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Toulouse, 28/11/2003

O/Réf. M4586- IEC/ETS

TEST REPORT OF
406 MHz EPIRB

MANUFACTURER :

STANDARD COMMUNICATIONS PTY

BEACON MODEL : MT400

Written : 28/11/2003
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Visa :

Approved : 2/12/2003
By: Didier NAWS
Visa :

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Visa :

Distribution :

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CHAPTER 1

ADMINISTRATION, GENERAL COMMENTS AND SUMMARY OF TESTS

1.1 GENERAL COMMENTS

This document reports the procedures and results of certification tests on 406-MHz SARSAT beacons. The tests were conducted for the European Union Type Approval of Marine Equipement (Marine Equipment Directive 96/98/EC) and Australian Type Approval

1.2 ADMINISTRATION

1.2.1 WORK ORDER

Manufacturer : Standard Communications PTY. LTD.
Address : 6, Frank Street – GLADESVILLE NSW 2111 AUSTRALIA
Represented by : Mr Craig DUNCAN

1.2.2 INTESPACE TEST CENTER

The test operations have been conducted by : Mr Gérard PEYROU

1.2.3 SCHEDULE

Start of test : 24 March 2003
End of test : 17 June 2003 for first part of tests and 28 November 2003 for alls tests

1.2.4 WORK REFERENCE : **M4686 – IEC & ETS**

1.2.5 EQUIPEMENT UNDER TEST

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

Equipement Under Test (EUT)	Model	Beacon serial number	Bracket mechanism	Comments
1	MT400	C204		- Antenna disconnected - 50 Ω RF Output Connector
2	MT400	C203		Nominal EPIRB
2b	MT400	011		Nominal EPIRB
3	MT400	C223	MT400 Manual Mounting Bracket	Beacon Case (without electronic)

1.3 TEST FACILITIES

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

1.4 STANDARDS AND TEST PROCEDURES APPLICABLES

- COSPAS-SARSAT standards :
- "C/S T. 001- Issue 3 - Revision 4 - October 2002 "
- "C/S T. 007- Issue 3 - Revision 9 - October 2002"

- ETS 300 066 V1.3.1: Electromagnetic Compatibility and Radio Spectrum Matters (ERM) ; Float-free maritime satellite Emergency Position Indicating Radio Beacons (EPIRBs) operating in the 406,0 MHz to 406,1 MHz ; Technical characteristic and methods of measurement - (2001-01)

- IEC 61097-2 : Global maritime distress and safety system (GMGSS)- Part 2 : COSPAS-SARSAT EPIRB – Satellite emergency position indicating radio beacon operating on 406 MHz – Operational and performance requirements, methods of testing and required test results (2002-09)

- IEC 60945 : Maritime navigation and radiocommunication equipement and systems - General requirements – Methods of testing and required test results . (2002-08)

- INTESPACE Radiobeacon Test Procedures

1.5 TEST SEQUENCE

1.5.1 SERIES OF TESTS RUN IN ORDER :	ETS	IEC61097-2	EN/IEC 60945
1 - Initial Alivness Test	(5.2)	(A.1.1)	(8.1)
2 - Dry Heat Test	(6.2.2)	(A.1.2)	(8.2)
3 - Damp Heat Test	(6.2.3)	(A.1.3)	(8.3)
4 - Vibration Test	(6.3)	(A.1.4)	(8.7)
5 - Ruggedness Test	(6.4)	(A.1.5)	
6 - Drop Tests	(6.6)	(A.1.7)	(8.6)
7 - Thermal shock, Leakage and Immersion Tests	(6.8)	(A.1.9)	(8.9)
8 - Low Temp, Strobe Light and Battery Capacity Tests	(6.7)	(A.1.13)	(8.4)
9 - Other Cospas-Sarsat C/S T.007 Tests	(7 &11)	(A.1.14)	

1.5.2 SERIES OF TESTS RUN ANY TIME DURING THE SEQUENCE :

	ETS	IEC61097-2	EN/IEC 60945
10 - Hose Stream Test	(6.9)		
11 - Corrosion Test	(6.5)	(A1.6)	(8.12)
12 - Homing Device Test	(10.3)		
13 - Buoyancy & Stability Test	(6.10)	(A2.3)	
14 - Solar Radiation Test	(6.11)		(8.10)
15 - Oil Resistance Test	(6.12)		(8.11)
16 - Compass Safe Distance		(A.2.6)	(11.2)
17 - RF Field Immunity Test			(10.4)
18 - Electrostatic Discharge Immunity Test			(10.9)

Beacon identical electronic :

- EUT 1 : MT400 S/N C204 was used for tests 1 to 9 (partially),
- EUT 2 : MT400 S/N C203 was used for tests 9 (partialy), 10, 12 to14 and 16
- EUT 2b : MT400 S/N 011 was used for tests 17 and 18

Beacon without electronic

- EUT 3 : MT400 S/N C223 was used for test 11, 15

:

- STANDARD COMMUNICATION MT400 Mounting Bracket

14.1 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 numering 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. (± 3 °C) (°C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (+ 70 to + 55 °C)	
1. INITIAL ALIVENESS TEST						**Chapter 2**
* Carrier Frequency	406.028 ± 0.001	MHz		406.027943		29 March 2003
* Power Output	35 - 39	dBm		36.1		(C/S Elec. & Funct.
* Data Message	must be correct	√		√		Test at amb Temp. Chapter 10)
2. DRY HEAT CYCLE						**Chapter 3**
• Aliveness Test (during 2 hour period)						31 March & 1 April 2003
* Carrier Frequency	406.028 ± 0.001	MHz			406.02790	(C/S Elec. & Funct.
* Power Output	35 - 39	dBm			35.6	Test at + 55°C
* Data Message	must be correct	√			√	Chapter 10)
• Aliveness Test (at end of 2 hour period)						
* Carrier Frequency	406.028 ± 0.001	MHz			406.02794	
* Power Output	35 - 39	dBm			35.5	
* Data Message	must be correct	√			√	

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						**Chapter 4**
• Aliveness Test (during 2 hour period)						30&31 March 2003
* Carrier Frequency	406.028 ± 0.001	MHz			406.02794	
* Power Output	35 - 39	dBm			35.3	
* Data Message	must be correct	√			√	
• Aliveness Test (end of the test)						
* Carrier Frequency	406.028 ± 0.001	MHz			406.027941	
* Power Output	35 - 39	dBm			35.2	
* Data Message	must be correct	√			√	
4. VIBRATION TEST						**Chapter 5**
• Exterior Mechanical Inspection	No damage	√		√		2 to 4 April, 2002
• Aliveness Test						
* Carrier Frequency	406.028 ± 0.001	MHz		406.027948		
* Power Output	35 - 39	dBm		35.5		
* Data Message	must be correct	√		√		

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)	
5. RUGGEDNESS TEST						**Chapter 6**
• Exterior Mechanical Inspection	No damage	√		√		4 April, 2002
• Aliveness Test						
* Carrier Frequency	406.028 ± 0.001	MHz		406.027947		
* Power Output	35 - 39	dBm		35.5		
* Data Message	must be correct	√		√		
6. DROP TEST						**Chapter 7**
Into Water						April 7th, 2003
• Exterior Mechanical Inspection	No damage	√		√		
• Aliveness Test						
* Carrier Frequency	406.028 ± 0.001	MHz		406.027940		
* Power Output	35 - 39	dBm		35.4		
* Data Message	must be correct	√		√		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (-30°C to -20 °C)	T amb. (± 3 °C) (22°)	T max. (± 3 °C) (55 °C)	
7. THERMAL SHOCK, LEAKAGE AND IMMERSION TEST						**Chapter 8**
• Aliveness Test						
* Carrier Frequency	406.028 ± 0.001	MHz		√		7 April 2003
* Power Output	35 - 39	dBm		√		
* Data Message	must be correct	√		√		
• Interior Inspection	No water	√		√		
8. LOW TEMPERATURE , STROBE LIGHT AND BATTERY CAPACITY						**Chapter 9**
• Aliveness Test (at the beginning of test)						15 to 18 April 2003 (C/S Elec. & Funct. Test at –20 °C Chapter 10)
* Carrier Frequency	406.028 ± 0.001	MHz	406.027928			
* Power Output	35 - 39	dBm	36.8			
* Data Message	must be correct	√	√			
• Aliveness Test (end of test)						
* Carrier Frequency	406.028 ± 0.001	MHz	406.027913			
* Power Output	35 - 39	dBm	35.4			
* Data Message	must be correct	√	√			

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (- 20 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (_____ °C)	
8.A . BATTERY CAPACITY TEST						**Chapter 9**
Operational Life						15 to 18 April 2003
• Frequency						
* Nominal Carrier	406.028 ± 0.001	MHz	406. 027925			Results after 48 hours
* Short-term stability	≤ 0.002	parts/ million in 100 ms	< 0.0007			(C/S Oper. Life Test at min Temp. Chapter 10)
• Medium term stability :						
* Mean slope	≤ 0.001	parts/ million /min	< 0.00015			
* Residual variation	≤ 0.003	parts/ million	< 0.0008			
• RF output power	35-39	dBm	36.5			
• Auxiliary radio-locating Peak Envelope output Power	14-20	dBm	18.8			
8.B. STROBE LIGHT TEST						**Chapter 9 and Chapter 10** (C/S Elec. & Funct. Test at min, amb, and max Temp.)
• Flash rate	20-30	/min	21	20	20	
• Effective intensity	0.75	Cd	2.0	1.9	1.9	
• Pulse duration	10^{-6} - 1	S		0.26		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (-20 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (+55 °C)	
9. COSPAS-SARSAT TYPE APPROVAL TEST REPORTS	C-S Certificate (attach test reports)	√	√	√	√	**Chapter 10**
10. HOSE STREAM TEST						**Chapter 11**
• EUT not release from bracket		√		√		5 may 2003
• EUT not automatically activate		√		√		
11. CORROSION TEST						**Chapter 12**
• Exterior Mechanical Inspection	No damage	√		√		26 march to 23 april , 2003
• Aliveness Test						
* Carrier Frequency	406.028 ± 0.001	MHz		√		
* Power Output	35 - 39	dBm		√		
* Data Message	must be correct	√		√		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (-20 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (+ 55°C)	
12. HOMING DEVICE TRANSMITTER TEST						**Chapter 13 and Chapter 10 (C/S T.A. Tests Results)**
• Carrier frequency	121.5 ± 0.006	MHz	121.50008	121.50112	121.50051	March 26th, to May 5th, 2003
• PERP	14-20	dBm	18.5	18.6	17.3	
• Duty Cycle	100	%	100	100	100	
• Modulation						
* Frequency	≤ 700 Hz within range of 300-1600 Hz	Hz	300 → 1360	300 → 1360	300 → 1360	
* Direction	Upward	√	√	√	√	
* Duty cycle	33-55	%	38	40	36	
* Factor	0.85-1.0	#	> 0.85	> 0.85	> 0.85	
* Sweep repetition rate	2 - 4	Hz	2.7	2.7	2.7	
• Antenna						
* Pattern	Omnidirectional	√		√		March 27th, 2003
* Polarization	Vertical	√		√		
* VSWR	≤ 1.5:1	√				Not checked (Antenna integrated)

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) (____ °C)	
13. BUOYANCY AND STABILITY TEST						**Chapter 14**
						3 april 2003
• Time to upright	≤ 2	s		1		
• Reserve buoyancy	≥ 5	%		≈ 26		OK with ETS
• Float upright ; Antenna base	> 4	cm		> 4		calculation method
14. SOLAR RADIATION TEST				≈ 81 hours		**Chapter 15**
• Aliveness Test						7 to 18 april 2003
* Carrier Frequency	406.028 ± 0.001	MHz		OK		
* Power Output	35 - 39	dBm		36.1		
* Data Message	must be correct	√		√		
• External Inspection	No damage	√		√		
15. OIL RESISTANCE TEST				≈ 89 hours		**Chapter 16**
• Self Test	must be correct	√		√		7 to 16 may 2003
• External Inspection	No damage	√		√		

PARAMÈTRES TO BE MEASURED DURING TESTS	RANGE OF SPECIFICATION	UNITS	TEST RESULTS			COMMENTS
			T min. (± 3 °C) (-20 °C)	T amb. (± 3 °C) (22 °C)	T max. (± 3 °C) (55 °C)	
16. COMPASS SAFE DISTANCE						**Chapter 17**
• Safe distance wiht no compensed earth field	Note the result	m		< 0,20 m		2 April 2003
• Safe distance wiht compensed earth field	Note the result	m		< 0,20 m		
17. RF FIELD IMMUNITY TEST						**Chapter 18**
• EUT not automatically activate		√		√		27 &28 November 2003
• Self Test	must be correct	√				
18. ELECTROSTATIC DISCHARGE IMMUNITY TEST						**Chapter 19**
• EUT not automatically activate		√		√		26 &27 November 2003
• Self Test	must be correct	√				
* Data Message	must be correct	√				

CHAPTER 2

INITIAL ALIVENESS TEST

2.1. TEST SPECIFICATIONS AND SEQUENCE

Following :
- Section A2.1 of C/S T. 007 standard ;
- Section 5.2 and 5.10 of ETS 300-066;
- Section A1.1 of IEC 61097-2
- Section 8.1 of EN 60945

• 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 : 1/3
Name : STANDARD COMMUNICATION
Type : MT400
Number : C204

2.3 TEST SITE

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 : 1/3
Name : STANDARD COMMUNICATION
Type : MT400
Number : C204
Date : 31 March 2003

406 MHz MEASUREMENTS

1 – Environmental Temperature (° C)			22.2 ° C
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	36.1
- Power risetime	ms	< 5	1.60 ms
- Power falltime	ms	< 5	0.04 ms
3 – SPURIOUS OUTPUT			
- In band	*		OK
- Carrier harmonics	*		
4 –DIGITAL MESSAGE GENERATOR			
- Repetition rate	**		OK
- Bit rate	bits/S	400 ± 4	399.7
- Transmission time	ms	440 ± 4,4	440.4
- CW preamble	ms	160 ± 1,6	160.34
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	0
- Protocol flag	bit	26	1
- Country code	bits	27-36	0503
- Protocol	bits	37-39	111
- Homing	bits	84-85	01
- Activation type	bits	108	0
- BCH 1 code read / calculated	bits	86-106 / 25-85	070010 / 070010
- BCH 2 code read / calculated	bits	133-144 / 107-132	NA
6 – FREQUENCY			
- Nominal value	KHz	406 028 ± 1	406 027.943
- Short term stability		< $2x10^{-9}$/100 ms	2.8 x 10^{-10}

* See graphs page 28 of chapter 10

** See graph page 21 of chapter 10

CHAPTER 3

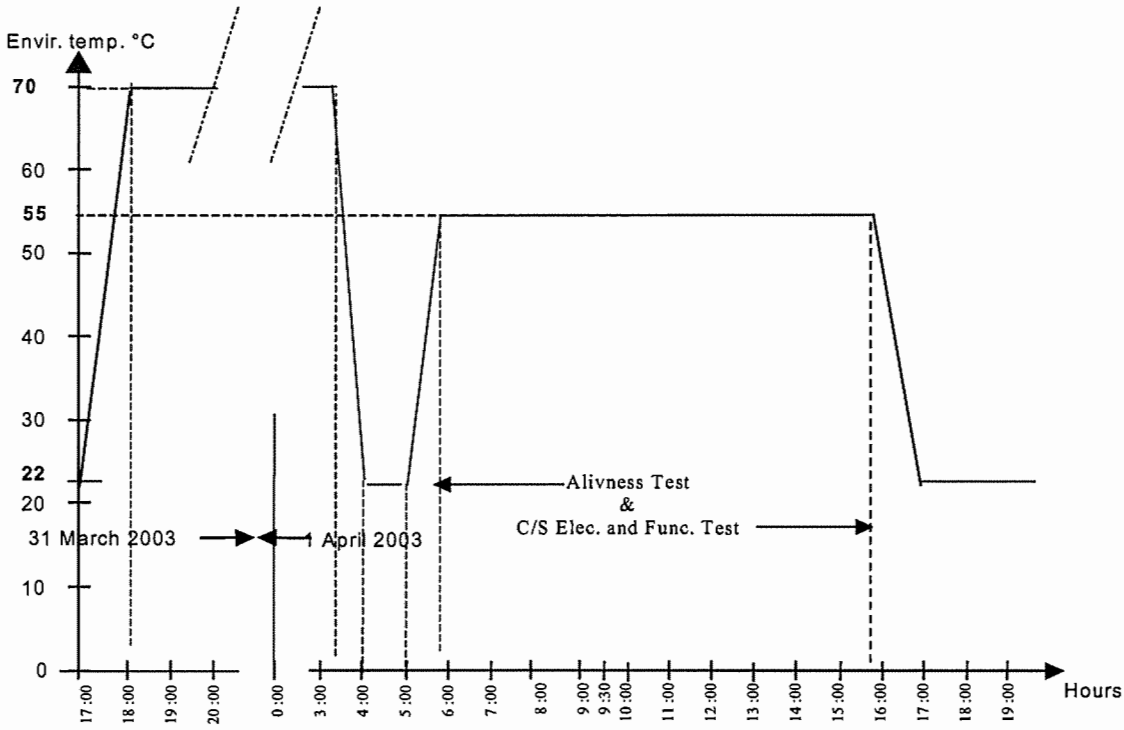
DRY HEAT TEST

3.1. TEST SPECIFICATIONS AND SEQUENCE

Following :
- Section A2.1 of C/S T. 007 standard ;
- Section 6.2.2 of ETS 300-066 V1.3.1 ;
- Section A1.2 of IEC 61097-2 and
- Section 8.2 of IEC 60945

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 : 1/3
Name : STANDARD COMMUNICATION
Type : MT400
Number : C204

Bracket : STANDARD COMMUNICATION - MT400 Manual Mounting Bracket

3.3 TEST SITE

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 10 : C/S Type Approval Test Report – Electrical and Functional Test at 55° C

3.5.2 ALIVENESS SUMMARY TEST RESULTS
Date : 1 April 2003

1 – Environmental Temperature (° C)			52.8 ° C
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	35.5
- Power risetime	ms	< 5	1.80 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	399.7
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	440.3
- CW preamble	ms	160 ± 1.6	160.2
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	0
- Protocol flag	bit	26	1
- Country code	bits	27-36	0503
- Protocol	bits	37-39	111
- Homing	bits	84-85	01
- Activation type	bits	108	0
- BCH 1 code read / calculated	bits	86-106 / 25-85	070010 / 070010
- BCH 2 code read / calculated	bits	133-144 / 107-132	NA
6 – FREQUENCY			
- Nominal value	KHz	406 028 ± 1	406 027.940
- Short term stability		$< 2x10^{-9}$/100 ms	2.5×10^{-10}

* See graphs on chapter 10 : C/S Type Approval Test Report – Electrical and Functional Test at 55° C

CHAPTER 4

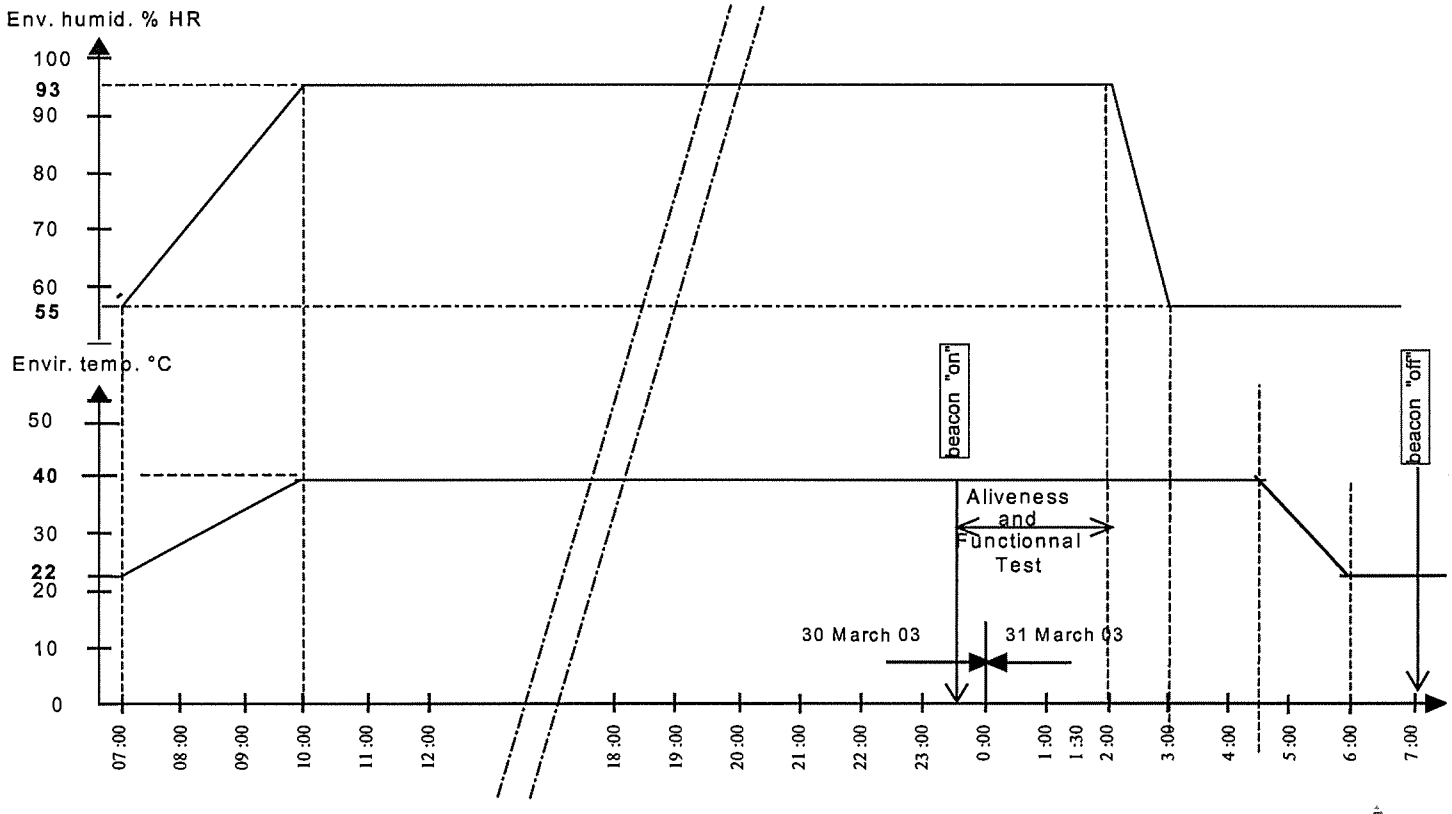
DAMP HEAT TEST

4.1. TEST SPECIFICATIONS AND SEQUENCE

Following :
- Section A2.1 of C/S T. 007 standard ;
- Section 6.2.3 of ETS 300-066 V1.3.1 ;
- Section A1.3 of IEC 61097-2 and
- Section 8.3 of IEC 60945

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

4.1.1 DAMP CYCLE PROGRAMME



4.1.2 MEASUREMENTS AT 40° C ± 3° C and 93 % ±2 % HR :
- Transmitter power output,
- Digital Message,
- Digital Message Generator,
- Modulation,
- Transmitted frequency ,
- Spurious output,

