CHAPTER 16

121.5 MHz AUXILLARY RADIO-LOCATING DEVICE TRANSMITTER TEST

	Name	Date	Signature
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16.1 - ELECTRICAL AND FUNCTIONAL TEST OF 121,5 MHZ AT CONSTANT TEMPERATURE

16.1.1 TEST SPECIFICATIONS AND PROGRAMME

Following
- Section A17.0 of RTCM Recommended Standards for 406 MHz Satellite EPIRBs (Version 2.1 June 20, 2002)
- Section A17.0 of TP4522(E) Performance Standards for 406 MHz Satellite EPIRBs

• Perform following measurements.
- Carrier frequency
- Modulation frequency
- Transmitter duty cycle
- Sweep repetition rate
- Modulation duty cycle
- Modulation factor

Note : These tests are performed during the COSPAS-SARSAT Type Approval tests (chapter 11)

16.1.2 EQUIPMENT UNDER TEST

Beacon Unit
Name : KANNAD
Type : SAFELINK
Number : 12

16.1.3 TEST SITE

Toulouse Space Center (CST) - INTESPACE Laboratory.

16.1.4 TEST EQUIPMENT

• Climatic chamber : CLIMATS F.C.H. – Type: Austral 137H60/1,5E - S/N: S4880.
• Argos - Cospas/Sarsat Test Bench

16.1.5. RESULTS OF HOMING TRANSMITTER TESTS

			T min. - 20° C	T amb. 22° C	T max + 55° C
1 - OPERATING LIFETIME AT MINIMUM TEMPERATURE		24H	≈ 50 h		
2 - CARRIER FREQUENCY	*	121500 kHz± 5 kHz	121.5028	121.5017	121.5008
3 - PEAK ENVELOPE OUTPUT POWER (into 50 Ohms load)	**	14 dBm + 6/- 2 dBm	15.5 dBm	16.4 dBm	16.6 dBm
4 - TRANSMITTER DUTY CYCLE		continuous	Cont.	Cont.	Cont.
5 - MODULATION FREQUENCY		300 to 1 600 Hz	490 to 1330	510 to 1330	500 to 1330
6 - MODULATION DUTY CYCLE		33 % - 55 %	41 %	40 %	40 %
7 - MODULATION FACTOR		> 0.85	. > 0.85	> 0.85	> 0.85
8 - SWEEP REPETITION RATE		2 Hz - 4 Hz	2.85 Hz	2.88 Hz	2.91 Hz
9 - HOMING TRANSMISSION CODING	*	Bits 112 = 1	1	1	1

* See data and graphs of results on chapter 13 “ Cospas-Sarsat Type Approval Tests Report ”

16.1.6. SPECTRUM MEASUREMENT RESULTS

See graphs of results on chapter 11 "Cospas-Sarsat Type Approval Tests Report" and chapter 9 "Spurious Emission Test"

16.2- HOMING RADIATED OUTPUT POWER

16.2.1 - ADMINISTRATION

16.2.1.1 WORK ORDER : E.09788

16.2.1.2 TEST TEAM : G. PEYROU

16.2.1.3 SCHEDULE : 26/06/2009

16.2.2 - PURPOSE

The radiation tests of the dedicated radio beacon are performed in INTESPACE EMC Laboratory in compliance with the test methods described in :

- Section A17.0 of RTCM Recommended Standards for 406 MHz Satellite EPIRBs (Version 2.1, 2002)

Frequency tested : 121.5 MHz.

16.2.3 - RADIO BEACON IDENTIFICATIONS

Beacon Unit
Name : KANNAD
Type : SAFELINK
Number : 9

16.2.4 - TEST SITE DESCRIPTION

Tests are performed in an anechoic chamber (size 16 m x 10 m x 11 m) .
Walls, ceiling and doors are lined with EMERSON CUMING foams VHP 36 and VHP 26 type.
The EPIRB is placed as shown on figures n° 1and n° 2 next pages .

