

CHAPTER 5

A5.0 - VIBRATION TEST

5.1. ADMINISTRATIVE INFORMATION

5.1.1. CLIENT

JOTRON Electronics a.s.

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 : June 6th, 2000
End of test : June 7th, 2000

5.1.4. INTESPACE FILE REFERENCE : M2393-RTCM

5.2. UNIT UNDER TEST (UUT)

EUT : 2/2
Name : JOTRON
Type : TRON 40GPS
Number : 7001

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

Control : accelerometer (analysis and processing)
Measurements : Spectral Dynamics SD2225

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 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

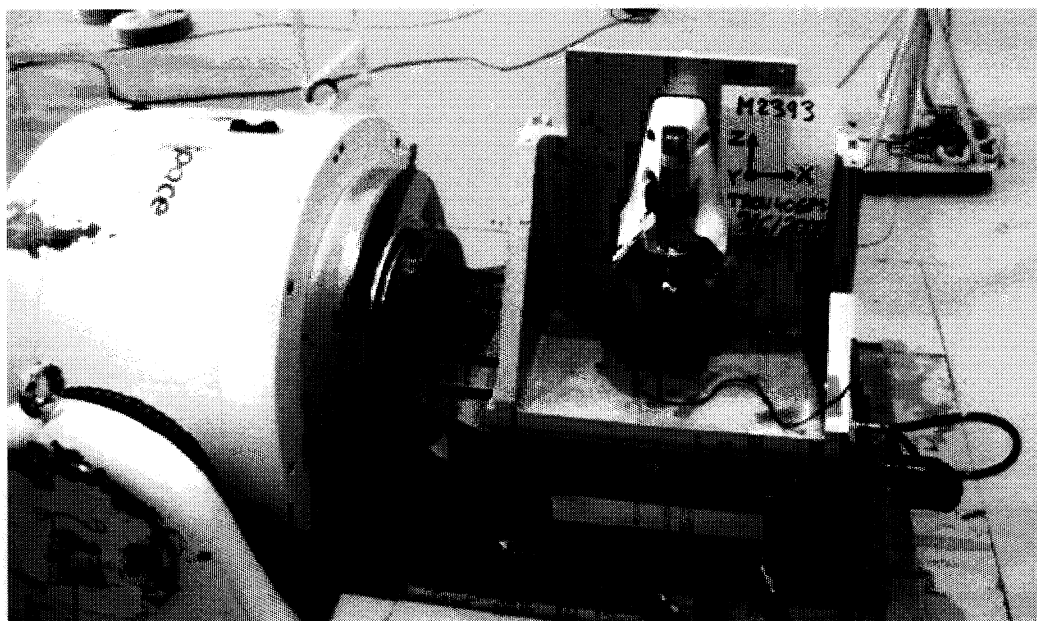
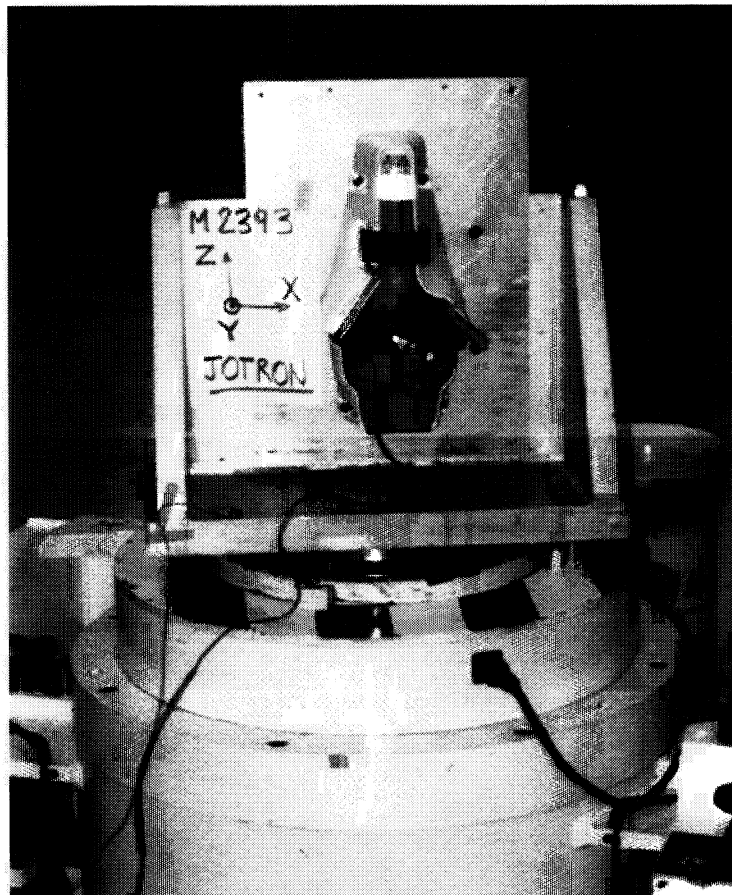
Duration : 30 minutes on each axis

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	-/1	9.28
1X (control)	Glued on Beacon Necklace	10122	12/2	8.31
1Y (control)	Glued on Beacon Necklace	3748	11/3	8.31
1Z (control)	Glued on Beacon Necklace	5326	13/4	8.31

5.7. PHOTOGRAPH



5.8. TEST SCHEDULE

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
6 June 2000 PREL	Sinewave vibrations 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		Preliminary testing without the equipment	
6 June 2000 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 Test duration : 30 min.	5.9.1	Nominal	Set up the beacon on test table on Zaxis (80 kN) . Functional testing : nominal.
7 June 2000 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 Test duration : 30 min.	5.9.2	Nominal	Set up the beacon on test table on Y axis (67 kN) . Functional testing : nominal.

Date / Test n°	Specifications	Paragraph	Events - Observations	
			Test equipment	Unit under test
7 June 2000 001X	Sinewave vibrations 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 Test duration : 30 min.	5.9.3	Nominal	Set up the beacon on test table on X axis (67 kN). Functional testing : nominal. Removal of beacon
7 June 2000			End of the vibration test	
7 June 2000 Visual inspection		5.9.5.1		Nothing abnormal to note
7 June 2000 EPIRB Aliveness Test		5.9.5.2	Cospas Sarsat Test Bench	Nominal

5.9. TEST RESULTS

5.9.1. RESULTS OF Z VIBRATION AXIS



CONTROL PARAMETERS:

DURATION -

Type: Time
Sweeps: 12.00
Test Time (hhh:mm:ss): 000:30:00

CONTROL STRATEGY -

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

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 10.00 dB/sec
Level Increment: 1.00 dB

COMPRESSION PARAMETERS -

Manual Override: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 1.2180 Oct/min
Sweep Rate 2: 0.6090 Oct/min
Sweep Rate 3: 0.3045 Oct/min
Sweep Duration (hhh:mm:ss): 000:02:29
Manual Override: Disable

SWEEP/COMPRESSION TABLE -

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

REFERENCE TABLE:

Reference Type: Acceleration

Units for Acceleration, Velocity and Displacement: g, m/s, mm

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	10	Displacement	5	-3	3	-5	5
2	15	Displacement	1.6	-3	3	-5	5
3	25	Displacement	0.8	-3	3	-5	5
4	33	Displacement	0.4	-3	3	-5	5

REFERENCE PARAMETERS -

Minimum Frequency: 4.000 Hz
Maximum Frequency: 33.000 Hz
Transducer Crossover: 4.000 Hz
Crossover Range: 10.000 %
Frequency Points: 200.000
Box Tolerance: Enable
Box Alarm Width (%): 3
Box Abort Width (%): 5

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

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 4.00 Hz
 Maximum Frequency: 32.00 Hz
 L'Intelligence de l'Environnement TS: M2393-RTCM 32.00 Hz : DS/RC//AS 2000-224

Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 1

LOOP CHECK -

Noise Threshold: 20.00 mV RMS
 Frequency: 35.00 Hz
 Maximum Drive: 270.00 mV RMS
 Pause after Loop Check: Yes

DRIVE SIGNAL -

Maximum Drive: 5.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

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 92.80	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No 69.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Sensitivity Check (mV/Units)	Channel Label	Documentation
1	Control	Yes 92.80	Pilote P	
2	Auxiliary	No 69.00	1Z SENSOR	

Label 2

(14 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

DOCUMENTATION:

Display Text -
 Title 1: 001Z TEST : RTCM 02/5/97
 Title 2: M2393 - JOTRON TRON 40 GPS N 7001
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Interval
 Interval (sweep or sec): 1
 Message Log -
 Log Mode: Use Run Number
 Printing -
 Automatic Plot: Off

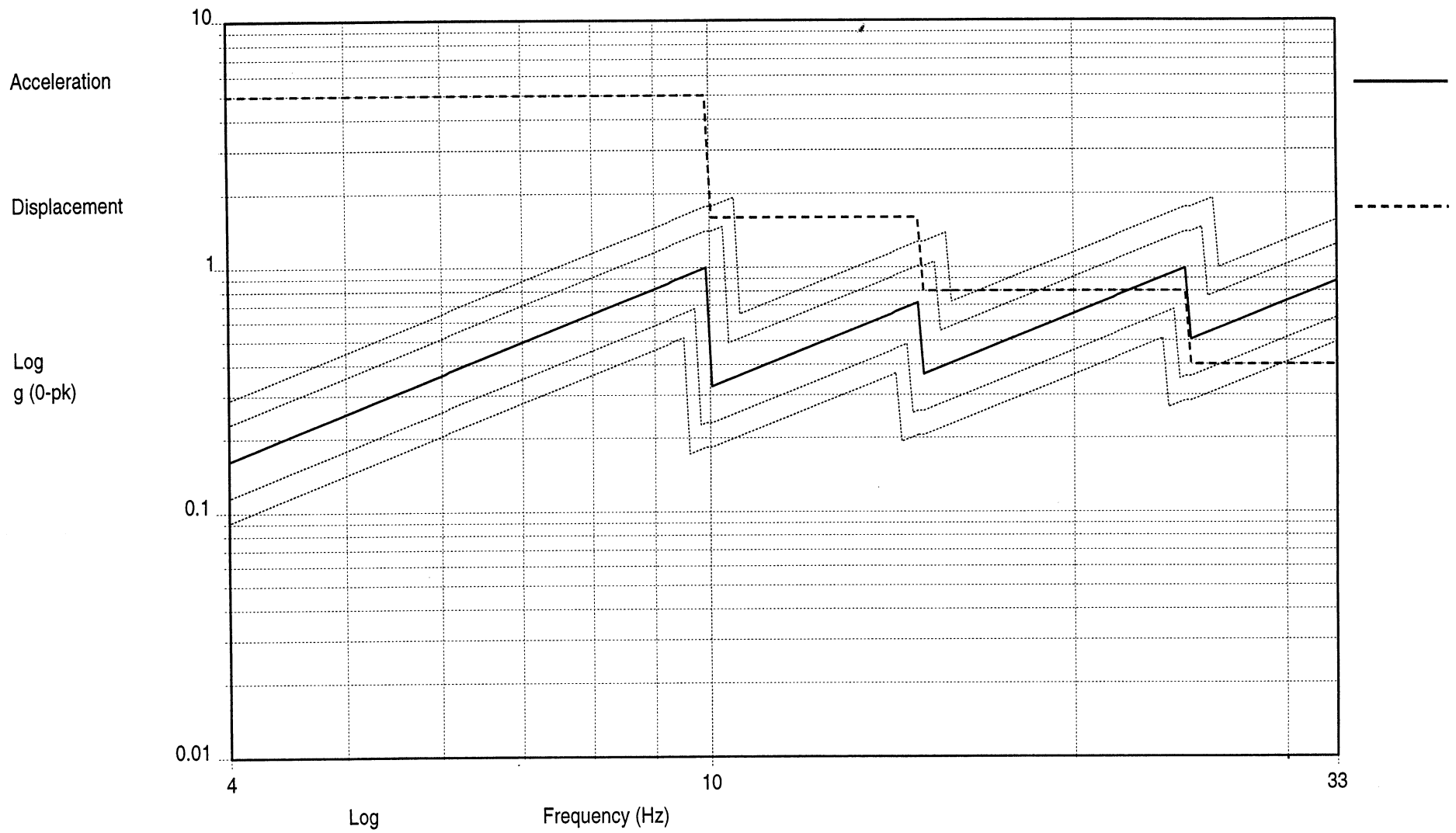
REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List