4.2. EQUIPMENT UNDER TEST

Beacon Unit : 1/3
Name : STANDARD COMMUNICATION
Type : MT400
Number : C204

Bracket : STANDARD COMMUNICATION - MT400 Manual Mounting Bracket

4.3 TEST SITE

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 : 31 March 2003

1 - Environmental Temperature (° C / HR)			+ 40. ° C ± 1 / 93 % ± 2
2 – POWER OUTPUT			
- Transmission power	dBm	37 ± 2	35.2
- Power risetime	ms	< 5	-
- 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	399.7
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	440.4
- CW preamble	ms	160 ± 1.6	160.6
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	0
- Protocol flag	bit	26	1
- Country code	bits	27-36	0503
- Protocol	bits	37-39	111
- Homing	bits	84-85	01
- Activation type	bits	108	0
- BCH 1 code read / calculated	bits	86-106 / 25-85	070010 / 070010
- BCH 2 code read / calculated	bits	133-144 / 107-132	NA
6 – FREQUENCY			
- Nominal value	KHz	406 025 ± 2	406 027.941
- Short term stability		< 2×10^{-9}/100 ms	1.5 x 10^{-10}

* See graphs page hereafter

4.5.2 DATA AND GRAPHS OF MEASUREMENTS RESULTS

Laboratoire de certification
Controle balise ARGOS/SARSAT

Constructeur	Standard-Communications
Modele	MT400
Numero de serie	C204
Reference	M4586
Type	SARSAT
Date de l'essai	31 Mar 2003 6:07:39
TempΘrature	22.8 ⁞C

Message balise

Message recu	(1-112):	FFFE2F5F7F03C480000009C00400
Format flag	(25):	0
Protocole flag	(26):	1
Code pays	(27-36):	0503
Pays	:	
Code protocole	(37-39):	111
Protocole utilise	:	User - Test
Identification code	(26-85):	BEFE07890000001
Identification (Baudot)	(40-81):	:::::::
Numero	:	1E
BCH 1 lu/calcule	(86-106/25-85):	070010/070010
Homing	(84-85):	01
Activation type	(108):	Manual
Position GPS de reference	:	N 43°33'34'' E 1°28'48
Position GPS	:	No

Controle message

Duree de la porteuse pure	160.35ms +- 0.00
Duree de l'emission	440.42 ms
Frequence de modulation	399.66Hz +- 0.00

Stabilite de frequence

Frequence moyenne	F2	406027940.79 Hz
SIGMA2	F2-F1	1.271E-10
SIGMA3	F3-F2	1.149E-10

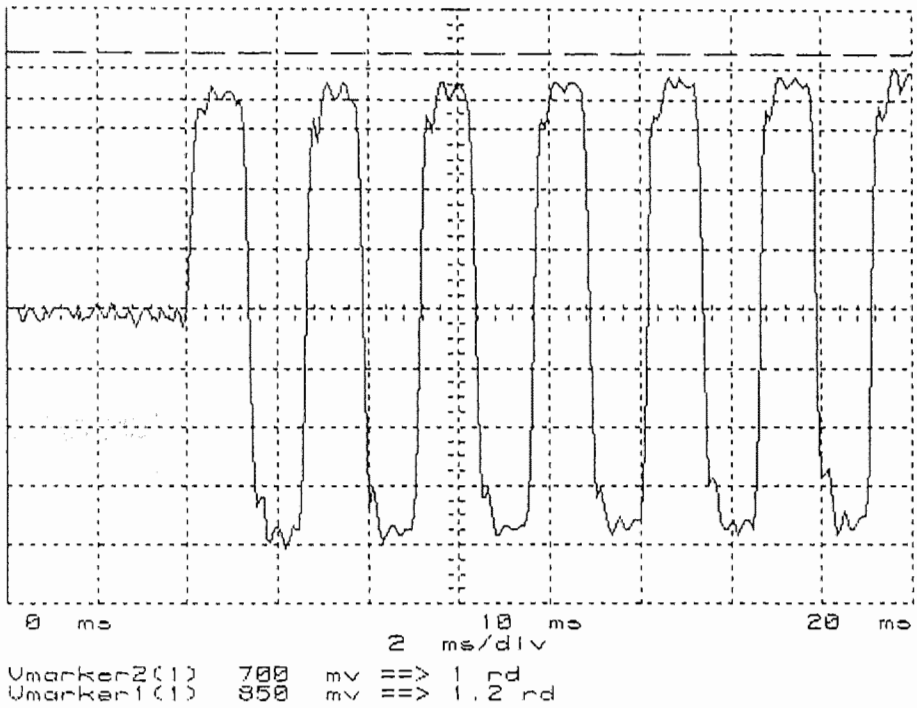
Mesures d'indice

F	F1	G1
49940.56	232	62
49940.73	231	61

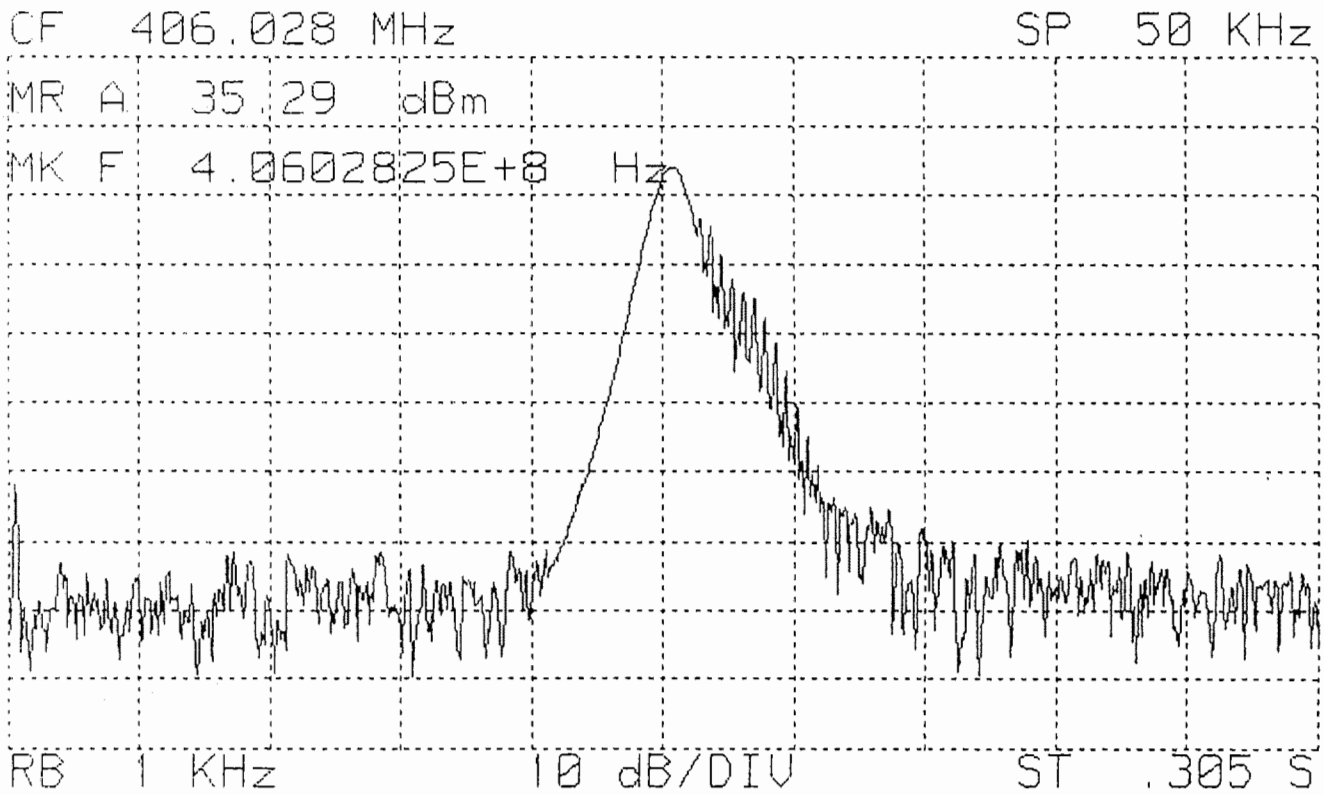
Excursion de phase totale	rd		<= 2.48	2.13
Excursion de phase positive	rd	0.96<	<1.24	1.04
Excursion de phase negative	rd	-1.24<	<-0.96	-1.09
Symetrie de l'excursion	%		<= 5	2.32

Mesures de puissance

Puissance	dBm	35.23



Spectre de frequence



intespace
L'Intelligence de l'Environnement

Rapport d'essai

M4586-Damp Heat Test

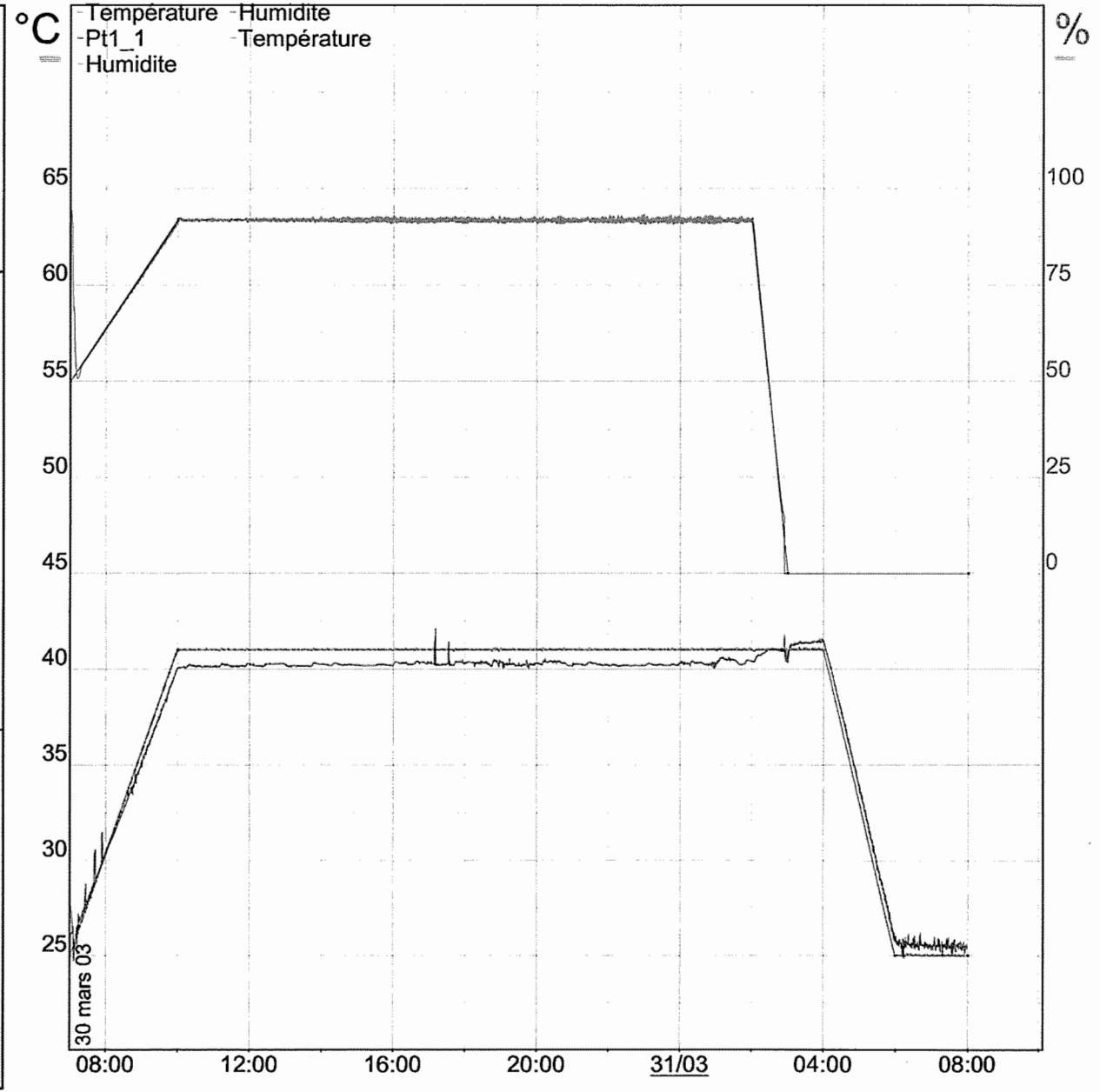
Essai effectué du 30 mars 03 (07h00)
au 31 mars 03 (08h00)
Durée de l'essai: 25h00,00

PCH60
N° S4880

Damp Heat Test (EN 60945)
Date d'impression: 31 mars 03
1pages(s)

Commentaires

Manufacturer : Standard Communications
Model : MT400
S/N : C203
UUT 1
IEC 61097-2 (2002-09) & 60945 (2002-08)
AS/NZS 4280-1-2002
ETS 300066
.....
.....
.....



CHAPTER 5

VIBRATION TEST

5.1 ADMINISTRATIVE INFORMATION

5.1.1 CLIENT
Standard Communications PTY. LTD.

5.1.2. REPRESENTATIVES PRESENT
For the Client : Craig DUNCAN
For the Test Laboratory : J. M. BUCHMAN

5.1.3. DATES
Start of test : April 2nd, 2003
End of test : April 4th, 2003

5.1.4. INTESPACE FILE REFERENCE : M4586-ETS/IEC

5.2. UNIT UNDER TEST (UUT)

Beacon Unit : 1/3
Name : STANDARD COMMUNICATIONS
Type : MT400
Number : C204

Bracket : STANDARD COMMUNICATIONS - MT400 Manual Mounting Bracket

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 draw § 5.7)
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 » (vertical axis : normal mounting)

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 6.3 of ETS 300-066 V1.3.1. ;
- Section A1.4 of IEC 61097-2 and
- Section 8.7 of IEC 60945

5.5.3.1 Resonance detection

Sinewave vibrations on three axis :

Frequency (Hz)	**Peak to Peak Amplitude (mm) or Acceleration Amplitude (m/s^{-2})**
4 Hz to 13.2 Hz	2 mm
13.2 Hz to 100 Hz	7 m/s^{-2}

5.5.3.2 Endurance vibration

Sinewave vibration test at each resonance frequency with the duration of 2 hours and amplitude level as above specified or if no resonance occurred , the endurance test shall be carried out at frequency of 30 Hz .

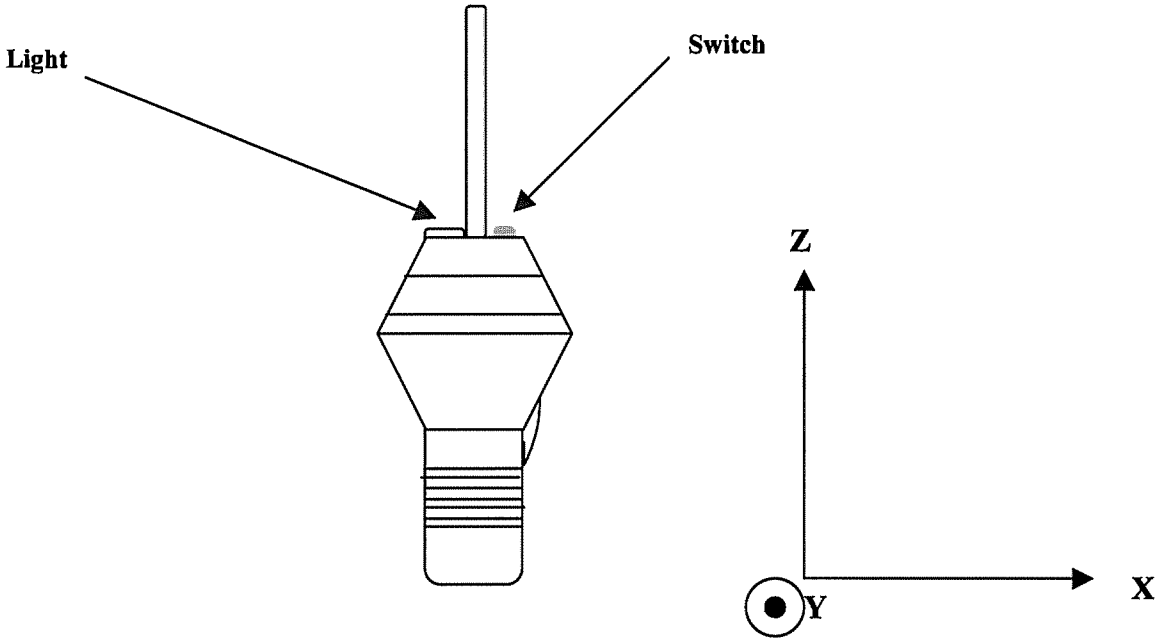
5.5.3.2 Beacon control :

Visual inspection and Aliveness test after the Vibrations Tests

6.6 LIST OF SERVO AND CONTROL SENSORS

Sensor	Location	N° acc.	Cable	Sensivity 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. DRAW : VIBRATION AXIS



5.8. TEST SCHEDULE

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
April 2nd, 2003 **001X**	Sinewave vibrations : X axis Resonance detection 2 mm p-p from 4 to 13.2 Hz 7 m/s^{-2} from 13.2 to 100 Hz Sweep rate : 0.5 Oct/min	5.9.1	No Resonance Frequency.	Set up the beacon on test table on Xaxis (80 kN) . Functional testing : nominal.
April 2nd, 2003 **002X**	Sinewave vibrations : X axis Endurance vibrations : 7m/s^{-2} at F = 30 Hz Test duration : 2 hours	5.9.2	OK	Functional testing : nominal.
April 3th, 2003 **001Y**	Sinewave vibrations : Y axis Resonance detection 2 mm p-p from 4 to 13.2 Hz 7m/s^{-2} from 13.2 to 100 Hz Sweep rate : 0.5 Oct/min	5.9.3	Resonance Frequency : 82 Hz Accel. Amplitude : 42.2 m/s^{-2}	Set up the beacon on test table on Y axis (80 kN) . Functional testing : nominal.
April 3th, 2003 **002Y**	Sinewave vibrations : Y axis Endurance vibrations : 7m/s^{-2} at F = 82 Hz Test duration : 2 hours	5.9.4	OK	Functional testing : nominal

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
April 4th, 2003 **001Z**	Sinewave vibrations : Z axis Resonance detection 2 mm p-p from 4 to 13.2 Hz 7m/s^{-2} from 13.2 to 100 Hz Sweep rate : 0.5 Oct/min	5.9.5	No Resonance Frequency.	Set up the beacon on test table on Z axis (80 kN)
002Z	Sinewave vibrations : Z axis Endurance vibrations : 7m/s^{-2} at Fr = 30 Hz Test duration : 2 hours	5.9.6	OK	Functional testing : nominal. Removal of beacon
Visual inspection		5.9.6.1		Nothing abnormal to note
April 4th, 2003 EPIRB Aliveness Test		5.9.6.2	Cospas Sarsat Test Bench	Nominal

5.9. TEST RESULTS

5.9.1. RESULTS OF X VIBRATION AXIS (FR detection)

Sine Version 4.8.0 Test Summary Listing

Data Storage File Name: IEC.001
Current Date: Wed Apr 02 2003 18:56:22

DOCUMENTATION:
Title 1: ETS 300 066 - IEC61097-2 - Test 1X
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Test Function:	Test
Date at Shutdown:	02-Apr-2003
Time at Shutdown:	18:52:10
Test Completed Normally	
Elapsed Time	000:08:38
Remaining Time	000:00:01
Elapsed Sweeps	1.00
Remaining Sweeps	0.00
Frequency at Shutdown:	100.00 Hz
Test Level:	0.00 dB
Maximum Control Error:	-4.15 dB @ 6.01 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	100	0.5	65

REFERENCE TABLE:
REFERENCE PARAMETERS -

Minimum Frequency:	5.000 Hz
Maximum Frequency:	100.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	17.016 dB
Minimum Acceleration (0-pk):	0.987 m/s²
Maximum Acceleration (0-pk):	7.000 m/s²
Maximum Velocity (0-pk):	0.084 m/s
Maximum Displacement (pk-pk):	2.000 mm

CHANNEL TABLE:

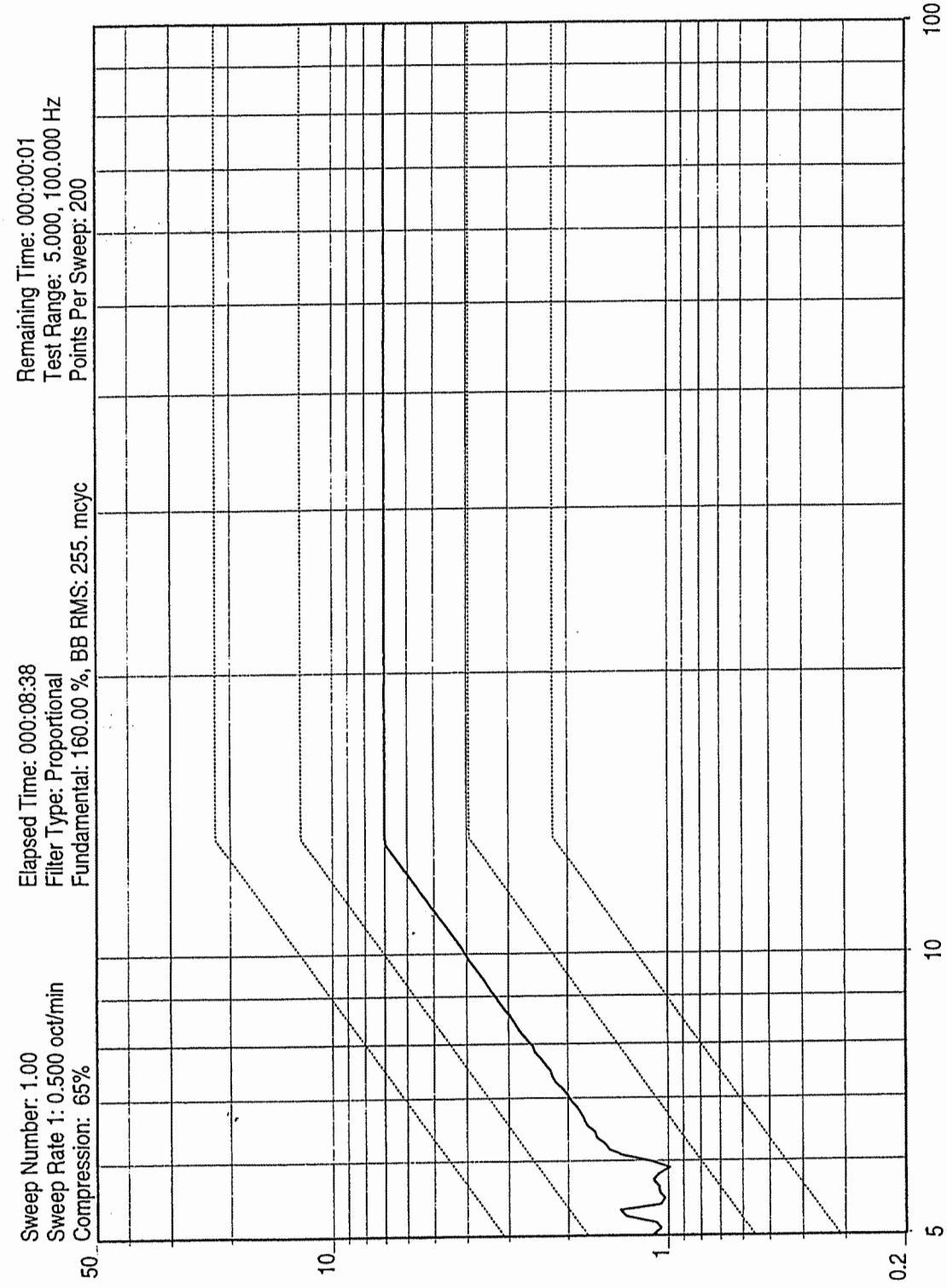
Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	26.51	AC	Accel	m/s²	0.00		BB RMS
2	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
3	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
4	Auxiliary	No	12.80	AC	Accel	m/s²			BB RMS

