

Toulouse, 18 July 2001

O/Réf. M3223-RTCM

RTCM TEST REPORT OF 406 MHz EPIRB

MANUFACTURER : ACR Electronics Inc.
BEACON MODEL : RLB35

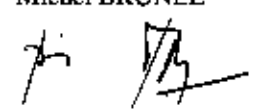
Written: 18 July 2001
By: Gérard PEYROU

Visa: 

Approved: 23 July 2001
By: Alain SERDANE

Visa: 

Quality Control: 24 July 2001
By: Michel BRUNEL

Visa: 

Distribution :

- Mr Cal HAVENS
- ITS/AP/ET

ACR Electronics, Inc.
INTESPACE.

(2 copies)
(1 copy)

This document may not be reproduced other than in full .
It includes 312 pages. A part of reproduction
must be submitted at the laboratory authorization .

*The COFRAC Test section accreditation proves the technical ability of
the laboratory for tests or analysis under the authority of the accreditation*



Accréditation
N° 1-0743
Scope
given
on request

TABLE OF CONTENTS

CHAPTER	RTCM ITEMS	TITLE	Nb of pages
0			2
1		: ADMINISTRATION , GENERAL COMMENTS AND SUMMARY OF TESTS	16
2	A 1.0	: INITIAL ALIVNESS TEST	7
3	A 3.0	: DRY HEAT TEST	3
4	A 4.0	: DAMP HEAT TEST	8
5	A 5.0	: VIBRATION TEST	32
6	A 6.0	: BUMP TEST	24
7	A 7.0	: SALT FOG TEST	10
8	A 8.0	: DROP TESTS	20
9	A 9.0	: LEAKAGE AND IMMERSION TESTS	7
10	A 10.0	: SPURIOUS EMISSION TEST	8
11	A 11.0	: THERMAL SHOCK TESTS	14
12	A 12.0	: COSPAS-SARSAT C/S T.007 TESTS	99 (rec/ver)
13	A 13.0	: OPERATIONAL LIFE, STROBE LIGHT AND SELF TESTS	8
14	A 14.0	: AUTOMATIC RELEASE MECHANISM & AUTOMATIC ACTIVATION TESTS	11
15	A 15.0	: STABILITY & BUOYANCY TEST	5
16	A 16.0	: INADVERTENT ACTIVATION TEST	5
17	A 17.0	: AUXILLARY RADIO-LOCATING DEVICE TRANSMITTER TEST	14
18	A 18.0	: HUMIDITY TEST	8
19	A 19.0	: ORIENTATION TEST	11
Total			312

CHAPTER 1

A1.0- ADMINISTRATION, GENERAL COMMENTS AND SUMMARY OF TESTS
--

1.1 GENERAL COMMENTS

This document reports the procedures and results of certification tests on 406-MHz SARTSAT beacons. The tests were conducted for the United States Coast Guard (USCG) by INTESPACE (ITS) under a Center National d'Etudes Spatiales (C.N.E.S., the French Space Agency) contract.

1.2 ADMINISTRATION

1.2.1 WORK ORDER

Manufacturer : ACR Electronics, Inc.

Address : 5757 Ravenswood Road – FORT LAUDERDALE, FL 33312-6645 USA

Represented by : Mr Cal HAVENS

1.2.2 INTESPACE TEST CENTER

The test operations have been conducted by : Mr Gérard PEYROU

1.2.3 SCHEDULE

Start of test : 17 April 2001

End of test : 22 June 2001

1.2.4 WORK REFERENCE : **M3223-RTCM**

1.2.5 EQUIPEMENT UNDER TEST

The results from this test report concern only the equipment here after referenced :

Equipement Under Test (EUT)	Model	Beacon serial number	Float free system auto-release mechanism	Comments
1	RLB35	07		- Antenna disconnected - 50 Ω RF Output Connector
2	RLB35	01	ACR Model : Universal Sea Shelter Id 18560	

1.3 TEST FACILITIES

- ARGOS – COSPAS/SARSAT Certification Test Bench
- INTESPACE Environmental Test Equipements
- Toulouse CNES MCC

1.4 STANDARDS AND TEST PROCEDURES APPLICABLES

- COSPAS-SARSAT standards :
 - "C/S T. 001- Issue 3 - Revision 3 - October 1999 "
 - "C/S T. 007- Issue 3 - Revision 7 - October 2000"
- RTCM Recommended Standards for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRBs) - Version 2.0 - February 5, 1997
- INTESPACE Radiobeacon Test Procedures

1.5 TEST SEQUENCE

1.5.1 SERIES OF TESTS RUN IN ORDER * : (RTCM item)

1 - Initial Aliveness Test	(A 1.0)
2 - Dry Heat Test	(A 3.0)
3 - Damp Heat Test	(A 4.0)
4 - Vibration Test	(A 5.0)
5 - Bump Test	(A 6.0)
6 - Salt Fog Test	(A 7.0)
7 - Drop Tests	(A 8.0)
8 - Leakage and Immersion Tests	(A 9.0)
9 - Spurious Emission Test	(A 10.0)
10 - Thermal Shock Tests	(A 11.0)
11 - Cospas-Sarsat C/S T.007 Tests	(A 12.0)
12 - Operational Life, Strobe Light and Self Tests	(A 13.0)

* Except for the Salt Fog Test . It was done before item 4-Vibration Test

1.5.2 SERIES OF TESTS TO BE RUN ANY TIME DURING THE SEQUENCE :

- Automatic Release Mechanism & Automatic Activation Tests (A 14.0)
- Stability & Buoyancy Test (A 15.0)
- Inadvertent Activation Test (A 16.0)
- Auxillary Radio-Locating Device Transmitter Test (A 17.0)
- Humidity Test (A 18.0)
- Orientation Test (A 19.0)

The two electronic beacon are identical :

- EUT 1 : RLB35 S/N 07 was used for environmental and electrical tests RTCM items A 2.0 to A 13.0, A16, A 17 (partial), A 18, A19
- EUT 2 : TRON 40GPS n° 7000 was used for tests RTCM items A 12.0 (partial), A14.0, A15 and A 17 (partial) .

1.6 RESULTS

See following pages Summary of Test results and following chapters Test Result Reports (data and graphs)

General remark :

Regarding the issue of the measurement results performed on the certification test bench, due to the numbering of the computer data sheets, the beacon serial number alters from one curve to the other although the same beacon is concerned.

SUMMARY OF TESTS

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (-20°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) ($+70$ to $+55^{\circ}\text{C}$)	
1. INITIAL ALIVENESS TEST (A1.0) * Carrier Frequency * Power Output * Data Message	406.025 $\pm$ 0.002 35 - 39 must be correct	MHz dBm ✓		406.024511 37.2 ✓		Chapter 2 18 April 2001 (C/S Elec. & Funct. Test at amb Temp. Chapter 12)
2. DRY HEAT CYCLE (A3.0) * Aliveness Test (during 2 hour period) * Carrier Frequency * Power Output * Data Message * Aliveness Test (at end of 2 hour period) * Carrier Frequency * Power Output * Data Message	406.025 $\pm$ 0.002 35 - 39 must be correct 406.025 $\pm$ 0.002 35 - 39 must be correct	MHz dBm ✓ MHz dBm ✓			406.024502 37.6 ✓ 406.024503 37.6 ✓	Chapter 3 18 & 19 April 2001 (C/S Elec. & Funct. Test at $+55^{\circ}\text{C}$ Chapter 12)

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (__ °C)	T amb. (± 3 °C) (22°C)	T max. (± 3 °C) (+40 °C)	
3. DAMP HEAT CYCLE (A4.0) • Aliveness Test (during 2 hour period) • Carrier Frequency • Power Output • Data Message • Aliveness Test (end of 2 hour period) • Carrier Frequency • Power Output • Data Message	406.025 ± 0.002 35 - 39 must be correct	MHz dBm √			406.024504 37.5 √	Chapter 4 19&20 April 2001
		MHz dBm √			406.024506 37.5 √	
	No damage	√		√		Chapter 5 30&31 may, 2001
		MHz dBm √		406.024458 37.5 √		
4. VIBRATION TEST (A5.0) • Exterior Mechanical Inspection • Aliveness Test • Carrier Frequency • Power Output • Data Message						

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (_____ °C)	T amb. (± 3 °C) (22°)	T max. (± 3 °C) (_____ °C)	
5. BUMP TEST (A6.0) • Exterior Mechanical Inspection • Aliveness Test • Carrier Frequency • Power Output • Data Message	No damage	✓		✓		Chapter 6 1 June, 2001
	406.025 ± 0.002 35 - 39 must be correct	MHz dBm ✓		406.024460 37.4 ✓		
6. SALT FOG TEST (A7.0) • Exterior Mechanical Inspection • Aliveness Test • Carrier Frequency • Power Output • Data Message	No damage	✓		✓		Chapter 7 27 April to 4 May , 2001
	406.025 ± 0.002 35 - 39 must be correct	MHz dBm ✓		406.024474 37.4 ✓		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (- 40 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (_____ °C)	
7-A. DROP TEST (A8.1) On Hard Surface • Exterior Mechanical Inspection • Aliveness Test • Carrier Frequency • Power Output • Data Message	No damage	√	√			Chapter 8 5 june 2001
	406.025 ± 0.002 35 - 39 must be correct	MHz dBm √	406.024460 37.5 √			
7-B. DROP TEST (A8.2) Into Water • Exterior Mechanical Inspection • Aliveness Test • Carrier Frequency • Power Output • Data Message	No damage	√		√		6 june 2001
	406.025 ± 0.002 35 - 39 must be correct	MHz dBm √		406.024461 37.7 √		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (±3 °C) (- 40 °C)	T amb. (±3 °C) (22 °C)	T max. (±3 °C) (55 °C)	
8. LEAKAGE AND IMMERSION TEST (A9.0) • Aliveness Test • Carrier Frequency • Power Output • Data Message • Interior Inspection	406.025 ± 0.002 35 - 39 must be correct No water	MHz dBm √ √		406.024458 37.3 √ √		Chapter 9 8-12 june 2001
9. SPURIOUS EMISSIONS TEST (A10.0) • 406 MHz • 121.5 MHz	Figure 2-1 Figure 2-6	√ (attach graphs) √ (attach graphs)	√	√	√	Chapter 10 and Chapter 12 (C/S T.A. Tests Results) April 18 th , to April 27 th , 2001
			√	√	√	

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) ($\text{ }^{\circ}\text{C}$)	T amb. ($\pm 3^{\circ}\text{C}$) ($\text{ }^{\circ}\text{C}$)	T max. ($\pm 3^{\circ}\text{C}$) ($\text{ }^{\circ}\text{C}$)	
10. THERMAL SHOCK TEST (A11.0) • Self-activation in water • Aliveness Test : • Carrier Frequency • Power Output • Data Message • Frequency Stability • Short term stability • Medium term stability : • mean slope • residual frequency variation	≤ 5 406.025 ± 0.002 $35 - 39$ must be correct ≤ 0.002 ≤ 0.001 ≤ 0.003	minutes MHz dBm $\checkmark$ parts/ million in 100 ms parts/ million /minute parts/ million	LOW TEMPERATURE $-31^{\circ} \rightarrow 0.1^{\circ}\text{C}$ < 0.2 406.024495 36.7 $\checkmark$ ≤ 0.0002		HIGH TEMPERATURE $+70^{\circ} \rightarrow +31^{\circ}\text{C}$ < 0.2 406.024472 37.5 $\checkmark$ ≤ 0.0002	Chapter 11 12-14 june 2001
11. COSPAR-SARSAT TYPE (A12.0) APPROVAL TESTS	C-S Certificate (attach test report)	$\checkmark$	$-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ $\checkmark$	$22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ $\checkmark$	$55^{\circ}\text{C} \pm 3^{\circ}\text{C}$ $\checkmark$	Chapter 12

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (-40°C)	T amb. ($\pm 3^{\circ}\text{C}$) ($^{\circ}\text{C}$)	T max. ($\pm 3^{\circ}\text{C}$) ($^{\circ}\text{C}$)	
12. OPERATIONAL LIFE, STROBE LIGHT AND SELF TESTS (A13.0) Operational Life • Frequency • Nominal Carrier • Short-term stability	406.025 ± 0.002 ≤ 0.002	MHz parts/ million in 100 ms	406.024539 < 0.0003			Chapter 13 17-20 June 2001 Results after 48 hours (C/S Oper. Life Test at min Temp. Chapter 12)
• Medium term stability : • Mean slope	≤ 0.001	parts/ million /min	< 0.0001			
• Residual variation	≤ 0.003	parts/ million	< 0.0002			
• RF output power	35-39	dBm	36.0			
• Strobe flash rate	20-30	/min	21			
• Auxiliary radio-locating Peak Envelope output Power	14-20	dBm	18.3			

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (- 40°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (55°C)	
13. STROBE LIGHT TEST (A13.2)						Chapter 13 and Chapter 12 (C/S Elec. & Funct. Test at min, amb, and max Temp.)
	Flash rate	/min	21	21	21	
	Effective intensity	Cd	0.85	0.85	0.80	
	Pulse duration	S		$5 \cdot 10^{-3}$		
14. SELF TEST (A13.3)						Chapter 13 and Chapter 12 (C/S Elec. & Funct. Test at min, amb, and max Temp. P 43)
	RF pulse duration	✓	✓	✓	✓	
	Frame synchronization pattern	✓	✓	✓	✓	
	Number of RF bursts	✓	✓	✓	✓	

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) (-50°C)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (70°C)	
15. AUTOMATIC RELEASE MECHANISM TEST (A14.0) • Normal mounted orientation • Rolling 90° starboard • Rolling 90° port • Rolling 90° bow down • Rolling 90° stern down • Upside down	Release and float free before 4 meters ; automatic activation	✓ ✓ ✓ ✓ ✓ ✓	✓	✓ ✓ ✓ ✓ ✓ ✓	✓	Chapter 14 7-8 June 2001 Just acceptable at lower stowage temperature
16. STABILITY AND BUOYANCY TEST (A15.0) • Time to upright • Reserve buoyancy • Float upright ; Antenna base	≤ 2 ≥ 5 > 4	s % cm		1 0.4 > 4		Chapter 15 24 July 2000 OK with old method of specification measurement
17. INADVERTENT ACTIVATION TEST (A16.0) • EUT not release from bracket • EUT not automatically activate		✓ ✓		✓ ✓		Chapter 16 12 June 2001

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (±3 °C) (-40 °C)	T amb. (±3 °C) (22 °C)	T max. (±3 °C) (55 °C)	
18. AUXILIARY RADIO-LOCATING DEVICE TRANSMITTER TEST (A17.0) • Carrier frequency • PERP • Duty Cycle • Modulation * Frequency * Direction * Duty cycle * Factor * Sweep repetition rate	121.5 ± 0.006	MHz	121.4983	121.4996	121.4996	Chapter 17 and Chapter 12 (C/S T.A. Tests Results) April 18 th , to June 22 th , 2001 Just on the limits May 16 th , 2001 Not checked (Antenna integrated)
	14-20	dBm	18.1	17.96	17.6	
	100	%	100	100	100	
	≤ 700 Hz within range of 300-1600 Hz Upward 33-55 0.85-1.0 2 - 4	Hz	300 → 1460	290 → 1460	300 → 1460	
	Omnidirectional Vertical ≤ 1.5:1	✓ % # Hz ✓ ✓ ✓	✓ 39 > 0.85 2.6	✓ 41 > 0.85 2.6	✓ 40 > 0.85 2.6	
• Antenna * Pattern * Polarization * VSWR						

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. ($\pm 3^{\circ}\text{C}$) ($\text{ }^{\circ}\text{C}$)	T amb. ($\pm 3^{\circ}\text{C}$) (22°C)	T max. ($\pm 3^{\circ}\text{C}$) (40°C)	
19. HUMIDITY TEST (A18.0) • Aliveness Test : • Carrier frequency • Power Output • Data Message	406.025 $\pm$ 0.002 35-39 must be correct	MHz dBm ✓			406.024461 37.75 ✓	Chapter 18 June 7 th & 8 th 2001
20. ORIENTATION TEST (A19.0) VERTICAL • Aliveness Test : • Carrier frequency • Power Output • Data Message UPSIDE DOWN • Aliveness Test : • Carrier frequency • Power Output • Data Message HORIZONTAL • Aliveness Test : • Carrier frequency • Power Output • Data Message	406.025 $\pm$ 0.002 35-39 must be correct 406.025 $\pm$ 0.002 35-39 must be correct 406.025 $\pm$ 0.002 35-39 must be correct	MHz dBm ✓ MHz dBm ✓ MHz dBm ✓		406.024460 37.6 ✓ 406.024454 37.6 ✓ 406.024455 37.6 ✓		Chapter 19 and Chapter 12 (C/S T.A. Tests Results) June 8 th 2001

CHAPTER 2

A1.0-INITIAL ALIVENESS TEST

2.1. TEST SPECIFICATIONS AND SEQUENCE

The parameters defined in sections A 1.0 of the RTCM document are to be measured using a

- COSPAS/SARSAT test bench

• Measurements at ambient temperature :

- Transmitter power output,
- Digital Message,
- Digital Message Generator,
- Modulation,
- Transmitted frequency ,
- Spurious output,
- VSWR check,
- Self-test mode

2.2. EQUIPMENT UNDER TEST

Beacon Unit : 1/2

Name : ACR

Type : RLB35

Number : 07

2.3 TEST SITE

Toulouse Space Center (CST) - INTESPACE - AP/ET.

2.4. TEST EQUIPMENT

- Argos - Cospas/Sarsat Test Bench.

2.5. RESULTS

Data and graphs are reported next page

INITIAL ALIVENESS TEST RESULTS

Beacon Unit : 1/2
 Name : ACR
 Type : RLB35
 Number : 07
 Date : 18 April 2001

406 MHZ MEASUREMENTS

1 – Environmental Temperature (° C)			22.5 ° C
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.27
- Power risetime	ms	< 5	0.80 ms
- Power falltime	ms	< 5	0.80 ms
3 – SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics	*		
4 – DIGITAL MESSAGE GENERATOR			
- Repetition rate	**		OK
- Bit rate	bits/S	400 ± 4	401.29
- Transmission time	ms	440 ± 4,4	519.35
- CW preamble	ms	160 ± 1,6	160.38
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	087645 / 087645
- BCH 2 code read / calculated	bits	133-144 / 107-132	6D1 / 6D1
6 – FREQUENCY			
- Nominal value	KHz	406 025 ± 2	- 0.4883
- Short term stability		< 2x10 ⁻⁹ /100 ms	1.3 x 10 ⁻¹⁰

* See graphs page 2.7

** See graph page 2.5

Constructeur ACR
Modelé RLB35
Numero de serie 07
Reference M3223-1
Type SARSAT

Type de certification : Nominal
Date des mesures : 18 Apr 2001 10:21:21
Temperature de palier : 22 °C
Temperature lue : 22.4656293 °C

Message balise

Message reçu (1-144): FFFE2F96EE2EC0012C00221D917769FCB6D1
Format flag (25): 1
Protocole flag (26): 0
Code pays (27-36): 0366
Pays : USA
Code protocole (37-40): 1110
Protocole utilise : Standard - Test
Identification :
Numero :
BCH 1 lu/calculé (86-106/25-85): 087645/087645
BCH 2 lu/calculé (133-144/107-132): 6D1/6D1
Pos. Data Source (111): Internal
121.5 MHz Homing (112): Yes
Position GPS de reference : N 43°33'34'' E 1°28'48
Position GPS : Yes
Position GPS par défaut : No
Latitude position : 43°33'32'' Nord
Longitude position : 1°28'44'' Est
Delta position : 0 km

Contrôle du message

Durée de la porteuse pure	mS	158.4 <	<162.6	160.37 +/-	.01
Durée minimale				160.37	
Durée maximale				160.38	
Durée de l'émission	mS	513.8 <	<526.2	519.35	

Fréquence des bits

Fréquence de modulation	Hz	395.4 <	<404.6	401.29 +/-	.01
-------------------------	----	---------	--------	------------	-----

Mesures d'indice

Excursion de phase totale	rd	<= 2.48	2.27
Excursion de phase positive	rd	0.96 <	<1.24 1.15
Excursion de phase negative	rd	-1.24 <	<-0.96 -1.12
Symétrie de l'excursion	%	<= 5	-1.21

Stabilité de fréquence

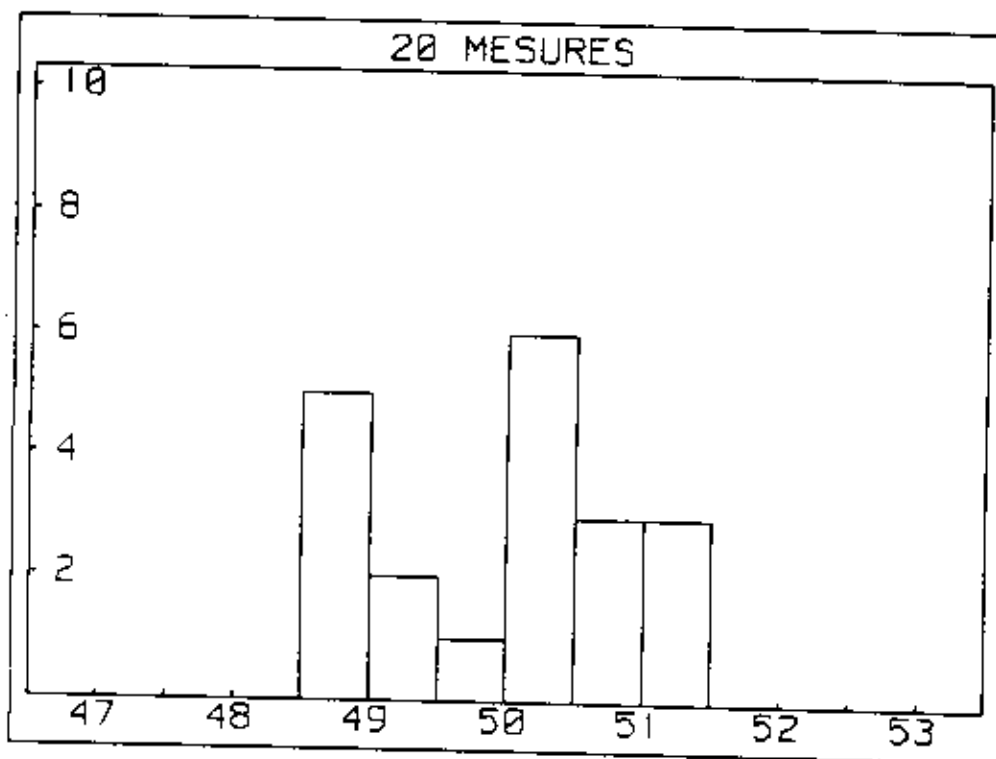
Fréquence moyenne F2	Hz	406024511.70
SIGMA2 F2-F1		3.234E-10
SIGMA3 F3-F2		1.341E-10
Slope	min. -1E-9 <	<1E-9 -2.989E-12
Residual frequency variation	<= 3E-9	1.087E-10

