



SST DEPARTMENT
VIBRATION TEST FACILITY
REPORT REF: AIV-2000-113-VIB
SMEI : CAMERA F.M. 3

RUTHERFORD APPLETON LABORATORY
Vibration Facility
Chilton, Didcot,
Oxfordshire OX11 0QX

Tel: Abingdon (01235) 446617

CONTENTS

1) TEST ITEM DESCRIPTION.....	2
2) TEST SPECIFICATION	2
3) PRE-TEST ACCELEROMETER VERIFICATION	3
4) CLEANLINESS	3
5) FIXTURE DETAILS.....	4
6) TEST SUMMARY.....	7
7) CONCLUSION	9
ANNEX A: ACCELEROMETER PLOTS FIGURES 1a&b – 12a&b	

1) TEST ITEM DESCRIPTION

The test item consisted of the SMEI F.M. 3 Camera. It required testing in all three axes, X and Z-axes on the slip table and Y-axis on the head.

2) TEST SPECIFICATION

The test Acceptance Specification levels were given in document ref: SMEI/UB/PLN/002 Issue 2 dated 15/12/2000. A low level sine survey was to be followed by a static load, a random and a final sine survey for all axes. One triaxial accelerometer and four single axis accelerometers were to be used for monitoring.

SINE SURVEY TEST

One sweep @ 0.5g from 5 Hz to 2000 Hz at 2 octaves per minute.

STATIC LOAD

Level:-22.5g

Frequency:- 35 Hertz

Duration:- Minimum 5 cycles (10 cycles used during testing)

RANDOM

ALL AXIS

FREQUENCY (Hz)	TEST LEVEL (g ² / Hz)
20	0.0330
40	0.0650
470	0.0650
2000	0.0036

Overall Test Level = 7.24 g rms. for 1 minute

3) PRE-TEST ACCELEROMETER VERIFICATION

Control System:

The calibrated control accelerometer (Endevco Type 7254A-100 (99.78mV/g) Serial No. 11923), was fastened onto the head of the LDS 954 shaker.

At a Frequency of 44.226 Hz with a displacement of 0.1 inches peak to peak, thus acceleration of 10 g peak the response of the auxiliary accelerometers were recorded. Also a 10 – 2000 Hz Sine Sweep run at 0.5 g at 2 octaves per minute was carried out to check the response of the accelerometers. Plots of the above runs are available for inspection, although not included in this report.

Auxiliary Accelerometers: -

Endevco Model 2258A-10 Triaxial
Endevco Model 7250A-10 Single Axis

CHANNEL NO.	SERIAL NUMBER	CALIBRATION mV/g	Date	SIGNAL CONDITIONER
2	11286 X	10.32	08/05/01	DYTRAN MODEL E4121 SERIAL No. 227
3	11286 Y	10.27	08/05/01	
4	11286 Z	10.35	08/05/01	
5	CN05	10.78	23/12/00	
6	CN10	10.39	24/12/00	
7	CY25	10.12	08/05/01	
8	CY28	9.60	08/05/01	

Control Accelerometer : Endevco Type 7254A-100 (99.78 mV/g) Serial No. 11923
Next Calibration due: 8 May 2001

Signal Conditioner: Dytran model E4121 Serial No. 227
Next Calibration due: 26 January 2001

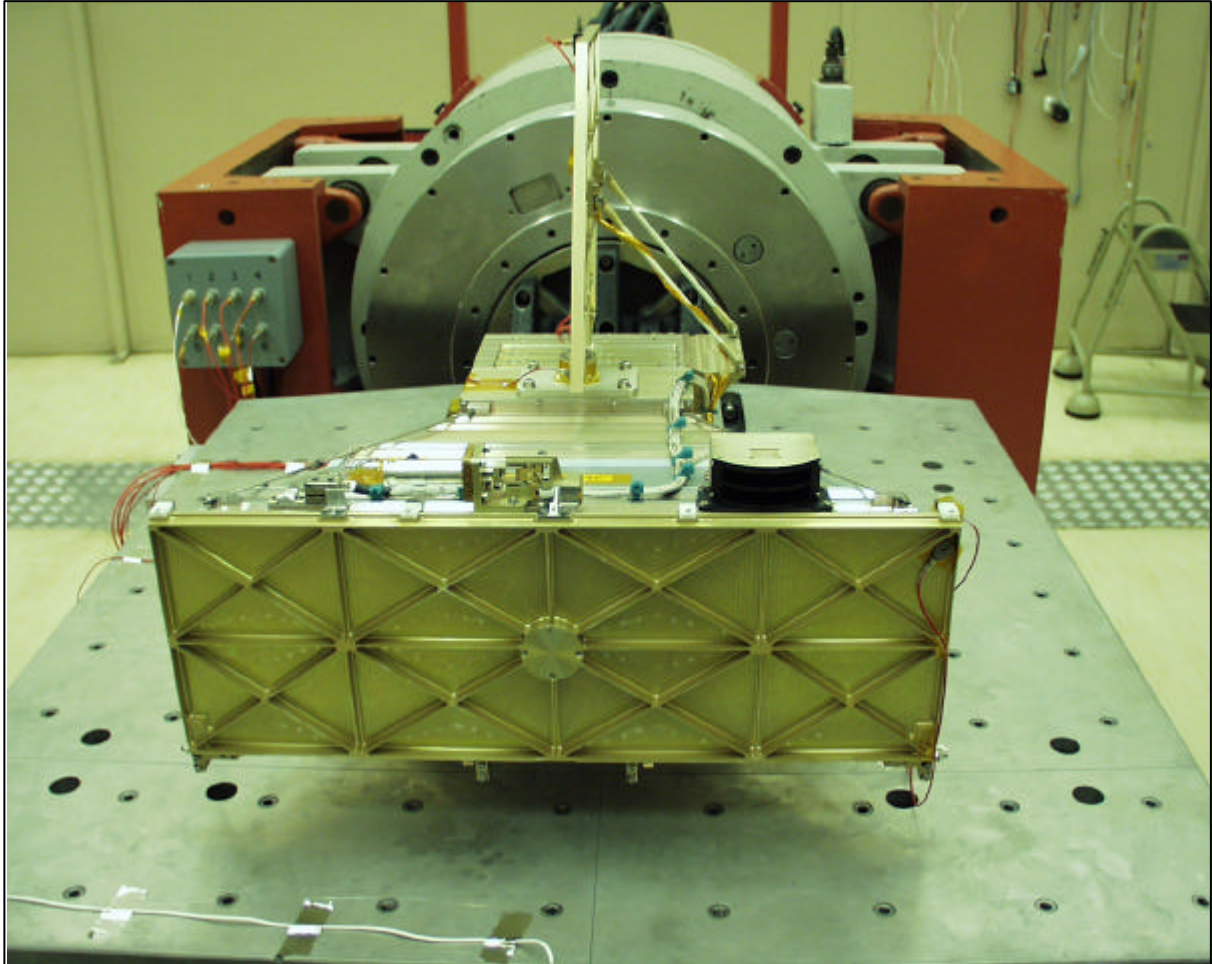
4) CLEANLINESS

Approved cleanroom gloves to be worn when handling the Test Item.

5) FIXTURE DETAILS

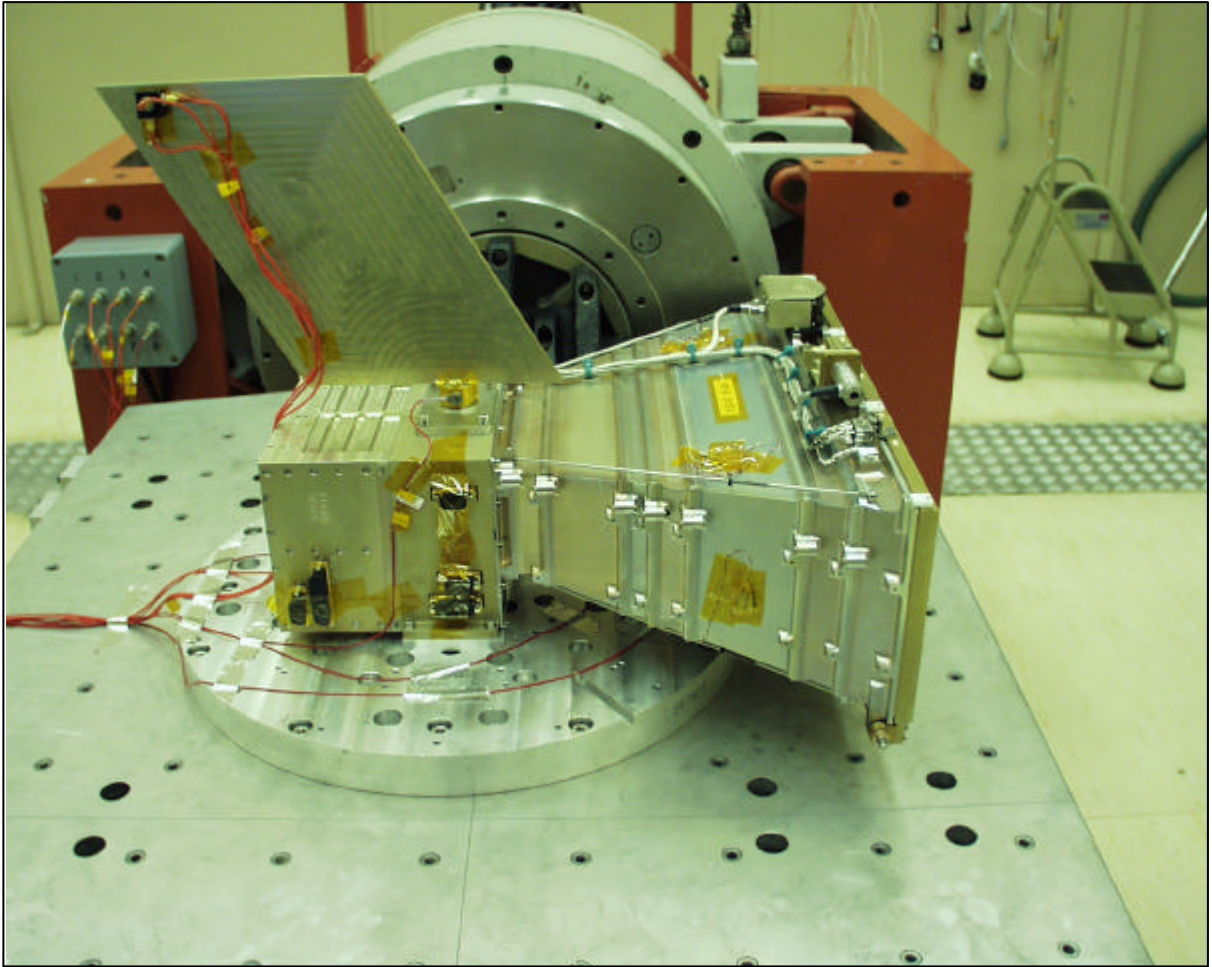
NOTE PHOTOGRAPHS FOR REFERENCE ONLY

Z AXIS VIBRATION TEST CONFIGURATION

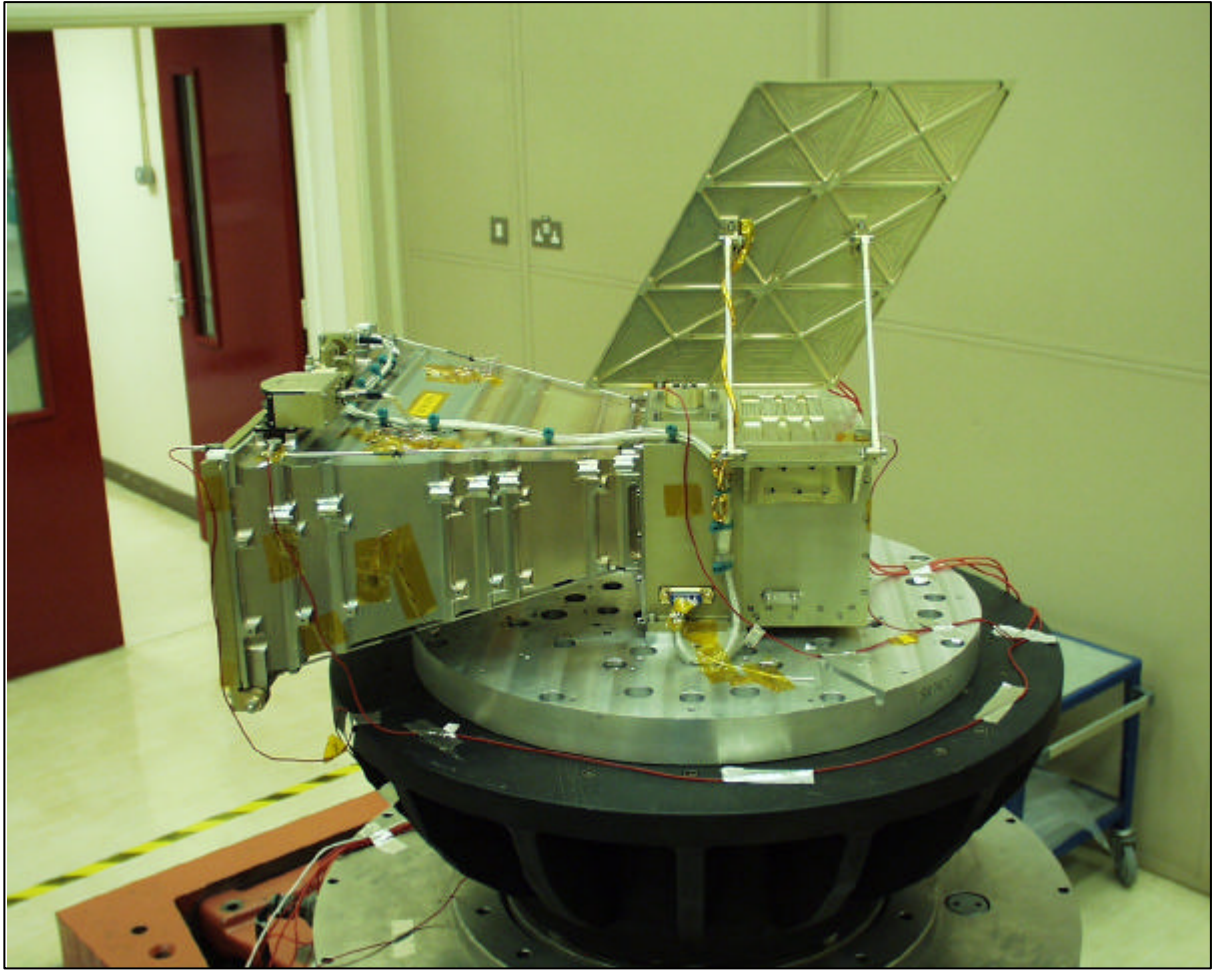


A view of the test item mounted on its vibration fixture on the slip table.

X AXIS VIBRATION TEST CONFIGURATION



Y AXIS VIBRATION TEST CONFIGURATION



6) TEST SUMMARY

Testing Date: 5 January 2001

Observers: Chris Eyles & John Bryant.

Organisation : Birmingham University
Astrophysics and Space Research Group
Edgbaston
Birmingham B15 2TT

CHANNEL ALLOCATION:

CONTROL:-

Channel No.	Accelerometer Type/Serial No.	Testing Axis	Mounting Position
1	Endevco 11923	In Axis	Fixture

MONITORING:-

Channel No.	Accelerometer Type/Serial No.	Testing Axis	Mounting Position
2	Endevco 11286-X	Y	Top corner radiator
3	Endevco 11286-Y	Z	Top corner radiator
4	Endevco 11286-Z	X	Top corner radiator
5	Endevco CN05	IN AXIS	Top end of cold finger
6	Endevco CN10	IN AXIS	Top corner baffles
7	Endevco CY25	IN AXIS	Rear end baffles
8	Endevco CY28	IN AXIS	Rear top corner electronics

NOTE

During the random shake in the Z-axis (see fig 7b) the accelerometer on the top corner of the baffles came adrift from the camera. This was reattached for all subsequent runs.

ACCELEROMETER TEST PLOTS

VIBRATION TESTS in the Y-axis

RUN 00001 SINE SURVEY *FIG 1 a & b*

RUN 00001 STATIC LOAD *FIG 2 a & b*

RUN 00001 RANDOM *FIG 3 a & b*

RUN 00002 POST RANDOM SINE SURVEY *FIG 4 a & b*

VIBRATION TESTS in the Z-axis

RUN 00003 SINE SURVEY *FIG 5 a & b*

RUN 00002 STATIC LOAD *FIG 6 a & b*

RUN 00002 RANDOM *FIG 7 a & b*

RUN 00004 POST RANDOM SINE SURVEY *FIG 8 a & b*

VIBRATION TESTS in the X-axis

RUN 00005 SINE SURVEY *FIG 9 a & b*

RUN 00003 STATIC LOAD *FIG 10 a & b*

RUN 00003 RANDOM *FIG 11 a & b*

RUN 00006 POST RANDOM SINE SURVEY *FIG 12 a & b*

7) CONCLUSION

The test item was subjected to the levels of vibration as detailed by document ref. SMEI/UB/PLN/002 Issue 2 dated 15/12/2000. No visible damage occurred during testing.

FACILITY OPERATOR: -

Signature.....

Date.....

2001

David RIPPINGTON

FACILITY MANAGER:-

Signature.....

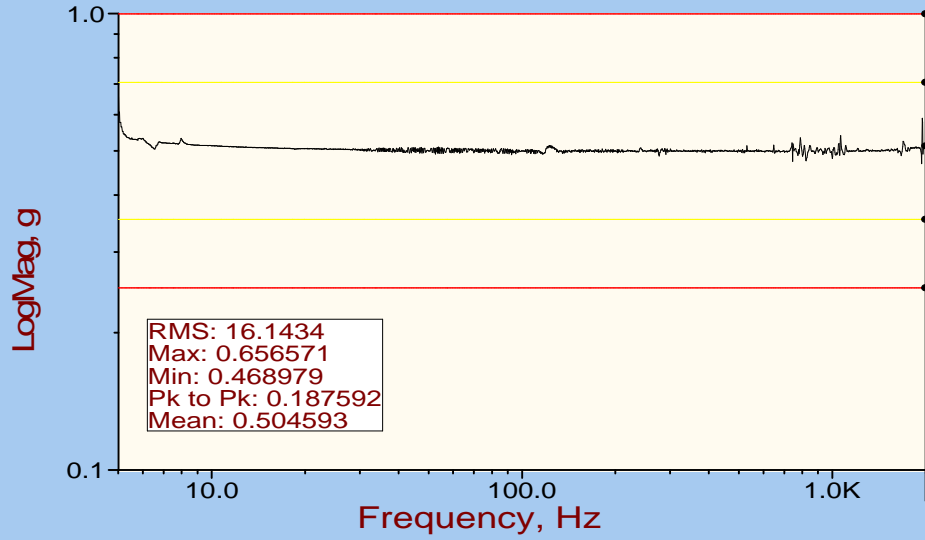
Date.....

2001

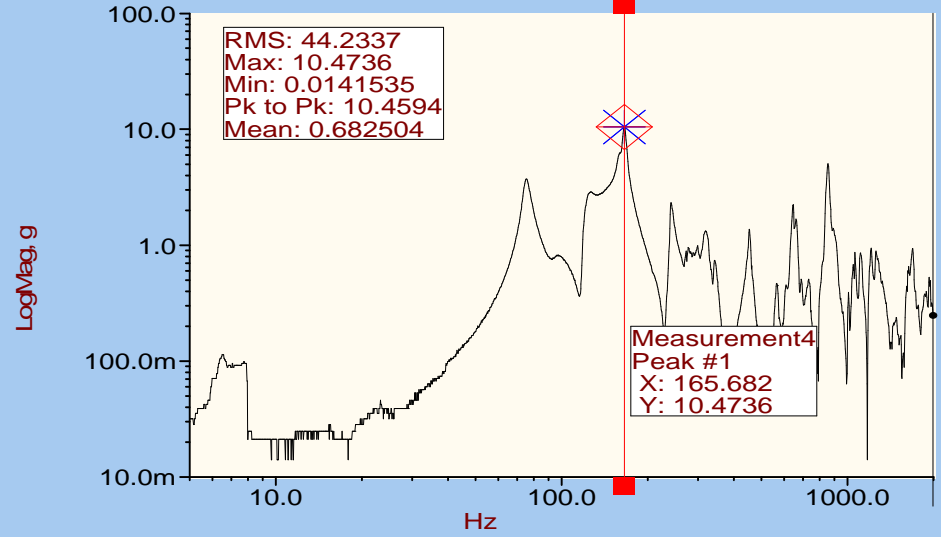
Graham TOPLIS

ANNEX:A ACCELEROMETER PLOTS

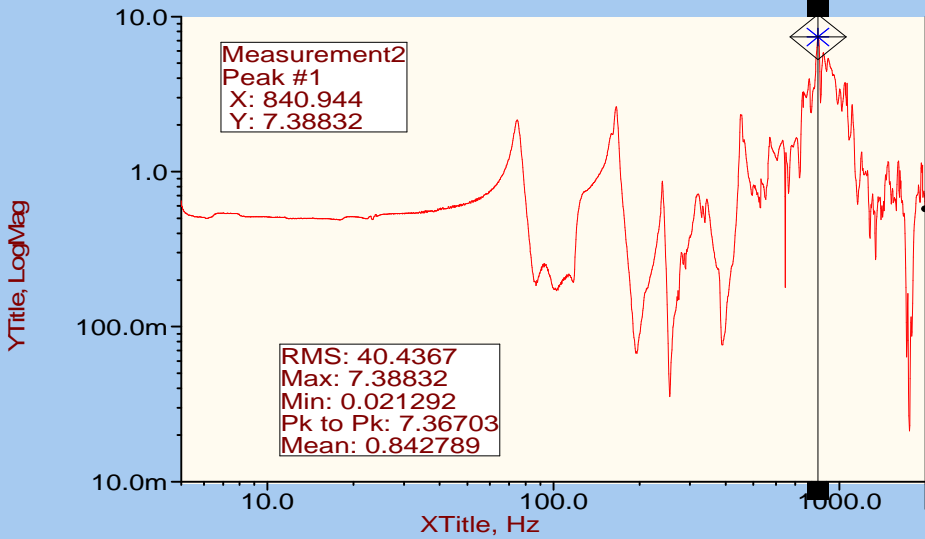
Control;AlarmLow;AlarmHigh;AbortLow;Abo



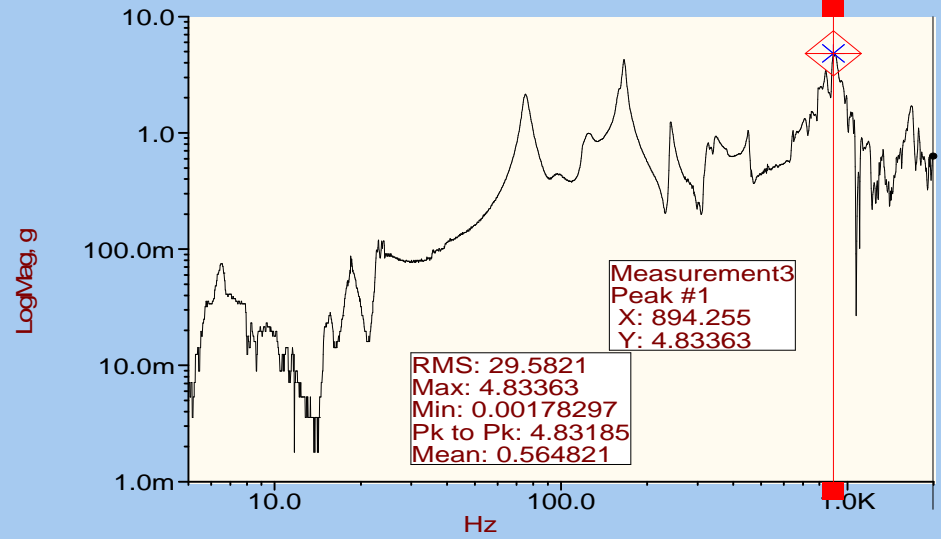
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



