



SST DEPARTMENT
VIBRATION TEST FACILITY
REPORT REF: AIV-2000-114-VIB
SMEI : CAMERA F.S.

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1) TEST ITEM DESCRIPTION

The test item consisted of the SMEI flight spare Camera, which had previously been vibrated (see report Ref: AIV-2000-098-VIB) to protoqualification levels when fitted with an engineering grade CCD. 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

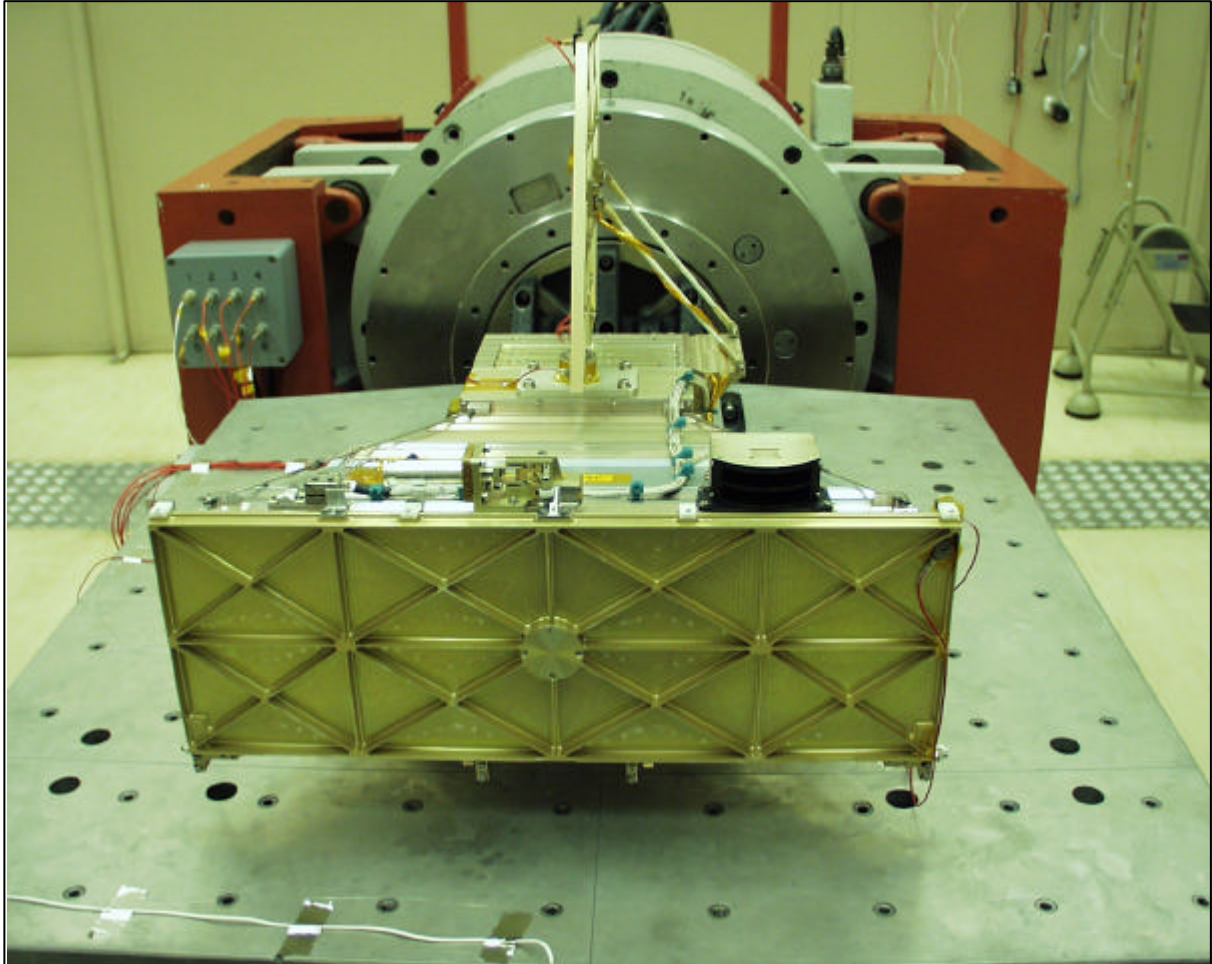
4) CLEANLINESS

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

5) FIXTURE DETAILS

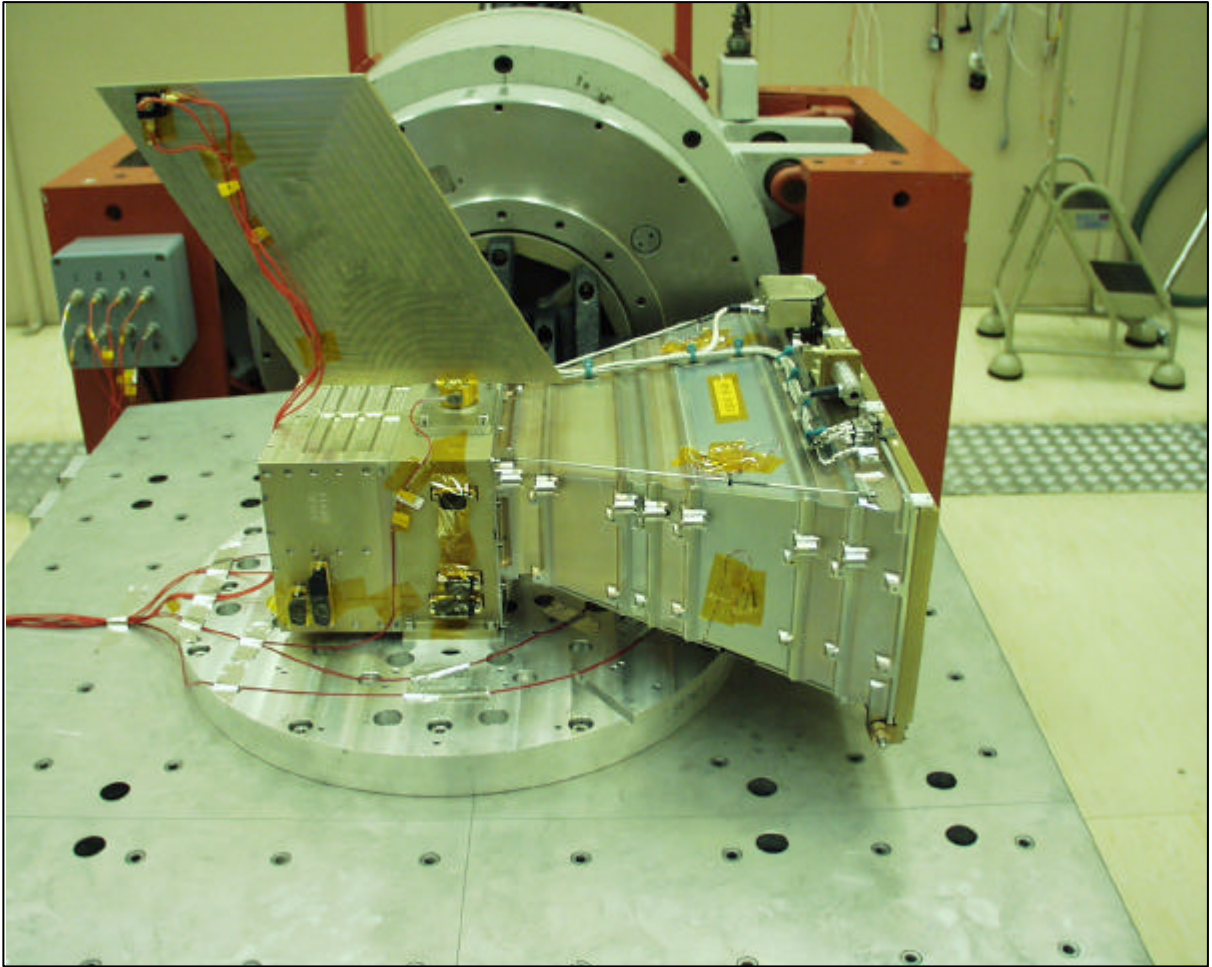
NOTE PHOTOGRAPHS FOR REFERENCE ONLY

Z AXIS VIBRATION TEST CONFIGURATION

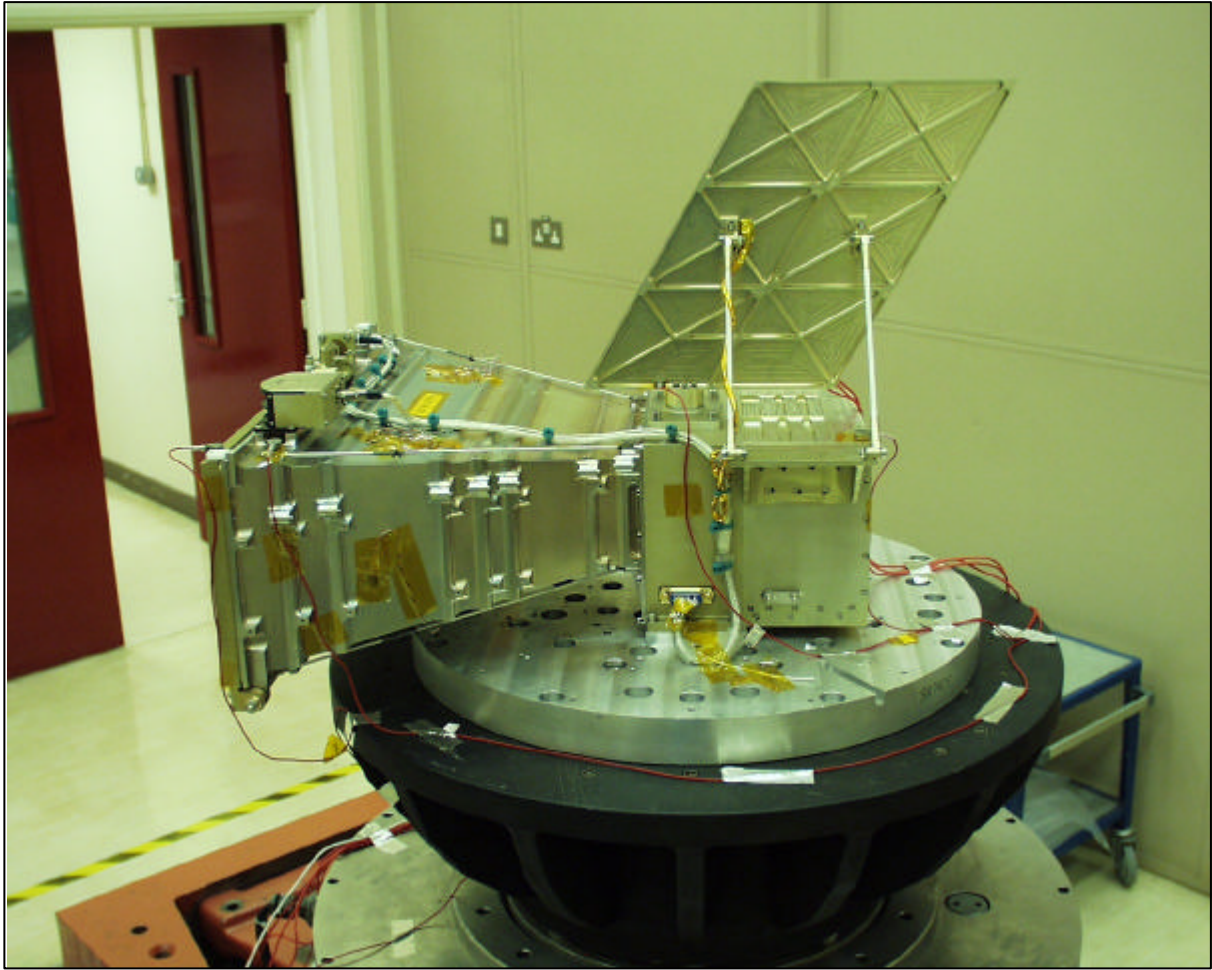


A view of the test item mounted on its vibration fixture on the slip table.

X AXIS VIBRATION TEST CONFIGURATION



Y AXIS VIBRATION TEST CONFIGURATION



6) TEST SUMMARY

Testing Date: 19 December 2000

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

ACCELEROMETER TEST PLOTS

VIBRATION TESTS in the Z-axis

RUN 00003 SINE SURVEY *FIG 1 a & b*

RUN 00002 STATIC LOAD *FIG 2 a & b*

RUN 00002 RANDOM *FIG 3 a & b*

RUN 00004 POST RANDOM SINE SURVEY *FIG 4 a & b*

VIBRATION TESTS in the X-axis

RUN 00005 SINE SURVEY *FIG 5 a & b*

RUN 00003 STATIC LOAD *FIG 6 a & b*

RUN 00003 RANDOM *FIG 7 a & b*

RUN 00006 POST RANDOM SINE SURVEY *FIG 8 a & b*

VIBRATION TESTS in the Y-axis

RUN 00007 SINE SURVEY *FIG 9 a & b*

RUN 00004 STATIC LOAD *FIG 10 a & b*

RUN 00004 RANDOM *FIG 11 a & b*

RUN 00008 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.....

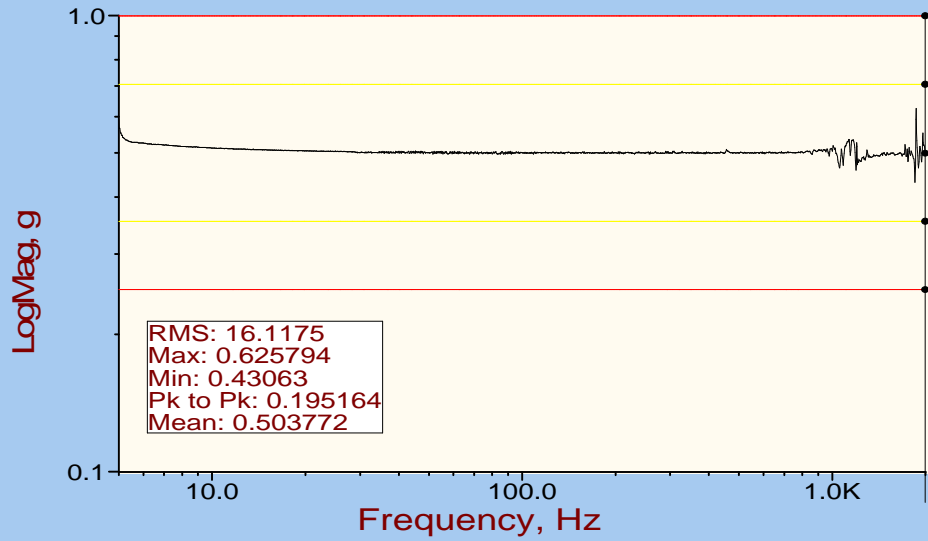
Date.....

2001

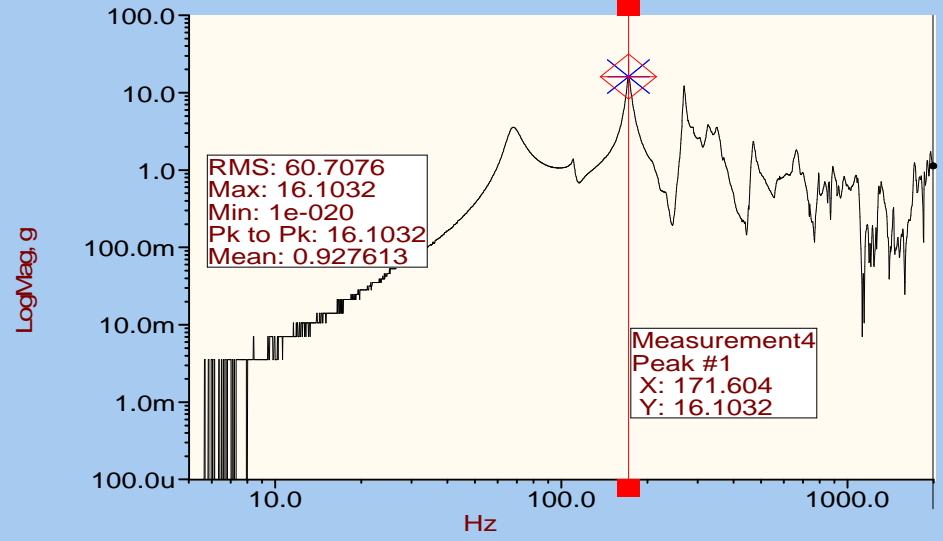
Graham TOPLIS

ANNEX:A ACCELEROMETER PLOTS

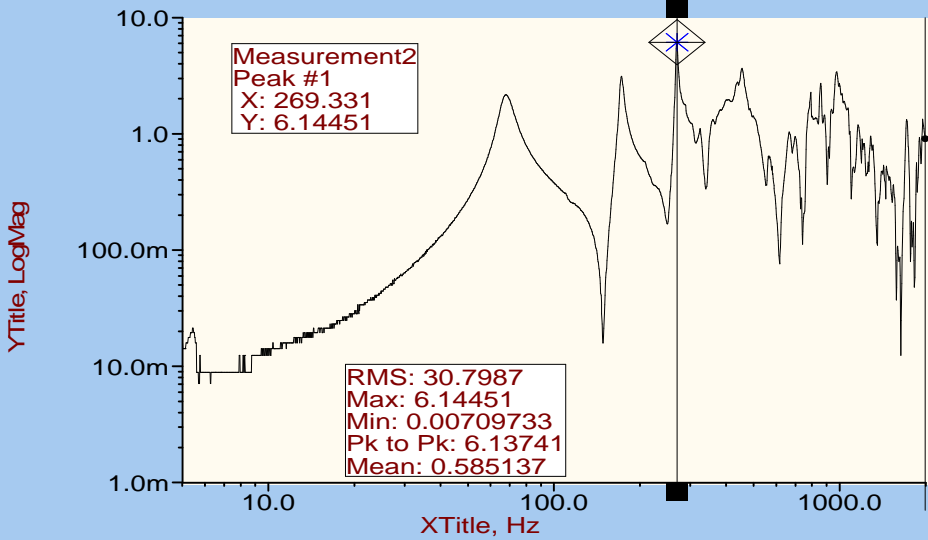
Control;AlarmLow;AlarmHigh;AbortLow;Abo



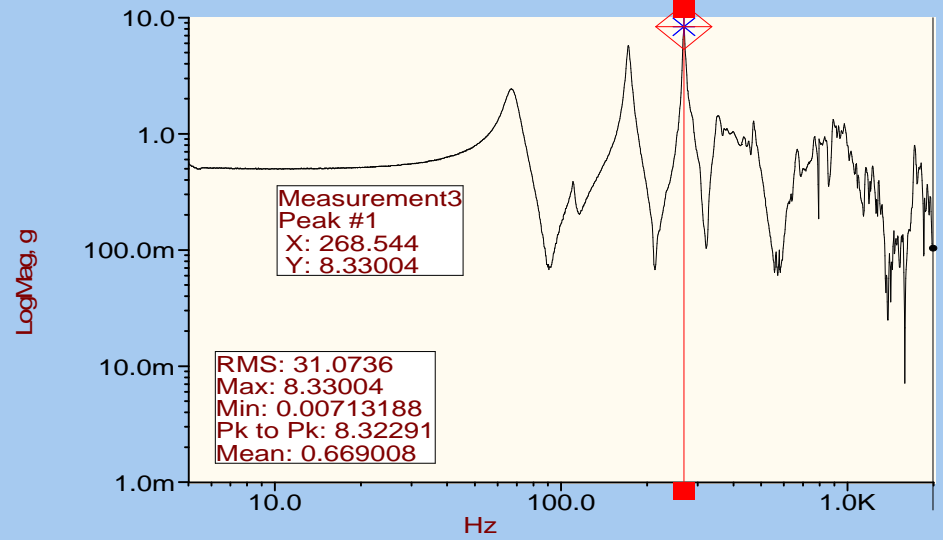
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