Puissance 340.6 MHz, dBm 37.52

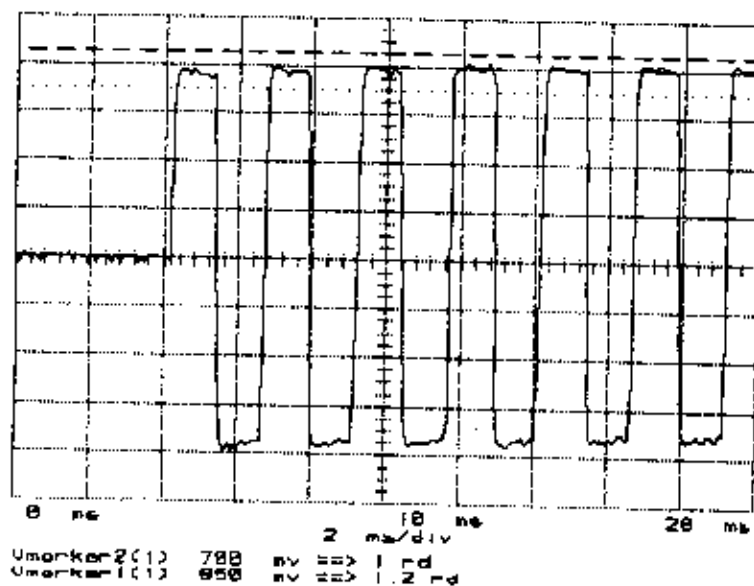
Fréquence moy 121.5 MHz 121499.63

Puissance 37.9 - 20 = 17.9 dBm

Recurrence des emissions

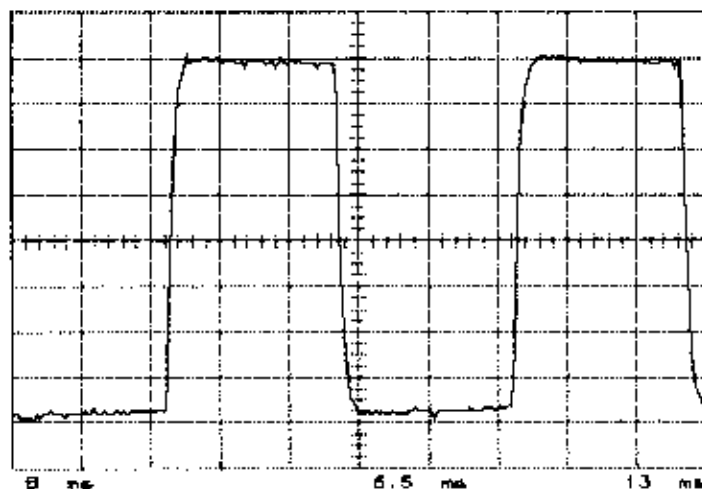


Oscilloscope

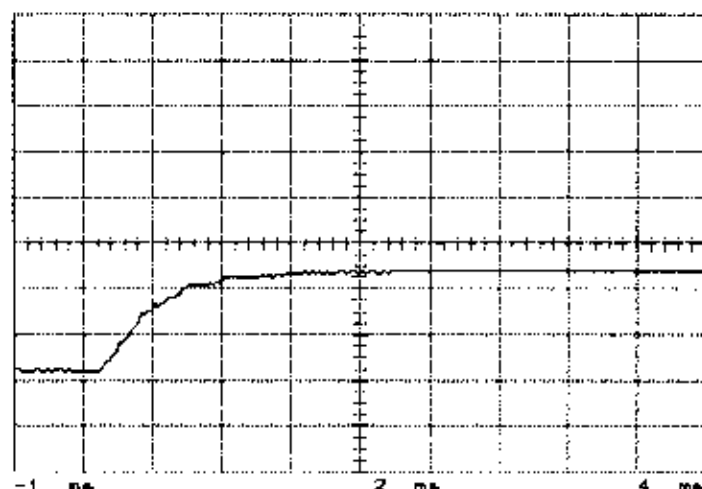


DUTY CYCLE : 2.0E-02

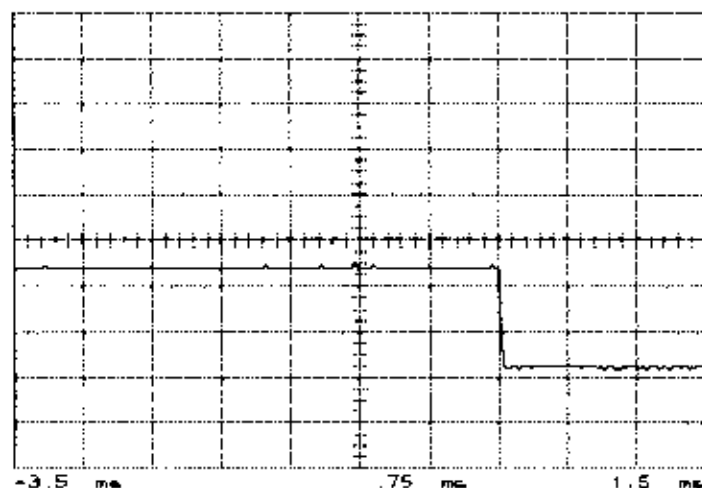
DUTY CYCLE : .8208001212851



falltime(1) <= 89.8285 us risetime(1) <= 89.8285 us
width(1) 1.21756 ms -width(1) 1.26746 ms



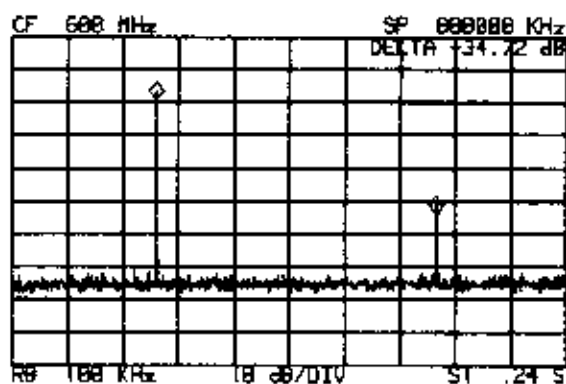
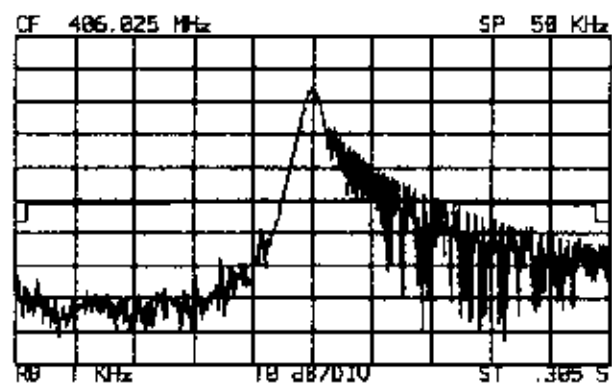
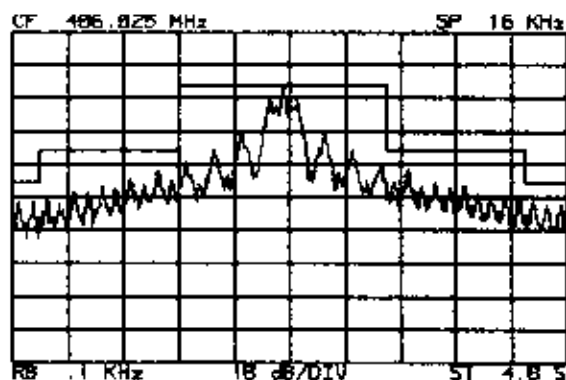
risetime(1) <= 768.463 us



risetime(1) <= 768.463 us falltime(1) <= 19.95 us

Spurious

ACR
RLB35
97
18 Apr 2001
486 MHz
TEMP : 22°C



CHAPTER 3

A3.0-DRY HEAT TEST

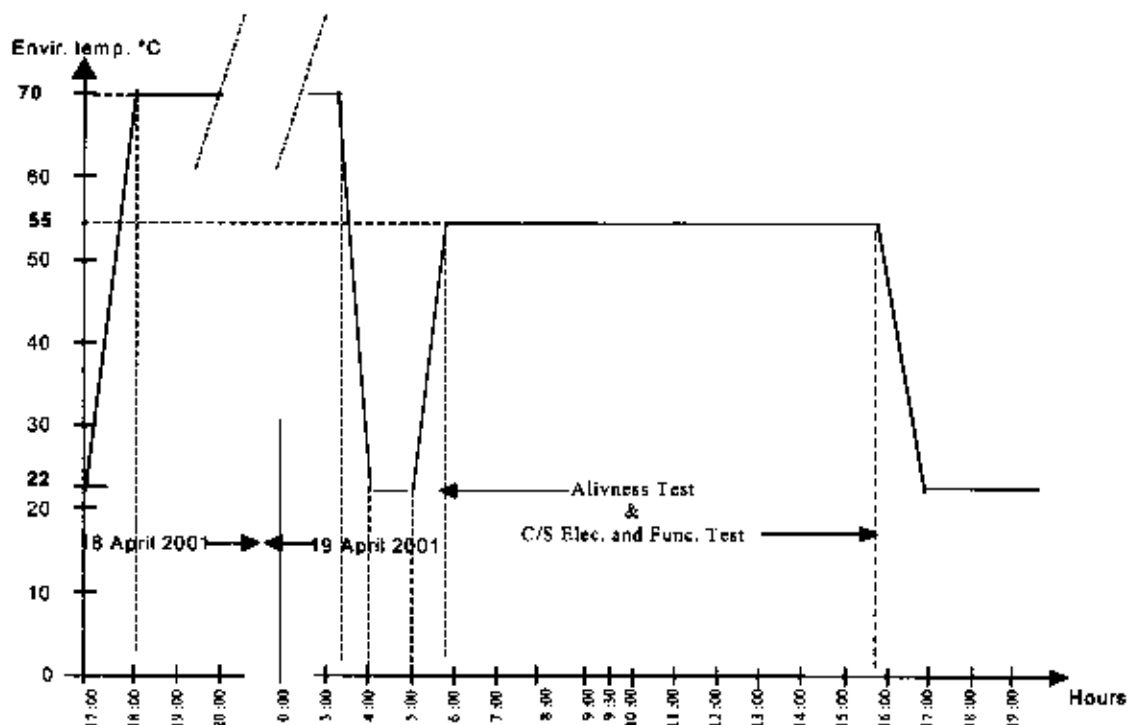
3.1. TEST SPECIFICATIONS AND SEQUENCE

The parameters defined in appendix A 3.0 of the RTCM document have been measured using a

- SARSAT Test Bench

We have used also Intespace Radiobeacon Test Procedure N° 553/AP/QA/F : Essai de Chaleur Sèche

3.1.1 DRY HEAT CYCLE PROGRAMME



3.1.2 MEASUREMENTS AT + 55° C :

- Transmitter power output,
- Digital Message,
- Digital Message Generator,
- Modulation,
- Transmitted frequency ,
- Spurious output,
- VSWR check,
- Self-test mode

3.2. EQUIPMENT UNDER TEST

Beacon Unit : 1/2

Name : ACR
 Type : RLB35
 Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

3.3 TEST SITE

Toulouse Space Center (CST) - INTESPACE - AP/ET.

3.4. TEST EQUIPMENT

- Climatic chamber : CLIMATS F.C.H. – Type: Austral 137H60/1,5E - S/N: S4880.
- KEITHLEY thermometer/multimeter ,Type : 2000, S/N 0678112 with CU-CT thermocouple.
- Argos - Cospas/Sarsat Test Bench.

3.5. RESULTS

3.5.1 C/S T.007 CHECKS RESULTS

See chapter 12 : C/S Type Approval Test Report – Electrical and Functional Test at 55° C

3.5.2 ALIVENESS SUMMARY TEST RESULTS

Date : 19 April 2001

1 – Environmental Temperature (° C)			54.3 ° C
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.6
- Power risetime	ms	< 5	0.85 ms
- Power falltime	ms	< 5	0.03 ms
3 – SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics	*		
4 –DIGITAL MESSAGE GENERATOR			
- Repetition rate	*		OK
- Bit rate	bits/S	400 ± 4	401.29
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	519.35
- CW preamble	ms	160 ± 1.6	160.35
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1029B4 / 1029B4
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 – FREQUENCY			
- Nominal value	KHz	406 025 ± 2	- 0.49796
- Short term stability		< 2x10 ⁻⁹ /100 ms	1.05 x 10 ⁻¹⁰

* See graphs on chapter 12 : C/S Type Approval Test Report – Electrical and Functional Test at 55° C

CHAPTER 4

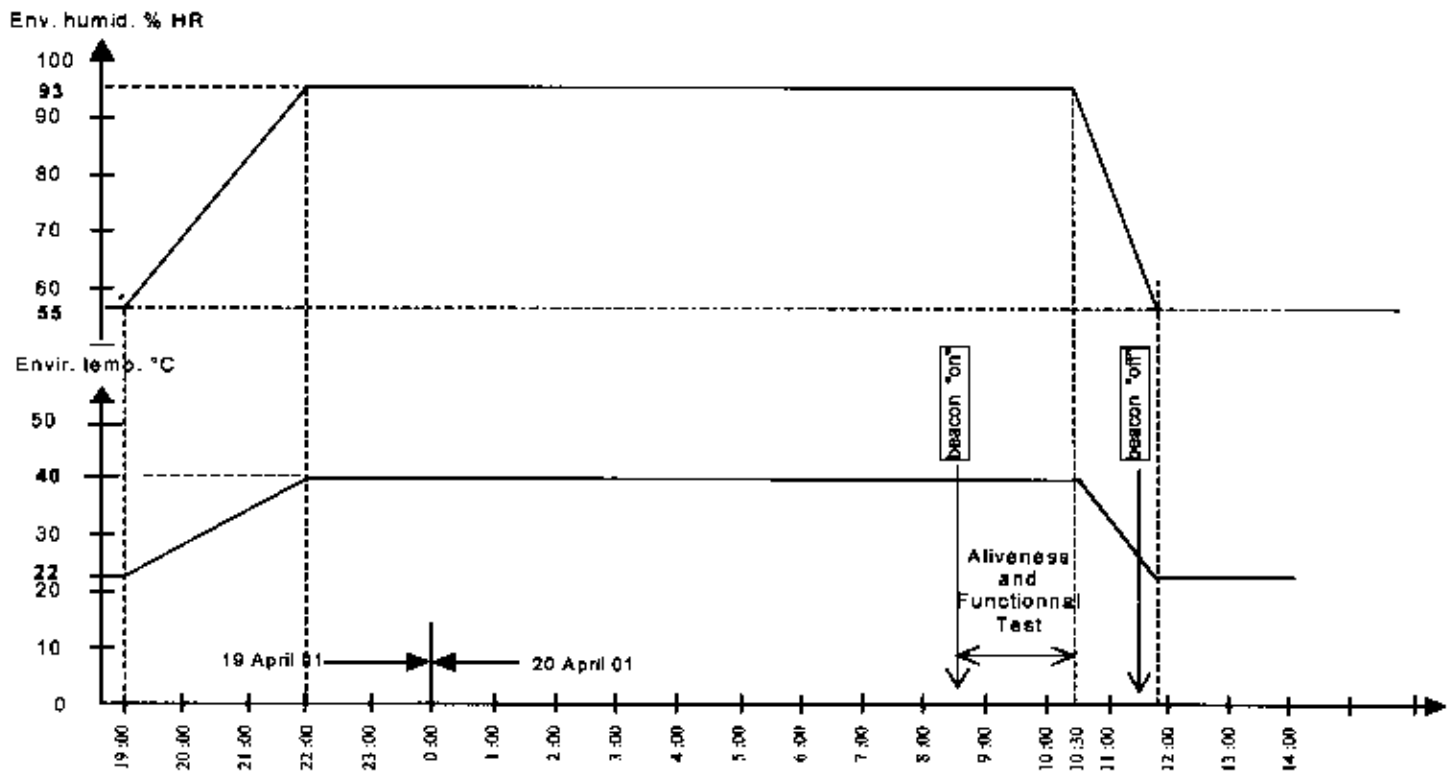
A4.0-DAMP HEAT TEST

4.1. TEST SPECIFICATIONS AND SEQUENCE

The parameters defined in sections A4.0 of the RTCM document are measured using a SARSAT test bench .

We have used also Intespace Radiobeacon Test Procedure N° 554/AP/QA/f : Essai de Chaleur Humide

4.1.1 DRY HEAT CYCLE PROGRAMME



4.1.2 MEASUREMENTS AT 40° C $\pm$ 3° C and 93 % $\pm$ 2 % HR :

- Transmitter power output,
- Digital Message,
- Digital Message Generator,
- Modulation,
- Transmitted frequency ,
- Spurious output,

4.2. EQUIPMENT UNDER TEST

Beacon Unit : 1/2
 Name : ACR
 Type : RLB35
 Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

4.3 TEST SITE

Toulouse Space Center (CST) - INTESPACE - AP/ET.

4.4. TEST EQUIPMENT

- Climatic chamber : CLIMATS F.C.H. – Type: Austral 137H60/1,5E - S/N: S4880.
- KEITHLEY thermometer/multimeter ,Type : 2000, S/N 0678112 with CU-CT thermocouple.
- COLE PARMER thermo-hygrometer, Type : TriSense S/N : 37000-00
- Argos - Cospas/Sarsat Test Bench.

4.5. RESULTS

4.5.1 SUMMARY OF MEASUREMENTS RESULTS

Date : 20 April 2001

1 - Environmental Temperature (° C / HR)			+ 40. ° C ± 1 / 93 % ± 2
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.5
- Power risetime	ms	< 5	0.81 ms
- Power falltime	ms	< 5	0.03 ms
3 - SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics	*		
4 -DIGITAL MESSAGE GENERATOR			
- Repetition rate	**		OK
- Bit rate	bits/S	400 ± 4	401.29
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	519.35
- CW preamble	ms	160 ± 1.6	160.37
5 - DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1029B4 / 1029B4
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 - FREQUENCY			
- Nominal value	KHz	406 025 ± 2	- 0.49548
- Short term stability		< 2x10 ⁻⁹ /100 ms	1.76 x 10 ⁻¹⁰

* See graphs page 4.8

** See graph page 4.5

4.5.2 DATA AND GRAPHS OF MEASUREMENTS RESULTS

Constructeur	ACR
Modele	RLB35
Numero de serie	07
Reference	M3223-2
Type	SARSAT

Type de certification : Nominal
Date des mesures : 20 Apr 2001 08:33:01
Temperature de palier : 40 °C / 93% 40
Temperature lue : 39.9839561 °C

```

Message reçu          (1-144): FFFE2F96EE2EC0017FDFFCOA6D3783E0F66C
Format flag          (25): 1
Protocole flag       (26): 0
Code pays           (27-36): 0366
Pays                 : USA
Code protocole       (37-40): 1110
Protocole utilise    : Standard - Test
Identification       :
Numero              :
BCH 1 lu/calculé    (86-106/25-85): 1029B4/1029B4
BCH 2 lu/calculé    (133-144/107-132): 66C/66C
Pos. Data Source     (111): Internal
121.5 MHz Homing     (112): Yes
Position GPS de référence : N 43°33'34'' E 1°28'48
Position GPS         : Yes
Position GPS par défaut : Yes

```

Duree de la porteuse pure	mS	158.4	< 162.6	160.36	+ -	.01
Duree minimale				160.36		
Duree maximale				160.37		
Duree de l'emission	mS	513.8	< 526.2	519.35		

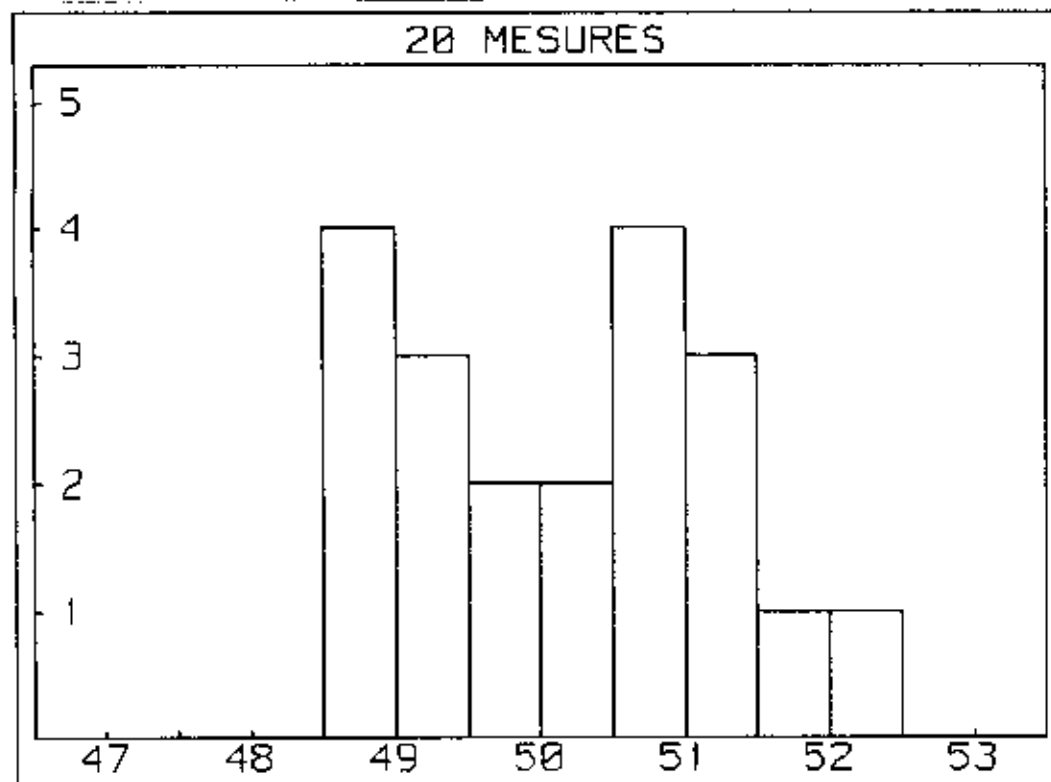
Frequency de modulation	Hz	395.4 <	<404.6	401.29 +- .01
-------------------------	----	---------	--------	---------------

Excursion de phase totale	rd	≤ 2.48	2.22
Excursion de phase positive	rd	$0.96 < < 1.24$	1.14
Excursion de phase negative	rd	$-1.24 < < -0.96$	-1.08
Symetrie de l'excursion	%	≤ 5	-2.94

Stabilité de fréquence

Fréquence moyenne	F2	Hz	406024504.52
SIGMA2	F2-F1		3.583E-10
SIGMA3	F3-F2		1.759E-10
Slope		min. -1E-9 < <1E-9	3.033E-10
Residual frequency variation		<= 3E-9	1.311E-10