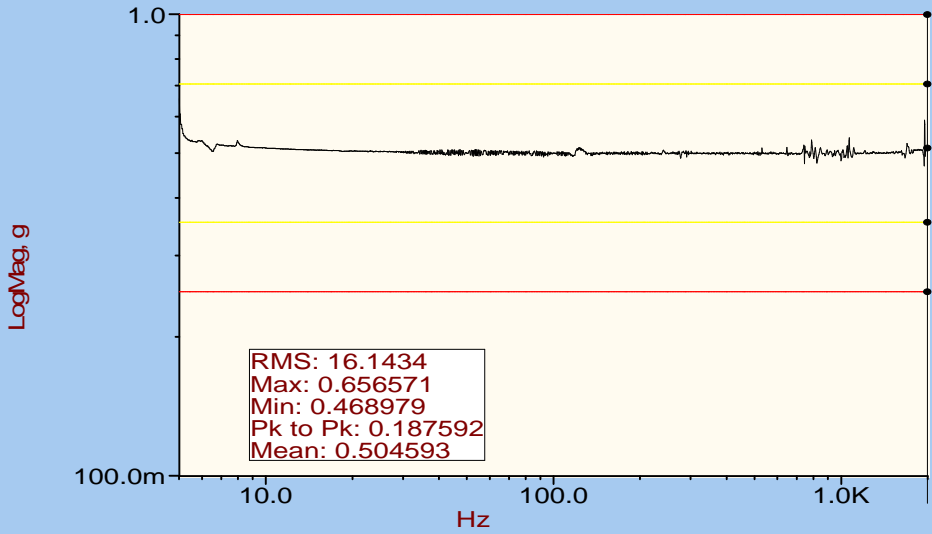
TOP CORNER RADIATOR Z AXIS



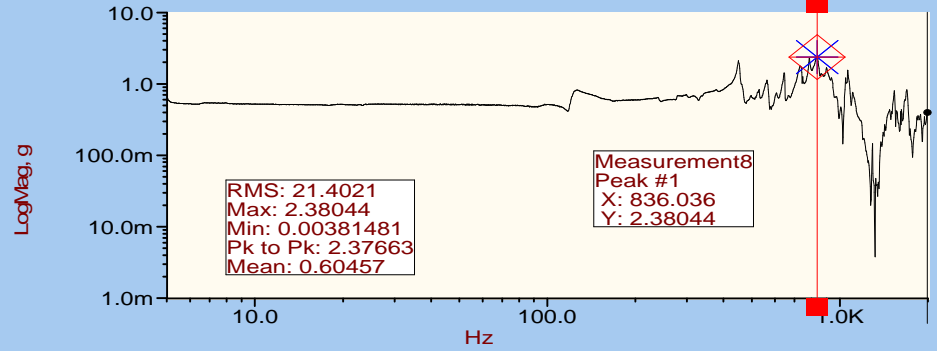
SMEI FM3 CAMERA SINE SURVEY
RUN 00001
Y AXIS
14:08:36 04/01/2001

FIG 1a

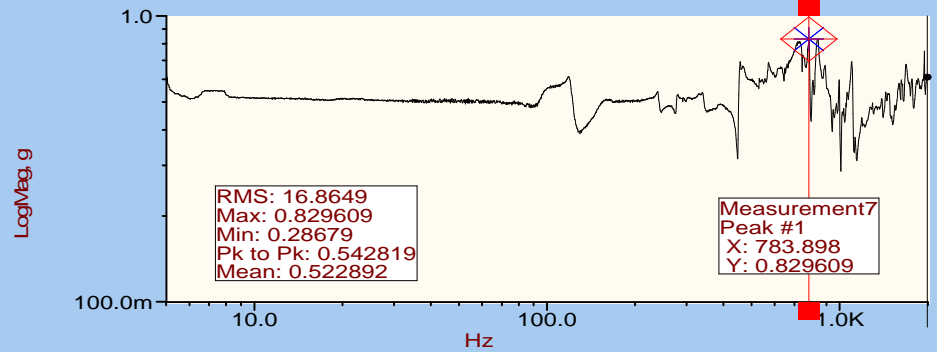
Control;AlarmLow;AlarmHigh;AbortLow;Abo



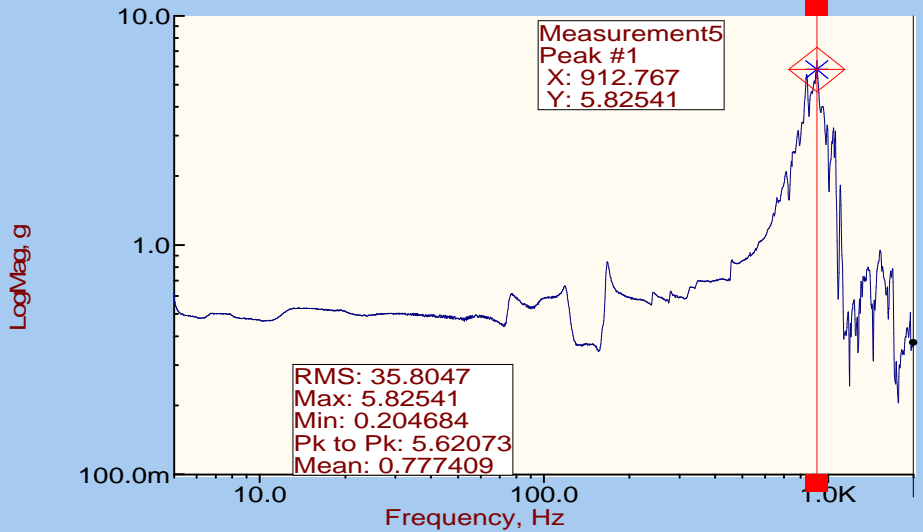
REAR TOP CORNER E BOX Y AXIS



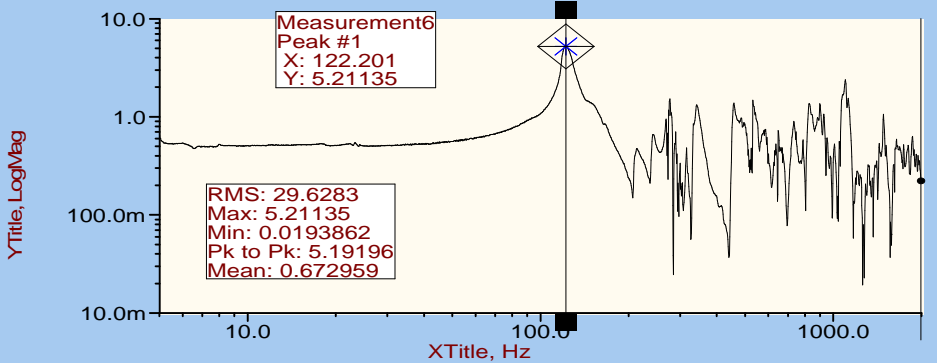
REAR END Baffle Y AXIS



TOP END COLD FINGER Y AXIS



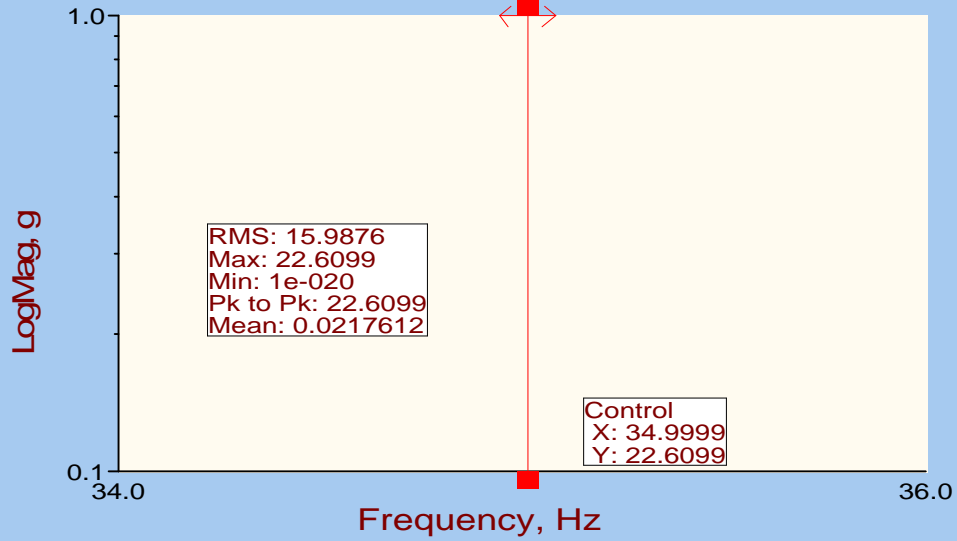
TOP CORNER Baffle Y AXIS



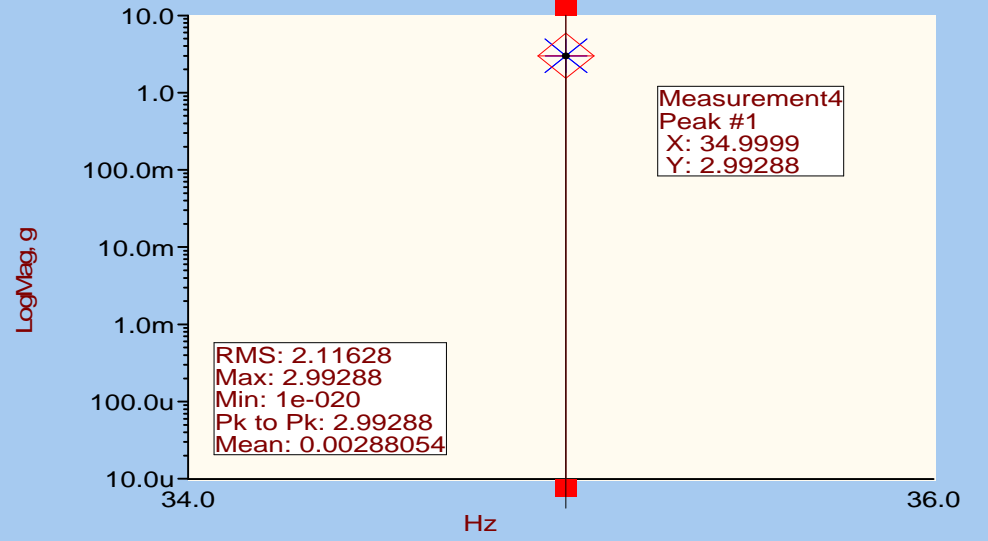
SMEI FM3 CAMERA SINE SURVEY
 RUN 00001
 Y AXIS
 14:08:36 04/01/2001

FIG 1b

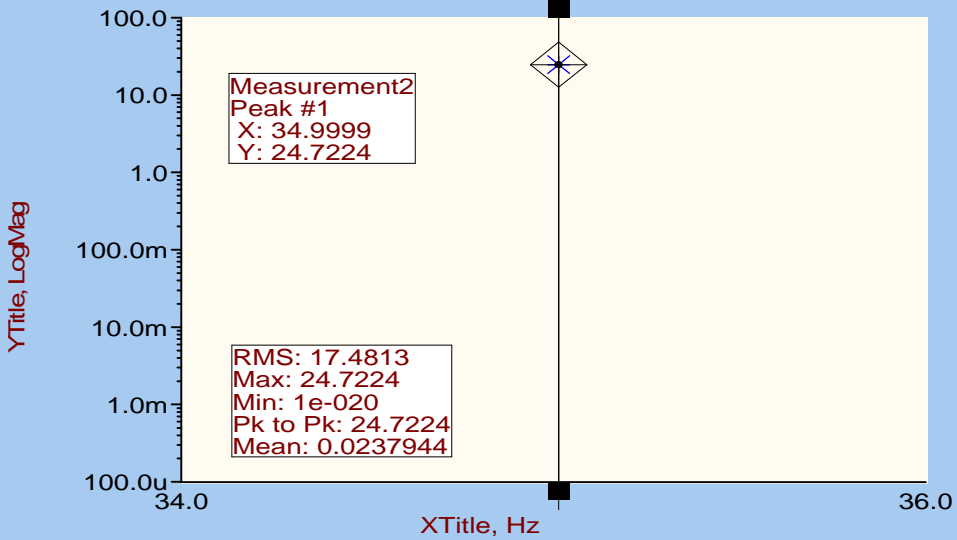
Control



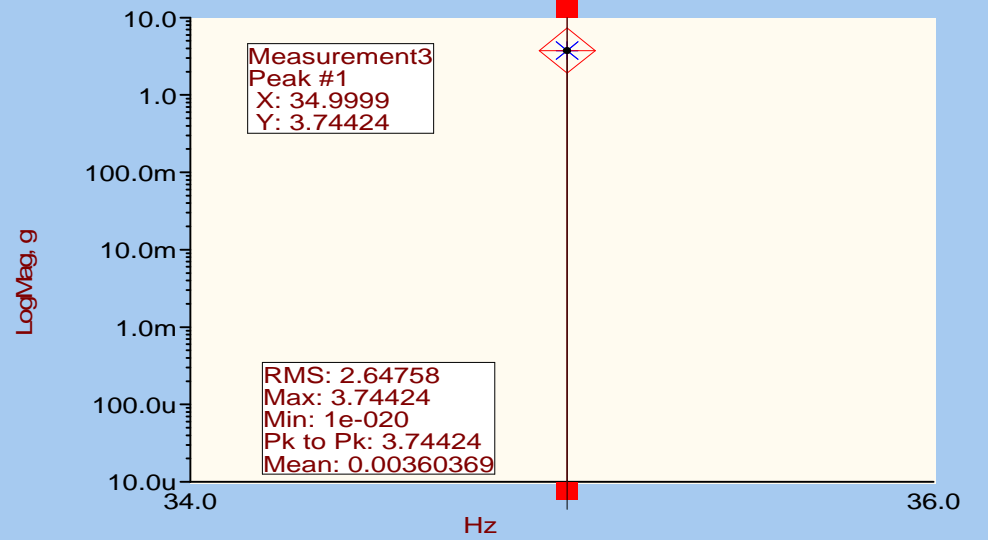
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



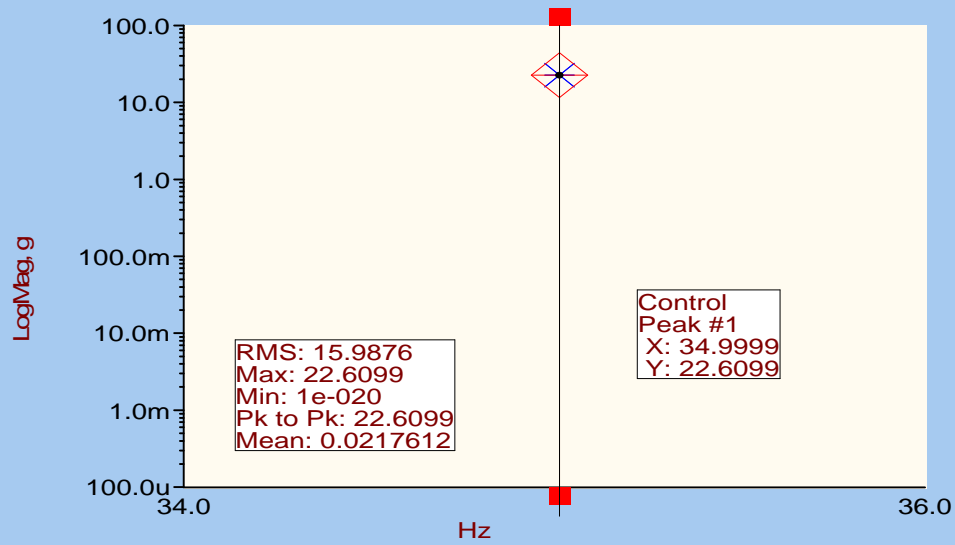
TOP CORNER RADIATOR Z AXIS



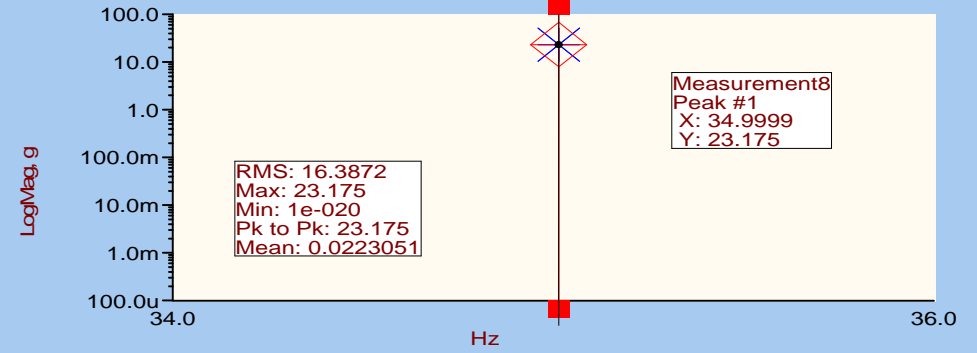
SMEI FM3 CAMERA STATIC LOAD
RUN 00001
Y AXIS
14:14:47 04/01/2001

FIG 2a

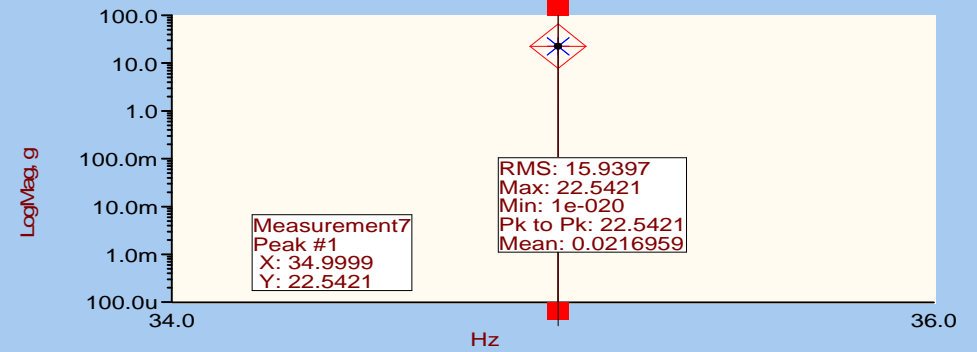
Control



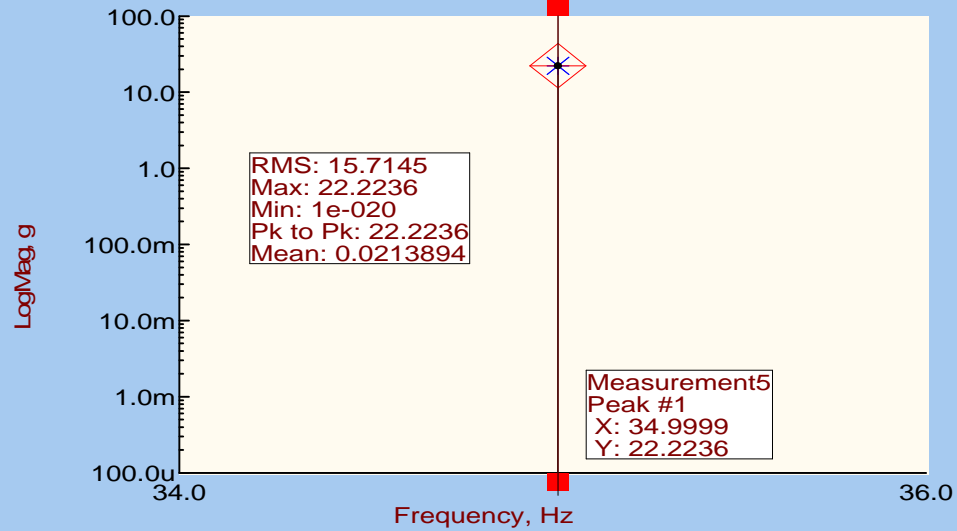
REAR TOP CORNER E BOX Y AXIS



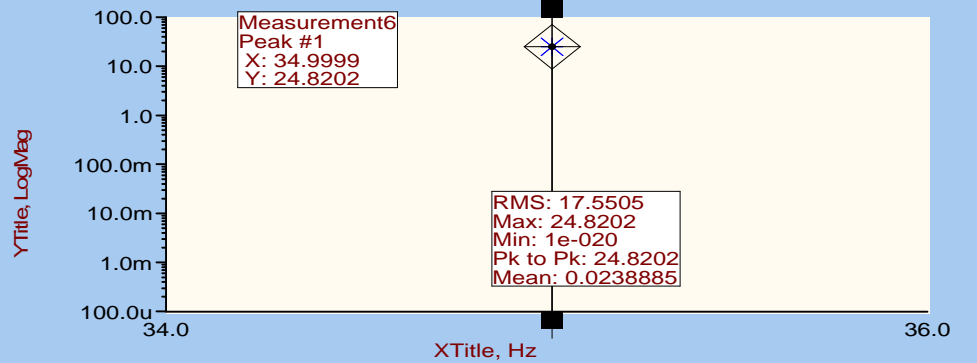
REAR END Baffle Y AXIS



TOP END COLD FINGER Y AXIS



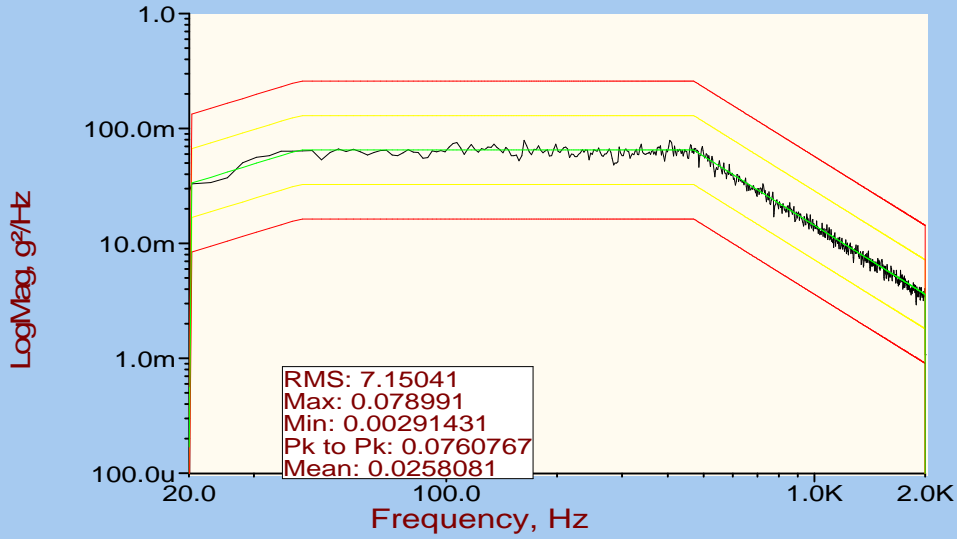
TOP CORNER Baffles Y AXIS



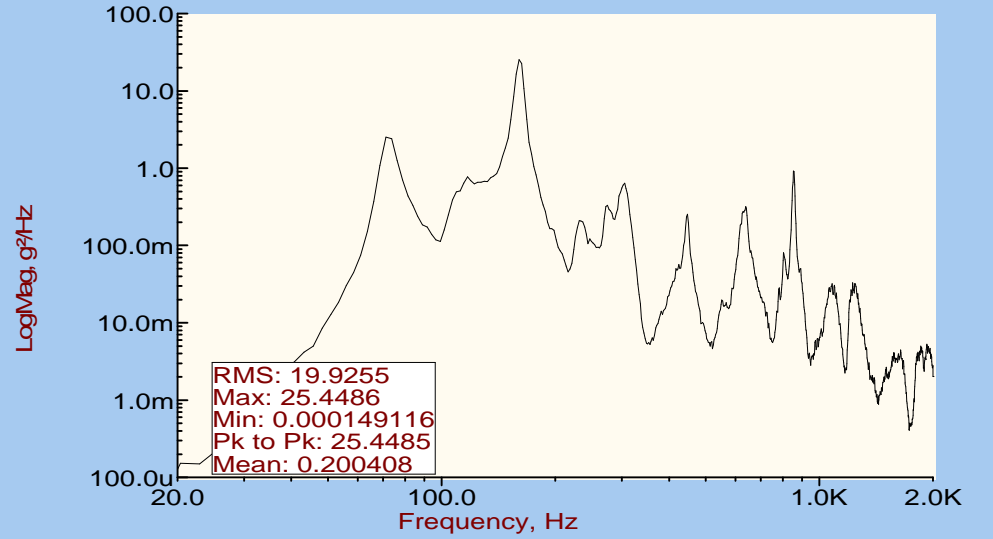
SMEI FM3 CAMERA STATIC LOAD
RUN 00001
Y AXIS
14:14:47 04/01/2001