5.11
12:19:29
06-Jun-2000

001Z TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S: 700 A
Sine Test Name: /user/client/m2393/sine/test/RTCM



Data Storage File Name: RTCM.005

Current Date: Tue Jun 06 2000 13:03:30

DOCUMENTATION:

Title 1: 001Z TEST : RTCM 02/5/97

Title 2: M2393 - JOTRON TRON 40 GPS N/S 701

Title 3:

TEST RESULTS:

Test Function:	Test
Date at Shutdown:	06-Jun-2000
Time at Shutdown:	13:01:16
Test Completed Normally	
Elapsed Time	000:30:00
Remaining Time	000:00:00
Elapsed Sweeps	12.00
Remaining Sweeps	0.00
Frequency at Shutdown:	4.00 Hz
Test Level:	0.00 dB
Maximum Control Error:	10.04 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:	15.918 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	92.80	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No	69.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label	Documentation Label
1	Control	Yes	92.80	Pilote P	
2	Auxiliary	No	69.00	1Z SENSOR	

(14 Inactive Channels)

TRANSFER FUNCTION PAIR TABLE:

Enable H(f) Measurement:	No
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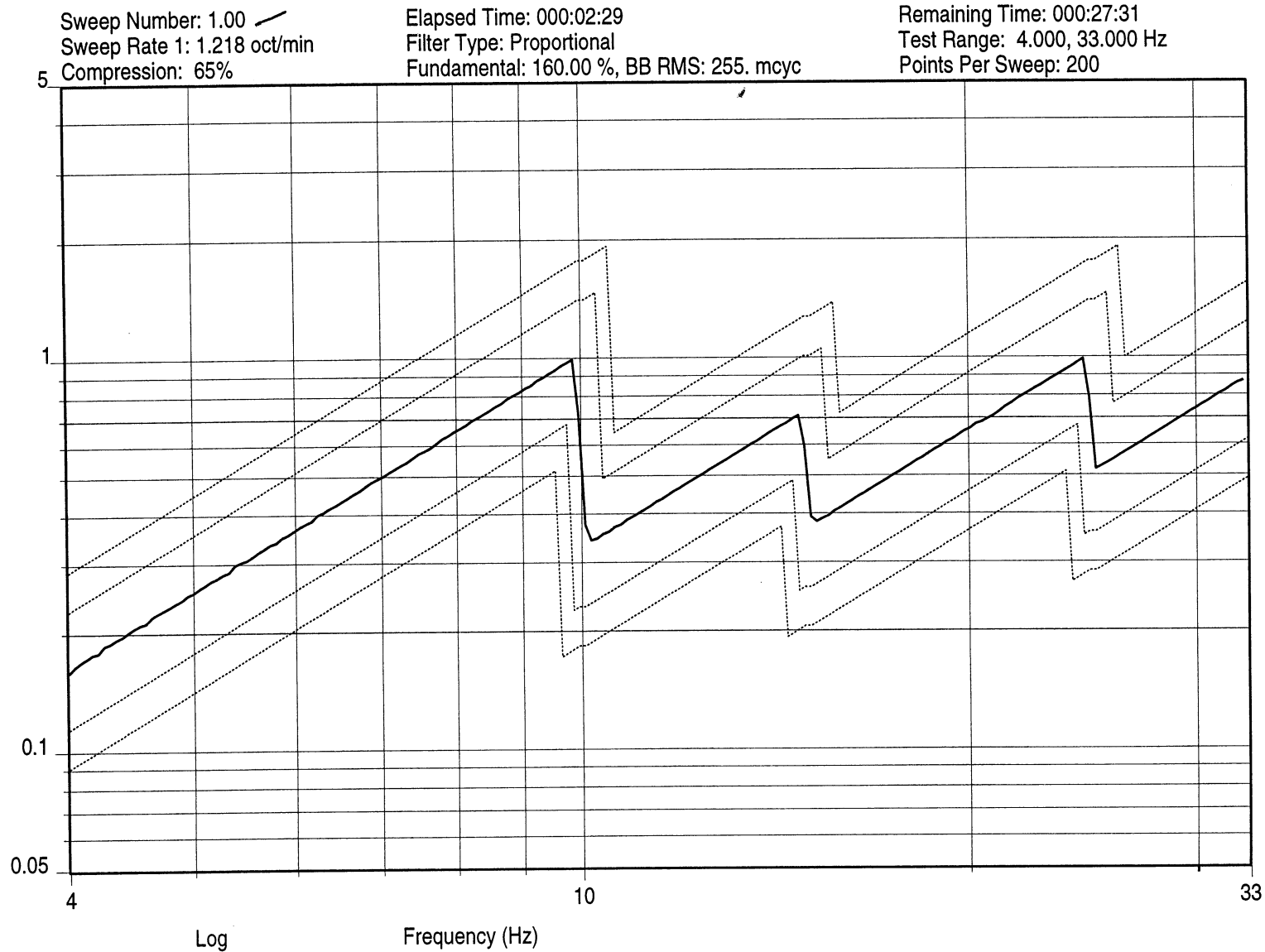


intespace

H(f)	Response	Reference	Label
L'Intelligence de l'Environnement	Channel 1	Channel 2	Channel 1
1	2	1	H(f) Pair Label 1

End of Sine Test Summary

```
%Test: RTCM.005
%Log: /user/client/m2393/sine/log/RTCM.005.log
06/06/00
12:29:39 Nulling Internal Offsets.
12:29:43 Nulling Completed.
12:29:44 Loop Check Started...
12:29:44 Measuring Ambient Noise...
12:29:48 Searching for Threshold...
12:29:55 Loop Check Completed.
12:29:57 Increasing to Test Level...
12:31:11 Start Level Reached.
12:31:11 Test Starts at 4.000 Hz
12:33:41 Saved Sweep Number 1.00
12:36:11 Saved Sweep Number 2.00
12:38:41 Saved Sweep Number 3.00
12:41:11 Saved Sweep Number 4.00
12:43:41 Saved Sweep Number 5.00
12:46:11 Saved Sweep Number 6.00
12:48:41 Saved Sweep Number 7.00
12:51:11 Saved Sweep Number 8.00
12:53:41 Saved Sweep Number 9.00
12:56:11 Saved Sweep Number 10.00
12:58:41 Saved Sweep Number 11.00
13:01:11 Shutdown Initiated...
13:01:16 Saved Sweep Number 12.00
```

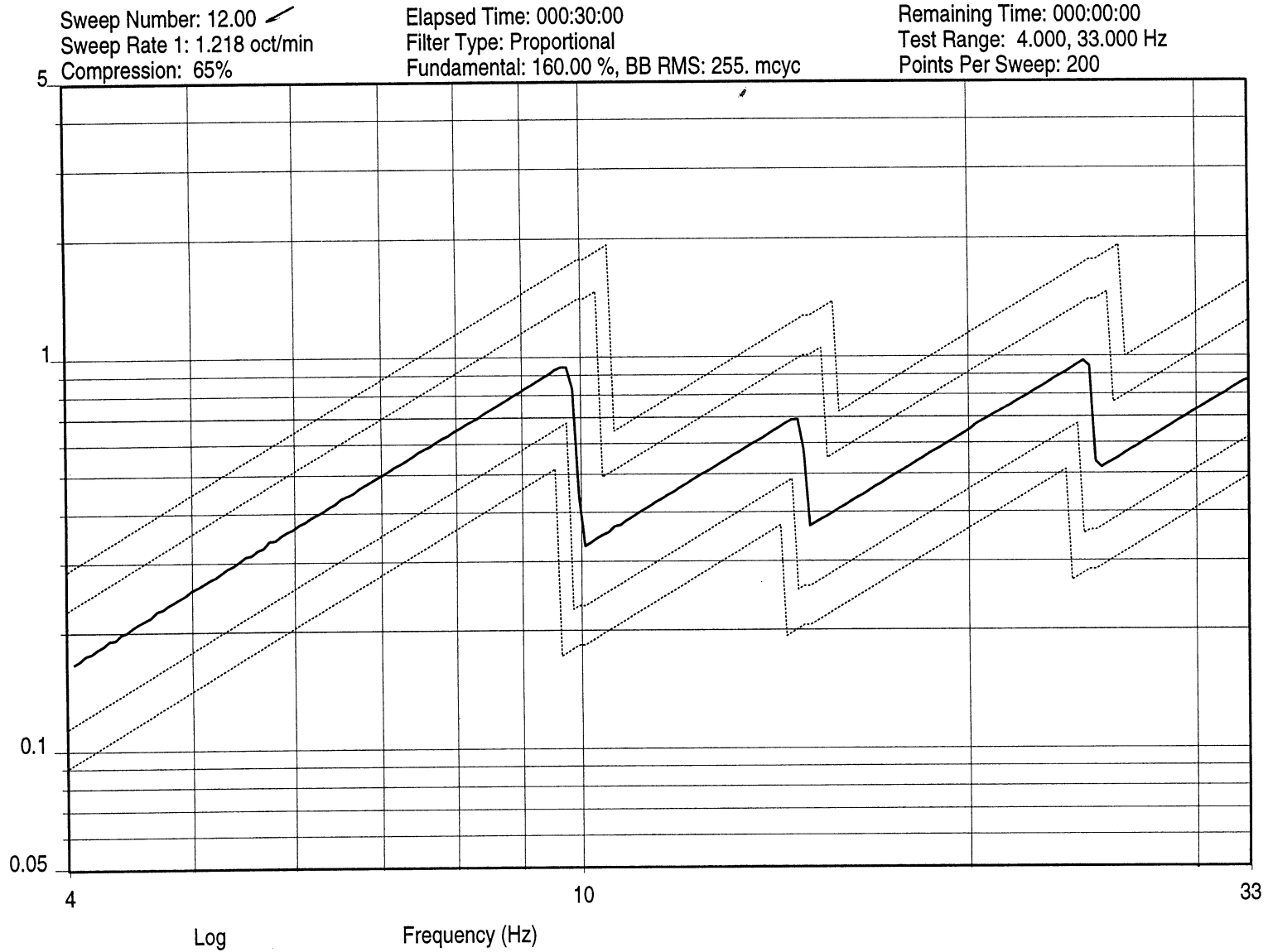


SERVO
Control

Log
Acceleration
g (0-pk)