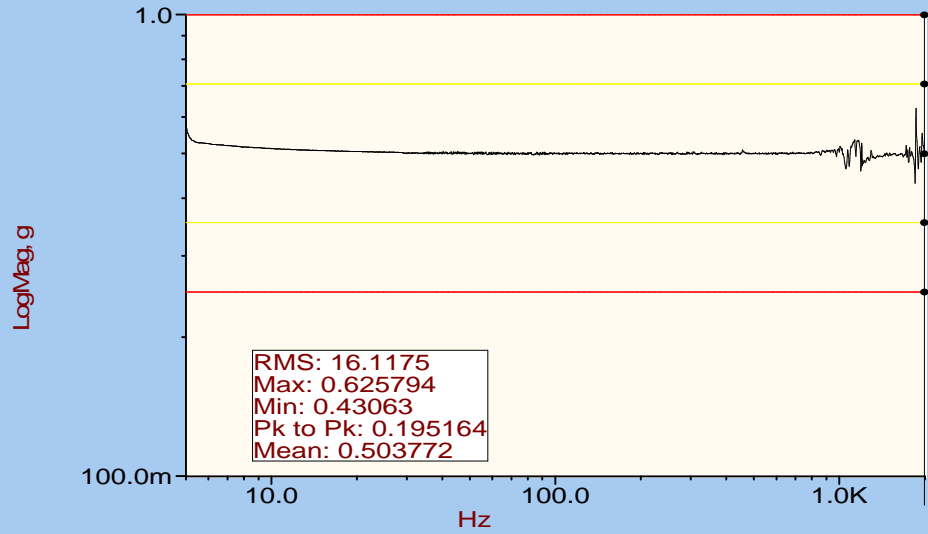
TOP CORNER RADIATOR Z AXIS



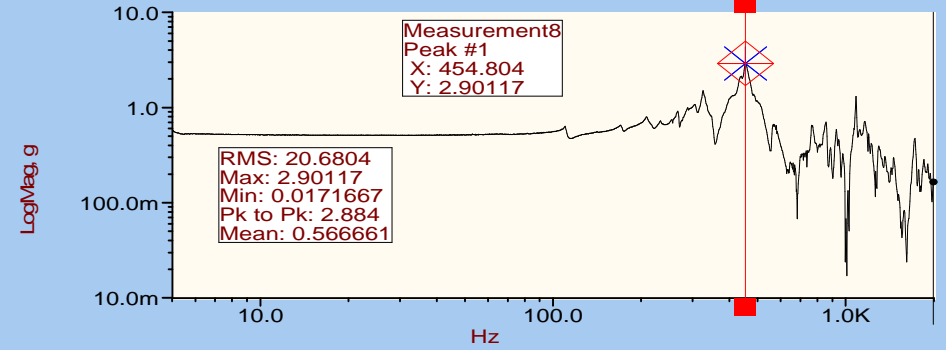
SMEI FLIGHT SPARE CAMERA SINE SURVEY
RUN 00003
Z AXIS
11:35:36 19/12/2000

FIG 1a

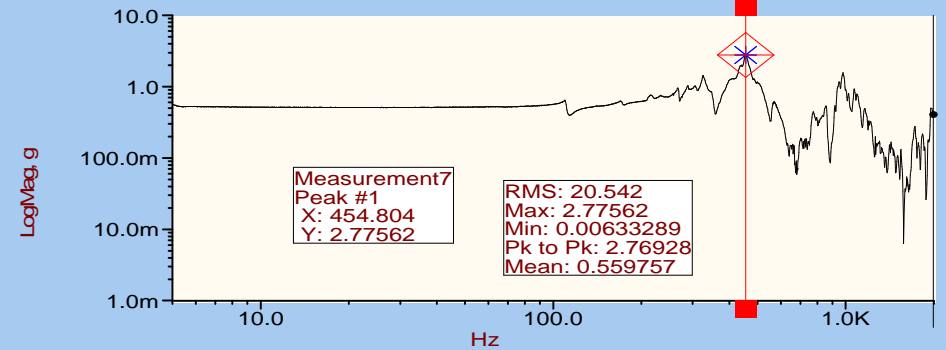
Control;AlarmLow;AlarmHigh;AbortLow;Abo



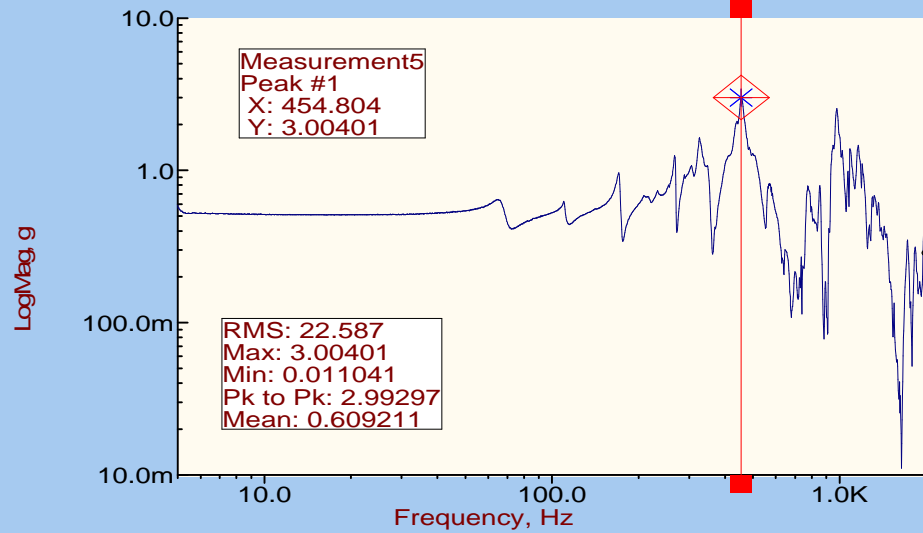
REAR TOP CORNER E BOX Z AXIS



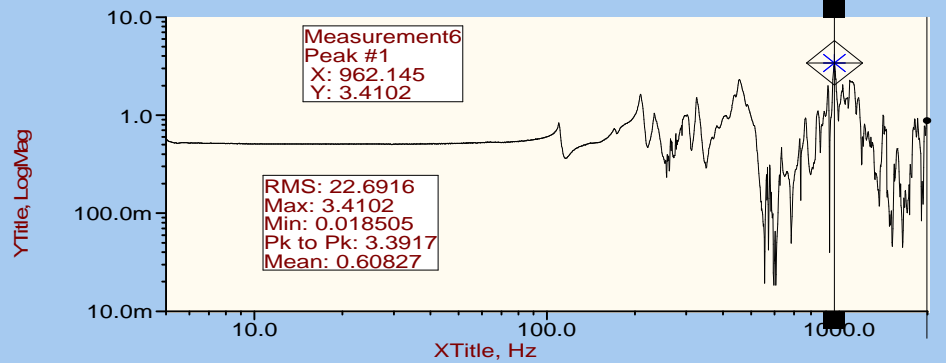
REAR END BAFFLE Z AXIS



TOP END COLD FINGER Z AXIS



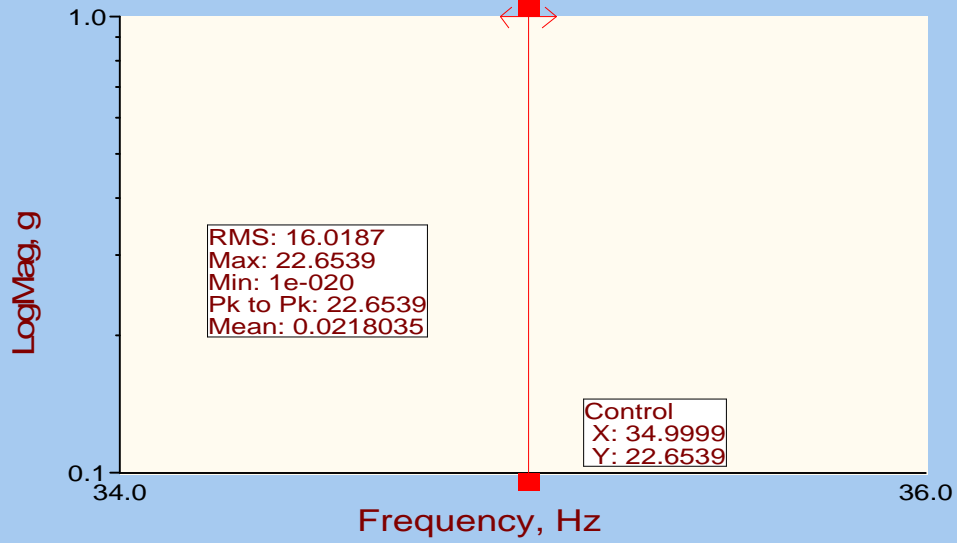
TOP CORNER BAFFLE Z AXIS



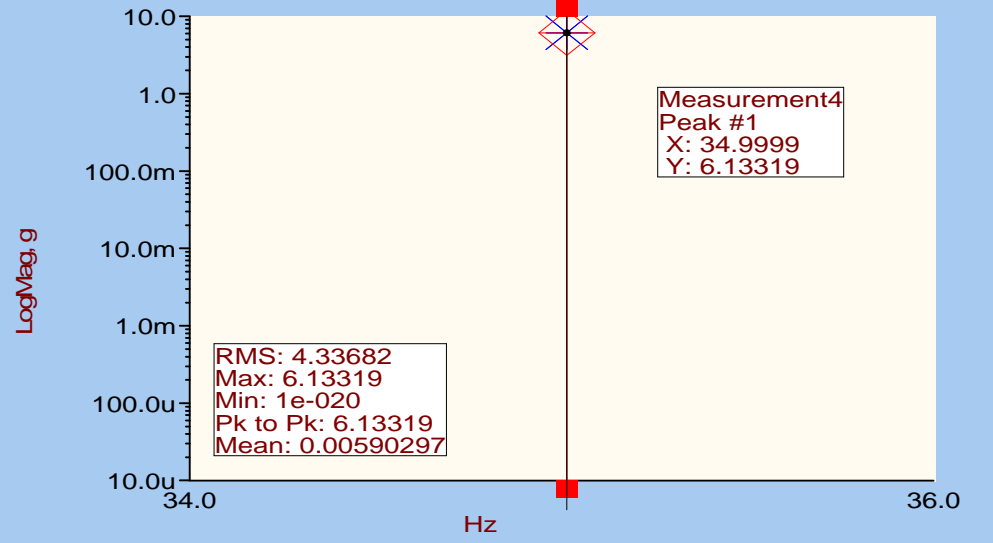
SMEI FLIGHT SPARE CAMERA SINE SURVEY
 RUN 00003
 Z AXIS
 11:35:36 19/12/2000

FIG 1b

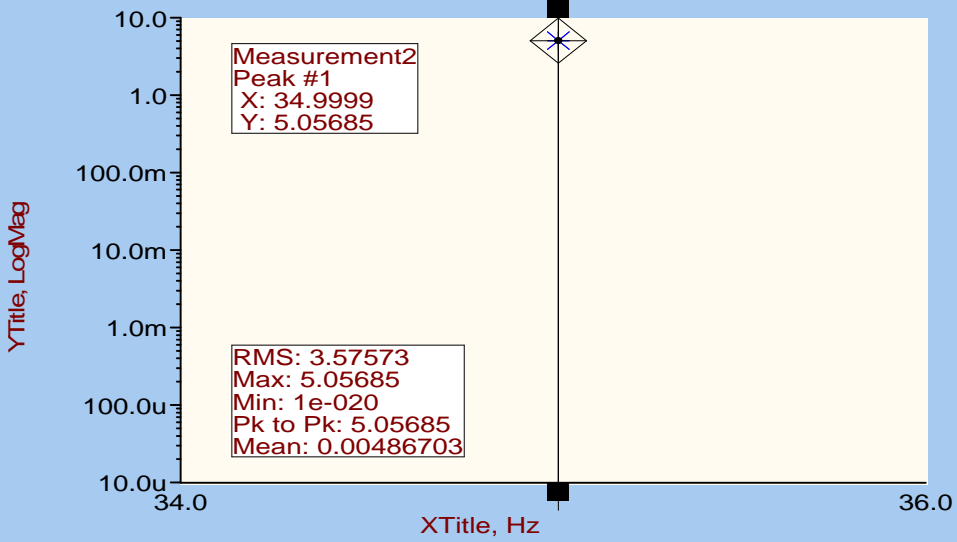
Control



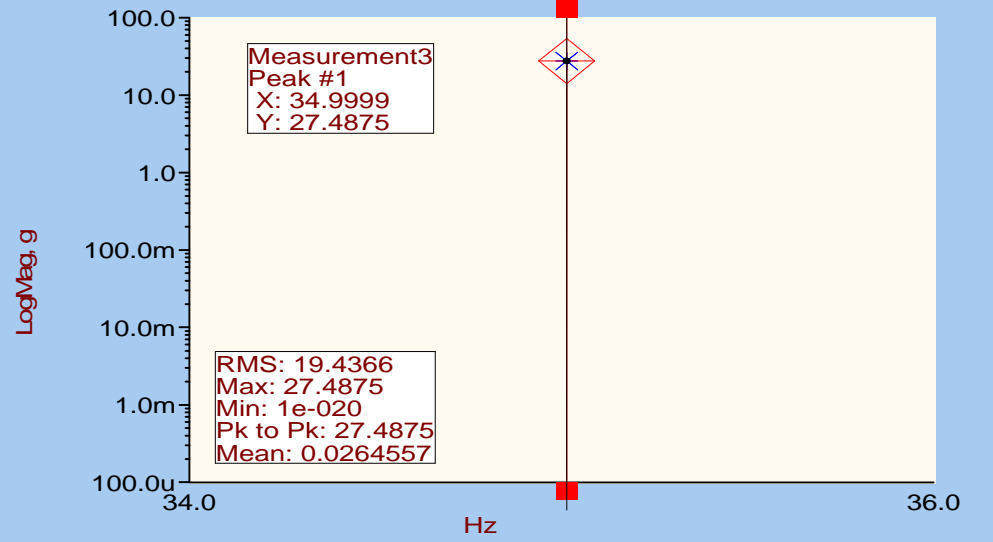
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



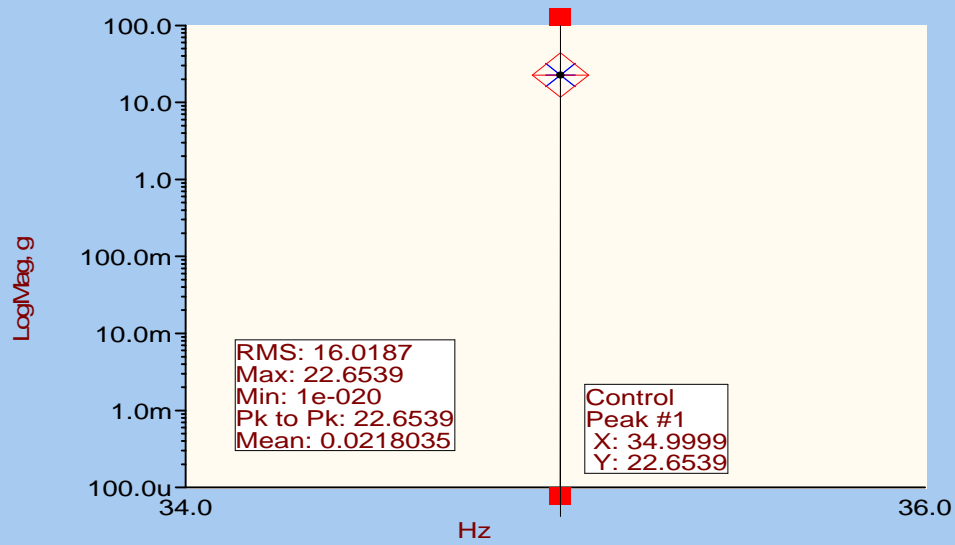
TOP CORNER RADIATOR Z AXIS



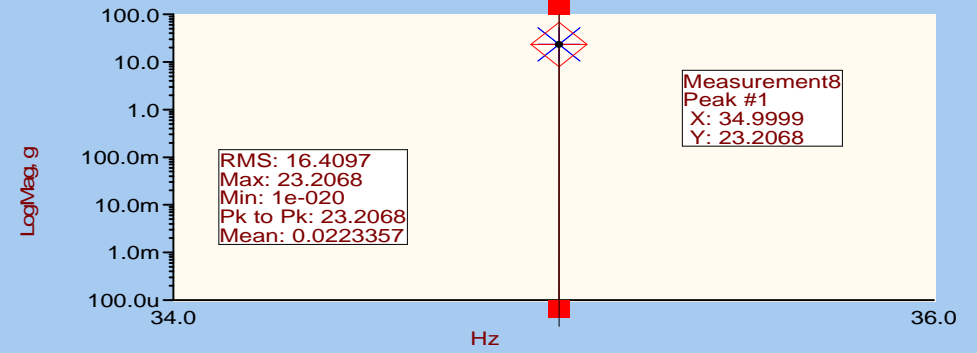
SMEI FLIGHT SPARE CAMERA STATIC LOAD
RUN 00002
Z AXIS
11:42:02 19/12/2000