FIG 2b

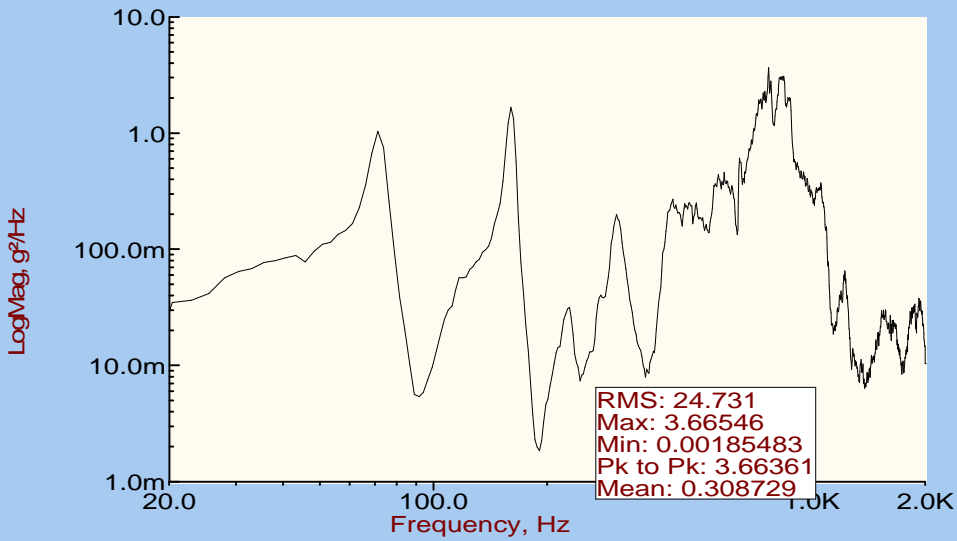
Control;AlarmLow;AlarmHigh;AbortLow;Abo



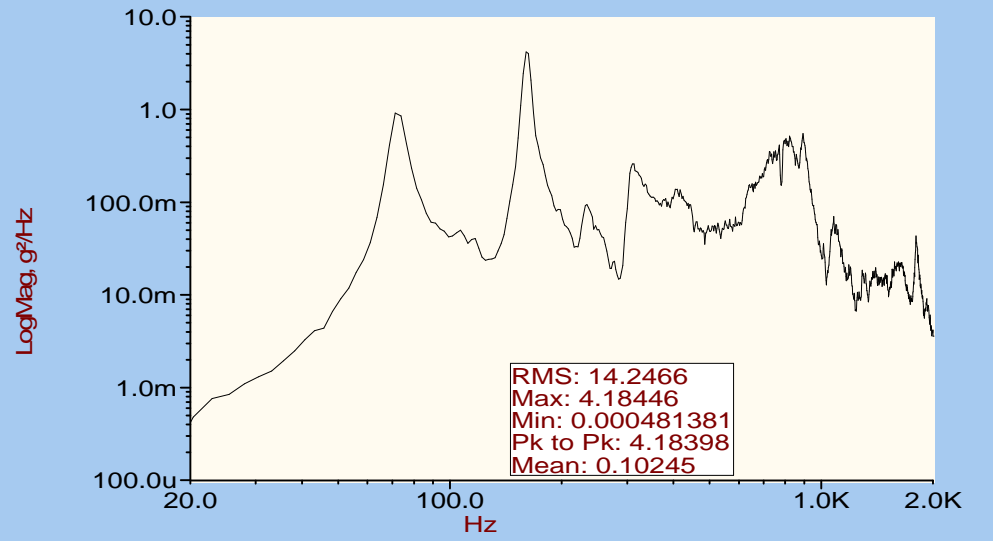
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



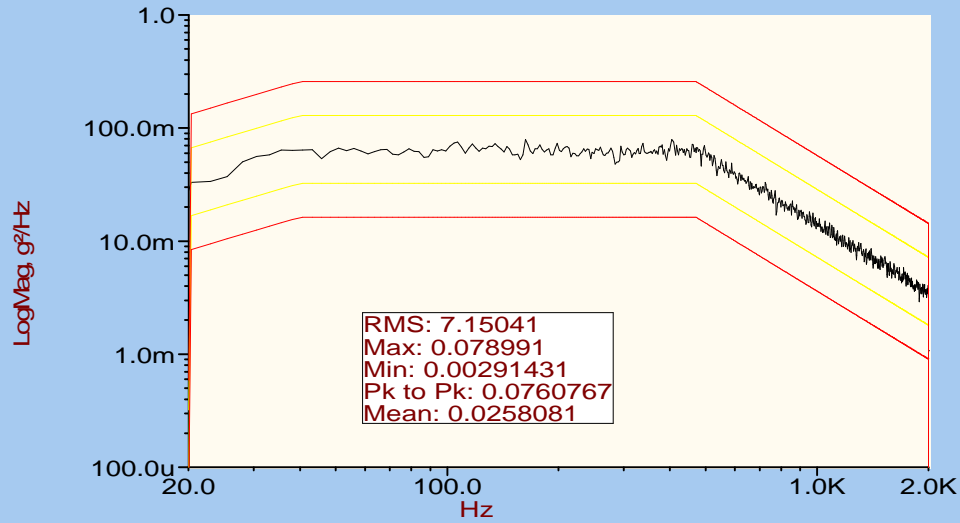
TOP CORNER RADIATOR Z AXIS



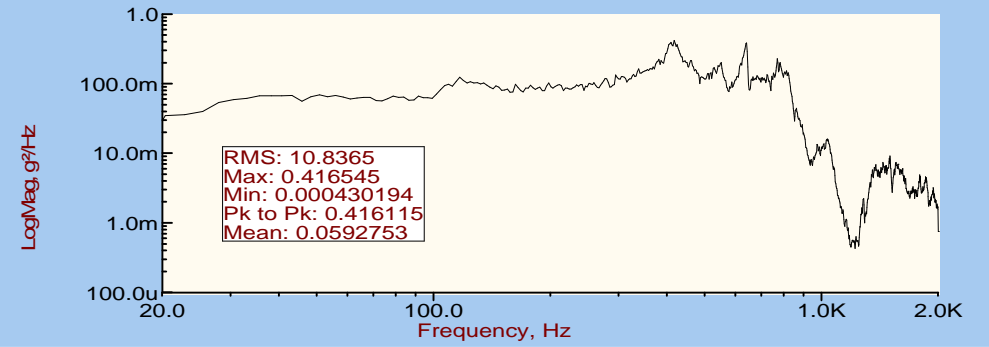
SMEI FM3 CAMERA RANDOM
RUN 00001
Y AXIS
14:16:27 04/01/2001

FIG 3a

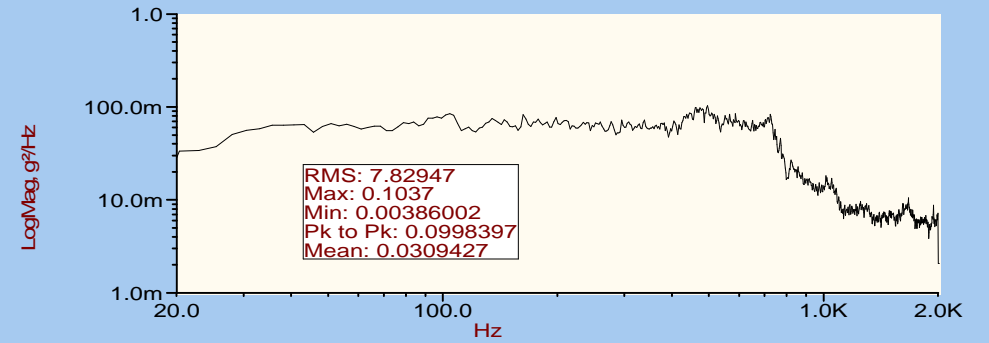
Control;AlarmLow;AlarmHigh;AbortLow;Abo



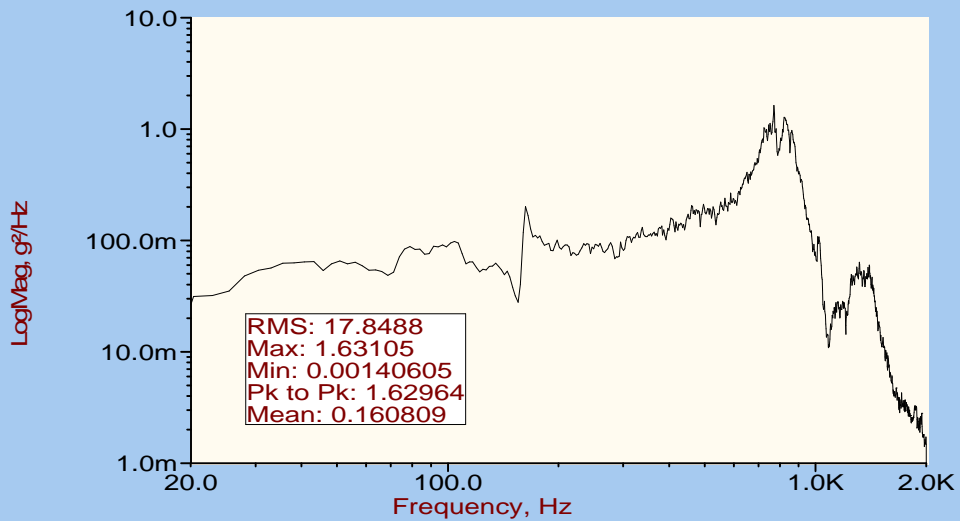
REAR TOP CORNER E BOX Y AXIS



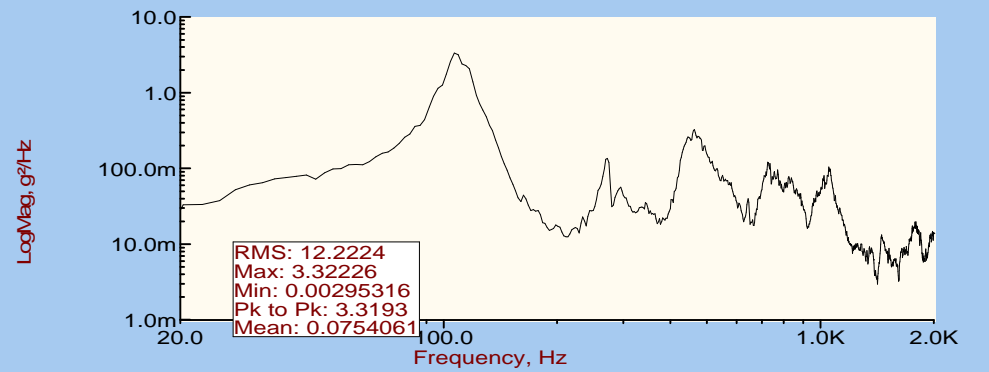
REAR END Baffle Y AXIS



TOP END COLD FINGER Y AXIS



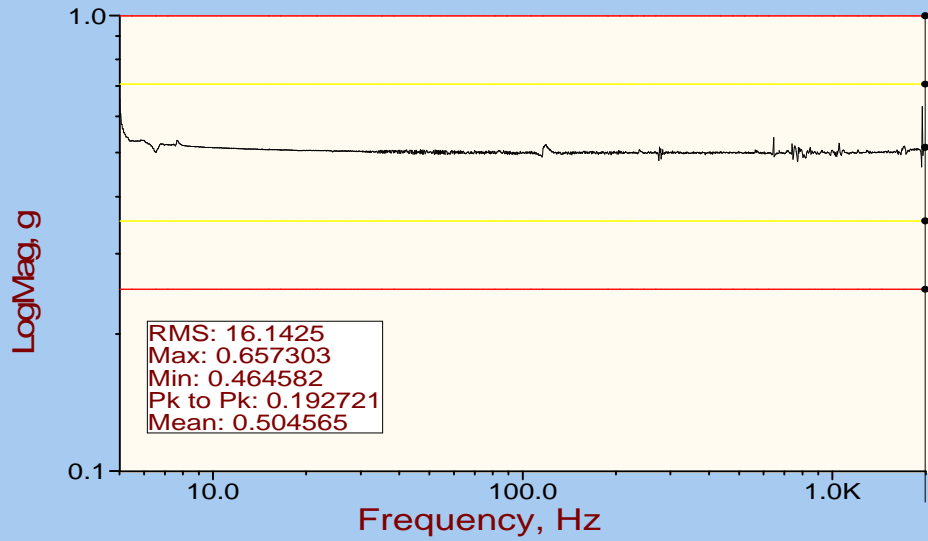
TOP CORNER Baffles Y AXIS



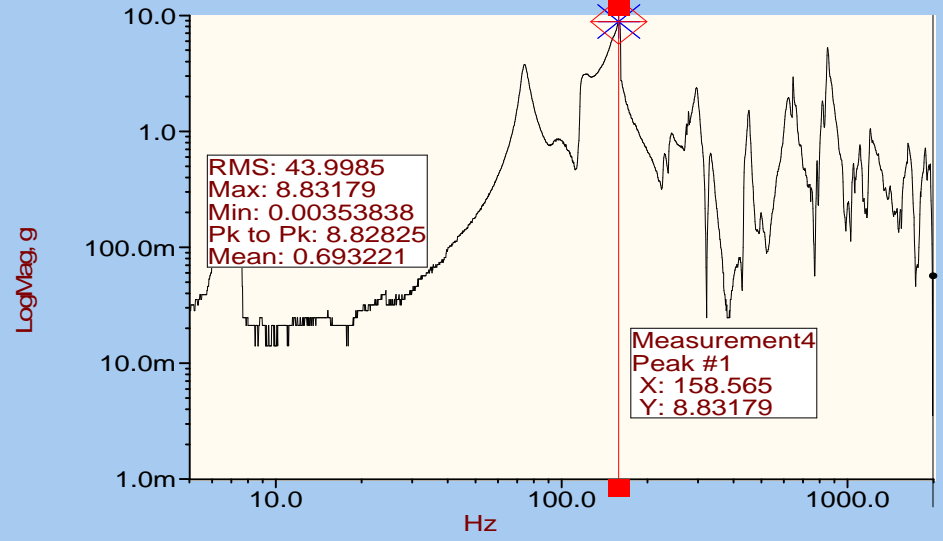
SMEI FM3 CAMERA RANDOM
RUN 00001
Y AXIS
14:16:27 04/01/2001

FIG 3b

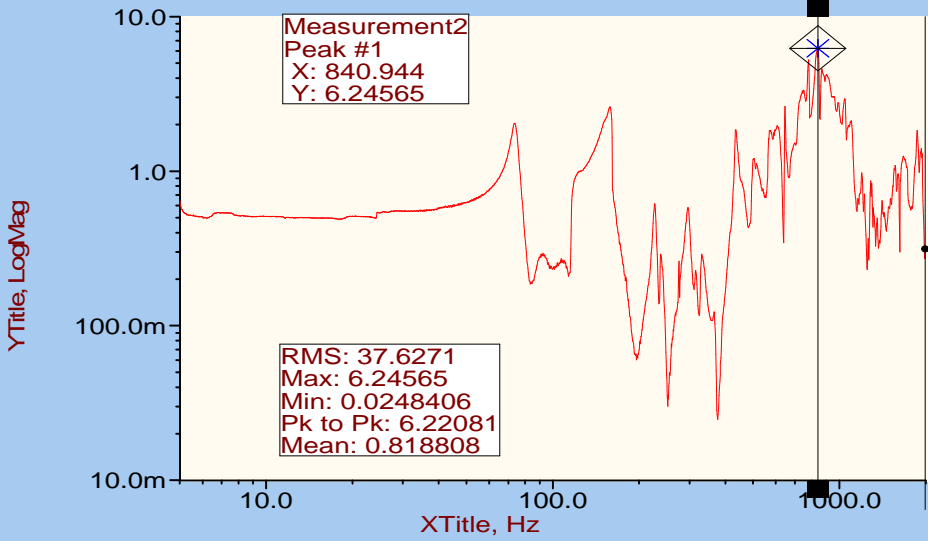
Control;AlarmLow;AlarmHigh;AbortLow;Abo



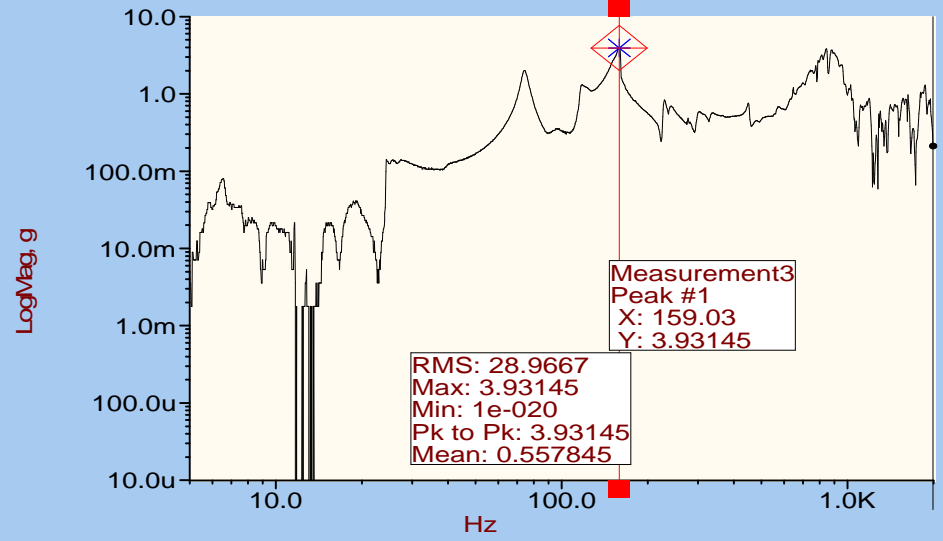
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



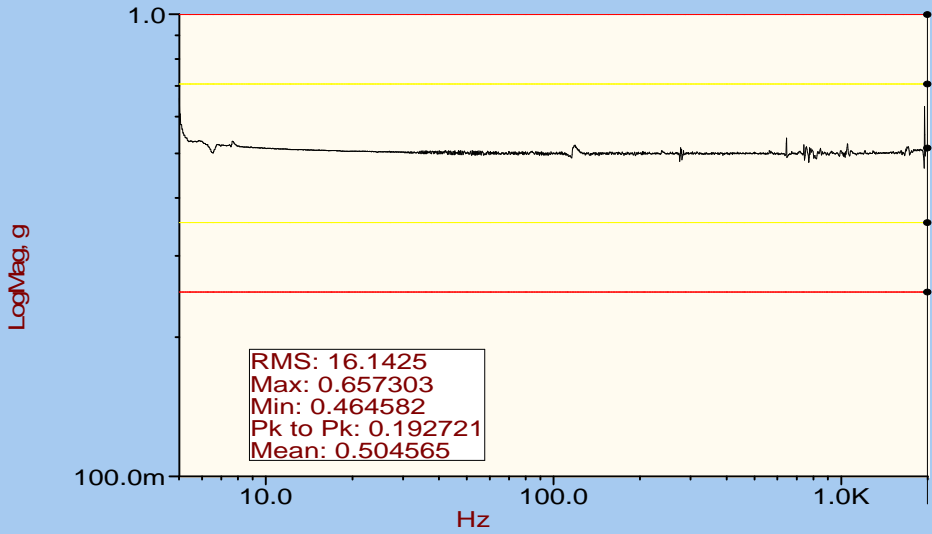
TOP CORNER RADIATOR Z AXIS



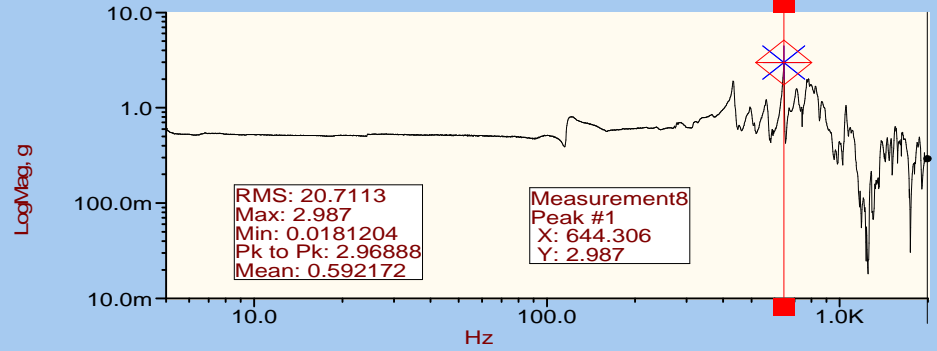
SMEI FM3 CAMERA POST RANDOM SINE SURVEY
RUN 00002
Y AXIS
14:19:44 04/01/2001

