d measurement	13:54	51,47
Minimum value		51,19
Maximum value		51,63

**Statistic measurements of
randomized repetition period of transmission
(item A.3.1.1, C/S T.007)**

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Test conditions:

normal climatic conditions: +20 °C;

time of beacon exposure at maximum specified operating temperature , before measurement: 2 hours;

beacon mode during exposure: turned ON;

number of measurements: 3

Requirement of C/S T.007 (Table F.1, section 3, the first paragraph):

the average repetition period based on 18 successive measurements shall be 50 sec \pm 1,5 sec;

the standard deviation of the 18 values of T_R shall be between 0,5 seconds and 2,0 seconds

Measurement commencement time	T_R between the beginnings of two successive transmissions, seconds	
	Average repetition period	Deviation
12:15	49.60	1.41

**Check of out-of-band and spurious emissions of output signal 406,037 MHz within a frequency range
406,0-406,1 MHz**

Model: Safesea E100 class 2

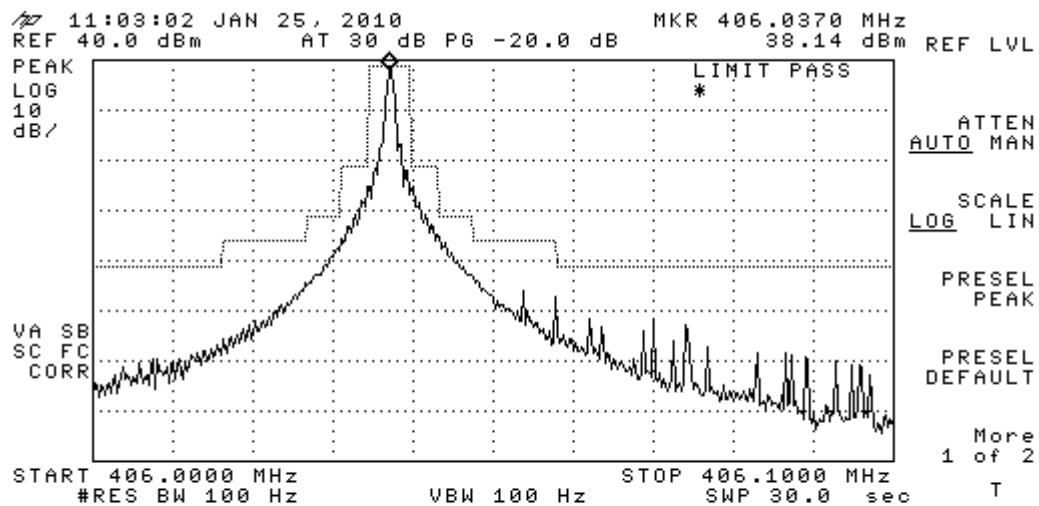
Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Plot after 2 hours operating at normal temperature + 20 °C



Measuring results when transmitter operated into a load having a VSWR of 3:1 (pure resistive load R=17 Ohm) after operation of the transmitter into an open circuit for period of 5 minutes, and then into a short circuit for period of 5 minutes.

Protocol N 6

Date 25.01.2010 Conditions Normal temperature

Beacon Model E100 class 2 Beacon N 0001200012I

Test duration 0 h 15 m	Bursts received 20	BCH error 0	Self-Test 0		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	406036.942	406036.944	406036.944
+Phase deviation, rad	1.00	1.20	1.10	1.10	1.11
-Phase deviation, rad	-1.00	-1.20	-1.10	-1.11	-1.11
Phase time rise, mcs	50.00	250.00	146.20	147.07	149.45
Phase time fall, mcs	50.00	250.00	159.82	164.71	165.36
Power, Wt	3.16	7.94	6.15	6.15	6.15
Power rise, ms	0.00	0.00	0.00	0.55	0.00
Bit Rate, bps	396.00	404.00	399.87	400.00	400.00
Asymmetry, %	0.00	5.00	0.42	0.47	0.52
CW Preamble, ms	158.40	161.60	160.10	160.11	160.12
Total burst duration, ms	435.60	444.40	439.00	439.05	439.05
Repetition period, s	47.50	52.50	47.80	49.30	52.51
Delta Rep. period, s	4.00			4.70	4.70
Slope(E-9)	-1.00	1.00	0.221	0.221	0.234
Residual variations (E-9)	0.00	3.00	0.183	0.183	0.193
Short term variations (E-9)	0.00	2.00	0.051	0.051	0.051

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500494	Low Sweep Frequency, Hz	345
Power, mW	78.9	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	831
Modulation Index, %	100		

Message	
Contents (full)	:FFFE2F 4C972000C6007CE887125 0

Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

Measuring results of EPIRB self-testProtocol N ZDate 25.01.2010 Conditions Normal temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Test duration 0 h 0 m	Bursts received 1	BCH error 0	Self-Test 1		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	0.000	406036.960	0.000
+Phase deviation, rad	1.00	1.20	0.00	1.10	0.00
-Phase deviation, rad	-1.00	-1.20	0.00	-1.11	0.00
Phase time rise, mcs	50.00	250.00	0.00	145.61	0.00
Phase time fall, mcs	50.00	250.00	0.00	164.59	0.00
Power, Wt	3.16	7.94	0.00	6.15	0.00
Power rise, ms	0.00	0.00	0.00	0.55	0.00
Bit Rate, bps	396.00	404.00	0.00	399.92	0.00
Asymmetry, %	0.00	5.00	0.00	0.41	0.00
CW Preamble, ms	158.40	161.60	0.00	160.10	0.00
Total burst duration, ms	435.60	444.40	0.00	439.00	0.00
Repetition period, s	47.50	52.50	0.00	0.00	0.00
Delta Rep. period, s	4.00			0.00	0.00
Slope(E-9)	-1.00	1.00	0.000	0.000	0.000
Residual variations (E-9)	0.00	3.00	0.000	0.000	0.000
Short term variations (E-9)	0.00	2.00	0.000	0.000	0.000

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500497	Low Sweep Frequency, Hz	345
Power, mW	79.2	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	831
Modulation Index, %	100		

Message	
Contents (full)	:FFFD0 4C972000C6007CE887125 0

Full message: FFFED04C972000C6007CE8871250

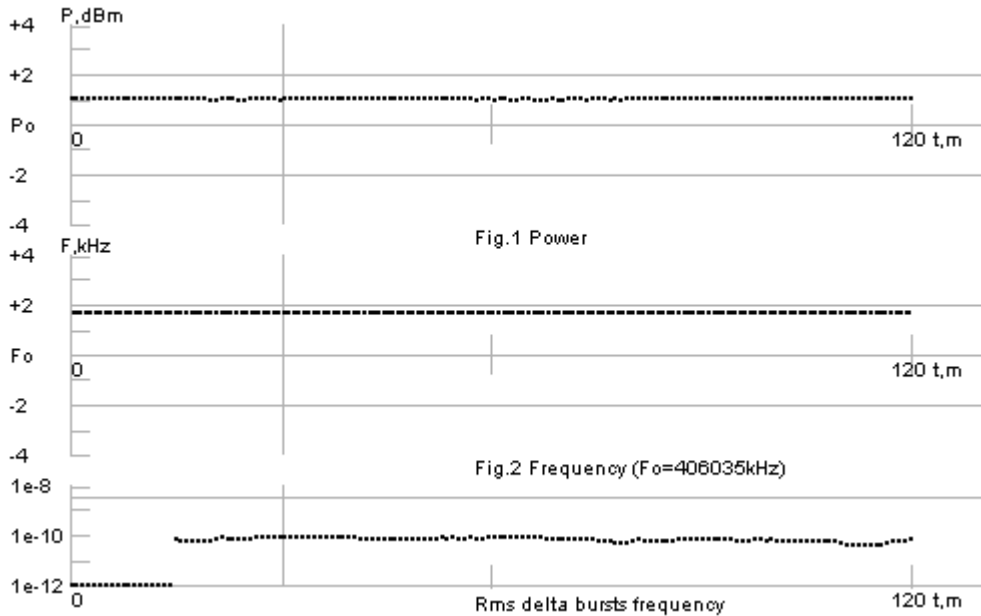
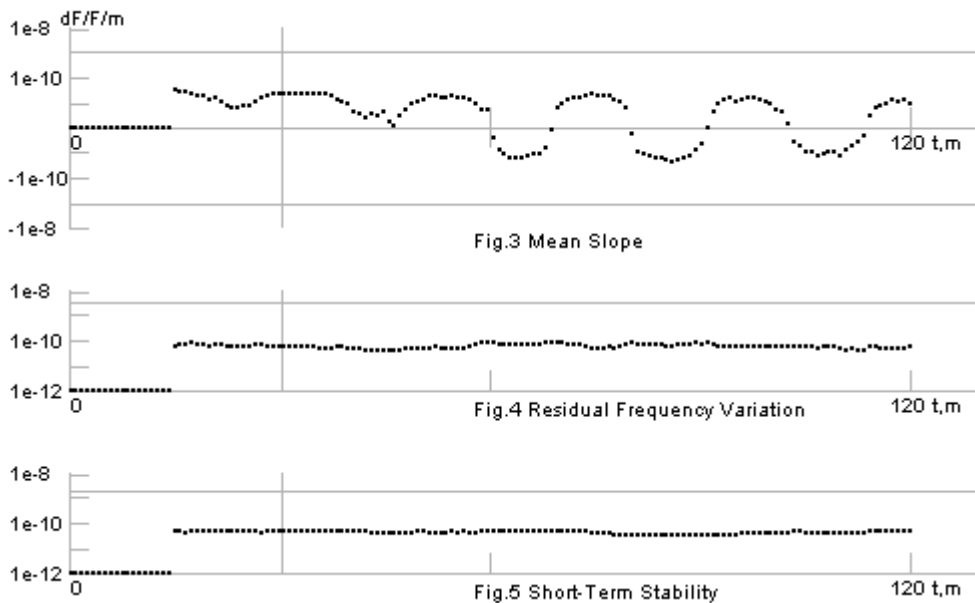
ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

ANNEX 1.2

**PERFORMANCE MEASUREMENTS
AT MAXIMUM DECLARED TEMPERATURE +55 °C**

TEST DURATION 2 HOURS

(Annex A.2.1 C/S T.007)

Model: Safesea E100 class 2**Serial number:** 0001200012I**Firmware:** Issue 00.00.23**EPIRB Float-free****Test Date:** 25.01.2010Protocol N 8Date 25.01.2010 Conditions Maximum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0Protocol N 9Date 25.01.2010 Conditions Maximum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0

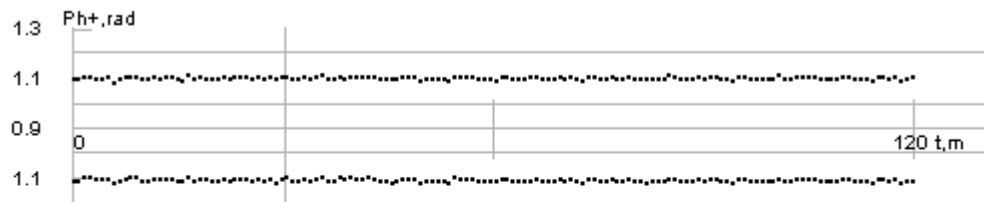
Protocol N 10Date 25.01.2010 Conditions Maximum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0

Fig.6 Modulation index

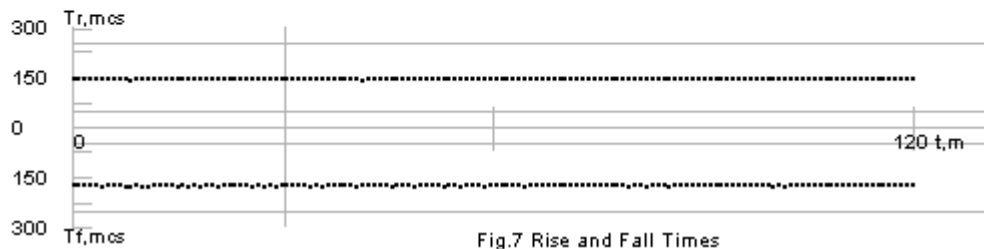


Fig.7 Rise and Fall Times

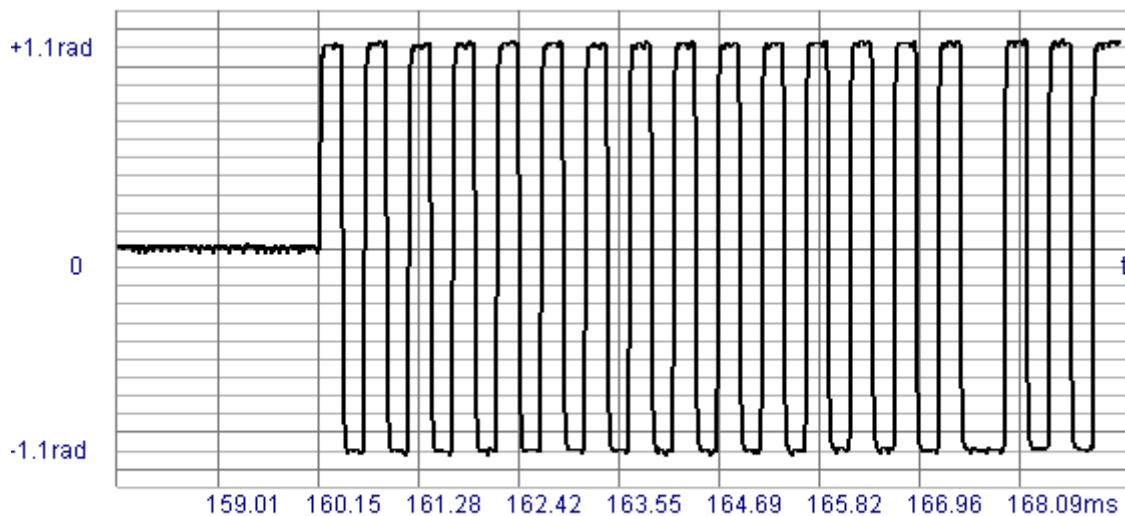
Protocol N 11Date 25.01.2010 Conditions Maximum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0