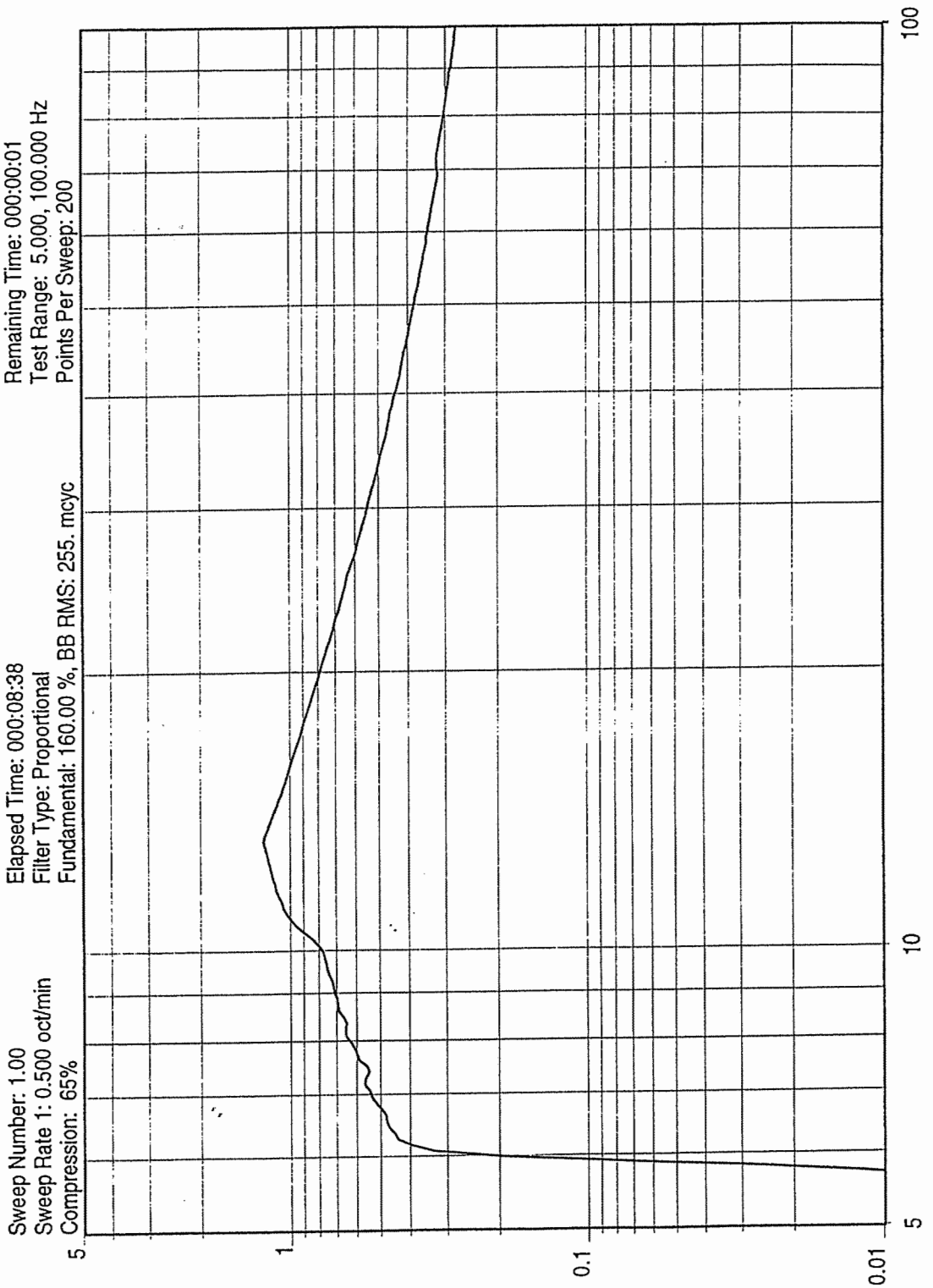
(Continued for Labels...)

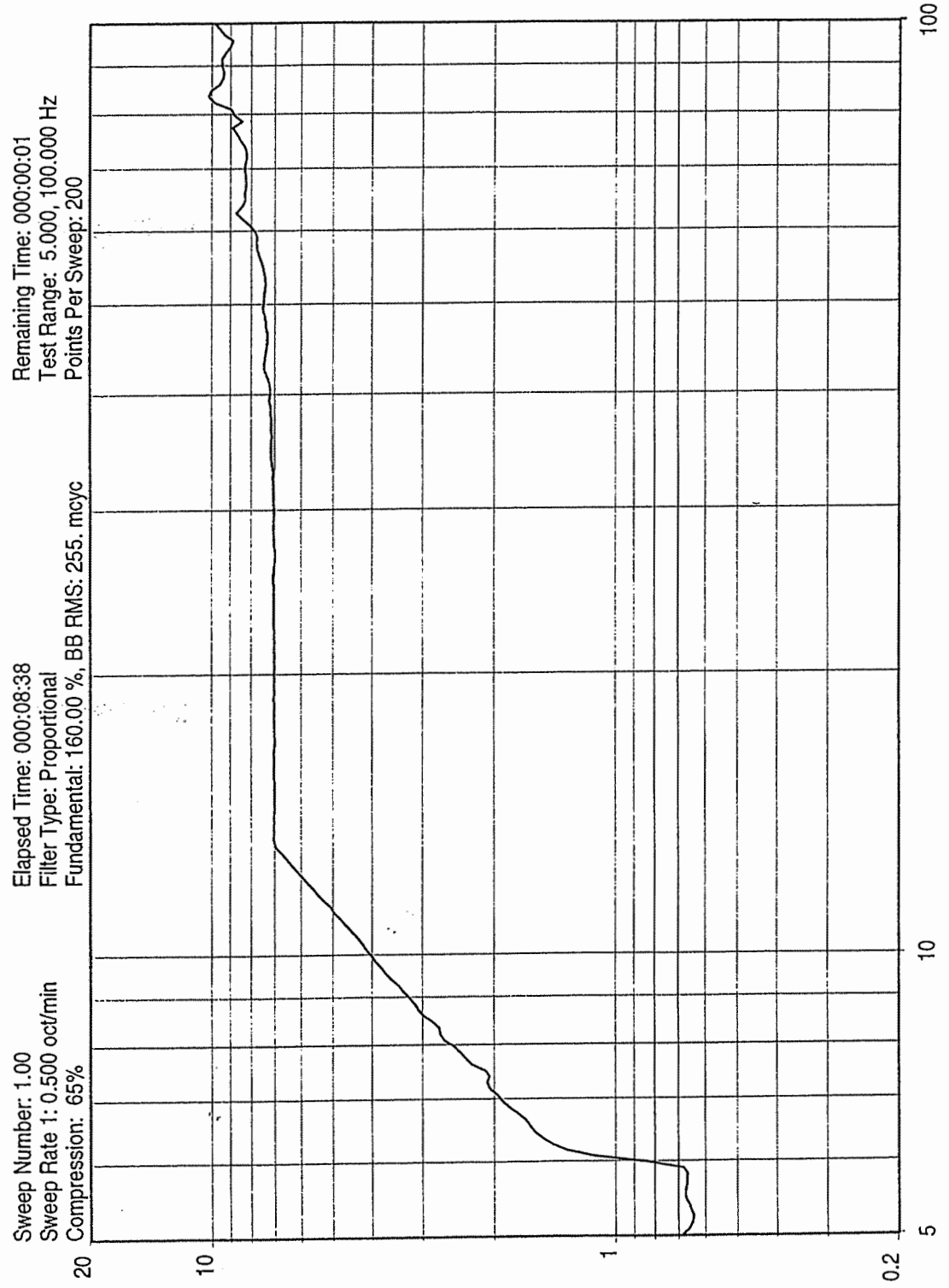
Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	26.51	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.80	SENSOR 1Z	

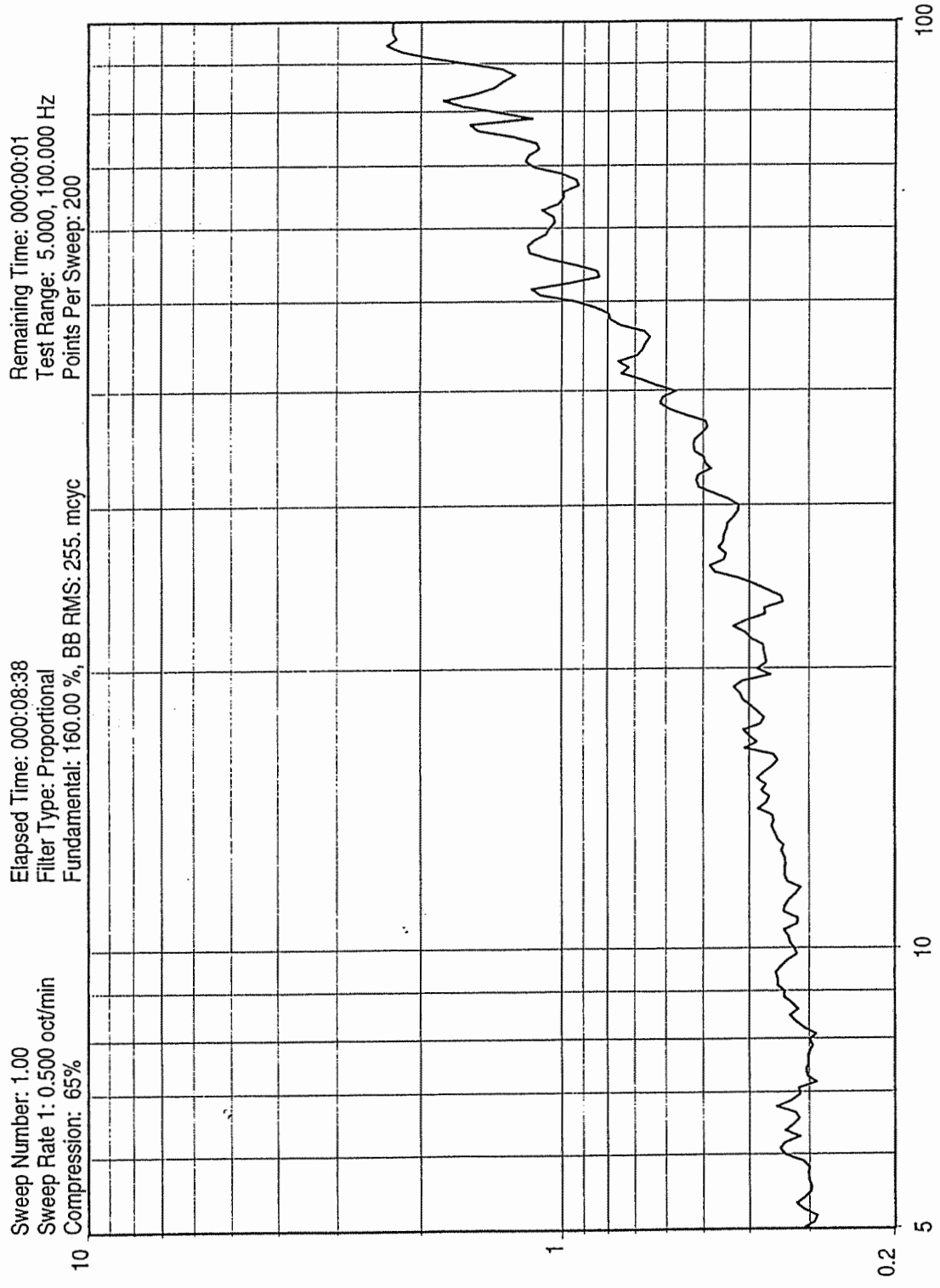
```
 (12 Inactive Channels)

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: IEC.001
%Log: /user/client/m4586/sine/log/IEC.001.log
04/02/03
18:42:56 Nulling Internal Offsets.
18:43:01 Nulling Completed.
18:43:01 Loop Check Started...
18:43:01 Measuring Ambient Noise...
18:43:12 Searching for Threshold...
18:43:22 Loop Check Completed.
18:43:24 Increasing to Test Level...
18:43:27 Start Level Reached.
18:43:27 Test Starts at 5.000 Hz
18:43:27 Minimum Drive Reached.
18:43:28 Minimum Drive Reached.
18:43:28 Minimum Drive Reached.
18:43:29 Minimum Drive Reached.
18:43:30 Minimum Drive Reached.
18:43:30 Minimum Drive Reached.
18:43:31 Minimum Drive Reached.
18:43:31 Minimum Drive Reached.
18:43:31 Minimum Drive Reached.
18:43:32 Minimum Drive Reached.
18:43:33 Minimum Drive Reached.
18:43:35 Minimum Drive Reached.
18:43:37 Minimum Drive Reached.
18:43:37 Minimum Drive Reached.
18:43:38 Minimum Drive Reached.
18:43:38 Minimum Drive Reached.
18:43:39 Minimum Drive Reached.
18:43:39 Minimum Drive Reached.
18:43:39 Minimum Drive Reached.
18:43:40 Minimum Drive Reached.
18:43:40 Minimum Drive Reached.
18:43:41 Minimum Drive Reached.
18:43:41 Minimum Drive Reached.
18:43:41 Minimum Drive Reached.
18:52:06 Shutdown Initiated...
18:52:10 Saved Sweep Number 1.00
```


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Control
Log
Acceleration
m/s² (0-pk)
50
10
1
0.2
5
10
100
Log
Frequency (Hz)
ETS 300 066 - IEC 1097-2 - Test 1X
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.001
18:53:31
02-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Drive
Log
V (0-pk)
5
1
0.1
0.01
5
10
100
Log
Frequency (Hz)
ETS 300 066 - IEC 1097-2 - Test 1X
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.001
18:53:31
02-Apr-2003

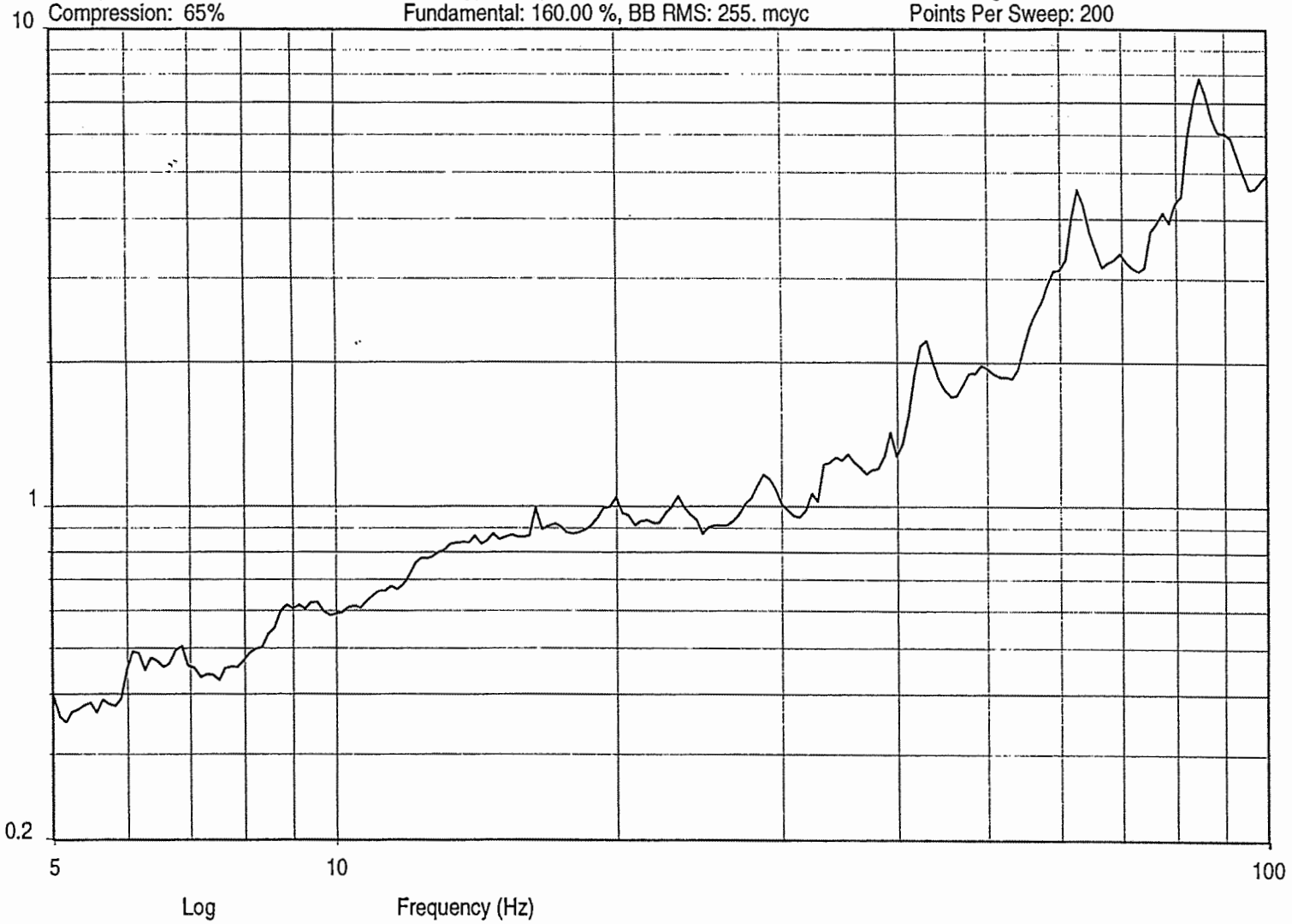

Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Auxiliary
BB RMS
2
Log
Acceleration
m/s² (0-pk)
20
10
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1X
ETS 300 066 - IEC 1097-2 - Test 1X
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.001
18:53:32
02-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Auxiliary
BB RMS
Log
Acceleration
m/s² (0-pk)
10
3
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1Y
ETS 300 066 - IEC 1097-2 - Test 1X
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.001
18:33:31
02-Apr-2003

Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%

Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc

Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200



SENSOR 1Z

ETS 300 066 - IEC 1097-2 - Test 1X
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.001

18:53:31
02-Apr-2003

5.9.2. TEST 2X : RESULTS OF X VIBRATION AXIS (Endurance test)

Data Storage File Name: IEC30Hz.002
Current Date: Thu Apr 03 2003 11:23:27

DOCUMENTATION:
Title 1: ETS 300 066 - IEC61097-2 Fr=30Hz/2Hours - Test 2X
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Test Function:	Single Frequency Dwell	
Date at Shutdown:	03-Apr-2003	
Time at Shutdown:	11:21:20	
Test Completed Normally		
Elapsed Time	002:00:00	
Remaining Time	000:00:00	
Elapsed Sweeps	0.00	
Remaining Sweeps	1.00	
Frequency at Shutdown:	30.00 Hz	
Test Level:	0.00 dB	
Maximum Control Error:	0.99 dB @ 30.00 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	100	0.5	65

REFERENCE TABLE:
REFERENCE PARAMETERS -

Minimum Frequency:	5.000 Hz
Maximum Frequency:	100.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	17.016 dB
Minimum Acceleration (0-pk):	0.987 m/s²
Maximum Acceleration (0-pk):	7.000 m/s²
Maximum Velocity (0-pk):	0.084 m/s
Maximum Displacement (pk-pk):	2.000 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	26.51	AC	Accel	m/s²	0.00		BB RMS
2	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
3	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
4	Auxiliary	No	12.80	AC	Accel	m/s²			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	26.51	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.80	SENSOR 1Z	

```
 (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: IEC30Hz.002
%Log: /user/client/m4586/sine/log/IEC30Hz.002.log
04/03/03
09:20:42 Nulling Internal Offsets.
09:20:47 Nulling Completed.
09:20:48 Loop Check Started...
09:20:48 Measuring Ambient Noise...
09:20:55 Searching for Threshold...
09:21:06 Loop Check Completed.
09:21:08 Increasing to Test Level...
09:21:10 Minimum Drive Reached.
09:21:15 Start Level Reached.
09:21:15 Test Starts at 30.00 Hz
11:21:15 Shutdown Initiated...
11:21:20 Saved Sweep Number 0.00
```

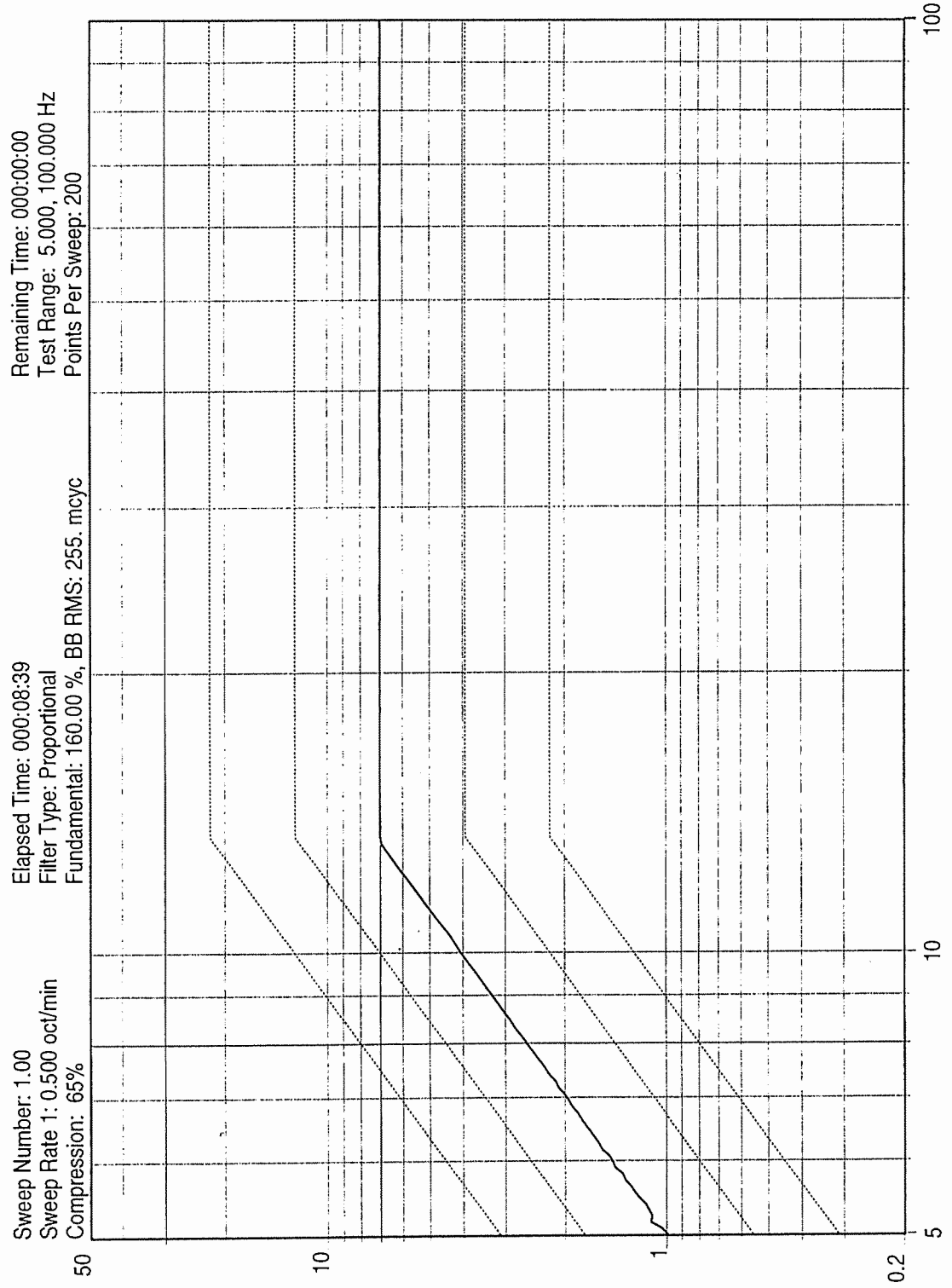

User Name: m4586
TEST
Data: IEC30Hz.002
Test Level: 0.00 dB
Filter Type: Proportional
Fundamental: 160.00 %
BB RMS: 255. mcyc
SCHEDULE
Name: Off
Sequence:
Cycle: Off
03-Apr-2003 11:23:07
Elapsed Time
002:00:00
Remaining Time
000:00:00
Messages
Start Level Reached.
Test Starts at 30.00 Hz
Shutdown Initiated...
Saved Sweep Number 0.00
Test Completed.
Test Frequency
30.00 Hz
Control Level 0-pk
7.0448 m/s²
Drive Level 0-pk
627.17 mV