Recurrence des émissions



Mesures de puissance

Puissance	dBm	37.52
-----------	-----	-------

Mesures du 121.5

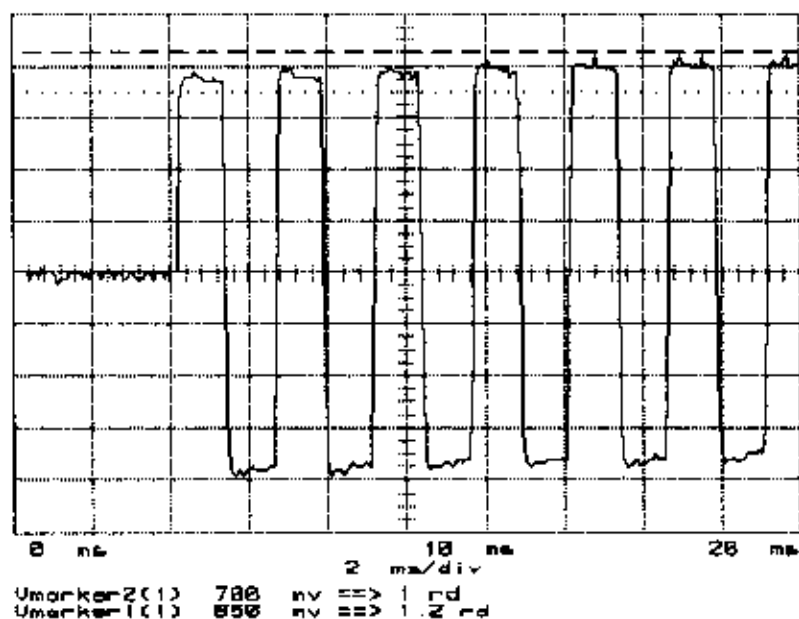
121499.47
121499.477
121499.461
121499.428
121499.449

Fréquence moy 121.5 MHz	121499.46
-------------------------	-----------

13.63
13.63
13.62
13.63
13.63

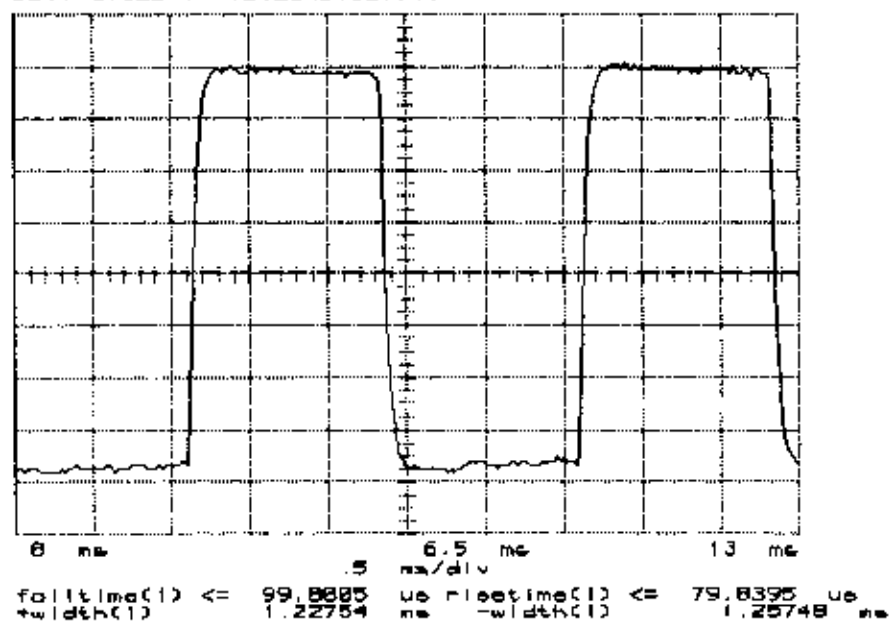
Puissance	17.8
-----------	------

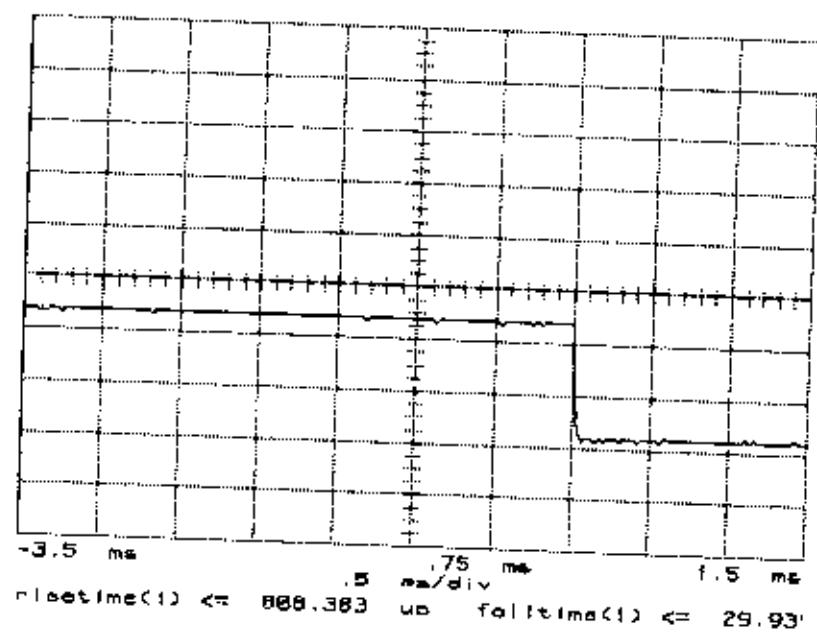
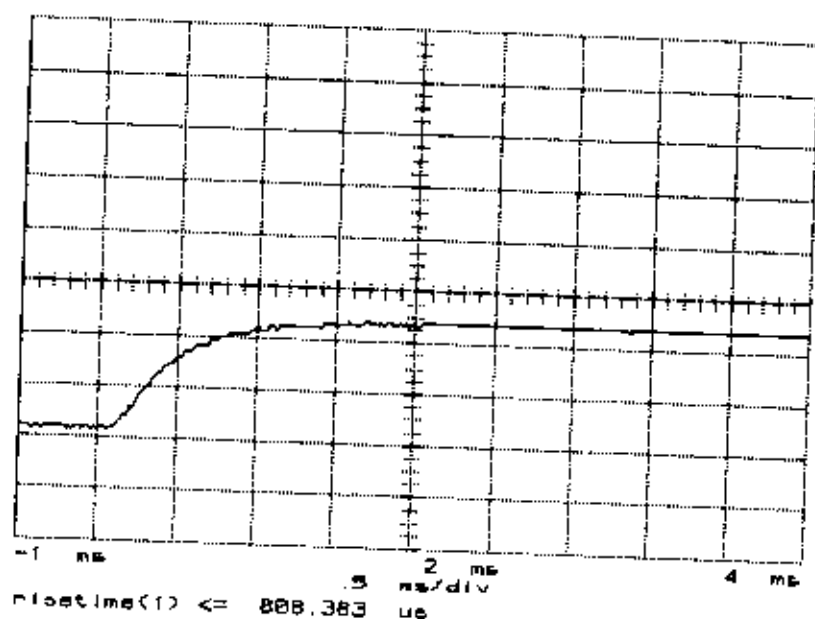
Oscilloscopes



DUTY CYCLE : 1.2E-02

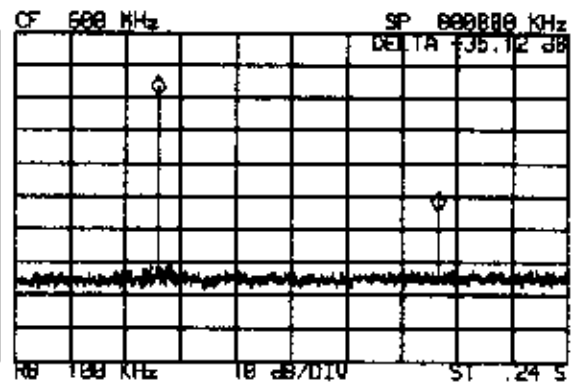
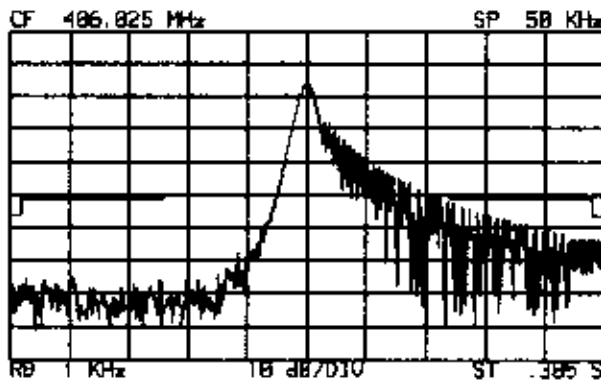
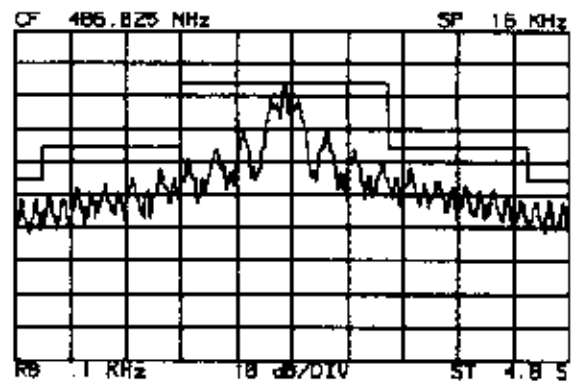
DUTY CYCLE : .0120481927711





Spurious

ACR
RLB35
87
29 Apr 2001
486 MHz
TEMP : 48°C



CHAPTER 5

A5.0-VIBRATION TEST

5.1 ADMINISTRATIVE INFORMATION

5.1.1 CLIENT

ACR Electronics Inc.

5.1.2. REPRESENTATIVES PRESENT

For the Client : G. PEYROU ITS/AP/ET

For the Test Laboratory : J. M. BUCHMAN

5.1.3. DATES

Start of test : May 30th, 2001

End of test : May 31th, 2000

5.1.4. INTESPACE FILE REFERENCE : M3223-ETS/IEC

5.2. UNIT UNDER TEST (UUT)

Beacon Unit : 1/2

Name : ACR

Type : RLB35

Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

5.3. PURPOSE OF THE TEST

Functional checkout of hardware after vibration testing.

5.4. TEST EQUIPMENT

5.4.1. TEST DEVICES

Electrodynamic vibration table, type 80 kN-2 and 67 kN with GR3

Spectral Dynamics SD2225 digital control panel

5.4.2. METROLOGICAL EQUIPMENT

Vibration Control : accelerometer (analysis and processing)

Vibration Measurements : Spectral Dynamics SD2225

Electrical Beacon Checking : Argos - Cospas/Sarsat Test Bench.

5.5. TEST PROCEDURE

5.5.1. AXIS (See photograph in § 5.7 page 5.4)

X-axis : parallel to the Beacon Bracket fixing plane and Beacon « widthways »

Y-axis : perpendicular to the Beacon Bracket fixing plane and Beacon « widthways »

Z-axis : parallel to the Beacon Bracket fixing plane and Beacon « lengthways »

5.5.2. MOUNTING

The beacon in its bracket is secured to a light-alloy supporting square.
 The complete assembly is firmly attached to the moving part of the vibration table according to the required axis.

5.5.3. TEST SPECIFICATIONS AND SEQUENCE

Vibrations following Section A5.0 of RTCM Recommended Standards for 406 MHz Satellite EPIRBs
 (Version 2.0 Feb 5,1997)

Sinewave vibrations on three axis :

Frequency (Hz)	Peak to Peak Amplitude (mm)
4-10	5
10-15	1.6
15-25	0.8
25-33	0.4

Sweep rate : 1.2 oct/min

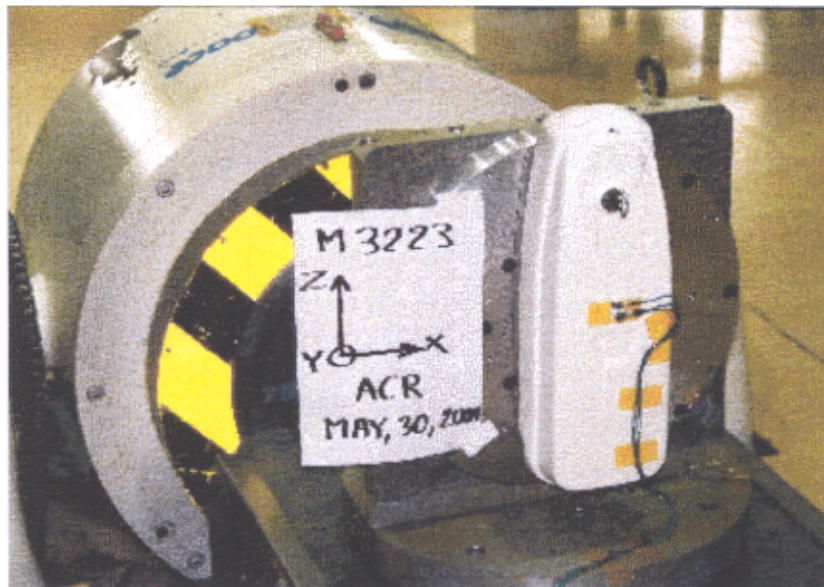
Duration : 30 minutes on each axis

Beacon control : Visual inspection and Aliveness test after the Vibrations Tests

5.6 LIST OF SERVO AND CONTROL SENSORS

Sensor	Location	N° acc.	Cable	Sensitivity pC/g
P (servo)	Screwed on test holder sheet	CP91	BU03	9.32
1X (control)	Glued on Beacon Necklace	10922	12/2	2.80
1Y (control)	Glued on Beacon Necklace	5326	13/3	7.10
1Z (control)	Glued on Beacon Necklace	3748	11/4	6.40

5.7. PHOTOGRAPH



5.8. TEST SCHEDULE

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
May 30 th , 2001 001Y	Sinewave vibrations : Y axis 5 mm p-p from 4 to 10 Hz 1.6 mm p-p from 10 to 15 Hz 0.8 mm p-p from 15 to 25 Hz 0.4 mm p-p from 25 to 33 Hz Sweep duration : 2 min 30 s	5.9.1	Nominal	Set up the beacon on test table on Y axis (80 kN). Functional testing : nominal.
May 30 th , 2001 001X	Sinewave vibrations : X axis 5 mm p-p from 4 to 10 Hz 1.6 mm p-p from 10 to 15 Hz 0.8 mm p-p from 15 to 25 Hz 0.4 mm p-p from 25 to 33 Hz Sweep duration : 2 min 30 s	5.9.2	Nominal	Set up the beacon on test table on X axis (80 kN). Functional testing : nominal.

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
May 31 st , 2001 001Z	Sinewave vibrations : Z axis 5 mm p-p from 4 to 10 Hz 1.6 mm p-p from 10 to 15 Hz 0.8 mm p-p from 15 to 25 Hz 0.4 mm p-p from 25 to 33 Hz Sweep duration : 2 min 30 s	5.9.3	Normal	Set up the beacon on test table on Z axis (80 kN) Functional testing : nominal Removal of beacon
Visual inspection		5.9.4.1		Nothing abnormal to note
EPIRB Aliveness Test		5.9.4.2	Cospas Sarsat Test Bench	Nominal

5.9. TEST RESULTS

5.9.1. RESULTS OF Y VIBRATION AXIS

Sine Version 4.8.0 Test Summary Listing

Data Storage File Name: RTCM.005
Current Date: Wed May 30 2001 14:52:15

DOCUMENTATION:

Title 1: 001Y TEST : RTCM MAY,2,1997
Title 2: M3223 - EPIRB ACR RLB35 S/N: 07
Title 3:

TEST RESULTS:

Test Function:	Test
Date at Shutdown:	30-May-2001
Time at Shutdown:	11:23:07
Test Completed Normally	
Elapsed Time	000:30:00
Remaining Time	000:00:00
Elapsed Sweeps	12.00
Remaining Sweeps	0.00
Frequency at Shutdown:	4.01 Hz
Test Level:	0.00 dB
Maximum Control Error:	-9.93 dB @ 10.00 Hz
Table of Alarms	Occurrences Maximum Value
Alarm Lines Out:	0
Maximum Drive:	0
Input Overload:	0

CONTROL PARAMETERS:

CONTROL STRATEGY -

Control Spectrum:	Maximum
Filter Type:	Proportional
Filter Specification:	Fundamental 160.00 %, RMS 255. mcyc
Sweep Mode:	Log

SWEEP/COMPRESSION TABLE -

Segment Number	Ending Frequency (Hz)	Sweep Rate (Oct/min)	Compression (%)
1	33	1.218	65

REFERENCE TABLE:

REFERENCE PARAMETERS -

Minimum Frequency:	4.000 Hz
Maximum Frequency:	33.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	15.918 dB
Minimum Acceleration (0-pk):	0.161 g
Maximum Acceleration (0-pk):	1.006 g
Maximum Velocity (0-pk):	0.157 m/s
Maximum Displacement (pk-pk):	5.000 mm

CHANNEL TABLE:

Channel Number	Channel Type	Loop Sensitivity Check (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes 93.20	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No 88.55	AC	Accel	g			BB RMS
3	Auxiliary	No 71.00	AC	Accel	g			BB RMS
4	Auxiliary	No 64.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Sensitivity Check (mV/Units)	Channel Documentation Label 1
1	Control	Yes 93.20	PILOTE P
2	Auxiliary	No 88.55	1X SENSOR
3	Auxiliary	No 71.00	1Y SENSOR
4	Auxiliary	No 64.00	1Z SENSOR

Label 2

{12 Inactive Channels}

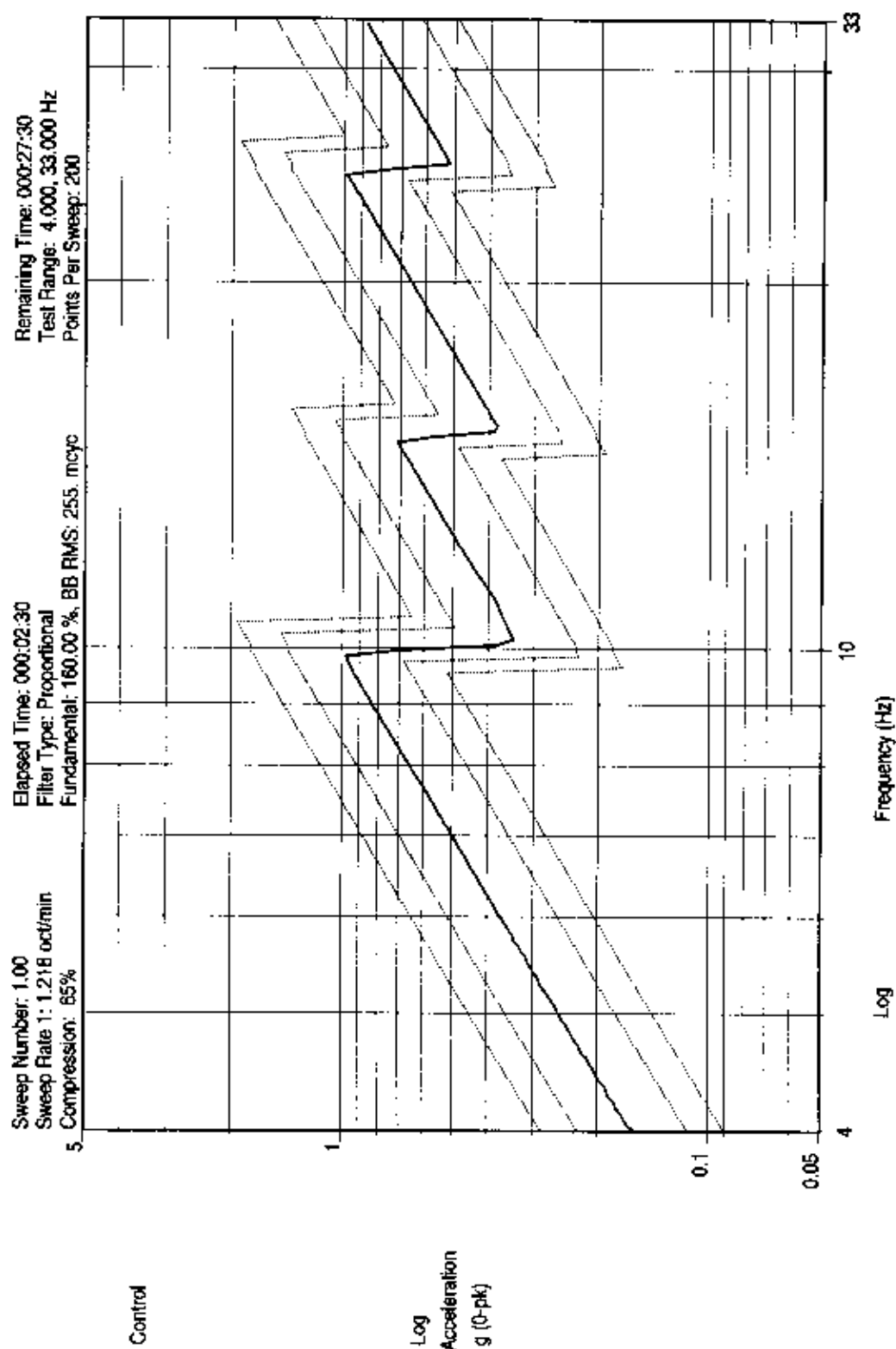
TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:	No
H(f) Response Reference Label	
Pair Channel Channel	
1 2 1	H(f) Pair Label 1