Fig.8 Phase

Phase+ = 63.46 ° TRise+ = 144.9 mcs

Phase- = -63.09 ° TFall- = 160.4 mcs

Protocol N 12Date 25.01.2010 Conditions Maximum temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Test duration 2 h 0 m	Bursts received 147	BCH error 0	Self-Test 0		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	406036.900	406036.901	406036.901
+Phase deviation, rad	1.00	1.20	1.08	1.11	1.11
-Phase deviation, rad	-1.00	-1.20	-1.10	-1.10	-1.12
Phase time rise, mcs	50.00	250.00	143.70	144.87	149.62
Phase time fall, mcs	50.00	250.00	156.76	160.38	164.28
Power, Wt	3.16	7.94	6.26	6.37	6.37
Power rise, ms	0.00	0.00	0.00	0.60	0.00
Bit Rate, bps	396.00	404.00	399.93	400.06	400.06
Asymmetry, %	0.00	5.00	0.30	0.45	0.48
CW Preamble, ms	158.40	161.60	160.10	160.11	160.13
Total burst duration, ms	435.60	444.40	439.05	439.05	439.15
Repetition period, s	47.50	52.50	47.81	49.71	52.51
Repetition period mean, s				49.61	
Repetition period rms, s				1.41	
Delta Rep. period, s	4.00			4.70	4.70
Slope(E-9)	-1.00	1.00	-0.020	0.009	0.036
Residual variations (E-9)	0.00	3.00	0.043	0.067	0.093
Short term variations (E-9)	0.00	2.00	0.034	0.055	0.056

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500100	Low Sweep Frequency, Hz	351
Power, mW	79.5	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	825
Modulation Index, %	100		

Message	
Contents (full)	:FFFE2F 4C972000C6007CE887125 0

Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

**Check of power output rise time of output signal 406,037 MHz
(item A.3.2.2.2 C/S T.007)**

Model: Safesea E100 class 2

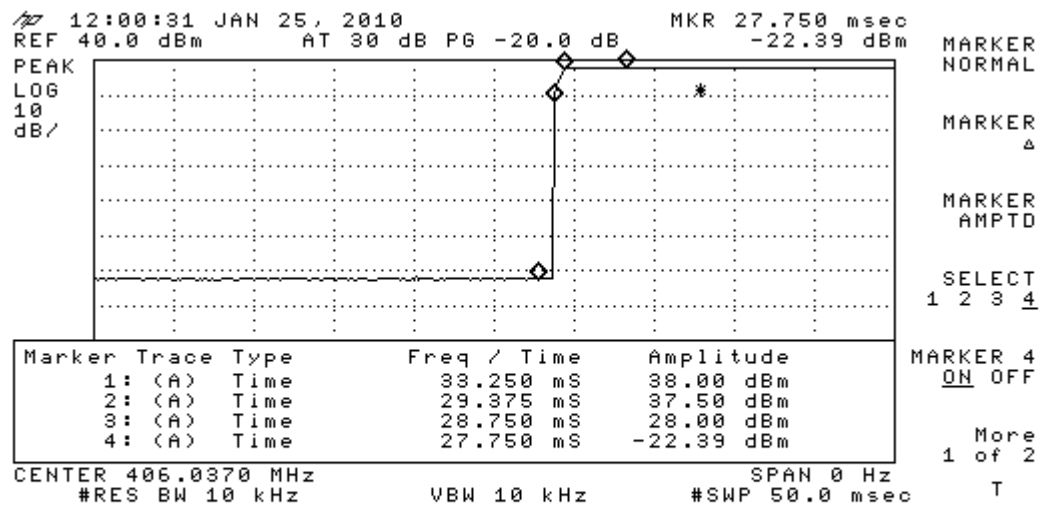
Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Plot after 2 hours operating at maximum temperature +55 °C



**Measurement of time interval
from the moment of beacon activation till the first (operating) burst**

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Test conditions:

- room ambient temperature : +18 °C;
- maximum specified operating EPIRB Survival temperature: +55 °C;
- time of beacon exposure at maximum specified operating temperature , before measurement: 2 hours;
- beacon mode during exposure: turned off;
- number of measurements: 3

Requirement of C/S T.007 (Table F.1, section 3, the last paragraph):

first burst delay shall exceed 47,5 seconds for all climatic conditions

	Measurement commencement time	Time interval, sec
		from the moment of beacon activation till the first (operating) burst
1 st measurement	18:50	51,51
2 ^d measurement	18:52	51,28
3 ^d measurement	18:54	51,41
Minimum value		51,28
Maximum value		51,51

**Statistic measurements of
randomized repetition period of transmission
(item A.3.1.1, C/S T.007)**

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Test conditions:

maximum specified operating EPIRB Survival temperature: +55 °C;
time of beacon exposure at maximum specified operating temperature , before measurement: 2 hours;
beacon mode during exposure: turned off;

Requirement of C/S T.007 (Table F.1, section 3, the first paragraph):

the average repetition period based on 18 successive measurements shall be 50 sec \pm 1,5 sec;

the standard deviation of the 18 values of T_R shall be between 0,5 seconds and 2,0 seconds

Measurement commencement time	T_R between the beginnings of two successive transmissions, seconds	
	Average repetition period	Deviation
17:15	49.61	1.41

**Check of out-of-band and spurious emissions of output signal 406,037 MHz within a frequency range
406,0-406,1 MHz**

Model: Safesea E100 class 2

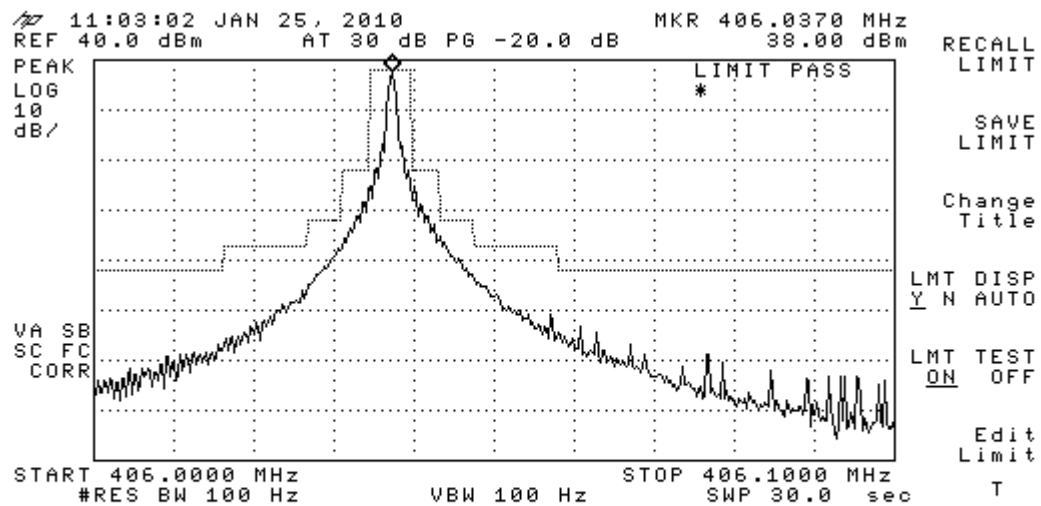
Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 25.01.2010

Plot after 2 hours operating at maximum declared temperature +55 °C.



Measuring results when transmitter operated into a load having a VSWR of 3:1 (pure resistive load R=17 Ohm) after operation of the transmitter into an open circuit for period of 5 minutes, and then into a short circuit for period of 5 minutes.

Protocol N 13

Date 25.01.2010 Conditions Maximum temperature

Beacon Model E100 class 2 Beacon N 0001200012I

Test duration 0 h 15 m	Bursts received 20	BCH error 0	Self-Test 0		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	406036.900	406036.900	406036.900
+Phase deviation, rad	1.00	1.20	1.09	1.10	1.11
-Phase deviation, rad	-1.00	-1.20	-1.10	-1.11	-1.12
Phase time rise, mcs	50.00	250.00	145.23	146.54	147.21
Phase time fall, mcs	50.00	250.00	158.55	160.42	161.92
Power, Wt	3.16	7.94	6.37	6.37	6.37
Power rise, ms	0.00	0.00	0.00	0.60	0.00
Bit Rate, bps	396.00	404.00	399.94	399.94	400.07
Asymmetry, %	0.00	5.00	0.32	0.42	0.48
CW Preamble, ms	158.40	161.60	160.11	160.11	160.12
Total burst duration, ms	435.60	444.40	439.05	439.10	439.10
Repetition period, s	47.50	52.50	47.81	48.31	52.51
Delta Rep. period, s	4.00			4.70	4.70
Slope(E-9)	-1.00	1.00	-0.021	-0.004	-0.004
Residual variations (E-9)	0.00	3.00	0.155	0.155	0.190
Short term variations (E-9)	0.00	2.00	0.047	0.047	0.047

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500097	Low Sweep Frequency, Hz	351
Power, mW	79.3	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	825
Modulation Index, %	100		

Message	
Contents (full)	:FFFE2F 4C972000C6007CE887125 0

Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

Measuring results of EPIRB self-testProtocol N 14Date 25.01.2010 Conditions Maximum temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Test duration 0 h 0 m	Bursts received 1	BCH error 0	Self-Test 1		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	0.000	406036.899	0.000
+Phase deviation, rad	1.00	1.20	0.00	1.10	0.00
-Phase deviation, rad	-1.00	-1.20	0.00	-1.10	0.00
Phase time rise, mcs	50.00	250.00	0.00	145.43	0.00
Phase time fall, mcs	50.00	250.00	0.00	159.67	0.00
Power, Wt	3.16	7.94	0.00	6.37	0.00
Power rise, ms	0.00	0.00	0.00	0.60	0.00
Bit Rate, bps	396.00	404.00	0.00	399.94	0.00
Asymmetry, %	0.00	5.00	0.00	0.42	0.00
CW Preamble, ms	158.40	161.60	0.00	160.10	0.00
Total burst duration, ms	435.60	444.40	0.00	439.10	0.00
Repetition period, s	47.50	52.50	0.00	0.00	0.00
Delta Rep. period, s	4.00			0.00	0.00
Slope(E-9)	-1.00	1.00	0.000	0.000	0.000
Residual variations (E-9)	0.00	3.00	0.000	0.000	0.000
Short term variations (E-9)	0.00	2.00	0.000	0.000	0.000

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500091	Low Sweep Frequency, Hz	351
Power, mW	79.7	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	825
Modulation Index, %	100		

Message	
Contents (full)	:FF FED0 4C972000C6007CE887125 0

Full message: FFFED04C972000C6007CE8871250

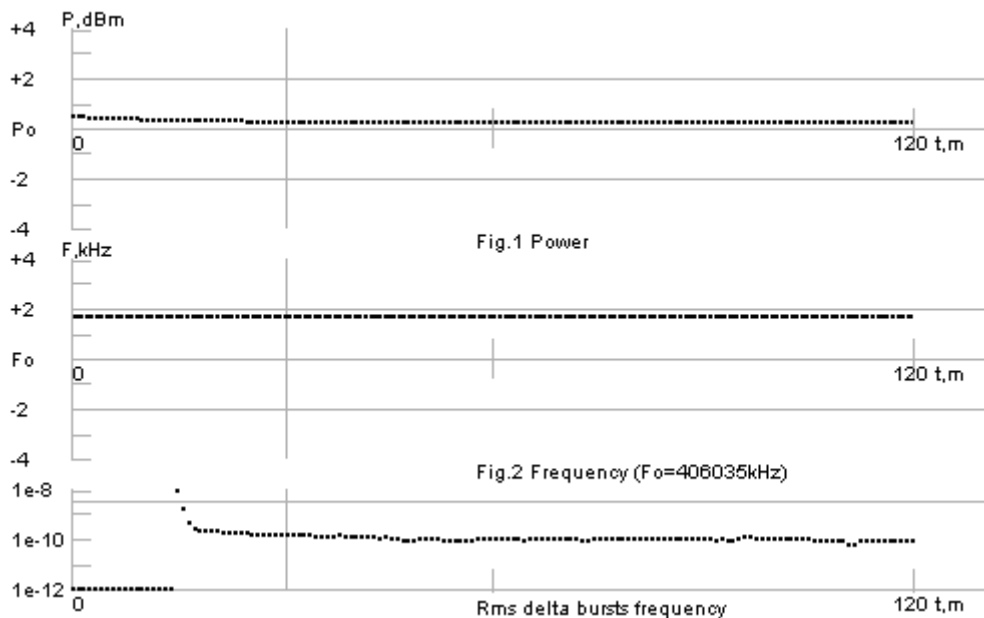
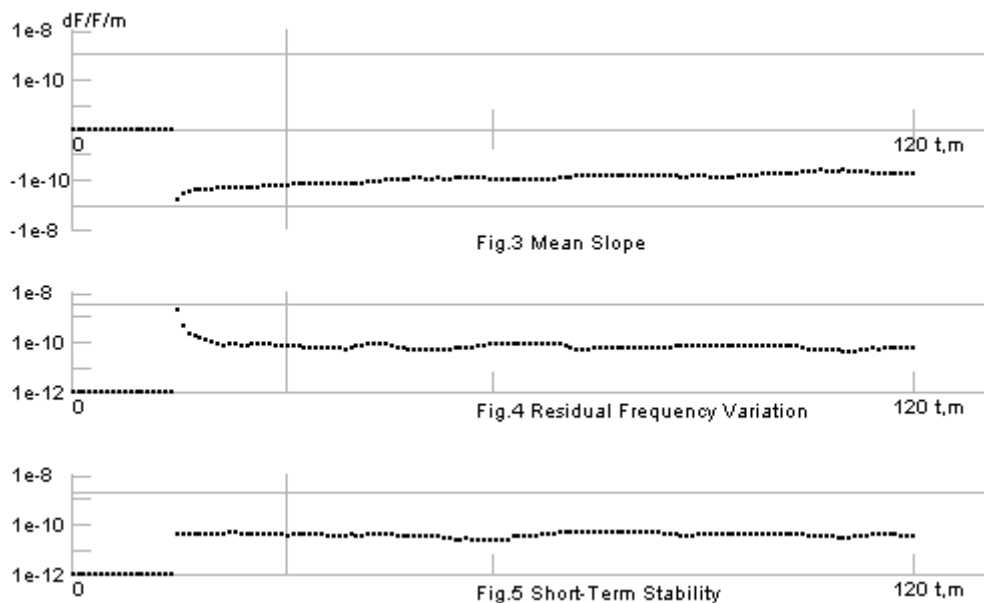
ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

