

## CHAPTER 11

<p><b>AUXILIARY RADIO-LOCATING DEVICE TRANSMITTER TEST</b></p>
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**11.1 - ELECTRICAL AND FUNCTIONAL TEST OF 121,5 MHZ  
AT THREE CONSTANT TEMPERATURE**

### 11.1.1 TEST SPECIFICATIONS AND PROGRAMME

Following section A5.0 of RTCM Recommended Standards for 406 MHz Satellite PLBs (Version 1.1 Feb 4, 2003) :

- 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 10)

### 11.1.2 EQUIPMENT UNDER TEST

Beacon Unit : 1/3  
Name : ACR / TeraFix<sup>TM</sup> 406GPS I/O PLB  
Type : PLB200  
Number : 07

### 11.1.3 TEST SITE

INTESPACE Laboratory.

### 11.1.4 TEST EQUIPMENT

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

**11.1.5. RESULTS OF HOMING TRANSMITTER TESTS**

Beacon Unit : 1/3  
 Name : ACR / TeraFix™ 406GPS I/O PLB  
 Type : PLB200  
 Number : 07

		T min. - 20° C	T amb. 22° C	T max + 55° C
1 - OPERATING LIFETIME AT MINIMUM TEMPERATURE	24H	≈ 35 h		
2 - CARRIER FREQUENCY *	121500 kHz ± 5 kHz	121.49628	121.50165	121.50062
3 - PEAK ENVELOPE OUTPUT POWER ** ( into 50 Ohms load )	14 dBm + 6/- 2 dBm	19.3 dBm	19.6 dBm	19.7 dBm
4 - TRANSMITTER DUTY CYCLE	continuous	Cont.	Cont.	Cont.
5 - MODULATION FREQUENCY	300 to 1 600 Hz	360 to 1460	360 to 1460	360 to 1460
6 - MODULATION DUTY CYCLE	33 % - 55 %	38 %	42 %	39 %
7 - MODULATION FACTOR	> 0.85	> 0.85	> 0.85	> 0.85
8 - SWEEP REPETITION RATE	2 Hz - 4 Hz	2.6 Hz	2.6 Hz	2.6 Hz
9 - HOMING TRANSMISSION CODING *	Bits 112 = 1	1	1	1

\* See data and graphs of results on chapter 9 "Cospas-Sarsat Type Approval Tests Report "

**11.1.6. SPECTRUM MEASUREMENT RESULTS**

See graphs of results on chapter 9 "Cospas-Sarsat Type Approval Tests Report" and chapter 7 "Spurious Emission Test"

**11.2- HOMING RADIATED OUTPUT POWER ON UUT 2/3**

### 11.2.1 - ADMINISTRATION

11.2.1.1	WORK ORDER :	Reference: E5503-RTCM
11.2.1.2	TEST TEAM :	Joseph COMMENGES
11.2.1.3	SCHEDULE :	23 to 25 june 2004

### 11.2.2 - PURPOSE

The radiation tests of the dedicated radio beacon are performed in INTESPACE EMC Laboratory in compliance with the test methods described in Section A12.3 of RTCM Recommended Standards for 406 MHz Satellite PLBs (Version 1.1 Feb 4, 2003)

Frequency tested : 121.5 MHz.

### 11.2.3 - RADIO BEACON IDENTIFICATIONS

- Manufacturer : ACR
- Model N° : PLB200 / TeraFixTM 406GPS I/O PLB
- Serial N° : 11
- Antenna : ACR A3-06-2328 quater wave

### 11.2.4 - 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 PLB is placed as shown on figures n° 1 and n° 2 next pages .