End of Sine Test Summary

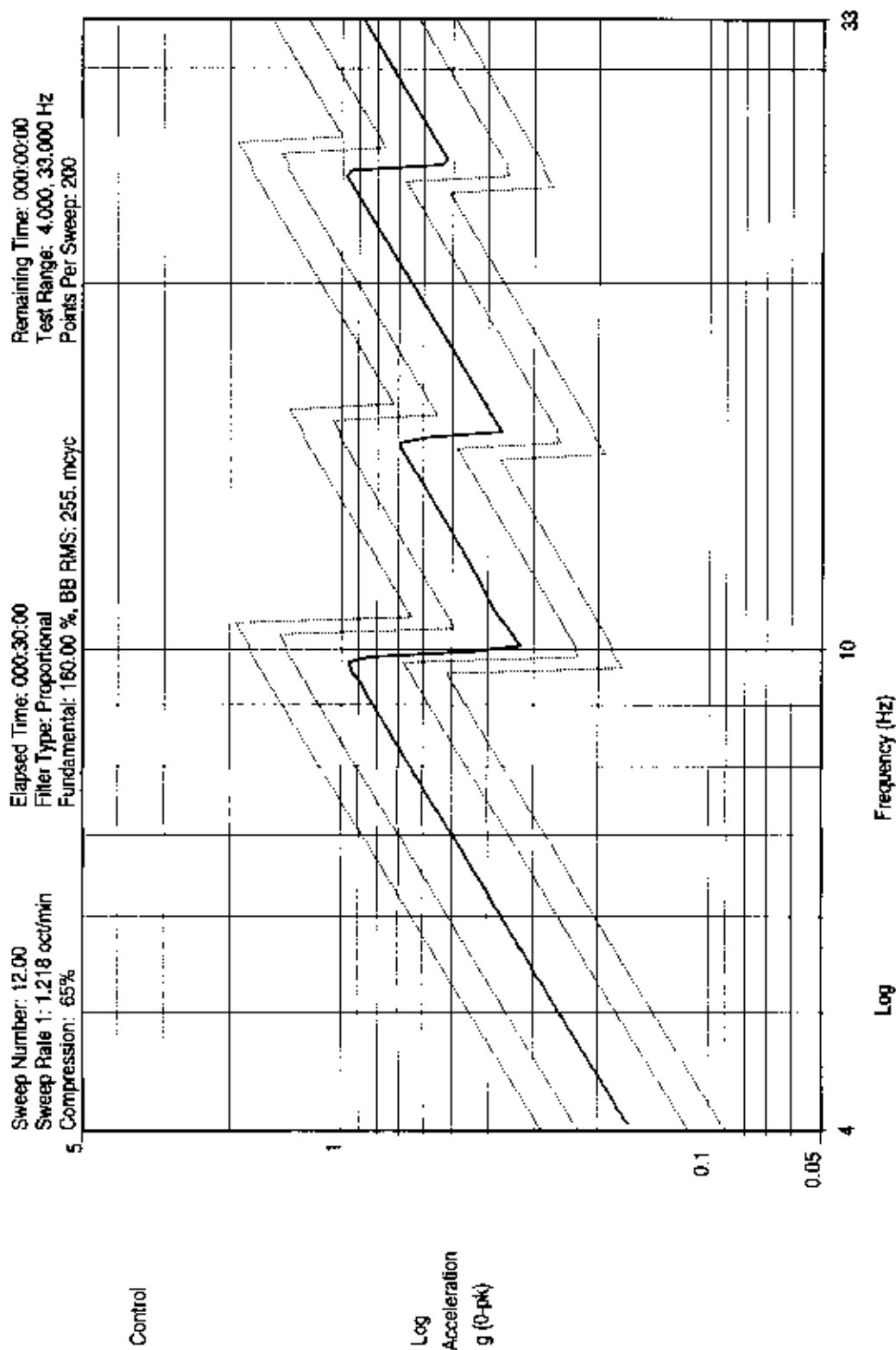
sine message log
1.00000

```
%Test: RTCM.005
%Log: /user/client/m3223/sine/log/RTCM.005.log
05/30/01
10:51:47 Nulling Internal Offsets.
10:51:53 Nulling Completed.
10:51:53 Loop Check Started...
10:51:53 Measuring Ambient Noise...
10:52:01 Searching for Threshold...
10:52:09 Loop Check Completed.
10:52:11 Increasing to Test Level...
10:53:02 Start Level Reached.
10:53:02 Test Starts at 4.000 Hz
10:55:32 Saved Sweep Number 1.00
10:58:02 Saved Sweep Number 2.00
11:00:32 Saved Sweep Number 3.00
11:03:02 Saved Sweep Number 4.00
11:05:32 Saved Sweep Number 5.00
11:08:02 Saved Sweep Number 6.00
11:10:32 Saved Sweep Number 7.00
11:13:02 Saved Sweep Number 8.00
11:15:32 Saved Sweep Number 9.00
11:18:02 Saved Sweep Number 10.00
11:20:32 Saved Sweep Number 11.00
11:23:02 Shutdown Initiated...
11:23:07 Saved Sweep Number 12.00
```



001Y TEST : RTCM MAY.2.1997
M3223 - EPIRB ACR RLB35 SN: 07
Sine Data Review Name: RTCM.005

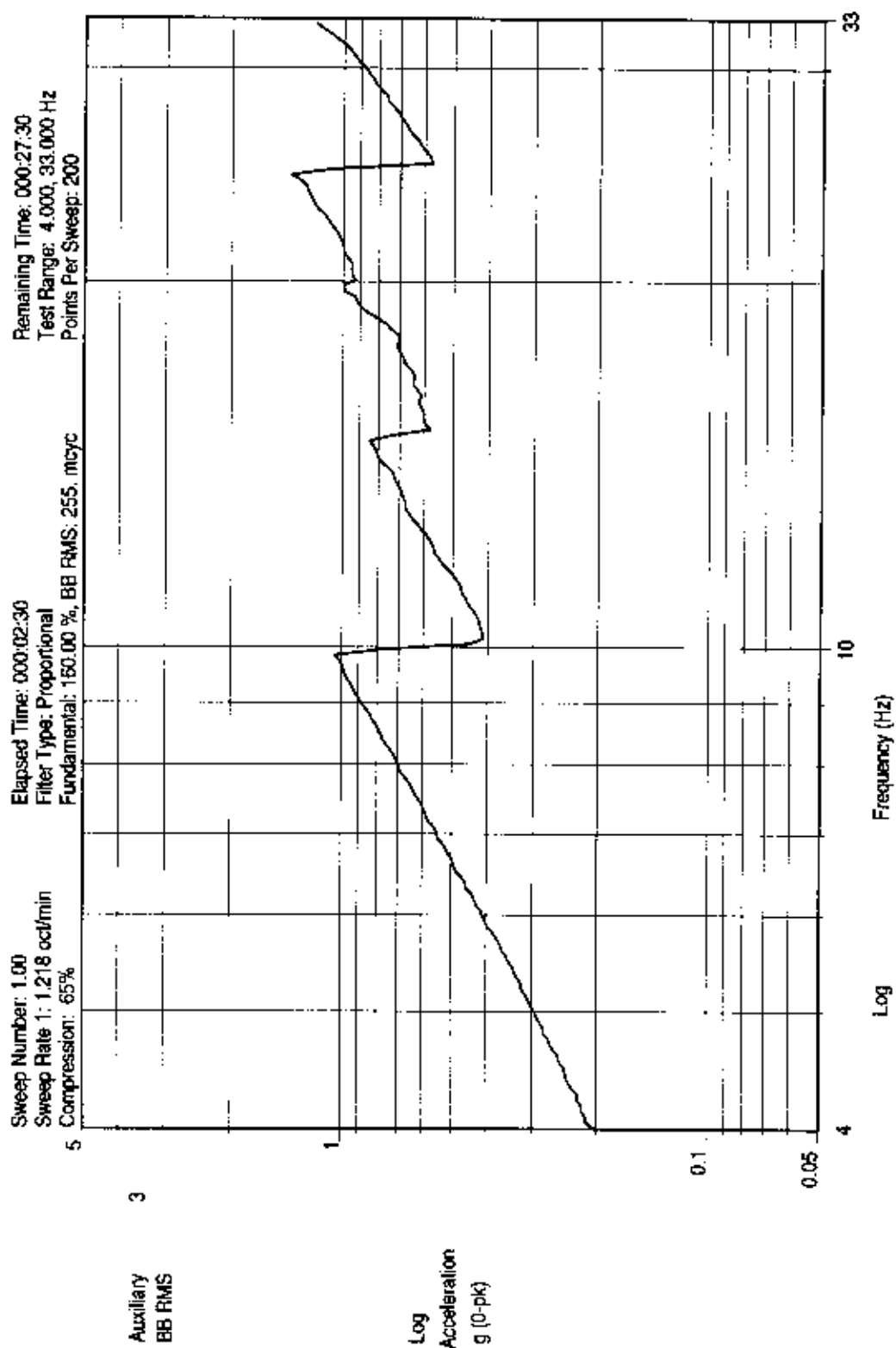
10:55:32
Wed May 30 2001



11-23-16

30-May-2001

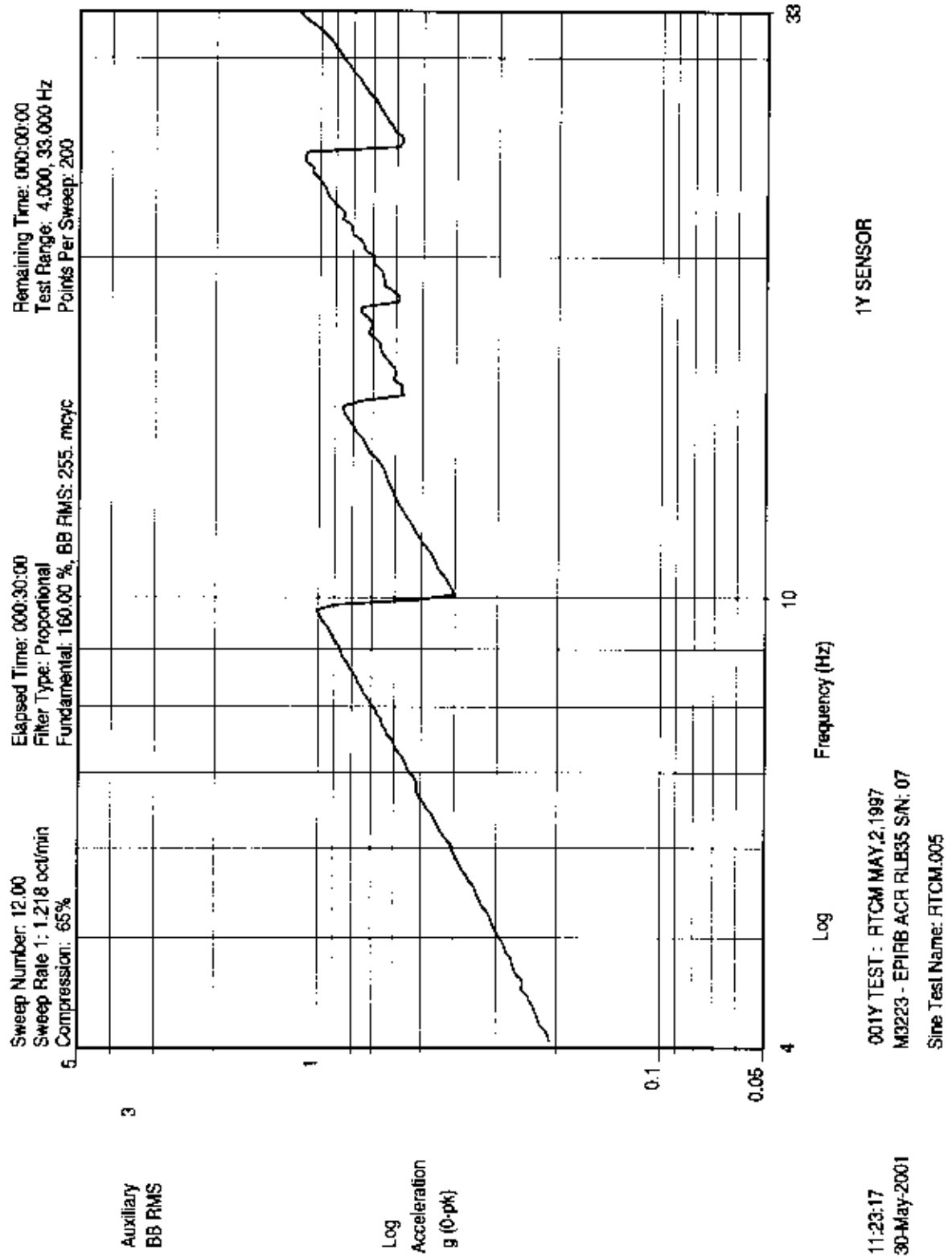
001Y TEST : RTCM MAY 2, 1997
M3223 - EPIRB ACR RLB35 SN: 07
Sine Test Name: RTCM.005



1Y SENSOR

001Y TEST : RTCM MAY 2, 1997
 M3223 - EPIRB ACR RLB35 S/N: 07
 Sine Data Review Name: RTCM.L005

10:55:32
 Wed May 30 2001



5.9.2. RESULTS OF X VIBRATION AXIS

Sine Version 4.8.0 Test Summary Listing

Data Storage File Name: RTCM.008
 Current Date: Wed May 30 2001 14:48:09

DOCUMENTATION:

Title 1: 001X TEST : RTCM MAY, 2, 1997
 Title 2: M3223 - EPIRB ACR RLB35 S/N: 07
 Title 3:

TEST RESULTS:

Test Function: Test
 Date at Shutdown: 30-May-2001
 Time at Shutdown: 14:45:13
 Test Completed Normally
 Elapsed Time 000:30:00
 Remaining Time 000:00:00
 Elapsed Sweeps 12.00
 Remaining Sweeps -0.00
 Frequency at Shutdown: 4.02 Hz
 Test Level: 0.00 dB
 Maximum Control Error: -9.91 dB @ 10.00 Hz
 Table of Alarms Occurrences Maximum Value
 Alarm Lines Out: 0
 Maximum Drive: 0
 Input Overload: 0

CONTROL PARAMETERS:

CONTROL STRATEGY -

Control Spectrum: Maximum
 Filter Type: Proportional
 Filter Specification: Fundamental 160.00 %, RMS 255. mcyc
 Sweep Mode: Log

SWEEP/COMPRESSION TABLE -

Segment Number	Ending Frequency (Hz)	Sweep Rate (Oct/min)	Compression (%)
1	33	1.218	65

REFERENCE TABLE:

REFERENCE PARAMETERS -

Minimum Frequency: 4.000 Hz
 Maximum Frequency: 33.000 Hz
 Frequency Points: 200.000
 Box Tolerance: Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range: 15.918 dB
 Minimum Acceleration (0-pk): 0.161 g
 Maximum Acceleration (0-pk): 1.006 g
 Maximum Velocity (0-pk): 0.157 m/s
 Maximum Displacement (pk-pk): 5.000 mm

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	93.20	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No	88.55	AC	Accel	g			BB RMS
3	Auxiliary	No	71.00	AC	Accel	g			BB RMS
4	Auxiliary	No	64.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label
1	Control	Yes	93.20	PILOTE P
2	Auxiliary	No	88.55	1X SENSOR
3	Auxiliary	No	71.00	1Y SENSOR
4	Auxiliary	No	64.00	1Z SENSOR

Label 2

(12 Inactive Channels)

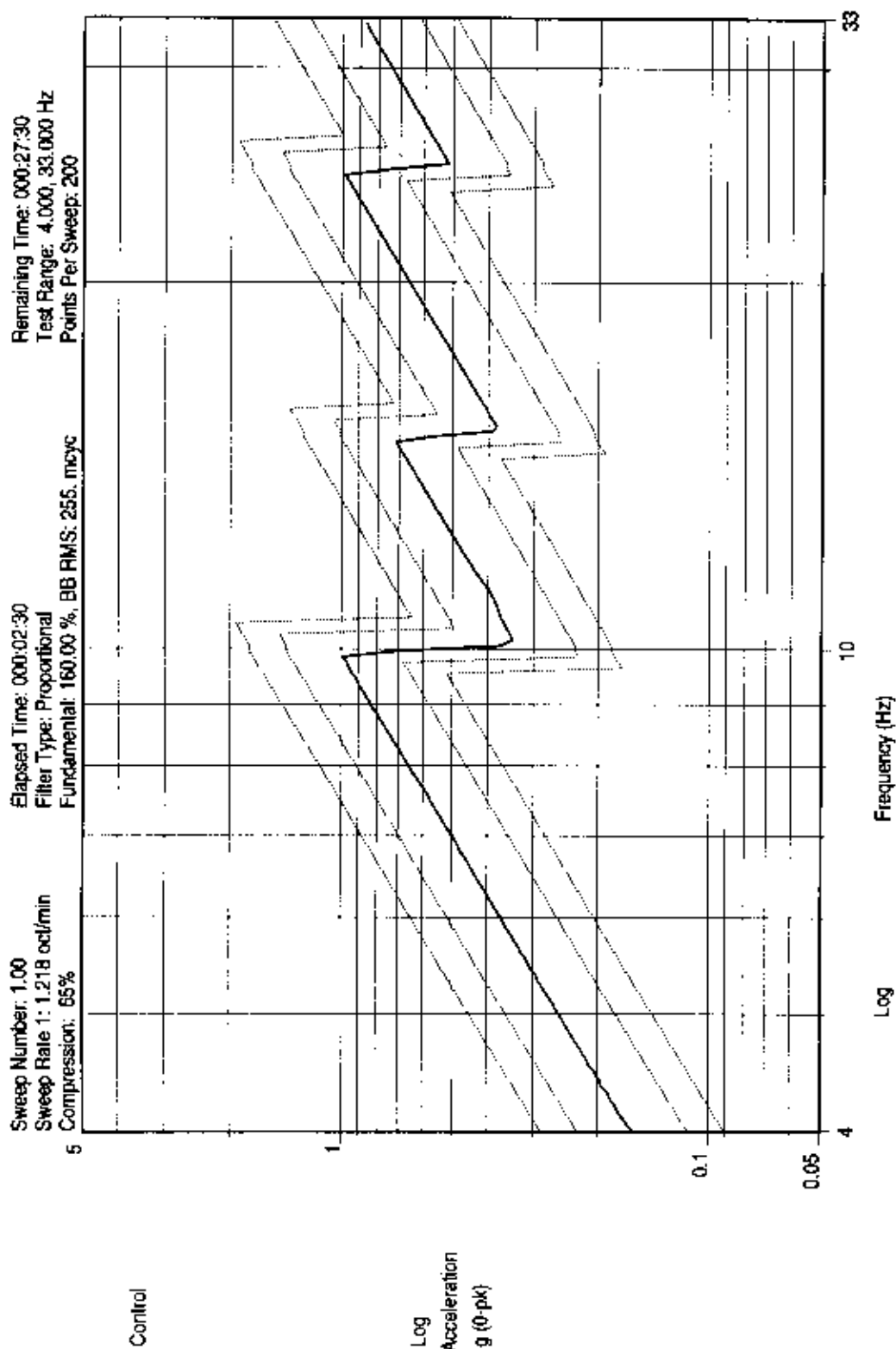
TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:	No
H(f) Response Reference Label	
Pair Channel Channel	
1 2 1	H(f) Pair Label 1

End of Sine Test Summary

sine message log
1.00000

```
%Test: RTCM.008
%Log: /user/client/m3223/sine/log/RTCM.008.log
05/30/01
14:13:54 Nulling Internal Offsets.
14:14:02 Nulling Completed.
14:14:03 Loop Check Started...
14:14:03 Measuring Ambient Noise...
14:14:10 Searching for Threshold...
14:14:18 Loop Check Completed.
14:14:20 Increasing to Test Level...
14:15:08 Start Level Reached.
14:15:08 Test Starts at 4.000 Hz
14:17:38 Saved Sweep Number 1.00
14:20:08 Saved Sweep Number 2.00
14:22:38 Saved Sweep Number 3.00
14:25:08 Saved Sweep Number 4.00
14:27:38 Saved Sweep Number 5.00
14:30:08 Saved Sweep Number 6.00
14:32:38 Saved Sweep Number 7.00
14:35:08 Saved Sweep Number 8.00
14:37:38 Saved Sweep Number 9.00
14:40:08 Saved Sweep Number 10.00
14:42:38 Saved Sweep Number 11.00
14:45:08 Shutdown Initiated...
14:45:13 Saved Sweep Number 12.00
```