FIG 4a

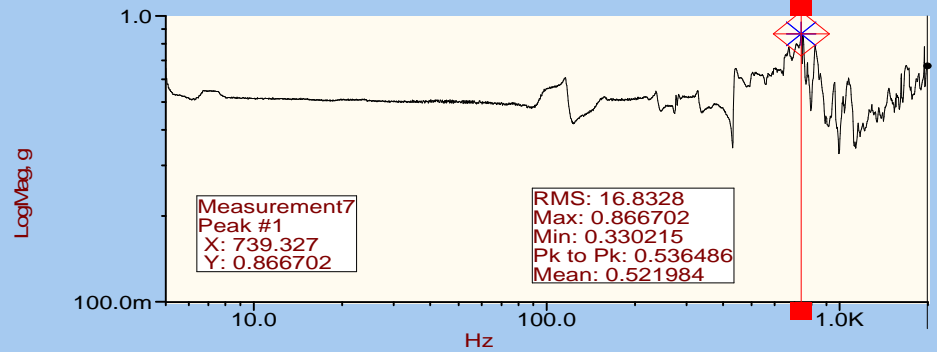
Control;AlarmLow;AlarmHigh;AbortLow;Abo



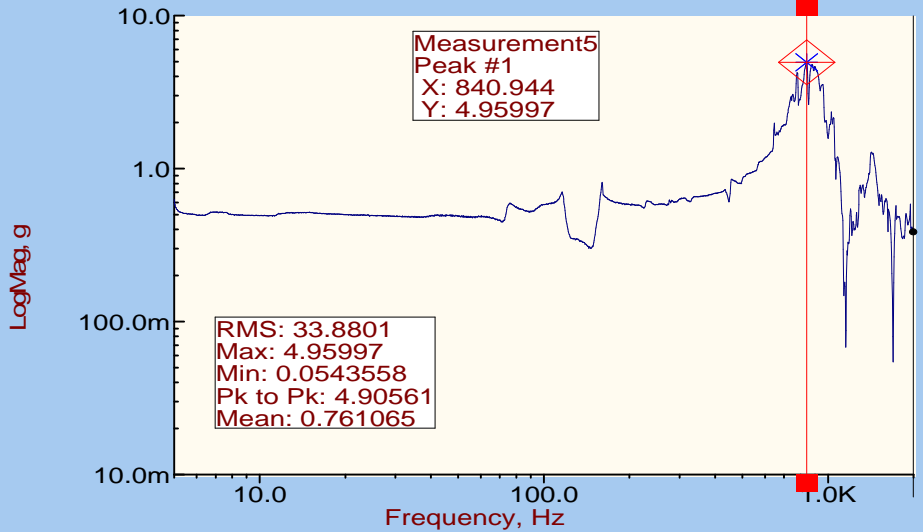
REAR TOP CORNER E BOX Y AXIS



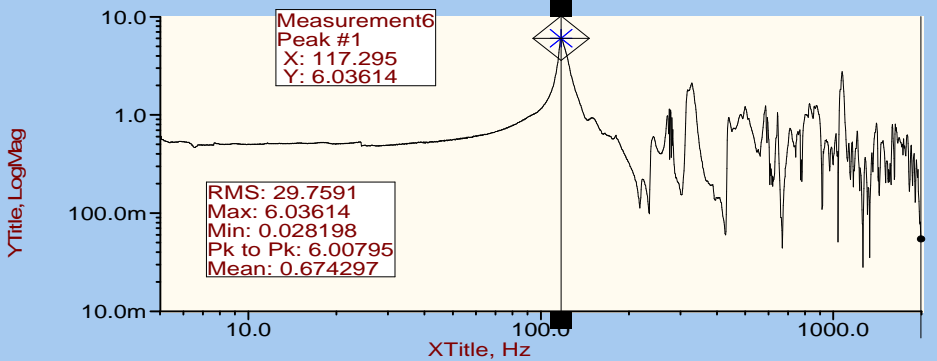
REAR END BAFFLE Y AXIS



TOP END COLD FINGER Y AXIS



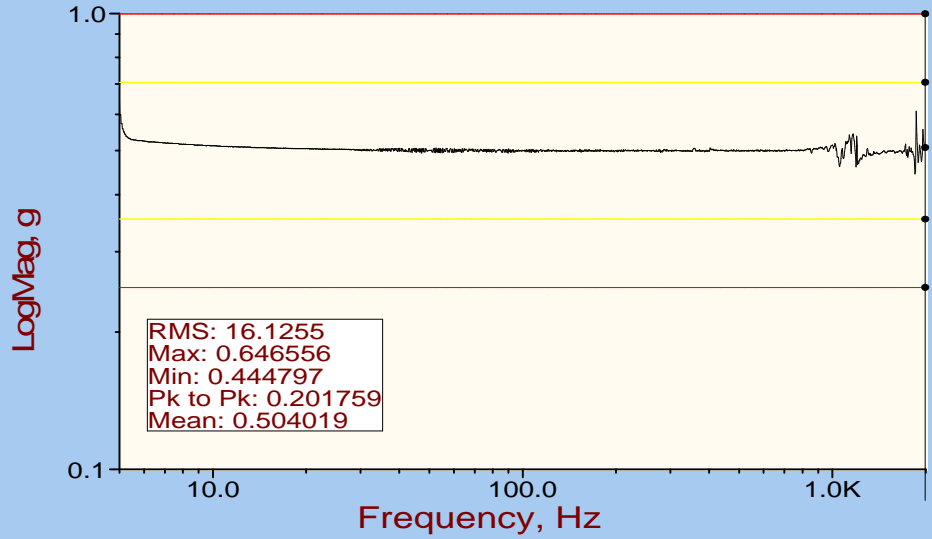
TOP CORNER BAFFLE Y AXIS



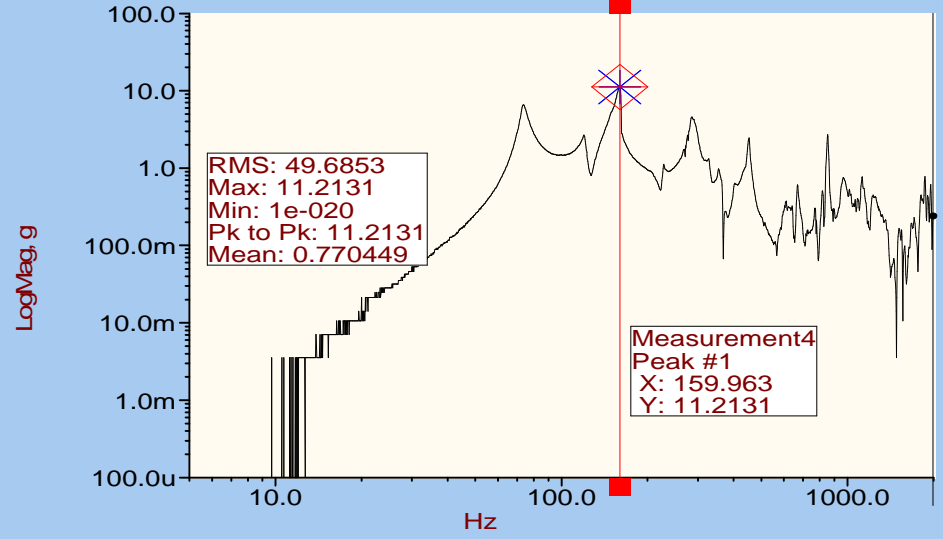
SMEI FM3 CAMERA POST RANDOM SINE SURVEY
 RUN 00002
 Y AXIS
 14:19:44 04/01/2001

FIG 4b

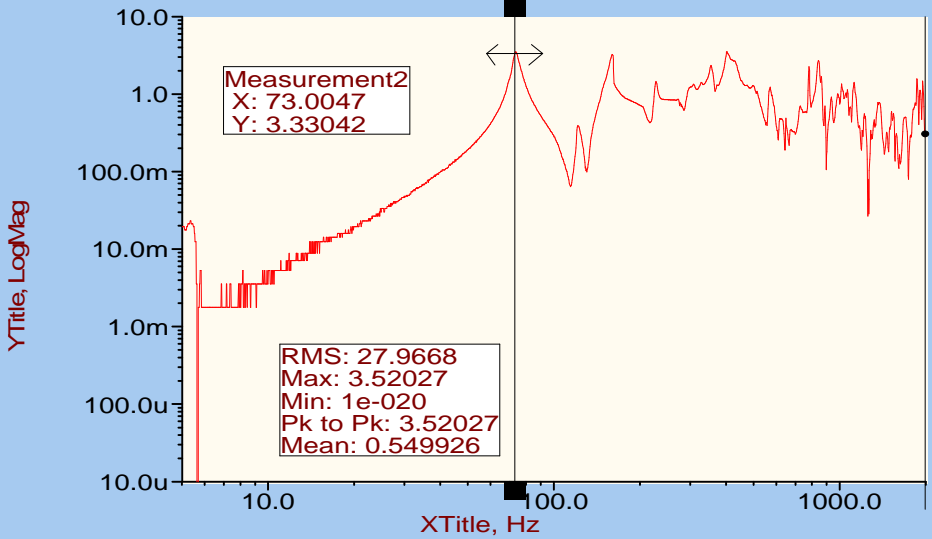
Control;AlarmLow;AlarmHigh;AbortLow;Abo



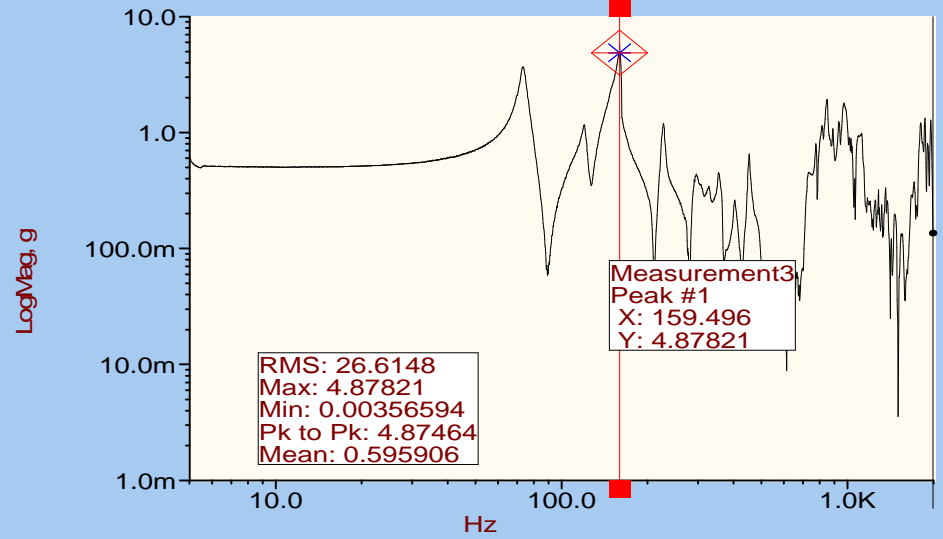
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



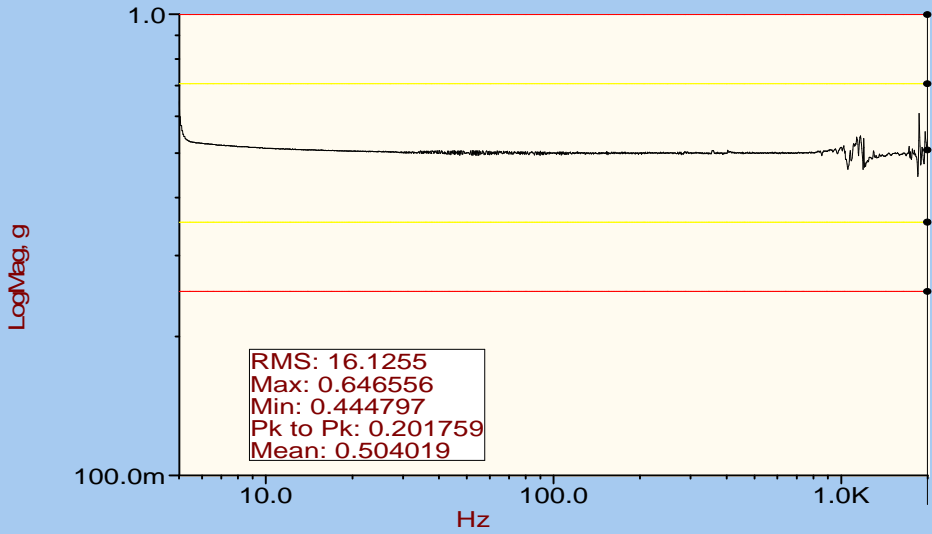
TOP CORNER RADIATOR Z AXIS



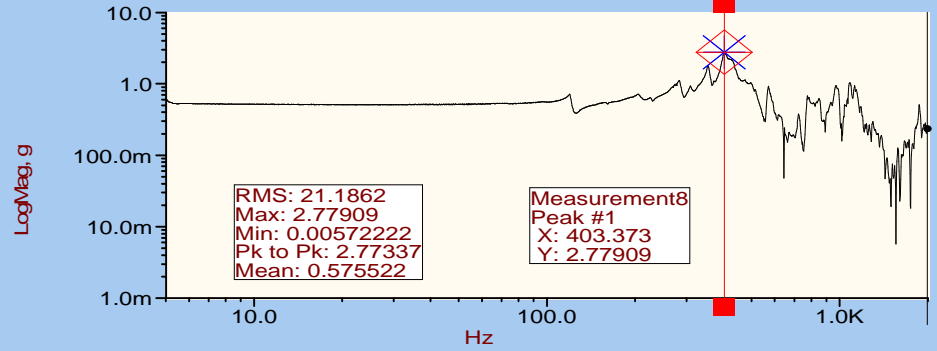
SMEI FM3 CAMERA SINE SURVEY
 RUN 00003
 Z AXIS
 15:46:46 04/01/2001

FIG 5a

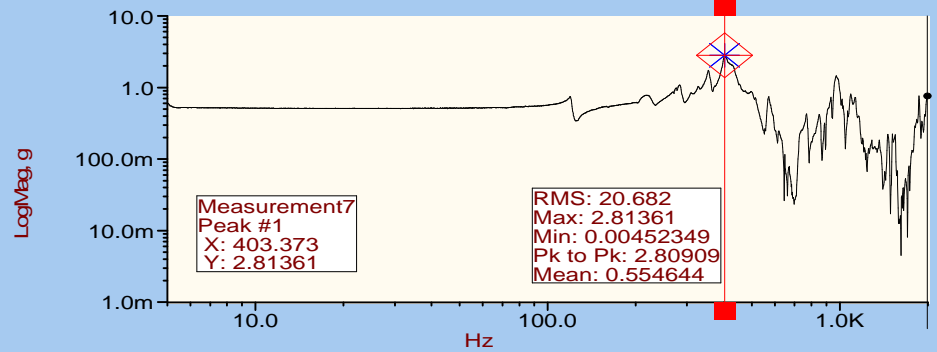
Control;AlarmLow;AlarmHigh;AbortLow;Abo



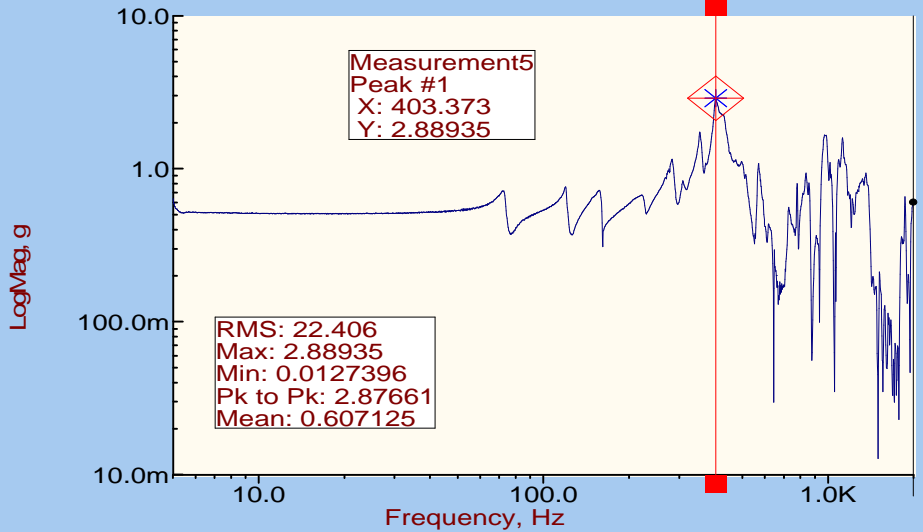
REAR TOP CORNER E BOX Z AXIS



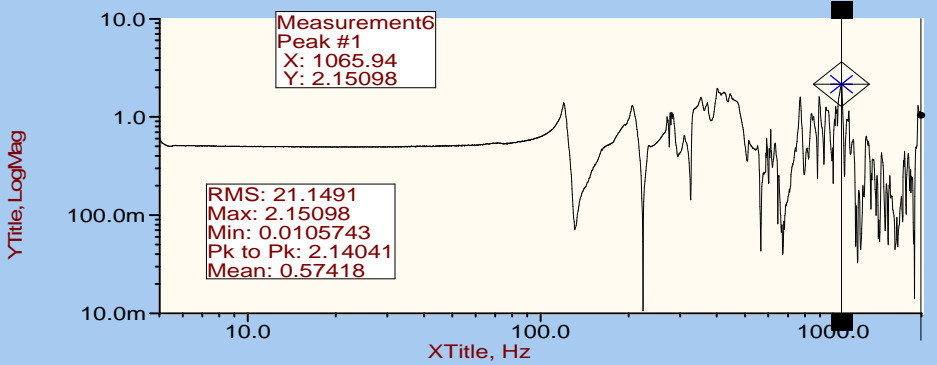
REAR END BAFFLE Z AXIS



TOP END COLD FINGER Z AXIS



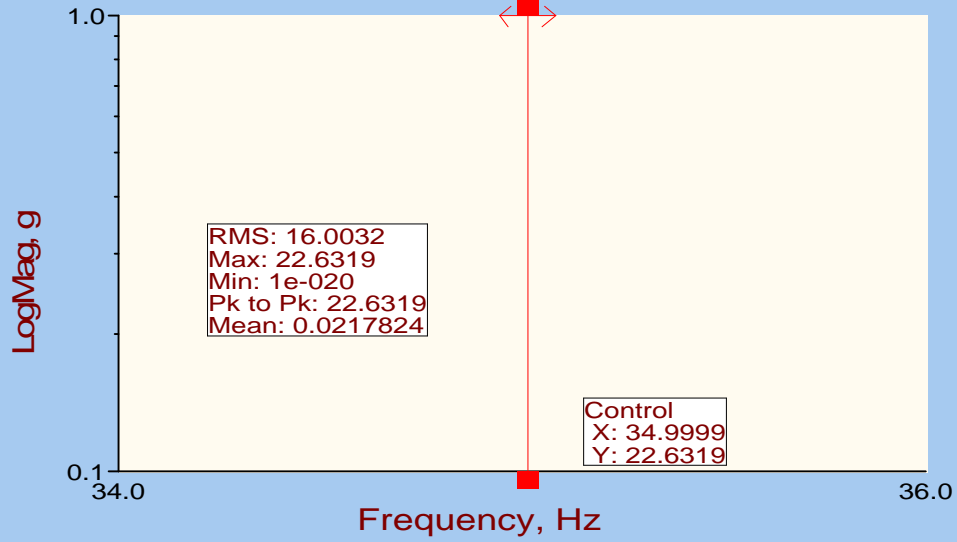
TOP CORNER BAFFLE Z AXIS



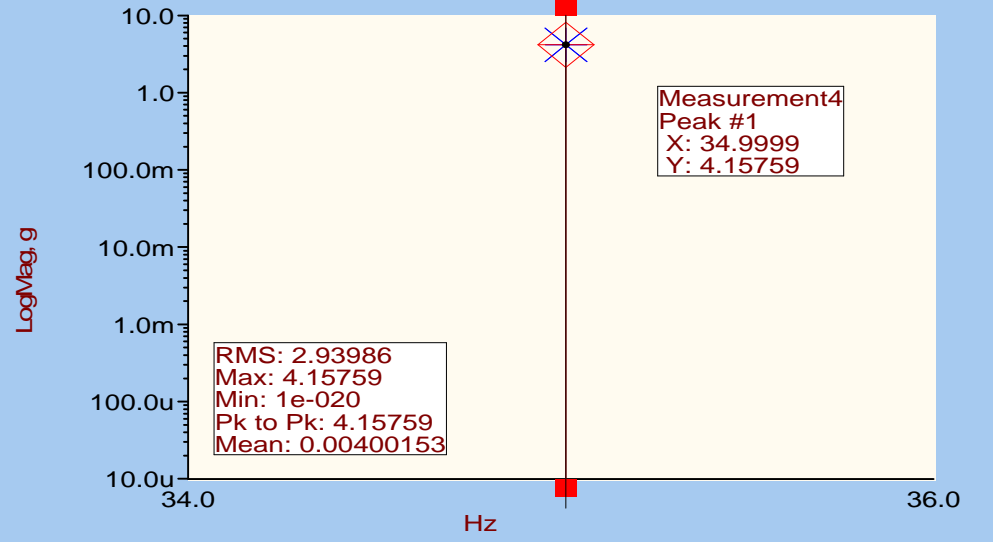
SMEI FM3 CAMERA SINE SURVEY
RUN 00003
Z AXIS
15:46:46 04/01/2001