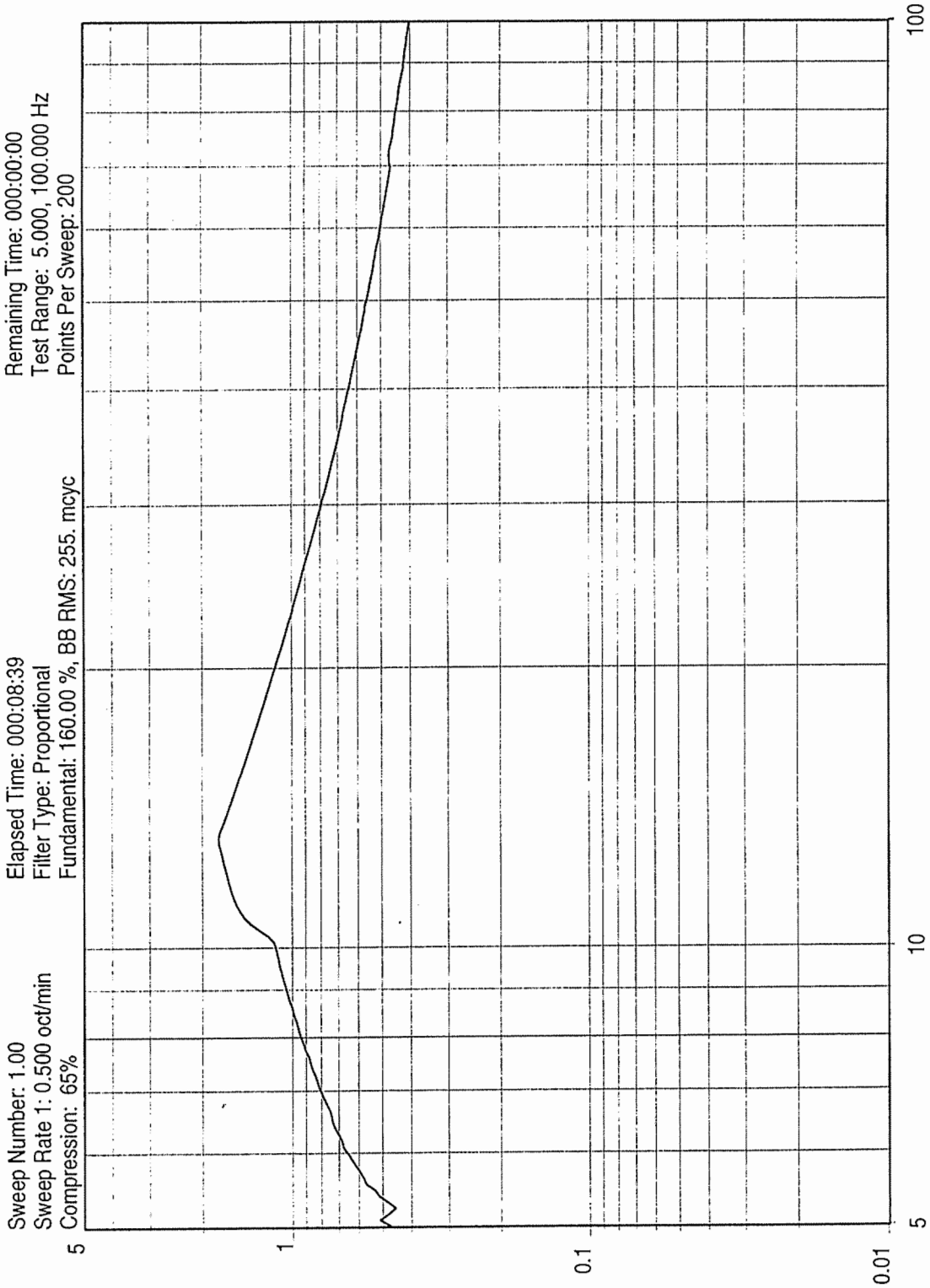
5.9.3. TEST 1Y : RESULTS OF 'Y' VIBRATION AXIS (FR detection)

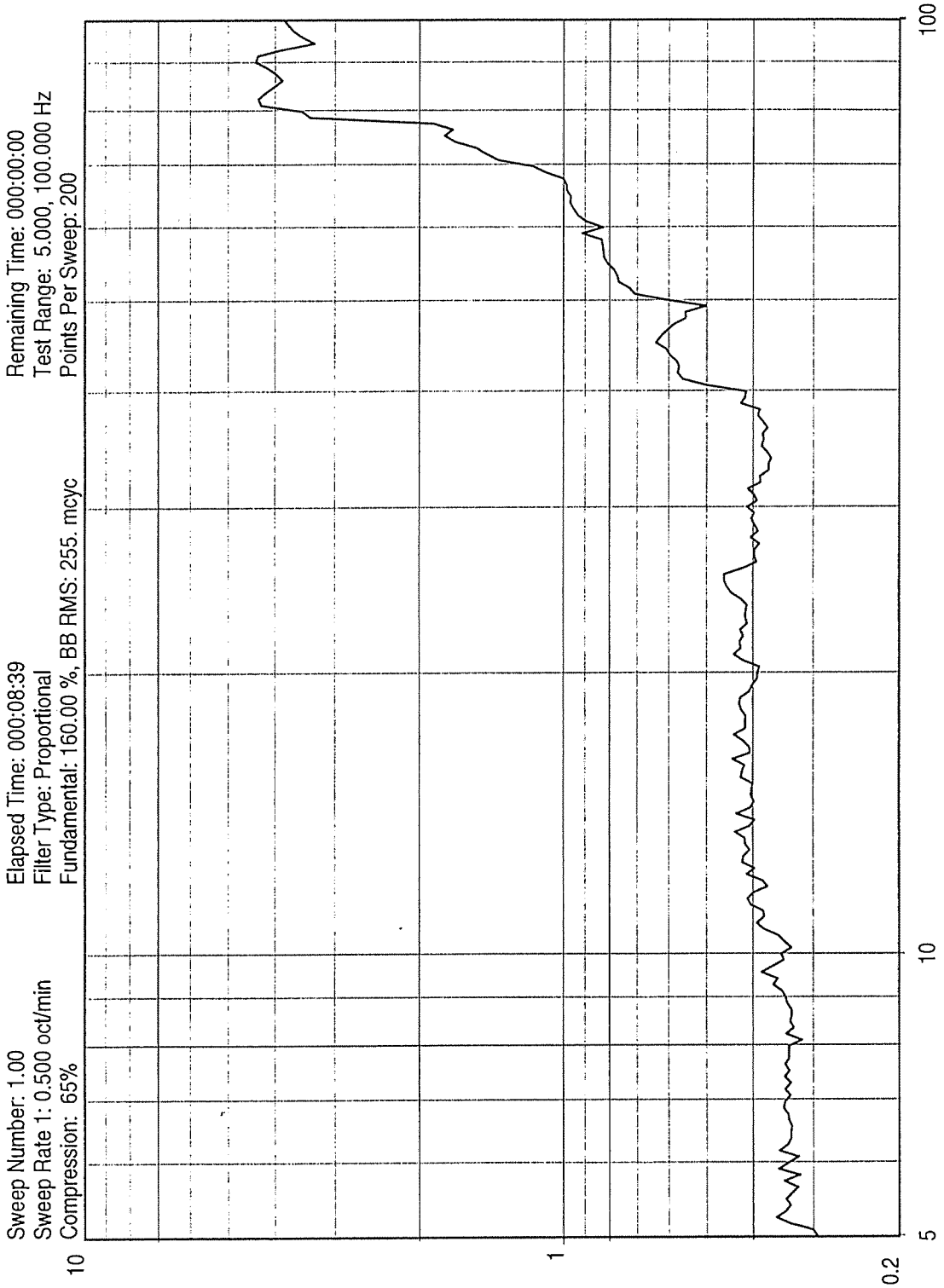
```
Data Storage File Name:                IEC.003
Current Date:                          Thu Apr 03 2003  13:40:32

DOCUMENTATION:
    Title 1: ETS 300 066 - IEC61097-2 - Test 1Y
    Title 2: M4586 - STD COM MT400 - S/N : C204
    Title 3:

TEST RESULTS:
    Test Function:                     Test
    Date at Shutdown:                  03-Apr-2003
    Time at Shutdown:                  13:39:48
    Test Completed Normally
    Elapsed Time                       000:08:39
    Remaining Time                     000:00:00
    Elapsed Sweeps                        1.00
    Remaining Sweeps                      0.00
    Frequency at Shutdown:              100.00 Hz
    Test Level:                           0.00 dB
    Maximum Control Error:               -0.90 dB  @     5.43 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    Ending       Sweep
        Number    Frequency     Rate     Compression
                    (Hz)      (Oct/min)     (%)
           1        100          0.5         65

REFERENCE TABLE:
    REFERENCE PARAMETERS -
        Minimum Frequency:              5.000 Hz
        Maximum Frequency:            100.000 Hz
        Frequency Points:             200.000
        Box Tolerance:                Disable
    SPECTRUM DYNAMIC LIMITS -
        Acceleration Range:            17.016 dB
        Minimum Acceleration (0-pk):    0.987 m/s²
        Maximum Acceleration (0-pk):    7.000 m/s²
        Maximum Velocity (0-pk):        0.084 m/s
        Maximum Displacement (pk-pk):   2.000 mm

CHANNEL TABLE:
Channel Channel     Loop Sensitivity Input     Transducer    Control   Profile Measurement
Number  Type        Check (mV/Units) Coupling  Type  Units   Weighting Number  Process
   1    Control      Yes     26.51   AC        Accel m/s²      0.00            BB RMS
   2    Auxiliary    No      14.44   AC        Accel m/s²                      BB RMS
   3    Auxiliary    No      14.44   AC        Accel m/s²                      BB RMS
   4    Auxiliary    No      12.80   AC        Accel m/s²                      BB RMS
(Continued for Labels...)
Channel Channel     Loop Sensitivity Channel Documentation
Number  Type        Check (mV/Units) Label 1                        Label 2
   1    Control      Yes     26.51   PILOT P
   2    Auxiliary    No      14.44   SENSOR 1X
   3    Auxiliary    No      14.44   SENSOR 1Y
   4    Auxiliary    No      12.80   SENSOR 1Z
```

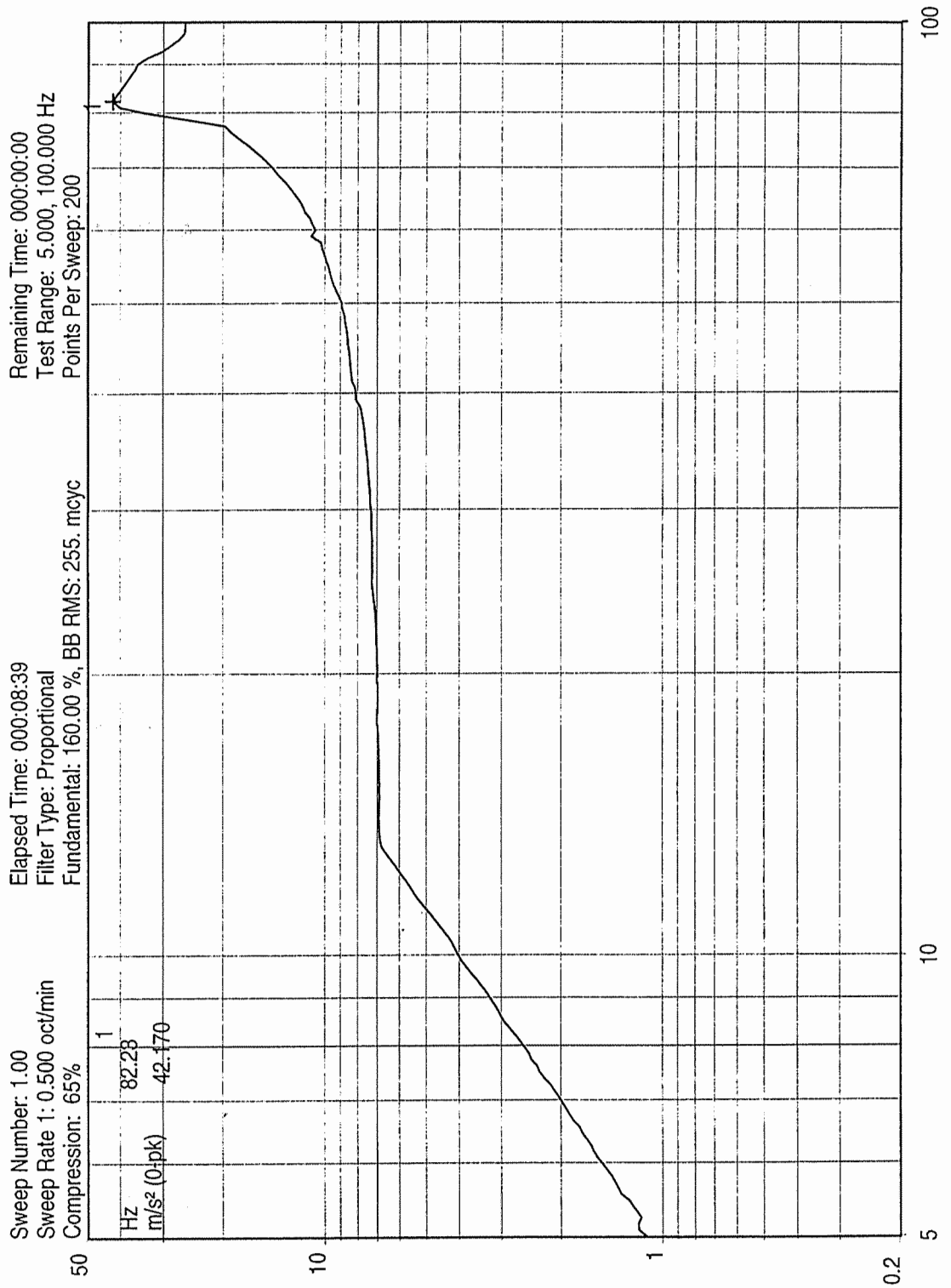
```
 (12 Inactive Channels)

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
```

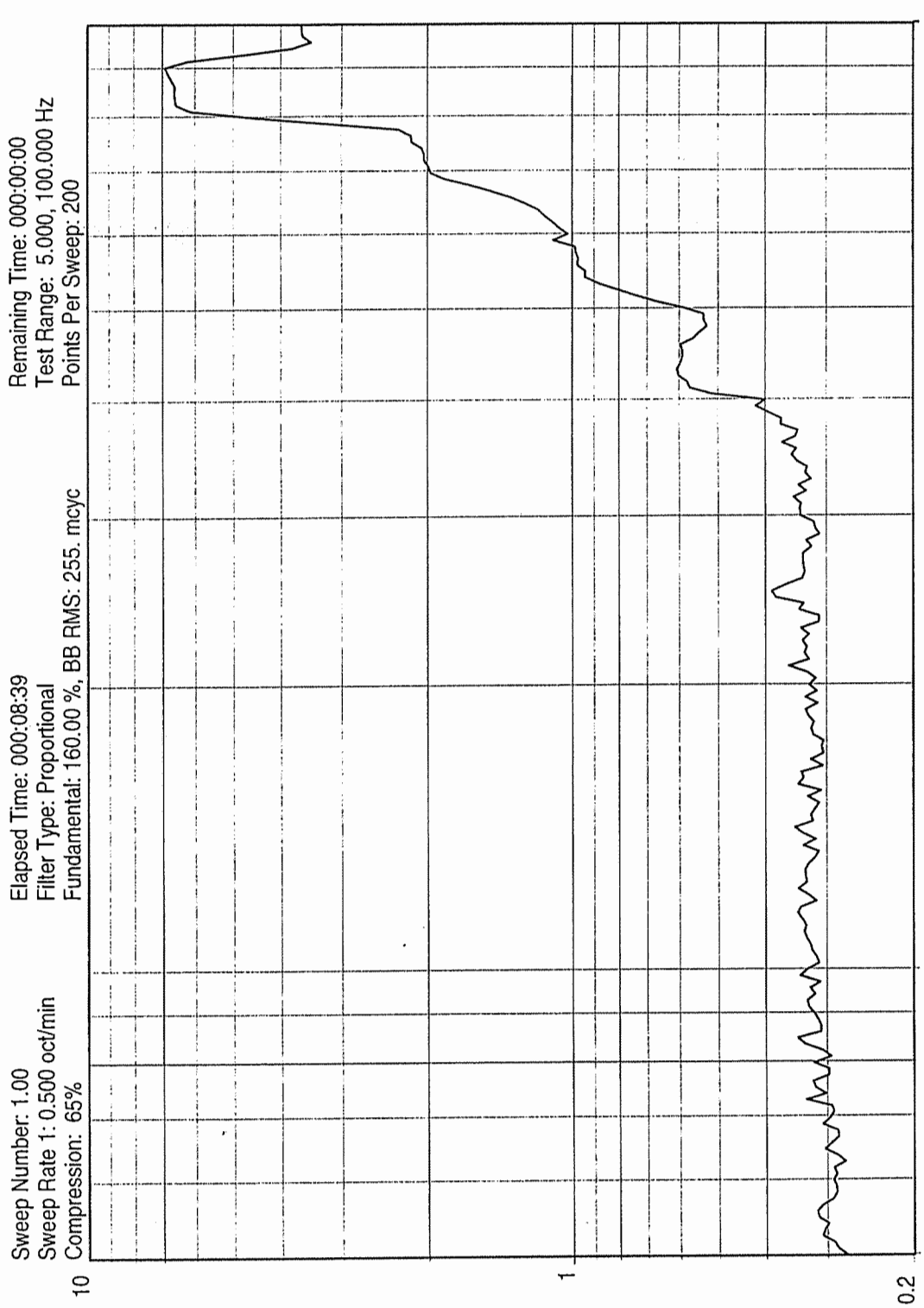
```
sine message log
1.00000

%Test: IEC.003
%Log: /user/client/m4586/sine/log/IEC.003.log
04/03/03
13:29:15 Nulling Internal Offsets.
13:29:21 Nulling Completed.
13:29:21 Loop Check Started...
13:29:21 Measuring Ambient Noise...
13:29:31 Searching for Threshold...
13:29:40 Loop Check Completed.
13:29:42 Increasing to Test Level...
13:29:45 Minimum Drive Reached.
13:29:46 Minimum Drive Reached.
13:29:47 Minimum Drive Reached.
13:31:05 Start Level Reached.
13:31:05 Test Starts at 5.000 Hz
13:39:44 Shutdown Initiated...
13:39:48 Saved Sweep Number 1.00
```


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:39
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:00
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Control
Log
Acceleration
m/s² (0-pk)
50
10
1
0.2
5
10
100
Log
Frequency (Hz)
ETS 300 066 - IEC 1097-2 - Test 1Y
M4586 - STD COM MT400 - S/N : C204
Sine Data Review Name:±IEC.003
13:39:48
Thu Apr 03 2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:39
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:00
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Drive
Log
Voltage
V (0-pk)
5
1
0.1
0.01
10
100
Log
Frequency (Hz)
ETS 300 066 - IEC 1097-2 - Test 1Y
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.003
13:39:57
03-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:39
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:00
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Auxiliary
BB RMS
Log
Acceleration
m/s² (0-pk)
10
2
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1X
ETS 300 066 - IEC 1097-2 - Test 1Y
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.003
13:39:58
03-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:39
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:00
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
1
82.28
42.170
Hz
m/s² (0-pk)
Auxiliary
BB RMS
Log
Acceleration
m/s² (0-pk)
50
10
3
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1Y
ETS 300 066 - IEC 1097-2 - Test 1Y
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.003
13:39:59
03-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:39
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:00
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Auxiliary
BB RMS
Log
Acceleration
m/s² (0-pk)
10
4
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1Z
ETS 300 066 - IEC 1097-2 - Test 1Y
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.003
13:39:58
03-Apr-2003

5.9.4. TEST 2Y : RESULTS OF 'Y' VIBRATION AXIS (Endurance at FR 82 Hz)

Sine Version 4.8.0 Test Summary Listing

Ref : M4586 – IEC & ETSI

Data Storage File Name: IEC82HZ.001
Current Date: Thu Apr 03 2003 15:49:38

DOCUMENTATION:
Title 1: ETS 300 066 - IEC 1097-2 Fr=82.2Hz/2Hours - Test 2Y
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Test Function:	Single Frequency Dwell
Date at Shutdown:	03-Apr-2003
Time at Shutdown:	15:48:46
Test Completed Normally	
Elapsed Time	002:00:00
Remaining Time	000:00:00
Elapsed Sweeps	0.00
Remaining Sweeps	1.00
Frequency at Shutdown:	82.23 Hz
Test Level:	0.00 dB
Maximum Control Error:	8.33 dB @ 82.23 Hz

Table of Alarms	Occurrences	Maximum Value
Alarm Lines Out:	2	0.00 dB
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	100	0.5	65

REFERENCE TABLE:
REFERENCE PARAMETERS -

Minimum Frequency:	5.000 Hz
Maximum Frequency:	100.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	17.016 dB
Minimum Acceleration (0-pk):	0.987 m/s²
Maximum Acceleration (0-pk):	7.000 m/s²
Maximum Velocity (0-pk):	0.084 m/s
Maximum Displacement (pk-pk):	2.000 mm