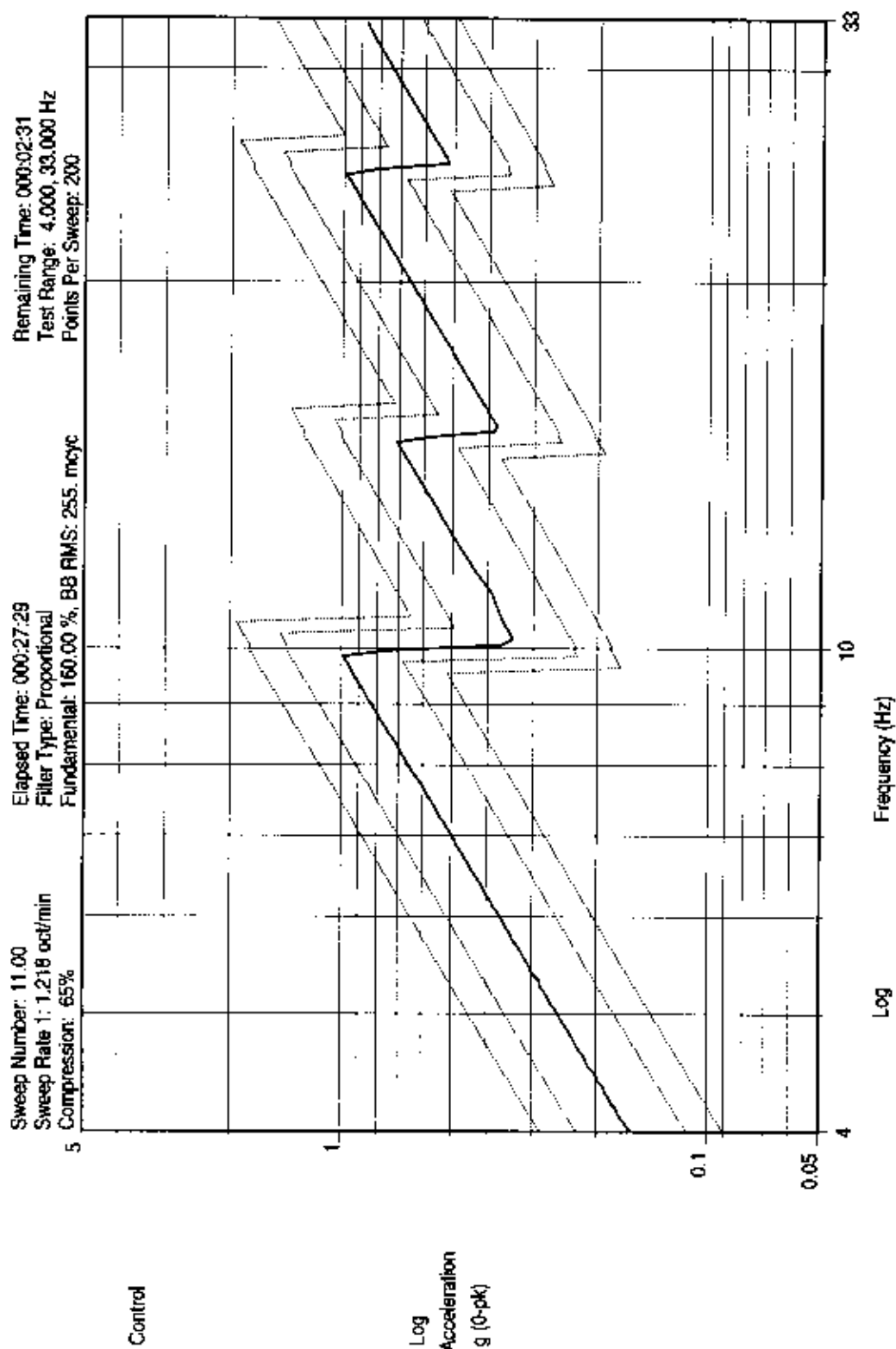
14:17:36

Wed May 30 2001

001X TEST : RTCM MAY 2, 1997

M3223 - EPIRB ACR RLB35 S/N: 07

Sine Data Review Name: RTCM.006



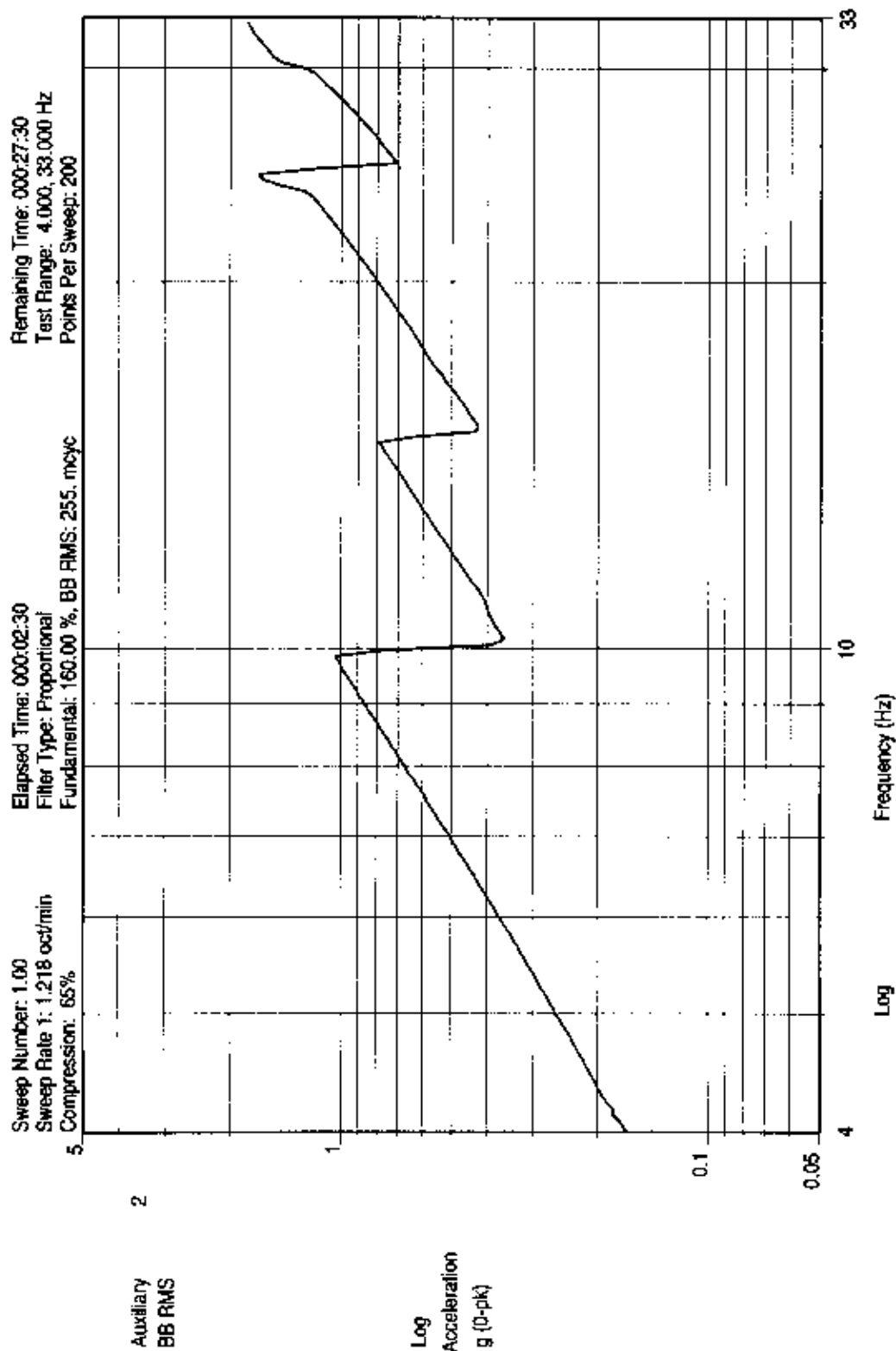
14:42:38

Wed May 30 2001

001X TEST : RTCM MAY,2,1997

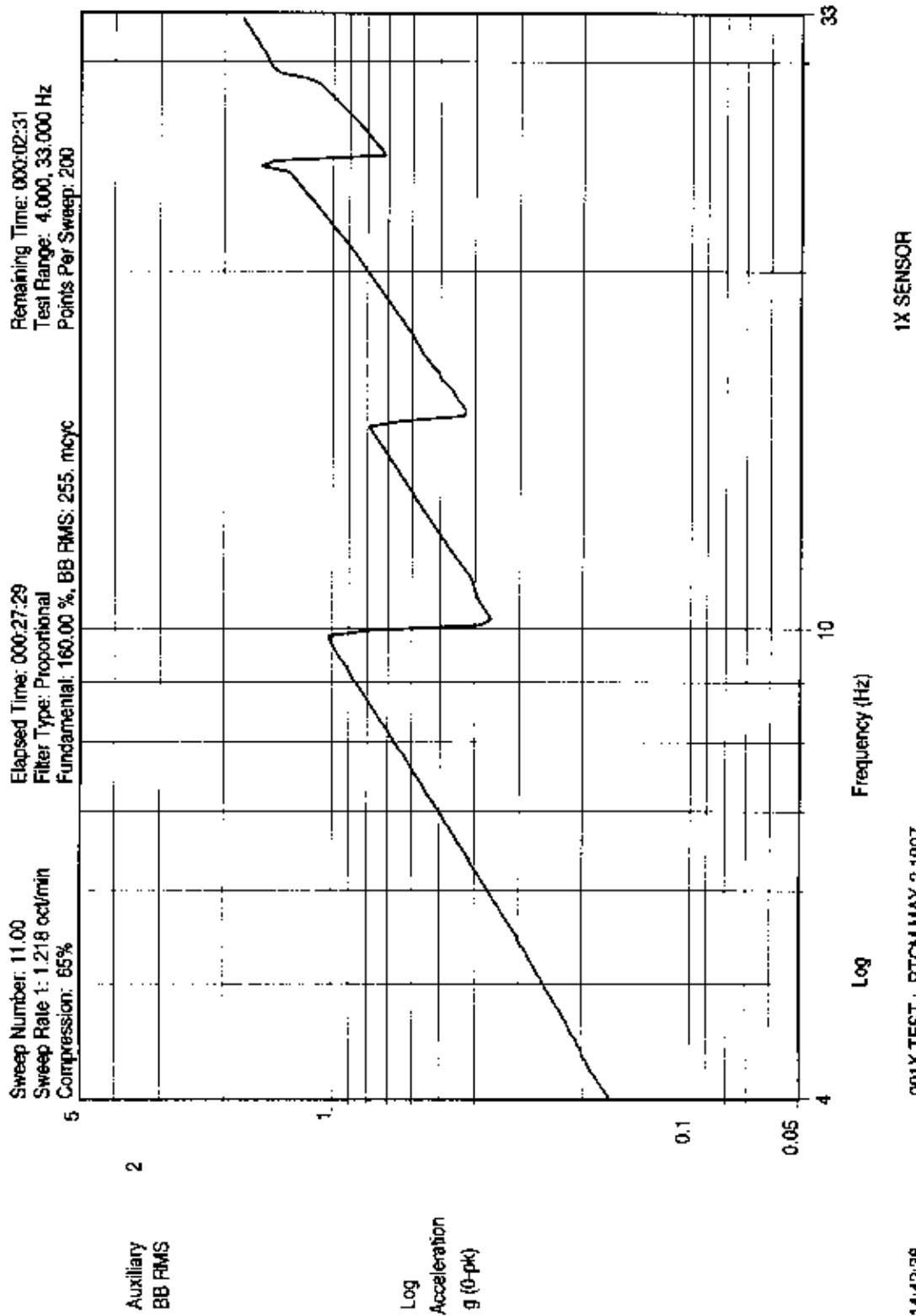
M3223 - EPIRB ACR RLB35 S/N: 07

Sine Data Review Name: RTCM,006



001X TEST : RTCM MAY 2, 1997
 M3223 - EPIRB ACR RLB35 S/N: 07
 Sine Data Review Name: RTCM.008

14:17:38
 Wed May 30 2001



14:42:36
 Wed May 30 2001

001X TEST : RTCM MAY 2, 1997
 M3223 - EPIRB ACR RLB35 S/N: 07
 Sine Data Review Name: RTCM.008

5.9.3. RESULTS OF Z VIBRATION AXIS

Sine Version 4.8.0 Test Summary Listing

Data Storage File Name: RTCM.011
 Current Date: Thu May 31 2001 11:17:21

DOCUMENTATION:

Title 1: 001Z TEST : RTCM MAY.2.1997
 Title 2: M3223 - EPIRB ACR RLB35 S/N: 07
 Title 3:

TEST RESULTS:

Test Function:	Test
Date at Shutdown:	31-May-2001
Time at Shutdown:	11:08:29
Test Completed Normally	
Elapsed Time	000:30:00
Remaining Time	000:00:00
Elapsed Sweeps	12.00
Remaining Sweeps	0.00
Frequency at Shutdown:	4.01 Hz
Test Level:	0.00 dB
Maximum Control Error:	9.97 dB @ 10.02 Hz
Table of Alarms	Occurrences Maximum Value
Alarm Lines Out:	0
Maximum Drive:	0
Input Overload:	0

CONTROL PARAMETERS:

CONTROL STRATEGY -

Control Spectrum:	Maximum
Filter Type:	Proportional
Filter Specification:	Fundamental 160.00 %, RMS 255. mcyc
Sweep Mode:	Log

SWEEP/COMPRESSION TABLE -

Segment Number	Ending Frequency (Hz)	Sweep Rate (Oct/min)	Compression (%)
1	33	1.218	65

REFERENCE TABLE:

REFERENCE PARAMETERS -

Minimum Frequency:	4.000 Hz
Maximum Frequency:	33.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	15.910 dB
Minimum Acceleration (0-pk):	0.161 g
Maximum Acceleration (0-pk):	1.006 g
Maximum Velocity (0-pk):	0.157 m/s
Maximum Displacement (pk-pk):	5.000 mm

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	93.20	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No	88.55	AC	Accel	g			BB RMS
3	Auxiliary	No	71.00	AC	Accel	g			BB RMS
4	Auxiliary	No	64.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label	Documentation Label
1	Control	Yes	93.20	PILOTE P	Label 1
2	Auxiliary	No	88.55	1X SENSOR	Label 2
3	Auxiliary	No	71.00	1Y SENSOR	
4	Auxiliary	No	64.00	1Z SENSOR	

(12 Inactive Channels)

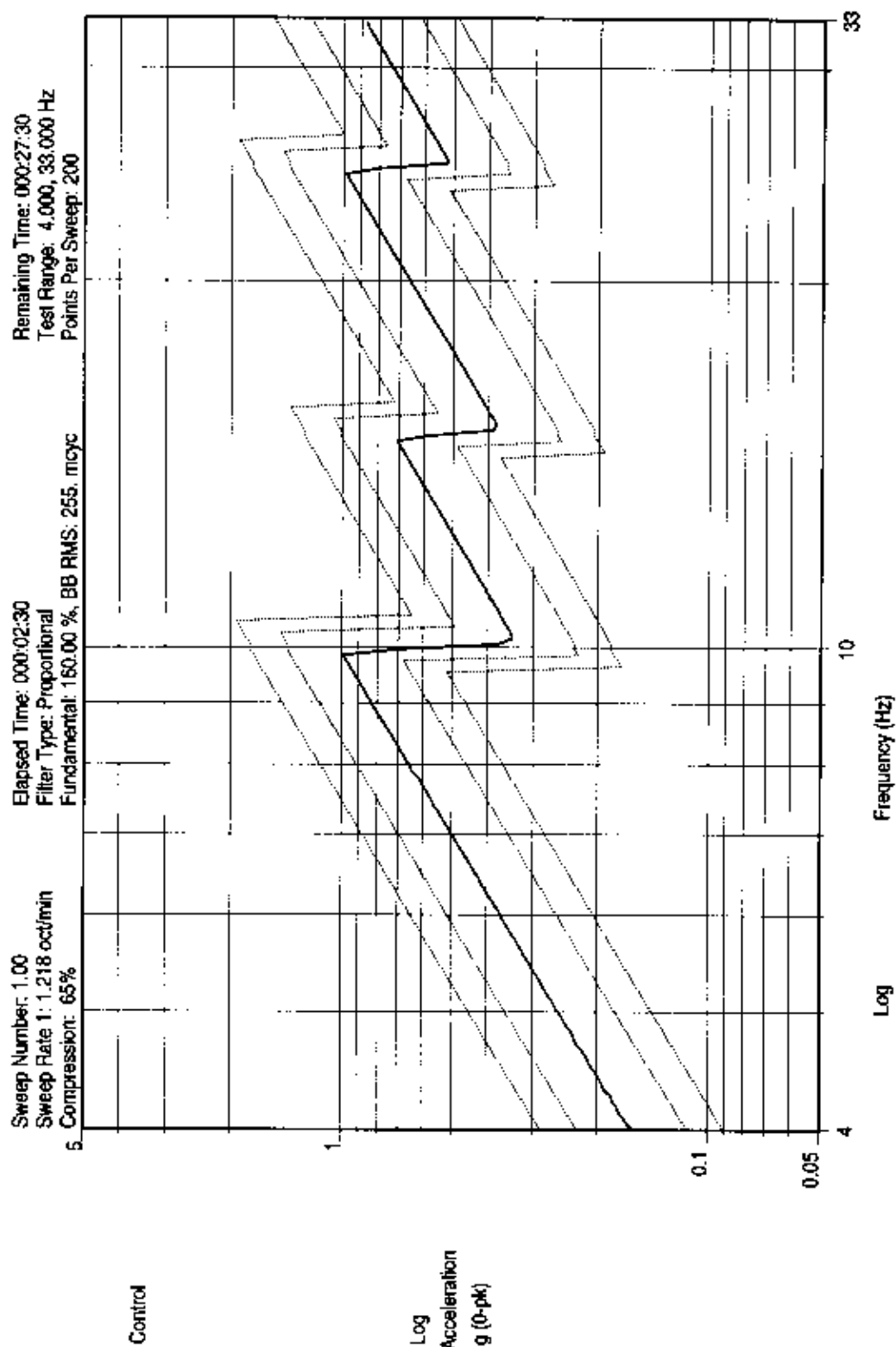
TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:			No
H(f)	Response	Reference	Label
Pair	Channel	Channel	
1	2	1	H(f) Pair Label 1

End of Sine Test Summary

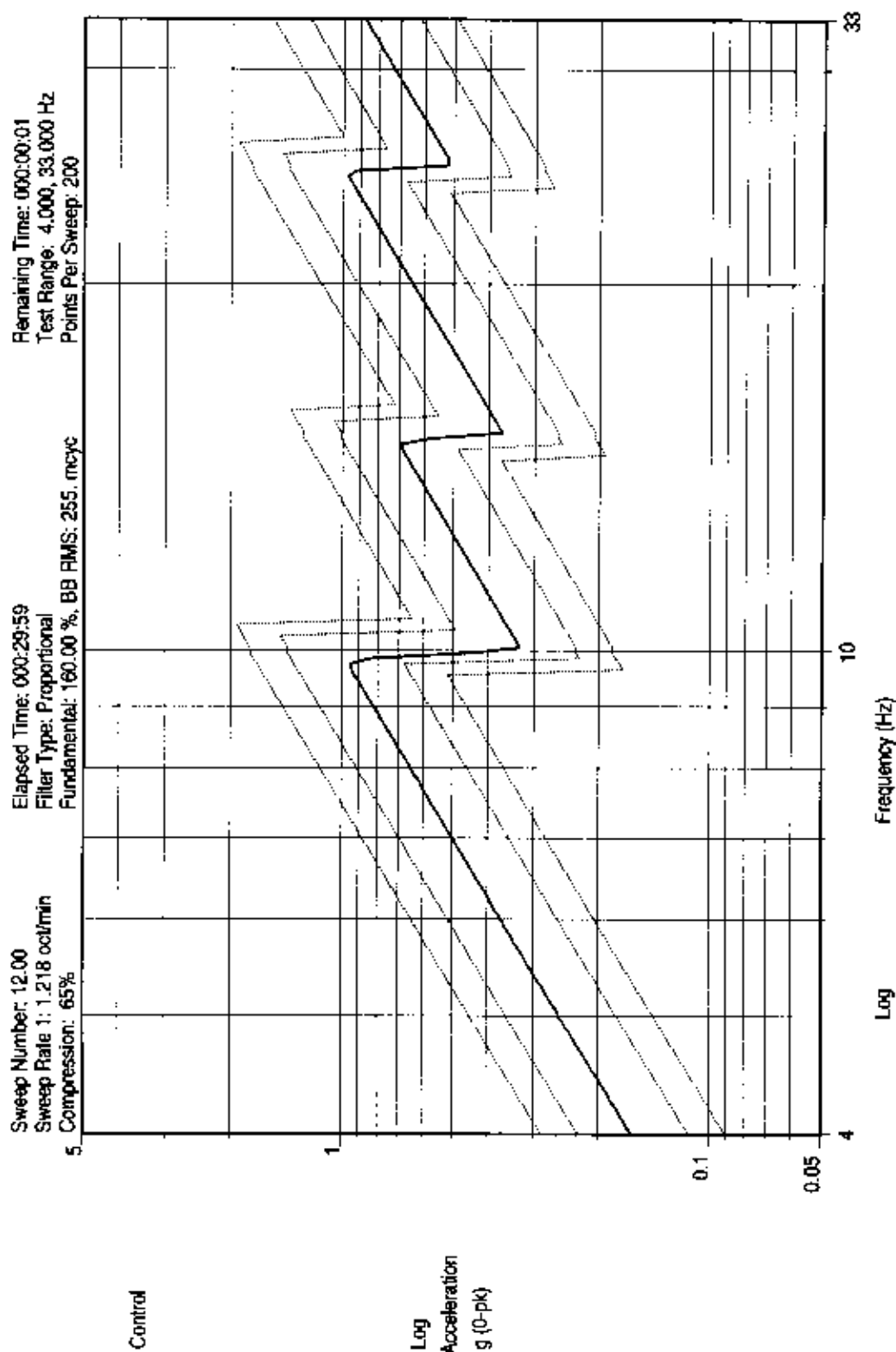
sine message log
1.00000

```
%Test: RTCM.011
%Log: /user/client/m3223/sine/log/RTCM.011.log
05/31/01
10:37:13 Loop Check Started...
10:37:13 Measuring Ambient Noise...
10:37:22 Searching for Threshold...
10:37:30 Loop Check Completed.
10:37:32 Increasing to Test Level...
10:38:23 Start Level Reached.
10:38:23 Test Starts at 4.000 Hz
10:40:54 Saved Sweep Number 1.00
10:43:24 Saved Sweep Number 2.00
10:45:54 Saved Sweep Number 3.00
10:48:24 Saved Sweep Number 4.00
10:50:53 Saved Sweep Number 5.00
10:53:23 Saved Sweep Number 6.00
10:55:53 Saved Sweep Number 7.00
10:58:23 Saved Sweep Number 8.00
11:00:53 Saved Sweep Number 9.00
11:03:23 Saved Sweep Number 10.00
11:05:53 Saved Sweep Number 11.00
11:08:23 Saved Sweep Number 12.00
11:08:23 Shutdown Initiated...
11:08:29 Saved Sweep Number 12.00
```



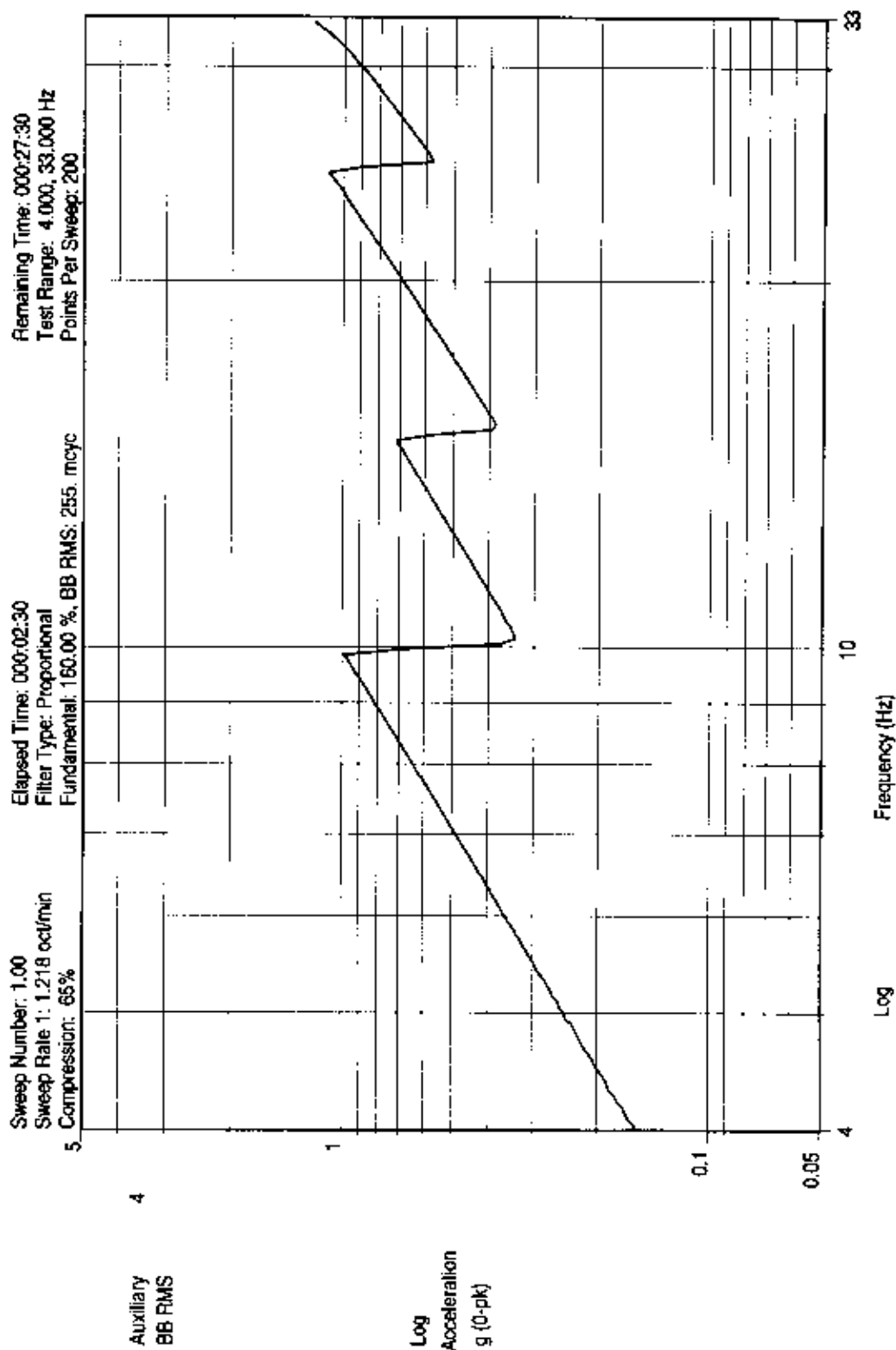
001Z TEST : RTCM MAY 2, 1997
M3223 - EPIRB ACR RLB35 S/N: 07
Sine Data Review Name: RTCM.011