FIG 5b

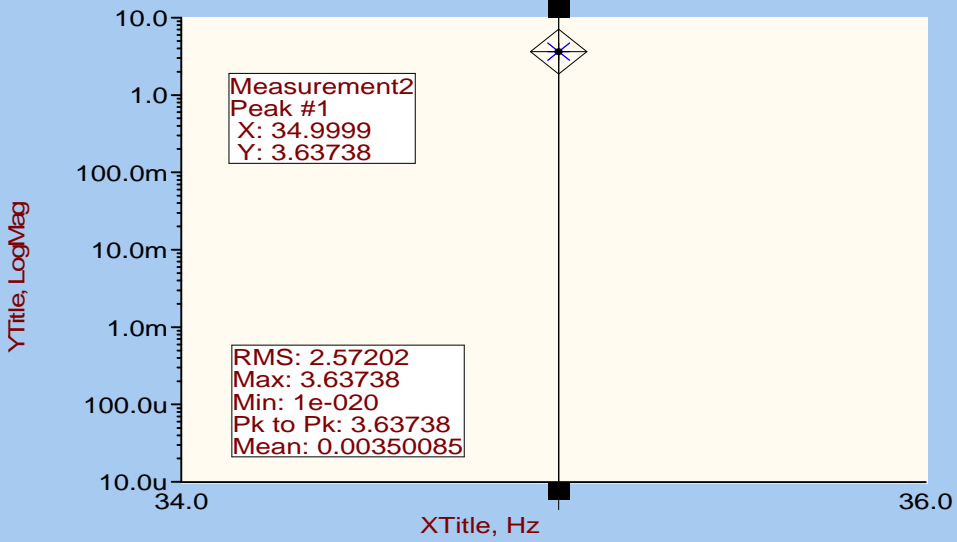
Control



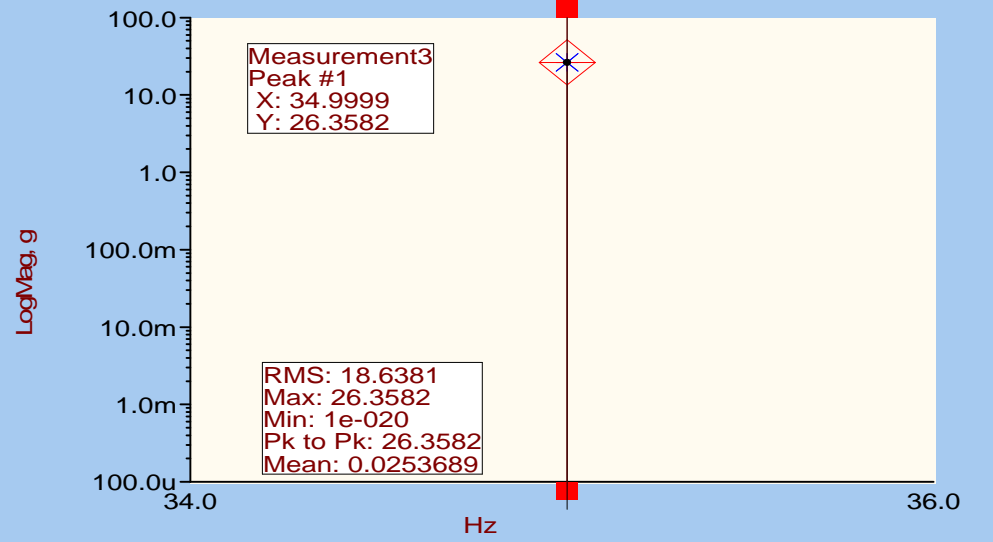
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



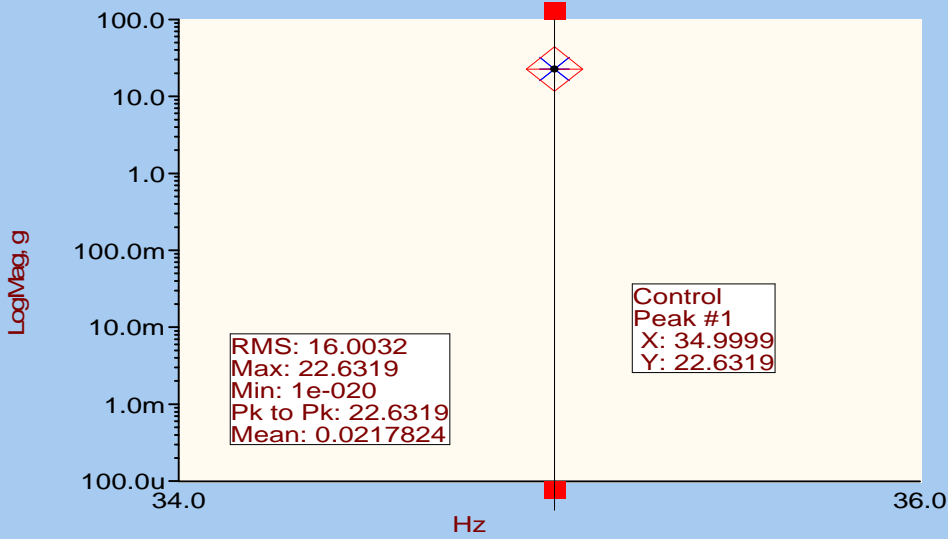
TOP CORNER RADIATOR Z AXIS



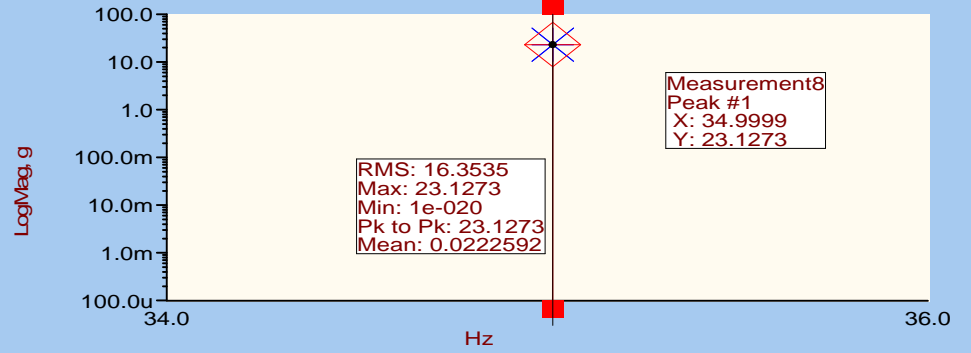
SMEI FM3 CAMERA STATIC LOAD
RUN 00002
Z AXIS
15:52:06 04/01/2001

FIG 6a

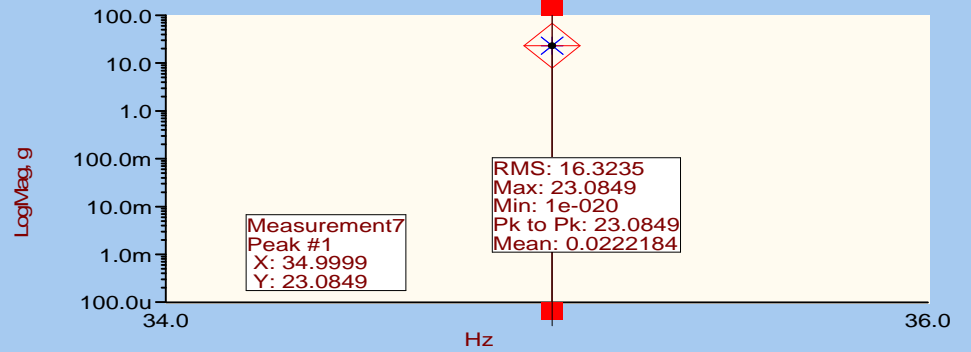
Control



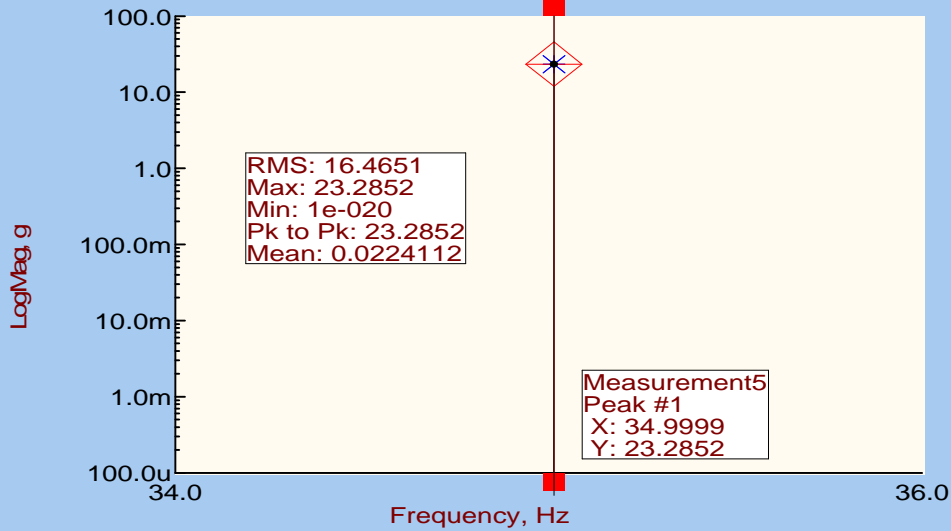
REAR TOP CORNER E BOX Z AXIS



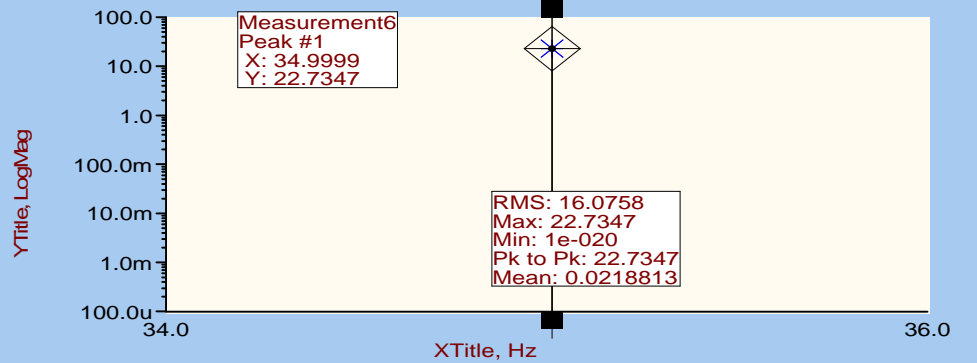
REAR END Baffle Z AXIS



TOP END COLD FINGER Z AXIS



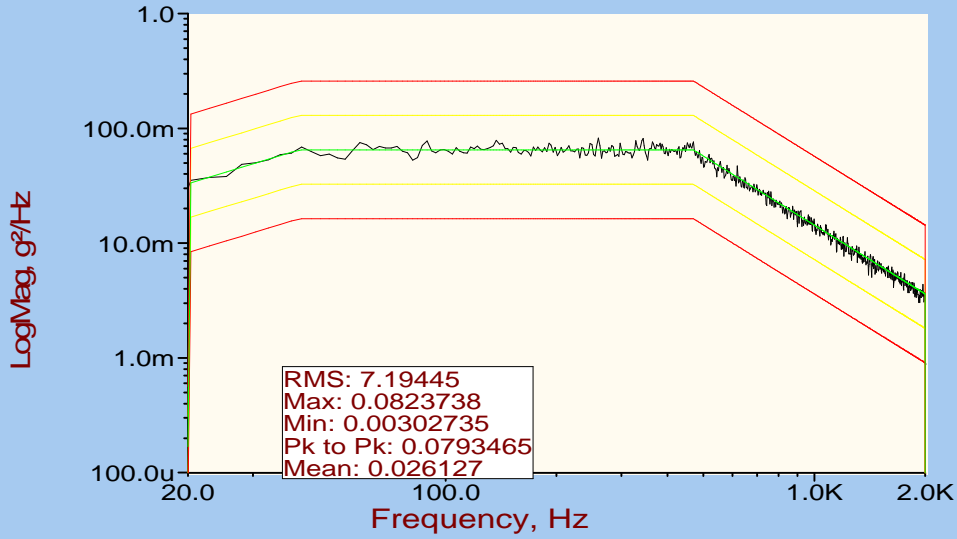
TOP CORNER Baffles Z AXIS



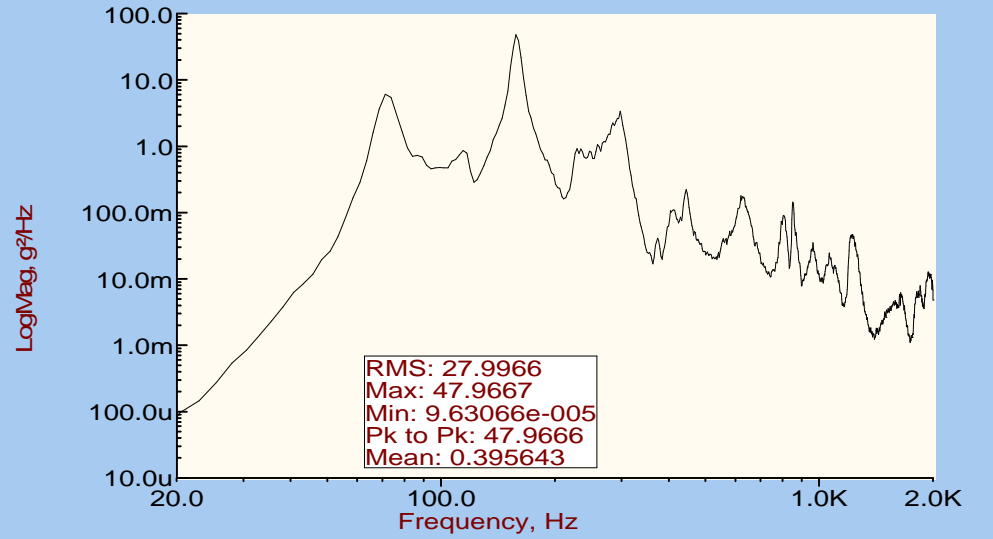
SMEI FM3 CAMERA STATIC LOAD
 RUN 00002
 Z AXIS
 15:52:06 04/01/2001

FIG 6b

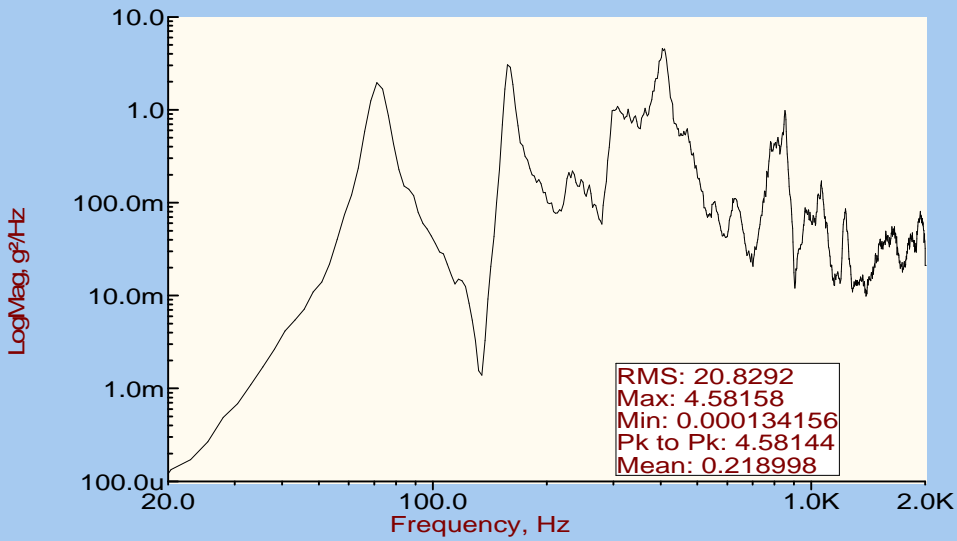
Control;AlarmLow;AlarmHigh;AbortLow;Abo



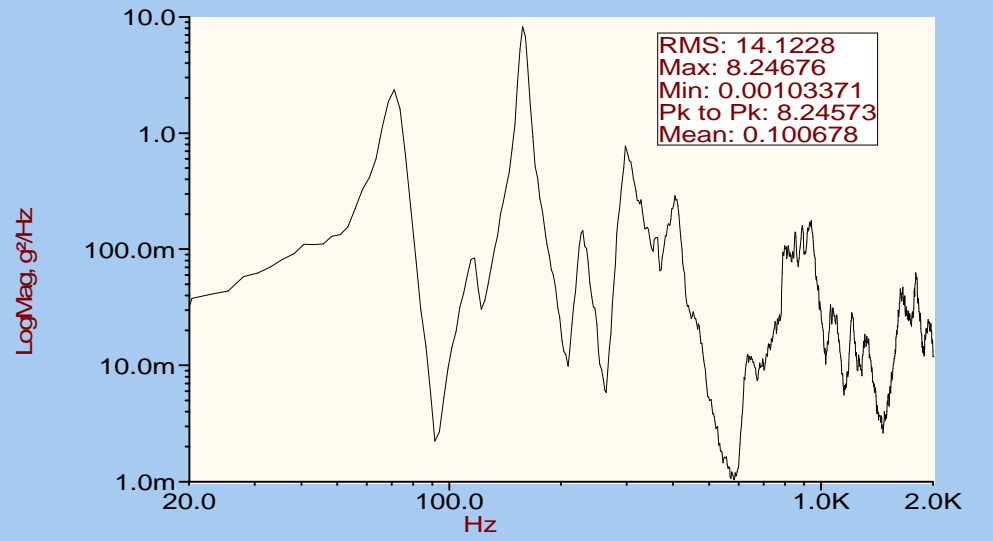
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



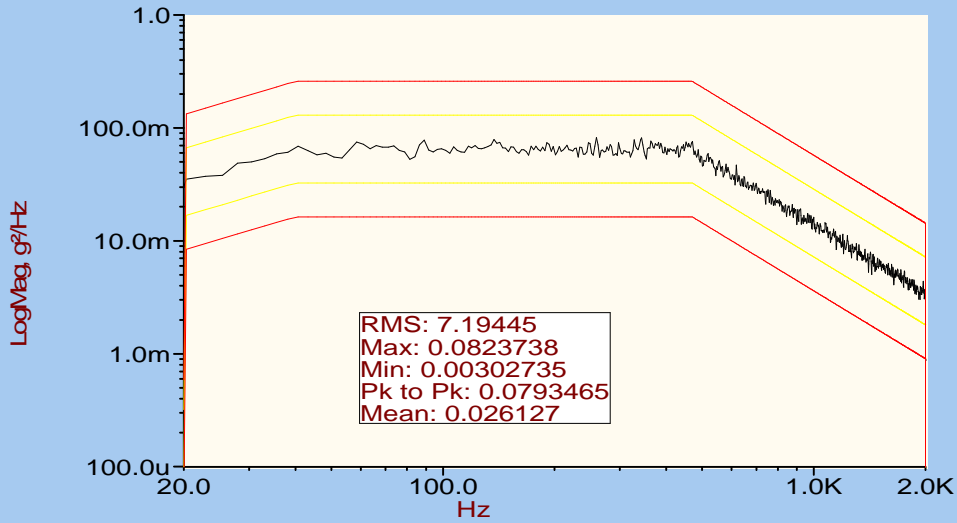
TOP CORNER RADIATOR Z AXIS



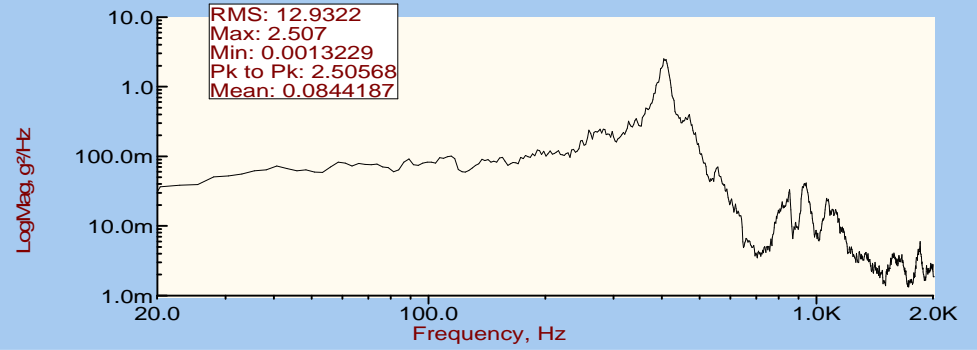
SMEI FM3 CAMERA RANDOM
RUN 00002
Z AXIS
15:54:10 04/01/2001

FIG 7a

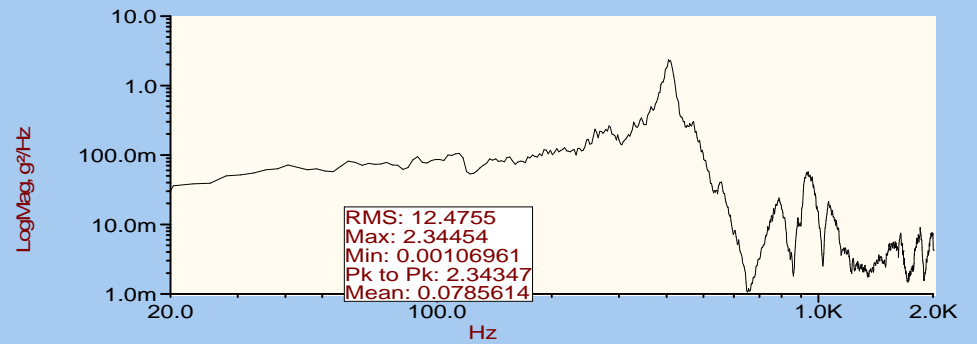
Control;AlarmLow;AlarmHigh;AbortLow;Abo



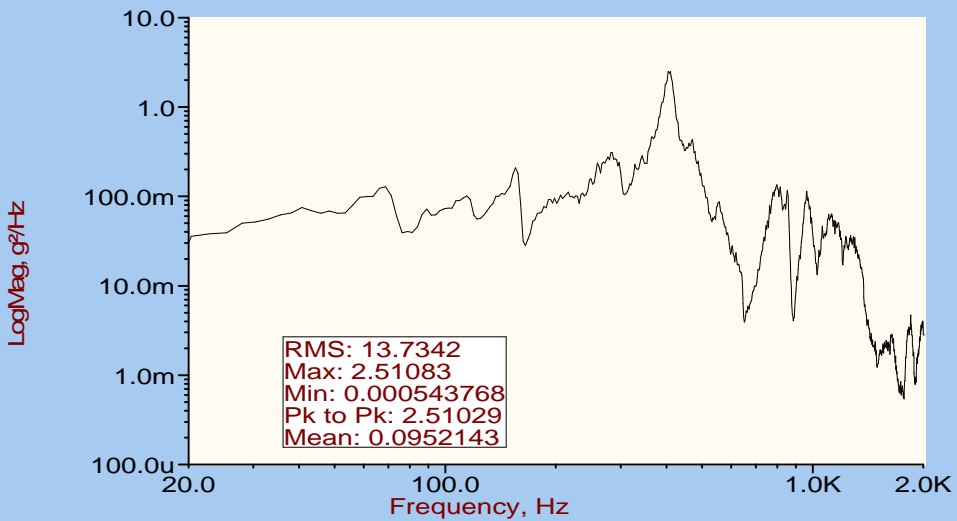
REAR TOP CORNER E BOX Z AXIS



REAR END BAFFLE Z AXIS



TOP END COLD FINGER Z AXIS



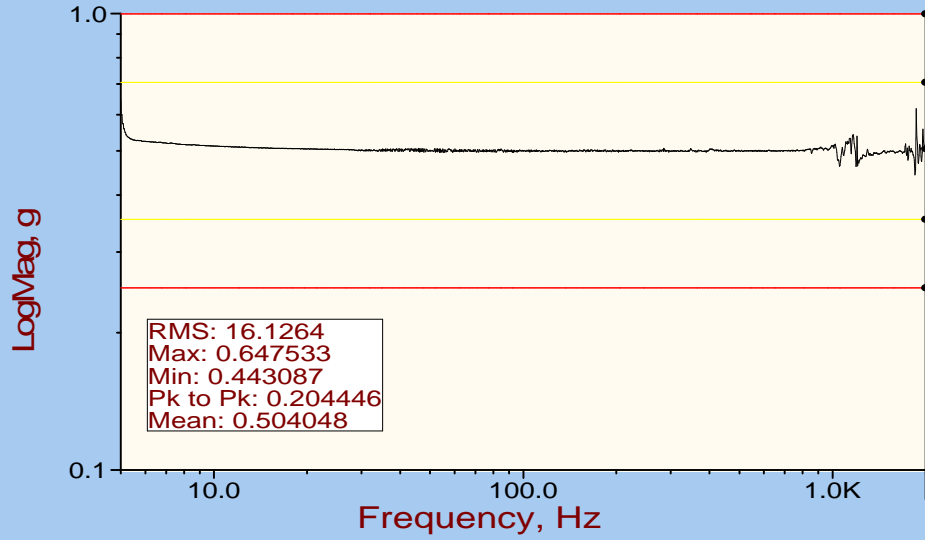
TOP CORNER BAFFLES Z AXIS



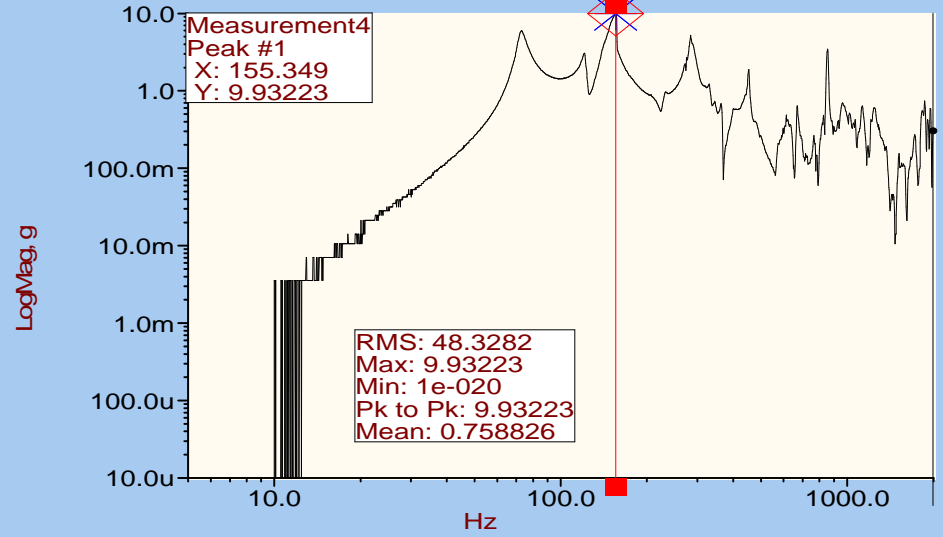
SMEI FM3 CAMERA RANDOM
RUN 00002
Z AXIS
15:54:10 04/01/2001