FIG 2a

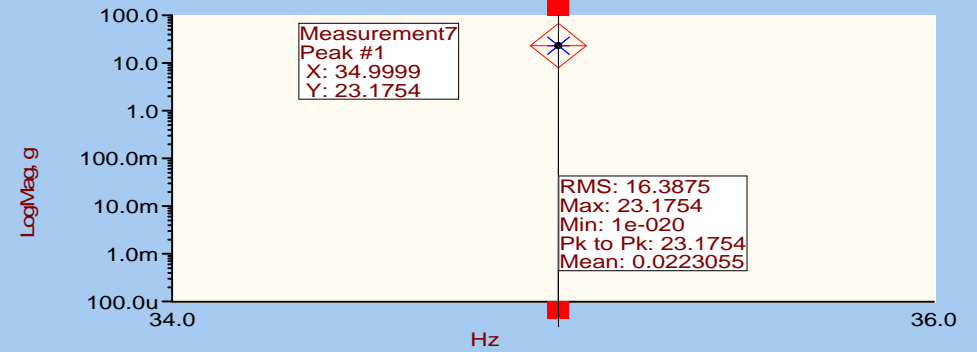
Control



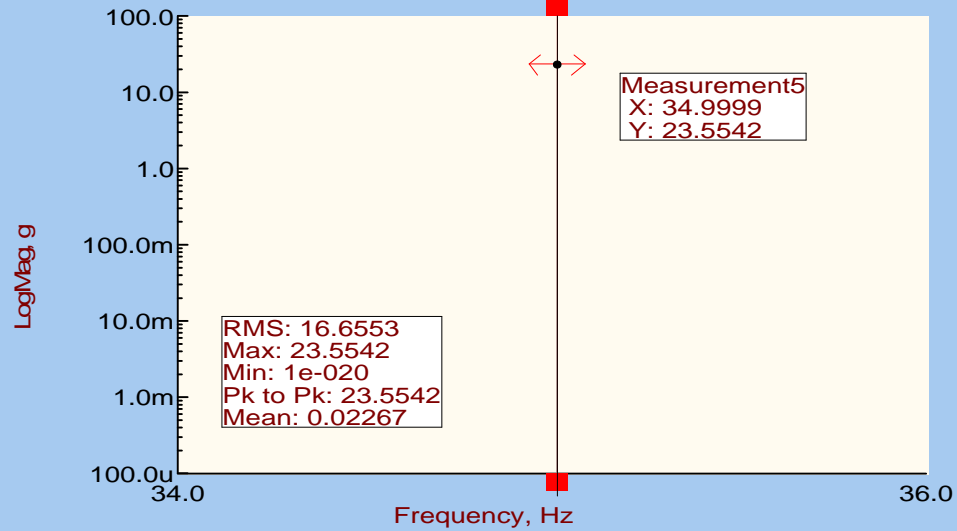
REAR TOP CORNER E BOX Z AXIS



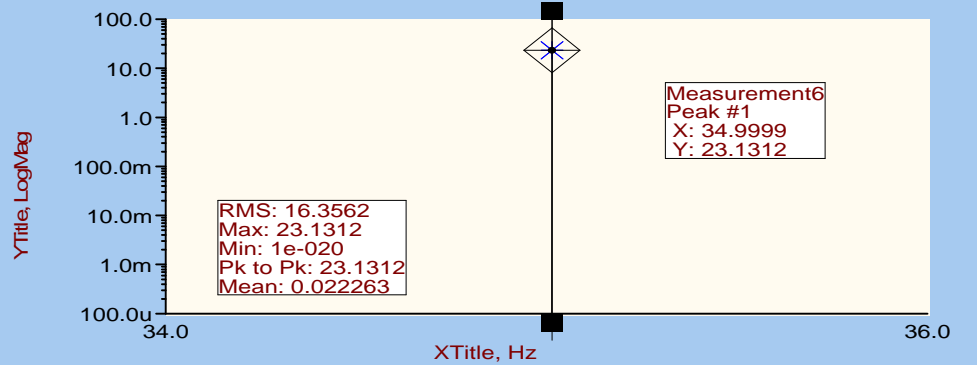
REAR END Baffle Z AXIS



TOP END COLD FINGER Z AXIS



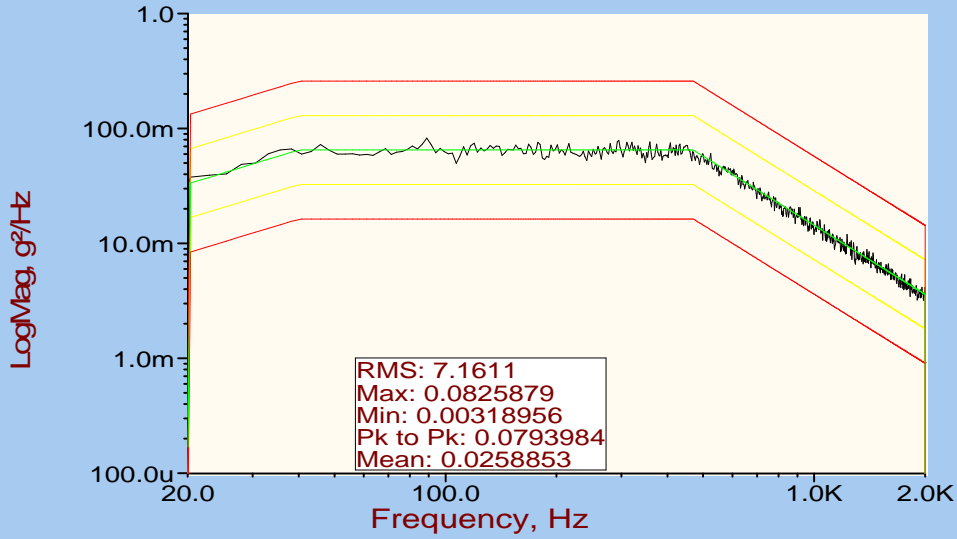
TOP CORNER Baffles Z AXIS



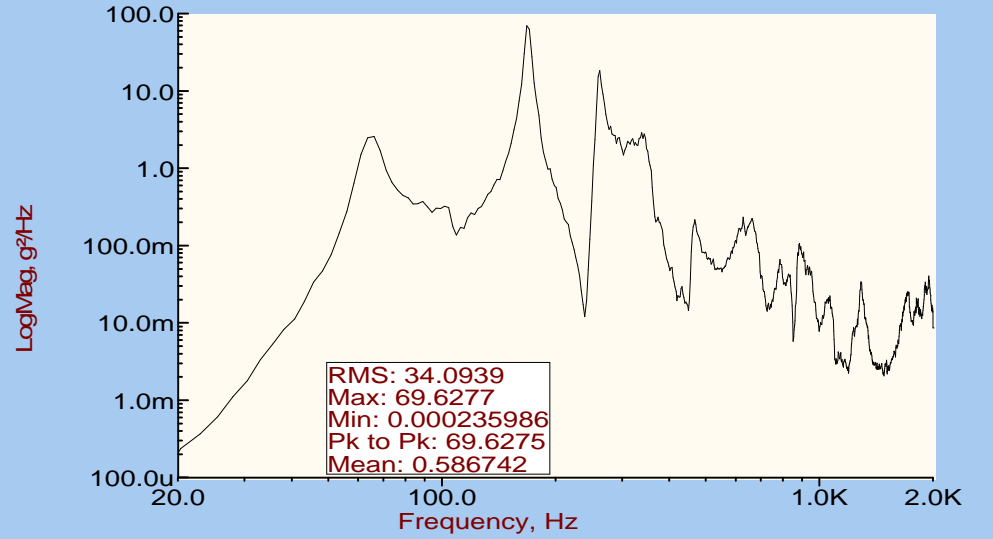
SMEI FLIGHT SPARE CAMERA STATIC LOAD
RUN 00002
Z AXIS
11:42:02 19/12/2000

FIG 2b

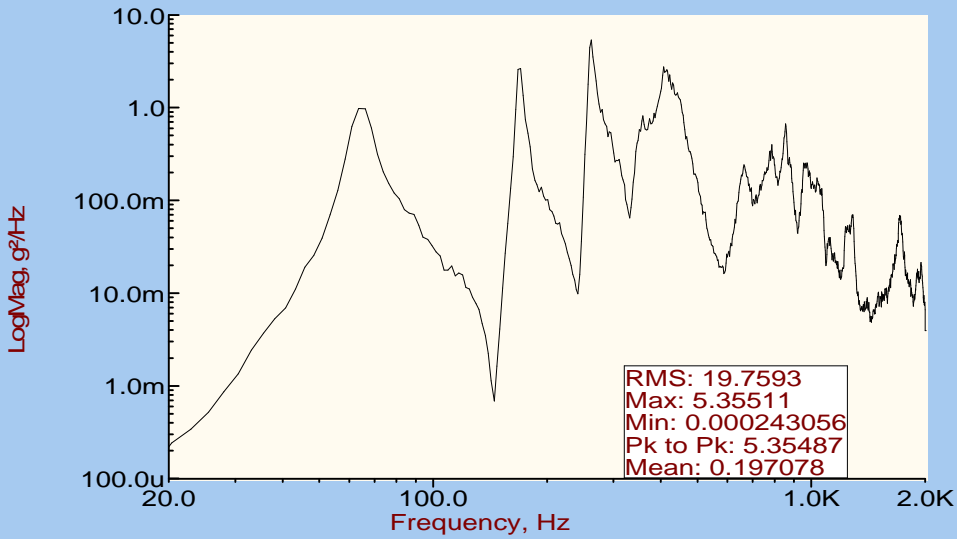
Control;AlarmLow;AlarmHigh;AbortLow;Abo



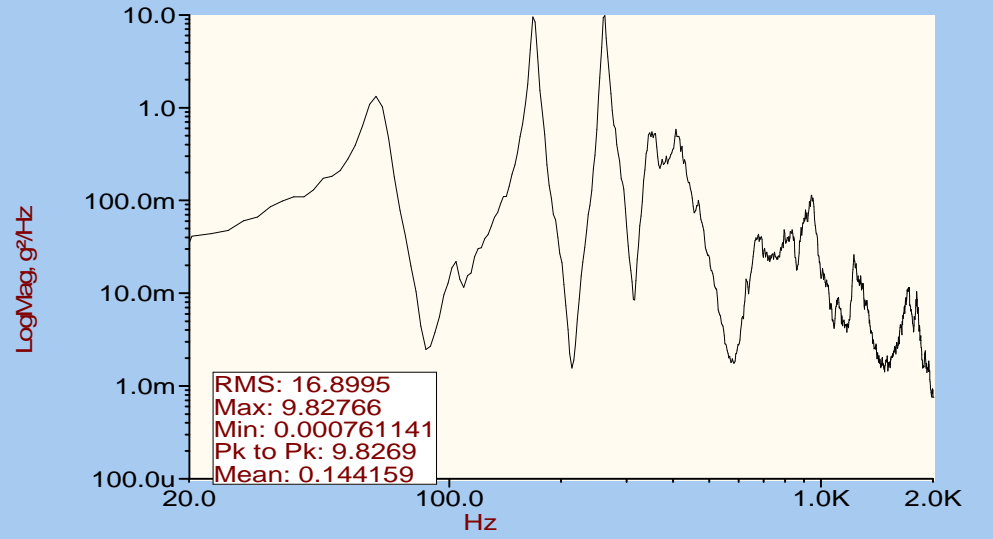
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



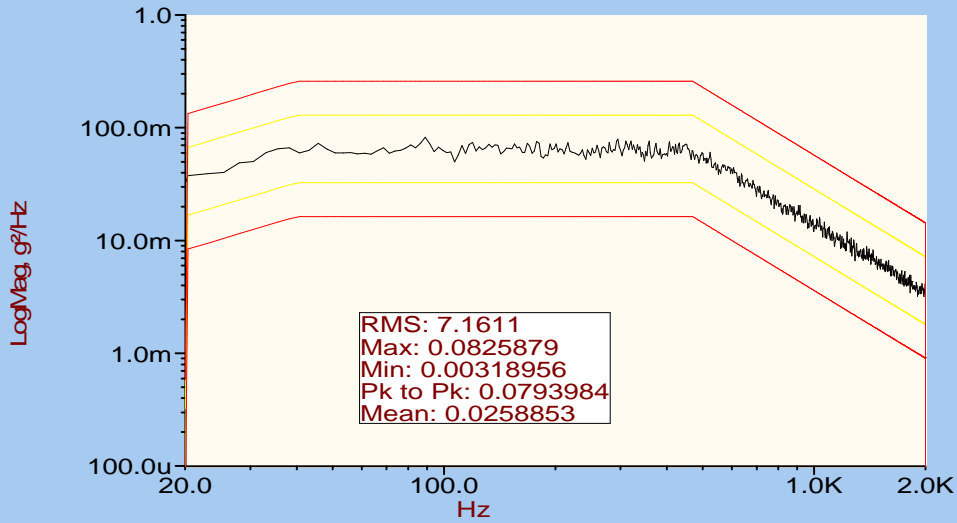
TOP CORNER RADIATOR Z AXIS



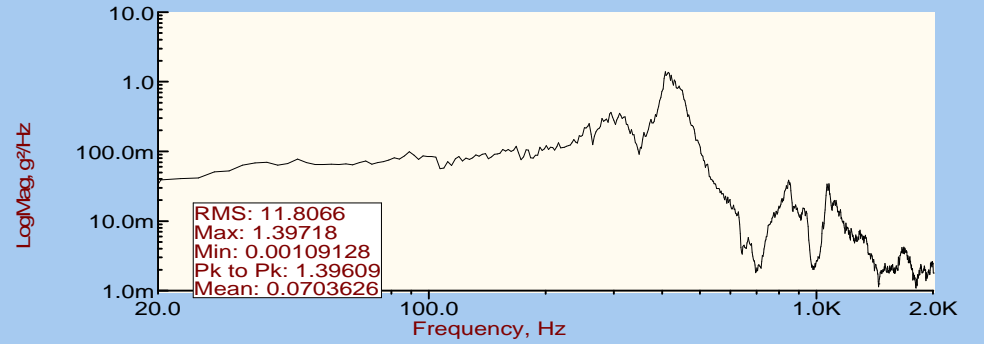
SMEI FLIGHT SPARE CAMERA RANDOM
RUN 00002
Z AXIS
11:46:39 19/12/2000

FIG 3a

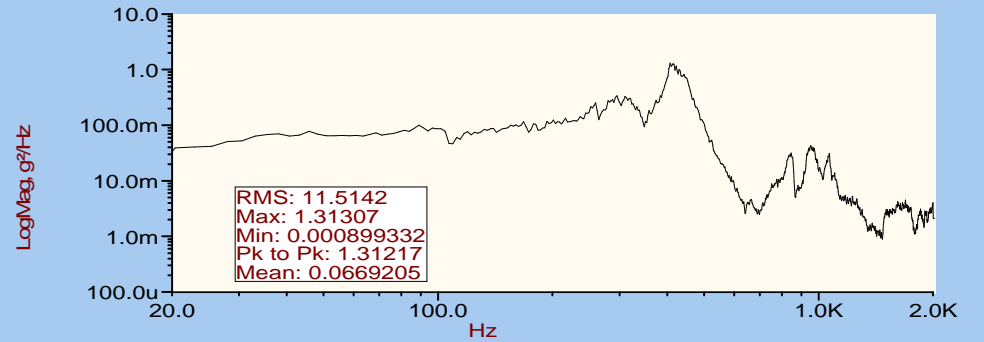
Control;AlarmLow;AlarmHigh;AbortLow;Abo



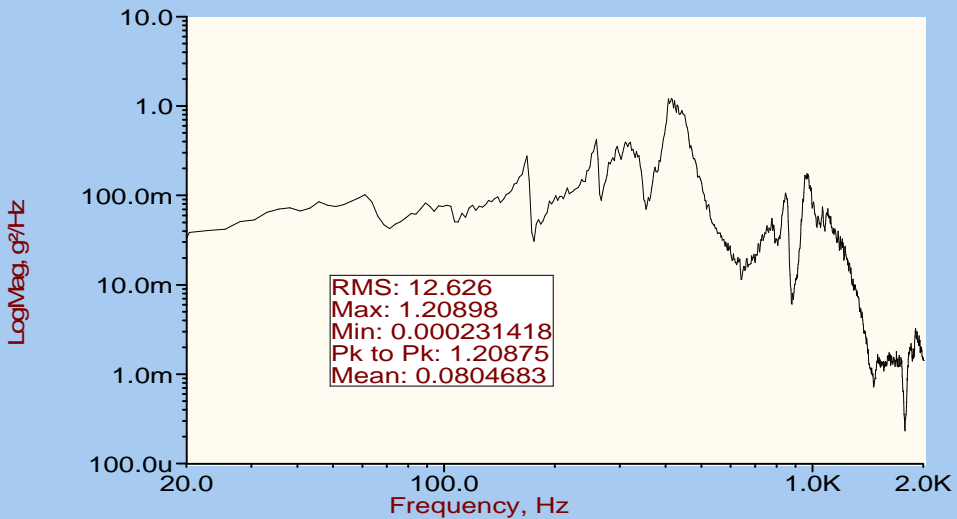
REAR TOP CORNER E BOX Z AXIS



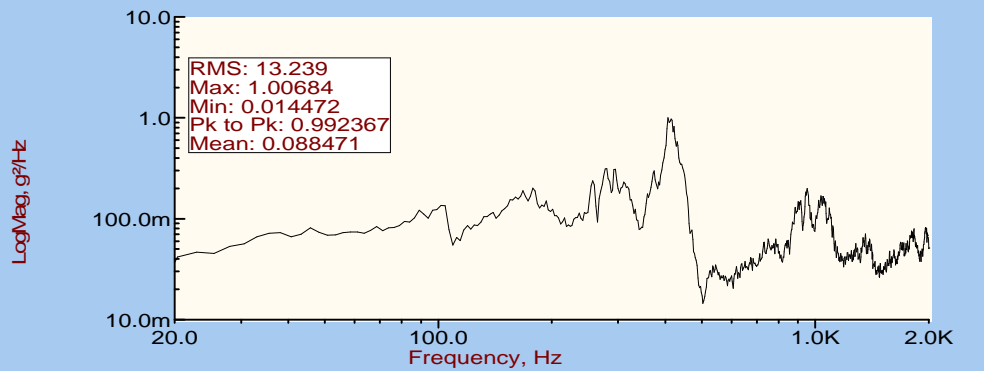
REAR END BAFFLE Z AXIS



TOP END COLD FINGER Z AXIS



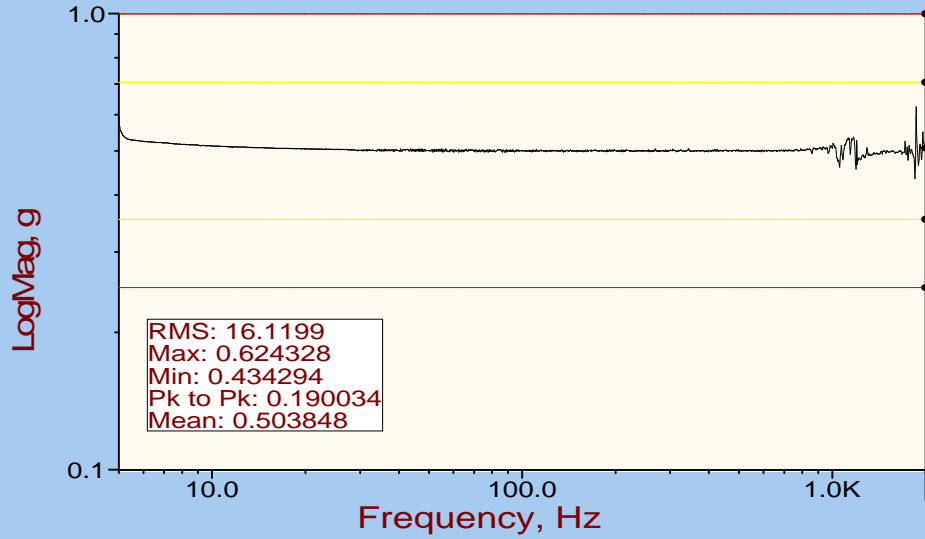
TOP CORNER BAFFLES Z AXIS



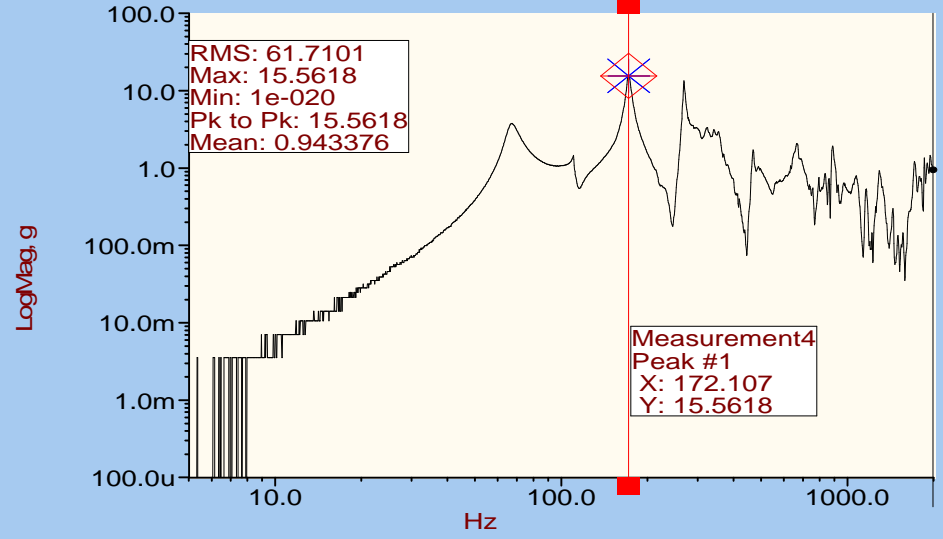
SMEI FLIGHT SPARE CAMERA RANDOM
RUN 00002
Z AXIS
11:46:39 19/12/2000