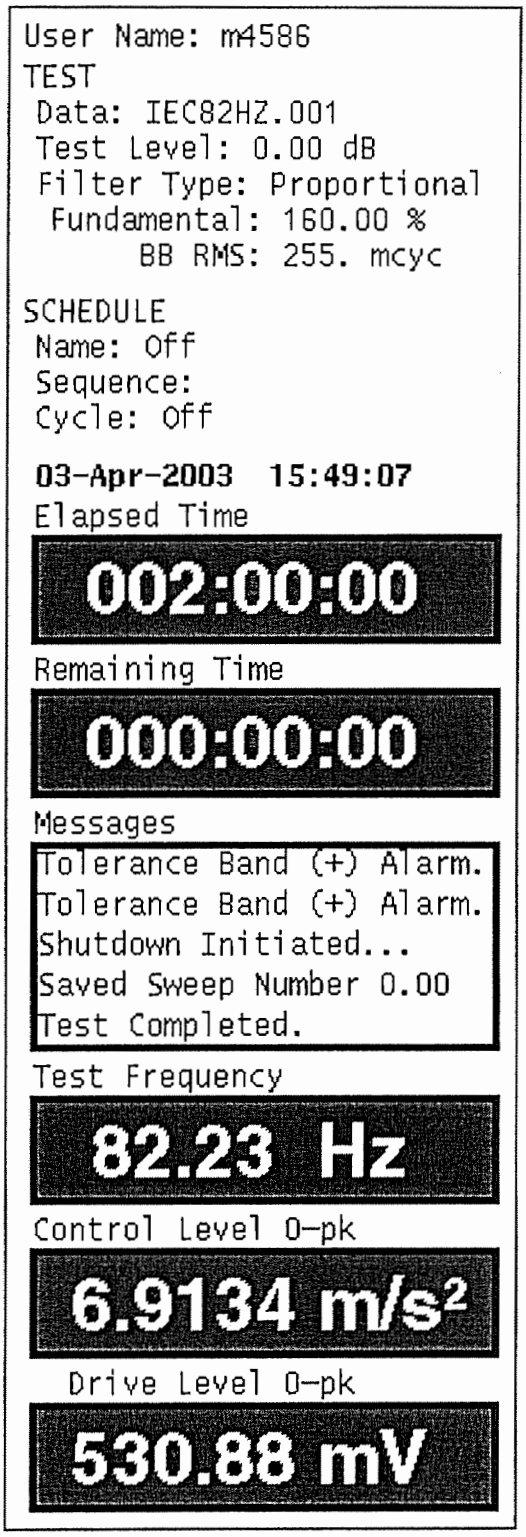
CHANNEL TABLE:

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	26.51	AC	Accel	m/s²	0.00		BB RMS
2	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
3	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
4	Auxiliary	No	12.80	AC	Accel	m/s²			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	26.51	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.80	SENSOR 1Z	

```
 (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: IEC82HZ.001
%Log: /user/client/m4586/sine/log/IEC82HZ.001.log
04/03/03
13:48:12 Nulling Internal Offsets.
13:48:17 Nulling Completed.
13:48:18 Loop Check Started...
13:48:18 Measuring Ambient Noise...
13:48:23 Searching for Threshold...
13:48:32 Loop Check Completed.
13:48:34 Increasing to Test Level...
13:48:36 Minimum Drive Reached.
13:48:41 Start Level Reached.
13:48:41 Test Starts at 82.23 Hz
14:59:52 Tolerance Band (+) Alarm.
14:59:52 Tolerance Band (+) Alarm.
15:48:41 Shutdown Initiated...
15:48:46 Saved Sweep Number 0.00
```


User Name: m4586
TEST
Data: IEC82HZ.001
Test Level: 0.00 dB
Filter Type: Proportional
Fundamental: 160.00 %
BB RMS: 255. mcyc
SCHEDULE
Name: Off
Sequence:
Cycle: Off
03-Apr-2003 15:49:07
Elapsed Time
002:00:00
Remaining Time
000:00:00
Messages
Tolerance Band (+) Alarm.
Tolerance Band (+) Alarm.
Shutdown Initiated...
Saved Sweep Number 0.00
Test Completed.
Test Frequency
82.23 Hz
Control Level 0-pk
6.9134 m/s²
Drive Level 0-pk
530.88 mV

5.9.5. TEST 1Z : RESULTS OF 'Z' VIBRATION AXIS (FR detection)

Site Version 4.8.0 Test Summary Listing

Ref : M4586 – IEC & ETSI

Data Storage File Name: IEC.007
Current Date: Fri Apr 04 2003 08:14:03

DOCUMENTATION:
Title 1: ETS 300 066 - IEC1097-2 - Test 1Z
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Test Function:	Test		
Date at Shutdown:	03-Apr-2003		
Time at Shutdown:	16:38:53		
Test Completed Normally			
Elapsed Time	000:08:38		
Remaining Time	000:00:01		
Elapsed Sweeps	1.00		
Remaining Sweeps	0.00		
Frequency at Shutdown:	100.00 Hz		
Test Level:	0.00 dB		
Maximum Control Error:	-0.77 dB	@ 68.46 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	100	0.5	65

REFERENCE TABLE:
REFERENCE PARAMETERS -

Minimum Frequency:	5.000 Hz
Maximum Frequency:	100.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	17.016 dB
Minimum Acceleration (0-pk):	0.987 m/s²
Maximum Acceleration (0-pk):	7.000 m/s²
Maximum Velocity (0-pk):	0.084 m/s
Maximum Displacement (pk-pk):	2.000 mm

CHANNEL TABLE:

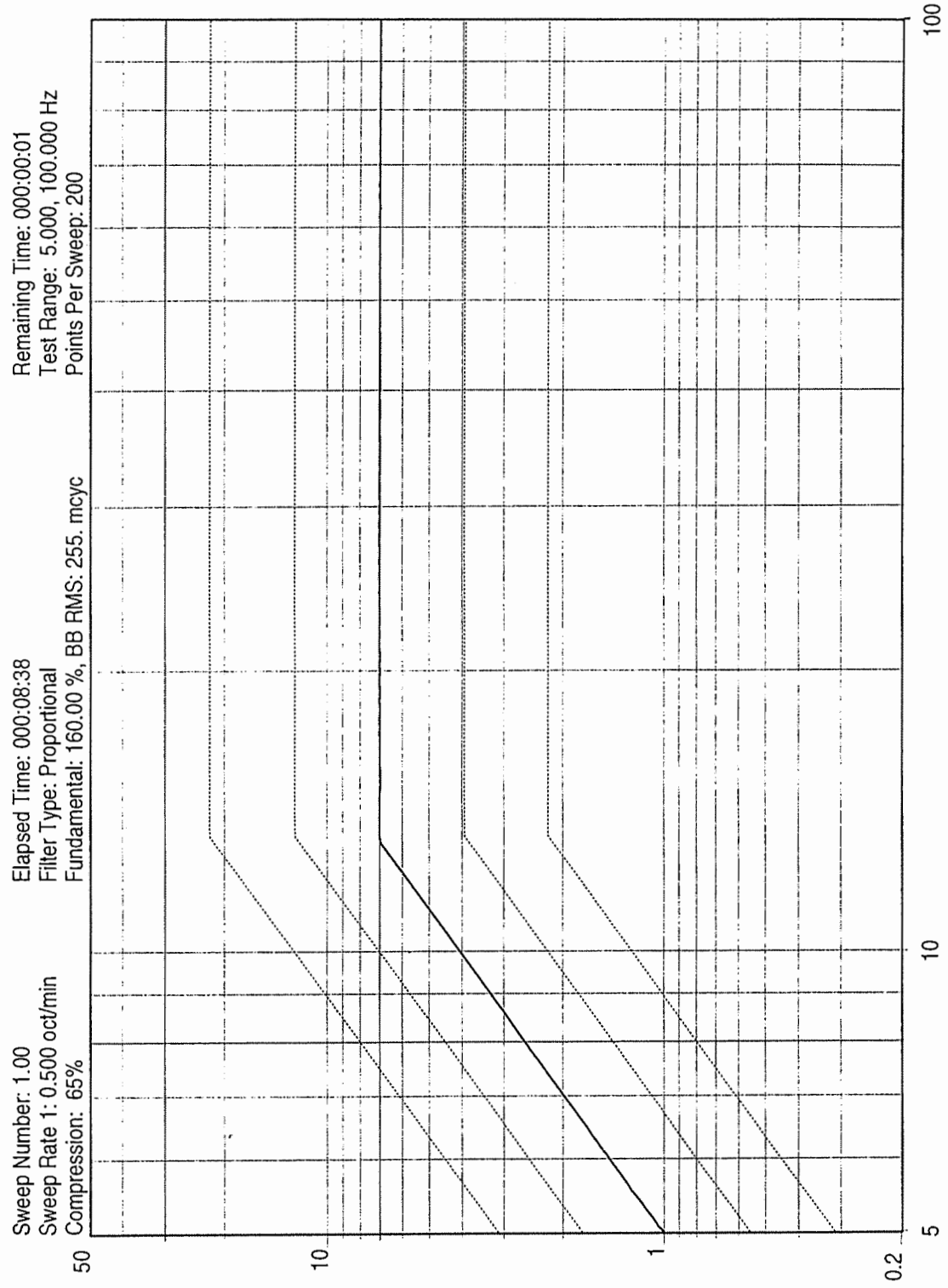
Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Input Coupling	Transducer Type	Units	Control Weighting	Profile Number	Measurement Process
1	Control	Yes	26.51	AC	Accel	m/s²	0.00		BB RMS
2	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
3	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
4	Auxiliary	No	12.80	AC	Accel	m/s²			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	26.51	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.80	SENSOR 1Z	

```
 (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
```

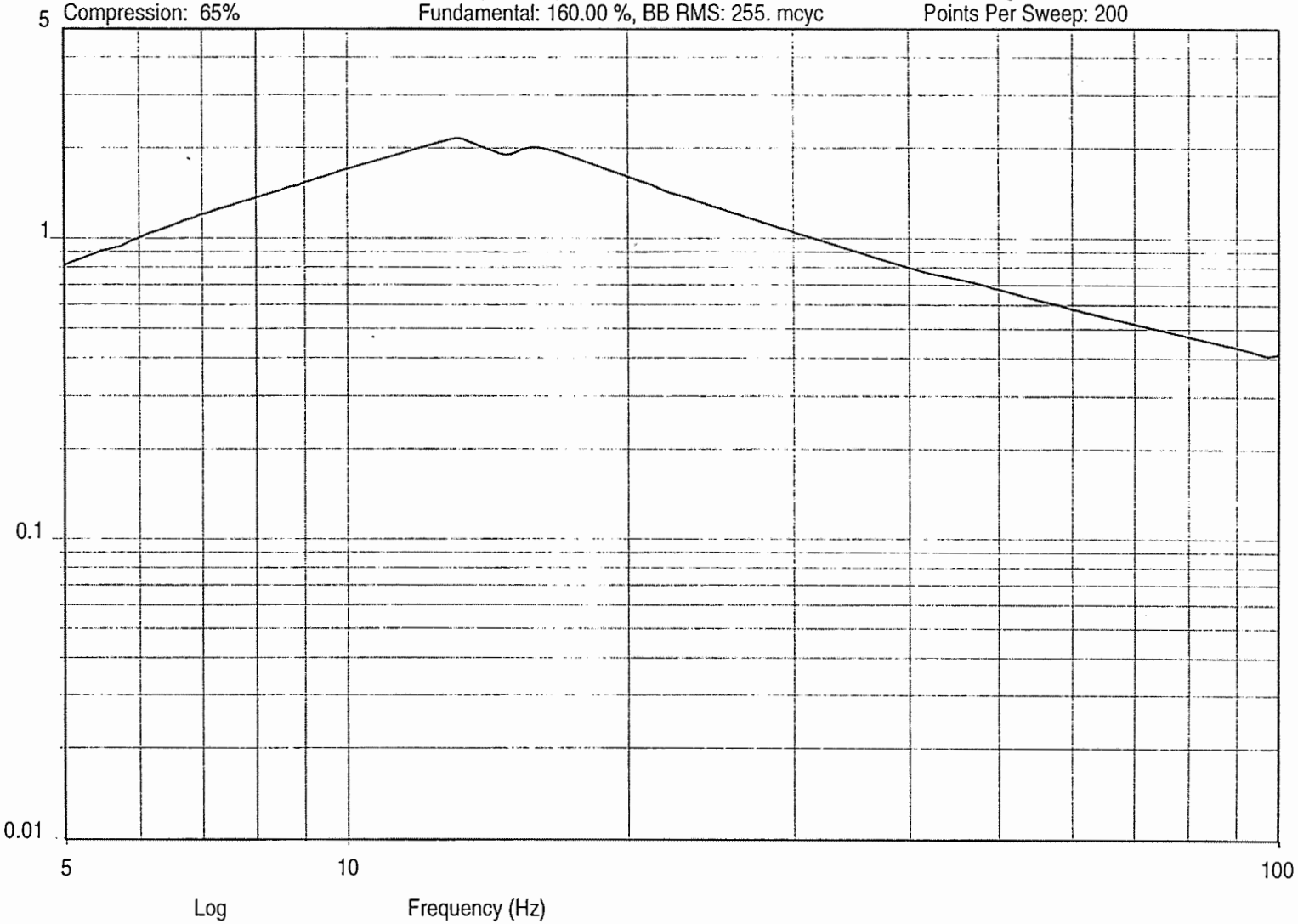
```
sine message log
1.00000

%Test: IEC.007
%Log: /user/client/m4586/sine/log/IEC.007.log
04/03/03
16:27:20 Loop Check Started...
16:27:20 Measuring Ambient Noise...
16:27:25 Searching for Threshold...
16:27:34 Loop Check Completed.
16:27:36 Increasing to Test Level...
16:30:10 Start Level Reached.
16:30:10 Test Starts at 5.000 Hz
16:38:49 Shutdown Initiated...
16:38:53 Saved Sweep Number 1.00
```


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
50
10
1
0.2
5
10
100
Log
Frequency (Hz)
Control
Log
Acceleration
m/s² (0-pk)
ETS 300 066 - IEC 1097-2 - Test 1Z
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.007
16:39:19
03-Apr-2003

Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%

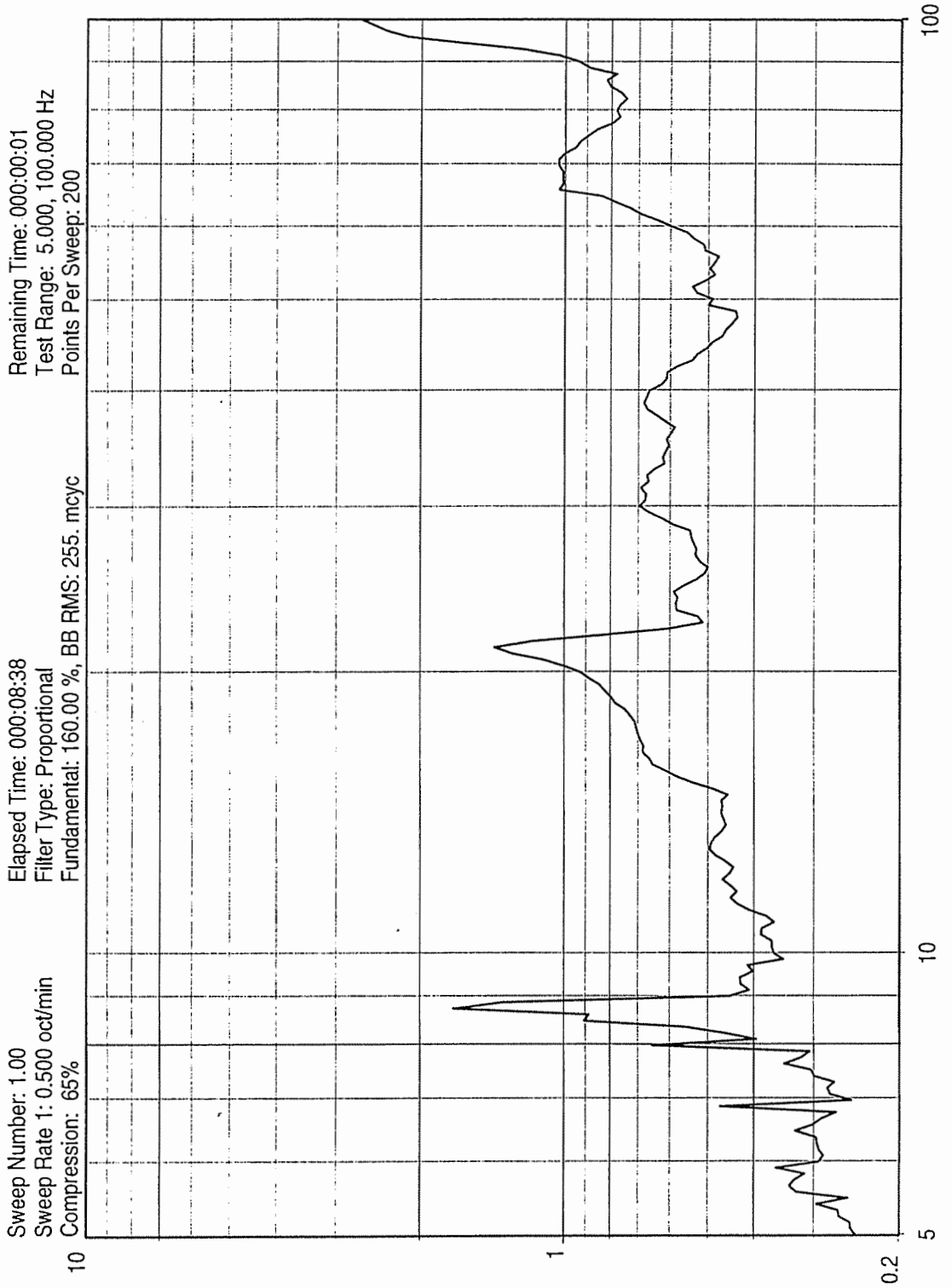
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc

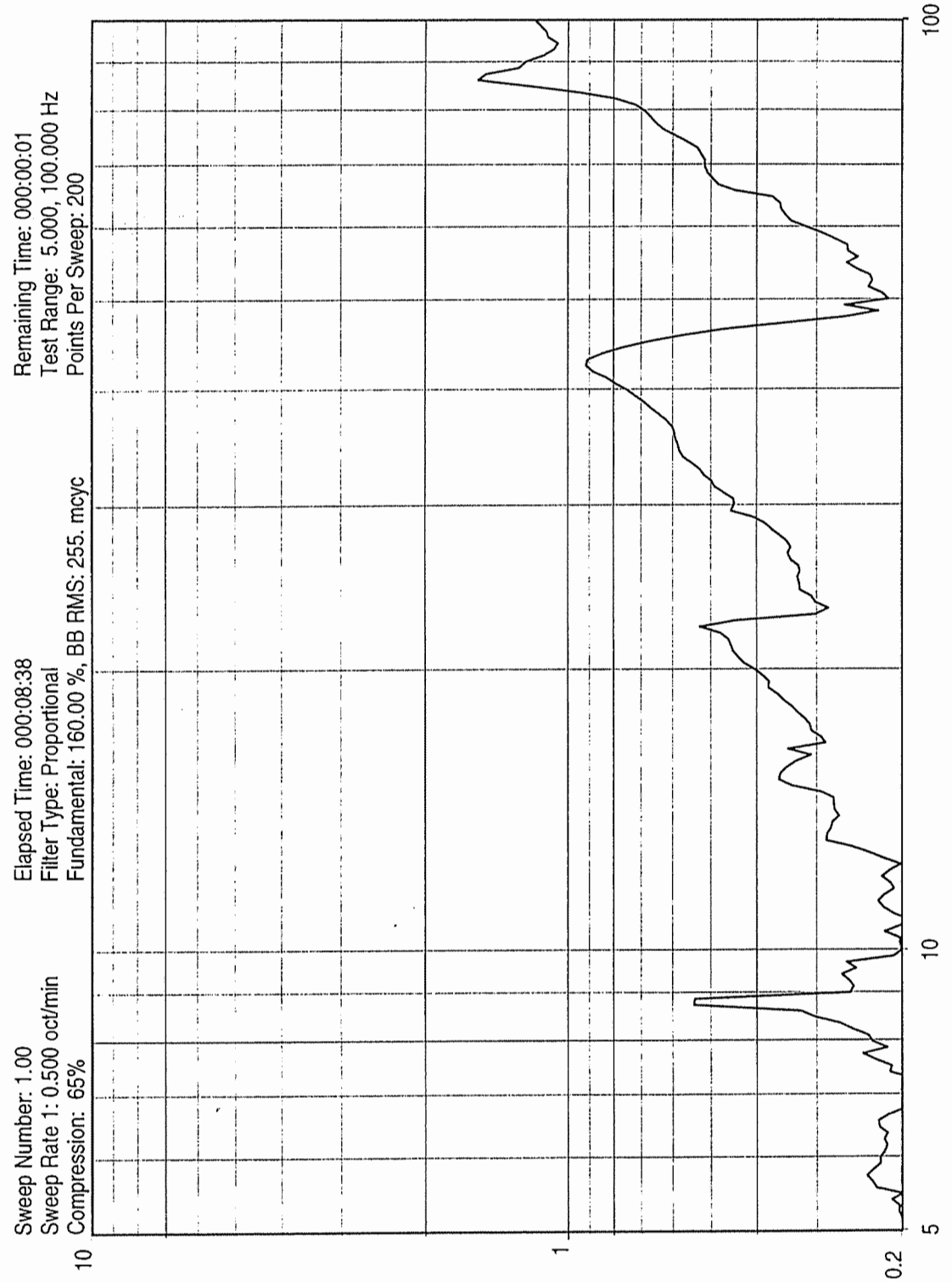
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200

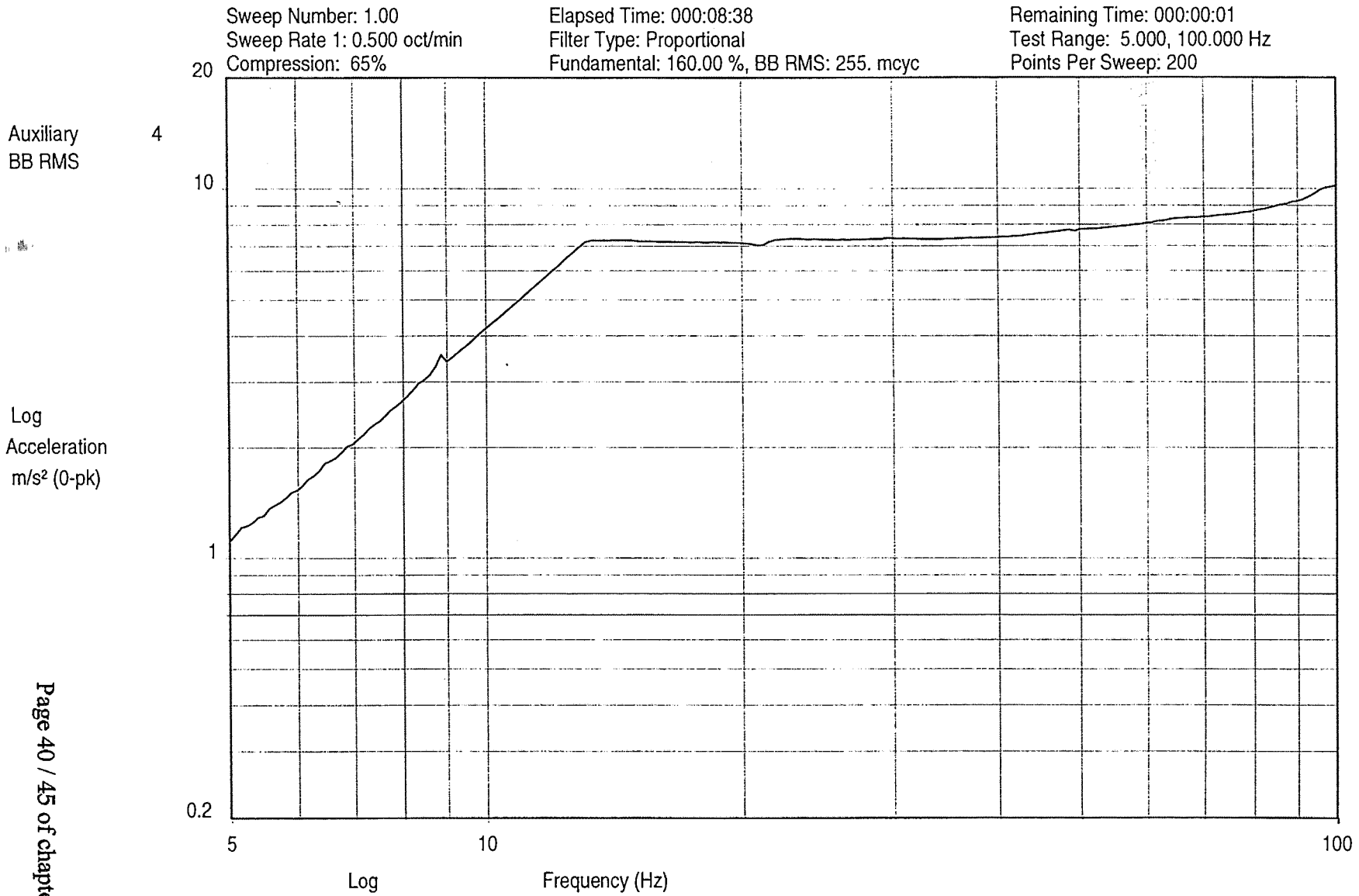


ETS 300 066 - IEC 1097-2 - Test 1Z
M4586 - STD COM MT400 - S/N : C204
Sine Test Name: IEC.007