FIG 7b

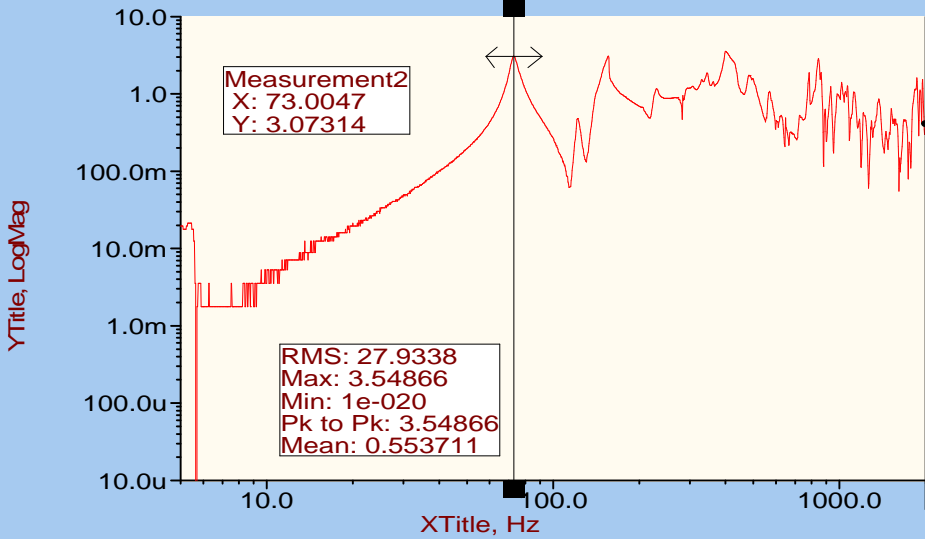
Control;AlarmLow;AlarmHigh;AbortLow;Abo



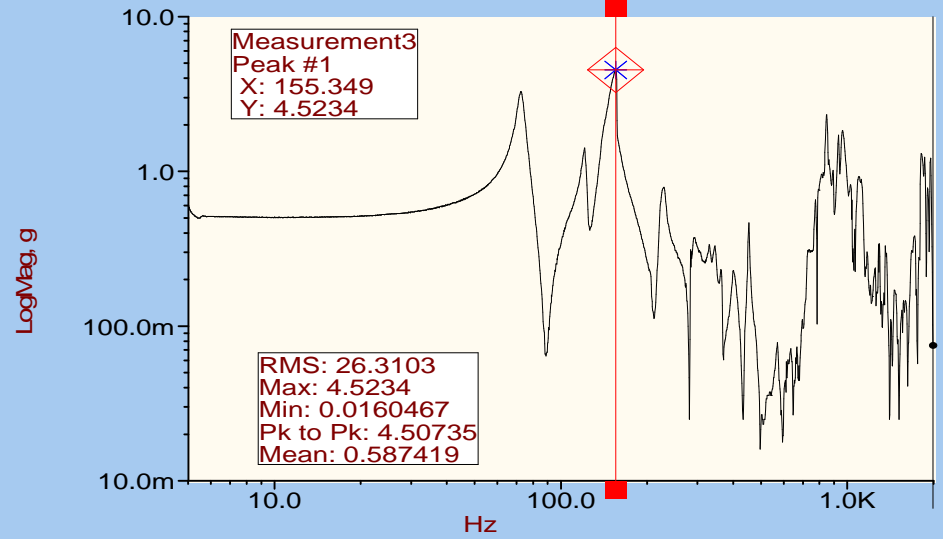
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



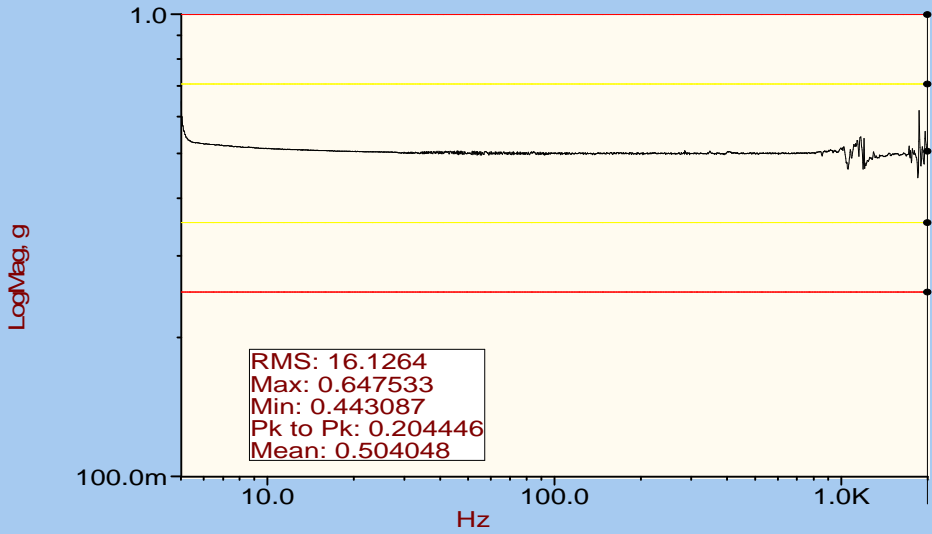
TOP CORNER RADIATOR Z AXIS



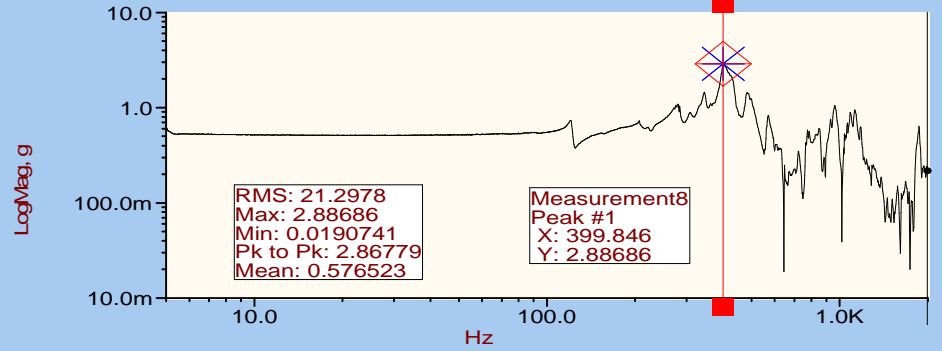
SMEI FM3 CAMERA POST RANDOM SINE SURVEY
RUN 00004
Z AXIS
16:00:25 04/01/2001

FIG 8a

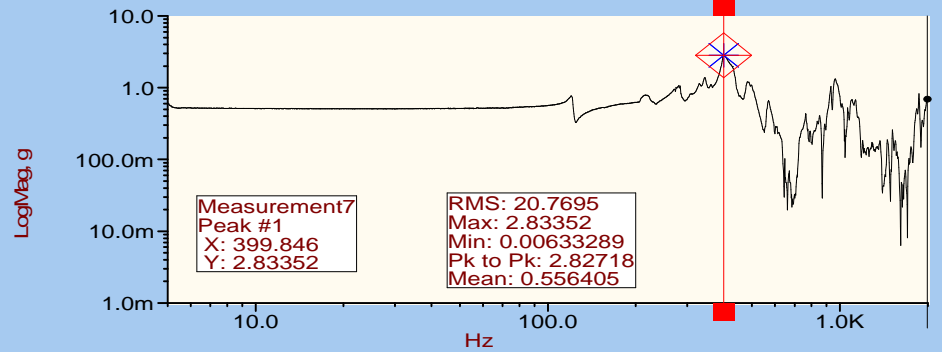
Control;AlarmLow;AlarmHigh;AbortLow;Abo



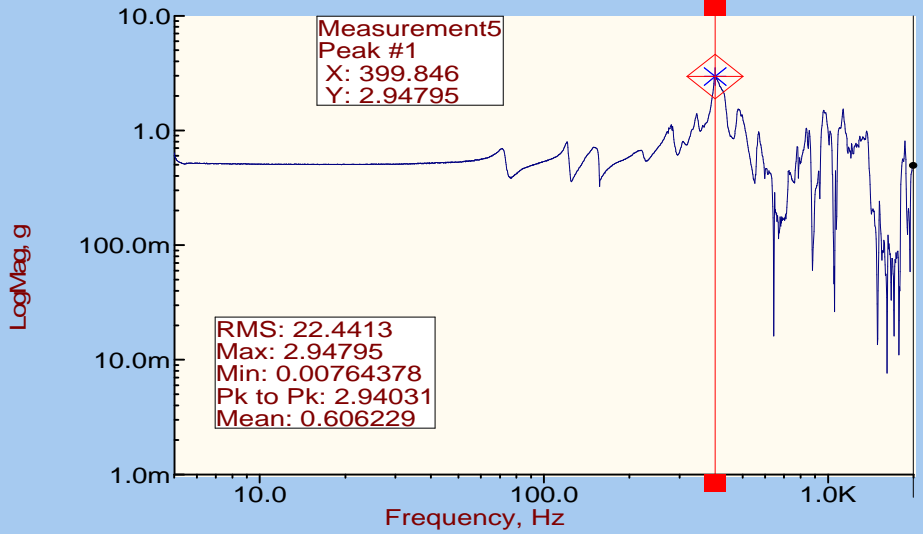
REAR TOP CORNER E BOX Z AXIS



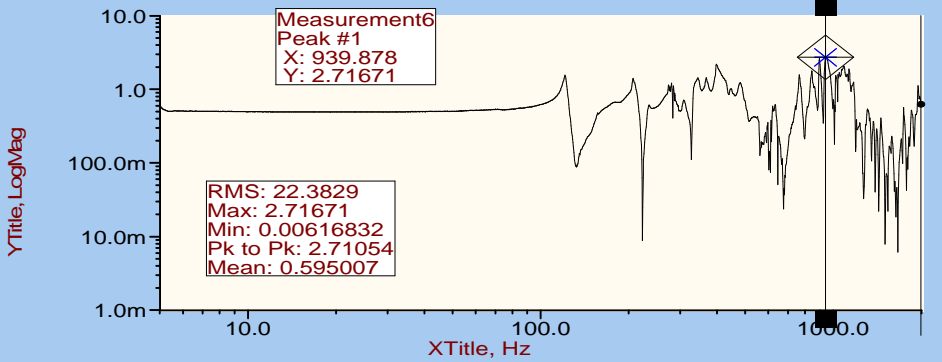
REAR END BAFFLE Z AXIS



TOP END COLD FINGER Z AXIS



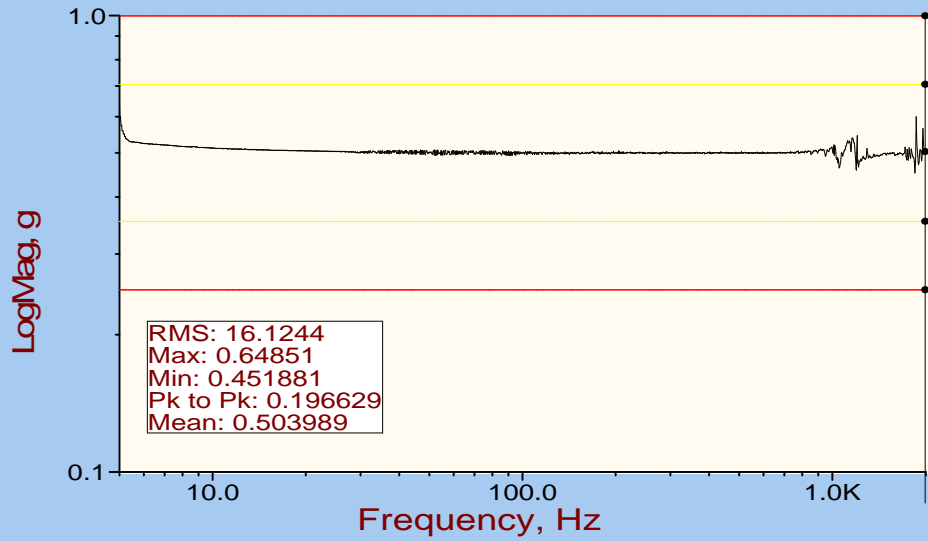
TOP CORNER BAFFLE Z AXIS



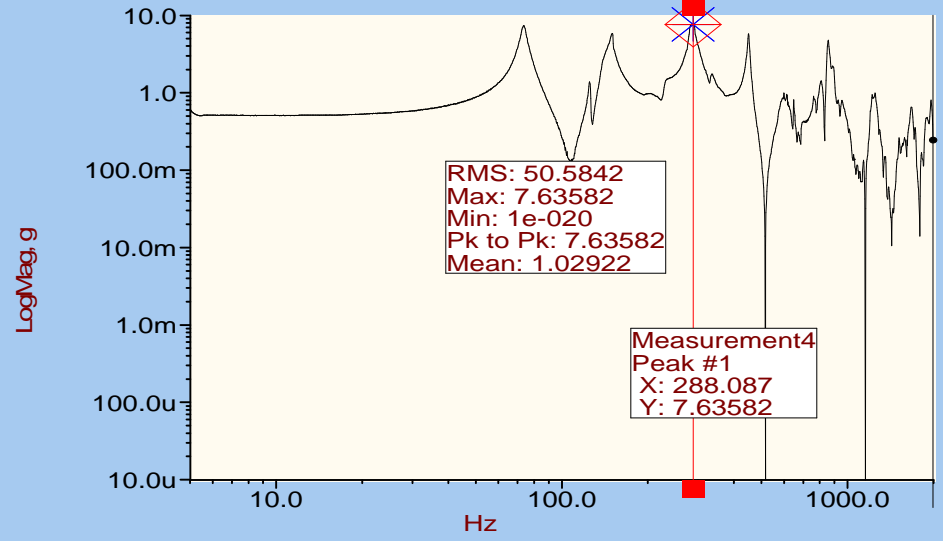
SMEI FM3 CAMERA POST RANDOM SINE SURVEY
 RUN 00004
 Z AXIS
 16:00:25 04/01/2001

FIG 8b

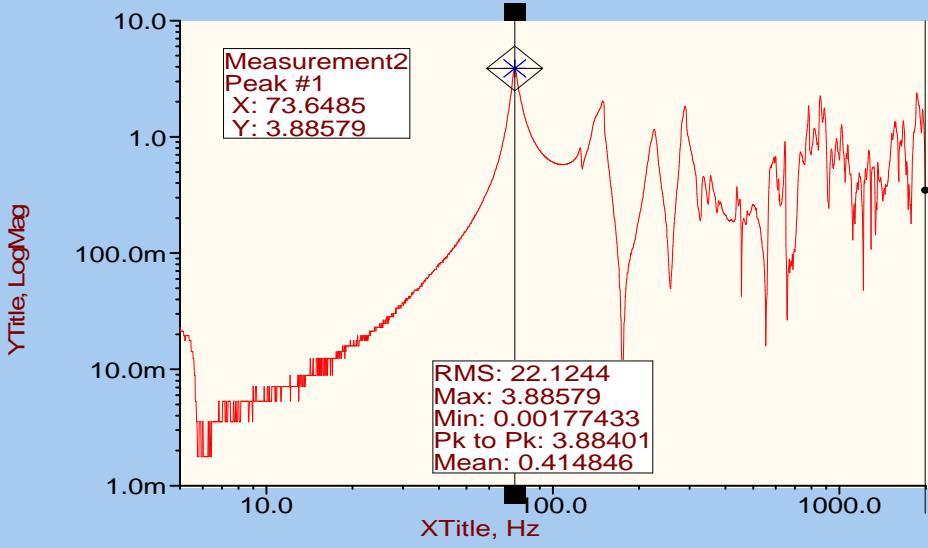
Control;AlarmLow;AlarmHigh;AbortLow;Abo



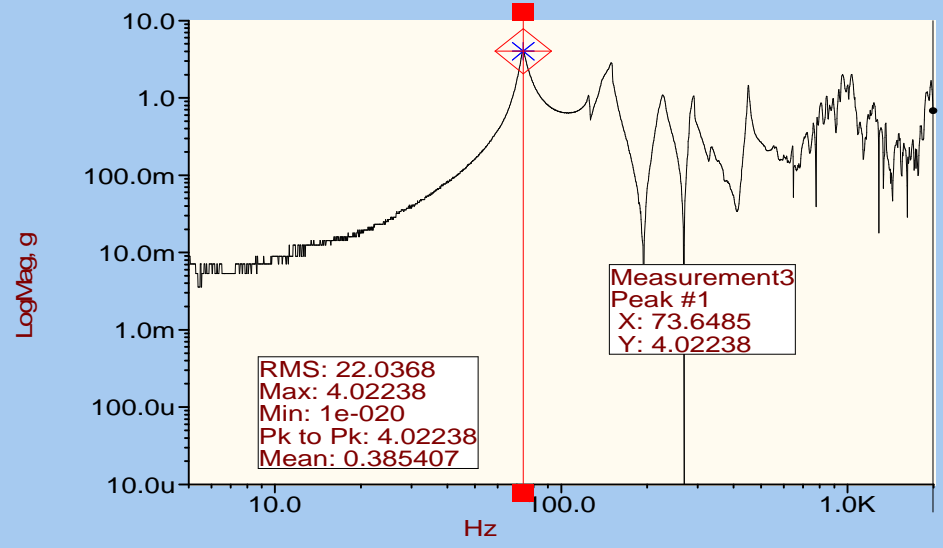
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



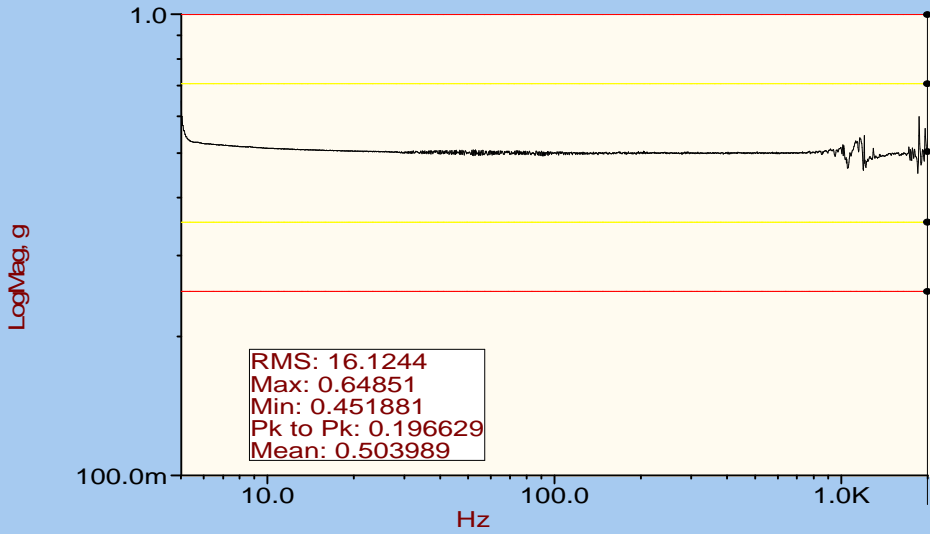
TOP CORNER RADIATOR Z AXIS



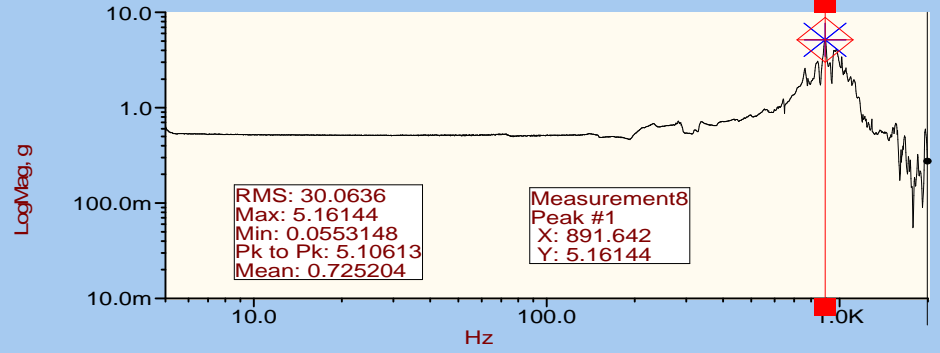
SMEI FM3 CAMERA SINE SURVEY
 RUN 00005
 X AXIS
 11:22:36 05/01/2001