FIG 3b

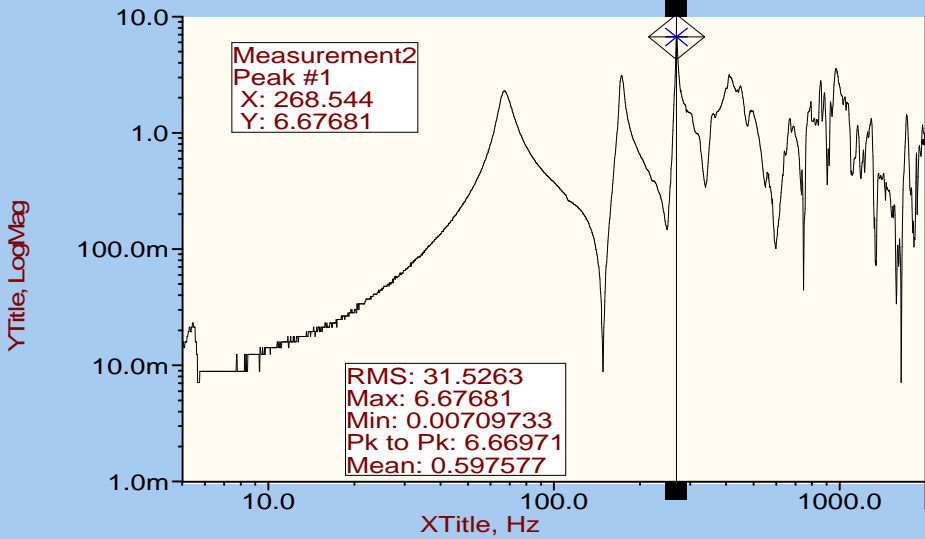
Control;AlarmLow;AlarmHigh;AbortLow;Abo



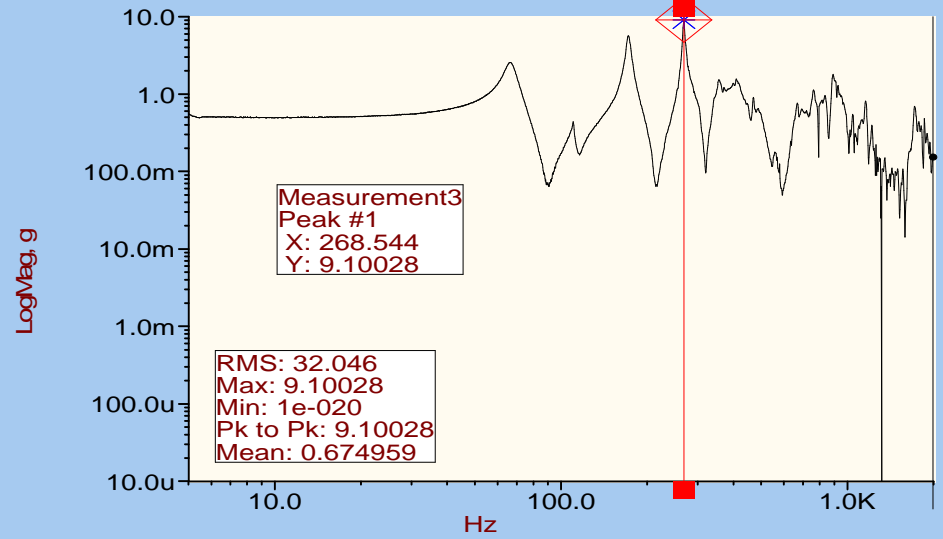
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



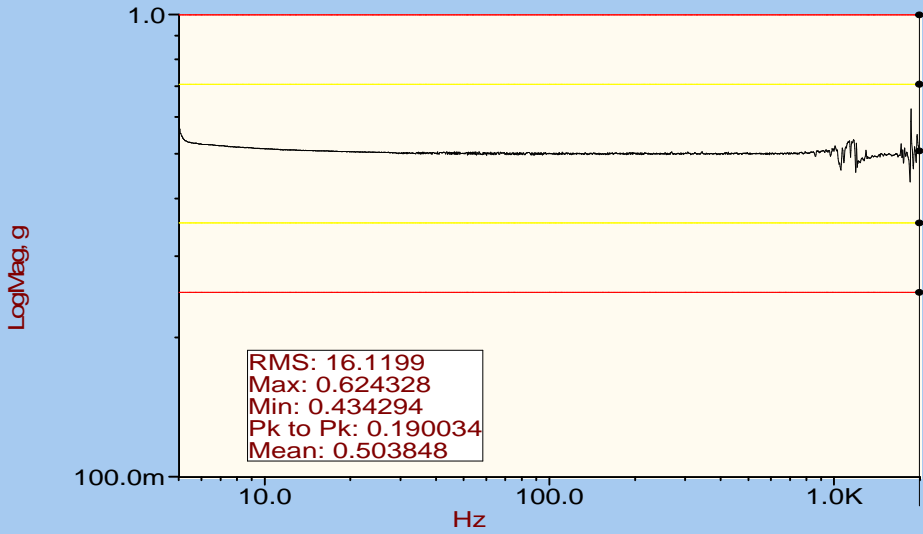
TOP CORNER RADIATOR Z AXIS



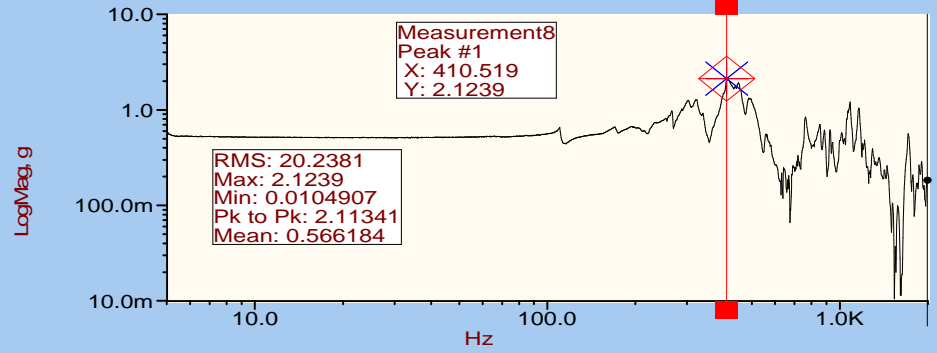
SMEI FLIGHT SPARE CAMERA POST RANDOM SINE SURVEY
RUN 00004
Z AXIS
11:50:25 19/12/2000

FIG 4a

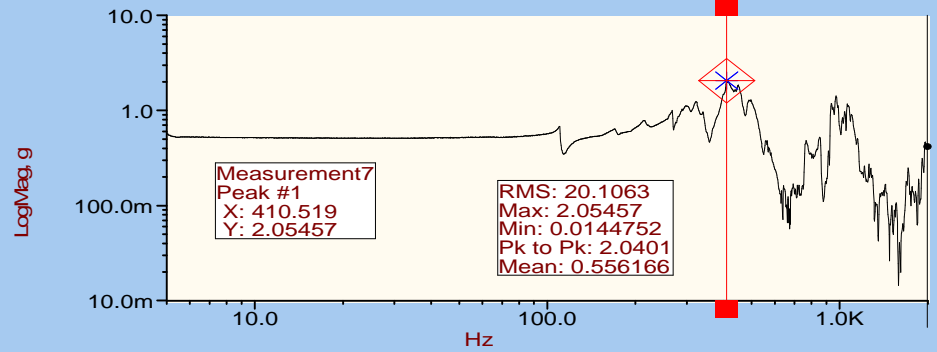
Control;AlarmLow;AlarmHigh;AbortLow;Abo



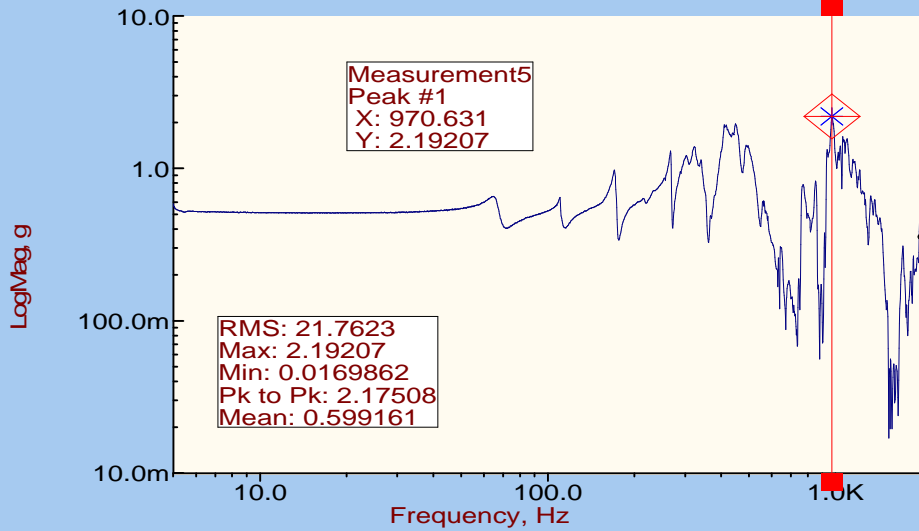
REAR TOP CORNER E BOX Z AXIS



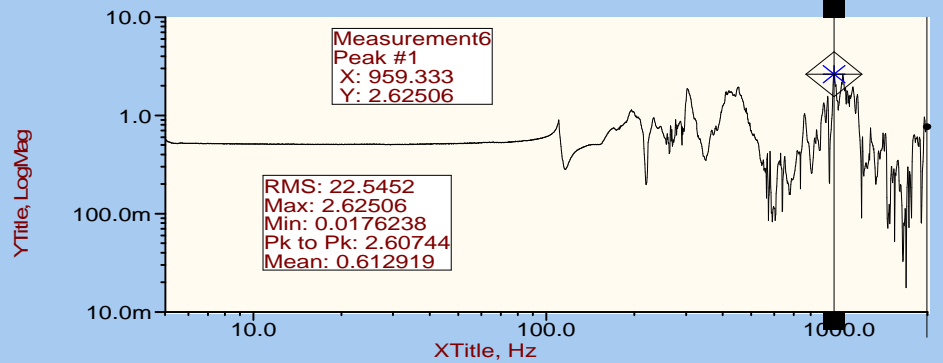
REAR END Baffle Z AXIS



TOP END COLD FINGER Z AXIS



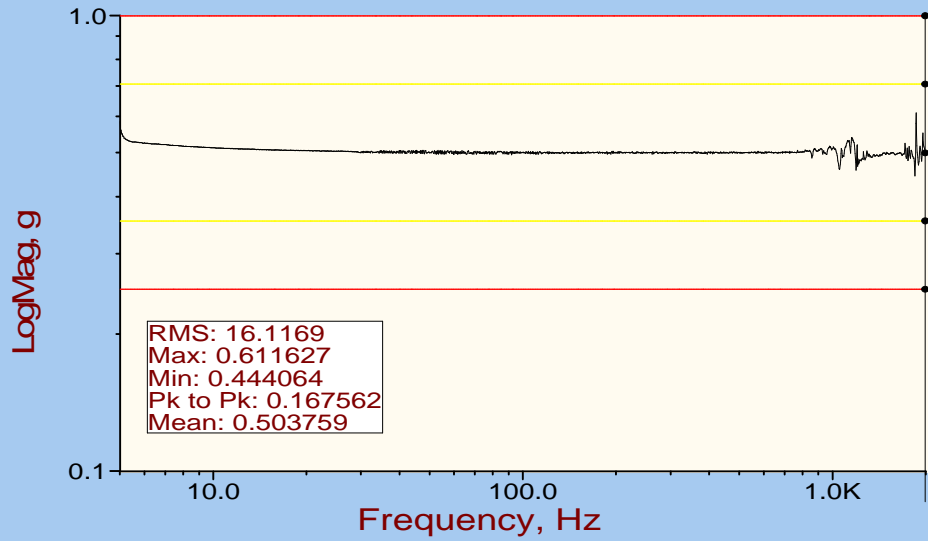
TOP CORNER Baffle Z AXIS



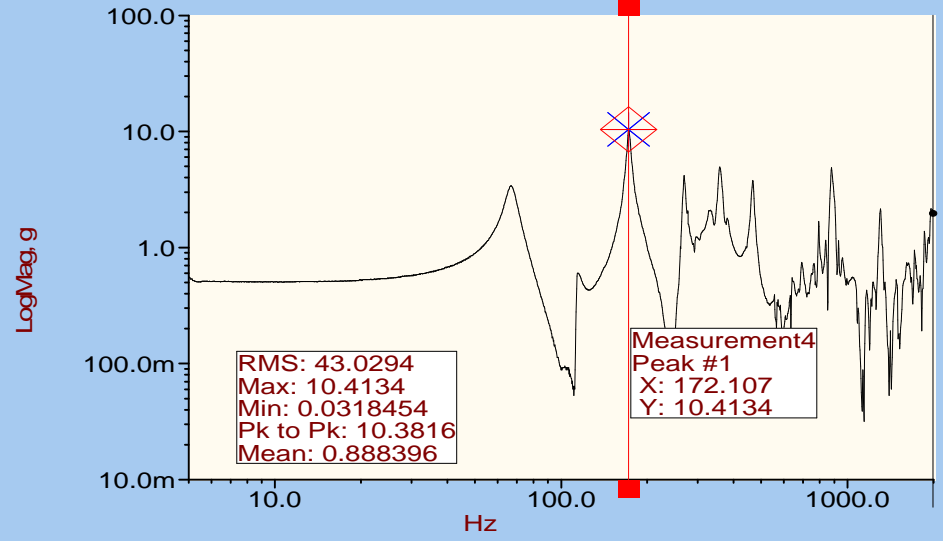
SMEI FLIGHT SPARE CAMERA POST RANDOM SINE SURVEY
RUN 00004
Z AXIS
11:50:25 19/12/2000

FIG 4b

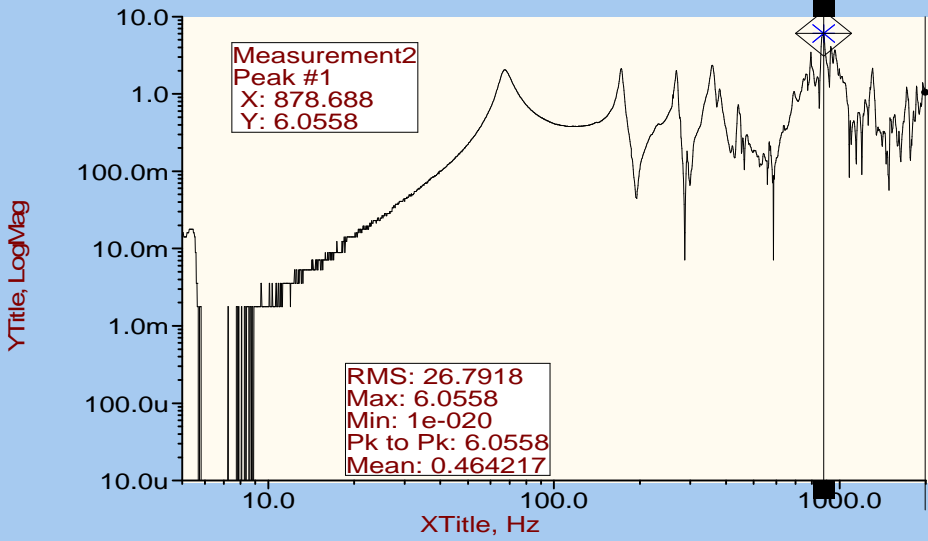
Control;AlarmLow;AlarmHigh;AbortLow;Abo



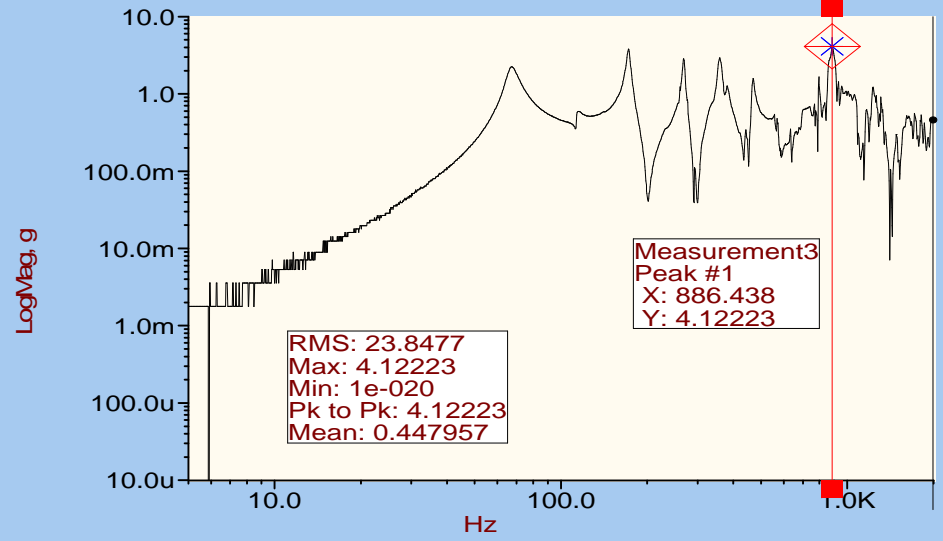
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



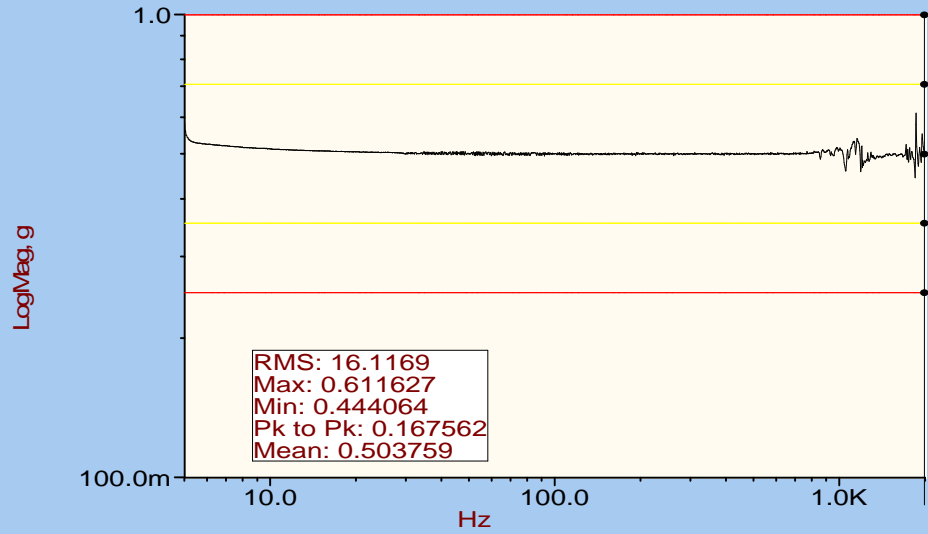
TOP CORNER RADIATOR Z AXIS



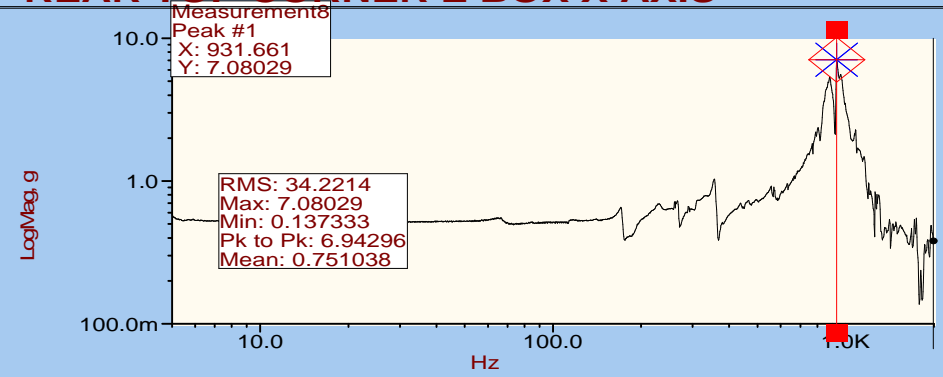
SMEI FLIGHT SPARE CAMERA SINE SURVEY
RUN 00005
X AXIS
12:47:30 19/12/2000