10:40:54
Thu May 31 2001



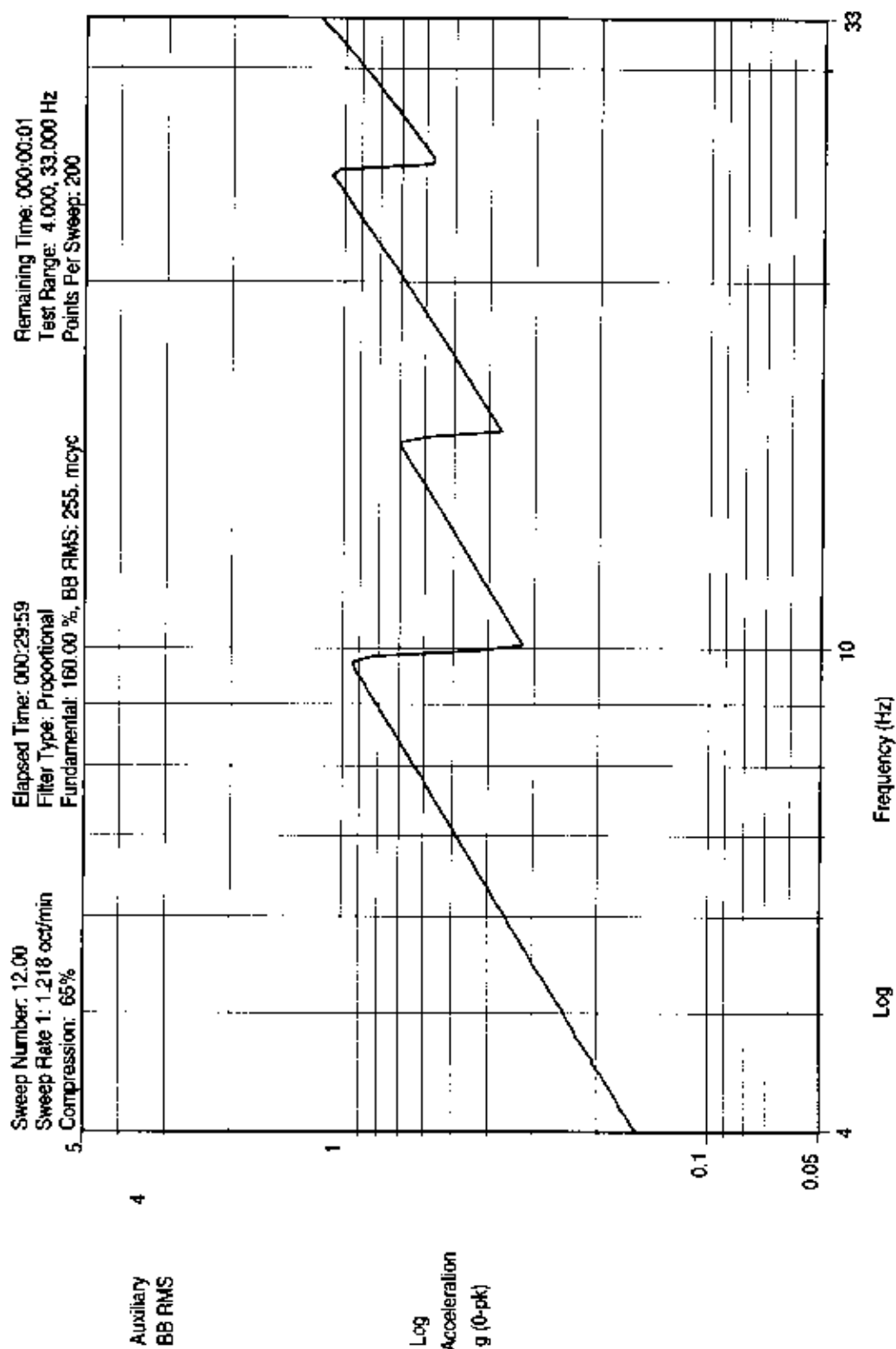
11:08:23
Thu May 31 2001

001Z TEST : RTCM MAY.2.1997
M3223 - EPIRB ACR RLB35 S/N: 07
Sine Data Review Name: RTCM.011



10:40:54
Thu May 31 2001

001Z TEST : RTCM MAY 2,1997
M3223 - EPIRB ACR RLB35 S/N: 07
Sine Data Review Name: RTCM.011



11:08:23

Thu May 31 2001

001Z TEST : RTCM MAY.2,1997

M3223 - EPIRB ACR RLB35 S/N: 07

Sine Data Review Name: RTCM:011

5.9.4. BEACON CHECKOUT

Test using a portable test bench and visual inspection confirmed that the beacon does not activate in an untimely manner during vibration testing.

5.9.5. FINAL CONTROL

5.9.5.1.External mechanical inspection.

A visual inspection was done on all external mechanical parts.

Result : nominal.

5.9.5.2.Aliveness test results

Result : nominal.

Data and graphs are reported next page

VIBRATION ALIVENESS TEST RESULTS

Beacon Unit : 1/2
 Name : ACR
 Type : RLB35
 Number : 07
 Bracket : ACR Universal Sea Shelter Id 18560

Date : June 1st, 2001

406 MHz Measurements

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.4
- Power risetime	ms	< 5	0.85
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT *			
- In band			OK-
- Carrier harmonics			
4 - DIGITAL MESSAGE GENERATOR *			
- Repetition rate			-
- Bit rate	bits/S	400 ± 4	401.28
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	519.35
- CW preamble	ms	160 ± 1.6	160.36
5 - DIGITAL MESSAGE *			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1029B4 / 1029B4
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 - FREQUENCY			
- Nominal value	KHz	406 025 ± 2	- 0.53974
- Short term stability		< 210 ⁻⁹ /100 ms	4.5 x 10 ⁻¹¹

* See data and graphs next pages

Date de l'essai 1 Jun 2001 15:20:08

Message balise

```

Message reçu          (1-144): FFFE2F96EE2EC0017FDFFC0A6D3783E0F66C
Format flag           (25): 1
Protocole flag        (26): 0
Code pays             (27-36): 0366
Pays                  : USA
Code protocole        (37-40): 1110
Protocole utilise     : Standard - Test
Identification        :
Numero                :
BCH 1 lu/calculé     (86-106/25-85): 1029B4/1029B4
BCH 2 lu/calculé     (133-144/107-132): 66C/66C
Pos. Data Source      (111): Internal
121.5 MHz Homing      (112): Yes
Position GPS de référence : N 43°33'34'' E 1°28'48
Position GPS          : Yes
Position GPS par défaut : Yes

```

Controle message

Duree de la porteuse pure	150.36ms +- 0.00
Duree de l'emission	519.35 ms
Frequence de modulation	401.28Hz +- 0.00

Stabilité de fréquence

Frequence moyenne	F2	405024460.26 Hz
SIGMA2	F2-F1	3.413E-10
SIGMA3	F3-F2	4.528E-11

Mesures d'indice

F	F1	G1
49459.51	233	60
49459.02	233	59

Excursion de phase totale	rd	≤ 2.48	2.30
Excursion de phase positive	rd	$0.96 < \leq 1.24$	1.13
Excursion de phase negative	rd	$-1.24 < \leq -0.96$	-1.17
Symetrie de l'excursion	a	≤ 5	1.54



L'Intelligence de l'Environnement

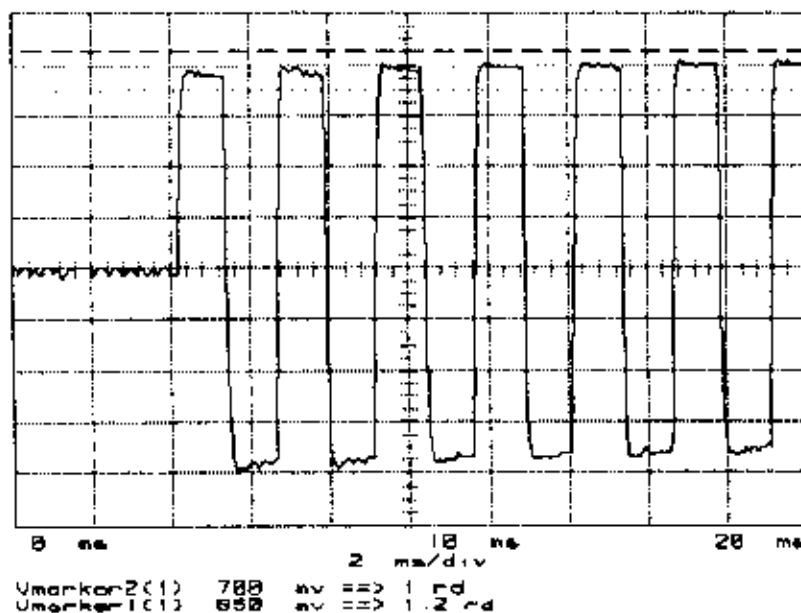
Mesures de puissance

Puissance

dBm

37.37

Oscillo



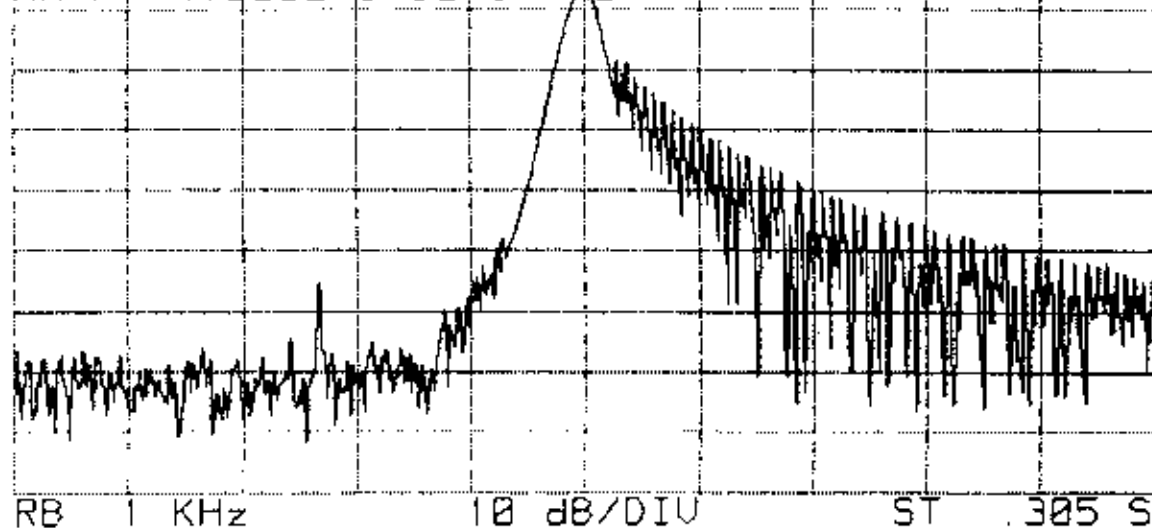
Spectre de fréquence

CF 486.025 MHz

SP 50 KHz

MR A 37.25 dBm

MK F 4.06024875E+8 Hz



CHAPTER 6

A6.0 – BUMP TEST

6.1. ADMINISTRATIVE INFORMATION

6.1.1. CLIENT

ACR Electronics Inc

6.1.2. REPRESENTATIVES PRESENT

For the Client : G. PEYROU ITS/AP/ET
For the Test Laboratory : J. M. BUCHMAN

6.1.3. DATES

Start of test : June 1st, 2001
End of test : June 1st, 2001

6.1.4. INTESPACE FILE REFERENCE : M2393-ETS/IEC

6.2. UNIT UNDER TEST (UUT)

Beacon Unit : 1/2
Name : ACR
Type : RLB35
Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

7.3. PURPOSE OF THE TEST

Functional checkout of hardware after vibration testing.

6.4. TEST EQUIPMENT

6.4.1. TEST DEVICES

Electrodynamic vibration table, type 80 kN-2 -GR3
Spectral Dynamics SD2225 digital control panel

6.4.2. METROLOGICAL EQUIPMENT

Control : accelerometer (analysis and processing)
Measurements : Spectral Dynamics SD2225
Electrical Beacon Checking : Argos - Cospas/Sarsat Test Bench

6.5. TEST PROCEDURE

6.5.1. AXIS (See photograph in § 6.7 page 6.4)

X-axis : parallel to the Beacon Bracket fixing plane and Beacon « widthways »
 Y-axis : perpendicular to the Beacon Bracket fixing plane and Beacon « widthways »
 Z-axis : parallel to the Beacon Bracket fixing plane and Beacon « lengthways »

6.5.2. MOUNTING

The beacon is secured to a light-alloy supporting square.

The complete assembly is firmly attached to the moving part of the vibration table according to the required axis.

6.5.3. TEST SPECIFICATIONS AND SEQUENCE

Bumps following

- Section 6.4 of ETS 300-066 (Second edition –September 1996)
- Section A1.5 of IEC 1097-2 (First edition –december 1994) and

- Profile of bump test :

Peak acceleration	98 m/s ²
Pulse duration	16 ms
Waveshape	Half-cycle Sinewave
Test axis	Vertical (Z)
Number of Bumps	4000

- Beacon control : Visual inspection and Aliveness test after the Ruggedness Tests

6.6. LIST OF SERVO AND CONTROL SENSORS

Sensor	Location	N° acc.	Cable	Sensitivity pC/g
P (servo)	Screwed on test holder sheet	CP91	BU03	9.32
1X (control)	Glued on Beacon Necklace	10922	12/2	2.80
1Y (control)	Glued on Beacon Necklace	5326	13/3	7.10
1Z (control)	Glued on Beacon Necklace	3748	11/4	6.40

6.7 PHOTOGRAPH



6.8. TEST SCHEDULE

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
June 1 st , 2001 PREL	Half-cycle sinewave Bump Peak acceleration 98 m/s ² Pulse duration 16 ms Test axis Vertical (+Z) Number of Bumps 1		Preliminary testing without the equipment	
June 1 st , 2001 004Z+	Half-cycle sinewave Bump Peak acceleration 98 m/s ² Pulse duration 16 ms Test axis Vertical (+Z) Number of Bumps 2000 Test duration : 50 min.	6.9.1	Nominal	Set up the beacon on test table on Zaxis (80 kN) . Functional testing : nominal.
June 1 st , 2001 004Z-	Half-cycle sinewave Bump Peak acceleration 98 m/s ² Pulse duration 16 ms Test axis Vertical (-Z) Number of Bumps 2000 Test duration : 50 min.	6.9.2	Nominal	Functional testing : nominal.
June 1 st , 2001	Visual inspection	6.9.4.1	End of the bump test	Removal of Beacon Nothing abnormal to note
June 1 st , 2001	EPFRB Aliveness Test	6.9.4.2	Cospas Sarsat Test Bench	Nominal

6.9. TEST RESULTS

6.9.1. RESULTS OF +Z BUMP AXIS (2000 bumps)



Intespace Version 3.8.0 Test File Listing

File Name: /user/client/m3223/shock/test/10gpos

Current Date: Fri Jun 01 2001 09:08:43

CONTROL PARAMETERS:

DURATION -

Number of Full Level Pulses: 2000
Delay between Pulses: 1000.0 ms

CONTROL STRATEGY -

Drive Update: On
Pulse Output Polarity: +
Weighting for Averaging: 0.125
Feedback Gain: 0.750
Waveform Trend Removal: Enable

OPERATION MODE -

Mode: Semi-Automatic

EQUALIZATION & SYSTEM IDENTIFICATION-

Start Level: -15.0 dB
Initial Excitation: Pulse
Prestored Drive: Off

STARTUP -

Initial Test Level: -11.0 dB
Level Increment: 3.0 dB
Delay between Pulses: 1000.0 ms

REFERENCE PARAMETERS:

REFERENCE PULSE -

Pulse Type: Half Sine
Pulse Amplitude: 10.00 g
Pulse Duration: 18.00 ms
Specify Buffer Duration: No
Buffer Duration: 200.00 ms
Center Pulse in Buffer: Yes
Sample Rate Multiplier: 5.12
Units for Accel, Vel, and Displ: g, m/s, mm

PULSE COMPENSATION -

Type: Pre- and Post-Pulse
Optimization: Single Sided Displacement
Pre-Pulse Amplitude: 20.0 %
Post-Pulse Amplitude: 20.0 %

PULSE DISPLAY TOLERANCE BANDS -

Type: None

PULSE DYNAMIC LIMITS -

Input Volts: 0.93 V
Acceleration: 9.98 g -2.00 g
Velocity: 0.56 m/s -0.56 m/s
Displacement: 0.04 mm -15.68 mm
Sample Rate: 1280.00 Hz

SRS ANALYSIS PARAMETERS -

SRS Spacing: 1/3 octave
SRS Filter Definition: Absolute Acceleration
SRS Damping: 5.00 %
SRS Q: 10.00

SAFETY PARAMETERS:

ALARM/ABORTS -

Maximum Average Error -
Alarm: 10.00 %
Abort: 20.00 %
Maximum Peak Error -
Alarm: 20.00 %
Abort: 50.00 %

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
Maximum Drive: 100.00 mV RMS



Loop Check:

Yes

Maximum Drive:

6.00 Vpeak

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/g)	Channel Label 1	Label 2
1	Control	Yes	93.2	PILOTE P	
2	Auxiliary	No	88.55	1X SENSOR	
3	Auxiliary	No	71	1Y SENSOR	
4	Auxiliary	No	64	1Z SENSOR	

DOCUMENTATION:

Display Text -

Title 1: 004Z+ TEST : RTCM + ETS 300 066 + IEC 1097.2

Title 2: M3223 - EPIRB RLB35 S/N: 07 - POSITIVE BUMP TEST

List Only Text -

Title 3:

Prompt before Test:

Yes

Data Storage -

Mode:

Manual

Message Log -

Mode:

Use Run Number

Printing -

Auto Plot after Test:

No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication:

No

SHAKER LIMITS:

Enable Shaker Limits:

Yes

File Name:

80kN

Shaker Description: Shaker 80kN Limits

Symmetric Values: NO

Acceleration (+g): 100.000

(-g): -100.000

Velocity (+m/s): 2.000

(-m/s): -2.000

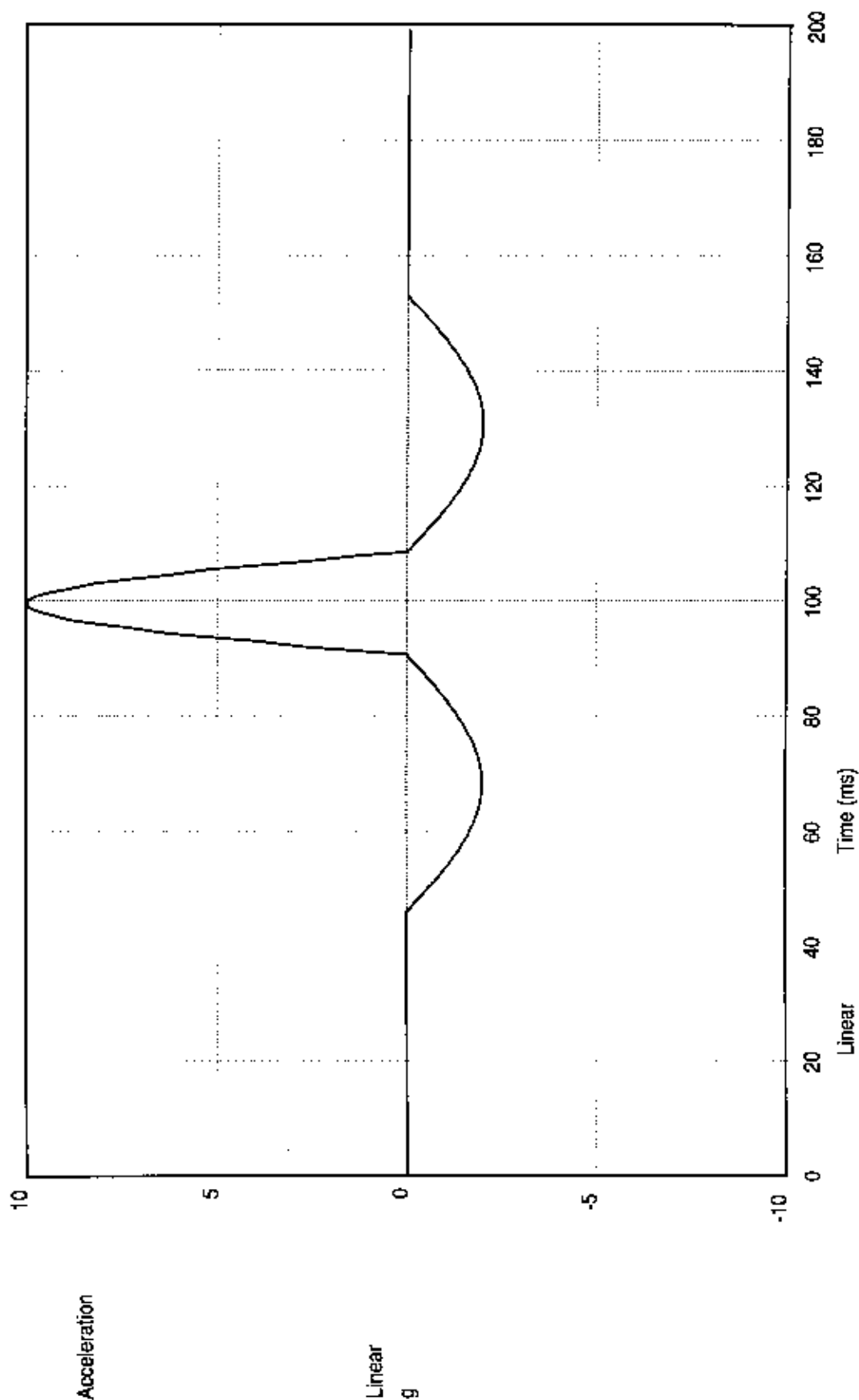
Displacement (+mm): 25.400

(-mm): -25.400

Voltage (+v): 10.000

(-v): -10.000

End of Classical Shock Test List





Intespace Version 3.8.0 Test Summary Listing

Unité de l'Environnement

Test Name:

10gpos.001

Fri Jun 01 2001 09:47:23

DOCUMENTATION:

Title 1: 004Z+ TEST : RTCM + ETS 300 066 + IEC 1097.2

Title 2: M3223 - EPIRB RLB35 S/N: 07 - POSITIVE BUMP TEST

Title 3:

TEST RESULTS:

Time at Shutdown:	09:47:07
Date at Shutdown:	01-Jun-2001
Test Completed Normally	
Last Pulse Output	
Pulse Amplitude:	9.97 g
Test Level:	0.00 dB
Polarity:	+
Average Error (Time Domain):	0.24 %
Peak Error (Time Domain):	0.32 %
Pulses Requested:	2000
Pulses Remaining:	0
Table of Alarms	Occurrences Maximum Value
Average Error:	0
Peak Error:	0
Maximum Drive:	0
Input Overload:	0

TABLE OF OUTPUTS:

Level	Number of Outputs
	Positive Negative
0.00	2000
-2.00	1
-5.00	1
-8.00	1
-11.00	1
-15.00	11

REFERENCE PARAMETERS:

REFERENCE PULSE -

Pulse Type:	Half Sine
Pulse Amplitude:	10.00 g
Pulse Duration:	18.00 ms

PULSE DYNAMIC LIMITS -

Acceleration:	9.98 g	-2.00 g
Velocity:	0.56 m/s	-0.56 m/s
Displacement:	0.04 mm	-15.68 mm
Sample Rate:	1280.00 Hz	