16:39:19
03-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Auxiliary
BB RMS
Log
Acceleration
m/s² (0-pk)
10
2
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1X
ETS 300 066 - IEC 1097-2 - Test 1Z
SENSOR 1X
Sine Test Name: IEC.007
16:39:19
03-Apr-2003


Sweep Number: 1.00
Sweep Rate 1: 0.500 oct/min
Compression: 65%
Elapsed Time: 000:08:38
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc
Remaining Time: 000:00:01
Test Range: 5.000, 100.000 Hz
Points Per Sweep: 200
Auxiliary
BB RMS
3
Log
Acceleration
m/s² (0-pk)
10
1
0.2
5
10
100
Log
Frequency (Hz)
SENSOR 1Y
ETS 300 066 - IEC 1097-2 - Test 1Z
SENSOR 1Y
Sine Test Name: IEC.007
16:39:19
03-Apr-2003



16:39:19
03-Apr-2003

ETS 300 066 - IEC 1097-2 - Test 1Z
SENSOR 1Z
Sine Test Name: IEC.007

5.9.6. TEST 2Z : RESULTS OF 'Z' VIBRATION AXIS (Endurance at FR 30 Hz)

Sine Version 4.8.0 Test Summary Listing

Data Storage File Name: IEC30Hz.004
Current Date: Fri Apr 04 2003 10:20:54

DOCUMENTATION:
Title 1: ETS 300 066 - IEC 1097-2 Fr=30Hz/2Hours - Test 2Z
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Test Function:	Single Frequency Dwell
Date at Shutdown:	04-Apr-2003
Time at Shutdown:	10:18:43
Test Completed Normally	
Elapsed Time	002:00:00
Remaining Time	000:00:00
Elapsed Sweeps	0.00
Remaining Sweeps	1.00
Frequency at Shutdown:	30.00 Hz
Test Level:	0.00 dB
Maximum Control Error:	-0.29 dB @ 30.00 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	100	0.5	65

REFERENCE TABLE:
REFERENCE PARAMETERS -

Minimum Frequency:	5.000 Hz
Maximum Frequency:	100.000 Hz
Frequency Points:	200.000
Box Tolerance:	Disable

SPECTRUM DYNAMIC LIMITS -

Acceleration Range:	17.016 dB
Minimum Acceleration (0-pk):	0.987 m/s²
Maximum Acceleration (0-pk):	7.000 m/s²
Maximum Velocity (0-pk):	0.084 m/s
Maximum Displacement (pk-pk):	2.000 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	26.51	AC	Accel	m/s²	0.00		BB RMS
2	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
3	Auxiliary	No	14.44	AC	Accel	m/s²			BB RMS
4	Auxiliary	No	12.80	AC	Accel	m/s²			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes	26.51	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.80	SENSOR 1Z	

```
sine message log
1.00000

%Test: IEC30Hz.004
%Log: /user/client/m4586/sine/log/IEC30Hz.004.log
04/04/03
08:18:09 Nulling Internal Offsets.
08:18:16 Nulling Completed.
08:18:16 Loop Check Started...
08:18:16 Measuring Ambient Noise...
08:18:21 Searching for Threshold...
08:18:29 Loop Check Completed.
08:18:31 Increasing to Test Level...
08:18:33 Minimum Drive Reached.
08:18:38 Start Level Reached.
08:18:38 Test Starts at 30.00 Hz
10:18:38 Shutdown Initiated...
10:18:43 Saved Sweep Number 0.00
```

```
 (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
```

5.9.7. 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.

5.9.8. FINAL CONTROL

5.9.8.1.External mechanical inspection.
A visual inspection was done on all external mechanical parts.
Result : nominal.

5.9.8.2.Aliveness test results

Result : nominal.

VIBRATION ALIVENESS TEST RESULTS

Beacon Unit : 1/3
Name : STANDARD COMMUNICATIONS
Type : MT400
Number : C204
Bracket : STANDARD COMMUNICATIONS - MT400 Manual Mounting Bracket

Date : April 4th, 2003

406 MHz Measurements

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	35.5
- Power risetime	ms	< 5	-
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT			
- In band			OK
- Carrier harmonics			
4 -DIGITAL MESSAGE GENERATOR			
- Repetition rate			
- Bit rate	bits/S	400 ± 4	OK
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	
- CW preamble	ms	160 ± 1.6	
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	0
- Protocol flag	bit	26	1
- Country code	bits	27-36	0503
- Protocol	bits	37-39	111
- Homing	bits	84-85	01
- Activation type	bits	108	0
- BCH 1 code read / calculated	bits	86-106 / 25-85	070010 / 070010
- BCH 2 code read / calculated	bits	133-144 / 107-132	NA
6 - FREQUENCY			
- Nominal value	KHz	406 028 ± 1	OK
- Short term stability		$< 210^{-9}$/100 ms	

CHAPTER 6

RUGGEDNESS TEST

6.1. ADMINISTRATIVE INFORMATION

6.1.1. CLIENT

Standard Communications PTY. LTD

6.1.2. REPRESENTATIVES PRESENT

For the Client : Craig DUNCAN
For the Test Laboratory : J. M. BUCHMAN

6.1.3. DATES

Start of test : April 4th, 2003
End of test : April 4th, 2003

6.1.4. INTESPACE FILE REFERENCE : **M4586 – IEC & ETSI**

6.2. UNIT UNDER TEST (UUT)

Beacon Unit : 1/3
Name : STANDARD COMMUNICATIONS
Type : MT400
Number : C204

Bracket : STANDARD COMMUNICATIONS - MT400 Manual Mounting Bracket

6 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 draw § 6.7)

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 » (vertical axis : normal mounting)

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 V1.3.1. and
- Section A1.5 of IEC 61097-2

• Profile of bump test :

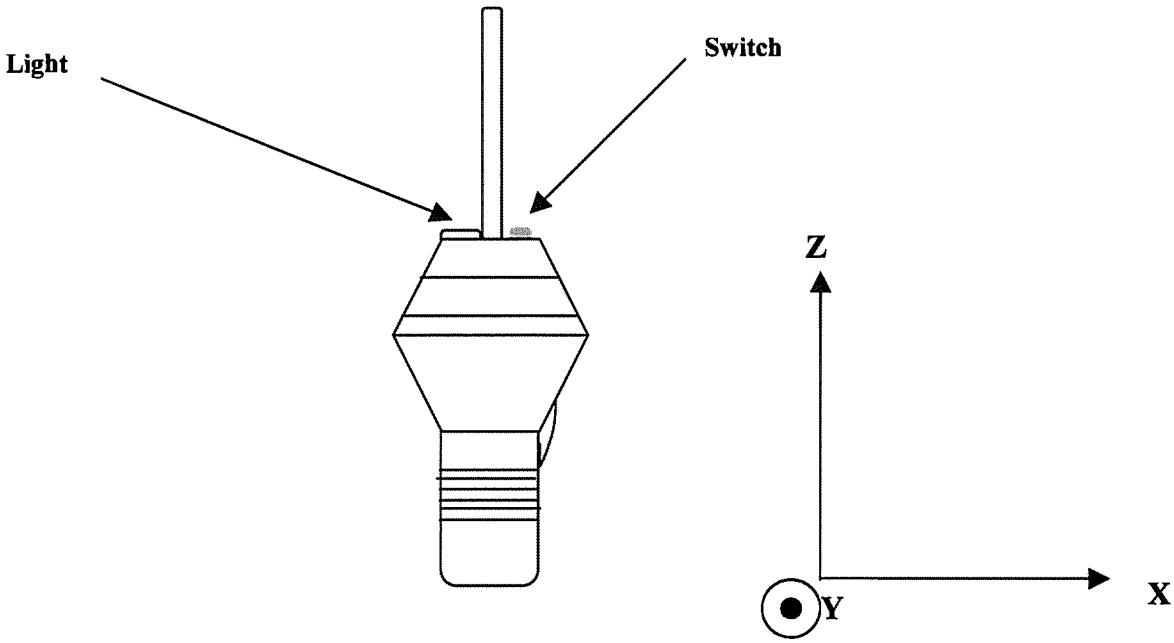
Peak acceleration	98 m/s^2
Pulse duration	16 ms
Waveshape	Half-cycle Sinewave
Test axis	Vertical (Z)
Number of Bumps	4000

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

6.6. LIST OF SERVO AND CONTROL SENSORS

Sensor	Location	N° acc.	Cable	Sensivity 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 DRAW : VIBRATION AXIS



6.8. TEST SCHEDULE

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
April 4th, 2003 **003Z+**	**Half-cycle sinewave Bump** Peak acceleration 98 m/s² 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.
April 4th, 2003 **003Z-**	**Half-cycle sinewave Bump** Peak acceleration 98 m/s² Pulse duration 16 ms Test axis Vertical (-Z) Number of Bumps 629 Test duration : 20 min.	6.9.2	Nominal	Functional testing : nominal.
April 4th, 2003 **003ZB-**	**Half-cycle sinewave Bump** Peak acceleration 98 m/s² Pulse duration 16 ms Test axis Vertical (-Z) Number of Bumps 1372 Test duration : 35 min.	6.9.3	Nominal End of the bump test	Functional testing : nominal. Removal of Beacon
April 4th, 2003	**Visual inspection**	6.9.4.1		Nothing abnormal to note
April 4th, 2003	**EPIRB 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)

Classical Shock Version 3.8.0 Test Summary Listing

Test Name: posbump.003
Current Date: Fri Apr 04 2003 11:31:20

DOCUMENTATION:
Title 1: BUMP TEST 98m/s2-16ms POSITIVE DIRECTION TEST 3Z
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Time at Shutdown:	11:30:52
Date at Shutdown:	04-Apr-2003
Test Completed Normally	
Last Pulse Output	
Pulse Amplitude:	96.31 m/s²
Test Level:	0.00 dB
Polarity:	+
Average Error (Time Domain):	1.39 %
Peak Error (Time Domain):	1.73 %
Pulses Requested:	2000
Pulses Remaining:	0

Table of Alarms	Occurrences	Maximum Value
Average Error:	17	13.9 %
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:	98.00 m/s²	
Pulse Duration:	16.00 ms	
PULSE DYNAMIC LIMITS -		
Acceleration:	98.00 m/s²	-19.60 m/s²
Velocity:	0.49 m/s	-0.49 m/s
Displacement:	0.00 mm	-11.93 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/m/s²)	Channel Label 1	Label 2
1	Control	Yes	26.5126	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.798	SENSOR 1Z	

End of Classical Shock Test Summary List

Test Name: posbump.003
Current Date: Fri Apr 04 2003 11:31:20

DOCUMENTATION:
Title 1: BUMP TEST 98m/s2-16ms POSITIVE DIRECTION TEST 3Z+
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Time at Shutdown:	11:30:52	
Date at Shutdown:	04-Apr-2003	
Test Completed Normally		
Last Pulse Output		
Pulse Amplitude:	96.31 m/s²	
Test Level:	0.00 dB	
Polarity:	+	
Average Error (Time Domain):	1.39 %	
Peak Error (Time Domain):	1.73 %	
Pulses Requested:	2000	
Pulses Remaining:	0	
Table of Alarms	Occurrences	Maximum Value
Average Error:	17	13.9 %
Peak Error:	0	
Maximum Drive:	0	
Input Overload:	0	

TABLE OF OUTPUTS:

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

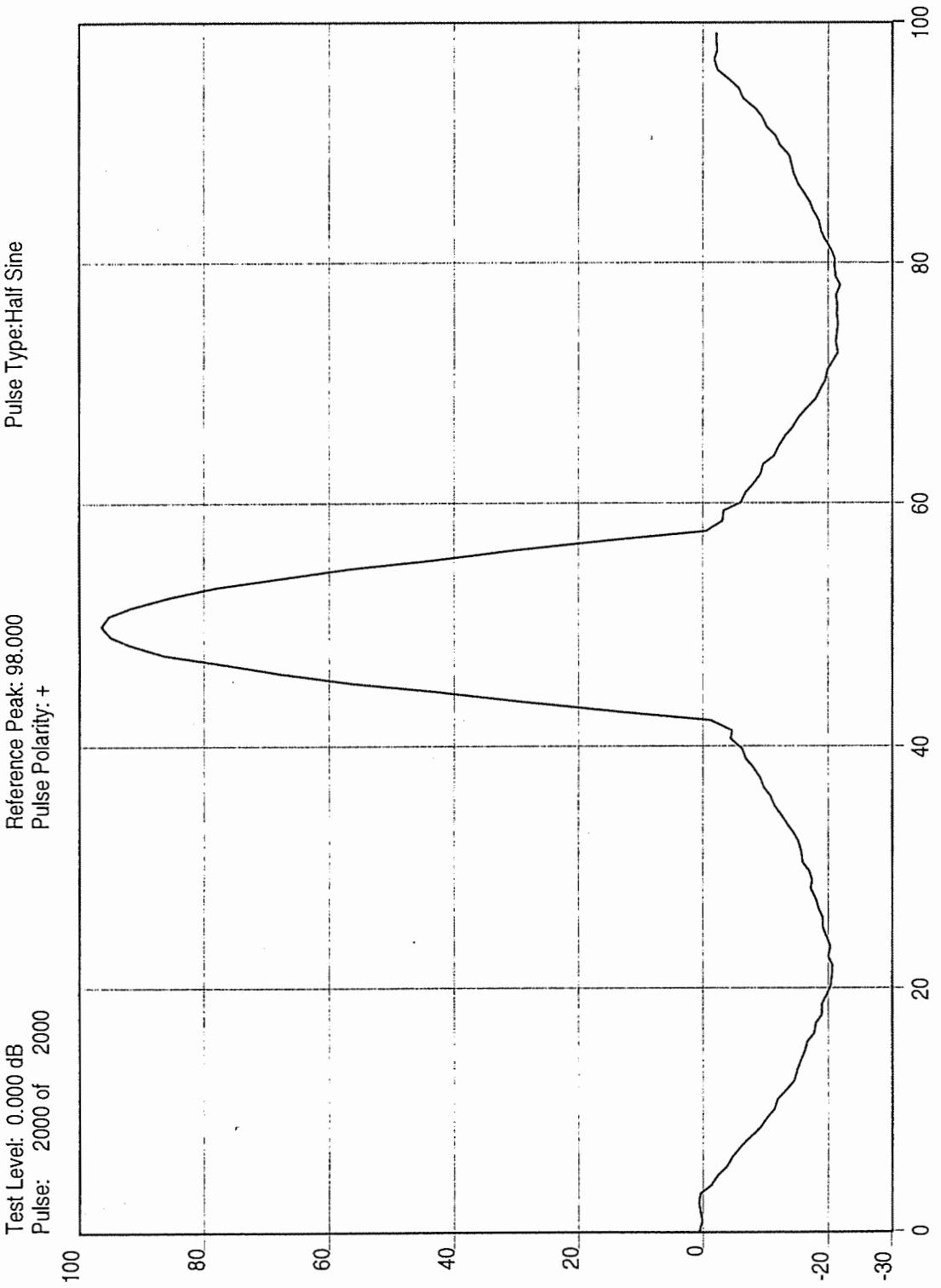
REFERENCE PARAMETERS:

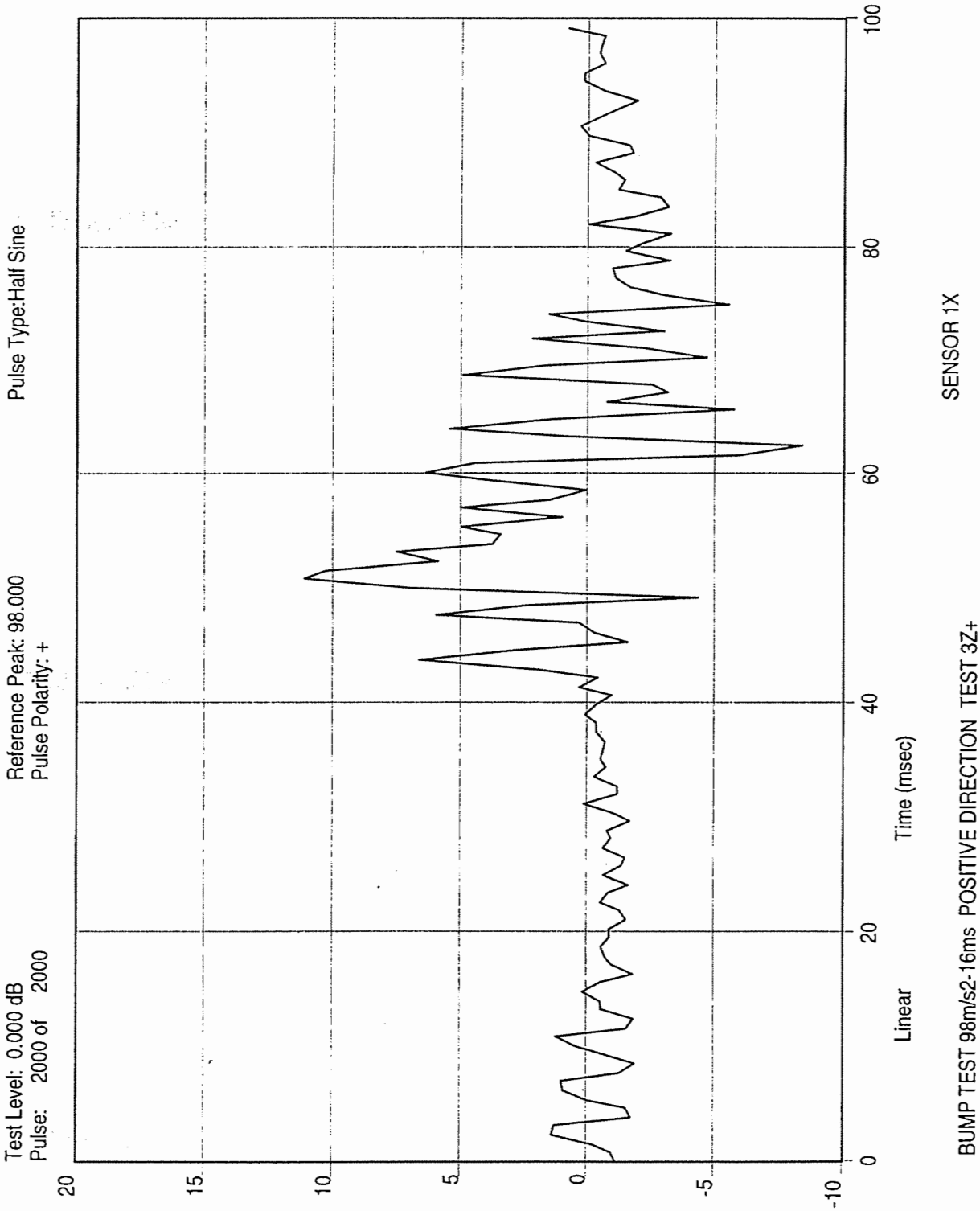
REFERENCE PULSE -		
Pulse Type:	Half Sine	
Pulse Amplitude:	98.00 m/s²	
Pulse Duration:	16.00 ms	
PULSE DYNAMIC LIMITS -		
Acceleration:	98.00 m/s²	-19.60 m/s²
Velocity:	0.49 m/s	-0.49 m/s
Displacement:	0.00 mm	-11.93 mm
Sample Rate:	1280.00 Hz	
SRS ANALYSIS PARAMETERS -		
SRS Spacing:	1/3 octave	
SRS Filter Definition:	Absolute Acceleration	
SRS Damping:	5.00 %	
SRS Q:	10.00	

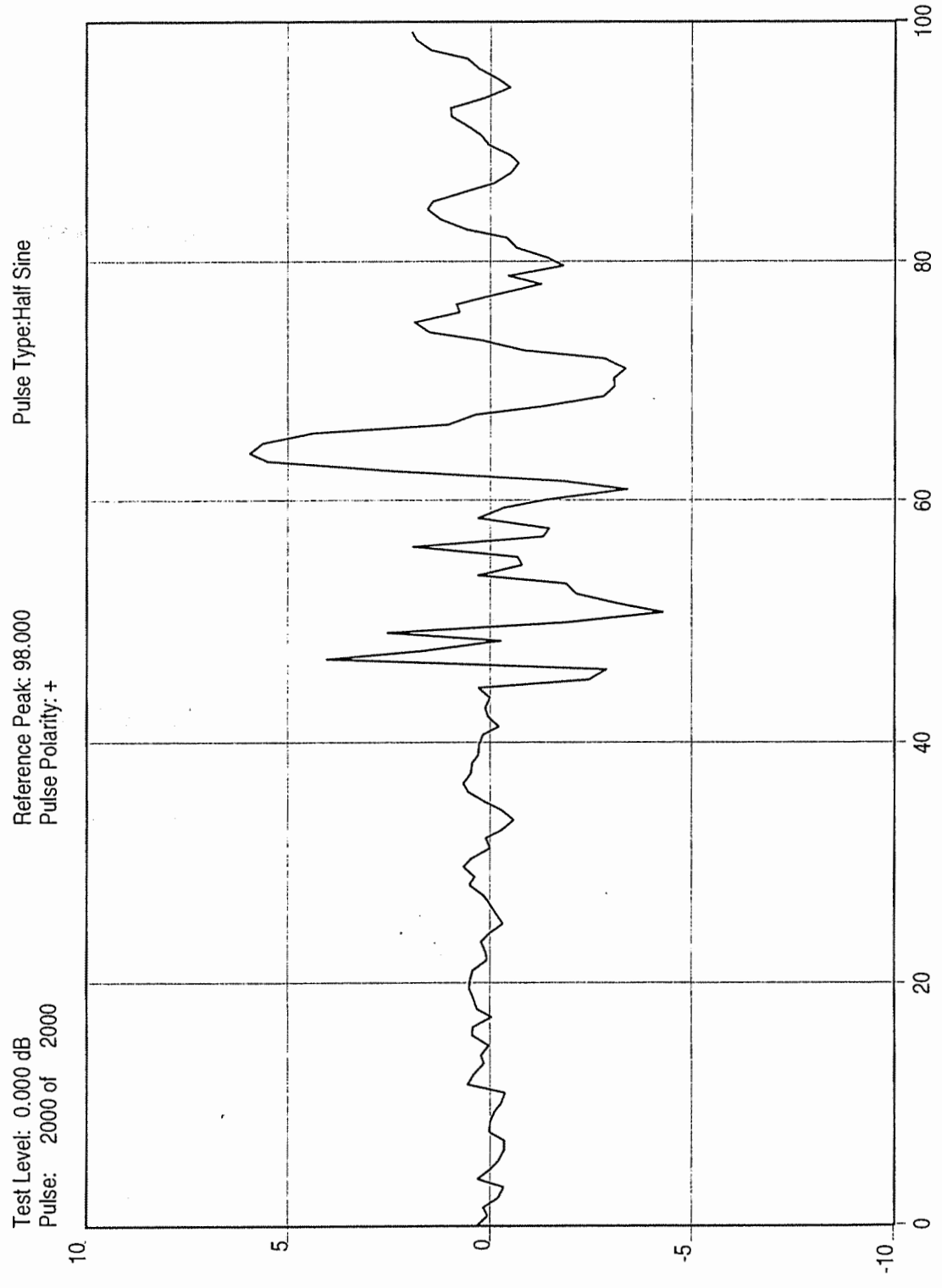
CHANNEL TABLE:

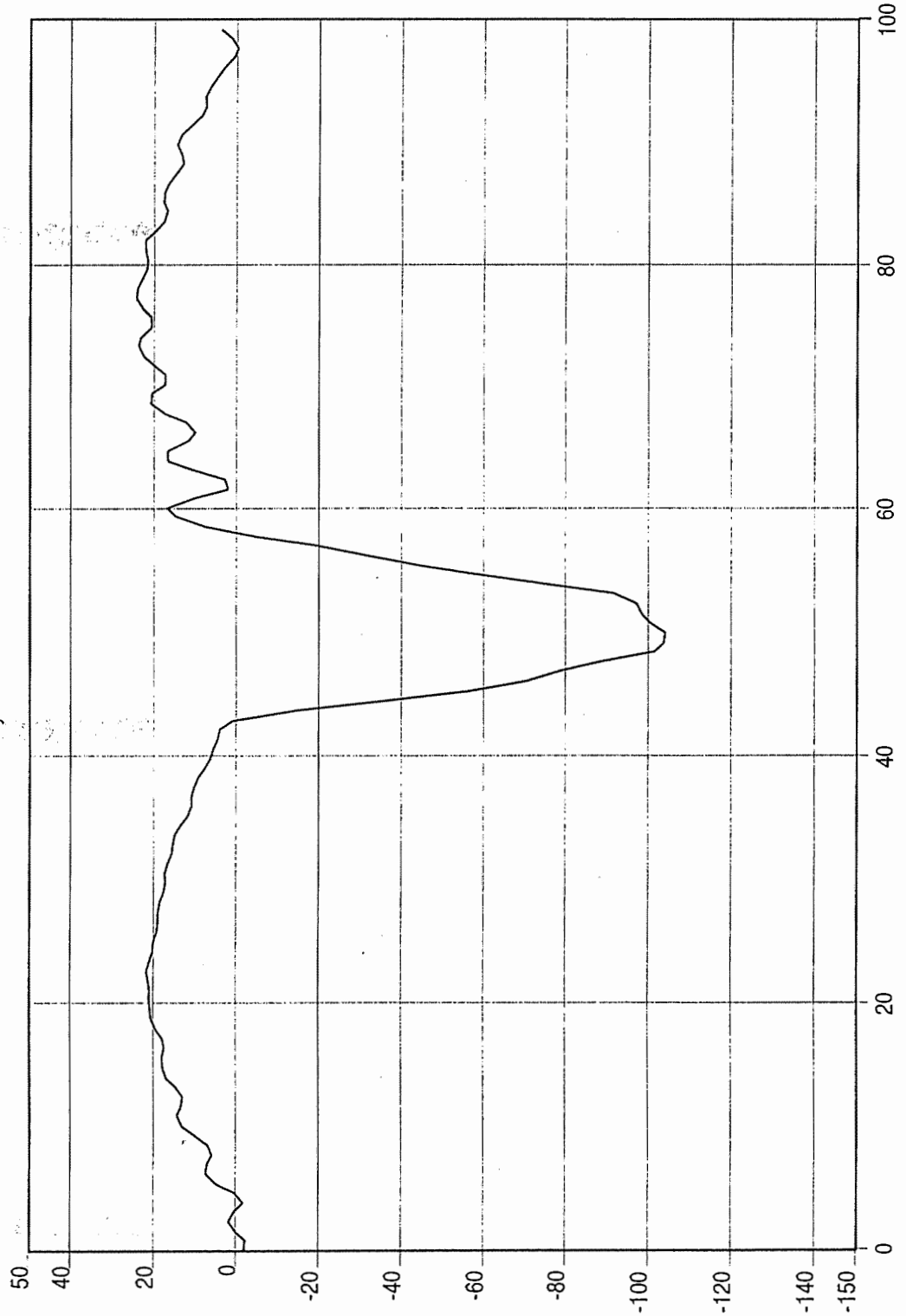
Channel Number	Channel Type	Loop Check	Sensitivity (mV/m/s²)	Channel Label 1	Label 2
1	Control	Yes	26.5126	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.798	SENSOR 1Z	

End of Classical Shock Test Summary List


Test Level: 0.000 dB
Pulse: 2000 of 2000
Reference Peak: 98.000
Pulse Polarity: +
Pulse Type:Half Sine
100
80
60
40
20
0
-20
-30
0
20
40
60
80
100
Linear
Time (msec)
PILOT P
BUMP TEST 98m/s2-16ms POSITIVE DIRECTION TEST 3Z+
M4586 - STD COM MT400 - S/N : C204
Classical Shock Data Review Name: posbump.003
Control
Acceleration
Linear
m/s²
Peak:
96.308
-21.918
11:30:37.2
Fri Apr 04 2003


Test Level: 0.000 dB
Pulse: 2000 of 2000
Reference Peak: 98.000
Pulse Polarity: +
Pulse Type:Half Sine
SENSOR 1X
Auxiliary Acceleration 2
Linear m/s²
Peak: 11.098 -8.410
20
15
10
5
0
-5
-10
0
20
40
60
80
100
Linear
Time (msec)
BUMP TEST 98m/s2-16ms POSITIVE DIRECTION TEST 3Z+
M4586 - STD COM MT400 - S/N : C204
Classical Shock Data Review Name: posbump.003
11:30:37.2
Fri Apr 04 2003


Test Level: 0.000 dB
Pulse: 2000 of 2000
Reference Peak: 98.000
Pulse Polarity: +
Pulse Type:Half Sine
SENSOR 1Y
Auxiliary
Acceleration
3
Linear
m/s²
Peak:
5.940
-4.289
10
5
0
-5
-10
0
20
40
60
80
100
Linear
Time (msec)
BUMP TEST 98m/s2-16ms POSITIVE DIRECTION TEST 3Z+
M4586 - STD COM MT400 - S/N : C204
Classical Shock Data Review Name: posbump.003
11:30:37.2
Fri Apr 04 2003


Test Level: 0.000 dB
Pulse: 2000 of 2000
Reference Peak: 98.000
Pulse Polarity: +
Pulse Type:Half Sine
SENSOR 1Z
Auxiliary
Acceleration
4
Linear
m/s²
Peak:
24.300
-104.128
50
40
20
0
-20
-40
-60
-80
-100
-120
-140
-150
0
20
40
60
80
100
Linear
Time (msec)
BUMP TEST 98m/s2-16ms POSITIVE DIRECTION TEST 3Z+
M4586 - STD COM MT400 - S/N : C204
Classical Shock Data Review Name: posbump.003
11:30:37.2
Fri Apr 04 2003

6.9.2. RESULTS OF -Z BUMP AXIS (629 bumps)

Classical Shock Version 3.8.0 Test Summary Listing

est Name:	negbump.002
Current Date:	Fri Apr 04 2003 12:57:27

DOCUMENTATION:
Title 1: BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3Z-
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Time at Shutdown:	12:56:18
Date at Shutdown:	04-Apr-2003
Reason for Shutdown:	Peak Abort Level Exceeded
Last Pulse Output	
Pulse Amplitude:	-116.88 m/s²
Test Level:	0.00 dB
Polarity:	-
Average Error (Time Domain):	21.33 %
Peak Error (Time Domain):	19.27 %
Pulses Requested:	0
Pulses Remaining:	0

Table of Alarms	Occurrences	Maximum Value
Average Error:	31	18.8 %
Peak Error:	1	26.8 %
Maximum Drive:	0	
Input Overload:	3	

TABLE OF OUTPUTS:

Level	Number of Outputs Positive	Negative
0.00		629
-2.00		1
-5.00		1
-8.00		1
-11.00		1
-15.00		11

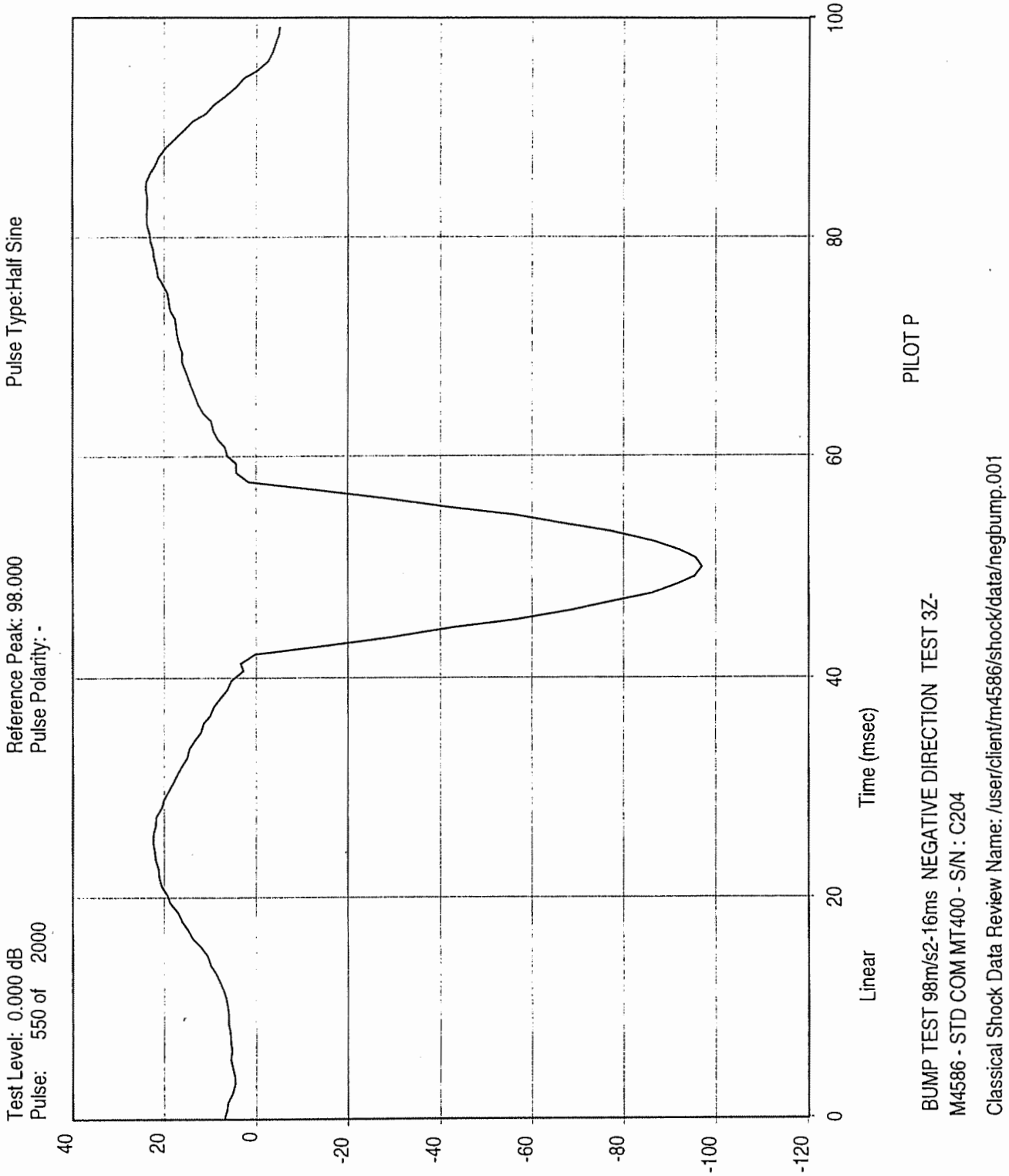
REFERENCE PARAMETERS:

REFERENCE PULSE -		
Pulse Type:	Half Sine	
Pulse Amplitude:	98.00 m/s²	
Pulse Duration:	16.00 ms	
PULSE DYNAMIC LIMITS -		
Acceleration:	98.00 m/s²	-19.60 m/s²
Velocity:	0.49 m/s	-0.49 m/s
Displacement:	0.00 mm	-11.93 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/m/s²)	Channel Label 1	Label 2
1	Control	Yes	26.5126	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.798	SENSOR 1Z	

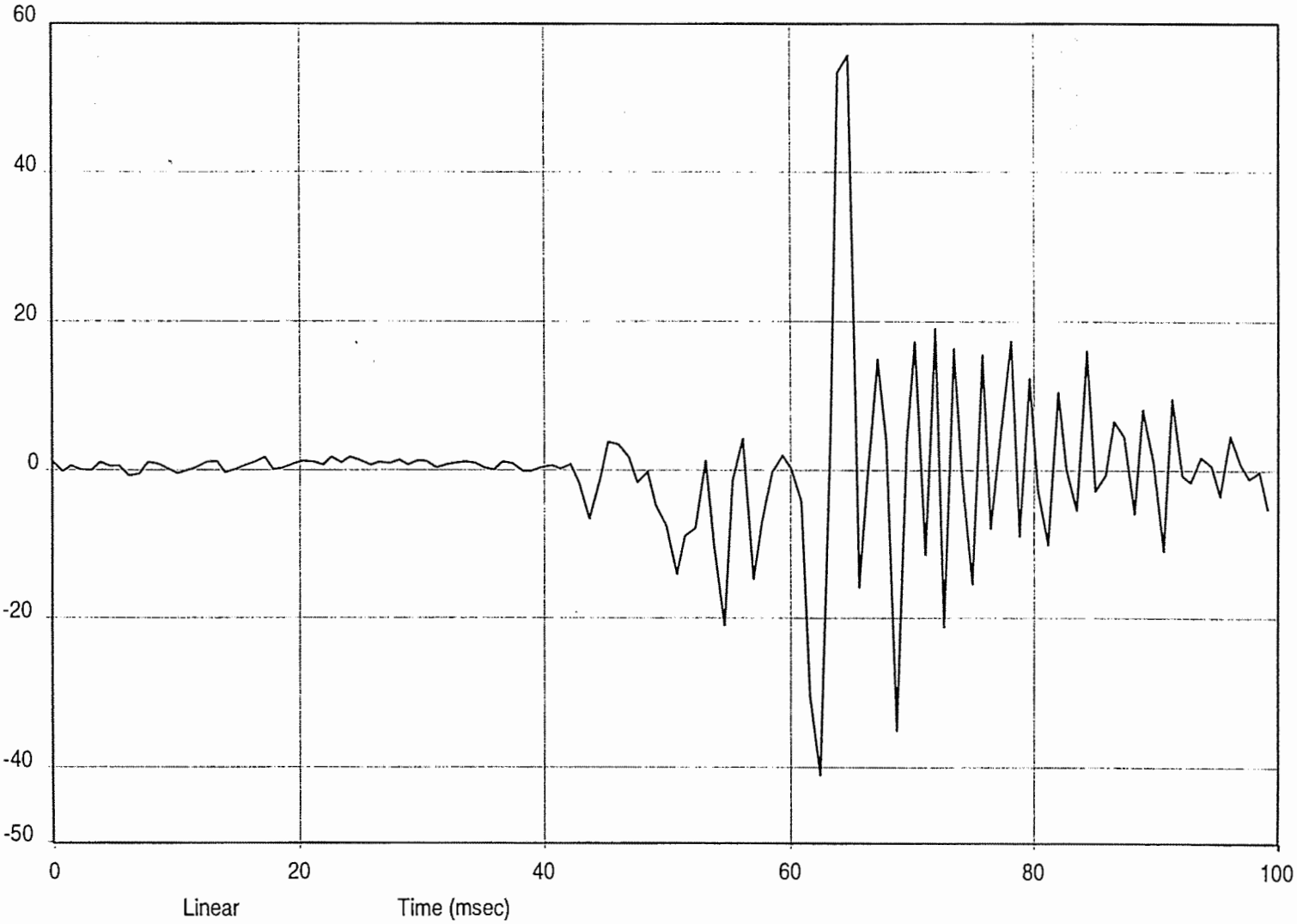
End of Classical Shock Test Summary List


Test Level: 0.000 dB
Pulse: 550 of 2000
Reference Peak: 98.000
Pulse Polarity: -
Pulse Type:Half Sine
Control
Acceleration
Linear
m/s²
Peak:
23.912
-97.017
40
20
0
-20
-40
-60
-80
-100
-120
0
20
40
60
80
100
Linear
Time (msec)
PILOT P
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3Z-
M4586 - STD COM MT400 - S/N : C204
Classical Shock Data Review Name: /user/client/m4586/shock/data/negbump.001
12:53:20.6
Fri Apr 04 2003

Test Level: 0.000 dB
Pulse: 550 of 2000

Reference Peak: 98.000
Pulse Polarity: -

Pulse Type:Half Sine



Auxiliary 2
Acceleration

Linear
m/s²

Peak:
55.646
-40.996

SENSOR 1X

12:53:20.6
Fri Apr 04 2003

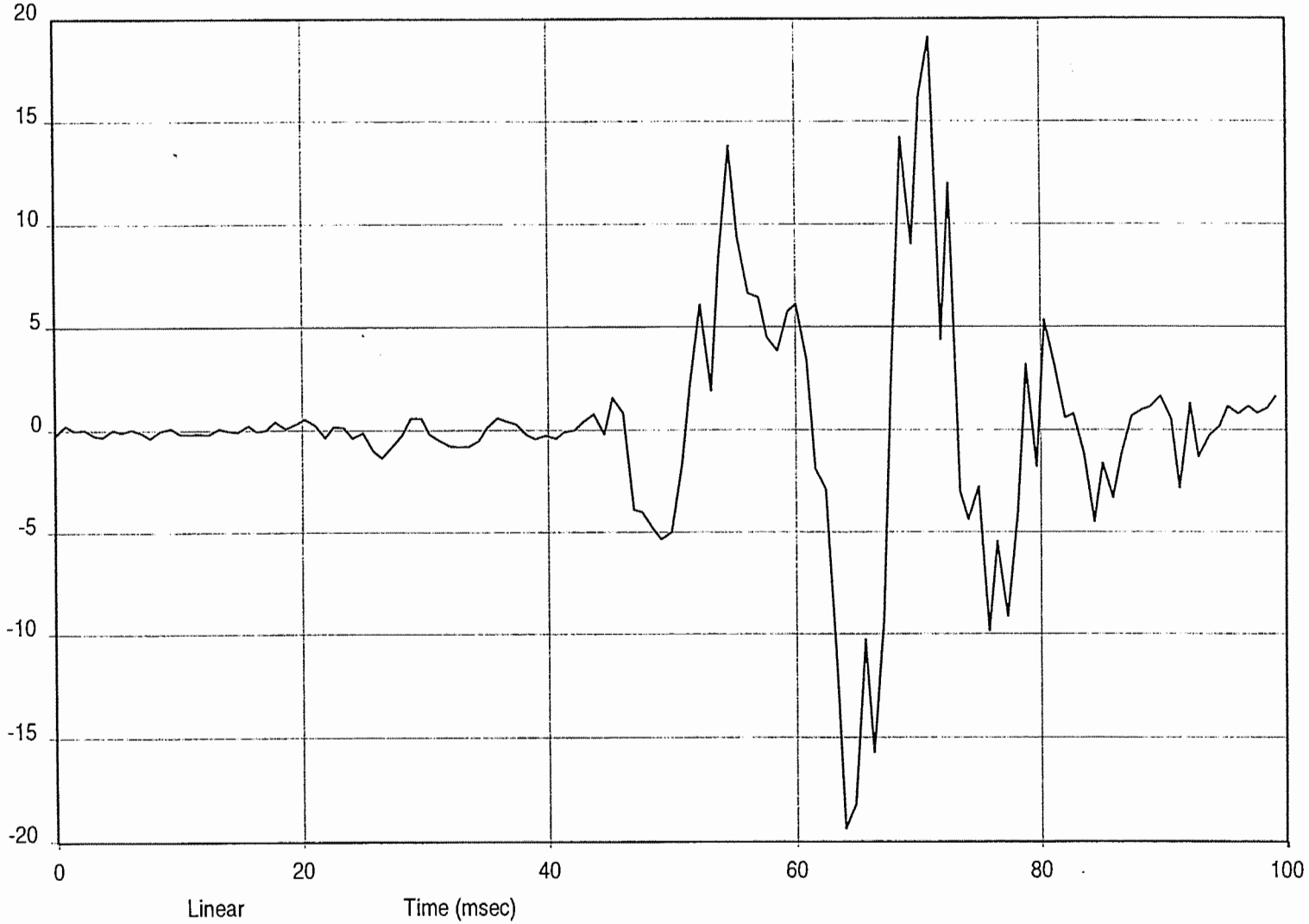
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3Z-
M4586 - STD COM MT400 - S/N : C204

Classical Shock Data Review Name: /user/client/m4586/shock/data/negbump.001

Test Level: 0.000 dB
Pulse: 550 of 2000

Reference Peak: 98.000
Pulse Polarity: -

Pulse Type:Half Sine



Auxiliary 3
Acceleration

Linear
m/s²

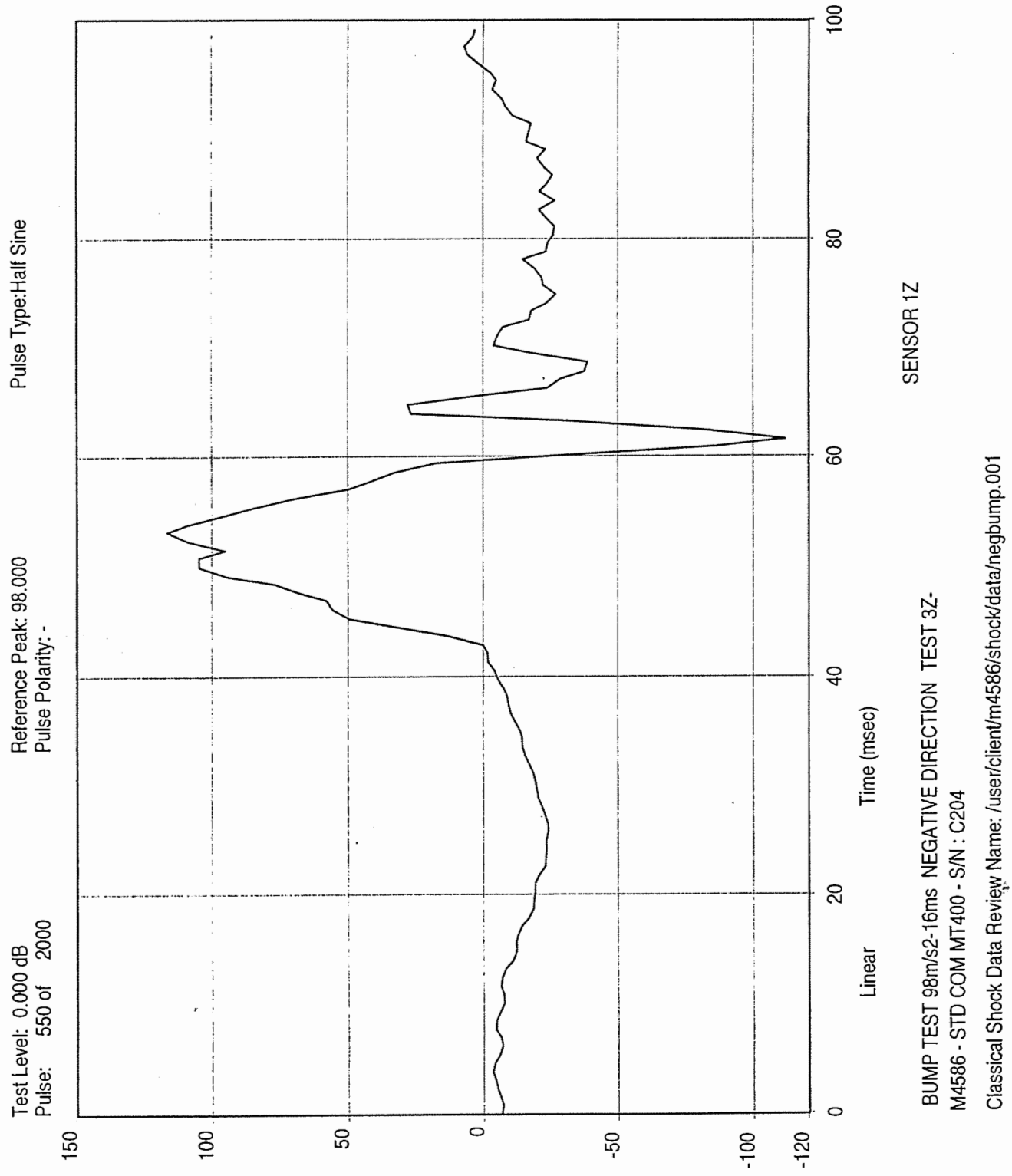
Peak:
19.069
-19.412

SENSOR 1Y

12:53:20.6
Fri Apr 04 2003

BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3Z-
M4586 - STD COM MT400 - S/N : C204