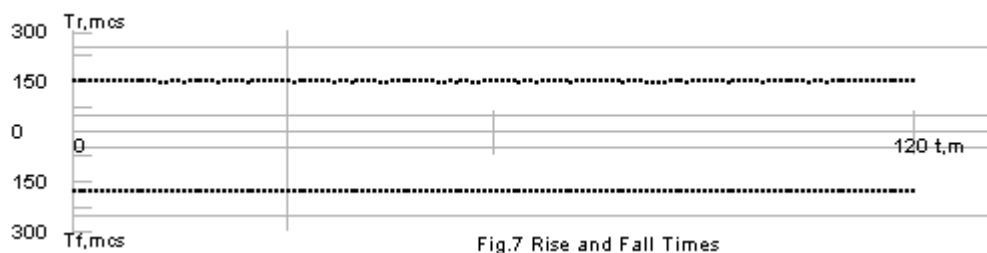
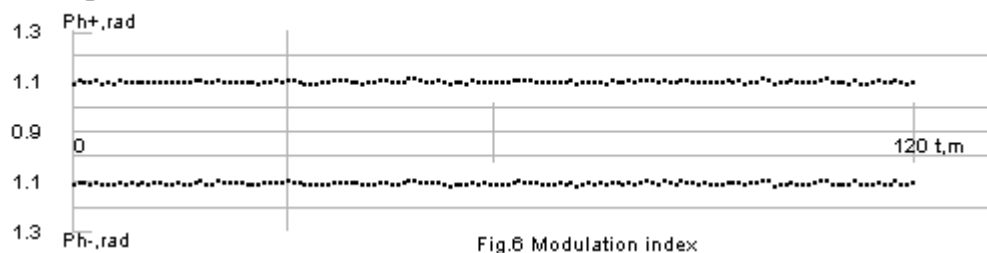
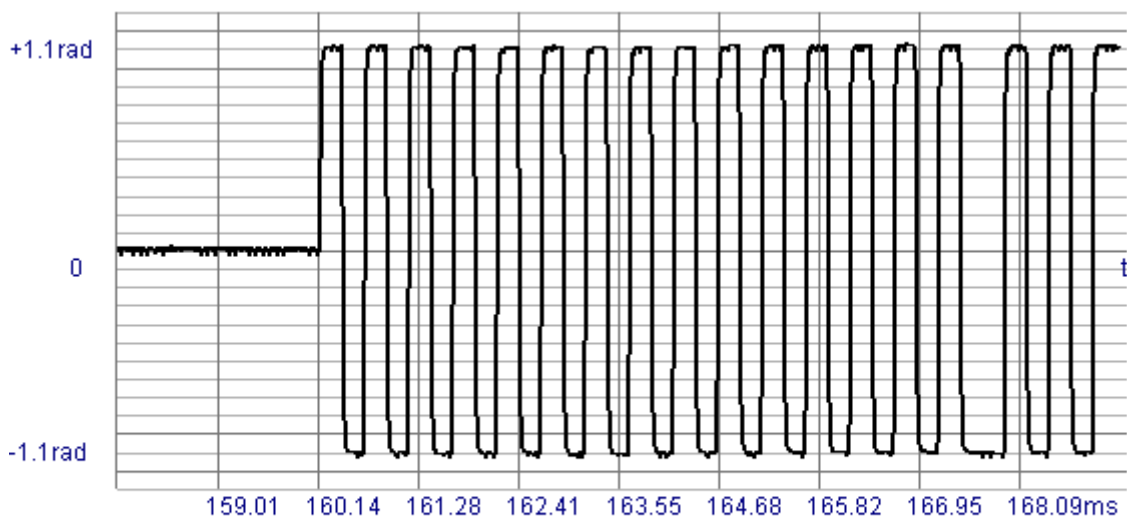
ANNEX 1.3

PERFORMANCE MEASUREMENTS
AT MINIMUM DECLARED TEMPERATURE MINUS 20 °C

TEST DURATION 2 HOURS

(Annex A.2.1 C/S T.007)

Model: Safesea E100 class 2**Serial number:** 0001200012I**Firmware:** Issue 00.00.23**EPIRB Float-free****Test Date:** 26.01.2010Protocol N 15Date 26.01.2010 Conditions Minimum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0Protocol N 16Date 26.01.2010 Conditions Minimum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0

Protocol N 17Date 26.01.2010 Conditions Minimum temperatureBeacon Model E100 class 2 Beacon N 0001200012IMessage: FFFE2F 4C972000C6007CE887125 0Protocol N 18Date 26.01.2010 Conditions Minimum temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Phase+ = 63.11 ° TRise+ = 150.3 mcs
Phase- = -63.27 ° TFall- = 166.9 mcs

Protocol N 19Date 26.01.2010 Conditions Minimum temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Test duration 2 h 0 m	Bursts received 147	BCH error 0	Self-Test 0		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	406036.928	406036.928	406036.934
+Phase deviation, rad	1.00	1.20	1.09	1.10	1.11
-Phase deviation, rad	-1.00	-1.20	-1.09	-1.10	-1.12
Phase time rise, mcs	50.00	250.00	149.19	150.30	151.63
Phase time fall, mcs	50.00	250.00	164.94	166.87	167.91
Power, Wt	3.16	7.94	5.31	5.31	5.61
Power rise, ms	0.00	0.00	0.00	0.70	0.00
Bit Rate, bps	396.00	404.00	399.91	399.94	400.07
Asymmetry, %	0.00	5.00	0.37	0.45	0.52
CW Preamble, ms	158.40	161.60	160.10	160.11	160.12
Total burst duration, ms	435.60	444.40	438.65	438.80	438.85
Repetition period, s	47.50	52.50	47.80	50.30	52.51
Repetition period mean, s				49.60	
Repetition period rms, s				1.41	
Delta Rep. period, s	4.00			4.70	4.70
Slope(E-9)	-1.00	1.00	-0.527	-0.055	-0.039
Residual variations (E-9)	0.00	3.00	0.042	0.061	1.989
Short term variations (E-9)	0.00	2.00	0.025	0.043	0.057

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500704	Low Sweep Frequency, Hz	345
Power, mW	78.3	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	831
Modulation Index, %	100		

Message	
Contents (full)	:FFFE2F 4C972000C6007CE887125 0

Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

**Check of power output rise time of output signal 406,037 MHz
(item A.3.2.2.2 C/S T.007)**

Model: Safesea E100 class 2

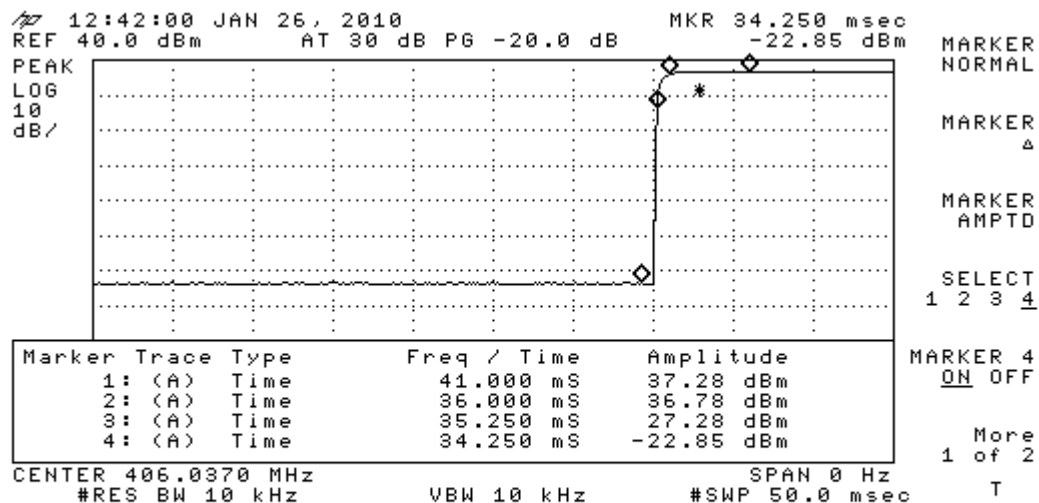
Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 26.01.2010

Plot after 2 hours operating at minimum temperature minus 20 °C



**Measurement of time interval
from the moment of beacon activation till the first (operating) burst**

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 26.01.2010

Test conditions:

- room ambient temperature: +19 °C;
- minimum specified operating EPIRB Survival temperature: minus 20 °C;
- time of beacon exposure at minimum specified operating temperature , before measurement: 2 hours;
- beacon mode during exposure: turned off;

Requirement of C/S T.007 (Table F.1, section 3, the last paragraph):

first burst delay shall exceed 47,5 seconds for all climatic conditions

	Measurement commencement time	Time interval, sec
		from the moment of beacon activation till the first (operating) burst
1 st measurement	08:30	51,42
2 ^d measurement	08:32	51,28
3 ^d measurement	08:34	51,65
Minimum value		51,28
Maximum value		51,65

**Statistic measurements of
randomized repetition period of transmission
(Item A.3.1.1, C/S T.007)**

Model: Safesea E100 class 2

Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 26.01.2010

Test conditions:

minimum specified operating EPIRB Survival temperature: minus 20 °C;
time of beacon exposure at minimum specified operating temperature , before measurement: 2 hours;
beacon mode during exposure: turned off;

Requirement of C/S T.007 (Table F.1, section 3, the first paragraph):

the average repetition period based on 18 successive measurements shall be 50 sec \pm 1,5 sec;
the standard deviation of the 18 values of T_R shall be between 0,5 seconds and 2,0 seconds

Measurement commencement time	T_R between the beginnings of two successive transmissions, seconds	
	Average repetition period	Deviation
09:30	49.60	1.41

**Check of out-of-band and spurious emissions of output signal 406,037 MHz within a frequency range
406,0-406,1 MHz**

Model: Safesea E100 class 2

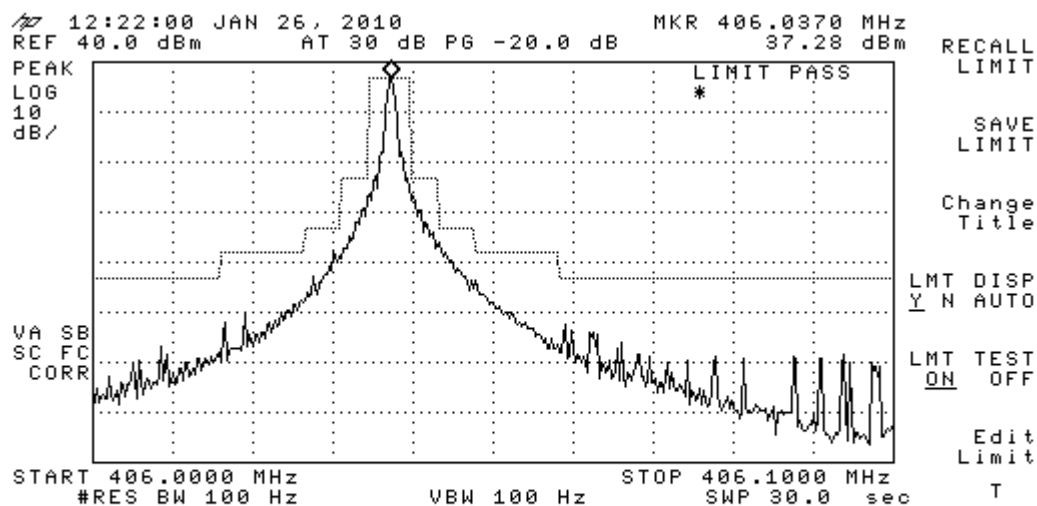
Serial number: 0001200012I

Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 26.01.2010

Plot after 2 hours operating at minimum declared temperature minus 20 °C.



Measuring results when transmitter operated into a load having a VSWR of 3:1 (pure resistive load R=17 Ohm) after operation of the transmitter into an open circuit for period of 5 minutes, and then into a short circuit for period of 5 minutes.

Protocol N 20

Date 26.01.2010 Conditions Minimum temperature

Beacon Model E100 class 2 Beacon N 00012000121

Test duration 0 h 18 m	Bursts received 23	BCH error 0	Self-Test 0		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	406036.927	406036.927	406036.927
+Phase deviation, rad	1.00	1.20	1.09	1.10	1.11
-Phase deviation, rad	-1.00	-1.20	-1.10	-1.11	-1.12
Phase time rise, mcs	50.00	250.00	148.94	150.66	151.02
Phase time fall, mcs	50.00	250.00	165.22	165.30	166.75
Power, Wt	3.16	7.94	5.27	5.30	5.30
Power rise, ms	0.00	0.00	0.00	0.75	0.00
Bit Rate, bps	396.00	404.00	399.94	399.94	400.07
Asymmetry, %	0.00	5.00	0.36	0.43	0.51
CW Preamble, ms	158.40	161.60	160.11	160.12	160.12
Total burst duration, ms	435.60	444.40	438.75	438.80	438.80
Repetition period, s	47.50	52.50	47.80	52.51	52.51
Delta Rep. period, s	4.00			4.70	4.70
Slope(E-9)	-1.00	1.00	0.003	0.003	0.062
Residual variations (E-9)	0.00	3.00	0.122	0.123	0.200
Short term variations (E-9)	0.00	2.00	0.036	0.036	0.036

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500770	Low Sweep Frequency, Hz	345
Power, mW	78.4	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	831
Modulation Index, %	100		

Message	
Contents (full)	:FFFE2F 4C972000C6007CE887125 0

Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

Measuring results of EPIRB self-testProtocol N 21Date 26.01.2010 Conditions Minimum temperatureBeacon Model E100 class 2 Beacon N 0001200012I

Test duration 0 h 0 m	Bursts received 1	BCH error 0	Self-Test 1		
406 MHz Transmitter Parameters	Limits		Measured		
	min	max	min	current	max
Frequency, kHz	406036.000	406038.000	0.000	406036.944	0.000
+Phase deviation, rad	1.00	1.20	0.00	1.11	0.00
-Phase deviation, rad	-1.00	-1.20	0.00	-1.10	0.00
Phase time rise, mcs	50.00	250.00	0.00	149.50	0.00
Phase time fall, mcs	50.00	250.00	0.00	165.97	0.00
Power, Wt	3.16	7.94	0.00	5.31	0.00
Power rise, ms	0.00	0.00	0.00	0.75	0.00
Bit Rate, bps	396.00	404.00	0.00	399.99	0.00
Asymmetry, %	0.00	5.00	0.00	0.48	0.00
CW Preamble, ms	158.40	161.60	0.00	160.10	0.00
Total burst duration, ms	435.60	444.40	0.00	438.75	0.00
Repetition period, s	47.50	52.50	0.00	0.00	0.00
Delta Rep. period, s	4.00			0.00	0.00
Slope(E-9)	-1.00	1.00	0.000	0.000	0.000
Residual variations (E-9)	0.00	3.00	0.000	0.000	0.000
Short term variations (E-9)	0.00	2.00	0.000	0.000	0.000

121.5 MHz Transmitter Parameters			
Carrier Frequency, Hz	121500770	Low Sweep Frequency, Hz	345
Power, mW	78.9	High Sweep Frequency, Hz	1176
Sweep Period, sec	0.3	Sweep Range, Hz	831
Modulation Index, %	100		

Message	
Contents (full)	:FF FED0 4C972000C6007CE887125 0

Full message: FFFED04C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

ANNEX 2

**OPERATING LIFETIME AT MINIMUM TEMPERATURE
(MINUS 20 °C)**

(Annex A.2.3 C/S T.007)

Battery discharge analysis due to storage and tests.