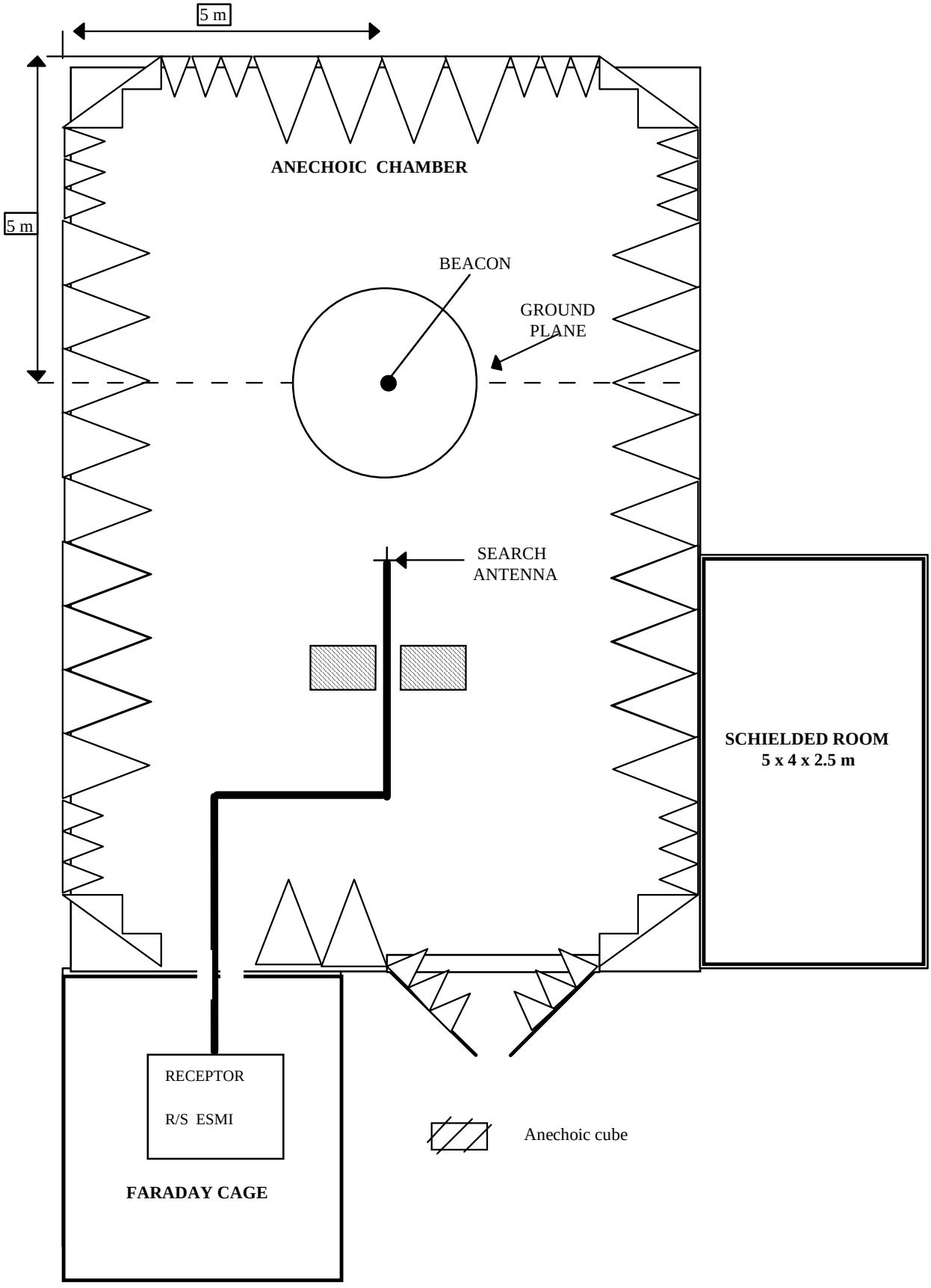

5 m
5 m
ANECHOIC CHAMBER
BEACON
GROUND
PLANE
SEARCH
ANTENNA
SCHIELDED ROOM
5 x 4 x 2.5 m
RECEPTOR
R/S ESMI
FARADAY CAGE
Anechoic cube