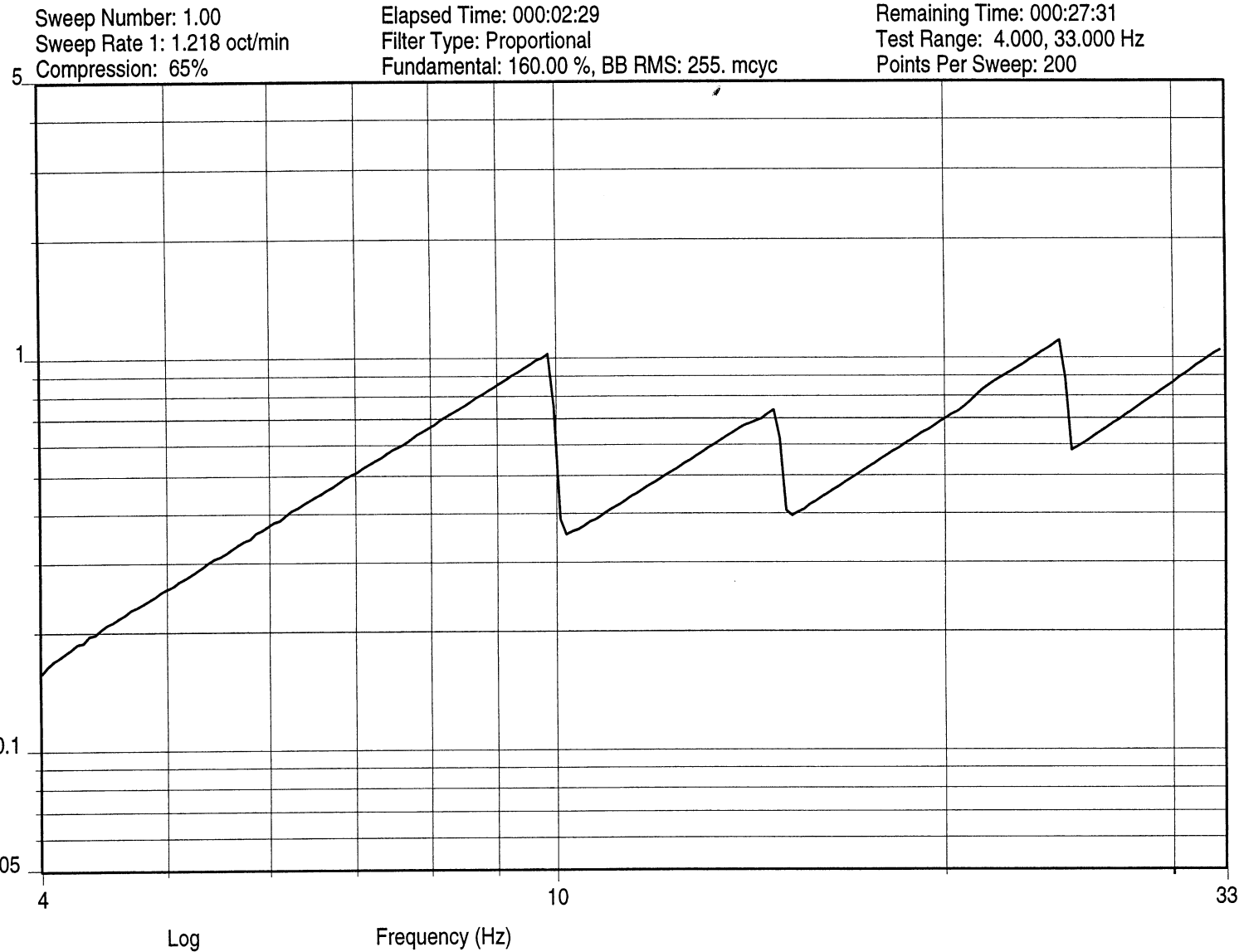
5.15
12:33:41
Tue Jun 06 2000

001Z TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S 7001
Sine Data Review Name: RTCM.005



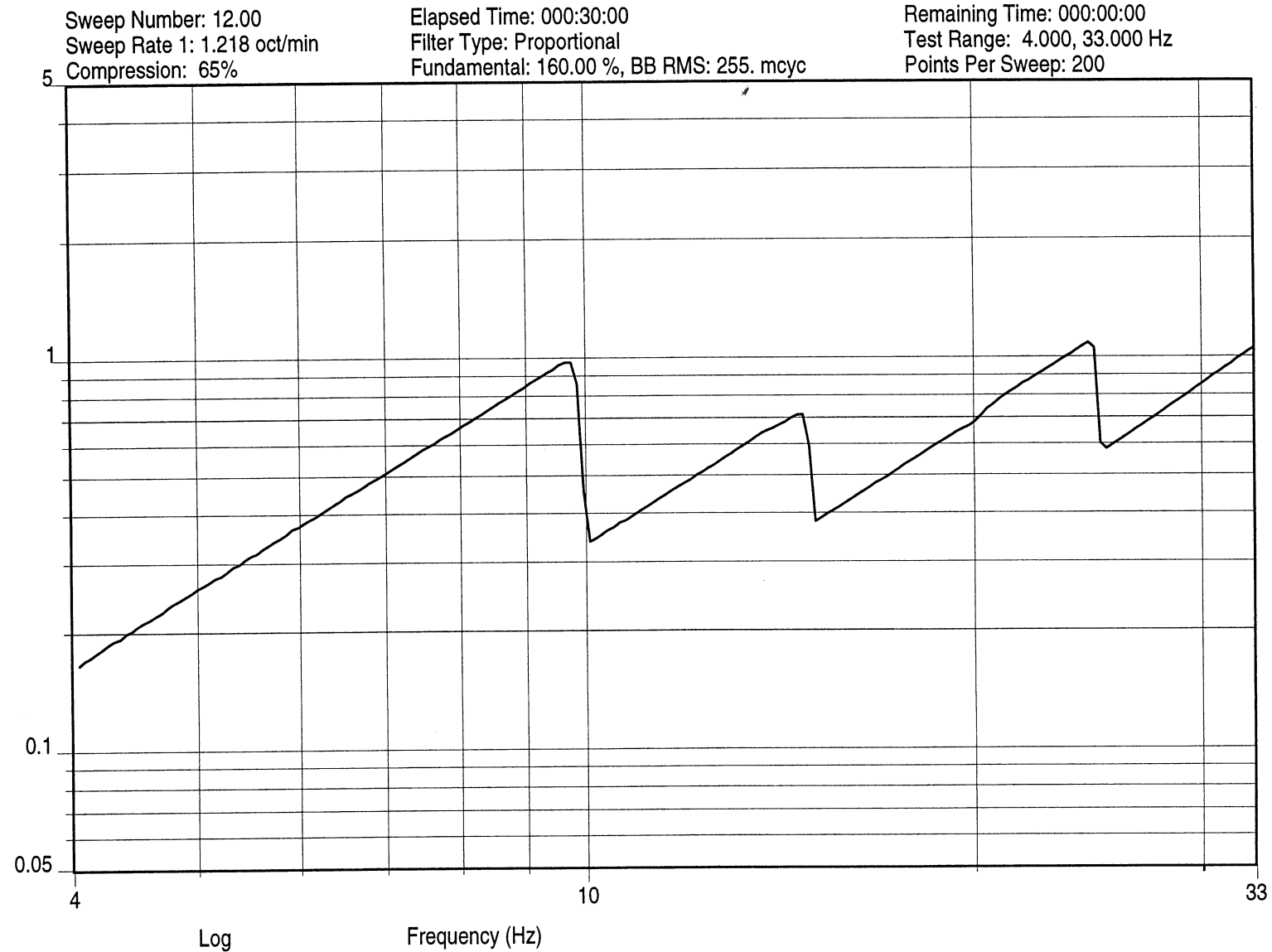
5.16
13:01:26
06-Jun-2000

001Z TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S
Sine Test Name: RTCM.005



12:33:41
Tue Jun 06 2000

001Z TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S2000
Sine Data Review Name: RTCM.005



Auxiliary
BB RMS
control

Log
Acceleration
g (0-pk)

1Z SENSOR (control)

5.18
 13:01:26
 06-Jun-2000

001Z TEST : RTCM 02/5/97
 M2393 - JOTRON TRON 40 GPS N/S2000
 Sine Test Name: RTCM.005

5.9.2. RESULTS OF OF Y VIBRATION AXIS

File Name: /user/client/m2393/sine/test/RTCM
Current Date: Tue Jun 06 2000 17:15:58

CONTROL PARAMETERS:

DURATION -

Type: Time
Sweeps: 12.00
Test Time (hhh:mm:ss): 000:30:00

CONTROL STRATEGY -

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

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 10.00 dB/sec
Level Increment: 1.00 dB

COMPRESSION PARAMETERS -

Manual Override: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 1.2180 Oct/min
Sweep Rate 2: 0.6090 Oct/min
Sweep Rate 3: 0.3045 Oct/min
Sweep Duration (hhh:mm:ss): 000:02:29
Manual Override: Disable

SWEEP/COMPRESSION TABLE -

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

REFERENCE TABLE:

Reference Type: Acceleration

Units for Acceleration, Velocity and Displacement: g, m/s, mm

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	10	Displacement	5	-3	3	-5	5
2	15	Displacement	1.6	-3	3	-5	5
3	25	Displacement	0.8	-3	3	-5	5
4	33	Displacement	0.4	-3	3	-5	5

REFERENCE PARAMETERS -

Minimum Frequency: 4.000 Hz
Maximum Frequency: 33.000 Hz
Transducer Crossover: 4.000 Hz
Crossover Range: 10.000 %
Frequency Points: 200.000
Box Tolerance: Enable
Box Alarm Width (%): 3
Box Abort Width (%): 5

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

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -



Minimum Frequency: 4.00 Hz
 Maximum Frequency: 33.00 Hz ITS : M2393-RTCM & CNES : DSO/RC//AS 2000-224
 Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 1