Classical Shock Data Review Name: /user/client/m4586/shock/data/negbump.001


Test Level: 0.000 dB
Pulse: 550 of 2000
Reference Peak: 98.000
Pulse Polarity: -
Pulse Type:Half Sine
Auxiliary Acceleration 4
Linear m/s²
Peak: 116.439 -111.757
150
100
50
0
-50
-100
-120
0
20
40
60
80
100
Linear
Time (msec)
SENSOR 1Z
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3Z-
M4586 - STD COM MT400 - S/N : C204
12:53:20.6
Fri Apr 04 2003
Classical Shock Data Review Name: /user/client/m4586/shock/data/negbump.001

6.9.3. RESULTS OF -Z BUMP AXIS (1372 bumps)

Test Name: negbump.004
Current Date: Fri Apr 04 2003 13:23:23

DOCUMENTATION:
Title 1: BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3ZB-
Title 2: M4586 - STD COM MT400 - S/N : C204
Title 3:

TEST RESULTS:

Time at Shutdown:	13:22:48
Date at Shutdown:	04-Apr-2003
Test Completed Normally	
Last Pulse Output	
Pulse Amplitude:	-96.71 m/s²
Test Level:	0.00 dB
Polarity:	-
Average Error (Time Domain):	1.53 %
Peak Error (Time Domain):	1.31 %
Pulses Requested:	1372
Pulses Remaining:	0

Table of Alarms	Occurrences	Maximum Value
Average Error:	6	13.5 %
Peak Error:	0	
Maximum Drive:	0	
Input Overload:	0	

TABLE OF OUTPUTS:

Level	Number of Outputs Positive	Negative
0.00		1372
-2.00		1
-5.00		1
-8.00		1
-11.00		1
-15.00		11

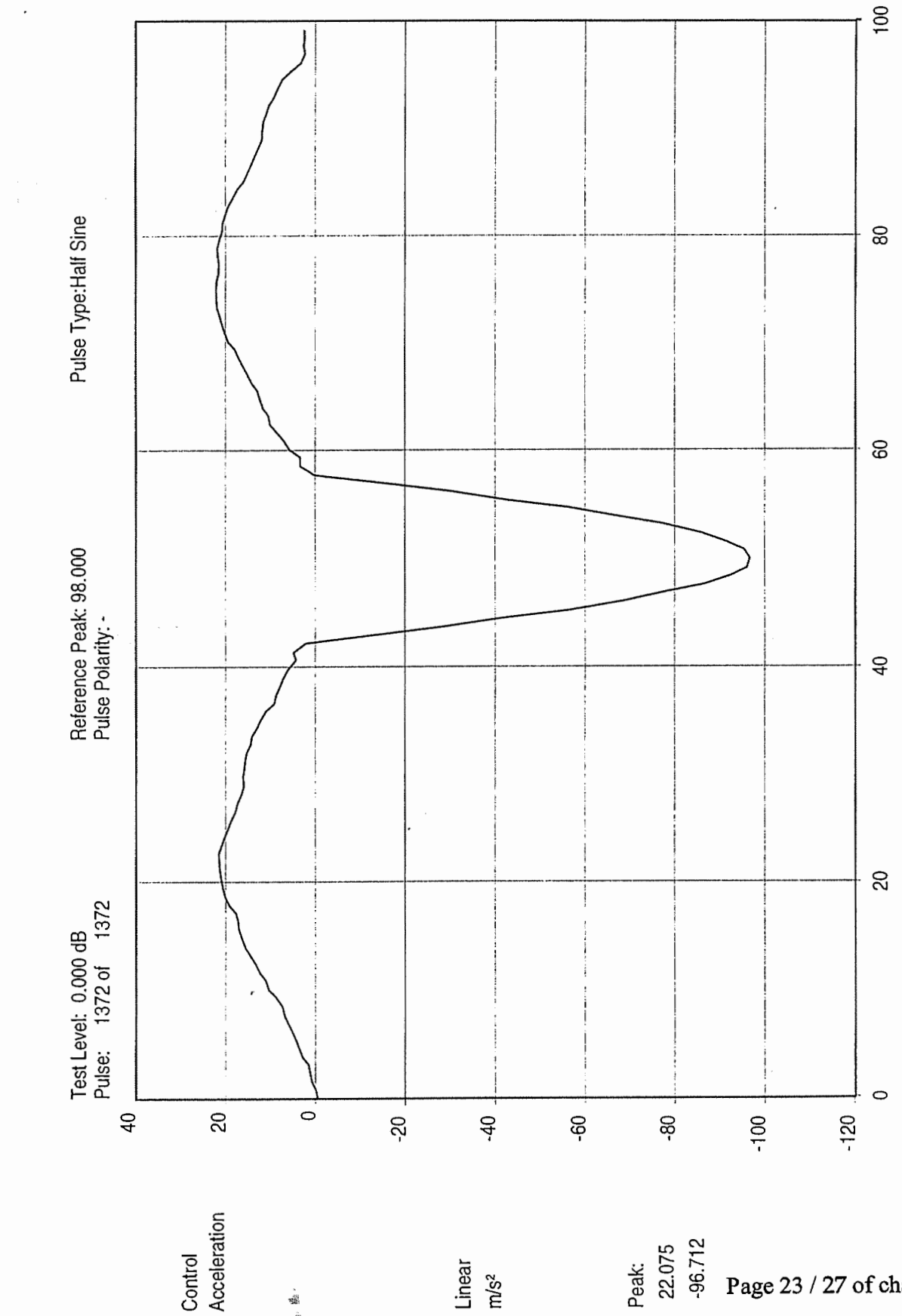
REFERENCE PARAMETERS:

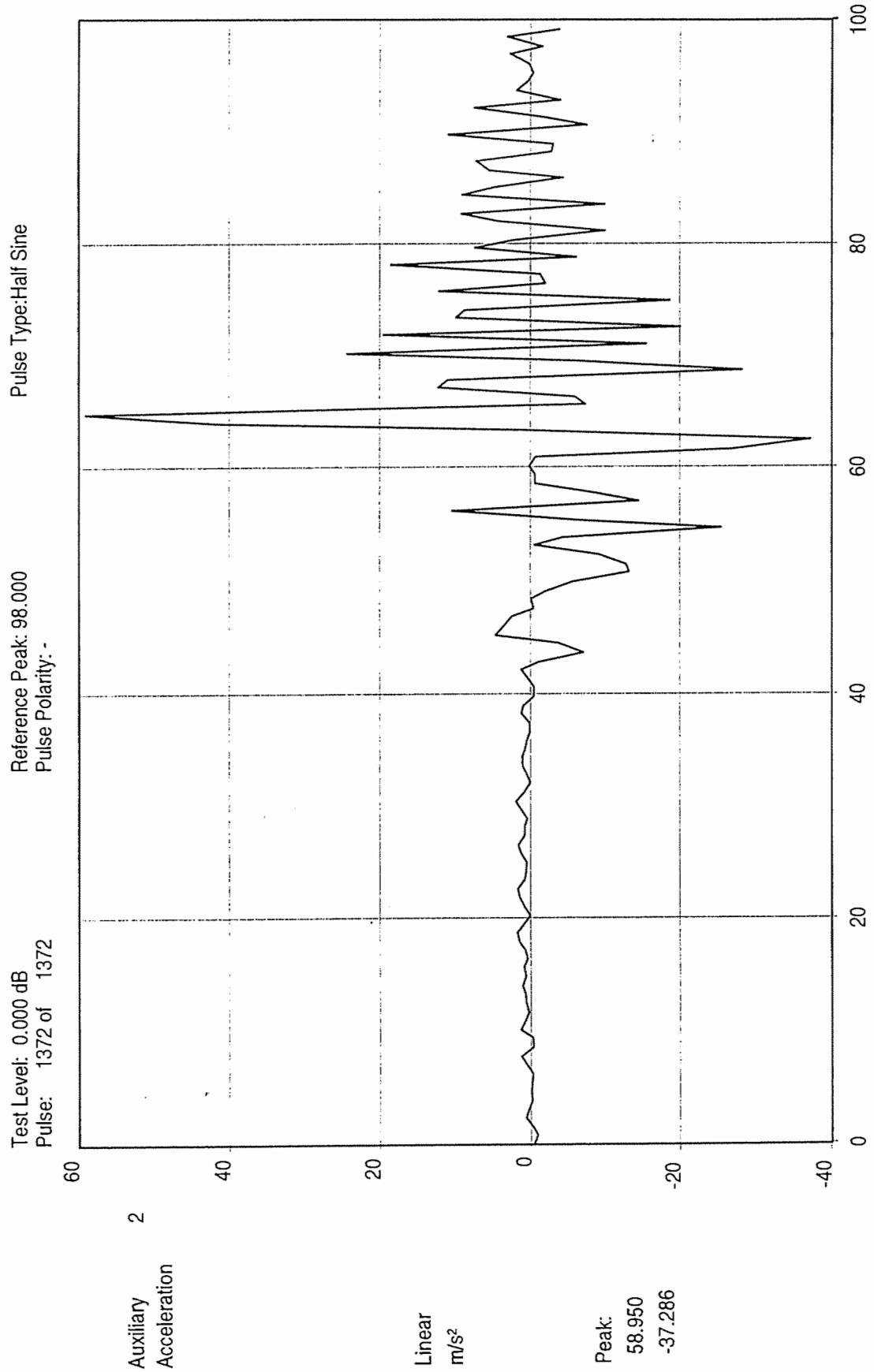
REFERENCE PULSE -		
Pulse Type:	Half Sine	
Pulse Amplitude:	98.00 m/s²	
Pulse Duration:	16.00 ms	
PULSE DYNAMIC LIMITS -		
Acceleration:	98.00 m/s²	-19.60 m/s²
Velocity:	0.49 m/s	-0.49 m/s
Displacement:	0.00 mm	-11.93 mm
Sample Rate:	1280.00 Hz	
SRS ANALYSIS PARAMETERS -		
SRS Spacing:	1/3 octave	
SRS Filter Definition:	Absolute Acceleration	
SRS Damping:	5.00 %	
SRS Q:	10.00	

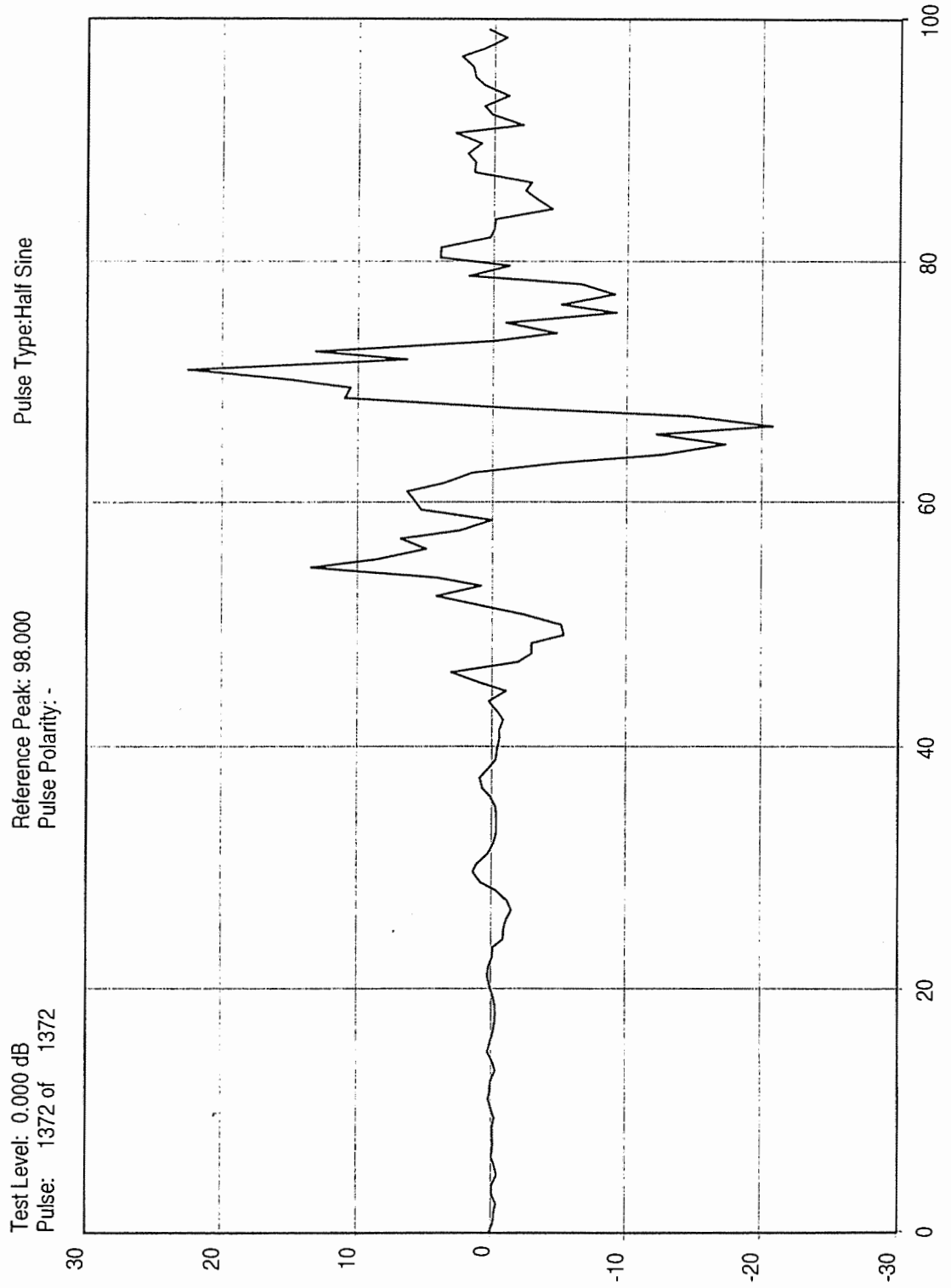
CHANNEL TABLE:

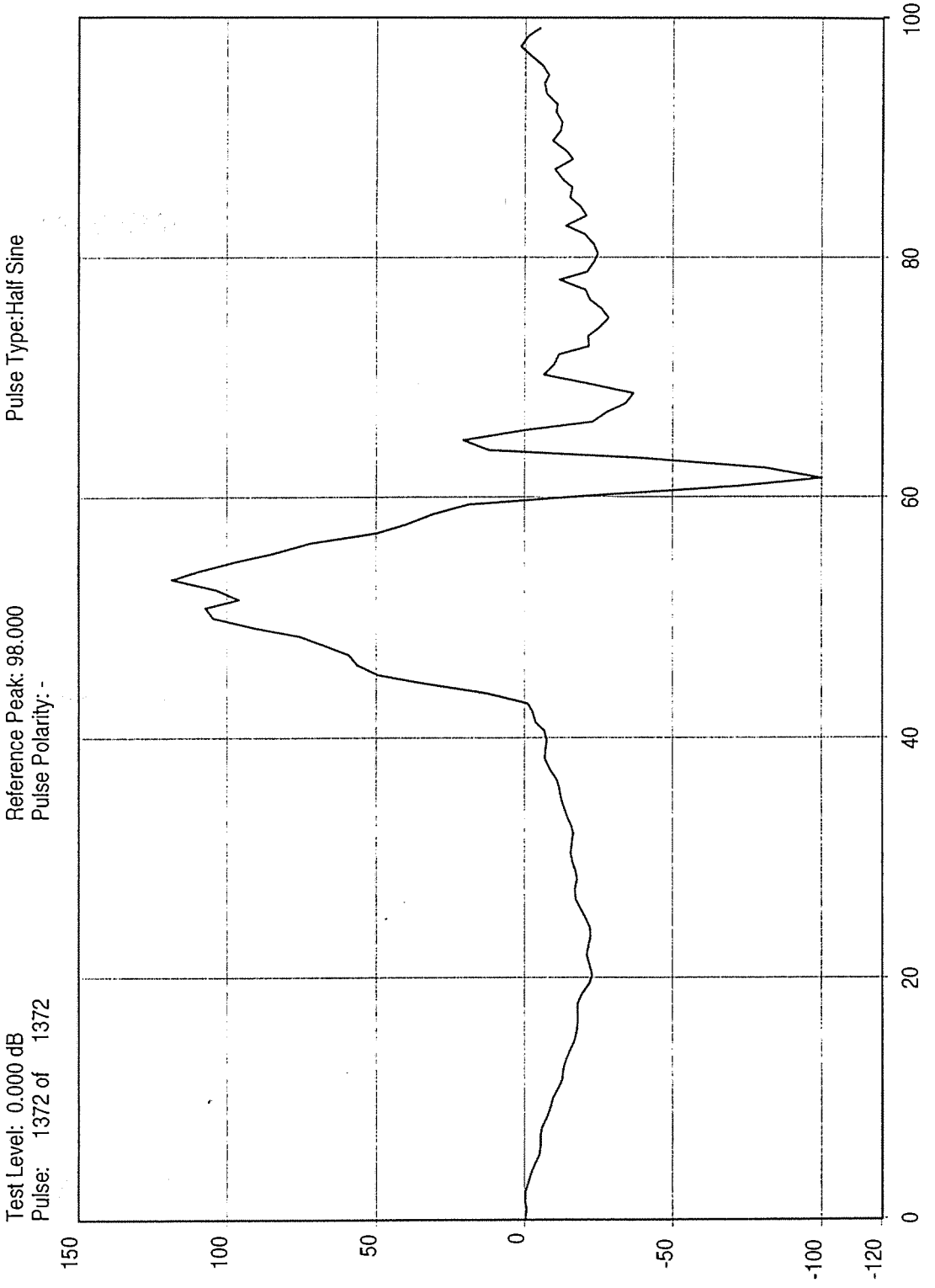
Channel Number	Channel Type	Loop Check	Sensitivity (mV/m/s²)	Channel Label 1	Label 2
1	Control	Yes	26.5126	PILOT P	
2	Auxiliary	No	14.44	SENSOR 1X	
3	Auxiliary	No	14.44	SENSOR 1Y	
4	Auxiliary	No	12.798	SENSOR 1Z	

End of Classical Shock Test Summary List


Test Level: 0.000 dB
Pulse: 1372 of 1372
Reference Peak: 98.000
Pulse Polarity: -
Pulse Type:Half Sine
PILOT P
Control
Acceleration
Linear
m/s²
Peak:
22.075
-96.712
40
20
0
-20
-40
-60
-80
-100
-120
0
20
40
60
80
100
Linear
Time (msec)
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3ZB-
M4586 - STD COM MT400 - S/N : C204
Classical Shock Test Name: negbump.004
13:22:34.1
Fri Apr 04 2003


Test Level: 0.000 dB
Pulse: 1372 of 1372
Reference Peak: 98.000
Pulse Polarity: -
Pulse Type:Half Sine
SENSOR 1X
Auxiliary
Acceleration
2
Linear
m/s²
Peak:
58.950
-37.286
60
40
20
0
-20
-40
0
20
40
60
80
100
Linear
Time (msec)
13:22:34.1
Fri Apr 04 2003
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3ZB-
M4586 - STD COM MT400 - S/N : C204
Classical Shock Test Name: negbump.004


Test Level: 0.000 dB
Pulse: 1372 of 1372
Reference Peak: 98.000
Pulse Polarity: -
Pulse Type:Half Sine
Auxiliary
Acceleration
3
Linear
m/s²
Peak:
22.547
-20.802
30
20
10
0
-10
-20
-30
0
20
40
60
80
100
Linear
Time (msec)
SENSOR 1Y
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3ZB-
M4586 - STD COM MT400 - S/N : C204
Classical Shock Test Name: negbump.004
13:22:34.1
Fri Apr 04 2003


Test Level: 0.000 dB
Pulse: 1372 of 1372
Reference Peak: 98.000
Pulse Polarity: -
Pulse Type:Half Sine
Auxiliary Acceleration 4
Linear m/s²
Peak: 118.403 -100.055
150
100
50
0
-50
-100
-120
0
20
40
60
80
100
Linear
Time (msec)
SENSOR 1Z
BUMP TEST 98m/s2-16ms NEGATIVE DIRECTION TEST 3ZB-
M4586 - STD COM MT400 - S/N : C204
Classical Shock Test Name:.negbump.004
13:22:34.1
Fri Apr 04 2003

6.9.4. 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.

6.9.5. FINAL CONTROL

6.9.5.1.External mechanical inspection.

A visual inspection was done on all external mechanical parts.

Result : nominal.

6.9.5.2.Aliveness test results

BUMP ALIVENESS TEST RESULTS

Beacon Unit : 1/3
Name : STANDARD COMMUNICATIONS
Type : MT400
Number : C204
Bracket : STANDARD COMMUNICATIONS - MT400 Manual Mounting Bracket

Date : April 4th, 2003

406 MHz Measurements

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	35.5
- Power risetime	ms	< 5	-
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT			
- In band			OK
- Carrier harmonics			
4 -DIGITAL MESSAGE GENERATOR			
- Repetition rate			
- Bit rate	bits/S	400 ± 4	OK
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	
- CW preamble	ms	160 ± 1.6	
5 – DIGITAL MESSAGE			
- Bit and frame sync	bits	1-24	FFFE2F
- Format flag	bit	25	0
- Protocol flag	bit	26	1
- Country code	bits	27-36	0503
- Protocol	bits	37-39	111
- Homing	bits	84-85	01
- Activation type	bits	108	0
- BCH 1 code read / calculated	bits	86-106 / 25-85	070010 / 070010
- BCH 2 code read / calculated	bits	133-144 / 107-132	NA
6 - FREQUENCY			
- Nominal value	KHz	406 028 ± 1	OK
- Short term stability		$< 210^{-9}$/100 ms	