FIG 9a

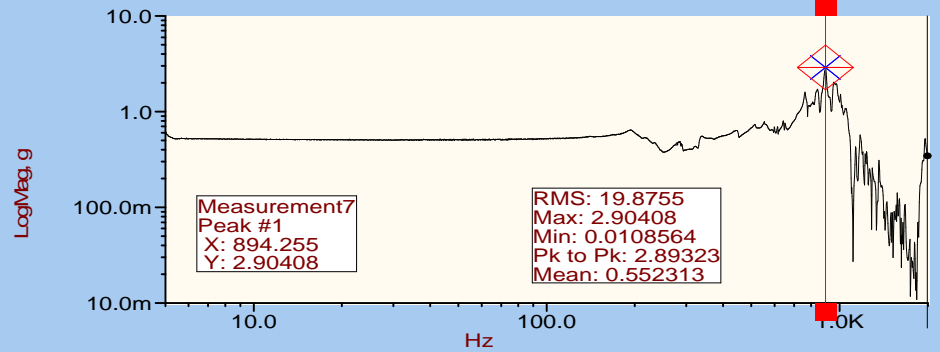
Control;AlarmLow;AlarmHigh;AbortLow;Abo



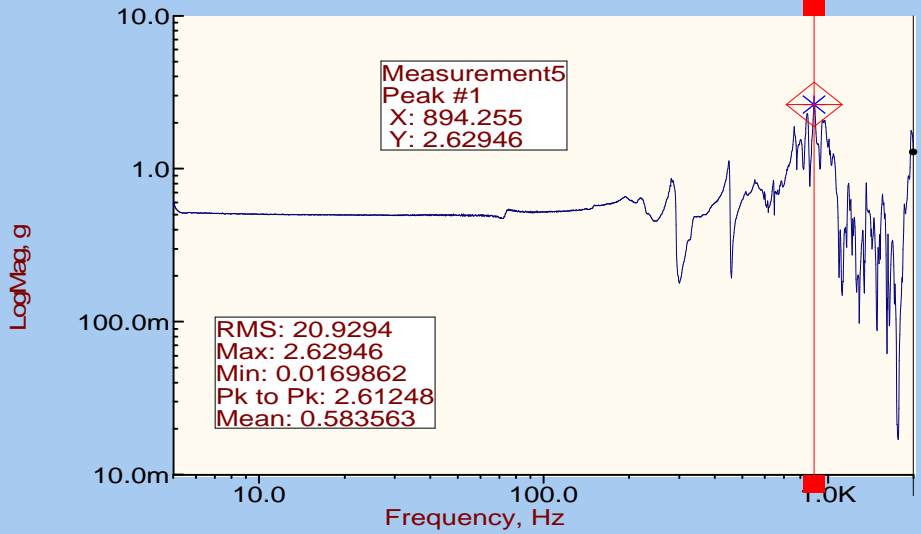
REAR TOP CORNER E BOX X AXIS



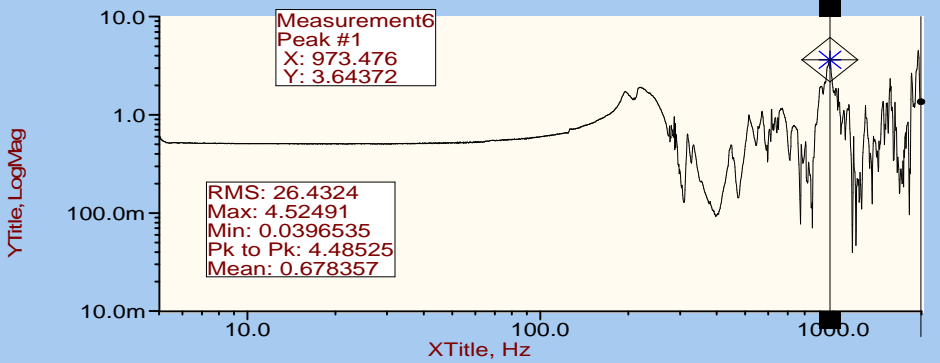
REAR END BAFFLE X AXIS



TOP END COLD FINGER X AXIS



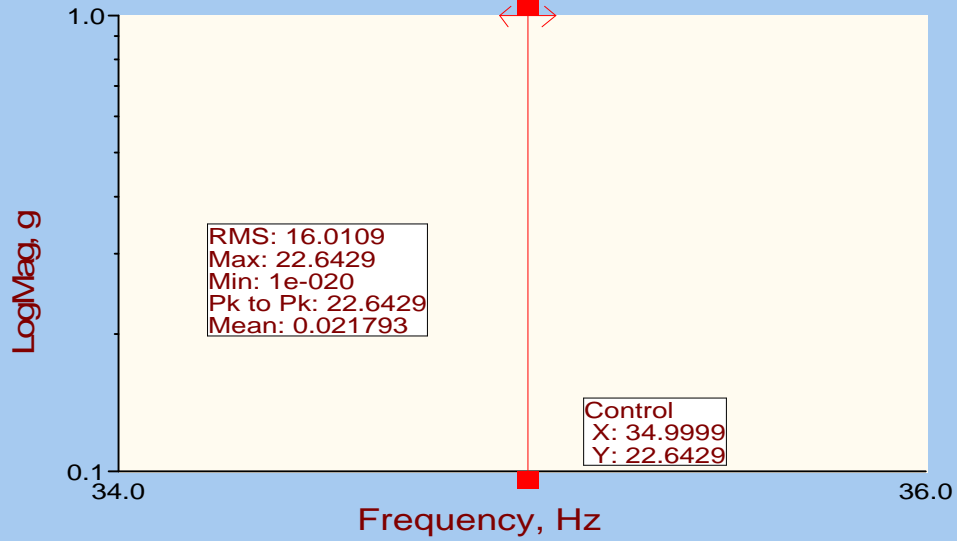
TOP CORNER BAFFLE X AXIS



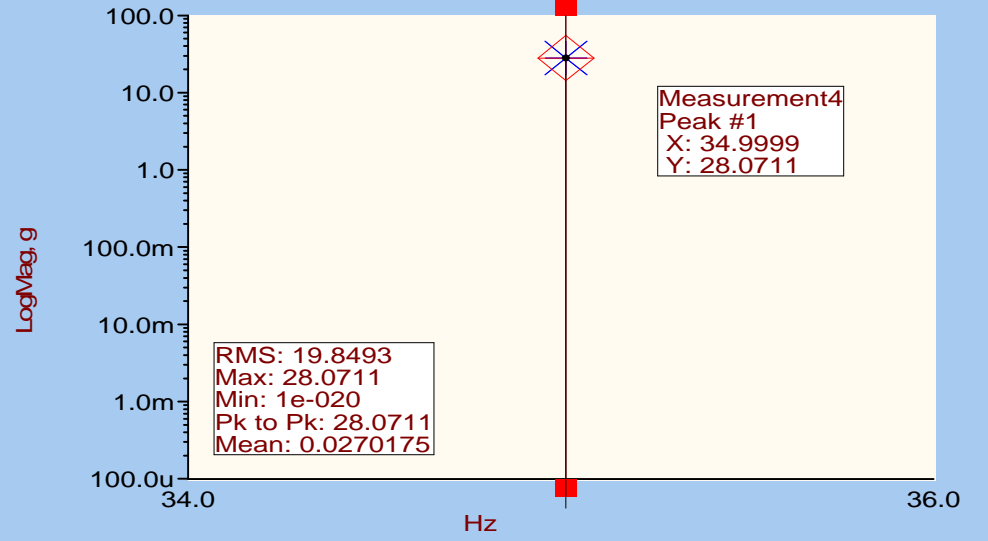
SMEI FM3 CAMERA SINE SURVEY
RUN 00005
X AXIS
11:22:36 05/01/2001

FIG 9b

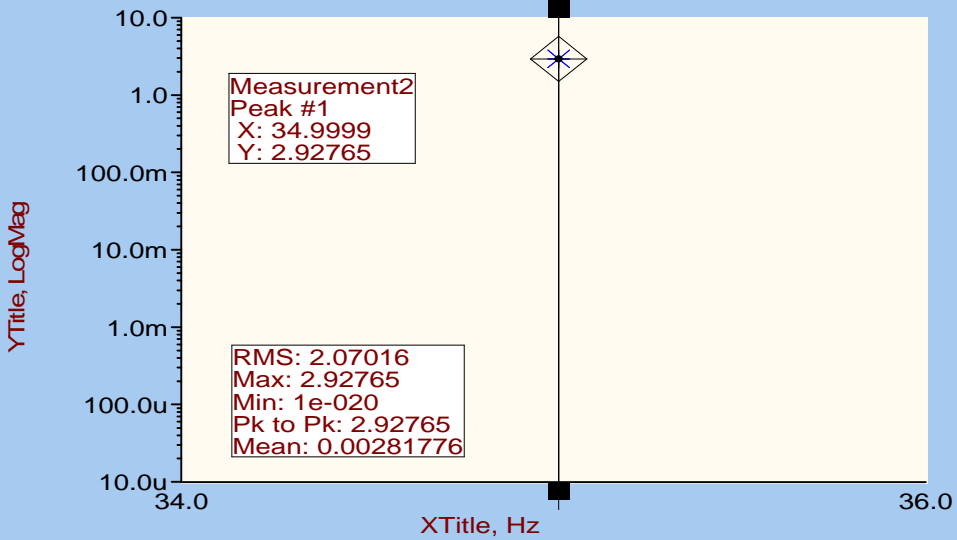
Control



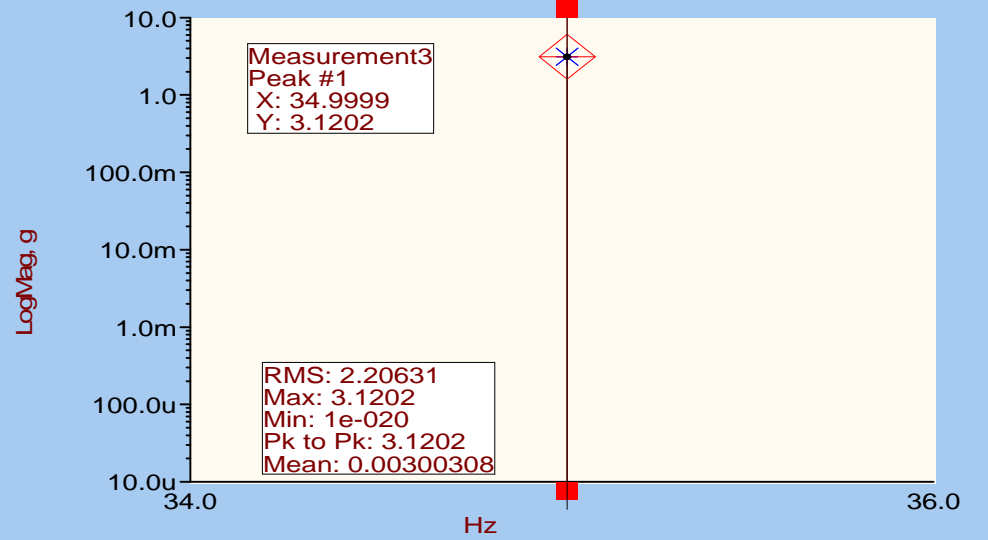
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



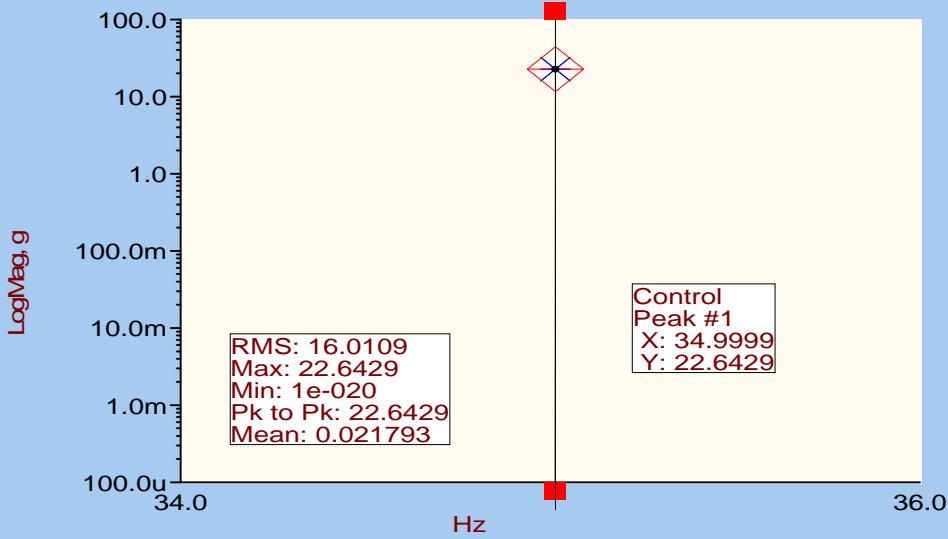
TOP CORNER RADIATOR Z AXIS



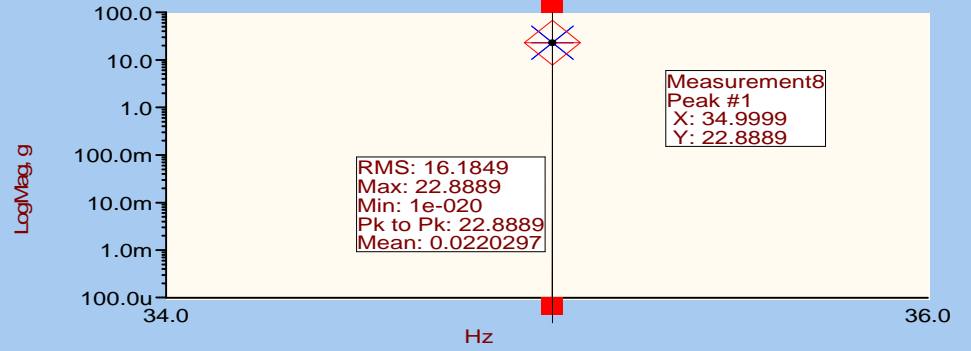
SMEI FM3 CAMERA STATIC LOAD
RUN 00003
X AXIS
11:27:40 05/01/2001

FIG 10a

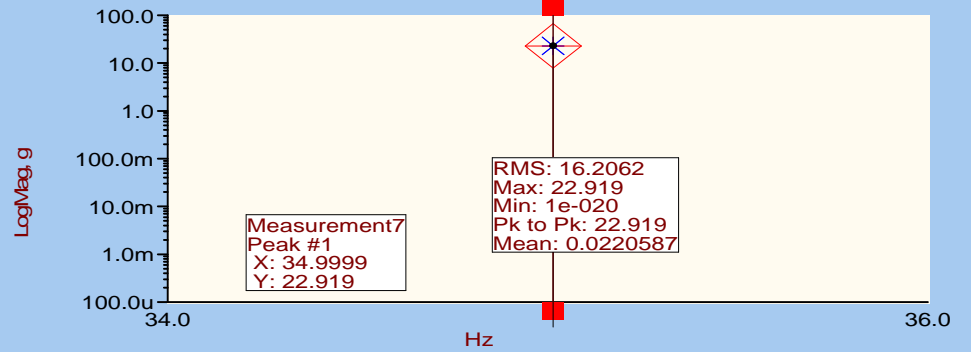
Control



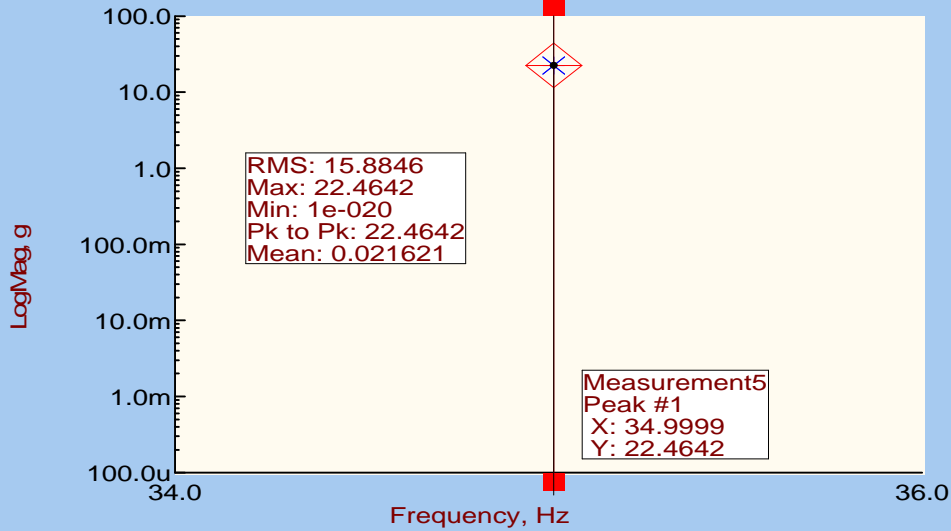
REAR TOP CORNER E BOX X AXIS



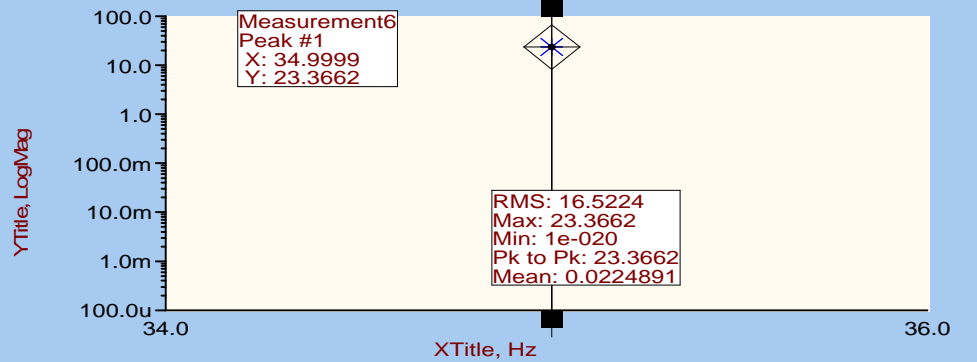
REAR END Baffle X AXIS



TOP END COLD FINGER X AXIS



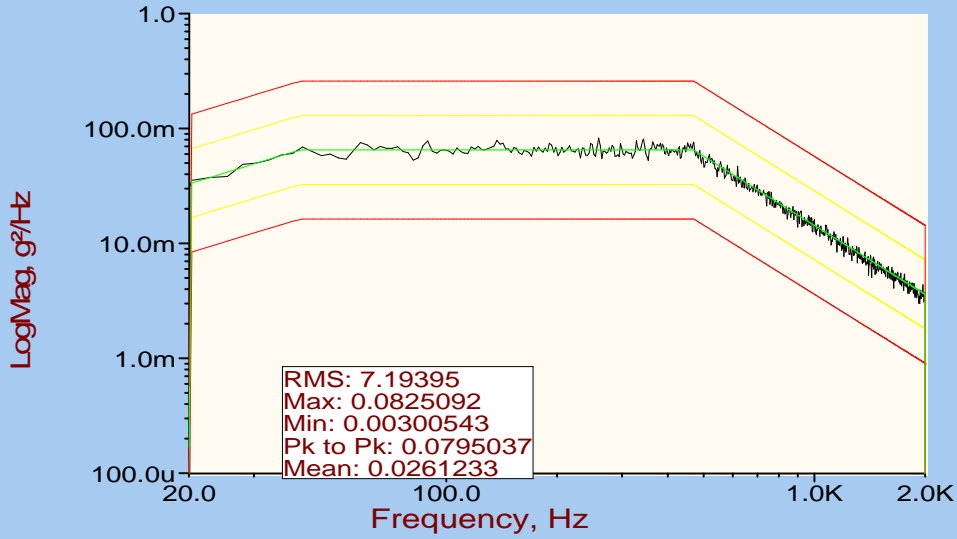
TOP CORNER Baffles X AXIS



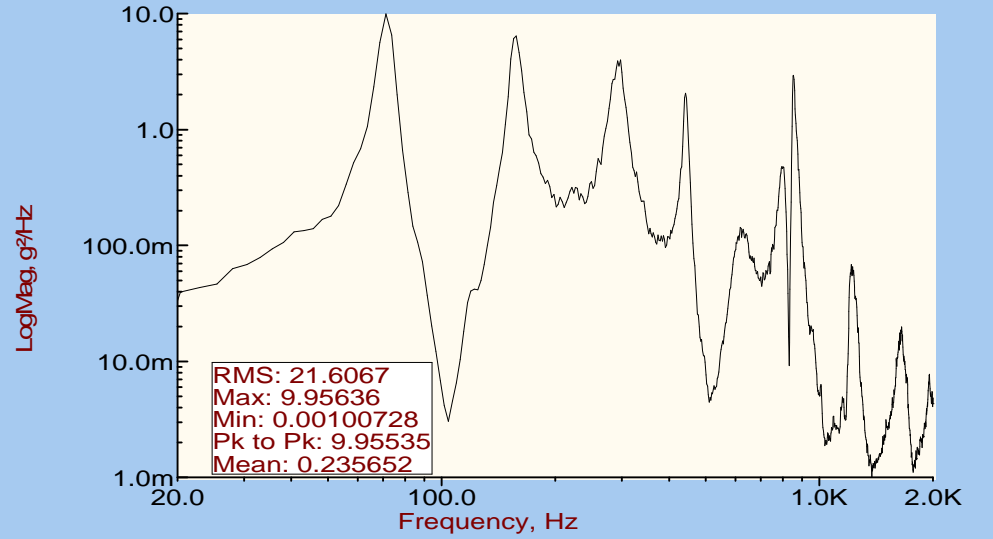
SMEI FM3 CAMERA STATIC LOAD
RUN 00003
X AXIS
11:27:40 05/01/2001