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 35.00 Hz
 Maximum Drive: 300.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 5.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

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 92.80	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No 88.55	AC	Accel	g			BB RMS
3	Auxiliary	No 62.70	AC	Accel	g			BB RMS
4	Auxiliary	No 69.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Sensitivity Check (mV/Units)	Channel Documentation Label 1	Label 2
1	Control	Yes 92.80	Pilote P	
2	Auxiliary	No 88.55	1X SENSOR	
3	Auxiliary	No 62.70	1Y SENSOR	
4	Auxiliary	No 69.00	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

DOCUMENTATION:

Display Text -
 Title 1: 001Y TEST : RTCM 02/5/97
 Title 2: M2393 - JOTRON TRON 40 GPS N/ST-001
 List Only Text -
 Title 3:
 Prompt before Test: Yes
 Data Storage -
 Storage Mode: Interval
 Interval (sweep or sec): 1
 Message Log -
 Log Mode: Use Run Number
 Printing -
 Automatic Plot: Off

REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List

Data Storage File Name: RTCM.008
 Current Date: Tue Jun 06 2000 17:57:38

DOCUMENTATION:

Title 1: 001Y TEST : RTCM 02/5/97
 Title 2: M2393 - JOTRON TRON 40 GPS N/S2000
 Title 3:

TEST RESULTS:

Test Function:	Test
Date at Shutdown:	06-Jun-2000
Time at Shutdown:	17:51:18
Test Completed Normally	
Elapsed Time	000:30:00
Remaining Time	000:00:00
Elapsed Sweeps	12.01
Remaining Sweeps	-0.00
Frequency at Shutdown:	4.05 Hz
Test Level:	0.00 dB
Maximum Control Error:	10.02 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	Ending	Sweep	
Number	Frequency	Rate	Compression
	(Hz)	(Oct/min)	(%)
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 92.80	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No 88.55	AC	Accel	g			BB RMS
3	Auxiliary	No 62.70	AC	Accel	g			BB RMS
4	Auxiliary	No 69.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Sensitivity Check (mV/Units)	Channel Documentation Label 1
1	Control	Yes 92.80	Pilote P
2	Auxiliary	No 88.55	1X SENSOR
3	Auxiliary	No 62.70	1Y SENSOR
4	Auxiliary	No 69.00	1Z SENSOR

Label 2



intespace

(2 Inactive Channels)
L'Intelligence de l'Environnement

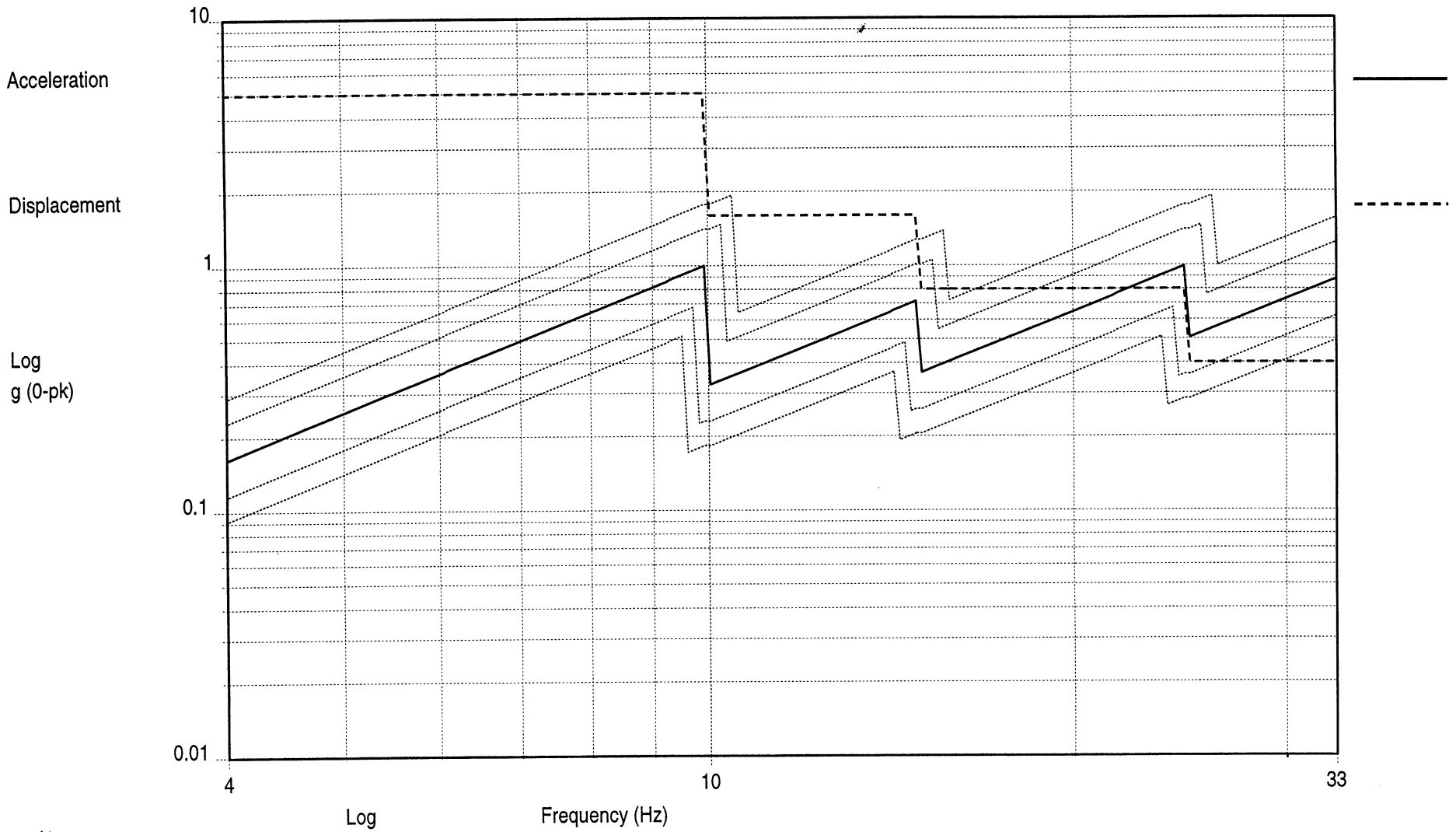
ITS : M2393-RTCM & CNES : DSO/RC//AS 2000-224

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

```
%Test: RTCM.008
%Log: /user/client/m2393/sine/log/RTCM.008.log
06/06/00
17:20:13 Nulling Internal Offsets.
17:20:17 Nulling Completed.
17:20:18 Loop Check Started...
17:20:18 Measuring Ambient Noise...
17:20:24 Searching for Threshold...
17:20:31 Loop Check Completed.
17:20:33 Increasing to Test Level...
17:21:12 Start Level Reached.
17:21:13 Test Starts at 4.000 Hz
17:23:43 Saved Sweep Number 1.00
17:26:13 Saved Sweep Number 2.00
17:28:43 Saved Sweep Number 3.00
17:31:13 Saved Sweep Number 4.00
17:33:42 Saved Sweep Number 5.00
17:36:13 Saved Sweep Number 6.00
17:38:43 Saved Sweep Number 7.00
17:41:13 Saved Sweep Number 8.00
17:43:42 Saved Sweep Number 9.00
17:46:13 Saved Sweep Number 10.00
17:48:42 Saved Sweep Number 11.00
17:51:12 Saved Sweep Number 12.00
17:51:13 Shutdown Initiated...
17:51:18 Saved Sweep Number 12.01
```



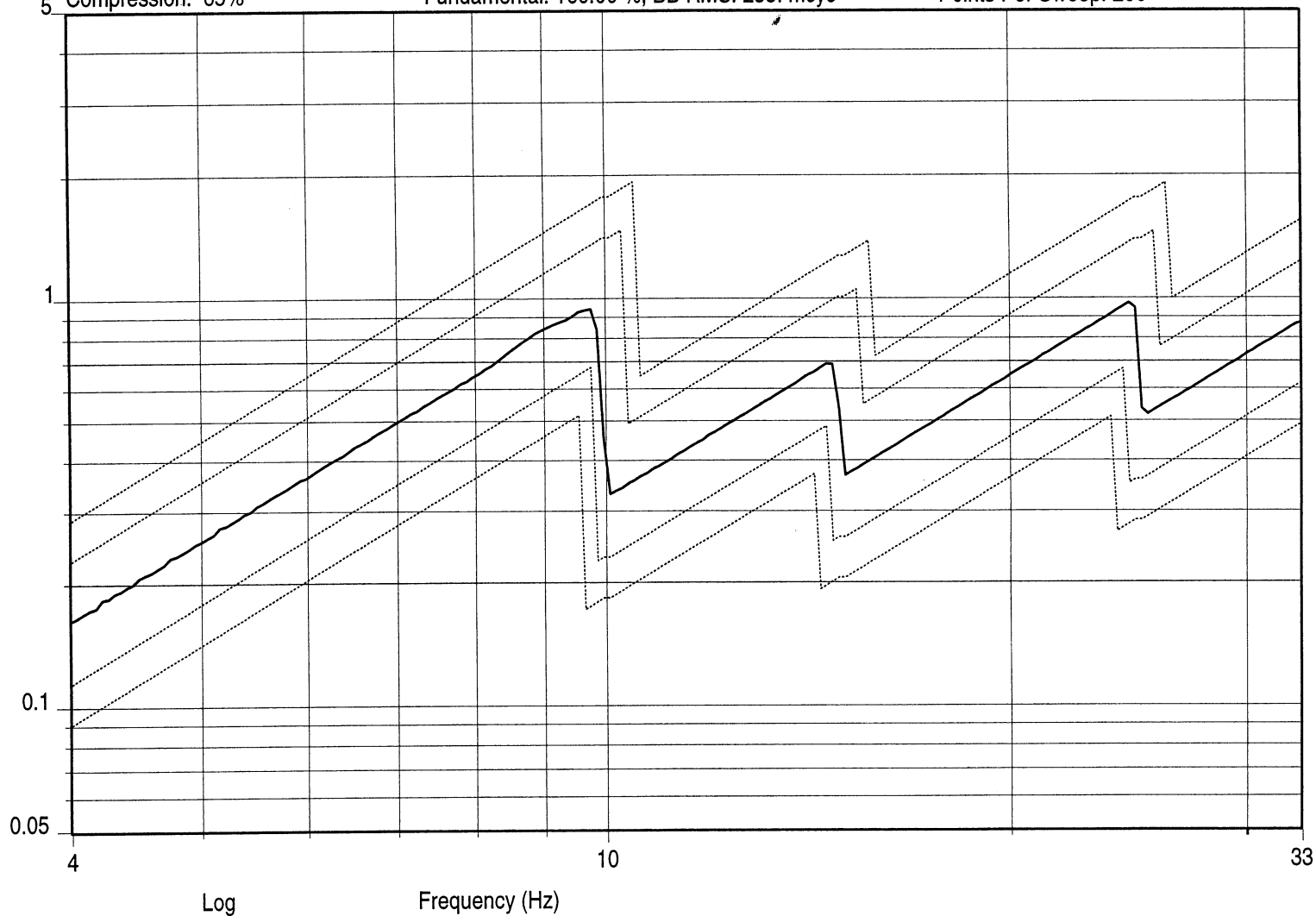
5.25
09:16:38
07-Jun-2000

001Y TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/5 7 J0A
Sine Test Name: /user/client/m2393/sine/test/RTCM