FIGURE 1

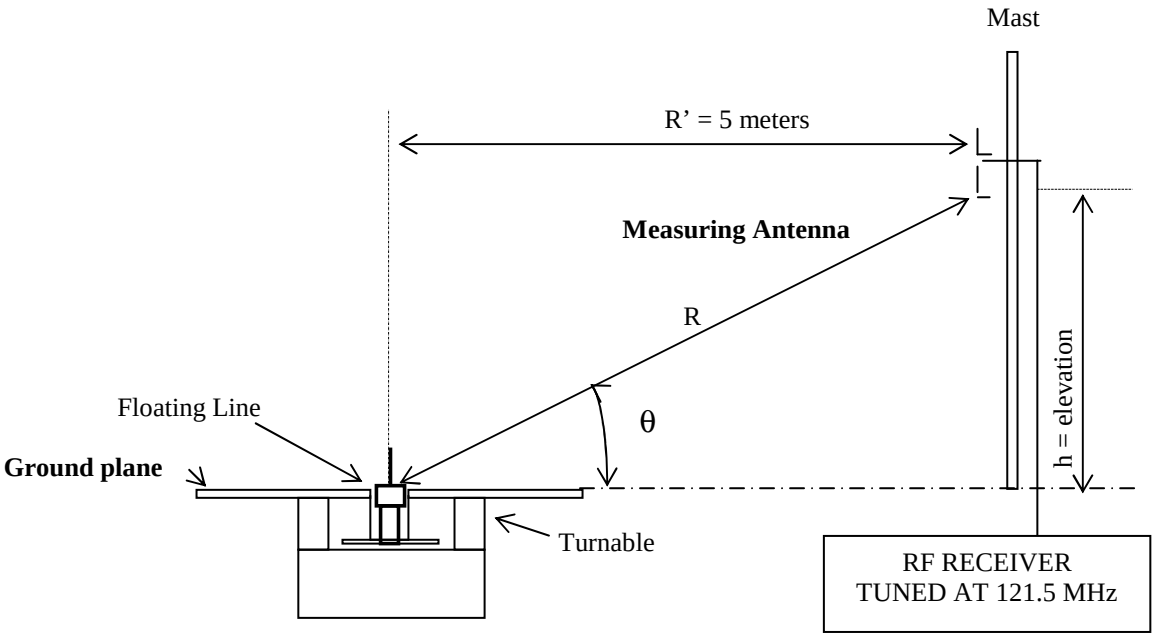


FIGURE 2 : Equipement Test Set Up For BEACON Antenna Test
(For BEACON designed for normal operation in water, ex: EPIRB)

16.2.5 - TEST METHOD

1/ The elevation angle between 5° and 20° which produces a maximum gain is determined with the EUT at an arbitrary azimuth .

2/ The PEP is measured and the elevation angle is noted (between 5° to 20°) and is remain fixed for the remainder of the test .

3/ The remaining 12 measurements of PEIRP is obtained by rotating the EUT in increments of 30° ± 3°. For each measurements the EUT PEIRP is computed using the following equation :

$$PEIRP = LOG^{-1}[(P_{REC} - G_{REC} + L_C + L_P)/10] \qquad \text{(Equation A)}$$

Where :

P_{rec} = Measured Power level from spectrum analyzer (dBm)
G_{rec} = Antenna gain of search antenna (dB)
L_c = Receive system attenuator and cable loss (dB)
L_p = Free space propagation loss (dB)

4/ The median value of PEIRP is compared to the specified PEIRP to be in the range 25 mW to 100 mW (14 dBm to 20 dBm)

16.2.6 - TEST MEASUREMENT EQUIPMENTS

Linear Antenna (Dipole) :

Manufacturer :	EMCO 3121C-DB3
PN / SN :	1430
Antenna Factor :	10,6
Calibration validity :	02/2010

Antenna measurements :