FIG 5a

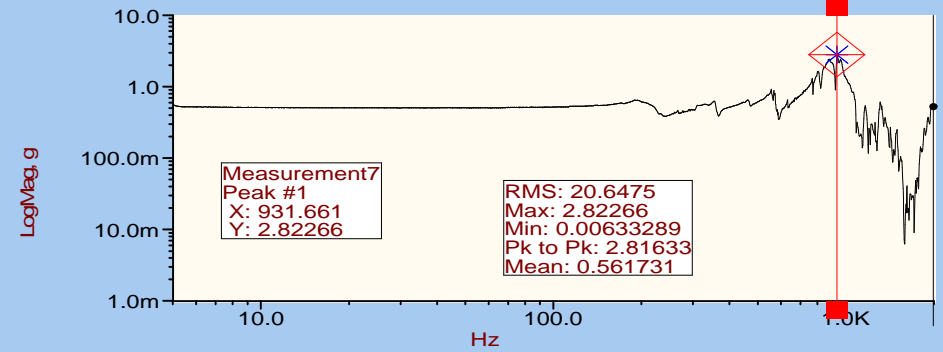
Control;AlarmLow;AlarmHigh;AbortLow;Abo



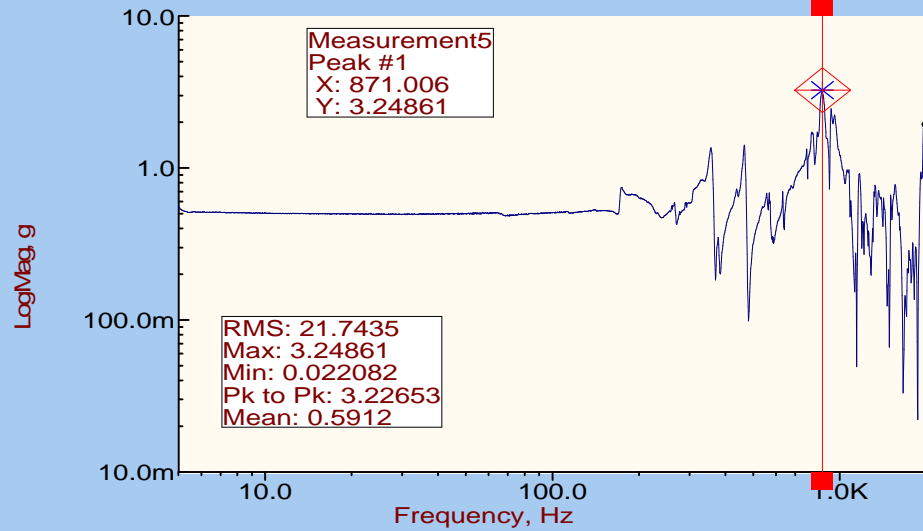
REAR TOP CORNER E BOX X AXIS



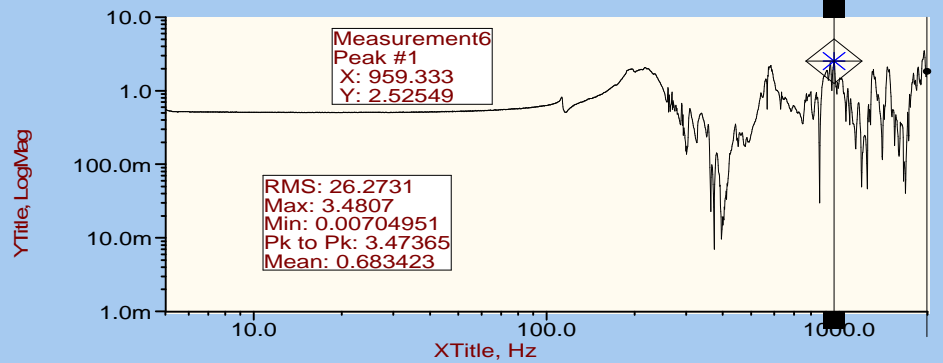
REAR END BAFFLE X AXIS



TOP END COLD FINGER X AXIS



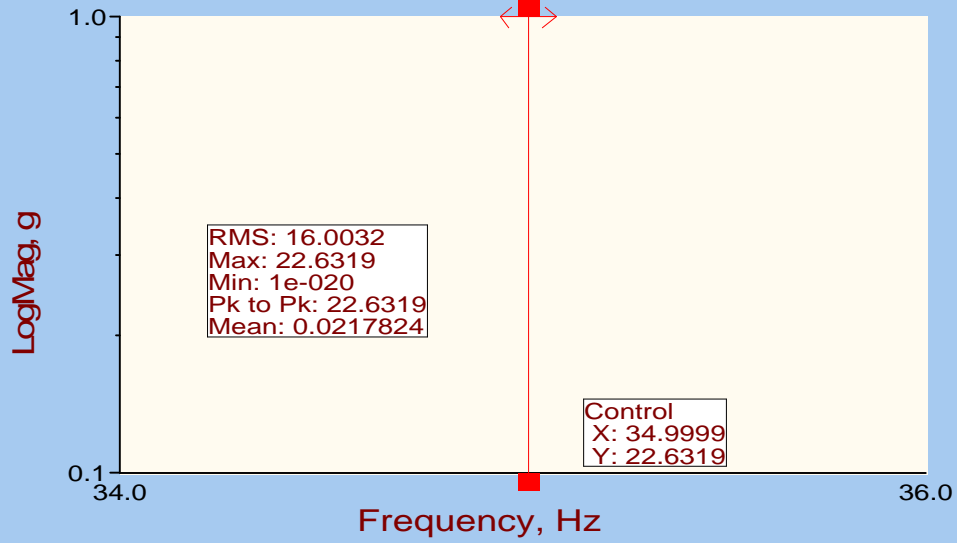
TOP CORNER BAFFLE X AXIS



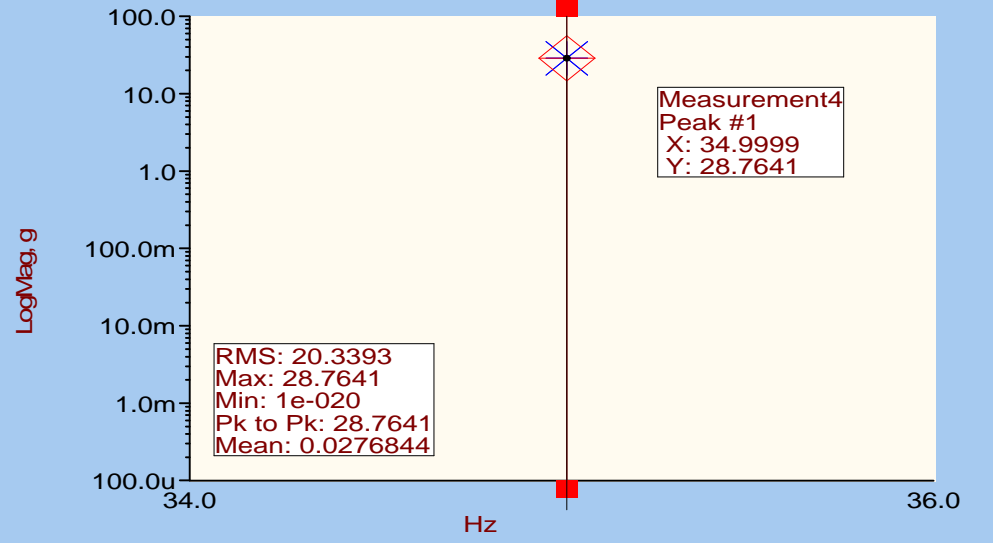
SMEI FLIGHT SPARE CAMERA SINE SURVEY
RUN 00005
X AXIS
12:47:30 19/12/2000

FIG 5b

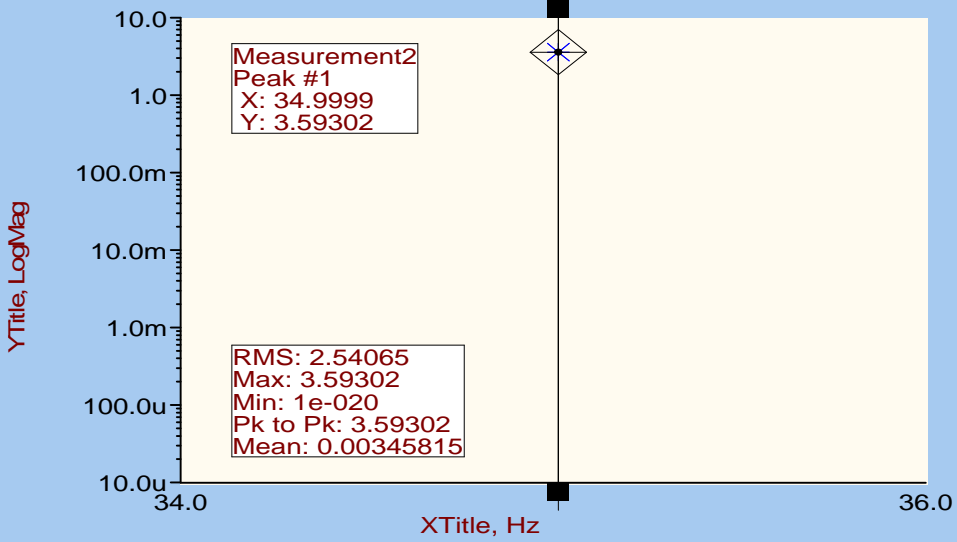
Control



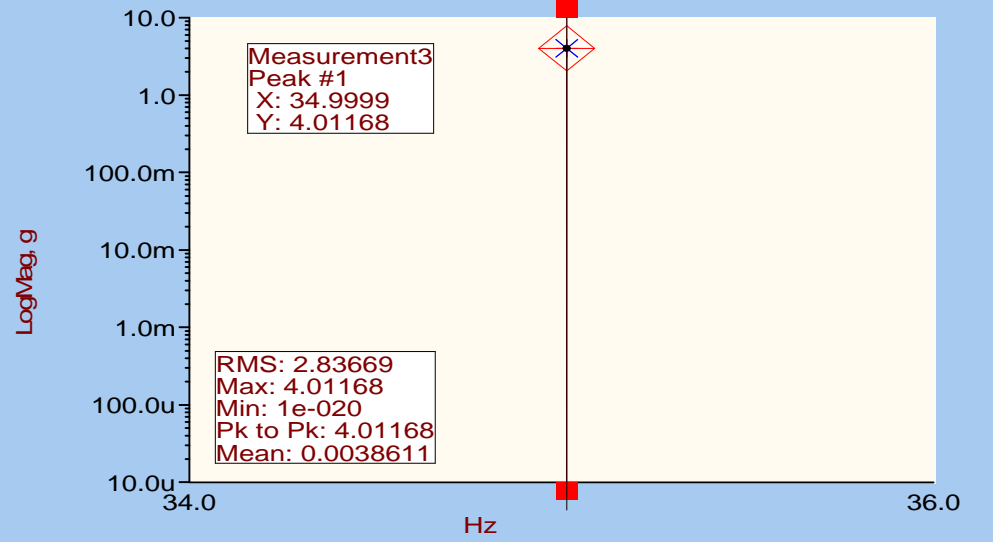
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



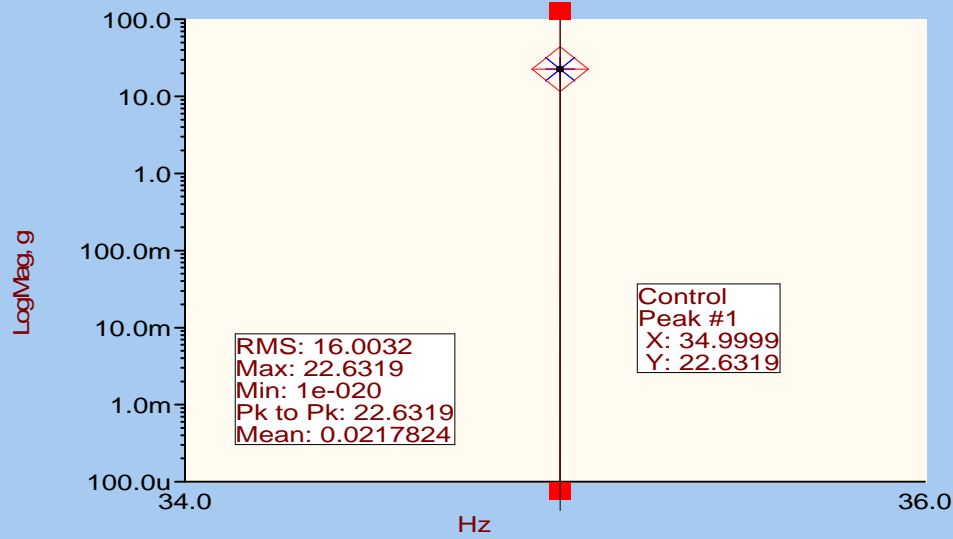
TOP CORNER RADIATOR Z AXIS



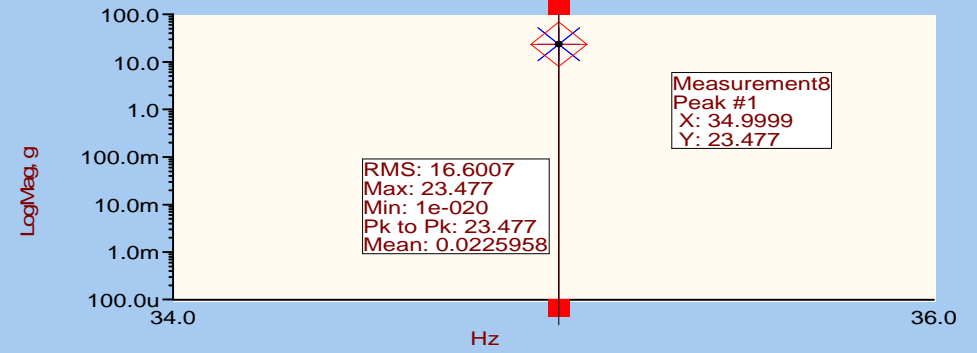
SMEI FLIGHT SPARE CAMERA STATIC LOAD
RUN 00003
X AXIS
12:54:38 19/12/2000

FIG 6a

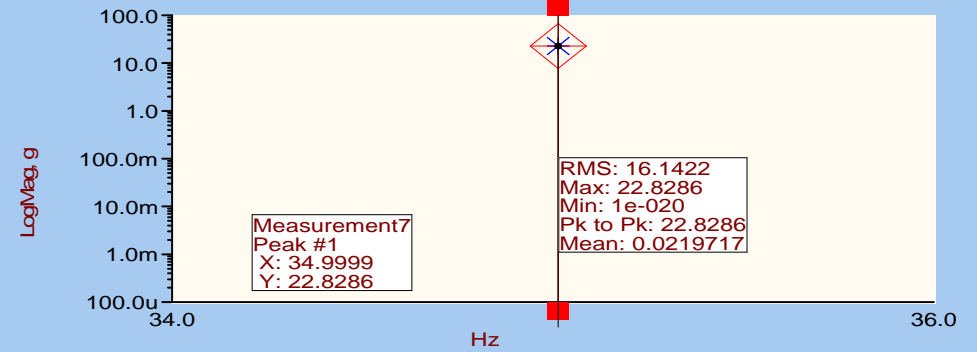
Control



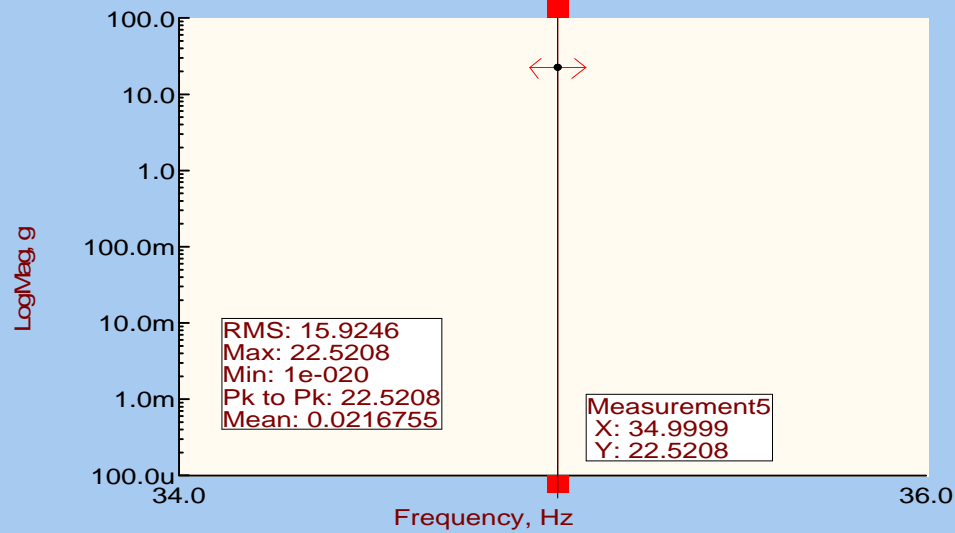
REAR TOP CORNER E BOX X AXIS



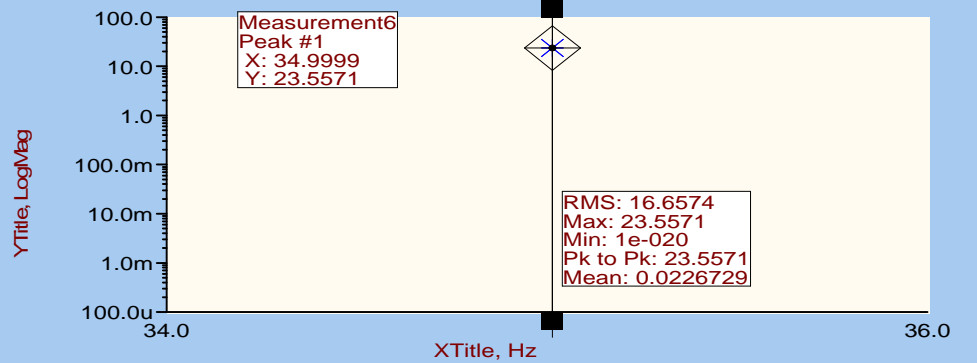
REAR END Baffle X AXIS



TOP END COLD FINGER X AXIS



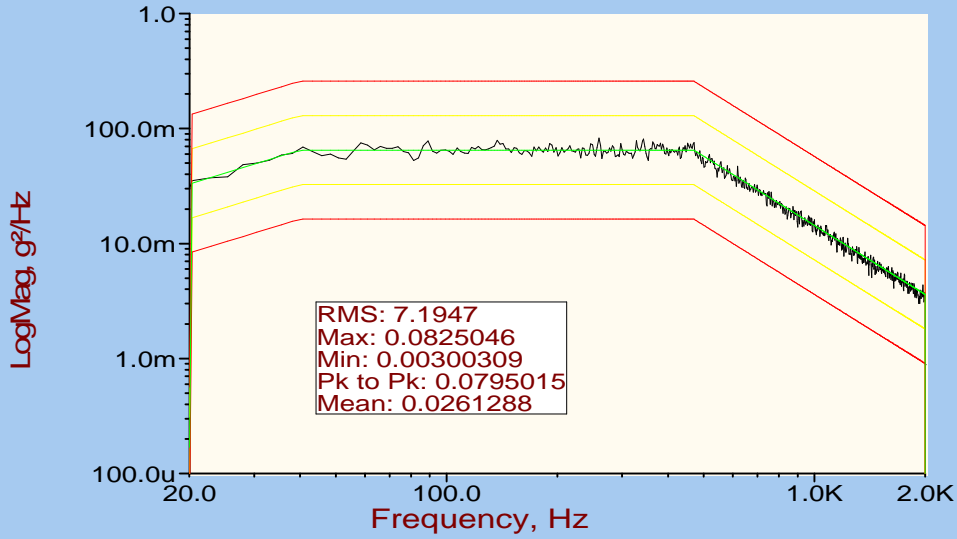
TOP CORNER Baffles X AXIS



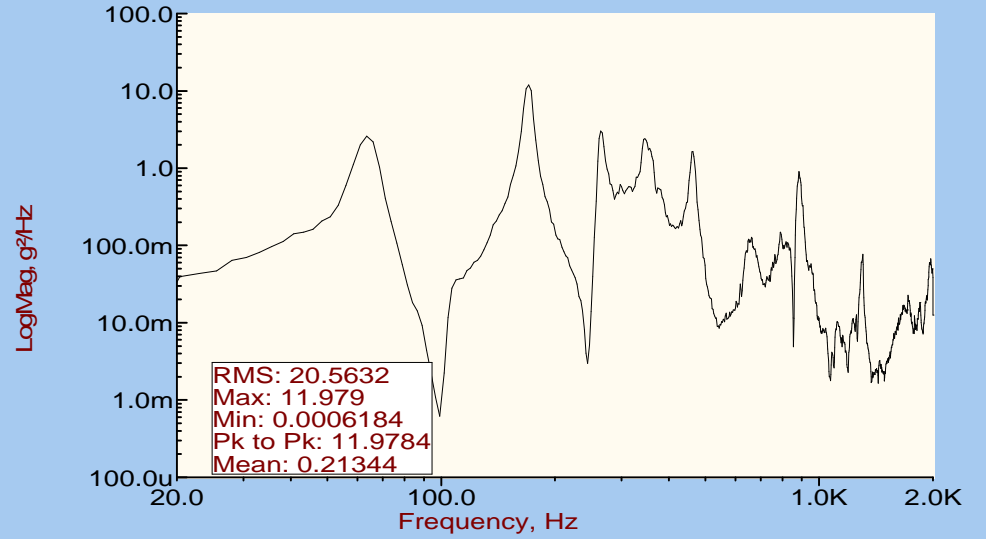
SMEI FLIGHT SPARE CAMERA STATIC LOAD
RUN 00003
X AXIS
12:54:38 19/12/2000