Sweep Number: 1.00 Elapsed Time: 000:29:59 Remaining Time: 000:00:01
 Sweep Rate 1: 1.218 oct/min Filter Type: Proportional Test Range: 4.000, 33.000 Hz
 Compression: 65% Fundamental: 160.00 %, BB RMS: 255. mcyc Points Per Sweep: 200

Servo
Control

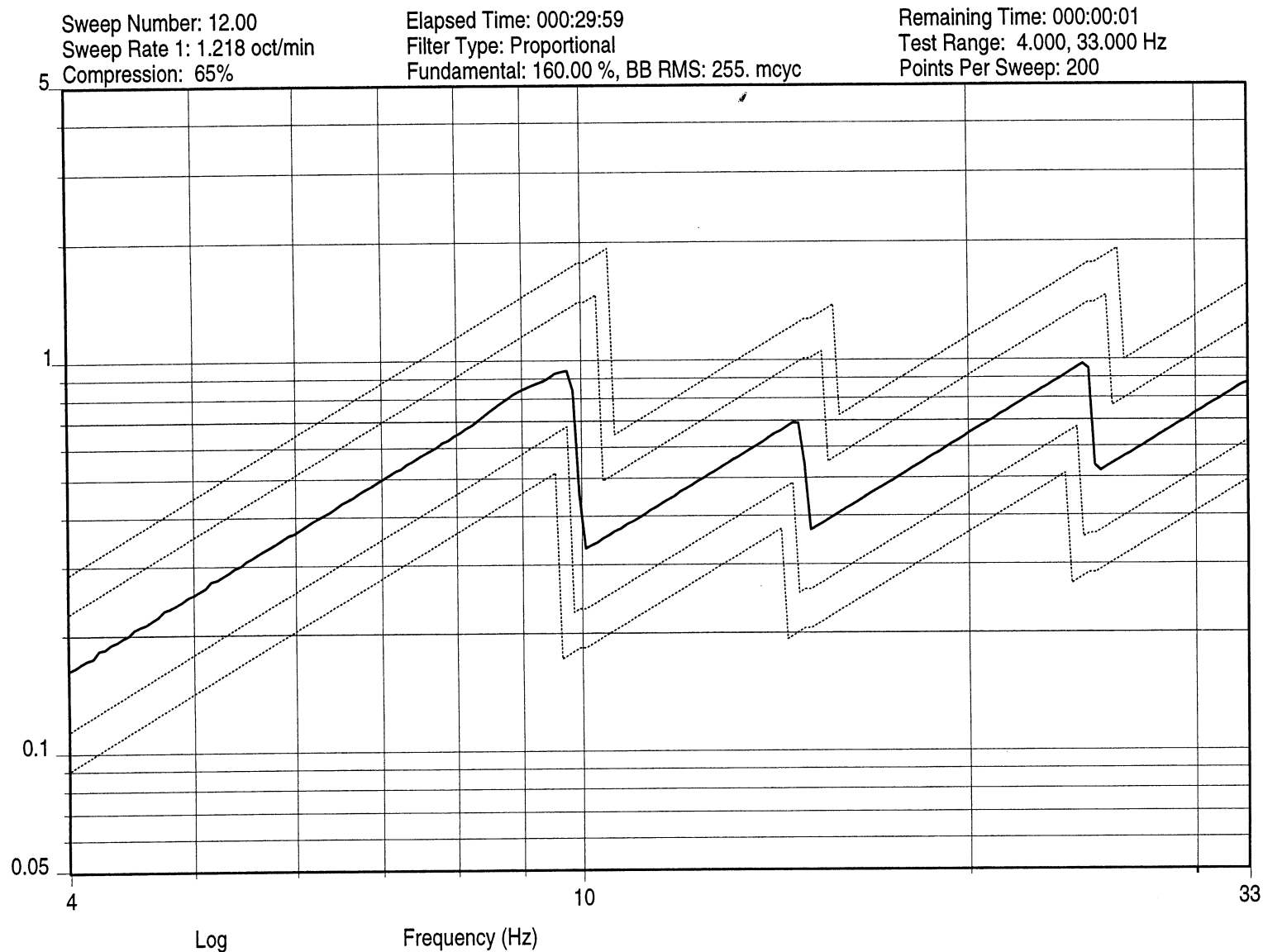
Log
Acceleration
g (0-pk)



5.26

17:51:12
Tue Jun 06 2000

001Y TEST : RTCM 02/5/97
 M2393 - JOTRON TRON 40 GPS N/S: 700 A
 Sine Data Review Name: RTCM.008

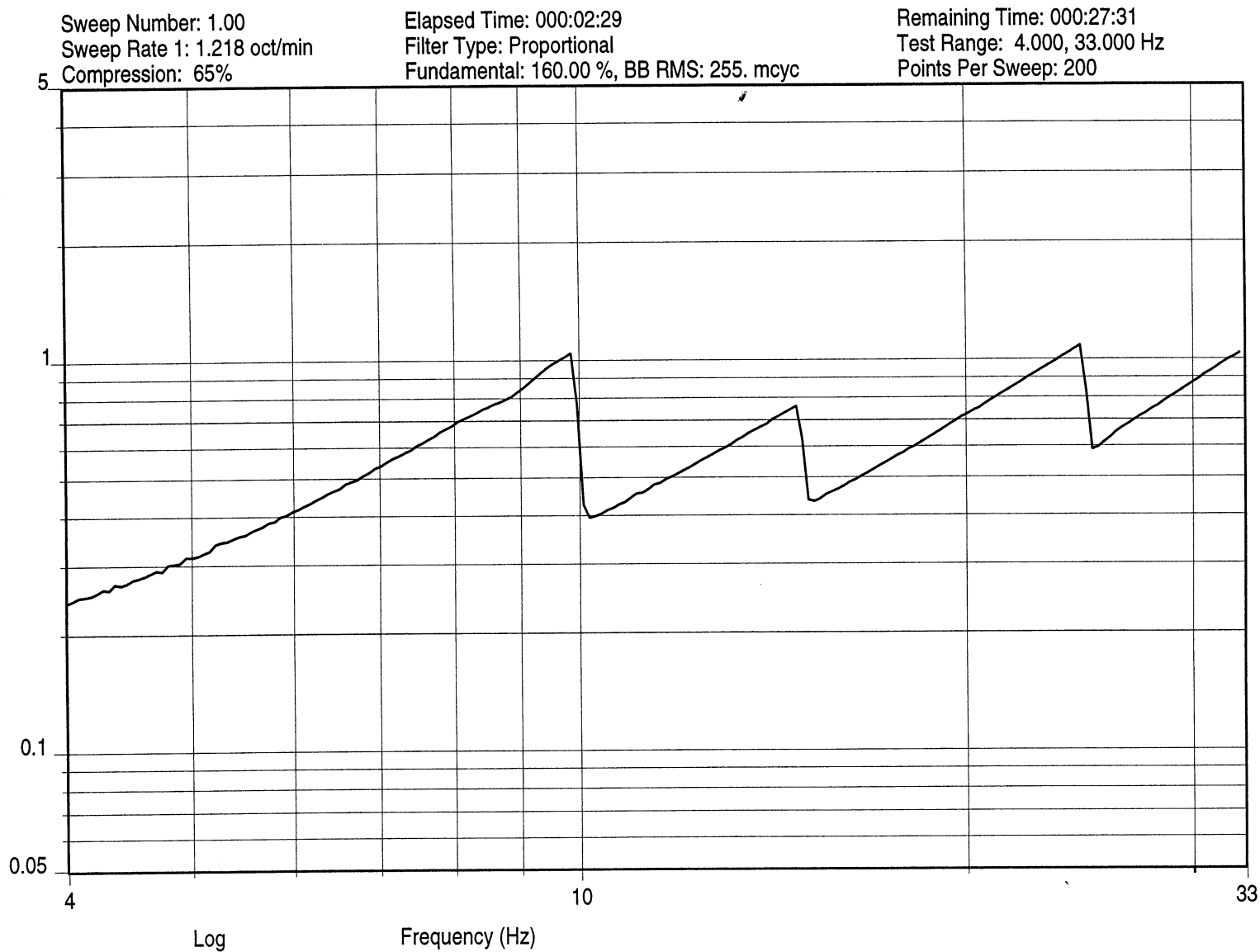


servo
Control

Log
Acceleration
g (0-pk)

5.27
17:51:12
Tue Jun 06 2000

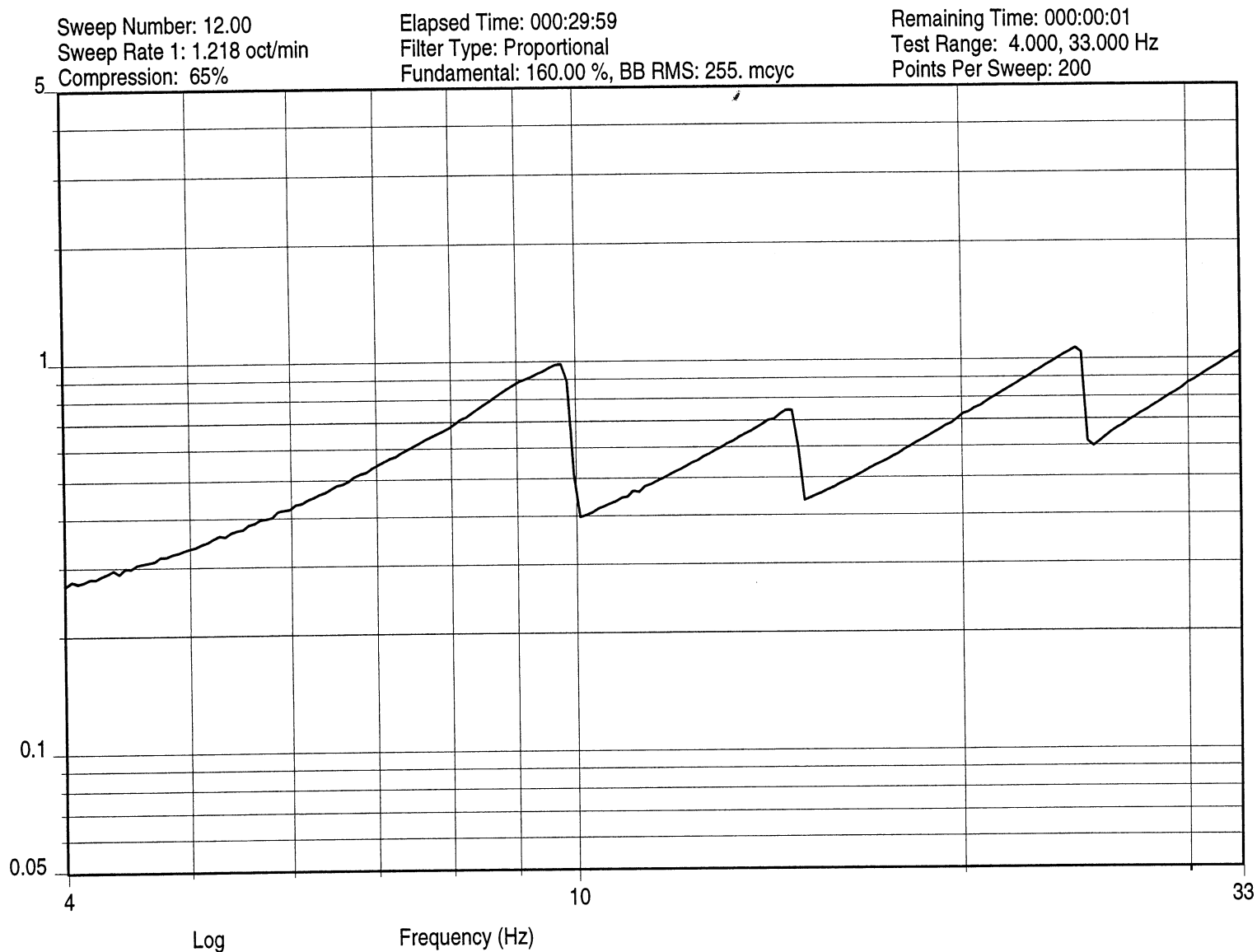
001Y TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S. 400 1
Sine Data Review Name: RTCM.008