Battery replacement interval :	5 Years
Initial Battery Capacity Class 2	4500mAh
Battery Self Drain :	0.6% per year
Self Test Interval :	12 tests per year
Battery reset :	1 test per battery life

1. Calculation of discharge of battery.

1.1 The depletion in battery power resulting from normal battery loss of energy due to battery ageing over the rated life of the battery pack:

Battery self Drain = Capacity – (1-self drain/year%)^{replacement Interval} x Capacity

Class 2 Battery Self drain = 4500 – (1-0.006)⁵x4500 = 133.39 mAh

Off Drain = Hours per year x replacement Interval x off Current

Average off Current in Off State Mode <100nA

Off Drain = 365x24x5x100x10⁻⁹ = 4.38mAh

1.2 The number of self-tests is 12 per year, as recommended by the beacon manufacturer. Maximum duration of one self test procedure is 13.39 seconds.

Average current measured in self test mode is 48.24 mA.

Capacity loss by one self test

Self Test Drain = Self tests per battery x self test current x self test duration (in hours)

Self Test Drain = 12x5 x 48.24 x (13.39/3600) = 10.774 mAh

The number of Battery Reset 1 per battery life, as recommended by the beacon manufacturer.

Maximum duration of one Battery Reset procedure is 28.756 seconds.

Average current measured in Battery Reset mode is 31.609 mA.

Capacity loss by one Reset mode

Battery Reset drain = Average Reset Current x Duration of reset (in hours)

Battery Reset Drain = 1x 31.609 x (28.756/3600) = 0.252 mAh

Total Drain = Battery Self Drain + Off Drain + Self Test Drain + Battery reset

Class 2 Total Drain = 133.39 + 4.38 + 10.774 + 0.252

Class 2 Total Drain = 148.79 mAh.

1.3 Correction coefficient of 1.65 applied to item (1.1) and item (1.2).

Worst case Drain= Battery Self Drain + 1.65x(Off Drain + Self Test Drain + Battery reset)

Worst Case Drain Class 2 = 133.39 + 1.65(4.38+10.774+0.252) = 158.81 mAh.

In accordance T.007 (A.2.3) the preliminary discharge of the battery was replaced by the equivalent extension of the operating lifetime test.

APPENDIX E TO ANNEX F

Table F-E.1: Beacon Operating Current

Beacon Operating Modes	Mode: Manuallyselectable or Automatic	Measurement interval, sec	Average Current, mAsec	Peak Current, mA
standby mode	Beacon does not consume a current in a standby mode.			
operating mode with GPS receiver in search mode	Beacon does not consume a current in a GPS mode.			
operating mode	Automatic	51	35.343	1209 (439ms)
self-test	Manually to Self-test On Automatic to Off mode	13.399	48.243	1200.3 (438.9ms)

The Battery preconditioning discharge time = Worst Case drain / Operational Current

For an E100 Class 2 EPIRB

The average current drain is 48.24 mA

For Class 2 E100 the discharge period will be 3 hours 18 minutes.

Total current drain after 3 hours 18 minutes is $48.24 \times 198 / 60 = 159.19$ mAh

2. Radio beacon measurement results, used for further tests and calculations.

Oscillograms of consumed currents of the EPIRB Survival in various modes

The oscillograms are presented below are measured on resistor with resistance 0,68 Ohm, plugged in the break of wire, connecting the positive terminal of battery with connection terminal of EPIRB.

The current value calculated with equation:

$$I = \frac{U}{R},$$

where I is a value of current (mA), U is a value of voltage (mV), Resistor value 0.68 (Ohm). Results of calculation are presented in Table 1

Table 1 – Consumption current for Self test mode of EPIRB

Part of selftest	Average current , A	Duration, sec	Consumption (A·hour)	Consumption (A.sec)
Start burst	0,006172	1,099	1,88417E-06	0,006783028
Serial green flash	0,007781	1,956	4,22768E-06	0,015219636
1-st step befor 121 ch	0,00538	0,6526	9,75274E-07	0,003510988
2-nd step befor 121 ch	0,0113	0,4976	1,56191E-06	0,00562288
121 ch	0,02095	0,9764	5,68211E-06	0,02045558
1-st step befor 406 ch	0,005535	0,6214	9,55403E-07	0,003439449
2-nd step befor 406 ch	0,0166	0,391	1,80294E-06	0,0064906
406 ch	1,2003	0,4389	0,000146337	0,52681167
1-st serial green flash after 406	0,0102	2,559	7,2505E-06	0,0261018
Pause betvin serial flesh	0,006527	1,9172	3,47599E-06	0,012513564
2-nd serial green flash after 406	0,008499	2,29	5,40631E-06	0,01946271
Total		13,3991	0,000179559	I _{av,A} = 0,048243

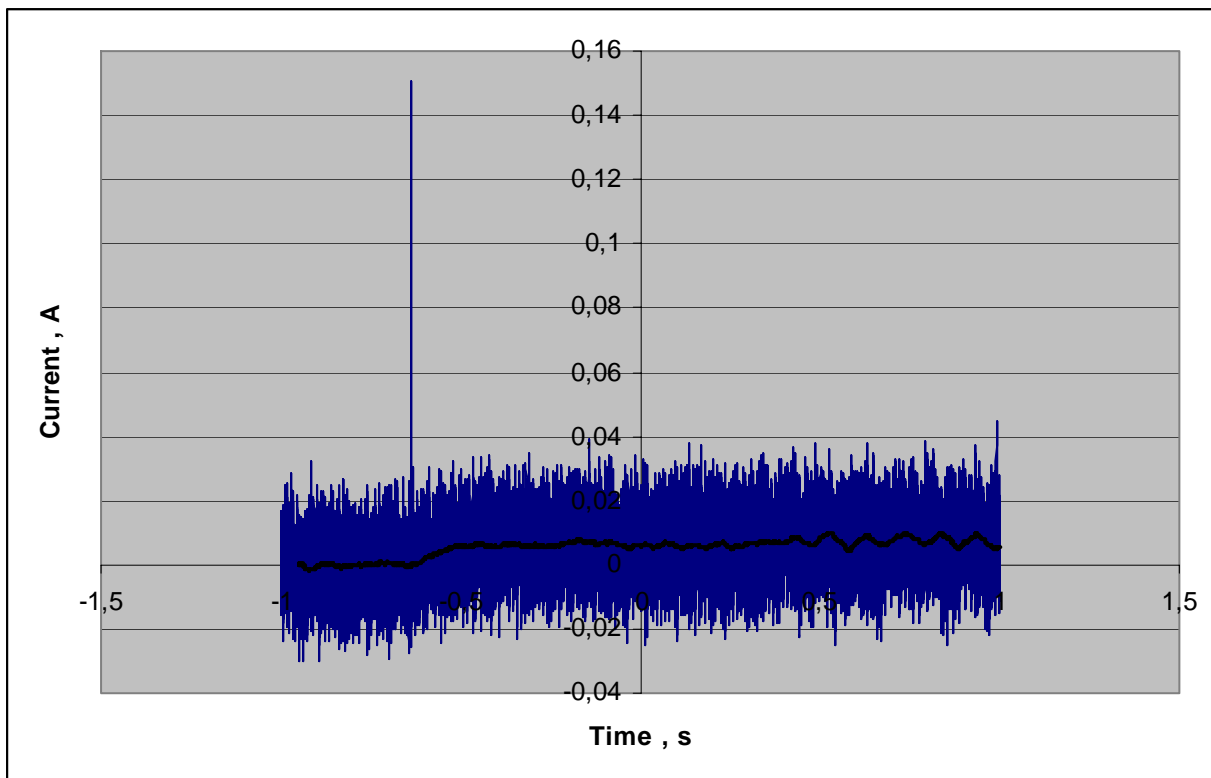


Fig 2.1 – Form of the current consumption during self-test mode after EPIRB to switch on

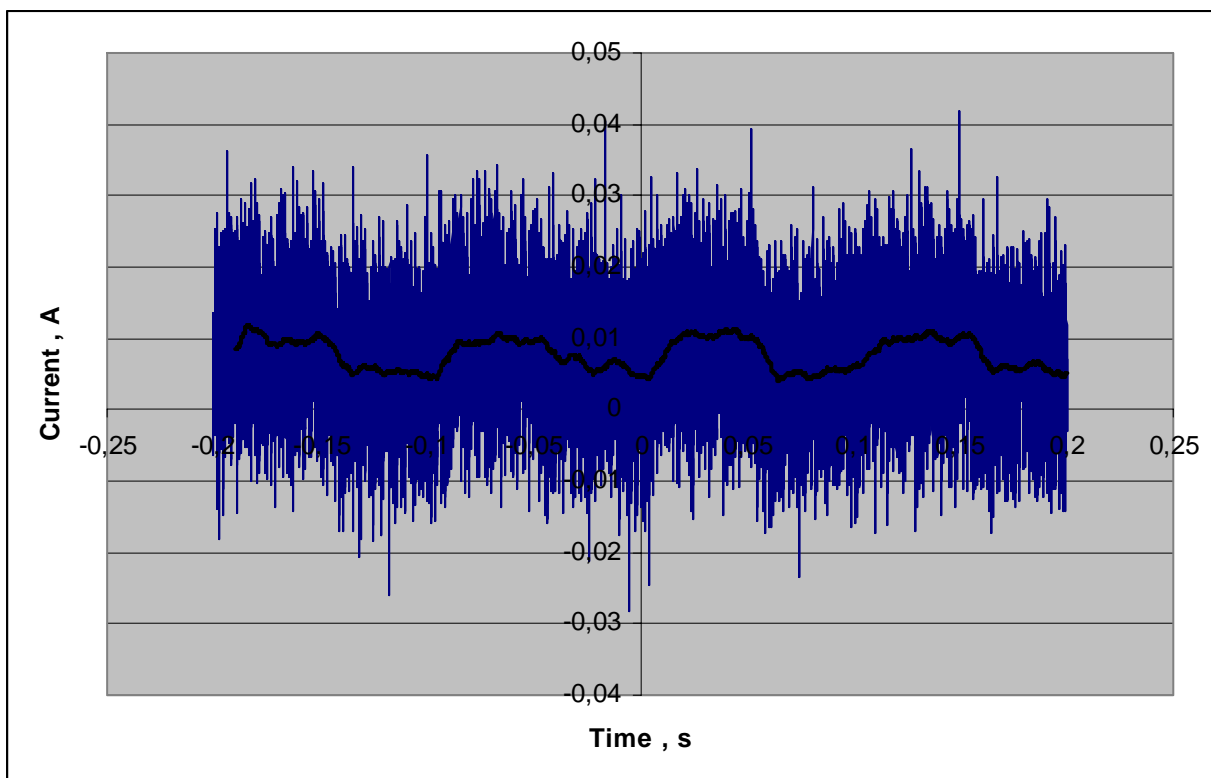


Fig 2.2 – A series green flash-light from the moment of EPIRB to switch on before radiation frequency 121,5 MHz