FIG 6b

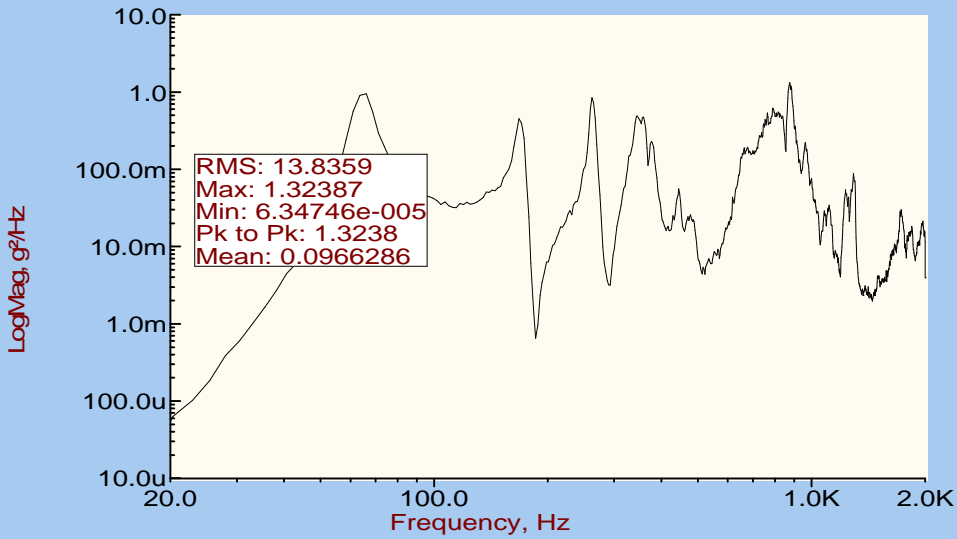
Control;AlarmLow;AlarmHigh;AbortLow;Abo



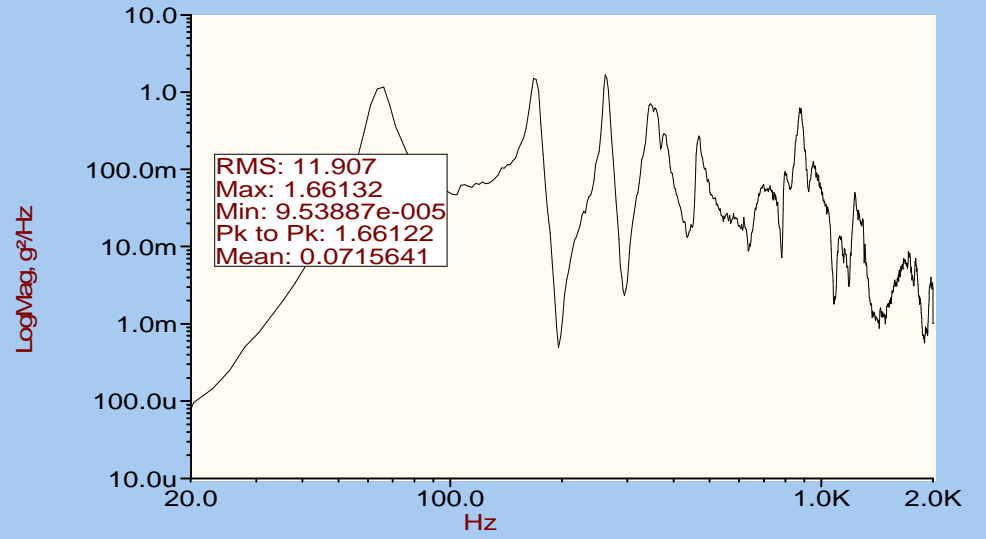
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



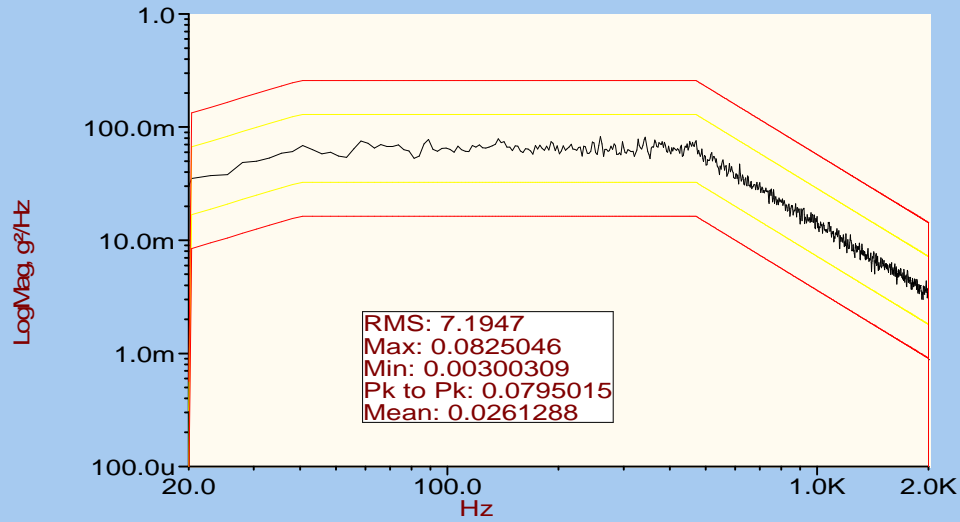
TOP CORNER RADIATOR Z AXIS



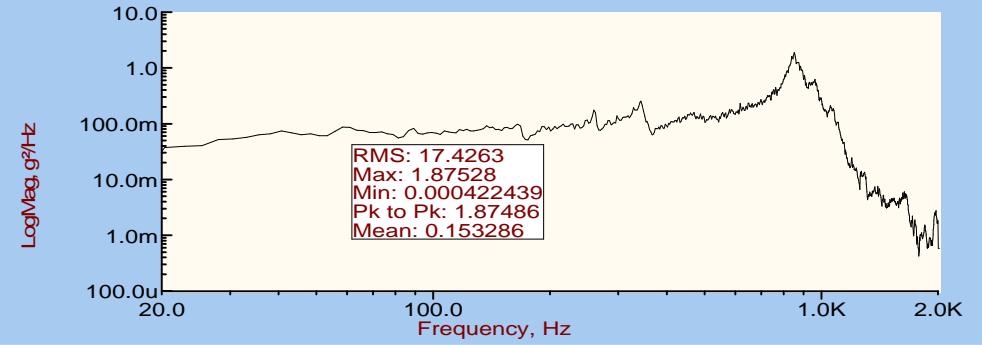
SMEI FLIGHT SPARE CAMERA RANDOM
RUN 00003
X AXIS
12:58:04 19/12/2000

FIG 7a

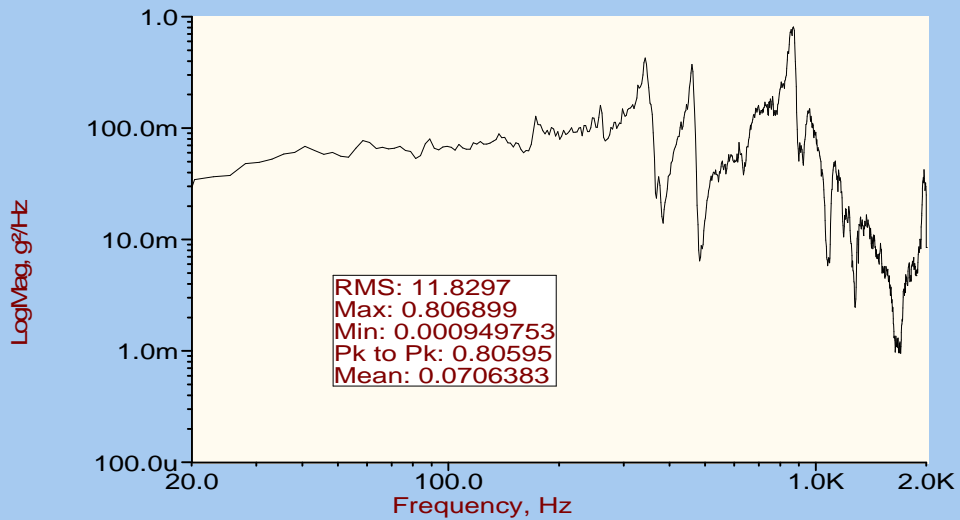
Control;AlarmLow;AlarmHigh;AbortLow;Abo



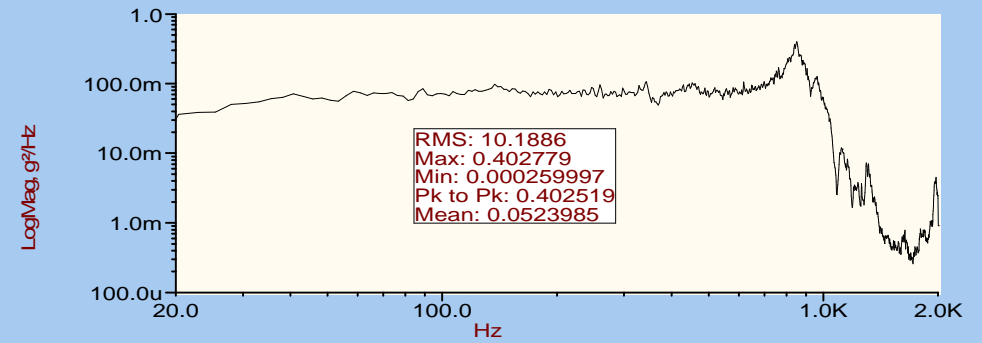
REAR TOP CORNER E BOX X AXIS



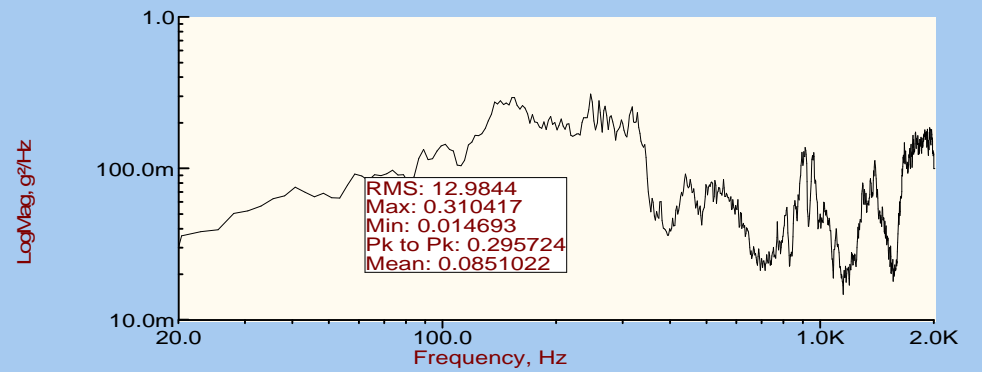
TOP END COLD FINGER X AXIS



REAR END BAFFLE X AXIS



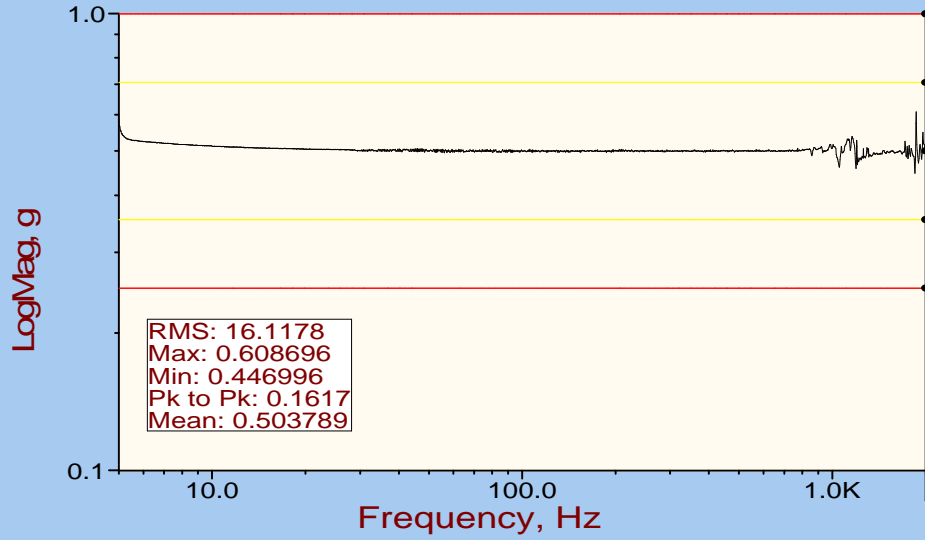
TOP CORNER BAFFLES X AXIS



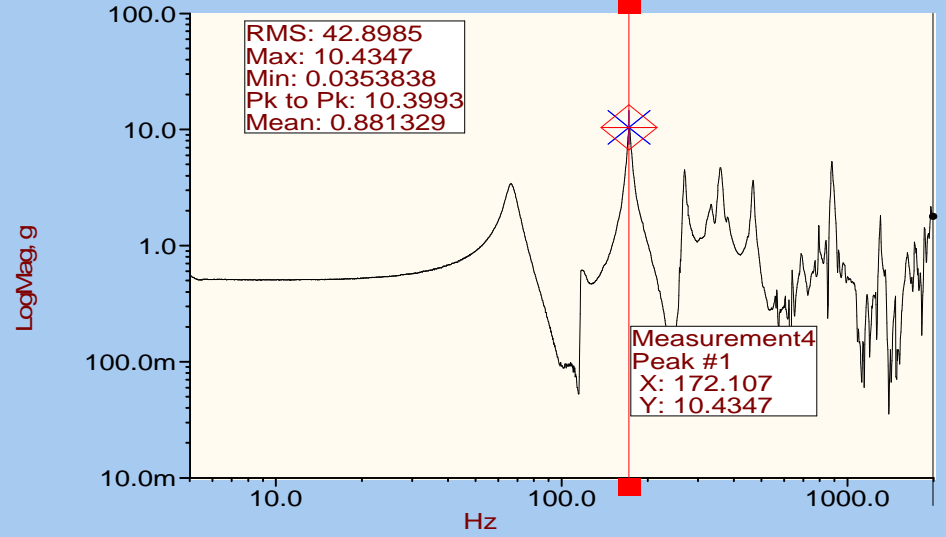
SMEI FLIGHT SPARE CAMERA RANDOM
RUN 00003
X AXIS
12:58:04 19/12/2000

FIG 7b

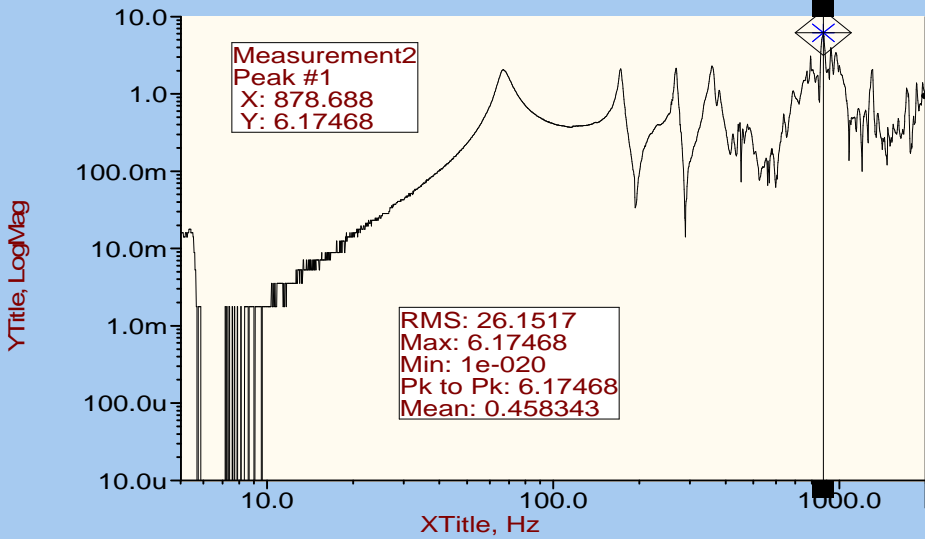
Control;AlarmLow;AlarmHigh;AbortLow;Abo



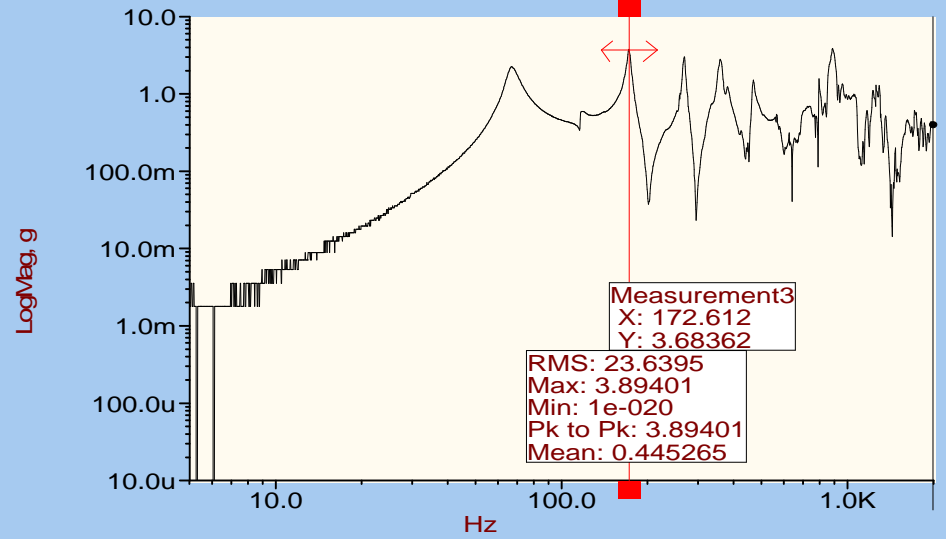
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



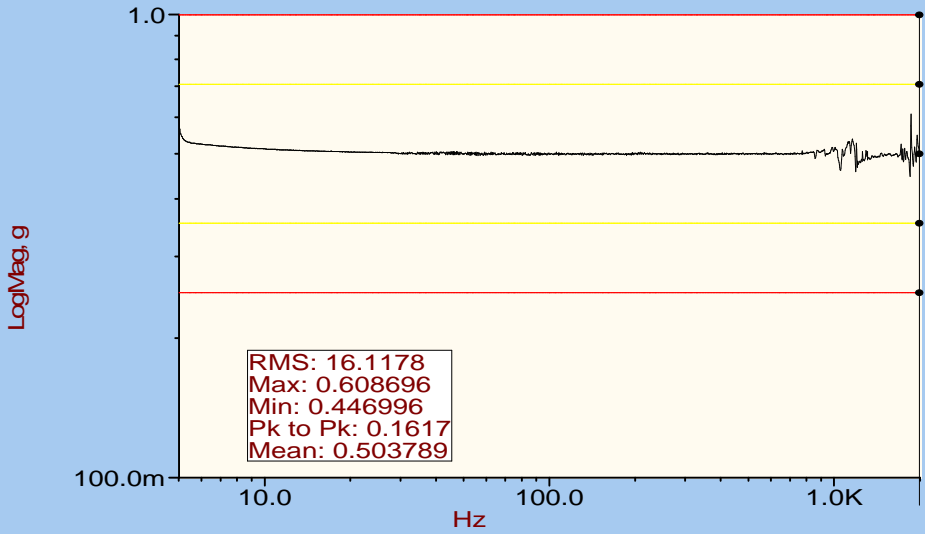
TOP CORNER RADIATOR Z AXIS



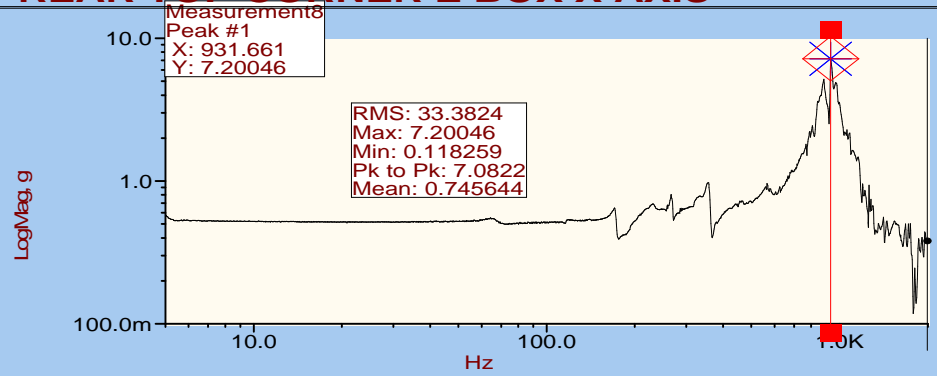
SMEI FLIGHT SPARE CAMERA POST RANDOM SINE SURVEY
RUN 00006
X AXIS
13:00:54 19/12/2000