1Y SENSOR (Control)

5.28
17:23:43
Tue Jun 06 2000

001Y TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S 00 1
Sine Data Review Name: RTCM.008



17:51:12
Tue Jun 06 2000

001Y TEST : RTCM 02/5/97
 M2393 - JOTRON TRON 40 GPS N/E 700 A
 Sine Data Review Name: RTCM.008

5.9.3. RESULTS OF X VIBRATION AXIS

File Name: RTCM
Current Date: Wed Jun 07 2000 12:37:59

CONTROL PARAMETERS:

DURATION -

Type: Time
Sweeps: 12.00
Test Time (hhh:mm:ss): 000:30:00

CONTROL STRATEGY -

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

EQUALIZATION -

Test Level: 0.00 dB

OPERATION MODE -

Manual Operation: Enable

STARTUP/SHUTDOWN -

Startup Rate: 10.00 dB/sec
Shutdown Rate: 10.00 dB/sec
Level Increment: 1.00 dB

COMPRESSION PARAMETERS -

Manual Override: Disable

SWEEP PARAMETERS -

Manual Sweep Start: No
Sweep Mode: Log
Sweep Rate Definition: 100%50%25%
Sweep Rate 1: 1.2180 Oct/min
Sweep Rate 2: 0.6090 Oct/min
Sweep Rate 3: 0.3045 Oct/min
Sweep Duration (hhh:mm:ss): 000:02:29
Manual Override: Disable

SWEEP/COMPRESSION TABLE -

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

REFERENCE TABLE:

Reference Type: Acceleration

Units for Acceleration, Velocity and Displacement: g, m/s, mm

Segment Number	Frequency (Hz)	Type	Value (Units)	-Alarm (dB)	+Alarm (dB)	-Abort (dB)	+Abort (dB)
1	10	Displacement	5	-3	3	-5	5
2	15	Displacement	1.6	-3	3	-5	5
3	25	Displacement	0.8	-3	3	-5	5
4	33	Displacement	0.4	-3	3	-5	5

REFERENCE PARAMETERS -

Minimum Frequency: 4.000 Hz
Maximum Frequency: 33.000 Hz
Transducer Crossover: 4.000 Hz
Crossover Range: 10.000 %
Frequency Points: 200.000
Box Tolerance: Enable
Box Alarm Width (%): 3
Box Abort Width (%): 5

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

SAFETY PARAMETERS:

ALARM/ABORTS -

Active Frequency Range -

Minimum Frequency: 4.00 Hz
 Maximum Frequency: 33.00 Hz
 Enable for Manual Mode: Yes
 Reference CSL Threshold: 20.00 dB
 CSL Count Threshold: 1

ITS: M2393-RTCM & CNES: DSO/RC//AS 2000-224

LOOP CHECK -

Noise Threshold: 30.00 mV RMS
 Frequency: 35.00 Hz
 Maximum Drive: 300.00 mV RMS
 Pause after Loop Check: No

DRIVE SIGNAL -

Maximum Drive: 5.00 Vpeak
 Attenuated Output Delay: 0.00 Seconds

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	92.80	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No	88.55	AC	Accel	g			BB RMS
3	Auxiliary	No	62.70	AC	Accel	g			BB RMS
4	Auxiliary	No	69.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Check	Sensitivity (mV/Units)	Channel Label	Documentation
1	Control	Yes	92.80	Pilote P	
2	Auxiliary	No	88.55	1X SENSOR	
3	Auxiliary	No	62.70	1Y SENSOR	
4	Auxiliary	No	69.00	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

DOCUMENTATION:

Display Text -

Title 1: 001X TEST : RTCM 02/5/97

Title 2: M2393 - JOTRON TRON 40 GPS N/S 400.1

List Only Text -

Title 3:

Prompt before Test: Yes

Data Storage -

Storage Mode: Interval

Interval (sweep or sec): 1

Message Log -

Log Mode: Use Run Number

Printing -

Automatic Plot: Off

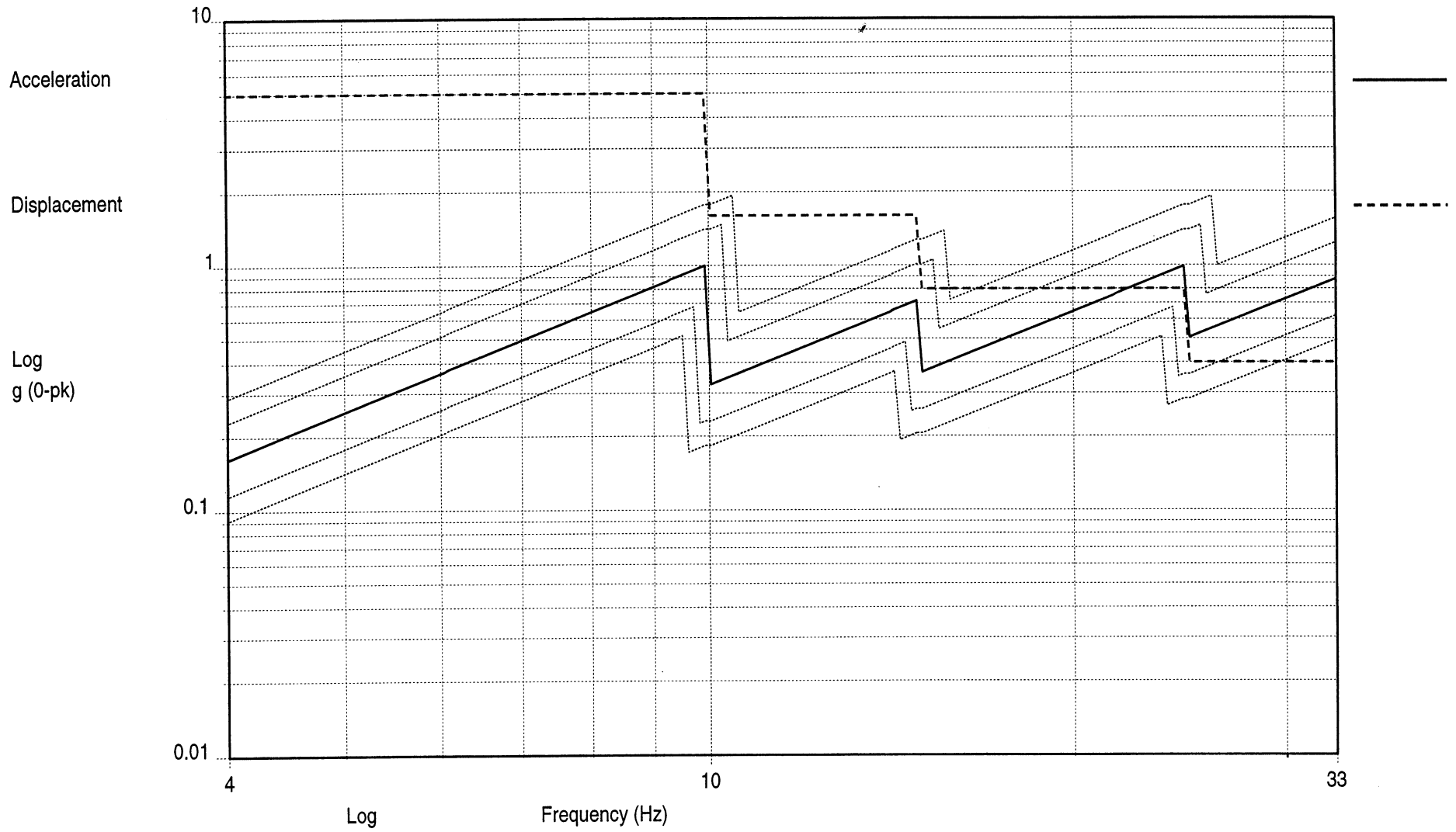
REMOTE COMMUNICATION TABLE:

Enable Remote Communication: No

SHAKER LIMITS:

Enable Shaker Limits: No

End of Sine Test List



5.33
12:37:22
07-Jun-2000

001X TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S 2000
Sine Test Name:



Data Storage File Name: RTCM.009
Current Date: Wed Jun 07 2000 14:33:12

DOCUMENTATION:

Title 1: 001X TEST : RTCM 02/5/97
Title 2: M2393 - JOTRON TRON 40 GPS N/S2000
Title 3:

TEST RESULTS:

Test Function: Test
Date at Shutdown: 07-Jun-2000
Time at Shutdown: 14:29:05
Test Completed Normally
Elapsed Time 000:30:00
Remaining Time 000:00:00
Elapsed Sweeps 12.00
Remaining Sweeps 0.01
Frequency at Shutdown: 4.02 Hz
Test Level: 0.00 dB
Maximum Control Error: 10.00 dB @ 10.01 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	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 92.80	AC	Accel	g	0.00		BB RMS
2	Auxiliary	No 88.55	AC	Accel	g			BB RMS
3	Auxiliary	No 62.70	AC	Accel	g			BB RMS
4	Auxiliary	No 69.00	AC	Accel	g			BB RMS

(Continued for Labels...)