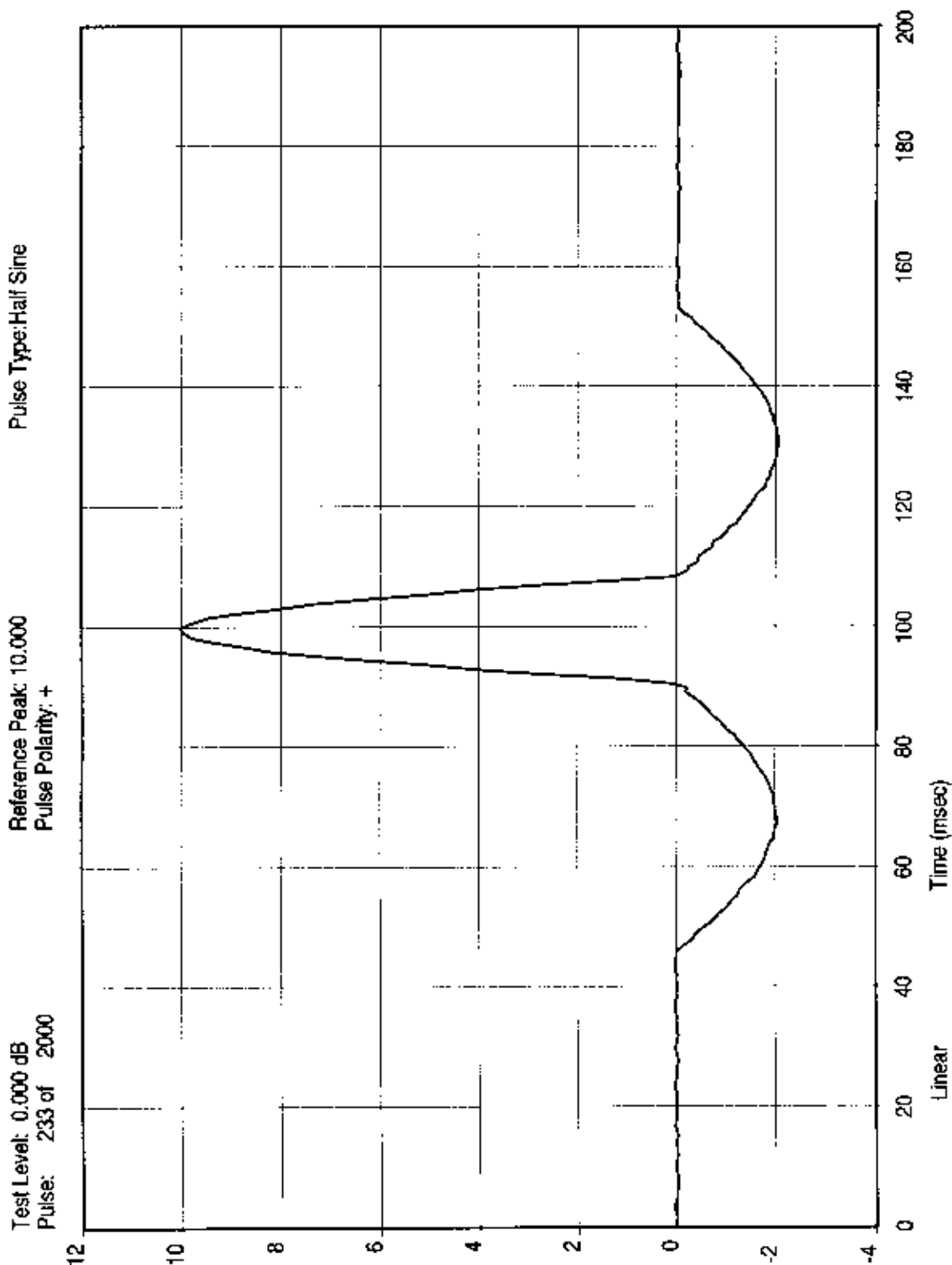
SRS ANALYSIS PARAMETERS -

SRS Spacing:	1/3 octave
SRS Filter Definition:	Absolute Acceleration
SRS Damping:	5.00 %
SRS Q:	10.00

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/g)	Channel Label 1	Label 2
1	Control	Yes	93.2	PILOTE P	
2	Auxiliary	No	88.55	1X SENSOR	
3	Auxiliary	No	71	1Y SENSOR	
4	Auxiliary	No	64	1Z SENSOR	

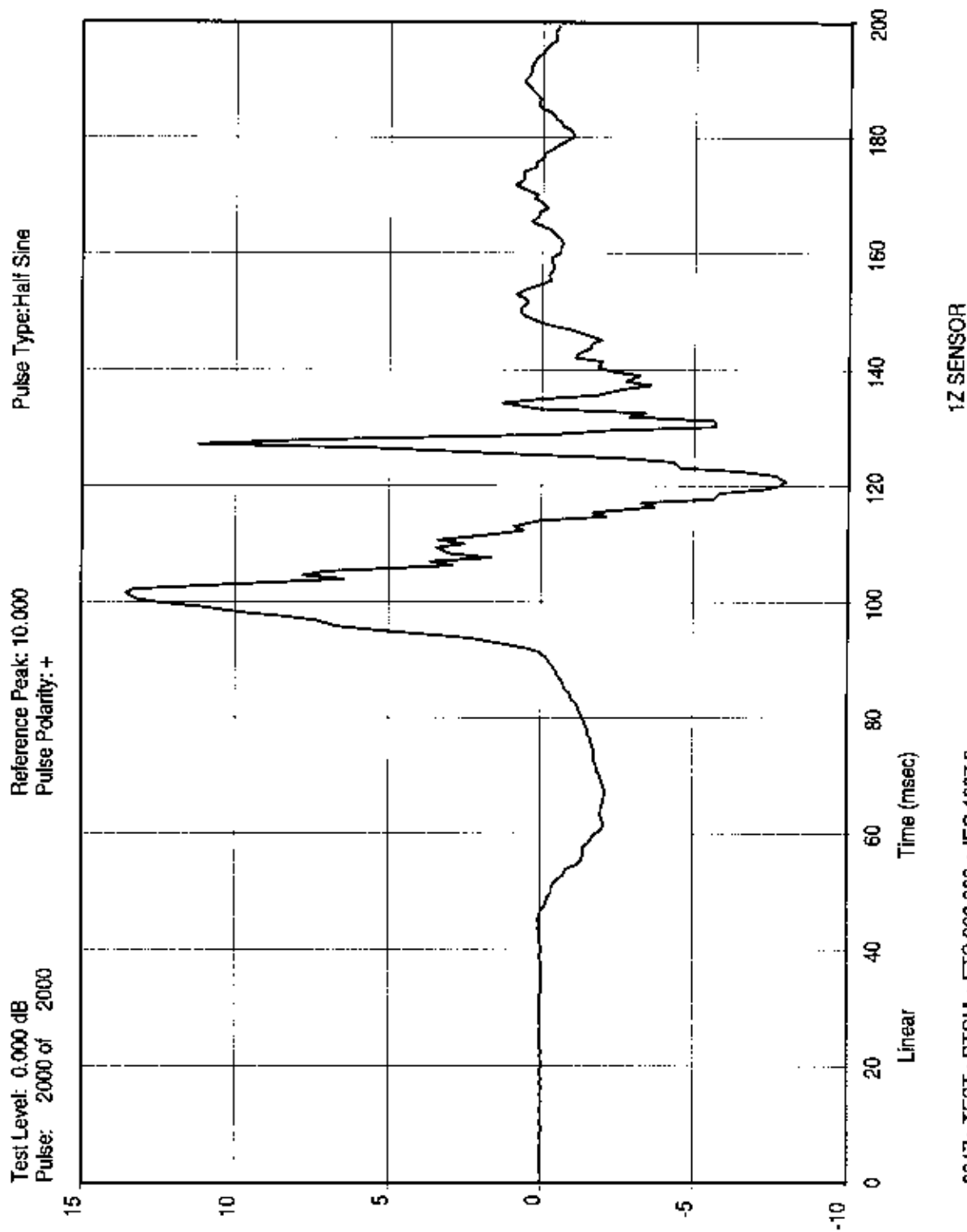
End of Classical Shock Test Summary List



PILOTE P

004Z+ TEST : RTCM + ETS 300 066 + IEC 1097.2
M2393 - EPIRB RLB35 S/N: 07 - POSITIVE BUMP TEST

Classical Shock Data Review Name: /user/client/m3223/shock/data/10gpos.001



6.9.1. RESULTS OF -Z BUMP AXIS (2000 bumps)

 **Intespace** Version 3.8.0 Test File Listing
 Intelligence de l'Environnement
 File Name: /user/client/m3223/shock/test/10gneg
 Current Date: Fri Jun 01 2001 09:50:02

CONTROL PARAMETERS:

DURATION -

Number of Full Level Pulses: 2000
 Delay between Pulses: 1000.0 ms

CONTROL STRATEGY -

Drive Update: On
 Pulse Output Polarity: -
 Weighting for Averaging: 0.125
 Feedback Gain: 0.750
 Waveform Trend Removal: Enable

OPERATION MODE -

Mode: Semi-Automatic

EQUALIZATION & SYSTEM IDENTIFICATION-

Start Level: -15.0 dB
 Initial Excitation: Pulse
 Prestored Drive: Off

STARTUP -

Initial Test Level: -11.0 dB
 Level Increment: 3.0 dB
 Delay between Pulses: 1000.0 ms

REFERENCE PARAMETERS:

REFERENCE PULSE -

Pulse Type: Half Sine
 Pulse Amplitude: 10.00 g
 Pulse Duration: 18.00 ms
 Specify Buffer Duration: No
 Buffer Duration: 200.00 ms
 Center Pulse in Buffer: Yes
 Sample Rate Multiplier: 5.12
 Units for Accel, Vel, and Displ: g, m/s, mm

PULSE COMPENSATION -

Type: Pre- and Post-Pulse
 Optimization: Single Sided Displacement
 Pre-Pulse Amplitude: 20.0 %
 Post-Pulse Amplitude: 20.0 %

PULSE DISPLAY TOLERANCE BANDS -

Type: None

PULSE DYNAMIC LIMITS -

Input Volts: 0.93 V
 Acceleration: 9.98 g -2.00 g
 Velocity: 0.56 m/s -0.56 m/s
 Displacement: 0.04 mm -15.68 mm
 Sample Rate: 1280.00 Hz

SRS ANALYSIS PARAMETERS -

SRS Spacing: 1/3 octave
 SRS Filter Definition: Absolute Acceleration
 SRS Damping: 5.00 %
 SRS Q: 10.00

SAFETY PARAMETERS:

ALARM/ABORTS -

Maximum Average Error -
 Alarm: 10.00 %
 Abort: 20.00 %
 Maximum Peak Error -
 Alarm: 20.00 %
 Abort: 50.00 %

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Maximum Drive: 100.00 mV RMS



Loop Check:

Yes

DRIVE SIGNAL -

Maximum Drive:

6.00 Vpeak

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/g)	Channel Label 1	Label 2
1	Control	Yes	93.2	PILOTE P	
2	Auxiliary	No	88.55	1X SENSOR	
3	Auxiliary	No	71	1Y SENSOR	
4	Auxiliary	No	64	1Z SENSOR	

DOCUMENTATION:

Display Text -

Title 1: 004Z- TEST : RTCM + ETS 300 066 + IEC 1097.2

Title 2: M3223 - EPIRB RLB35 S/N: 07 - NEGATIVE BUMP TEST

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Mode: Manual

Message Log -

Mode: Use Run Number

Printing -

Auto Plot after Test: No

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: Yes

File Name: 80kN

Shaker Description: Shaker 80kN Limits

Symmetric Values: NO

Acceleration (+g): 100.000 (-g): -100.000

Velocity (+m/s): 2.000 (-m/s): -2.000

Displacement (+mm): 25.400 (-mm): -25.400

Voltage (+v): 10.000 (-v): -10.000

End of Classical Shock Test List

Test Name: 10gneg.002
 Current Date: Fri Jun 01 2001 10:59:30

DOCUMENTATION:

Title 1: 004Z- TEST : RTCM + ETS 300 066 + IEC 1097.2
 Title 2: M3223 - EPIRB RLB35 S/N: 07 - NEGATIVE BUMP TEST
 Title 3:

TEST RESULTS:

Time at Shutdown: 10:59:10
 Date at Shutdown: 01-Jun-2001
 Test Completed Normally
 Last Pulse Output
 Pulse Amplitude: -10.00 g
 Test Level: 0.00 dB
 Polarity: -
 Average Error (Time Domain): 0.22 %
 Peak Error (Time Domain): 0.02 %
 Pulses Requested: 2000
 Pulses Remaining: 0

Table of Alarms	Occurrences	Maximum Value
Average Error:	0	
Peak Error:	0	
Maximum Drive:	0	
Input Overload:	2	

TABLE OF OUTPUTS:

Level	Number of Outputs	
	Positive	Negative
0.00		2000
-2.00		1
-5.00		1
-8.00		1
-11.00		1
-15.00		11

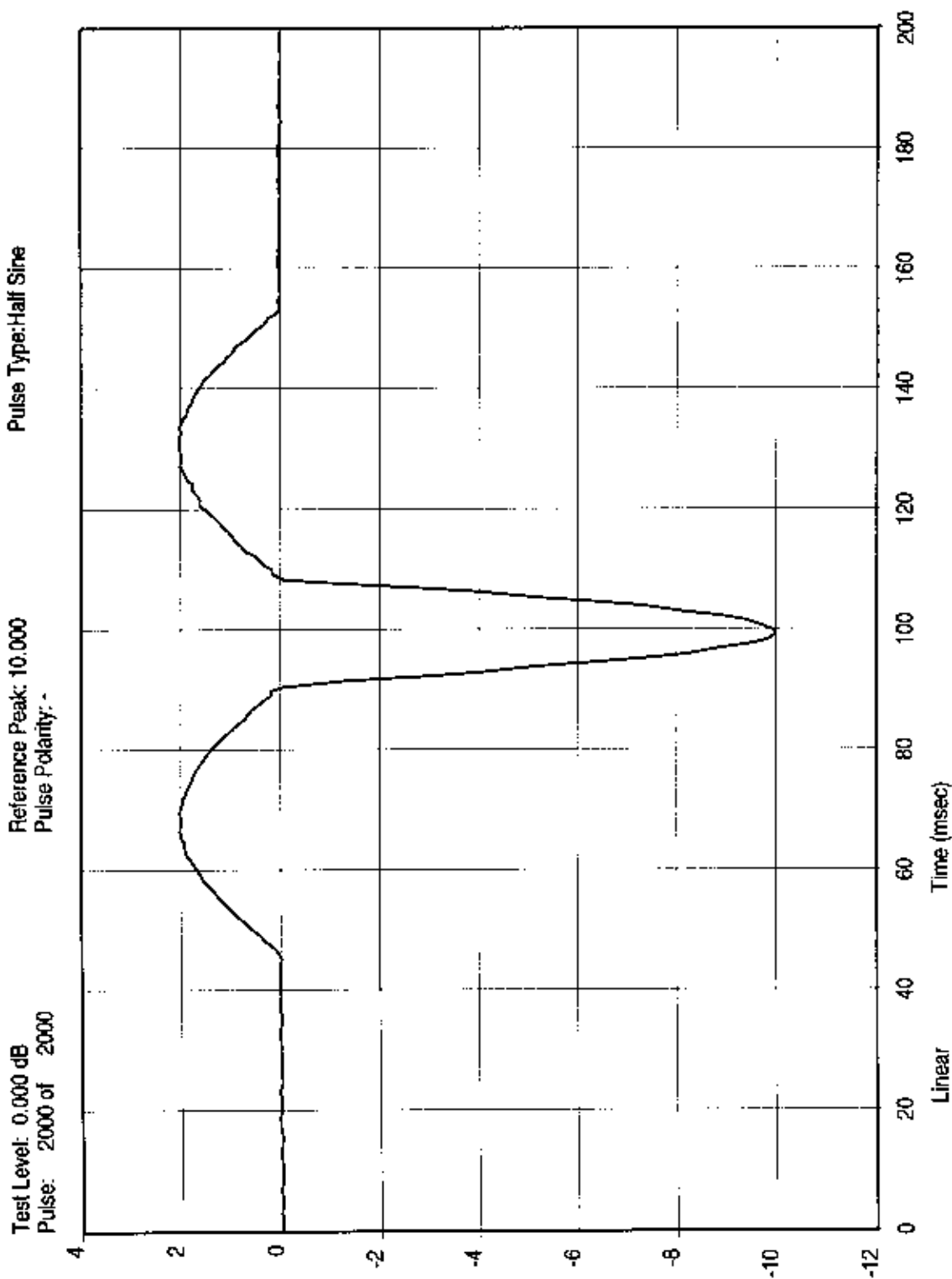
REFERENCE PARAMETERS:

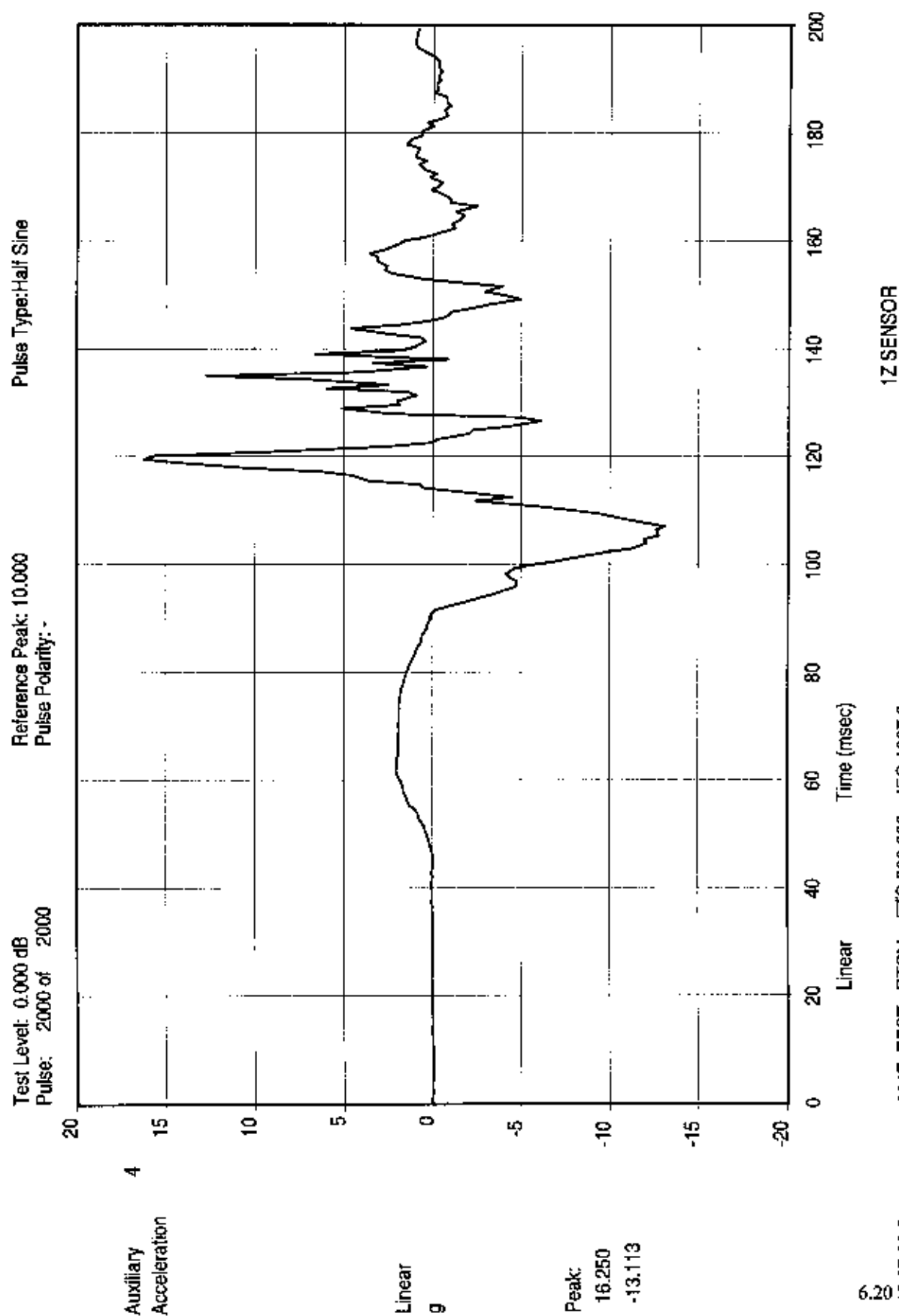
REFERENCE PULSE -
 Pulse Type: Half Sine
 Pulse Amplitude: 10.00 g
 Pulse Duration: 18.00 ms
 PULSE DYNAMIC LIMITS -
 Acceleration: 9.98 g -2.00 g
 Velocity: 0.56 m/s -0.56 m/s
 Displacement: 0.04 mm -15.68 mm
 Sample Rate: 1280.00 Hz
 SRS ANALYSIS PARAMETERS -
 SRS Spacing: 1/3 octave
 SRS Filter Definition: Absolute Acceleration
 SRS Damping: 5.00 %
 SRS Q: 10.00

CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/g)	Channel Label 1	Label 2
1	Control	Yes	93.2	PILOTE P	
2	Auxiliary	No	88.55	1X SENSOR	
3	Auxiliary	No	71	1Y SENSOR	
4	Auxiliary	No	64	1Z SENSOR	

End of Classical Shock Test Summary List





004Z- TEST : RTCM + ETS 300 066 + IEC 1097.2
M3223 - EPIRB RLB35 S/N: 07 - NEGATIVE BUMP TEST
Classical Shock Test Name: 10gneg.002

6.20
10:37:02.2
Fri Jun 01 2001

6.9.3. BEACON CHECKOUT

Test using a portable test bench and visual inspection confirmed that the beacon does not activate in an untimely manner during vibration testing.

6.9.4. FINAL CONTROL

6.9.4.1.External mechanical inspection.

A visual inspection was done on all external mechanical parts.

Result : nominal.

6.9.4.2.Aliveness test results

Result : nominal.