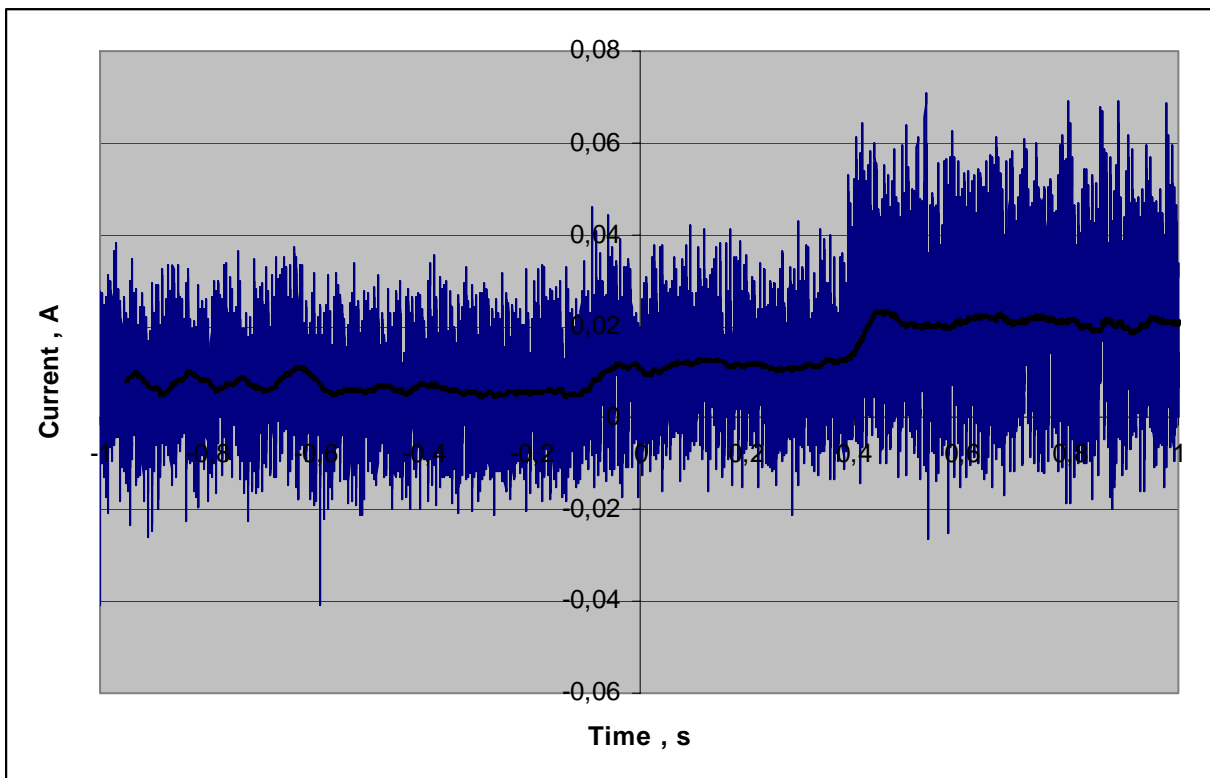


Fig 2.3 – Current deep before radiation of frequency 121,5 MHz

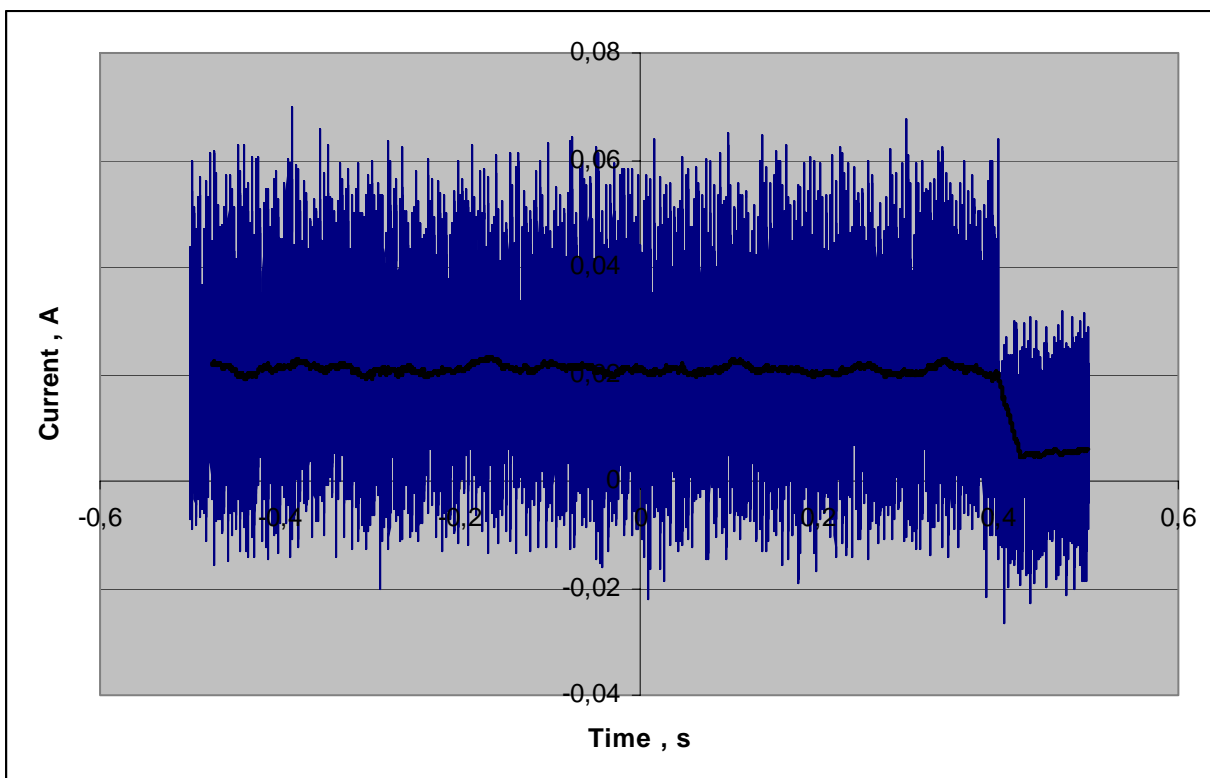


Fig 2.4 – Current consumption of frequency 121,5 MHz

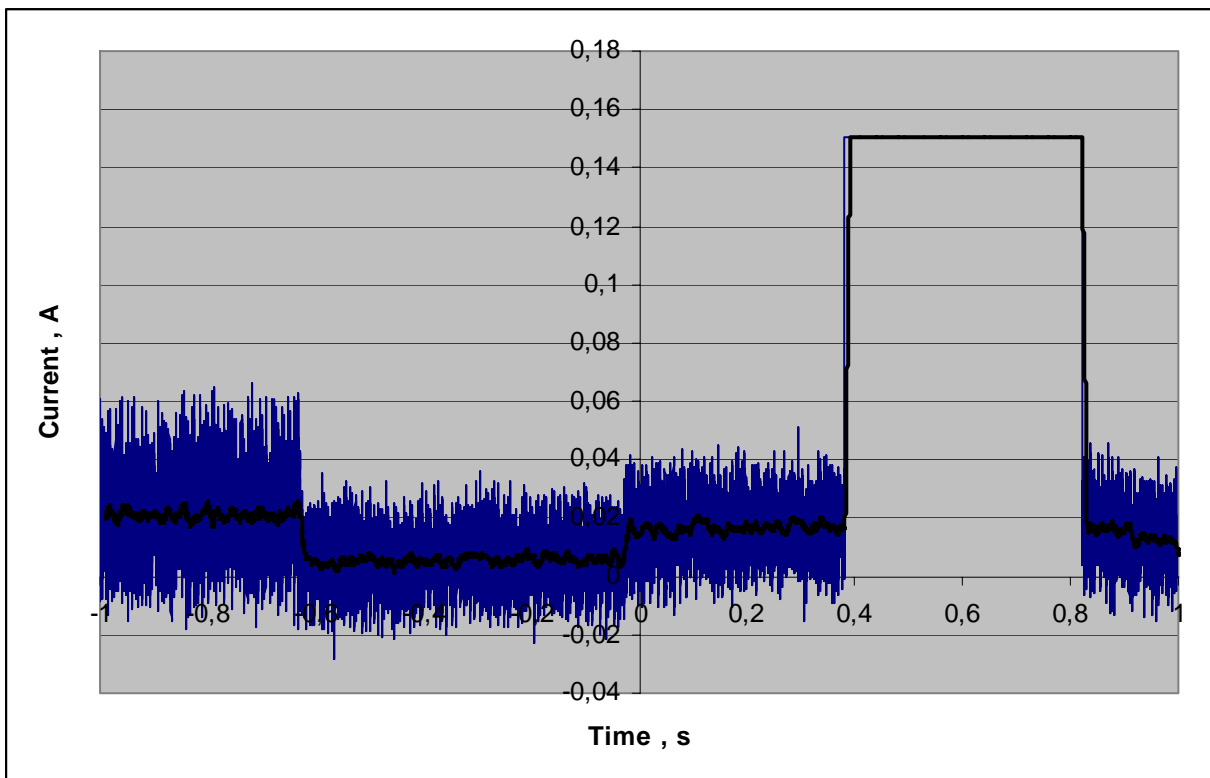


Fig 2.5 – Current deep before radiation of frequency 406,037 MHz

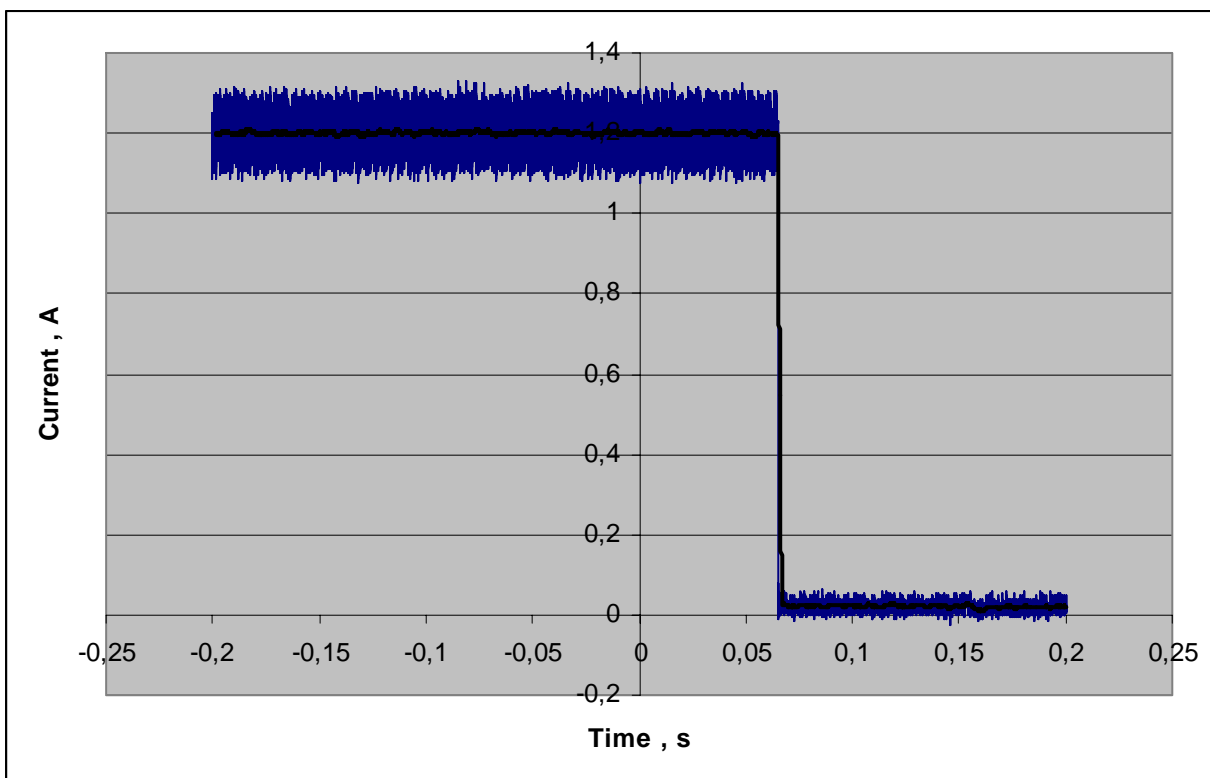


Fig 2.6 – Current consumption of frequency 406,037 MHz

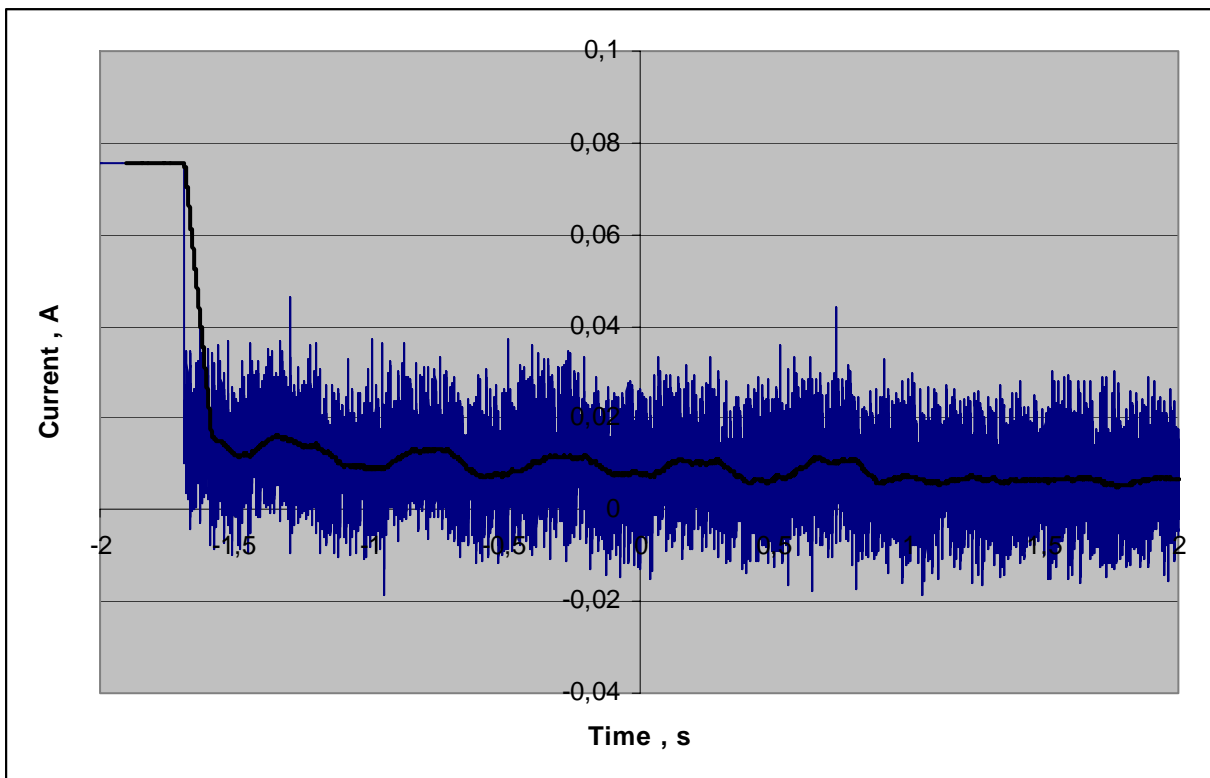


Fig 2.7 – Green flash-light after radiation of frequency 406,037 MHz

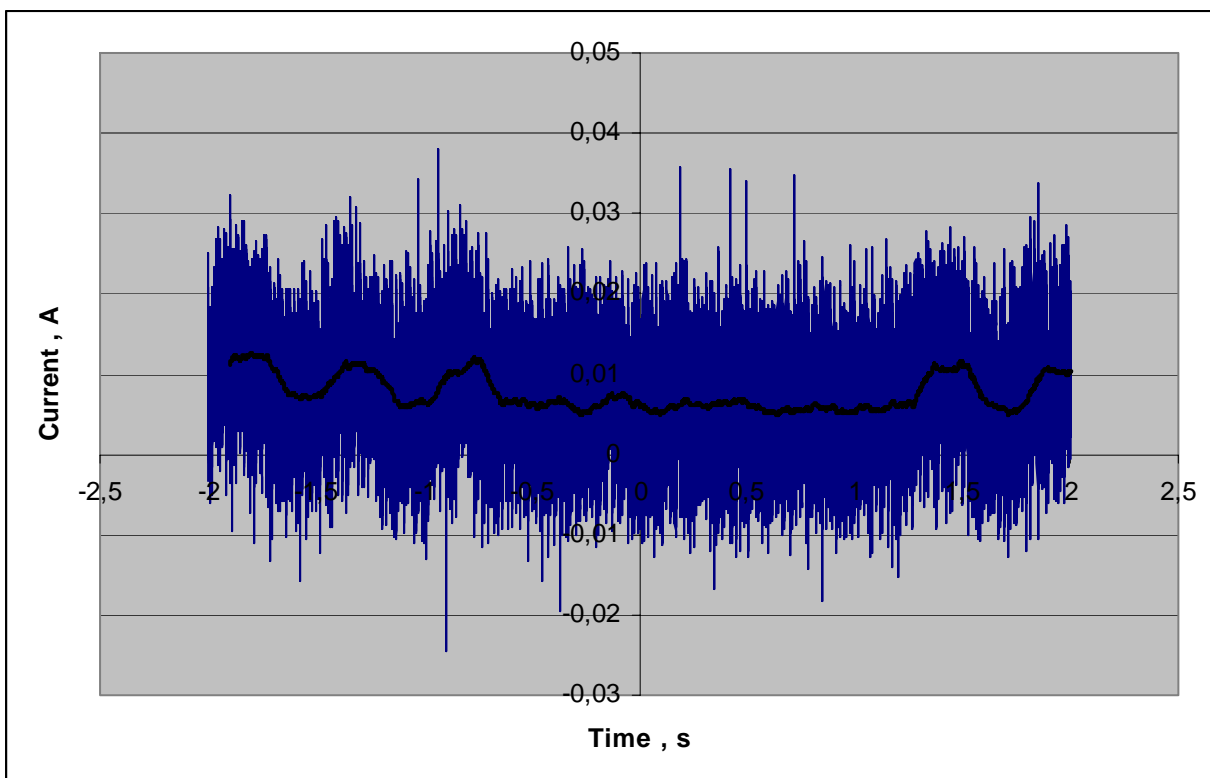


Fig 2.8 – Interval between series green flash-light

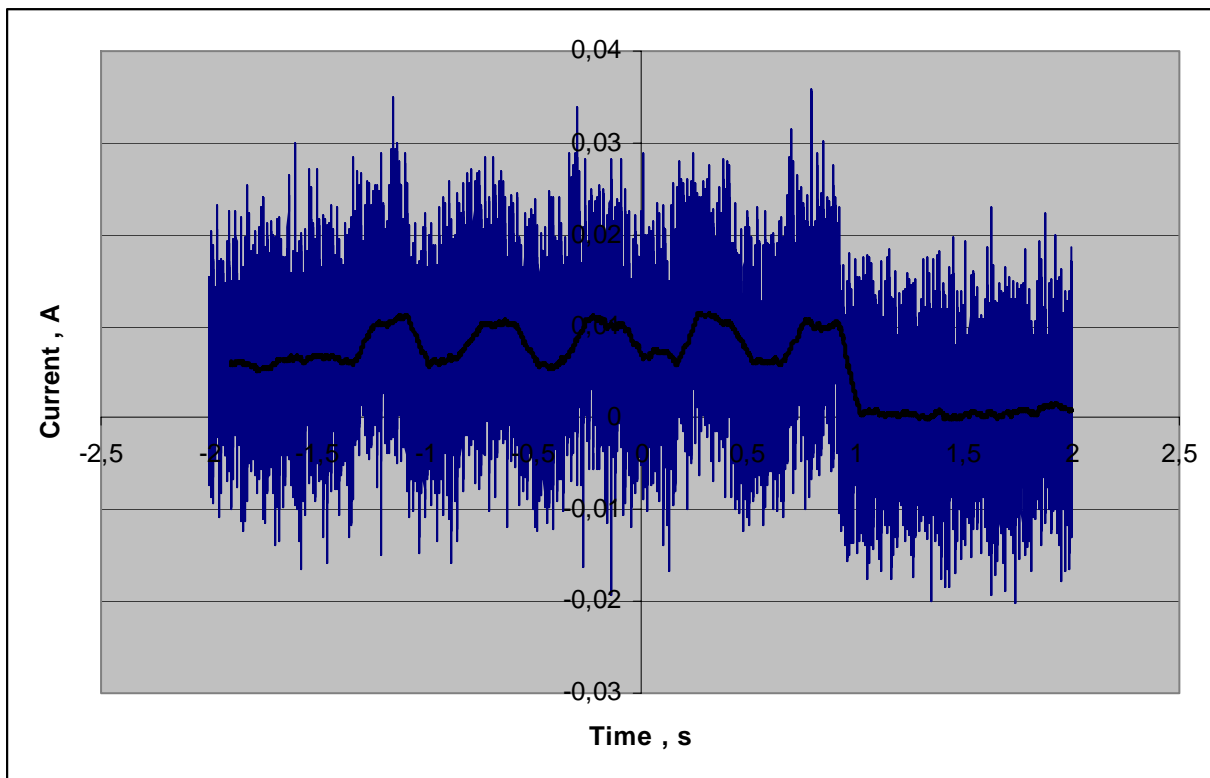


Fig 2.9 – Series green flash-light after interval between series six green flash-light

Table 2 – Consumption current for operating mode of EPIRB

Part of selftest	Average current , A	Duration, sec	Consumption (A·hour)	Consumption (A.sec)	
1-st burst					