Channel Number	Channel Type	Loop Sensitivity Check (mV/Units)	Channel Documentation
1	Control	Yes 92.80	Pilote P
2	Auxiliary	No 88.55	1X SENSOR
3	Auxiliary	No 62.70	1Y SENSOR
4	Auxiliary	No 69.00	1Z SENSOR

Label 2

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

```
%Test: RTCM.009
%Log: /user/client/m2393/sine/log/RTCM.009.log
06/07/00
13:57:19 Nulling Internal Offsets.
13:58:00 Nulling Completed.
13:58:01 Loop Check Started...
13:58:01 Measuring Ambient Noise...
13:58:08 Searching for Threshold...
13:58:15 Loop Check Completed.
13:58:17 Increasing to Test Level...
13:59:00 Start Level Reached.
13:59:00 Test Starts at 4.000 Hz
14:01:30 Saved Sweep Number 1.00
14:04:01 Saved Sweep Number 2.00
14:06:30 Saved Sweep Number 3.00
14:09:01 Saved Sweep Number 4.00
14:11:31 Saved Sweep Number 5.00
14:14:00 Saved Sweep Number 6.00
14:16:30 Saved Sweep Number 7.00
14:19:00 Saved Sweep Number 8.00
14:21:30 Saved Sweep Number 9.00
14:24:00 Saved Sweep Number 10.00
14:26:30 Saved Sweep Number 11.00
14:29:00 Shutdown Initiated...
14:29:05 Saved Sweep Number 12.00
```

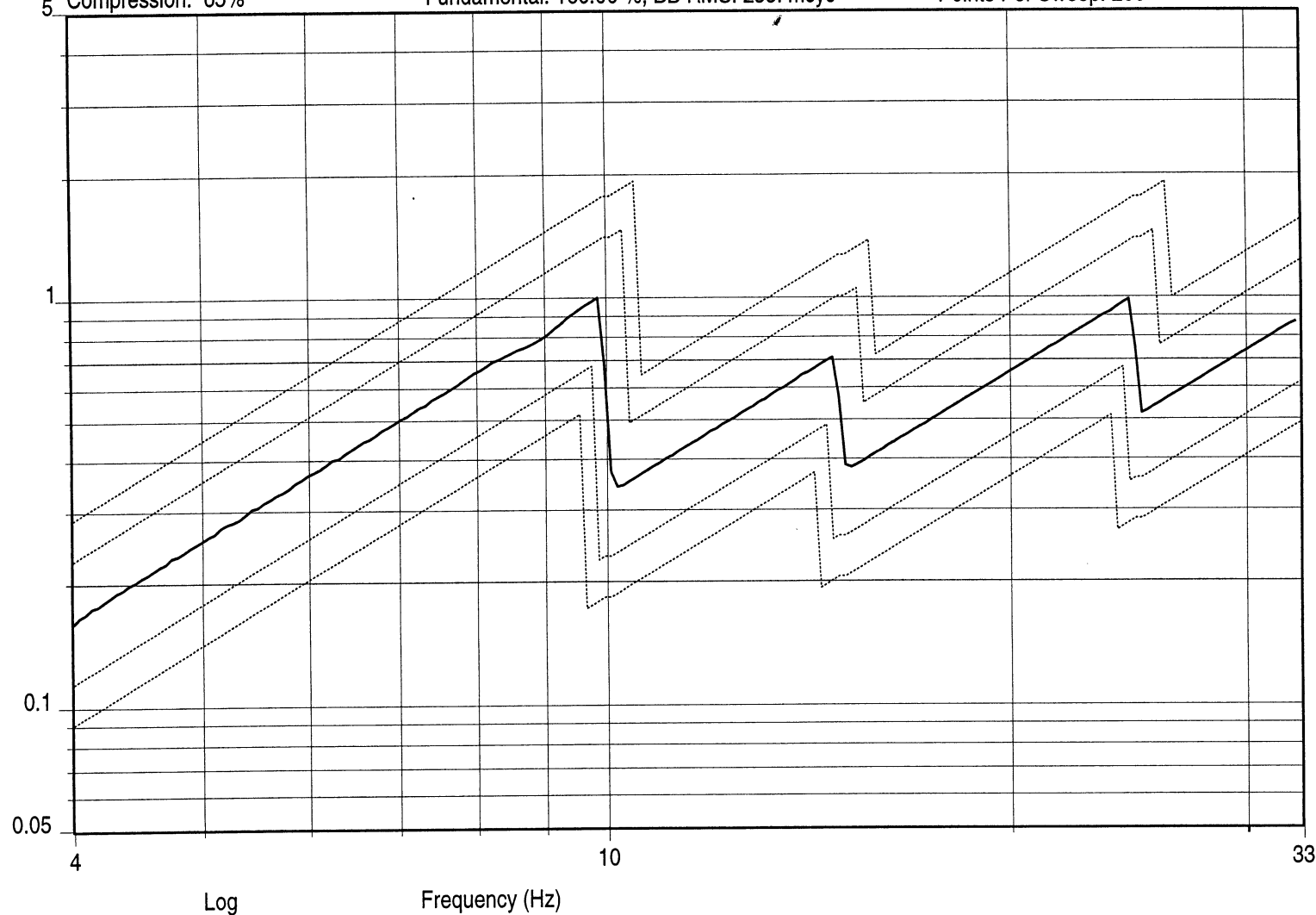
Sweep Number: 1.00
Sweep Rate 1: 1.218 oct/min
Compression: 65%

Elapsed Time: 000:02:30
Filter Type: Proportional
Fundamental: 160.00 %, BB RMS: 255. mcyc

Remaining Time: 000:27:30
Test Range: 4.000, 33.000 Hz
Points Per Sweep: 200

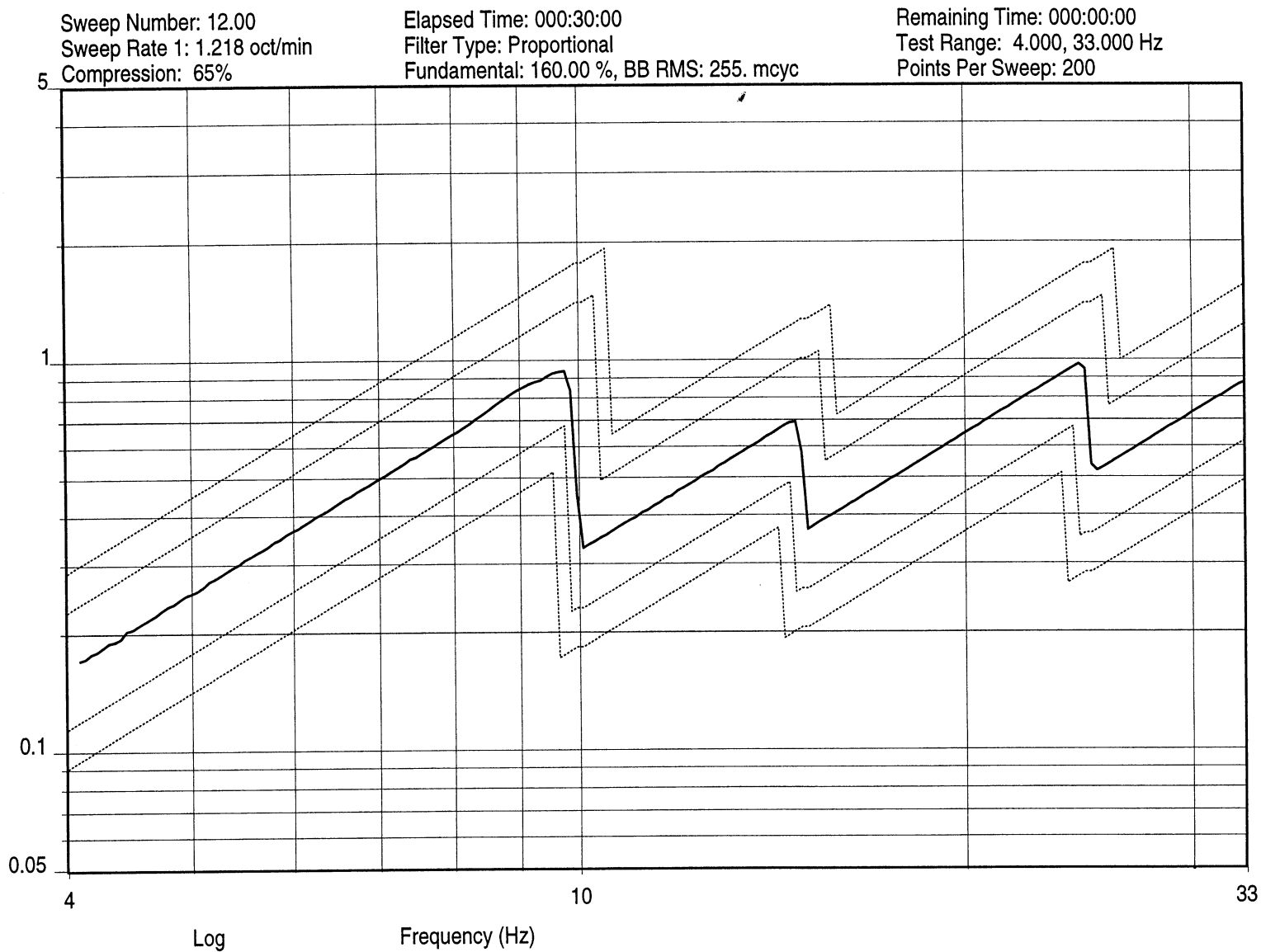
Servo
Control

Log
Acceleration
g (0-pk)