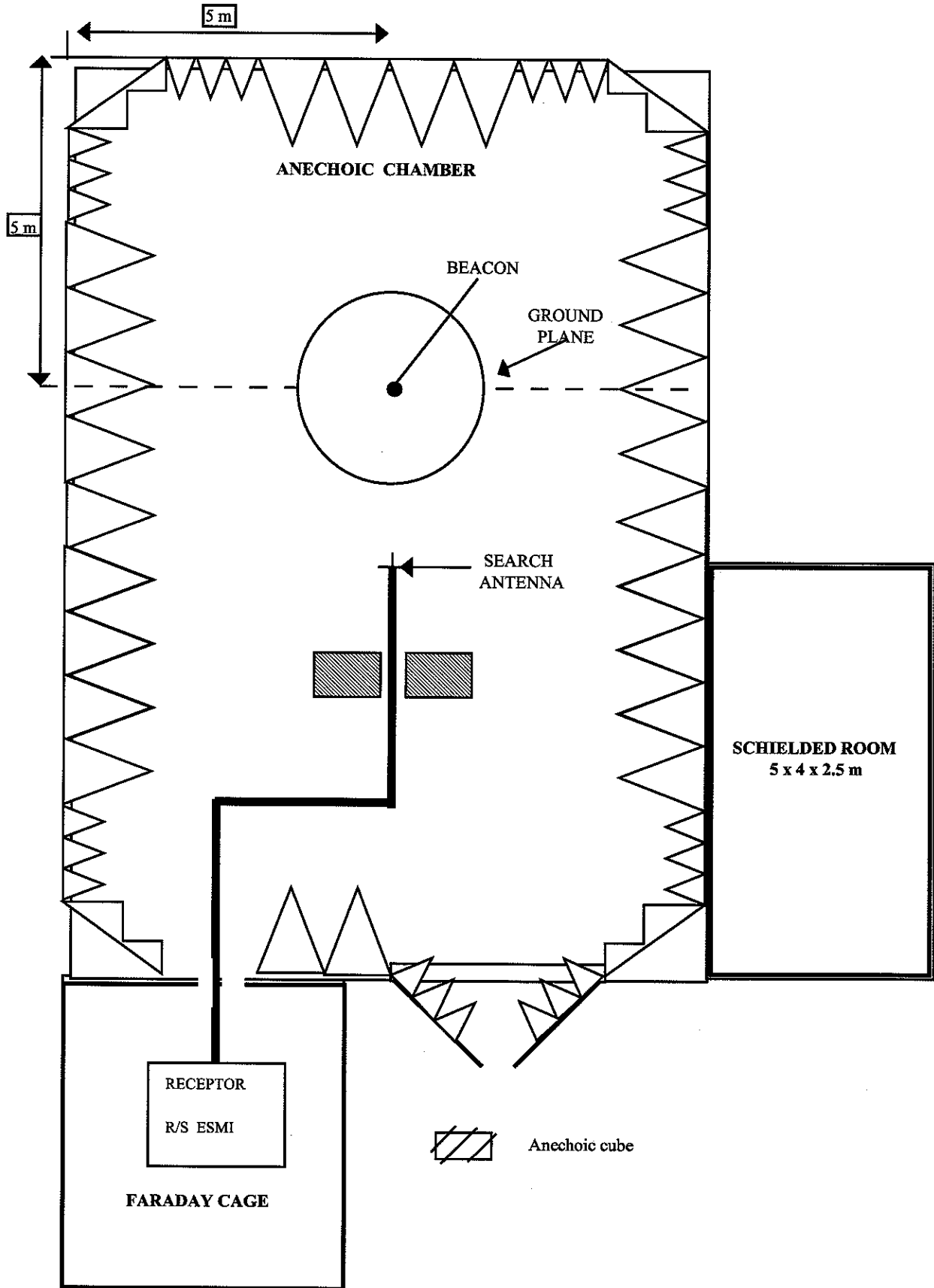


FIGURE 1

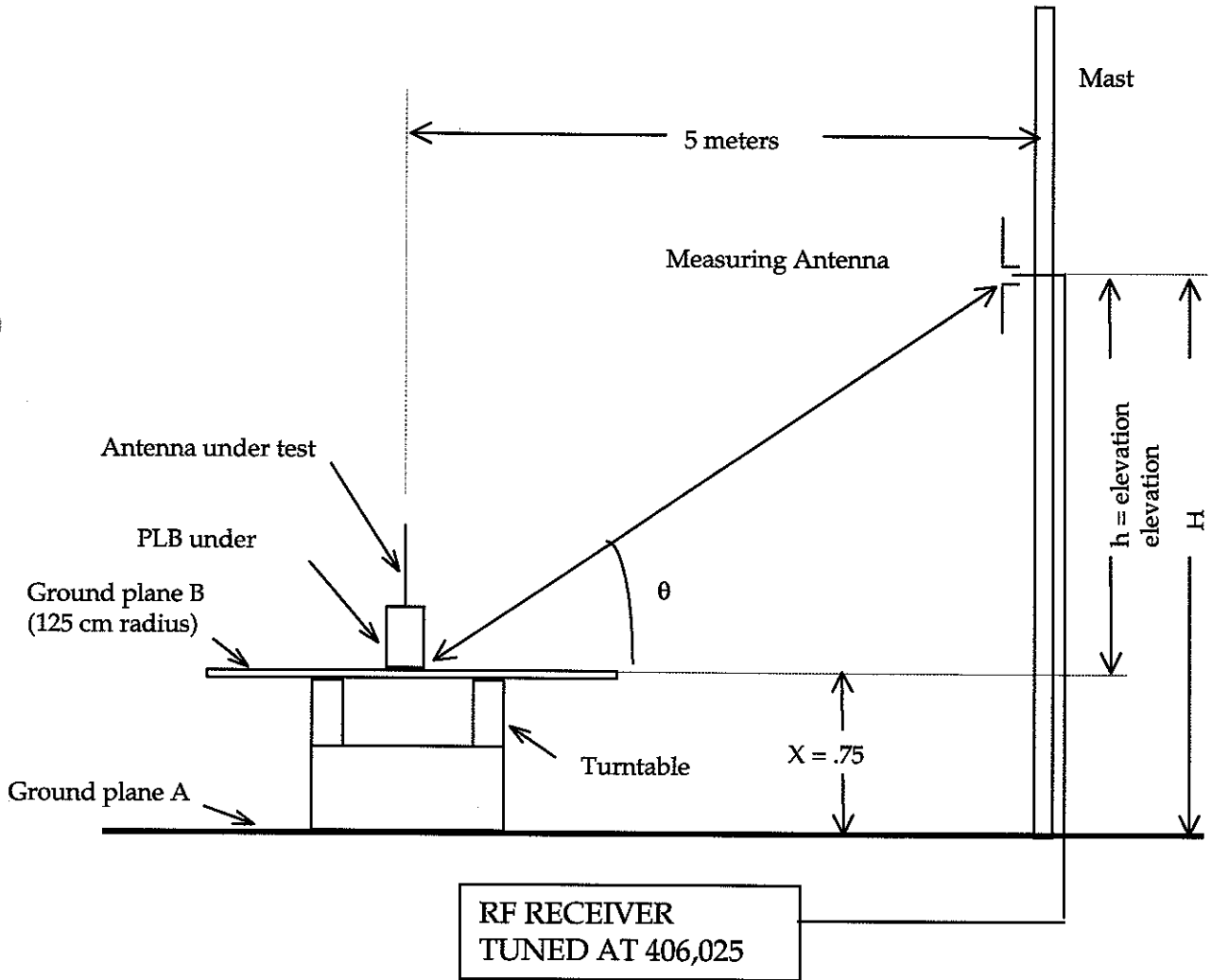


FIGURE B2a : Equipement Test Set-Up For BEACON Antenna Test .