Data and graphs are reported next pages

BUMP ALIVENESS TEST RESULTS

Beacon Unit : 1/2
 Name : ACR
 Type : RLB35
 Number : 07
 Bracket : ACR Universal Sea Shelter Id 18560

Date : June 1st, 2001

406 MHz Measurements

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.4
- Power risetime	ms	< 5	0.85
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT *			
- In band			OK-
- Carrier harmonics			
4 - DIGITAL MESSAGE GENERATOR *			
- Repetition rate			-
- Bit rate	bits/S	400 ± 4	401.28
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	519.35
- CW preamble	ms	160 ± 1.6	160.36
5 - DIGITAL MESSAGE *			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1029B4 / 1029B4
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 - FREQUENCY			
- Nominal value	KHz	406 025 ± 2	- 0.53974
- Short term stability		< 210 ⁻⁹ /100 ms	4.5 x 10 ⁻¹¹

* See data and graphs next pages

Laboratoire de certification
Contrôle balise ARGOS/SARSAT

Constructeur ACR
Modèle RLB35
Numéro de série 07
Référence M3223-1
Type SARSAT

Date de l'essai 1 Jun 2001 15:20:08

Message balise

Message reçu (1-144): FFFE2F96EE2EC0017FDFFCOA6D3783E0F56C
Format flag (25): 1
Protocole flag (26): 0
Code pays (27-36): 0366
Pays : USA
Code protocole (37-40): 1110
Protocole utilisé : Standard - Test
Identification :
Numéro :
BCH 1 lu/calculé (86-106/25-85): 1029B4/1029B4
BCH 2 lu/calculé (133-144/107-132): 66C/66C
Pos. Data Source (111): Internal
121.5 MHz Homing (112): Yes
Position GPS de référence : N 43°33'34'' E 1°28'48
Position GPS : Yes
Position GPS par défaut : Yes

Contrôle message

Durée de la porteuse pure 160.36ms +/- 0.00
Durée de l'émission 519.35 ms
Fréquence de modulation 401.28Hz +/- 0.00

Stabilité de fréquence

Fréquence moyenne F2 406024460.26 Hz
SIGMA2 F2-F1 3.413E-10
SIGMA3 F3-F2 4.528E-11

Mesures d'indice

F	F1	G1
49459.51	233	60
49459.02	233	59

Excursion de phase totale	rd	<= 2.48	2.30
Excursion de phase positive	rd	0.96< <1.24	1.13
Excursion de phase négative	rd	-1.24< <-0.96	-1.17
Symétrie de l'excursion	%	<= 5	1.54



L'Intelligence de l'Environnement

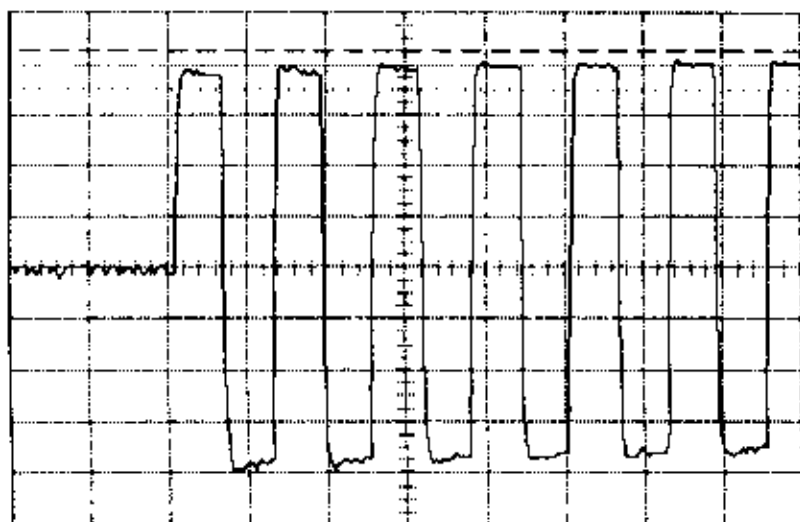
Mesures de puissance

Puissance

dBm

37.37

Oscillo



Umarker2(1) 788 mV ==> 1.7d
Umarker1(1) 650 mV ==> 1.2d

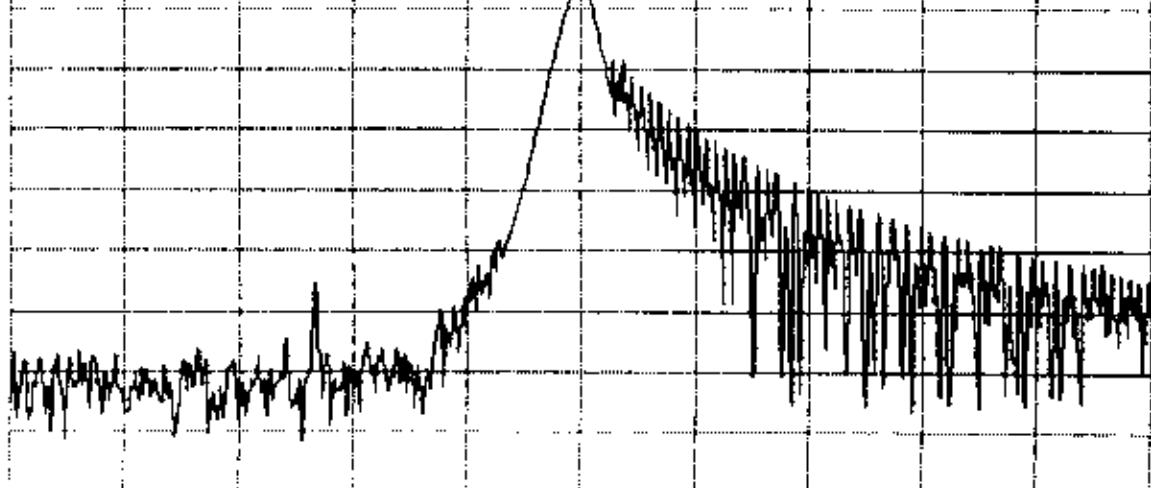
Spectre de fréquence

CF 406.025 MHz

SP 50 KHz

MR A 37.25 dBm

MK F 4.06024875E+8 Hz



RB 1 KHz

10 dB/DIV

ST 305 S

CHAPTER 7

A7.0 – SALT FOG TEST

7.1. TEST SPECIFICATIONS AND SEQUENCE

Following :

- Section A7.0 of RTCM Recommended Standards for 406 MHz Satellite EPIRBs (Version 2.0 Feb 5,1997) ;

Note : The EPIRB hereby considered has been also tested following :

- Section 6.5 of ETS 300-066 (Second edition –September 1996) ;
- Section A1.6 of IEC 1097-2 (First edition –december 1994) and
- Section 8.12 of EN 60945 (May 1997)

7.2. EQUIPMENT UNDER TEST

Beacon Unit : 1/2
Name : ACR
Type : RLB35
Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

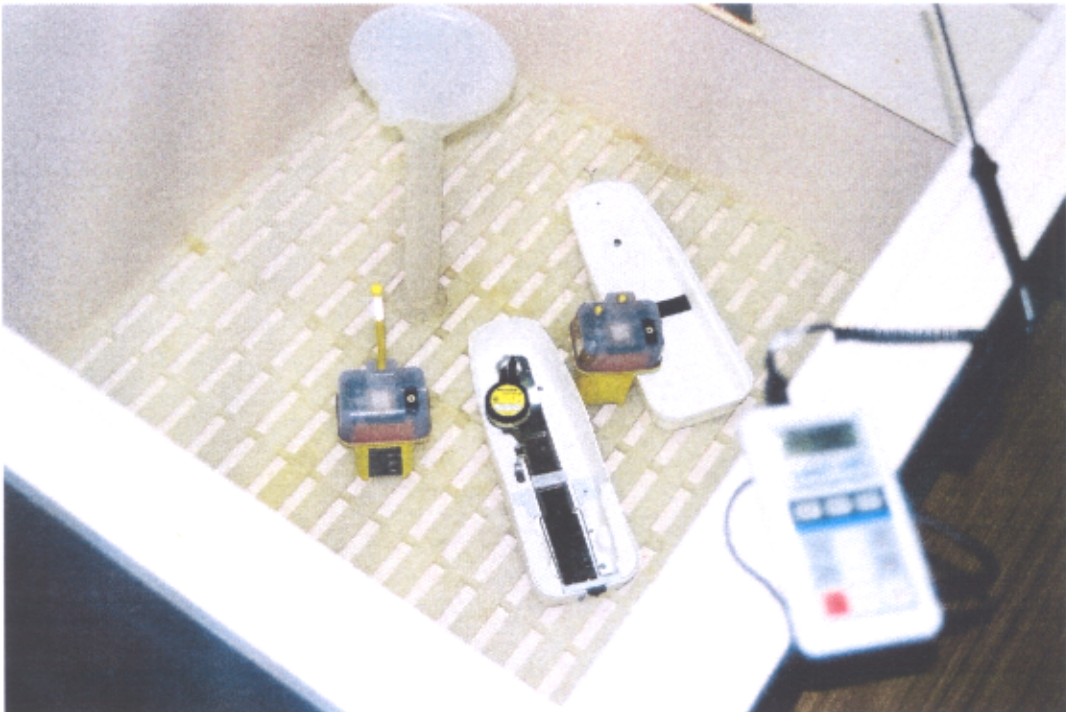
7.3. TEST SITE

Toulouse Space Center (C.S.T.) - INTESPACE Laboratory.

7.4. TEST EQUIPMENT

- Salt fog chamber SAPRATIN S /N : 229 (see photo page 7.3),
- Salt solution : Mil-Std-810 D (July 19th, 1983), method 509.2.
- Climatic chamber : CLIMATS P.C.H. – Type: Austral 137H60/1,5E - S/N: S4880.
- COLE PARMER thermo-hygrometer, Type : TriSense S/N : 37000-00,
- KEITHLEY thermometer/multimeter ,Type : 2000, S/N 0678112 with CU-CT thermocoupler.
- Argos - Cospas/Sarsat Test Bench.

SALT FOG TEST



7.5. TEST RESULTS

Note : The salt fog test has been conducted in two times :

- 1) First : following RTCM Recommended Standard
- 2) Second : following ETS / IEC Standards (The RTCM period has been considered as first time period of ETS/IEC specifications)

7.5.1 Test implementation

Place : INTESPACE Laboratory

Date	Hour	Events - Observations
April 27 th ,2001	15h	Salt bath preparation ; warming up of the chamber with beacon in it bracket
	17h	Salt fog injection (5% of NaCl) at $40^{\circ}\text{C} \pm 2^{\circ}\text{C} \geq 48 \text{ h}$
May 2 nd ,2001	8h	Salt fog injection stopped. Beacon dried during 24 h at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$
May 3 rd ,2001	10h	Salt fog injection at $40^{\circ}\text{C} \pm 2^{\circ}\text{C} \geq 12 \text{ h}$
May 4 th ,2001	10h	Salt fog injection stopped.
	11h30	Visual inspection at $\approx 22^{\circ}\text{C}$: OK . Nothing abnormal to note .
	14h	Electrical checks : See results of aliveness after RTCM salt fog test next page § 7.5.2
	15h	Beacon in FB4 bracket placed in the salt fog chamber at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$
	16h	Salt fog injection (5% of NaCl) at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 1 hour
	17h	Salt fog injection stoped and begining of first storage period at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $93 \% \pm 3 \%$ of HR
May 11 th ,2001	16h	Salt fog injection (5% of NaCl) at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 1 hour
	17h	Salt fog injection stopped and begining of second storage period at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $93 \% \pm 3 \%$ of HR
May 18 th ,2001	16h	Salt fog injection (5% of NaCl) at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 1 hour
	17h	Salt fog injection stopped and begining of second storage period at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $93 \% \pm 3 \%$ of HR
May 28 th ,2001	10h	End of salt fog test
	16h	Visual Inspection at 22°C : OK . Nothing abnormal to note Electrical checks : See results of aliveness after ETS/IEC salt fog test next page § 7.5.3

7.5.2 ALIVENESS TEST RESULTS AFTER RTCM SALT FOG TEST

Beacon Unit : 1/2
 Name : ACR
 Type : RLB35
 Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

406 MHZ MEASUREMENTS

May 4th,2001

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.4
- Power risetime	ms	< 5	0.85 ms
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics			
4 -DIGITAL MESSAGE GENERATOR			
- Repetition rate			OK
- Bit rate	bits/S	400 ± 4	401.31
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	519.36
- CW preamble	ms	160 ± 1.6	160.38
5 - DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1029B4 / 1029B4
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 - FREQUENCY			
- Nominal value	KHz	406 025 ± 2	-0.52587
- Short term stability		< 2x10 ⁻⁹ /100 ms	2.3 x 10 ⁻¹⁰

* See data and graphs next pages

Laboratoire de certification
Contrôle balise ARGOS/SARSAT

Constructeur ACR
 Modèle RLB35
 Numéro de série 07
 Référence M3223-1
 Type SARSAT

Date de l'essai 4 May 2001 14:04:58

Message balise

Message reçu (1-144): FFPE2F96EE2EC0017FDFPCOA6D3783E0F66C
 Format flag (25): 1
 Protocole flag (26): 0
 Code pays (27-36): 0366
 Pays : USA
 Code protocole (37-40): 1110
 Protocole utilisé : Standard - Test
 Identification :
 Numéro :
 BCH 1 lu/calculé (85-106/25-85): 1029B4/1029B4
 BCH 2 lu/calculé (133-144/107-132): 66C/66C
 Pos. Data Source (111): Internal
 121.5 MHz Homing (112): Yes
 Position GPS de référence : N 43°33'34'' E 1°28'48
 Position GPS : Yes
 Position GPS par défaut : Yes

Contrôle message

Durée de la porteuse pure 160.38ms +- 0.00
 Durée de l'émission 519.36 ms
 Fréquence de modulation 401.31Hz +- 0.00

Stabilité de fréquence

Fréquence moyenne F2 406024474.13 Hz
 SIGMA2 F2-F1 6.095E-10
 SIGMA3 F3-F2 2.299E-10

Mesures d'indice

F	F1	G1
49473.67	233	60
49473.5	233	59

Excursion de phase totale	rd	<= 2.48	2.23
Excursion de phase positive	rd	0.96< <1.24	1.14
Excursion de phase négative	rd	-1.24< <-0.96	-1.09
Symétrie de l'excursion	%	<= 5	-2.14

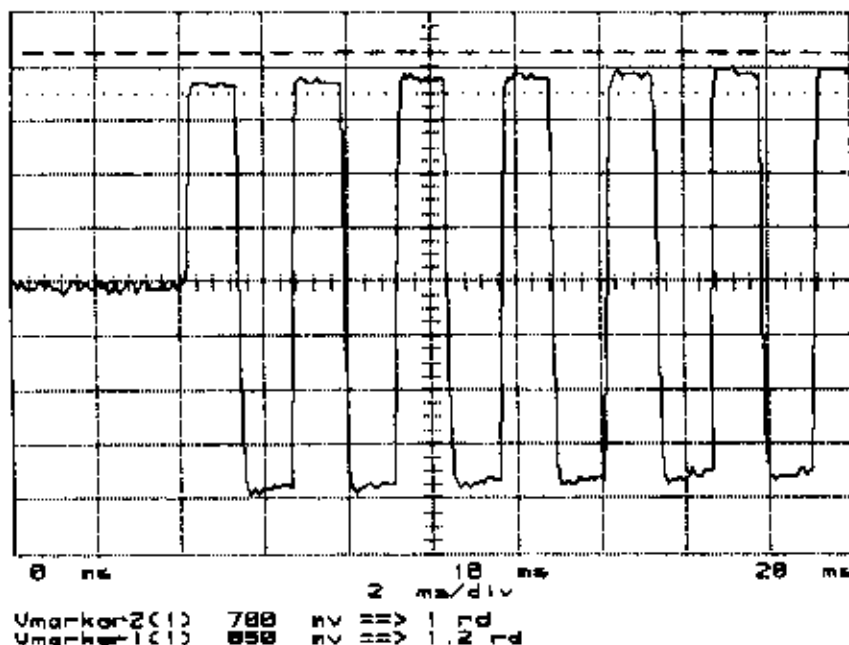
PRINT ON THIS SIDE ONLY HEWLETT PACKARD JETPLA R10RDE1... 97261 X AUKO 10 30

Puissance

dBm

37.41

Oscillo



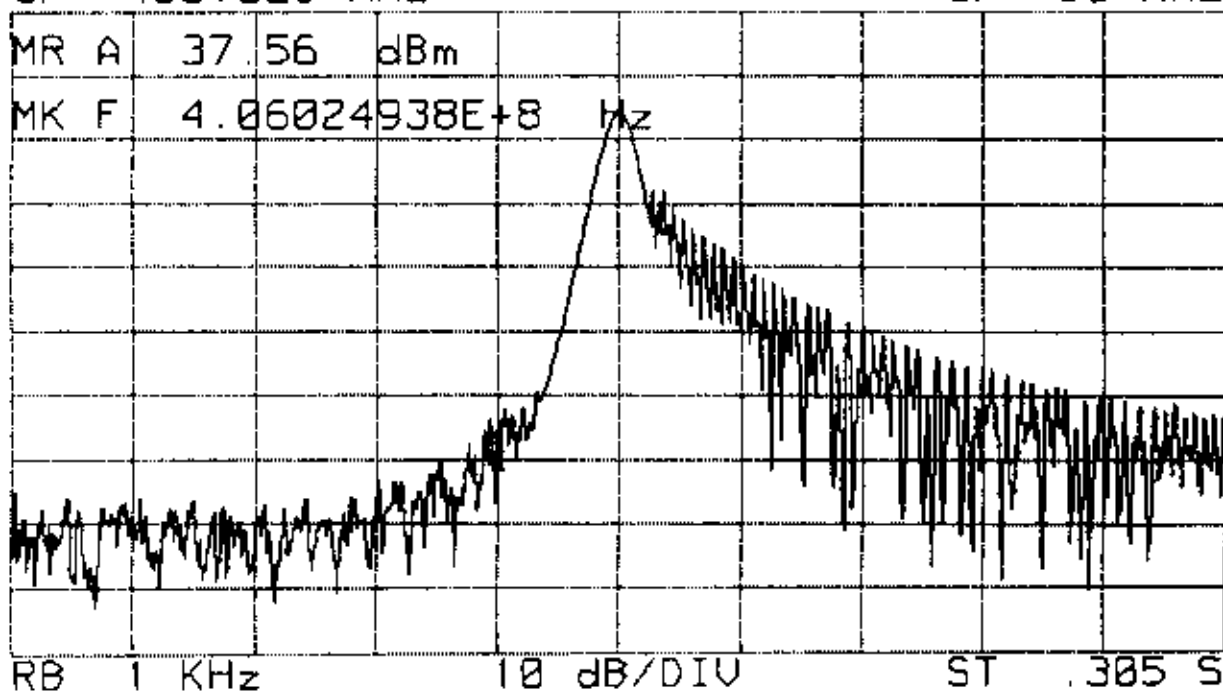
Spectre de fréquence

CF 406.025 MHz

SP 50 KHz

MR A 37.56 dBm

MK F 4.06024938E+8 Hz



7.5.3 ALIVENESS TEST RESULTS AFTER ETS/TEC SALT FOG TEST

Beacon Unit : 1/2
 Name : ACR
 Type : RLB35
 Number : 07

Bracket : ACR Universal Sea Shelter Id 18560

406 MHZ MEASUREMENTS

May 28th,2001

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.1
- Power risetime	ms	< 5	0.85 ms
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics			
4 -DIGITAL MESSAGE GENERATOR			
- Repetition rate			OK
- Bit rate	bits/S	400 ± 4	401.30
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	519.34
- CW preamble	ms	160 ± 1.6	160.35
5 - DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	1
- Protocol flag	bit	26	0
- Country code	bits	27-36	0366
- Protocol	bits	37-40	1110
- Encoded Position Data Source	bits	111	1
- Homing	bits	112	1
- BCH 1 code read / calculated	bits	86-106 / 25-85	1029B4 / 1029B4
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 - FREQUENCY			
- Nominal value	KHz	406 025 ± 2	-0.54053
- Short term stability		< 2x10 ⁻⁹ /100 ms	3.4 x 10 ⁻¹⁰

* See data and graphs next pages

P. 001 ON 141

Laboratoire de certification
Contrôle balise ARGOS/SARSAT

Constructeur ACR
 Modèle RLB35
 Numéro de série 07
 Référence M3223-1
 Type SARSAT

Date de l'essai 28 May 1991 16:53:01

Message balise

Message reçu (1-144): FFFE2F96EE2EC0017FDFFCOA6D3783E0F66C
 Format flag (25): 1
 Protocole flag (26): 0
 Code pays (27-36): 0366
 Pays : USA
 Code protocole (37-40): 1110
 Protocole utilise : Standard - Test
 Identification :
 Numéro :
 BCH 1 lu/calculé (86-106/25-85): 1029B4/1029B4
 BCH 2 lu/calculé (133-144/107-132): 66C/66C
 Pos. Data Source (111): Internal
 121.5 MHz Homing (112): Yes
 Position GPS de référence : N 43°33'34'' E 1°28'48
 Position GPS : Yes
 Position GPS par défaut : Yes

Contrôle message

Durée de la porteuse pure 160.35ms +- 0.00
 Durée de l'émission 519.34 ms
 Fréquence de modulation 401.30Hz +- 0.00
 Stabilité de fréquence

Fréquence moyenne F2 406024459.47 Hz
 SIGMA2 F2-F1 2.961E-10
 SIGMA3 F3-F2 3.413E-10

Mesures d'indice

F	F1	G1
49458.78	232	60
49458.16	232	59

	rd	<=		
Excursion de phase totale	rd	<= 2.48		2.25
Excursion de phase positive	rd	0.96<	<1.24	1.14
Excursion de phase négative	rd	-1.24<	<-0.96	-1.12
Symétrie de l'excursion	%	<= 5		-0.91

Mesures de puissance

Puissance dBm 34.10 + 3.00 = 39.10

AUKO 06 96

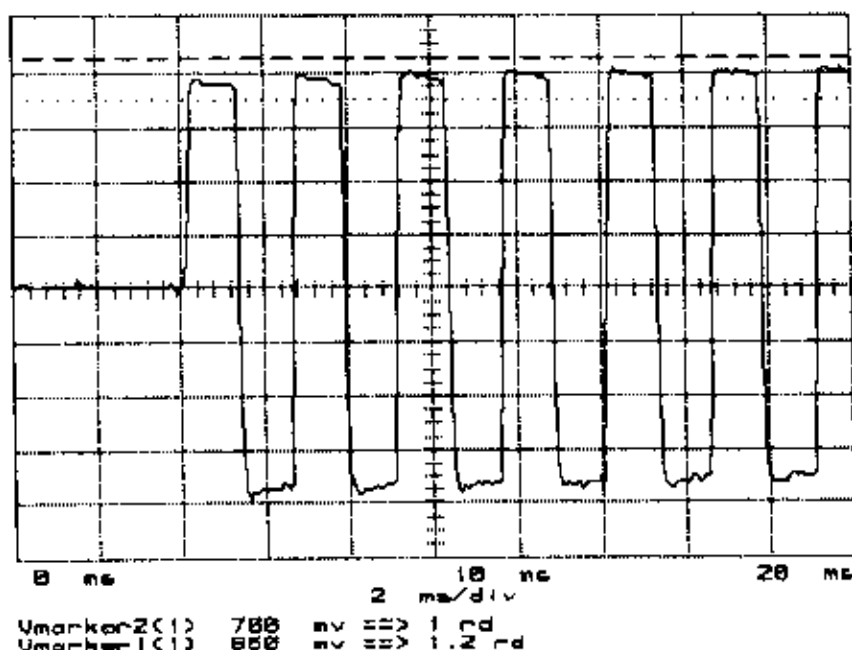
REORDEH NO 92261 K

TT-PACKAGE-0 JE 1 PAPER

NEWLE

Oscillo

PRINT ON THIS SIDE ONLY



Spectre de fréquence