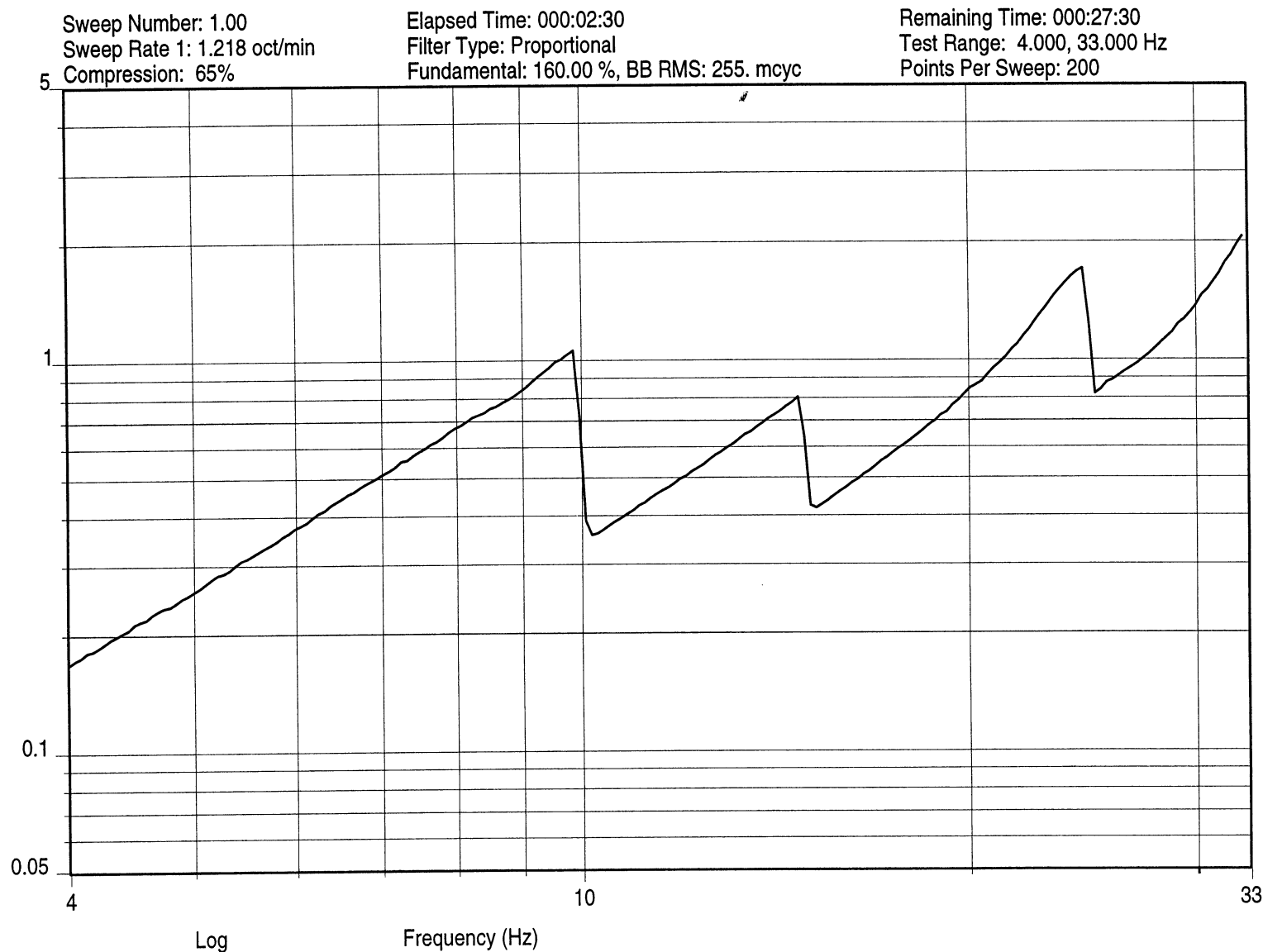
5.37
14:01:31
Wed Jun 07 2000

001X TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S: 2004
Sine Data Review Name: RTCM.009



001X TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S 2001
Sine Test Name: RTCM.009

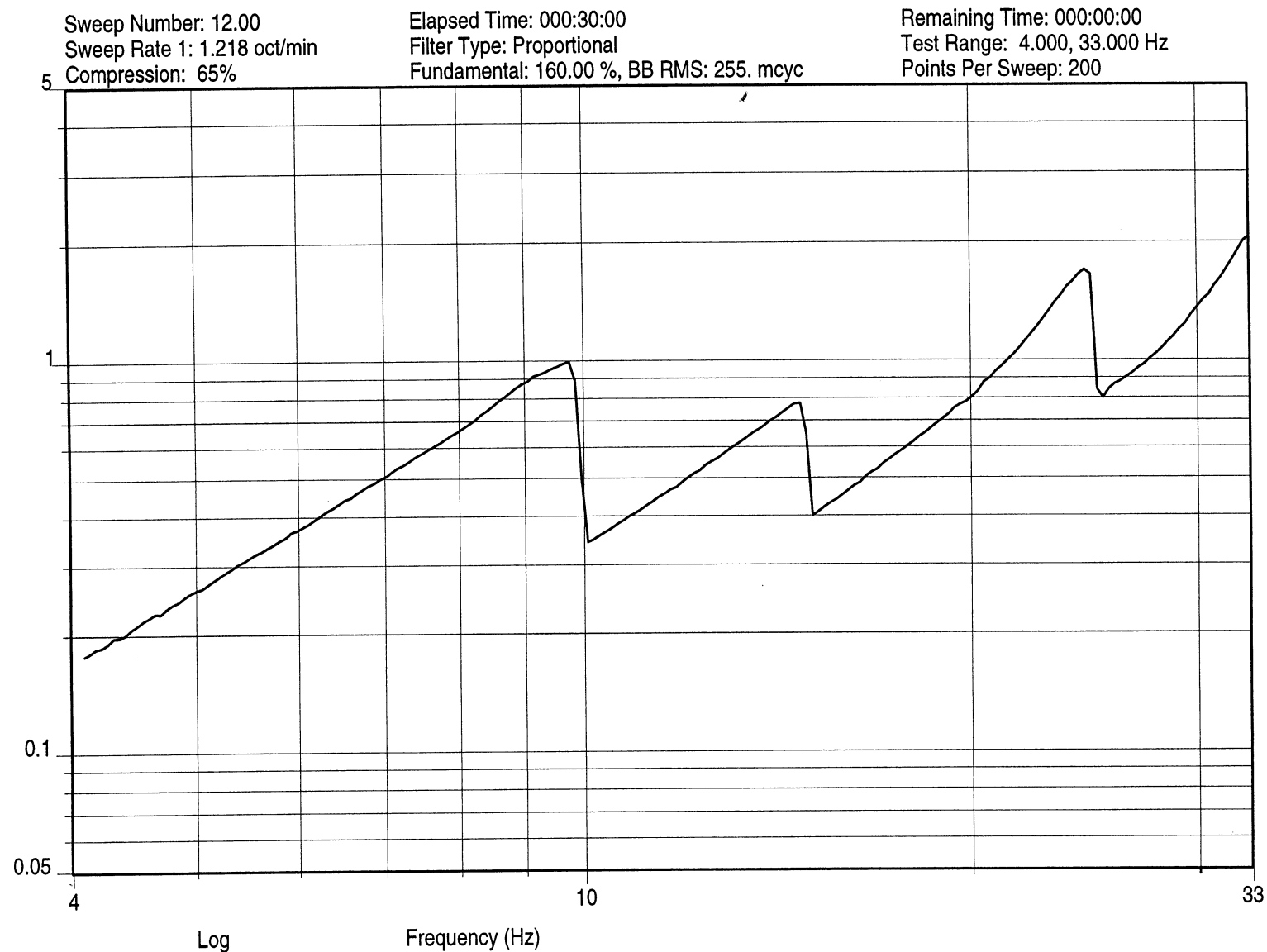
5.38
14:32:49
07-Jun-2000



1X SENSOR (x control)

5.39
14:01:31
Wed Jun 07 2000

001X TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S: 7001
Sine Data Review Name: RTCM.009



1X SENSOR (X control)

5.40
14:32:49
07-Jun-2000

001X TEST : RTCM 02/5/97
M2393 - JOTRON TRON 40 GPS N/S 2001
Sine Test Name: RTCM.009

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

CERTIFICATION CENTER MEASUREMENTS
VIBRATION ALIVENESS TEST RESULTS

E UT : 2/2
 Name : JOTRON
 Type : TRON 40GPS
 Number : 7001
 Date : 7 June 2000

406 MHz Measurements

1 - Environmental Temperature (° C)			+ 22° C
2 - POWER OUTPUT			
- Transmission power	dBm	37 ± 2	37.1
- Power risetime	ms	< 5	0.50
- Power falltime	ms	< 5	-
3 - SPURIOUS OUTPUT *			
- In band			-
- Carrier harmonics			
4 - DIGITAL MESSAGE GENERATOR *			
- Repetition rate			-
- Bit rate	bits/S	400 ± 4	398.9
- Transmission time	ms	440 ± 4.4 / 520 ± 5.2	521.1
- CW preamble	ms	160 ± 1.6	159.8
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	0257
- 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	105685 / 105685
- BCH 2 code read / calculated	bits	133-144 / 107-132	66C / 66C
6 - FREQUENCY			
- Nominal value	KHz	406 025 ± 2	+ 0.0899
- Short term stability		< 210 ⁻⁹ /100 ms	5 x 10 ⁻¹¹

* See data and graphs next pages

Laboratoire de certification
Contrôle balise ARGOS/SARSAT

Constructeur JOTRON
Modele TRON 40GPS
Numero de serie OCA07001
Reference M2393
Type SARSAT

Date de l'essai 7 Jun 2000 17:25:42

Message balise

Message reçu (1-144): FFFE2F901E1E24007FDFFC15A17783E0F66C
Format flag (25): 1
Protocole flag (26): 0
Code pays (27-36): 0257
Pays : NORWAY
Code protocole (37-40): 1110
Protocole utilise : Standard - Test
Identification :
Numero :
BCH 1 lu/calculé (86-106/25-85): 105685/105685
BCH 2 lu/calculé (133-144/107-132): 66C/66C
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 : Yes

Contrôle message

Duree de la porteuse pure 159.82ms +- 0.00
Duree de l'emission 521.09 ms

Frequence de modulation 398.86Hz +- 0.00

Stabilité de fréquence

Frequence moyenne F2 406025089.96 Hz

SIGMA2 F2-F1 8.185E-10
SIGMA3 F3-F2 5.050E-11

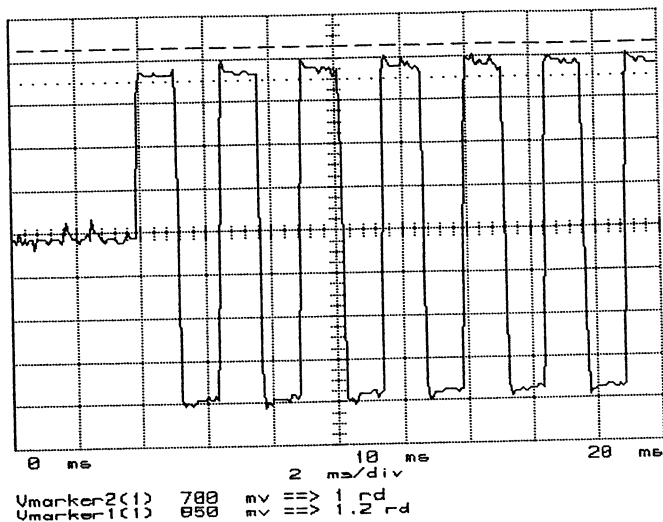
Mesures d'indice

F	F1	G1
50090.34	214	63
50090.24	259	63

Excursion de phase totale rd <= 2.48 2.26
Excursion de phase positive rd 0.96< <1.24 1.05
Excursion de phase negative rd -1.24< <-0.96 -1.22
Symetrie de l'excursion % <= 5 7.66

Mesures de puissance

Puissance dBm 37.14



Spectre de fréquence