### 11.2.5 - TEST METHOD

According Section A12.3 of RTCM Recommended Standards for 406 MHz Satellite PLBs (Version 1.1 Feb 4, 2003) :

- 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 :

$$PEIRP = LOG^{-1} [(P_{REC} - G_{REC} + L_c + L_p)/10] \quad (\text{Equation A})$$

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)

### 11.2.6 - TEST MEASUREMENT EQUIPMENTS

Search Antenna

- 121.5 MHz test : EMCO 3121C DB2 S/N 9904 1430

#### **SPECTRUM ANALYSER**

- R/S ESMI

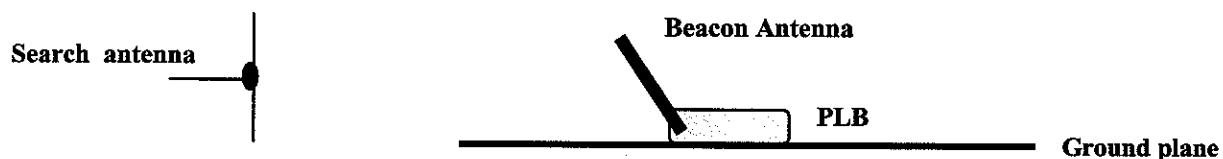
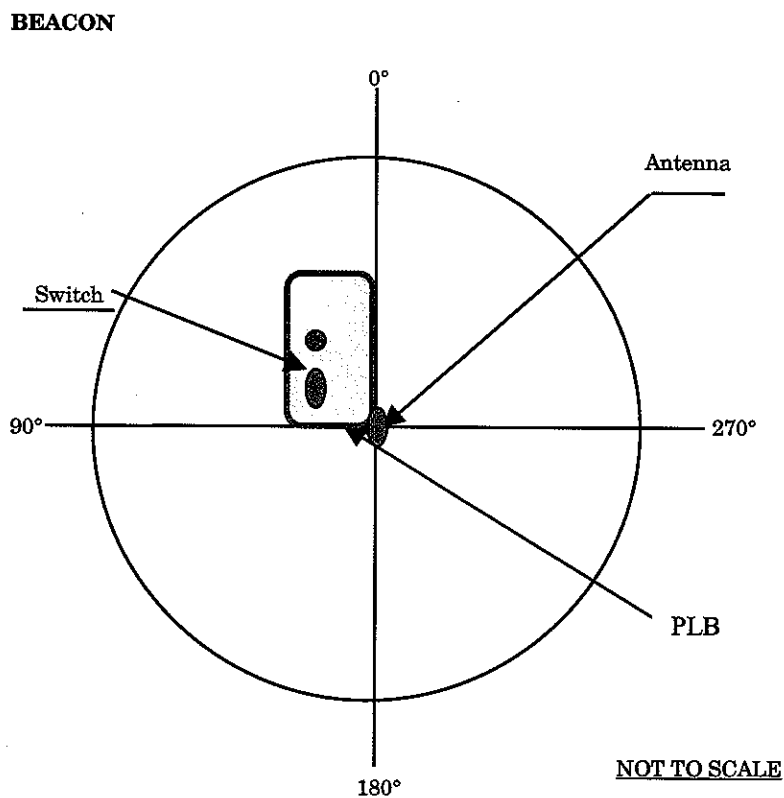
#### **CABLES**

- 20 m cable SUCOFLEX type 100 - cable loss at 121.5 MHz : 1.9 dB

### 11.2.7 - PLB MECHANICAL SET UP

PLB 0° axisq identified by the antenna position (see figure ) is the rotation center of azimuth angle.

A conductive aluminium paper is used to assure a good conductivits between beacon float level and the ground plane.



### 11.2.8- TESTS RESULTS

Following the Equation (A), 12 value of EUT PERP are computed at 20 ° (maximum level) of elevation angle

Azimut Angle	PEIRP (dBm)
0	17.63
30	17.73
60	17.63
90	17.73
120	17.83
150	17.83
180	17.73
210	17.83
240	17.73
270	17.63
300	17.73
330	17.83
<b>PEIRP variation</b>	<b>0.3</b>
<b>Mean value</b>	<b>17.74 dBm</b>

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

**14 dBm ≤ PERP ≤ 20 dBm**  
**and**  
**PEIRP Azimuth Variation < 6 dB**