Start first burst	0,0107	3,62	1,07594E-05	0,038734	
Serial flash	0,0085	47	0,000110972	0,3995	
First 406 ch	1,204	0,439	0,000146821	0,528556	
Step befor 406 ch	0,0171	0,34	0,000001615	0,005814	
Total		51,399	0,000270168	I _{av} ,A=	0,0189226
2-nd burst					
Start second burst	0,0235	2,71	1,76903E-05	0,063685	
Serial flash , 121 ch	0,0253	47,5108	0,000333895	1,20202324	
Second 406 ch	1,209	0,4392	0,000147498	0,5309928	
Step befor 406 ch	0,0171	0,34	0,000001615	0,005814	
Total		51	0,000500699	I _{av} ,A=	0,0353434

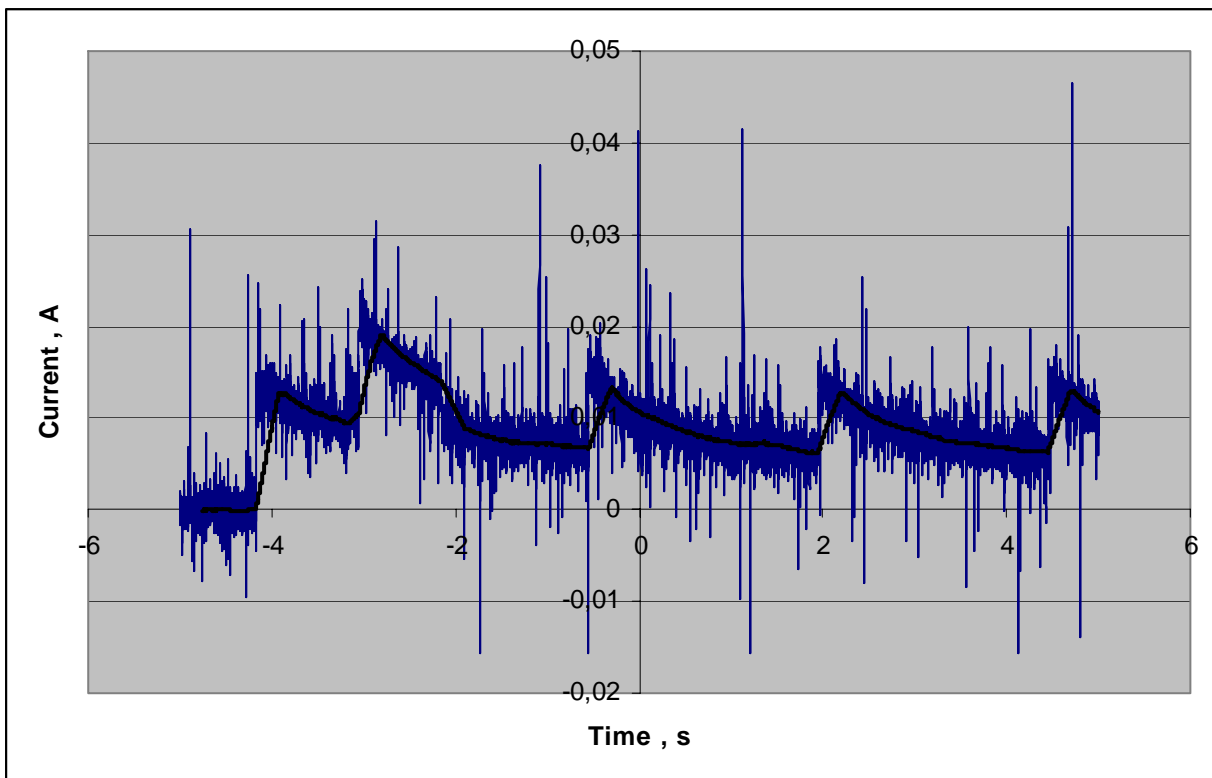


Fig 2.10 – Form of the current consumption during operation mode after EPIRB to switch on

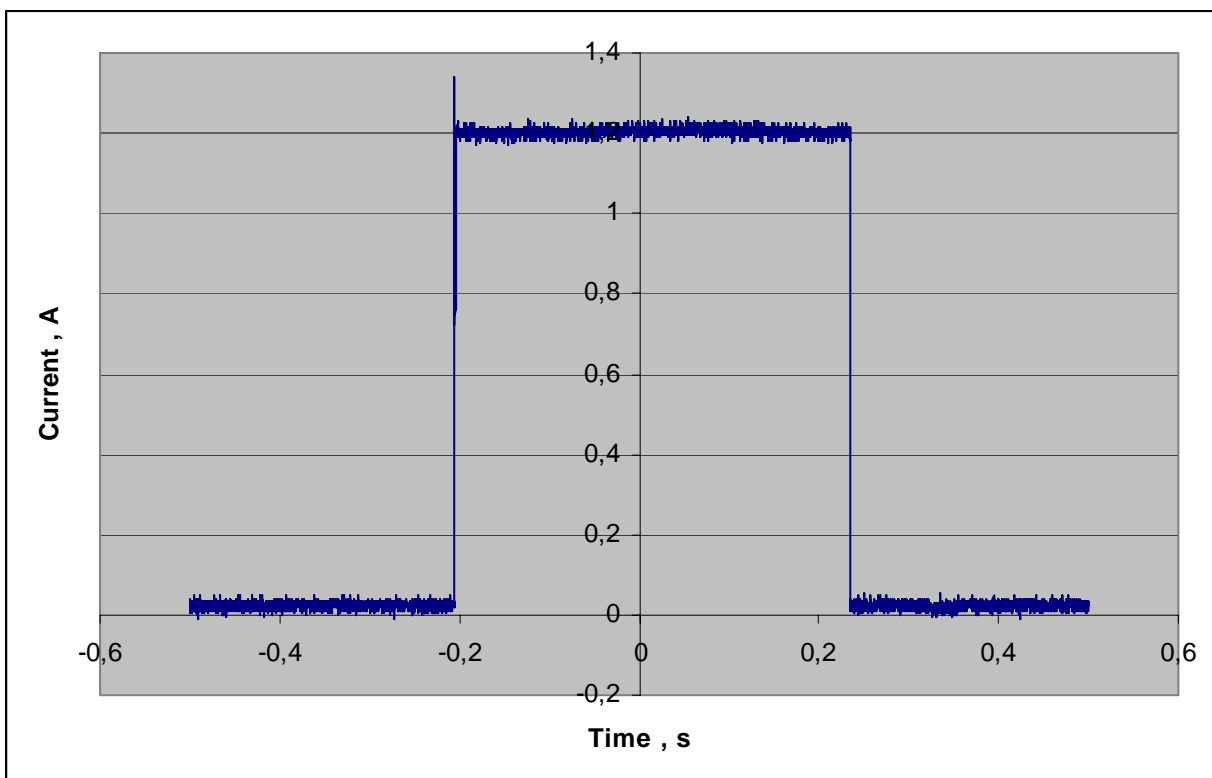


Fig 2.11 – Current consumption of frequency 406,037 MHz in fist operation burst

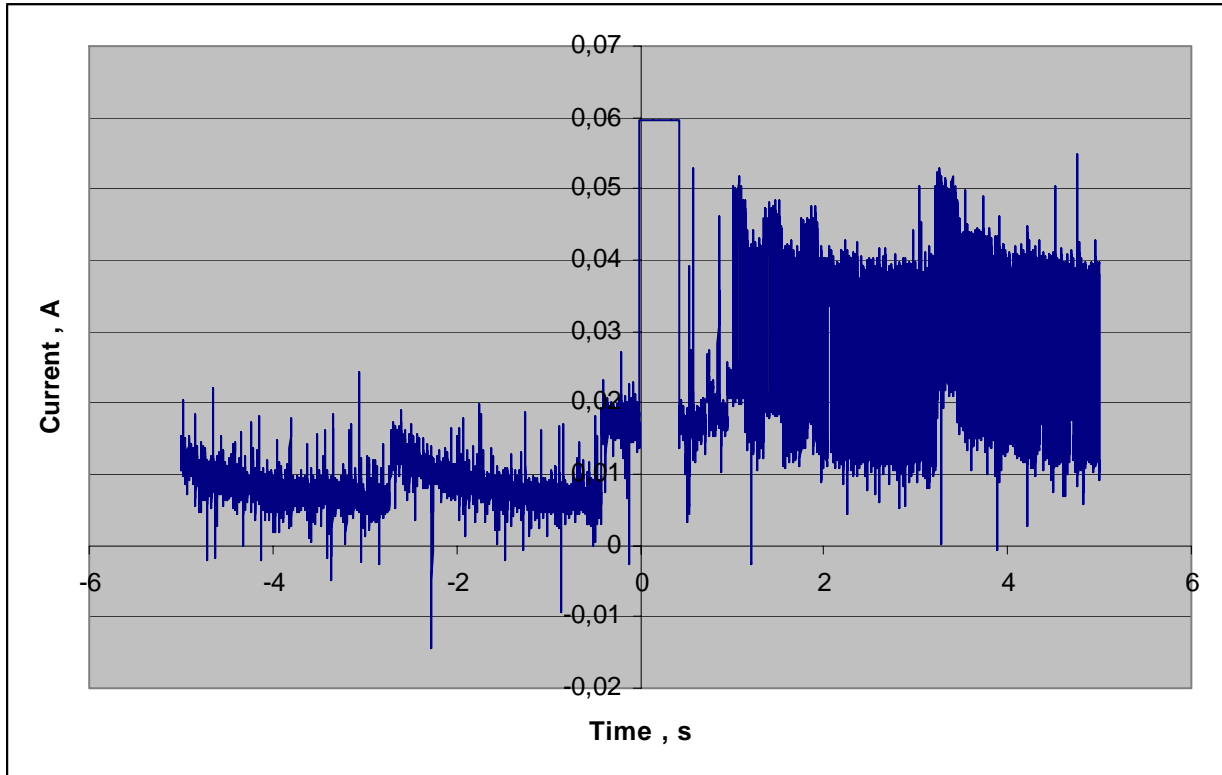


Fig 2.12 – Current consumption befor and after transmit 406 ch in fist operation burst and start second operation burst