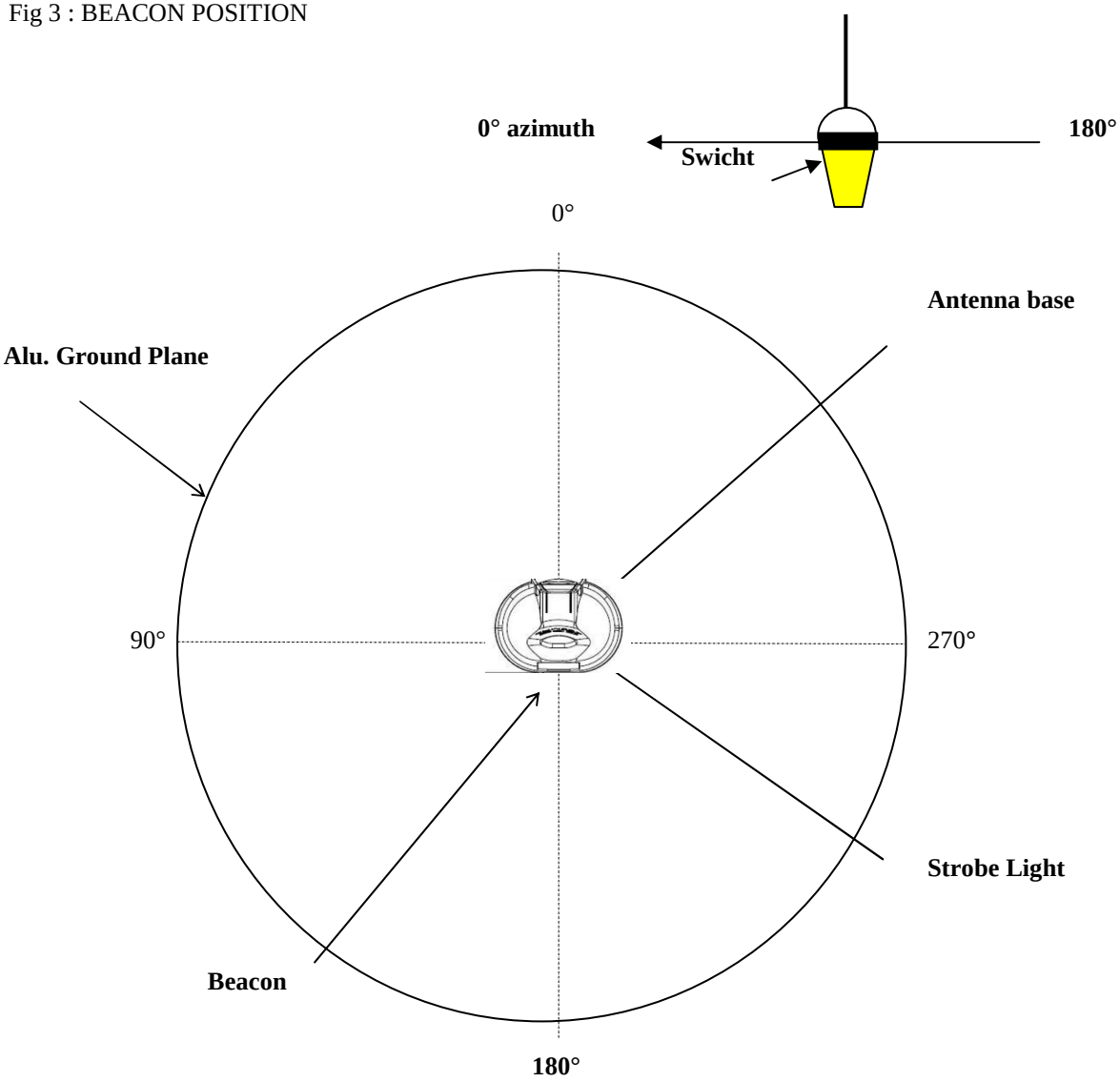
Manufacturer :	HP
Reference :	8566B
Serial number :	2449A01077
Calibration validity :	april-2010

Measurement cable type :	2 x 10 m cable SUCOFLEX type N
Measurement cable loss :	1.7dB (121.5MHz)

16.2.7 - EPIRB MECHANICAL SET UP

A conductive aluminum paper is used to assure a good conductivity between beacon float level and the ground plane.
Antenna is the centre of rotation of azimuth angle.
0°azimuth turn table direction is identified with the Beacon swicht

Fig 3 : BEACON POSITION



18.2.8 MEASUREMENT RESULTS

Following the Equation (A), 12 value of EUT PEIRP are computed at 14 ° of elevation angle

Azimut Angle	PEIRP (dBm)
0	14.24
30	14.04
60	13.04
90	14.14
120	14.14
150	13.94
180	14.14
210	14.04
240	14.04
270	14.14
300	13.94
330	14.04
Mean value	14.00

The PEIRP measured and computed are in conformance with specification required :

14 dBm ≤ PEIRP ≤ 20 dBm
and
PEIRP Azimuth Variation < 3 dB