FIG 8a

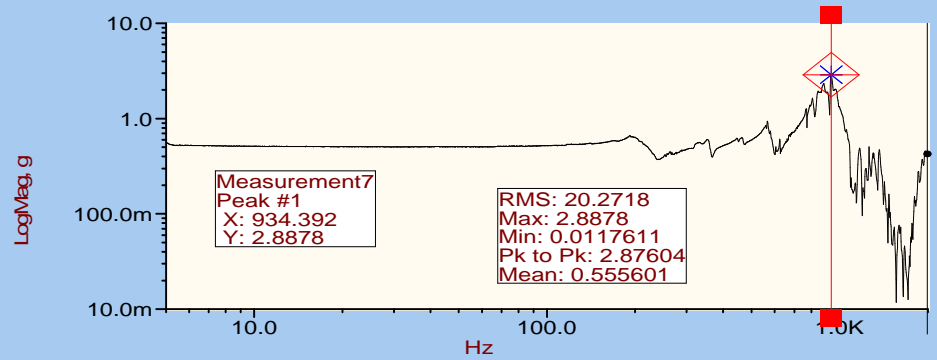
Control;AlarmLow;AlarmHigh;AbortLow;Abo



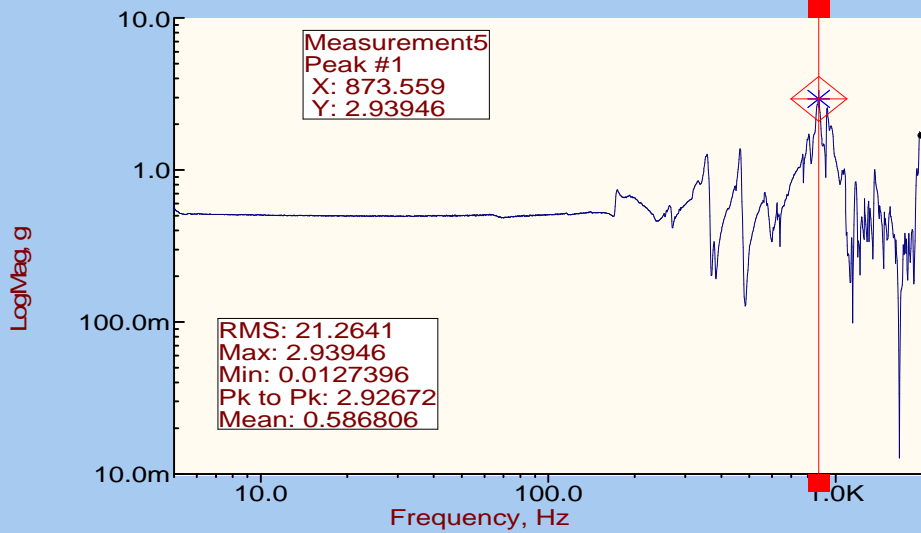
REAR TOP CORNER E BOX X AXIS



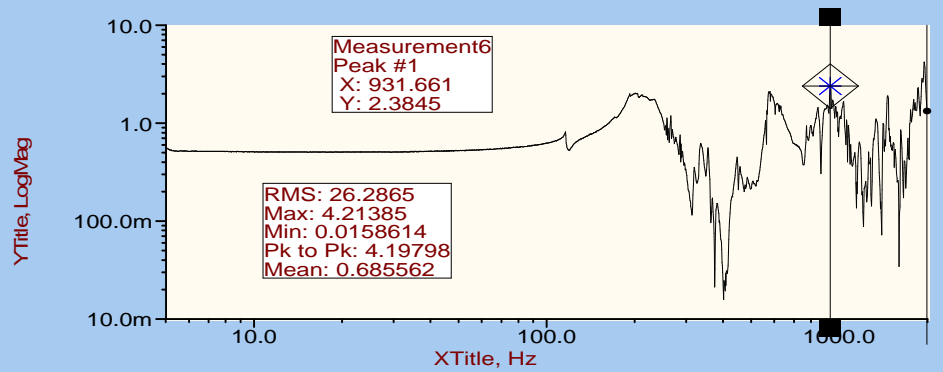
REAR END BAFFLE X AXIS



TOP END COLD FINGER X AXIS



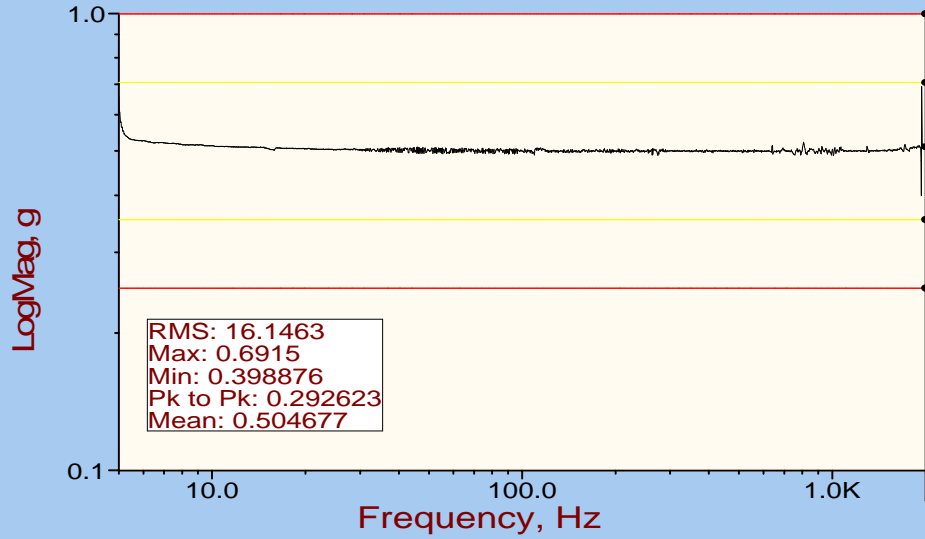
TOP CORNER BAFFLE X AXIS



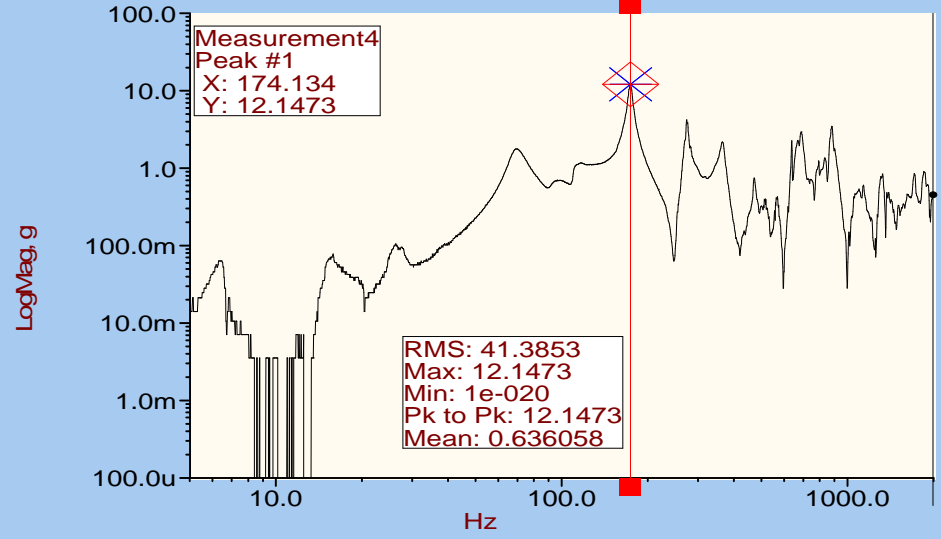
SMEI FLIGHT SPARE CAMERA POST RANDOM SINE SURVEY
RUN 00006
X AXIS
13:00:54 19/12/2000

FIG 8b

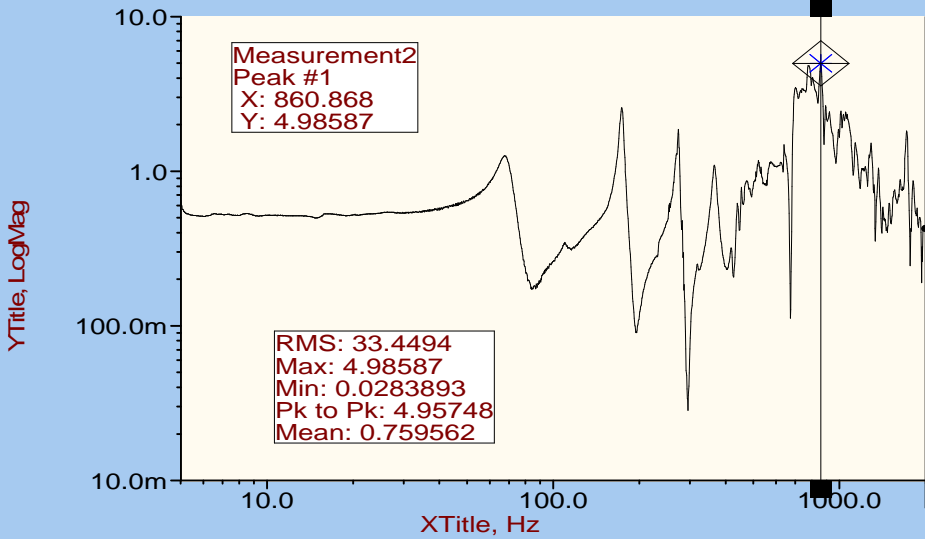
Control;AlarmLow;AlarmHigh;AbortLow;Abo



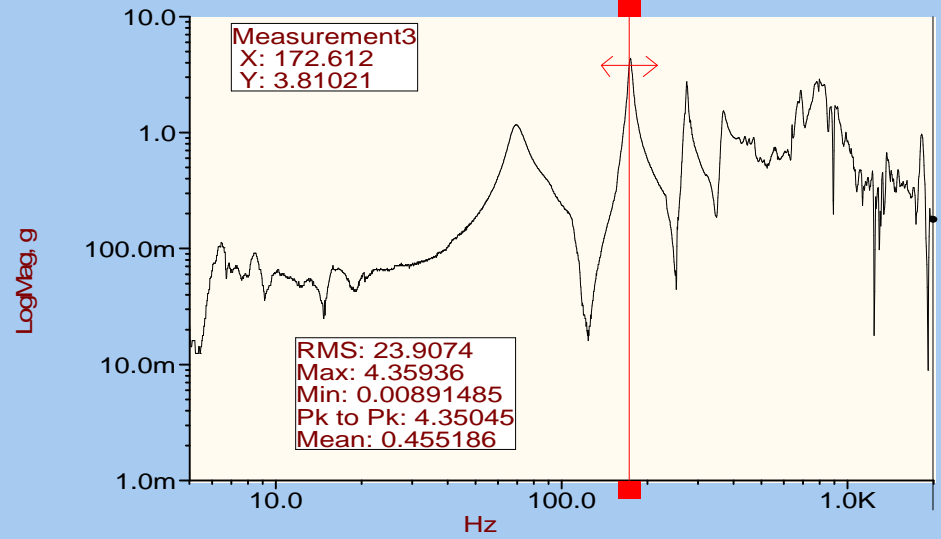
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



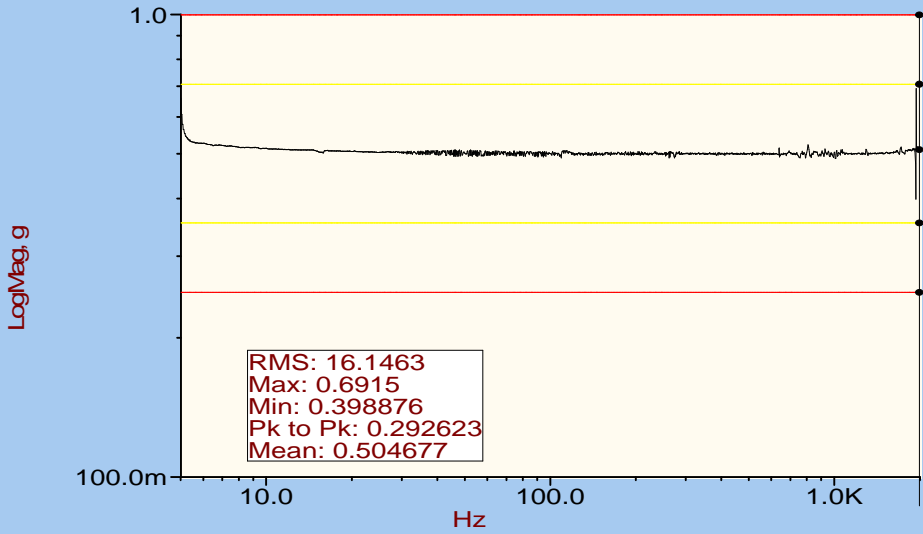
TOP CORNER RADIATOR Z AXIS



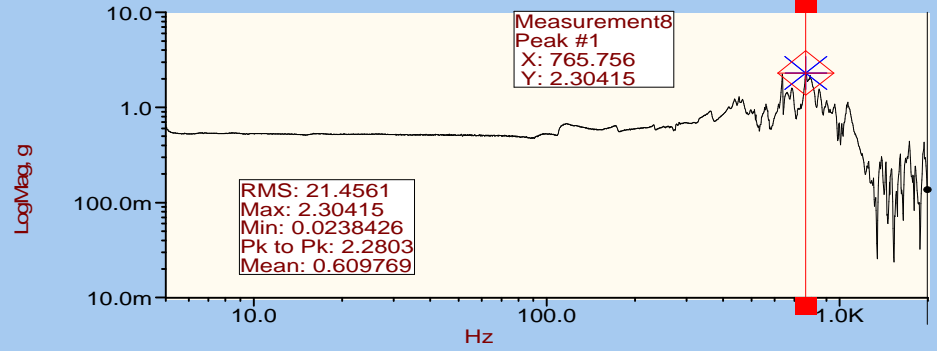
SMEI FLIGHT SPARE CAMERA SINE SURVEY
RUN 00007
Y AXIS
18:03:37 19/12/2000

FIG 9a

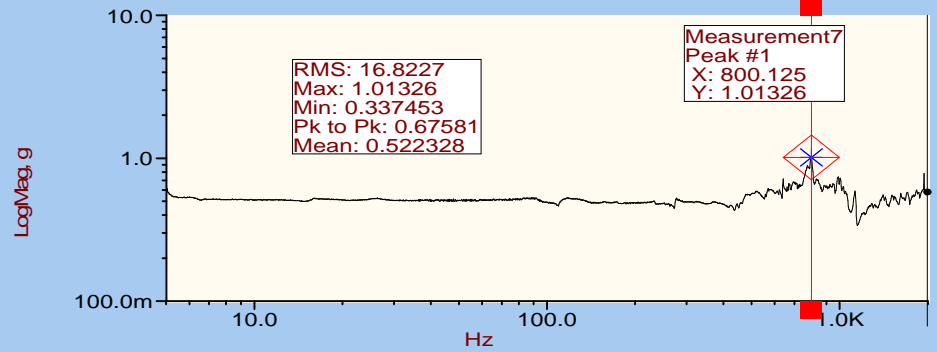
Control;AlarmLow;AlarmHigh;AbortLow;Abo



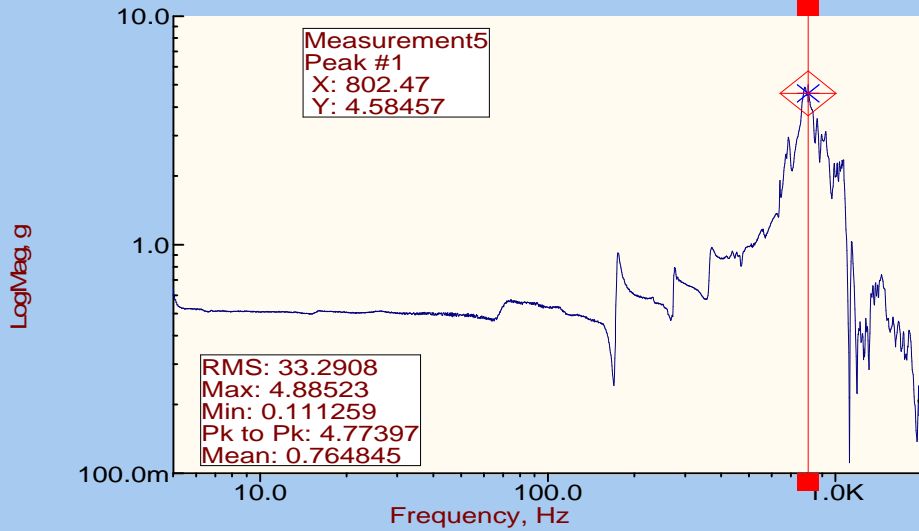
REAR TOP CORNER E BOX Y AXIS



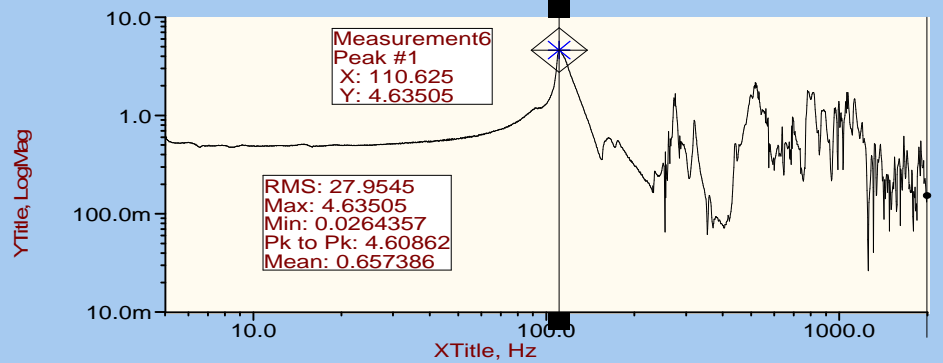
REAR END Baffle Y AXIS



TOP END COLD FINGER Y AXIS



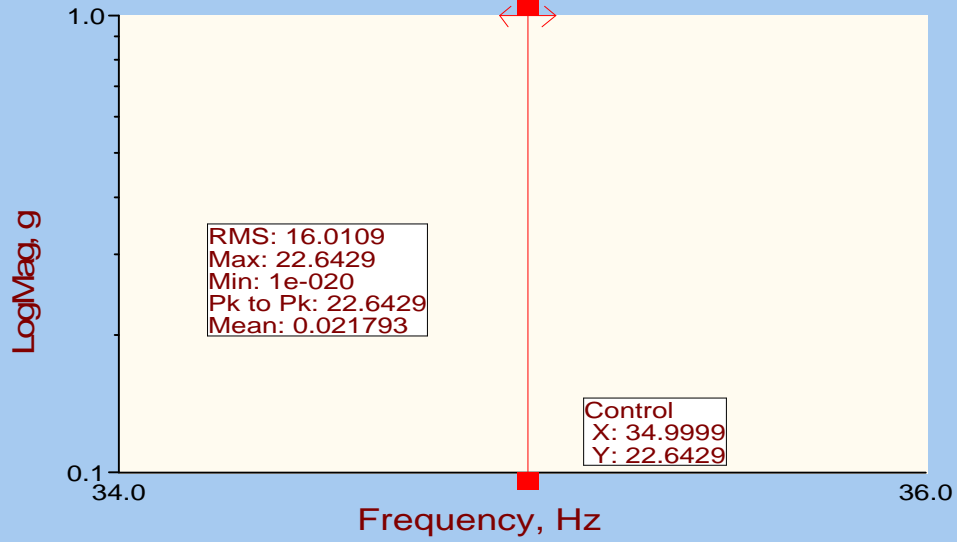
TOP CORNER Baffle Y AXIS



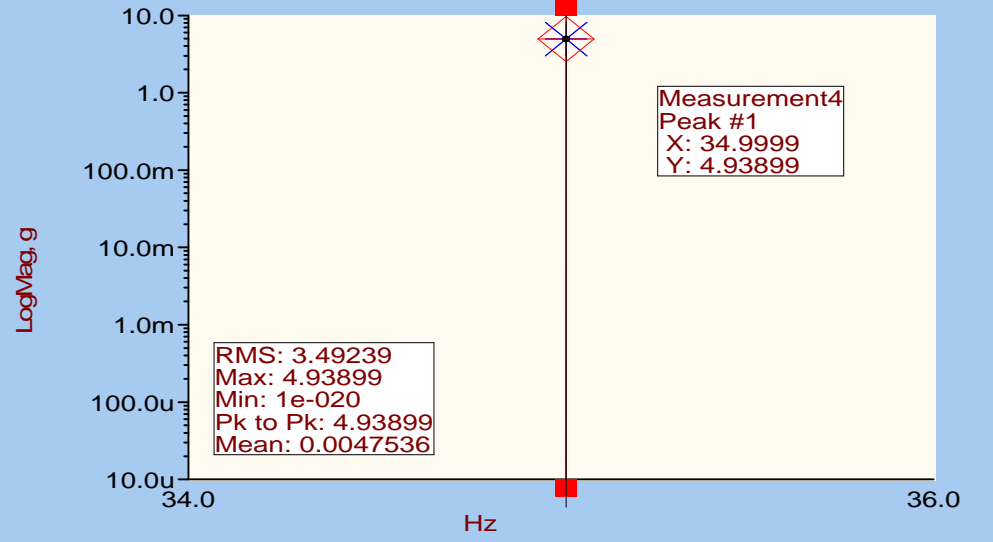
SMEI FLIGHT SPARE CAMERA SINE SURVEY
 RUN 00007
 Y AXIS
 18:03:37 19/12/2000