FIG10b

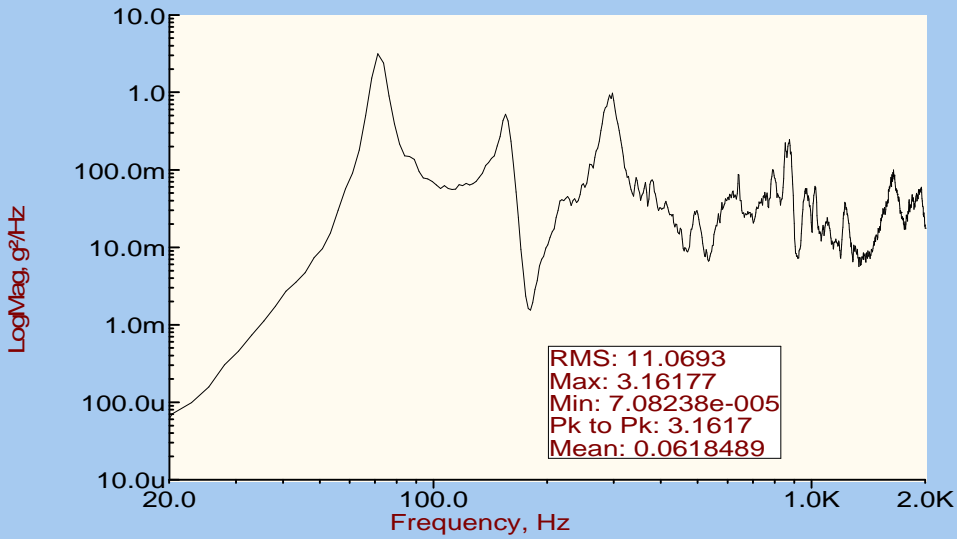
Control;AlarmLow;AlarmHigh;AbortLow;Abo



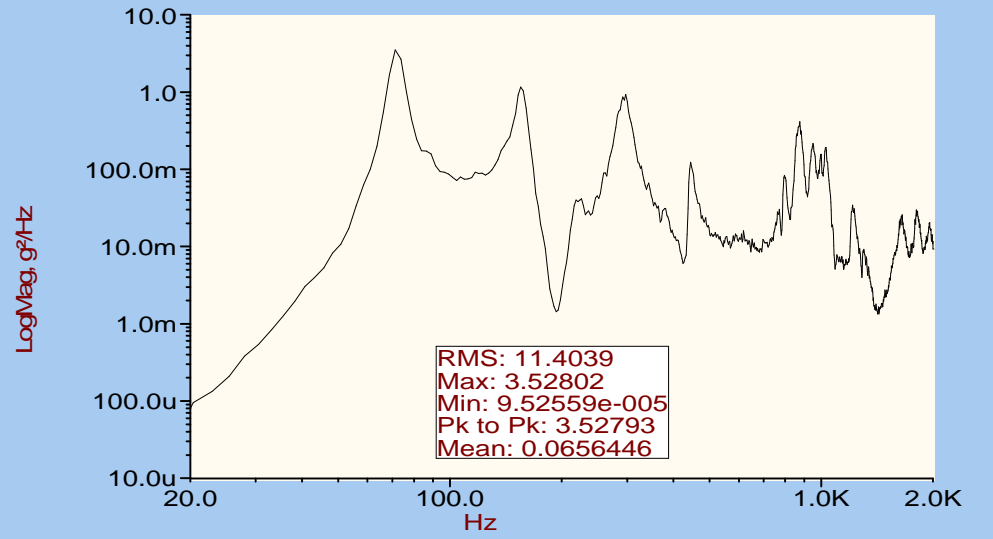
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



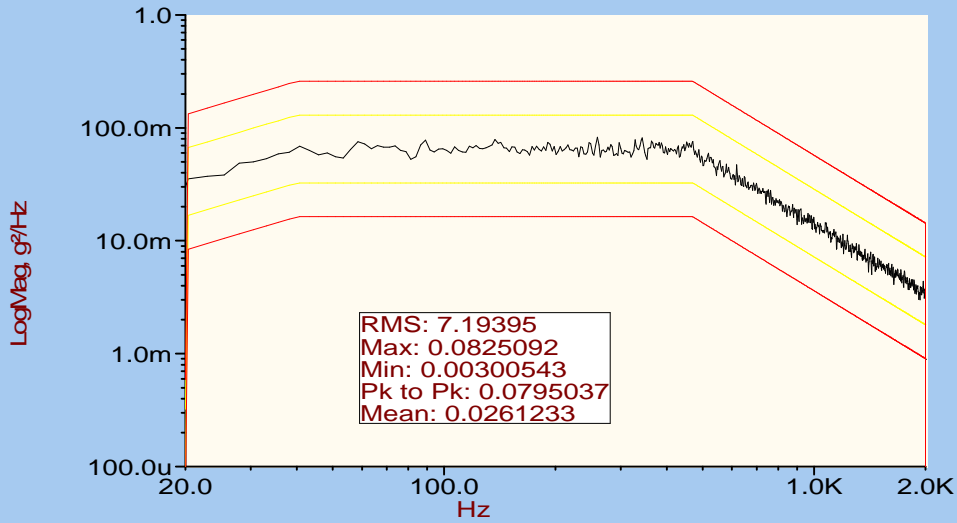
TOP CORNER RADIATOR Z AXIS



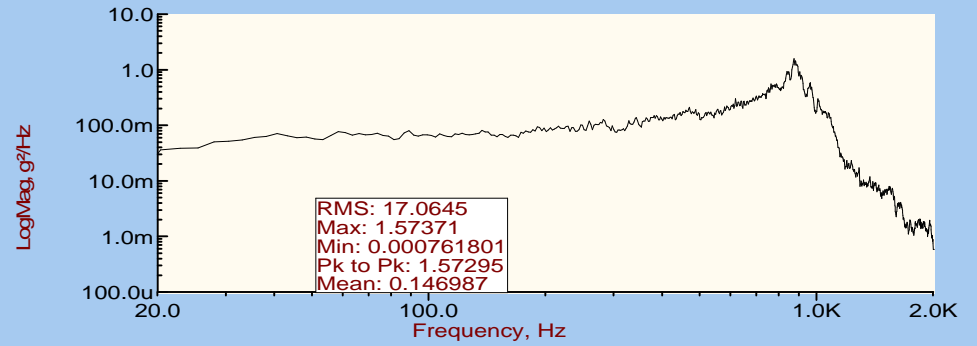
SMEI FM3 CAMERA RANDOM
RUN 00003
X AXIS
11:28:50 05/01/2001

FIG 11a

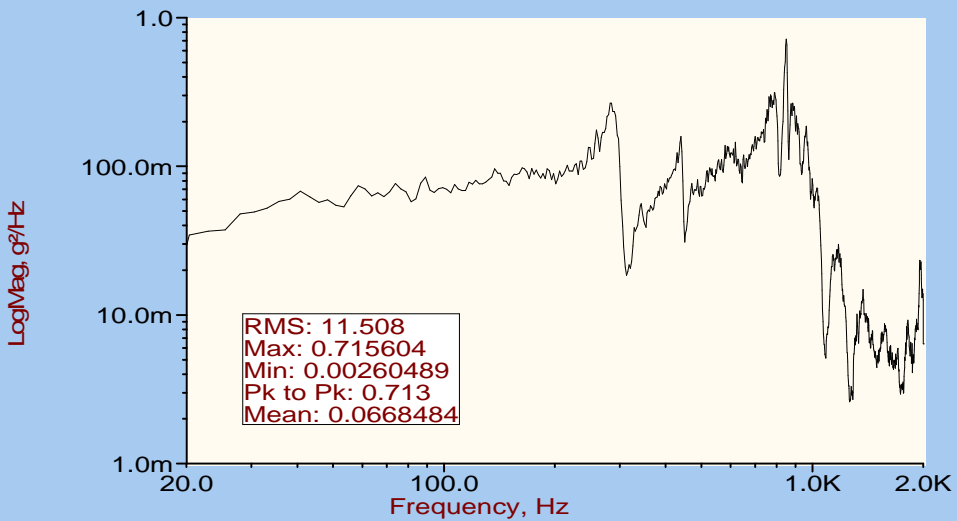
Control;AlarmLow;AlarmHigh;AbortLow;Abo



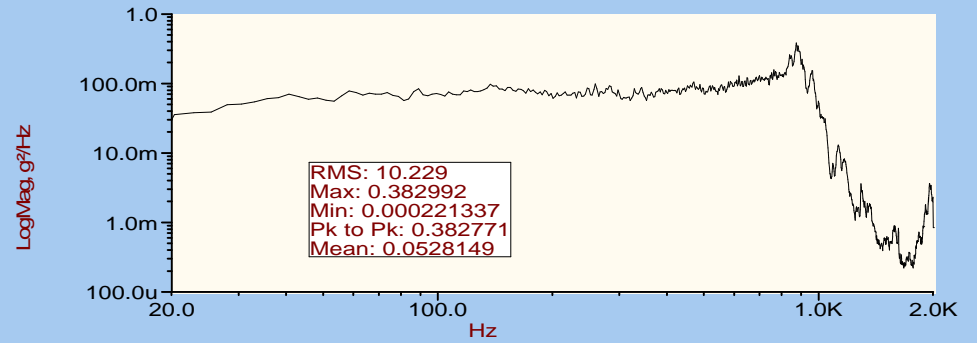
REAR TOP CORNER E BOX X AXIS



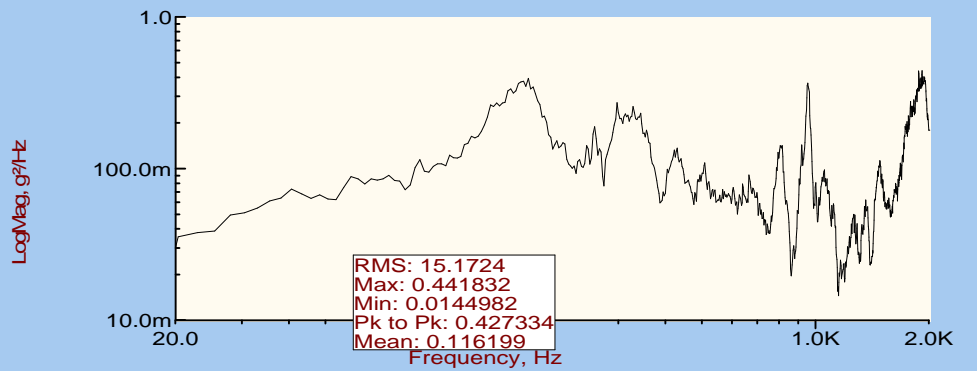
TOP END COLD FINGER X AXIS



REAR END BAFFLE X AXIS



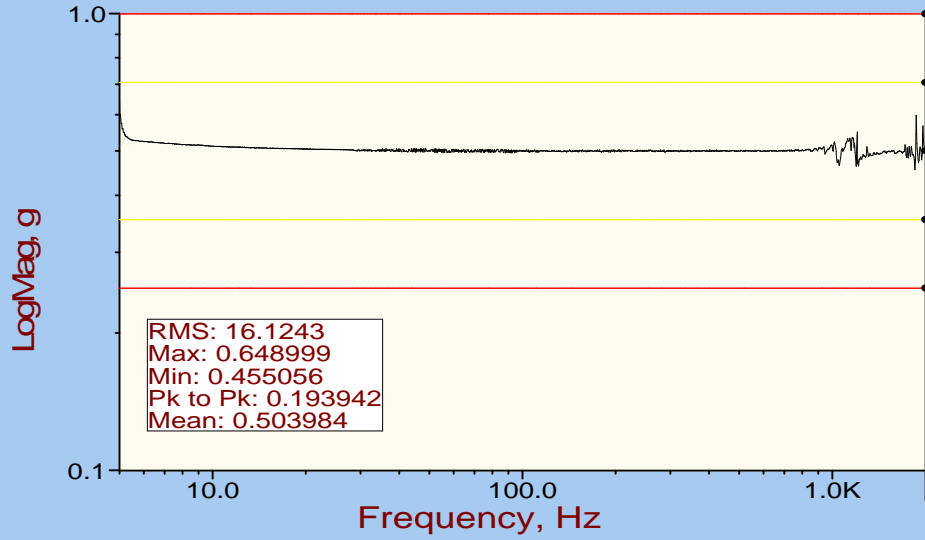
TOP CORNER BAFFLES X AXIS



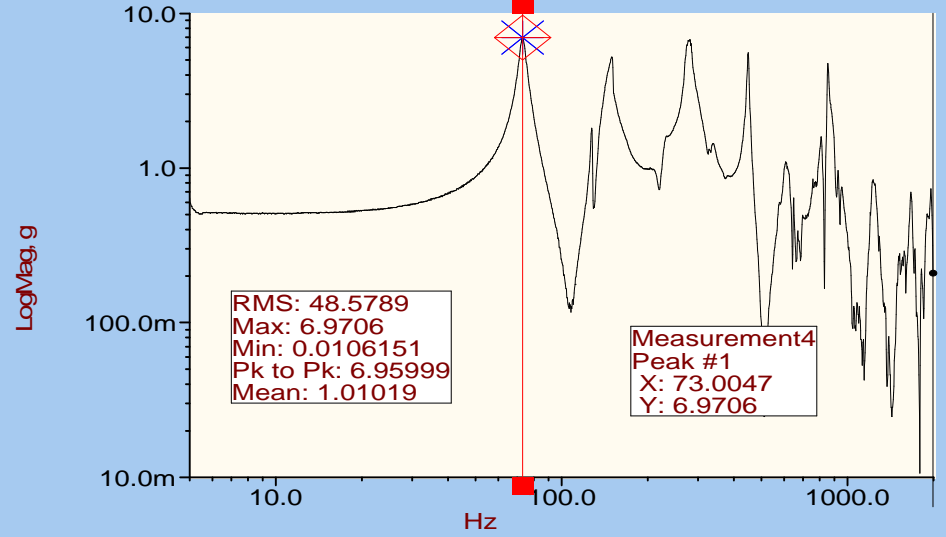
SMEI FM3 CAMERA RANDOM
RUN 00003
X AXIS
11:28:50 05/01/2001

FIG 11b

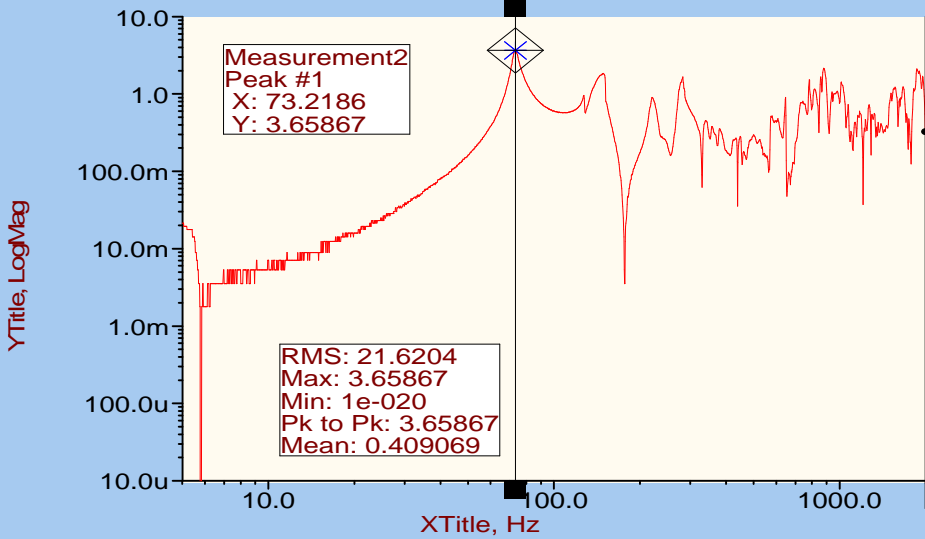
Control;AlarmLow;AlarmHigh;AbortLow;Abo



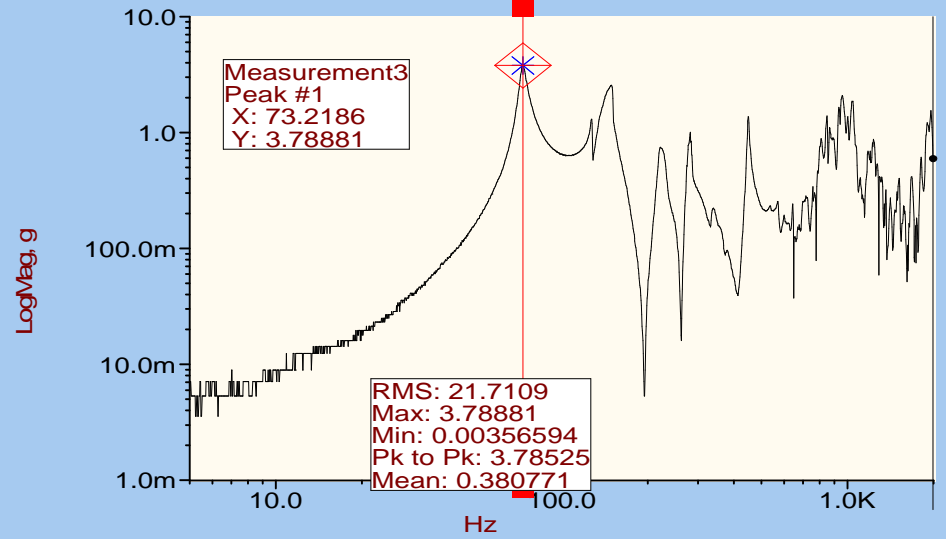
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



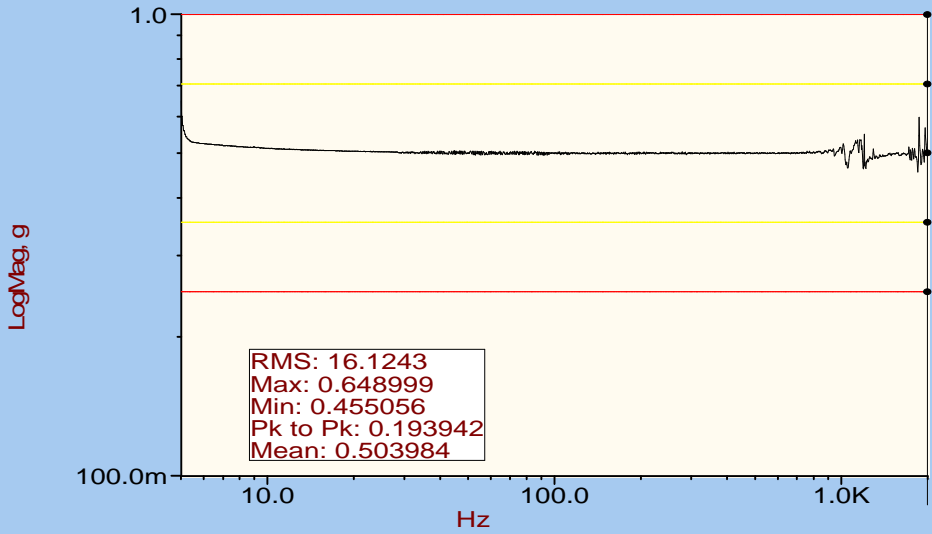
TOP CORNER RADIATOR Z AXIS



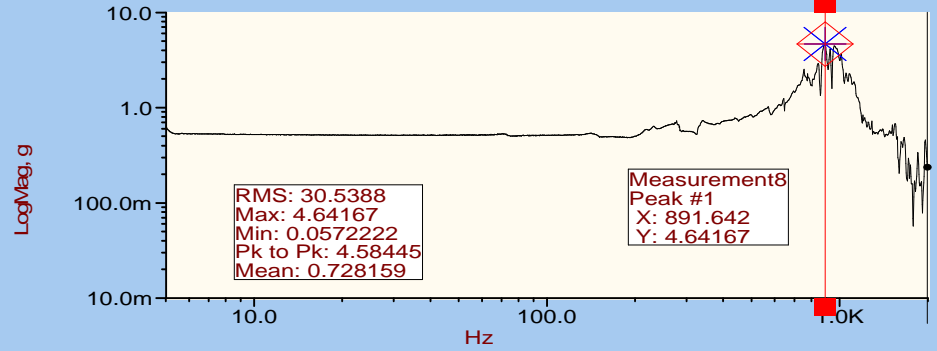
SMEI FM3 CAMERA POST RANDOM SINE SURVEY
RUN 00006
X AXIS
11:31:46 05/01/2001

FIG 12a

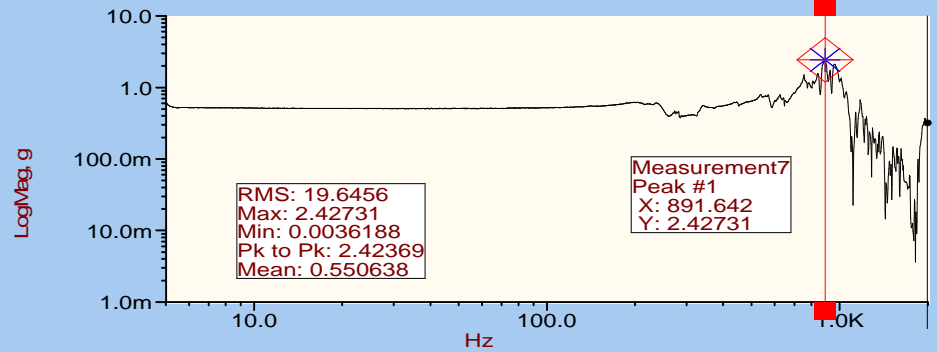
Control;AlarmLow;AlarmHigh;AbortLow;Abo



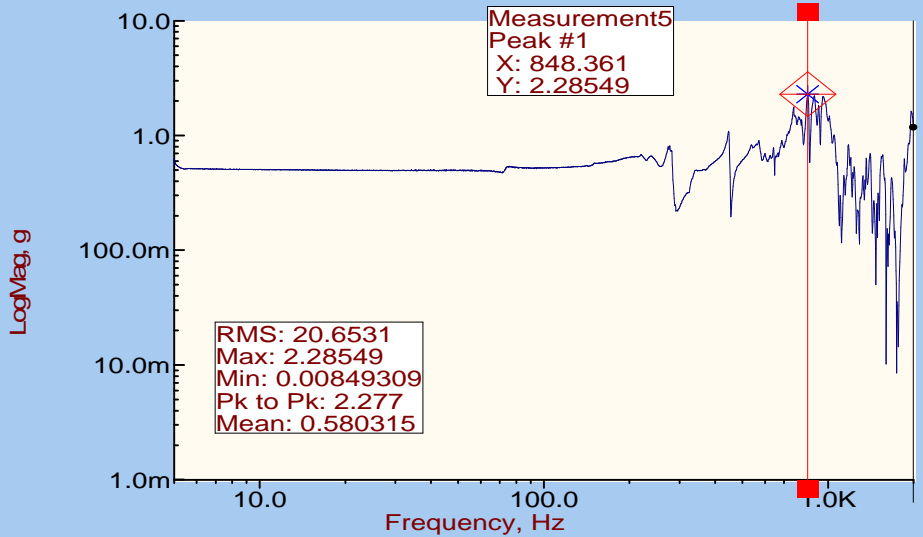
REAR TOP CORNER E BOX X AXIS



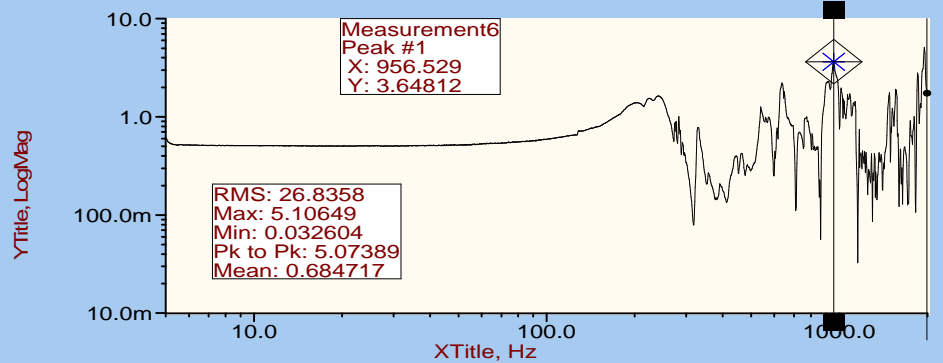
REAR END BAFFLE X AXIS



TOP END COLD FINGER X AXIS



TOP CORNER BAFFLE X AXIS



SMEI FM3 CAMERA POST RANDOM SINE SURVEY
 RUN 00006
 X AXIS
 11:31:46 05/01/2001

FIG 12b