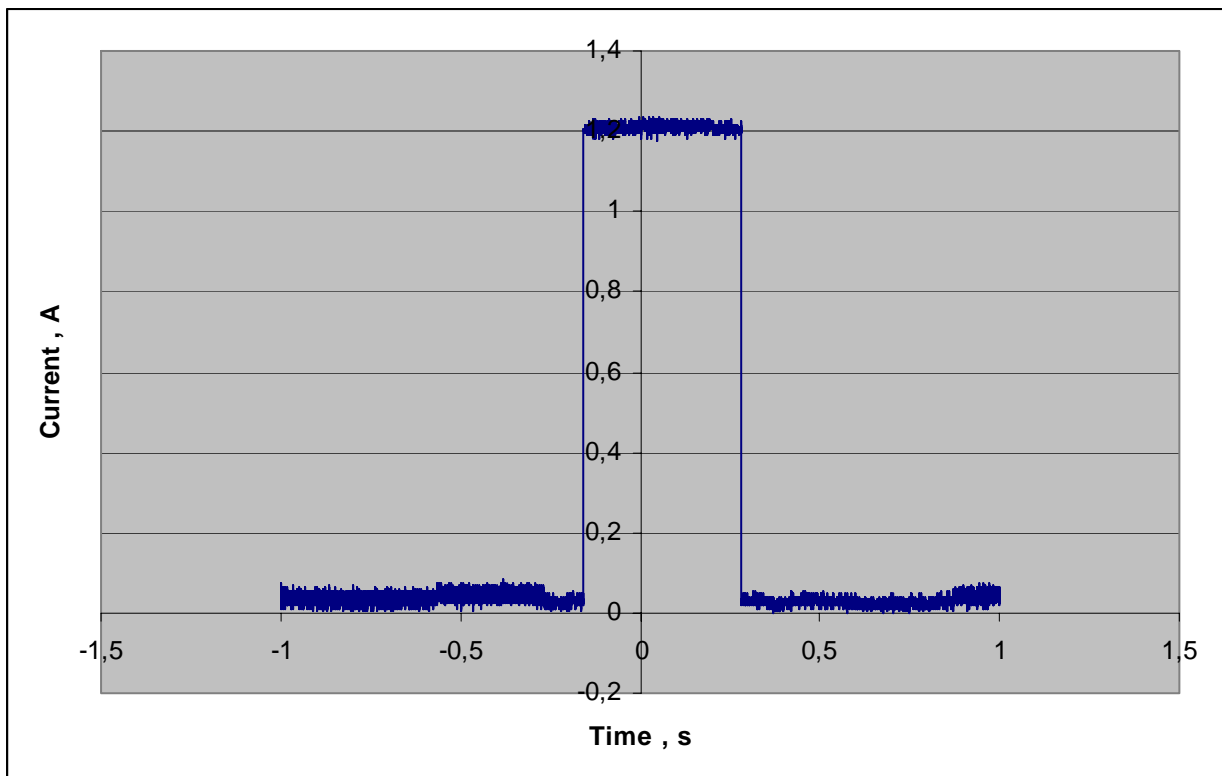


Fig 2.13 – Current consumption of frequency 406,037 MHz in second operation burst

ANNEX 3

BEACON CODING SOFTWARE

(Annex section A.2.8 of standard C/S T.007)

Model: Safesea E100 class 2
Serial number: 0001200012I
Firmware: Issue 00.00.23
EPIRB Float-free
Test Date: 26.01.2010

The procedure for checking of possibility of the radio beacon coding with a protocol is as follows:

1. Operator inputs the protocol data to programm.
2. Programm rewrites the data to the radio beacon long-term power independent memory via a data comport.
3. The radio beacon switched on and the message checked.
4. The self-test and operating message is verified.

Table of page numbers of report on testing of the coding of the declared EPIRB user's protocol types

Protocol type		Protocol No. (page No.)		
		Printout Kind		
		Registration and identification card of protocol type	Printout of decoded self-test mode message	Printout of decoded operating message
1	Maritime User Protocol with MMSI	(65)	23 (67)	22 (66)
2	Maritime User Protocol with Radio Call Sign	(68)	25 (70)	24 (69)
3	Serial User: Float-Free EPIRB with Serial Number	(71)	27 (73)	26 (72)
4	Serial User: Non Float-Free EPIRB with Serial Number	(74)	29 (76)	28 (75)
5	Radio Call Sign User Protocol	(77)	31 (79)	30 (78)

BEACON CODING SOFTWARE RESULTS

Table F-D.1: Examples of User Protocol Beacon Messages

(Examples required for each protocol requested for inclusion on the type approval certificate)

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	FFFE2F4C9418618618668A26F190	FFFED04C9418618618668A26F190
Maritime User Protocol with Radio Call Sign	FFFE2F4C9526F6F06B268C679110	FFFED04C9526F6F06B268C679110
Serial User: Float-Free EPIRB with Serial Number	FFFE2F4C96A000C6007CED45E1D0	FFFED04C96A000C6007CED45E1D0
Serial User: Non Float-Free EPIRB with Serial Number	FFFE2F4C972000C6007CE8871250	FFFED04C972000C6007CE8871250
Radio Call Sign User Protocol	FFFE2F4C9DBDBC1A55468D215510	FFFED04C9DBDBC1A55468D215510

Registration and identification card of protocol type No.1

EPIRB - Programming/Configuration Manager

File Serial Port

Connect an EPIRB, switch it on using TEST, then press 'Enable Communications' Enable Communications

EPIRB Information Refresh

TAC Number	0999	Power On Time (POT)	09:18:16
Serial Number	00099	POT Resets	000
Software Version	00.00.22	GPS Fitted	NO
BootLoader Version	001	GPS Tests Remaining	
Message Protocol	User - Maritime with MMSI	Self Test Fault	All Tests Passed

Enter Command Sentence ... Send

Response... Status...

#00: 000990999001000022091816000050004082

Upload Software Tests Controls **Configure** NVM Nav Tests

Select Message Protocol

- 40 User - Maritime with MMSI
- 41 User - Maritime with Radio Call Sign
- 42 User - EPIRB with Serial Number
- 43 User - Radio Call Sign

☒ Homer Enabled

Set EPIRB Protocol

MMSI

Serial

Callsign

Configuration Successful

Power Off

COM44

Protocol No. 22 — Operational Message Maritime User Protocol with MMSI

Decoding Beacon ID

Full message: FFFE2F4C9418618618668A26F190

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Maritime User	37-39	010
Maritime MMSI (6 digits): 999999	40-75	000011000011000011000011000011000011
Specific bcn: 0	76-81	001101
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	010001001101111000110
Calculated BCH 1:	N/A	010001001101111000110
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered or Nationally assigned	109-112	0000
15 Hex ID:	N/A	992830C30C30CD1

Protocol No. 23 — Self-Test Message Maritime User Protocol with MMSI

Decoding Beacon ID

Full message: FFFED04C9418618618668A26F190

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Maritime User	37-39	010
Maritime MMSI (6 digits): 999999	40-75	000011000011000011000011000011000011
Specific bcn: 0	76-81	001101
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	010001001101111000110
Calculated BCH 1:	N/A	010001001101111000110
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered or Nationally assigned	109-112	0000
15 Hex ID:	N/A	992830C30C30CD1

Registration and identification card of protocol type No.2

EPIRB - Programming/Configuration Manager

File Serial Port

Connect an EPIRB, switch it on using TEST, then press 'Enable Communications' Enable Communications

EPIRB Information Refresh

TAC Number	0999	Power On Time (POT)	09:18:16
Serial Number	00099	POT Resets	000
Software Version	00.00.22	GPS Fitted	NO
BootLoader Version	001	GPS Tests Remaining	
Message Protocol	User - Maritime with Radio Call Sign	Self Test Fault	All Tests Passed

Enter Command Sentence ... Send

Response... Status...

#00: 000990999001000022091816000050004182

Upload Software Tests Controls **Configure** NVM Nav Tests

Select Message Protocol

- 40 User - Maritime with MMSI
- 41 User - Maritime with Radio Call Sign**
- 42 User - EPIRB with Serial Number
- 43 User - Radio Call Sign

☒ Homer Enabled

Set EPIRB Protocol

MMSI

Serial

Callsign

Configuration Successful

Power Off

COM44

Protocol No. 24 — Operational Message Maritime User Protocol with Radio Call Sign

Decoding Beacon ID

Full message: FFFE2F4C9526F6F06B268C679110

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Maritime User	37-39	010
Radio Call Sign (6 digits): XPA02	40-75	100100110111101101111000001101011001
Specific bcn: 0	76-81	001101
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	100011001111001000100
Calculated BCH 1:	N/A	100011001111001000100
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered or Nationally assigned	109-112	0000
15 Hex ID:	N/A	992A4DEDE0D64D1

Protocol No. 25 — Self-Test Message Maritime User Protocol with Radio Call Sign

Decoding Beacon ID

Full message: FFFED04C9526F6F06B268C679110

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Maritime User	37-39	010
Radio Call Sign (6 digits): XPA02	40-75	100100110111101101111000001101011001
Specific bcn: 0	76-81	001101
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	100011001111001000100
Calculated BCH 1:	N/A	100011001111001000100
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered or Nationally assigned	109-112	0000
15 Hex ID:	N/A	992A4DEDE0D64D1

Registration and identification card of protocol type No.3

EPIRB - Programming/Configuration Manager

FileSerial Port

Connect an EPIRB, switch it on using TEST, then press 'Enable Communications'

Enable Communications

EPIRB Information

Refresh

TAC Number	0999	Power On Time (POT)	09:18:16
Serial Number	00099	POT Resets	000
Software Version	00.00.22	GPS Fitted	NO
BootLoader Version	001	GPS Tests Remaining	
Message Protocol	User - EPIRB with Serial Number	Self Test Fault	All Tests Passed

Enter Command Sentence ...

&00:

Send

Response...

#00: 000990999001000022091816000050004282

Status...

Upload SoftwareTestsControlsConfigureNVMNav Tests

Select Message Protocol

40 User - Maritime with MMSI

41 User - Maritime with Radio Call Sign

42 User - EPIRB with Serial Number

43 User - Radio Call Sign

☒ Float Free

☒ Homer Enabled

Set EPIRB Protocol

MMSI

Serial

Callsign

Configuration Successful

Power Off

COM44

Protocol No. 26 — Operational Message Serial User: Float-Free EPIRB with Serial Number

Decoding Beacon ID

Full message: FFFE2F4C96A000C6007CED45E1D0

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Float Free EPIRB with Serial Identification Number	40-42	010
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	101010001011110000111
Calculated BCH 1:	N/A	101010001011110000111
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992D40018C00F9D

Protocol No. 27 — Self-Test Message Serial User: Float-Free EPIRB with Serial Number

Decoding Beacon ID

Full message: FFFED04C96A000C6007CED45E1D0

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Float Free EPIRB with Serial Identification Number	40-42	010
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	101010001011110000111
Calculated BCH 1:	N/A	101010001011110000111
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992D40018C00F9D

Registration and identification card of protocol type No.4

EPIRB - Programming/Configuration Manager

File Serial Port

Connect an EPIRB, switch it on using TEST, then press 'Enable Communications' Enable Communications

EPIRB Information Refresh

TAC Number	0999	Power On Time (POT)	09:19:22
Serial Number	00099	POT Resets	000
Software Version	00.00.22	GPS Fitted	NO
BootLoader Version	001	GPS Tests Remaining	
Message Protocol	User - EPIRB with Serial Number	Self Test Fault	All Tests Passed

Enter Command Sentence ... Send

Response... Status...

#00: 000990999001000022091922000050004282

Upload Software Tests Controls **Configure** NVM Nav Tests

Select Message Protocol

- 33 User Location - Radio Call Sign
- 40 User - Maritime with MMSI
- 41 User - Maritime with Radio Call Sign
- 42 User - EPIRB with Serial Number**

☐ Float Free
☒ Homer Enabled

Set EPIRB Protocol

MMSI
Serial
Callsign

Configuration Successful

Power Off

COM44

Protocol No. 28 — Operational Message Serial User: Non Float-Free EPIRB with Serial Number

Decoding Beacon ID

Full message: FFFE2F4C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

Protocol No. 29 — Self-Test Message Serial User: Non Float-Free EPIRB with Serial Number

Decoding Beacon ID

Full message: FFFED04C972000C6007CE8871250

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Serial User	37-39	011
Serial Type: Non Float Free EPIRB with Serial Identification	40-42	100
Cospas-Sarsat Certificate Number in bits 74-83: Yes	43	1
Serial Number: 99	44-63	00000000000001100011
All 0s or National Use	64-73	0000000000
C/S Number or National Use (bit 43 refers): 999	74-83	1111100111
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	000100001110001001001
Calculated BCH 1:	N/A	000100001110001001001
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	992E40018C00F9D

Registration and identification card of protocol type No.5

EPIRB - Programming/Configuration Manager

File Serial Port

Press 'Connect to EPIRB' to attach a new EPIRB Connect to EPIRB

EPIRB Information Refresh

TAC Number	0999	Power On Time (POT)	09:17:14
Serial Number	00099	POT Resets	000
Software Version	00.00.22	GPS Fitted	NO
BootLoader Version	001	GPS Tests Remaining	
Message Protocol	User - Radio Call Sign	Self Test Fault	All Tests Passed

Enter Command Sentence ... Send

Response... Status...

#00: 000990999001000022091714000050004382

Upload Software Tests Controls **Configure** NVM Nav Tests

Select Message Protocol

- 40 User - Maritime with MMSI
- 41 User - Maritime with Radio Call Sign
- 42 User - EPIRB with Serial Number
- 43 User - Radio Call Sign**

☒ Homer Enabled

Set EPIRB Protocol

MMSI

Serial

Callsign

Configuration Successful

Power Off

COM44

Protocol No. 30 — Operational Message Radio Call Sign User Protocol

Decoding Beacon ID

Full message: FFFE2F4C9DBDBC1A55468D215510

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Radio Call Sign	37-39	110
Radio Call Sign Identification: XPA02	40-75	110111101101111000001101001010101010
Specific bcn: 0	76-81	001101
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	101001000010101010100
Calculated BCH 1:	N/A	101001000010101010100
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	993B7B7834AA8D1

Protocol No. 31 — Self-Test Message Radio Call Sign User Protocol

Decoding Beacon ID

Full message: FFFED04C9DBDBC1A55468D215510

ITEM	BITS	VALUE
Message format: short format	25	0
Protocol: User	26	1
Country code: 201	27-36	0011001001
User type: Radio Call Sign	37-39	110
Radio Call Sign Identification: XPA02	40-75	110111101101111000001101001010101010
Specific bcn: 0	76-81	001101
Spare	82-83	00
Aux radio device: 121.5 MHz	84-85	01
Encoded BCH 1:	86-106	101001000010101010100
Calculated BCH 1:	N/A	101001000010101010100
Emerg Code: Emergency Code Data Not Entered	107	0
Activation Type: Automatic and Manual Activation	108	1
Emergency Code: No information entered if all 0s, otherwise Nationally assigned	109-112	0000
15 Hex ID:	N/A	993B7B7834AA8D1

ANNEX 4

SATELLITE QUALITATIVE TEST

(Annex A.2.5 C/S T.007)

ANNEX 4.1

TEST CONFIGURATION FOR EPIRB, BEACON SITTING ABOVE GROUND PLANE

Satellite qualitative test

Configuration 8 Section 4.5 C/S T.007 (Issue 4 Rev.4 Oct 2009)

Equipment under Test: Radio beacon Safesea E100 class 2

Serial number: 0001200011I

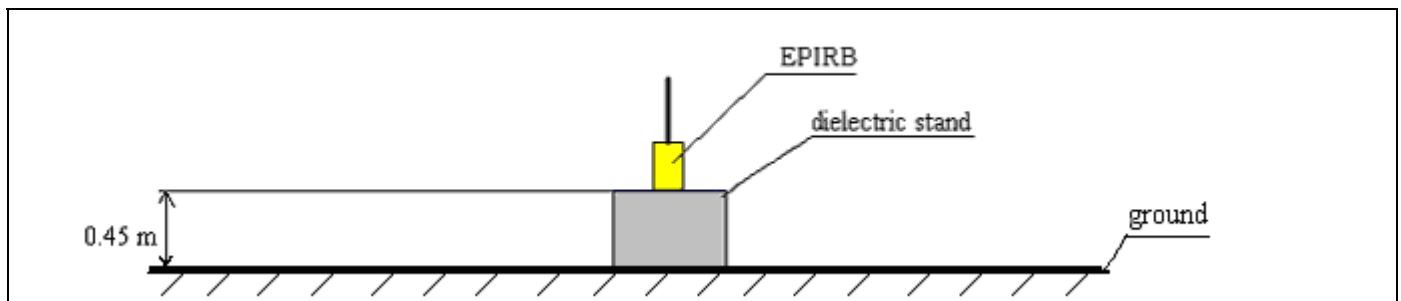
Firmware: Issue 00.00.23

EPIRB Float-free

Test Date: 11.02.2010

Test conditions:

- Ambient temperature at open testing area: 15 °C
- Relative air humidity: 65 %
- Atmosphere pressure: 759 mm/Hg.
- Satellite test EPIRB operation duration: 7 hours 05 minutes
- No homing transmitter operating.
- Radio beacon No. 0001200011I is placed on a wooden electrically insulating support so that its base is 0.45m above level dry ground. Configuration 8 Section 4.5 C/S T.007 (Issue 4 Rev.4 Oct 2009).
- BUT was placed in the vertical orientation described in the manufacturer's instructions
- BUT was placed in an area with a good all round view of the sky.
- Location of EPIRB is N44°32'8.56"; E33°26'41.80"



Radio beacon coding

The radio beacon is coded with Standard Location – Test protocol

Country code is 273 (Russia).

Message content 1 – 144 bits: FFFE2F4C9E69AC98E86E02A36B9000000000.

Radio beacon identification number (15-digit ID): 993CD35931D0DC0

Data from MMC (Moscow, Russia)

Satellite ID	Satellite Pass Number	Time of Closest Approach (TCA)	Cross Track Angle	Doppler Location	30 Hex ID Provided by LUT	Location Error (km)
S-8	08404	07:25	3	44°32.1' N 33°26.2' E	4C9E69AC98E86E 02A36B9000000000	0.66
S-11	07198	07:35	66	44°32.2' N 33°26.3' E	4C9E69AC98E86E 02A36B9000000000	0.53
S-9	09678	07:57	49	44°32.0' N 33°27.1' E	4C9E69AC98E86E 02A36B9000000000	0.59
S-12	05215	08:45	8	44°32.3' N 33°26.2' E	4C9E69AC98E86E 02A36B9000000000	0.72
S-11	07199	09:14	19	44°32.2' N 33°26.8' E	4C9E69AC98E86E 02A36B9000000000	0.17
S-9	09679	09:36	7	44°32.3' N 33°26.7' E	4C9E69AC98E86E 02A36B9000000000	0.29
S-10	04369	09:40	20	44°32.3' N 33°27.1' E	4C9E69AC98E86E 02A36B9000000000	0.61
S-12	05216	10:24	51	44°32.5' N 33°26.0' E	4C9E69AC98E86E 02A36B9000000000	1.13
S-10	04370	11:20	65	44°32.6' N 33°26.6' E	4C9E69AC98E86E 02A36B9000000000	0.86
S-12	05217	12:05	24	44°32.6' N 33°26.8' E	4C9E69AC98E86E 02A36B9000000000	0.86
S-7	01086	12:46	25	44°32.3' N 33°26.6' E	4C9E69AC98E86E 02A36B9000000000	0.32
S-10	04371	13:02	8	44°32.3' N 33°26.7' E	4C9E69AC98E86E 02A36B9000000000	0.29
S-8	08408	13:54	15	44°32.2' N 33°26.5' E	4C9E69AC98E86E 02A36B9000000000	0.28

S-7, S-8, S-9, S-10, S-11, S-12– satellites of USA
2733 - LUT of Russia (Nakhodka)

The Incident time and receiving time were Greenwich Mean Time

MCC Chief



Holodnyi V.P..
12.02.2010

Number satellite pass	Number satellite	Distance*, km
08404	S-8	0.66
05215	S-12	0.72
07199	S-11	0.17
09679	S-9	0.29
04369	S-10	0.61
04371	S-10	0.29
08408	S-8	0.28

* Distance between position of EPIRB and coordinates calculated by COSPAS-SARSAT system

$$\text{Ratio of successful solutions} = \frac{\text{number of Doppler solutions within 5 km with } 1^\circ < \text{CTA} < 21^\circ}{\text{number of satellite passes over test duration with } 1^\circ < \text{CTA} < 21^\circ} \times 100 \%$$

$$\text{Ratio of successful solutions} = \frac{7}{7} \times 100\% = 100 \%$$

ANNEX 5

PHOTOS OF EPIRB MODEL “SAFESEA E100 CLASS 2”



Fig. 5.1 — General view of EPIRB Survival (Safesea E100 class 2 No 0001200011I)

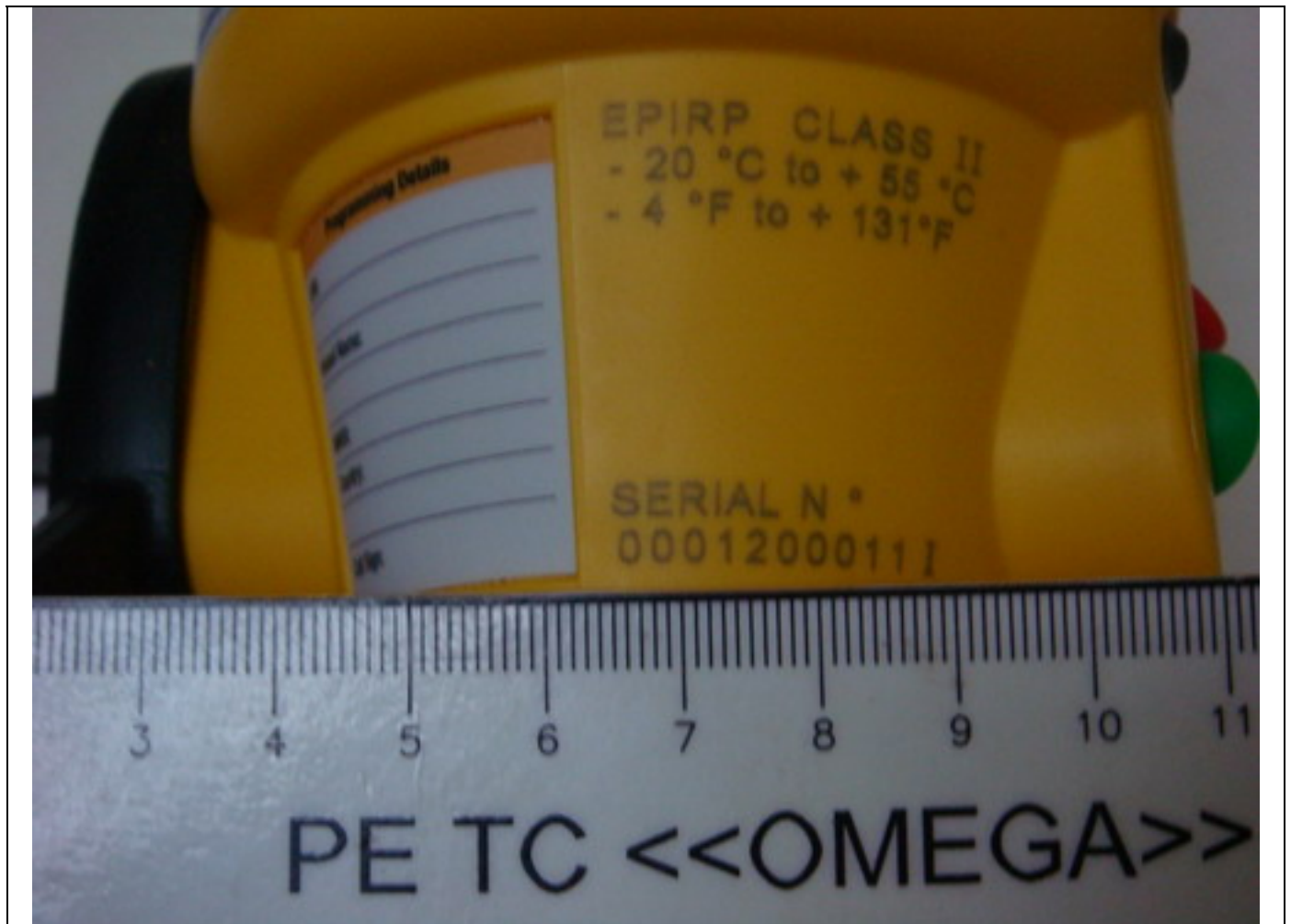


Fig. 5.2 — Photo of marking 1 (Safesea E100 class 2 No 0001200011I)



Fig. 5.3 — General view of EPIRB Survival (Safesea E100 class 2 No 0001200012I)



Fig. 5.4 — Photo of marking 2 (Safeset E100 class 2 No 00012000121)



Fig. 5.5 — Photo of marking 3 (Safesea E100 class 2 No 0001200012I)



Fig. 5.6 — Photo of marking 4 (Safesea E100 class 2 No 0001200012I)



Fig. 5.7 — Photo of marking 5 (SafeSea E100 class 2 No 0001200012I)



Fig. 5.8 — Photo of marking 6 (Safesea E100 class 2 No 0001200012I)



Fig 5.9 — General view of test site during satellite qualitative test at configuration 8 (section 4.5 standard T.007)

ANNEX 6**TEST EQUIPMENT USED AND TEST FACILITY ACCURACY****TEST EQUIPMENT USED**

No	Name of test equipment	Type, model	ser. No	Calibration due
1.	Beacon tester	BT-611	1005	11.2010
2.	Spectrum analyzer	HP8593E	3831U02306	05.2010
3.	Climatic chamber	KPK 400V	15	08.2010
4.	Ground plane	Ug	102282	n/a
5.	Stop-watch	SOSpr	2388	03.2010

TEST FACILITY ACCURACY AND OPTIONAL EQUIPMENT

No.	Parameter	Test facility accuracy
1.	Repetition Time	$\pm 0,01$ sec
2.	Total (Transmission Time)	$\pm 1,0$ ms
3.	CW Preamble	$\pm 1,0$ ms
4.	Bit Rate	$\pm 0,6$ bit/sec
5.	Nominal Frequency	± 100 Hz
6.	Frequency Stability	$< 1 \times 10^{-10}$
7.	Transmitted Power	$\pm 0,5$ dB
8.	Spurious Power Level	± 2 dB
9.	Carrier Rise Time	$\pm 0,5$ ms
10.	Modulation Rise	± 25 μ s
11.	Modulation Symmetry	$< 0,01$
12.	Phase Modulation	$\pm 0,04$ rad
13.	Voltage	0.1%
14.	Current value	2%
15.	Ambient temperature (near beacon) various	$\pm 2^{\circ}\text{C}$
16.	Antenna Measurement	± 3 dB

1.	Computer	Pentium 4	No. 102476
2.	Printer	Canon LBP 2900	L10891E
3.	Programming software	CSConfig	00.00.23
4.	Cable for EPIRB programming	-	1