FIG 9b

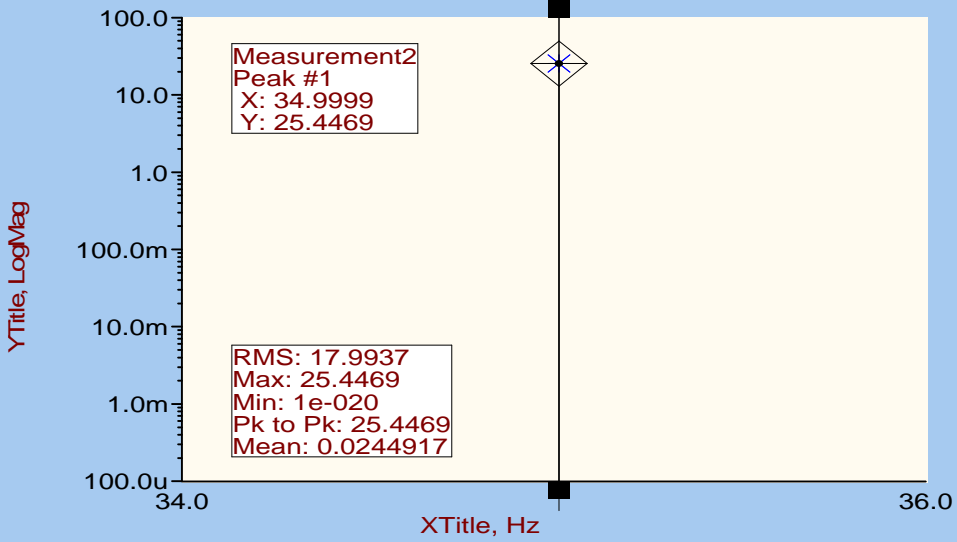
Control



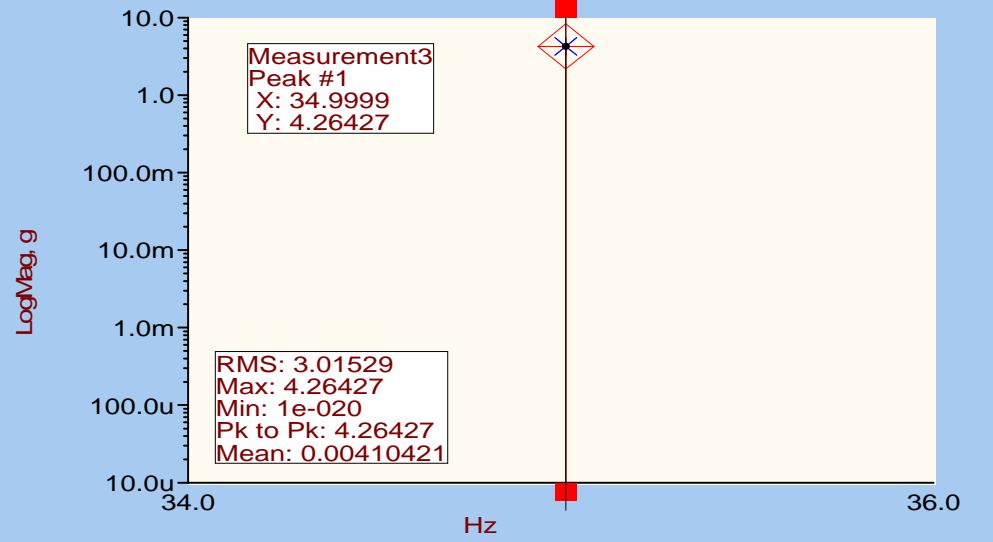
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



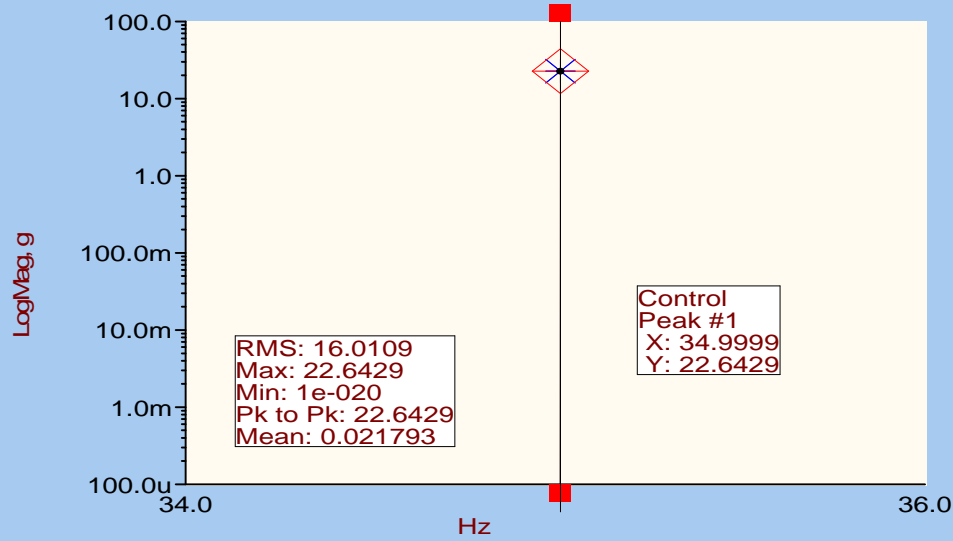
TOP CORNER RADIATOR Z AXIS



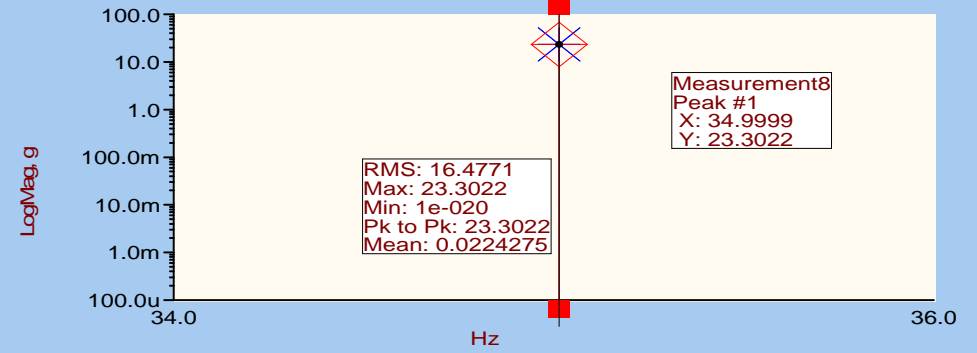
SMEI FLIGHT SPARE CAMERA STATIC LOAD
RUN 00004
Y AXIS
18:10:05 19/12/2000

FIG 10a

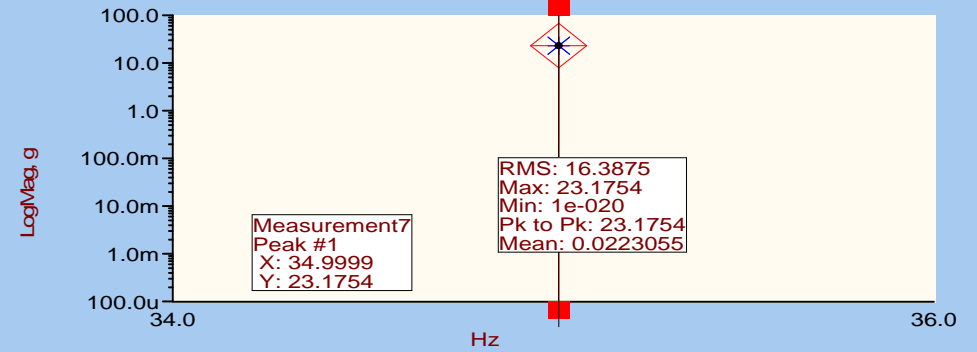
Control



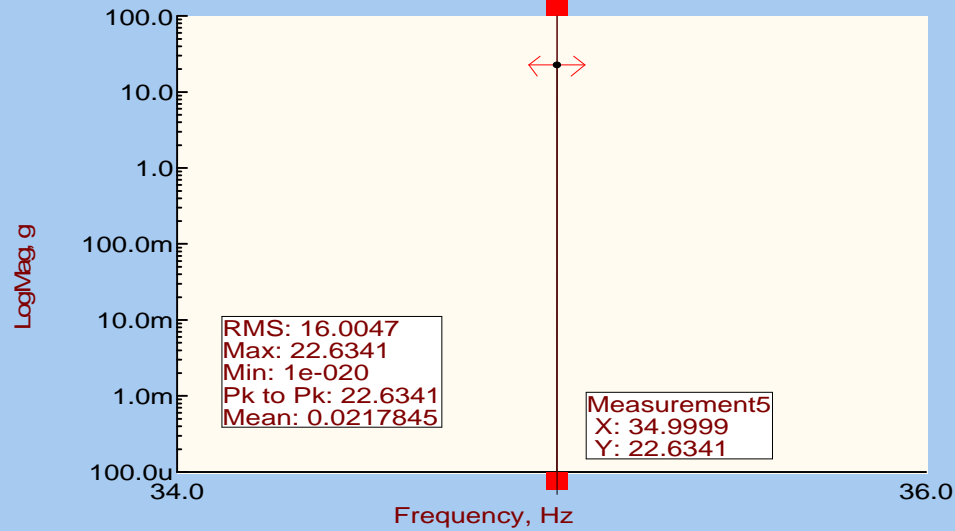
REAR TOP CORNER E BOX Y AXIS



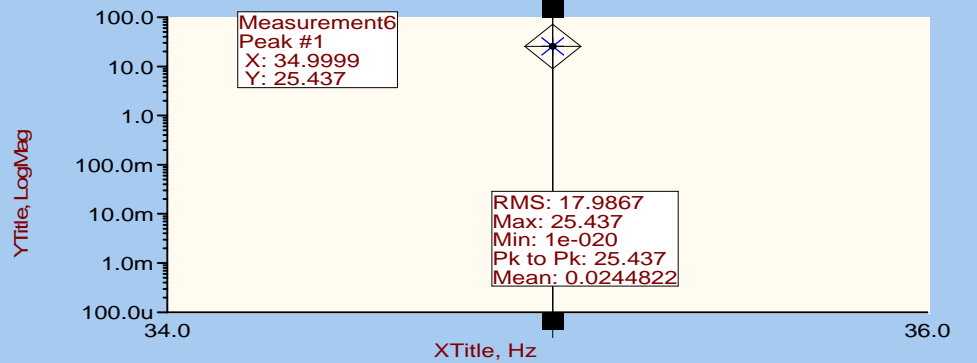
REAR END Baffle Y AXIS



TOP END COLD FINGER Y AXIS



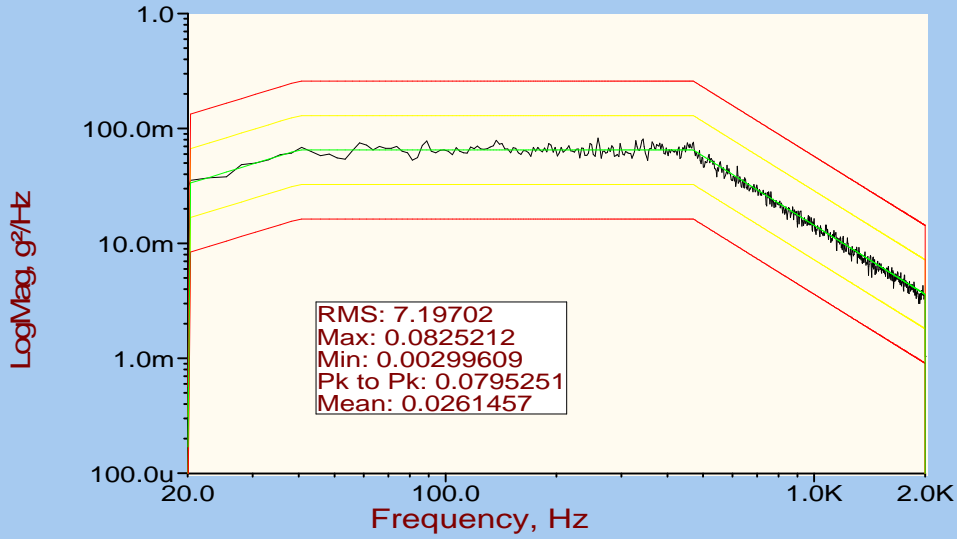
TOP CORNER Baffles Y AXIS



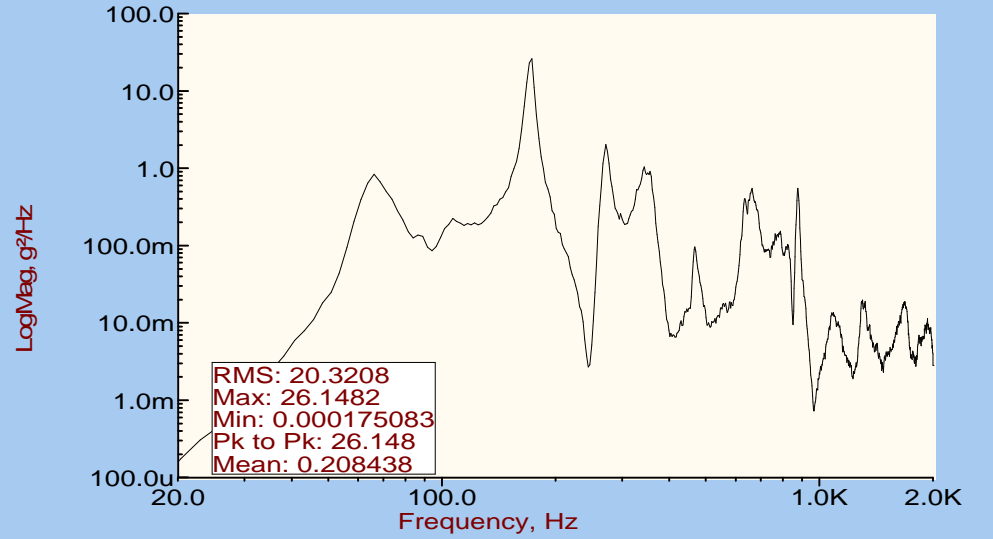
SMEI FLIGHT SPARE CAMERA STATIC LOAD
RUN 00004
Y AXIS
18:10:05 19/12/2000

FIG 10b

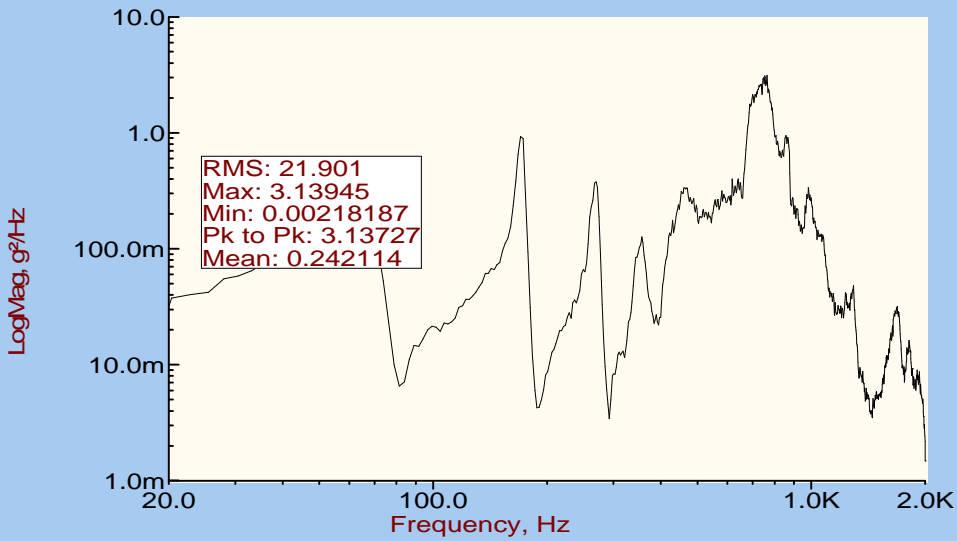
Control;AlarmLow;AlarmHigh;AbortLow;Abo



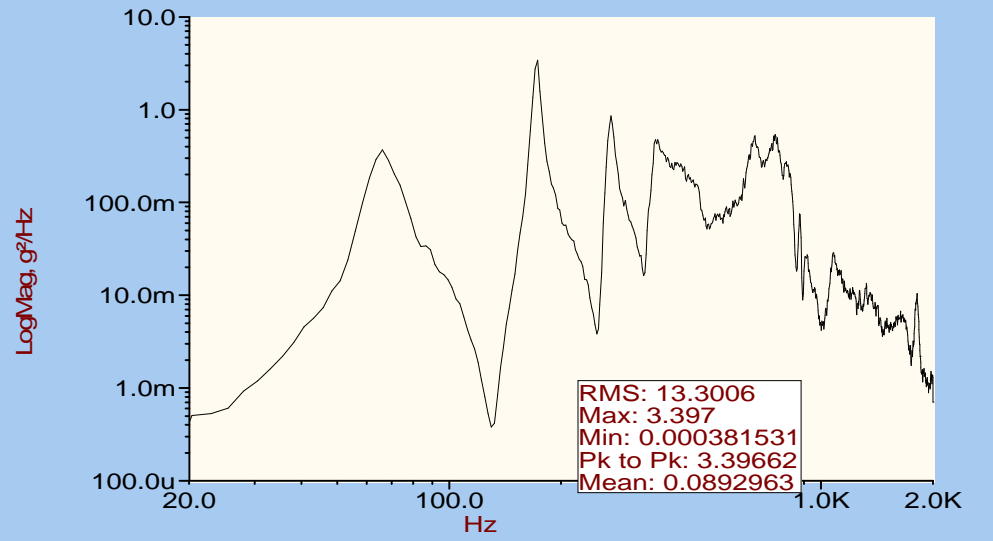
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



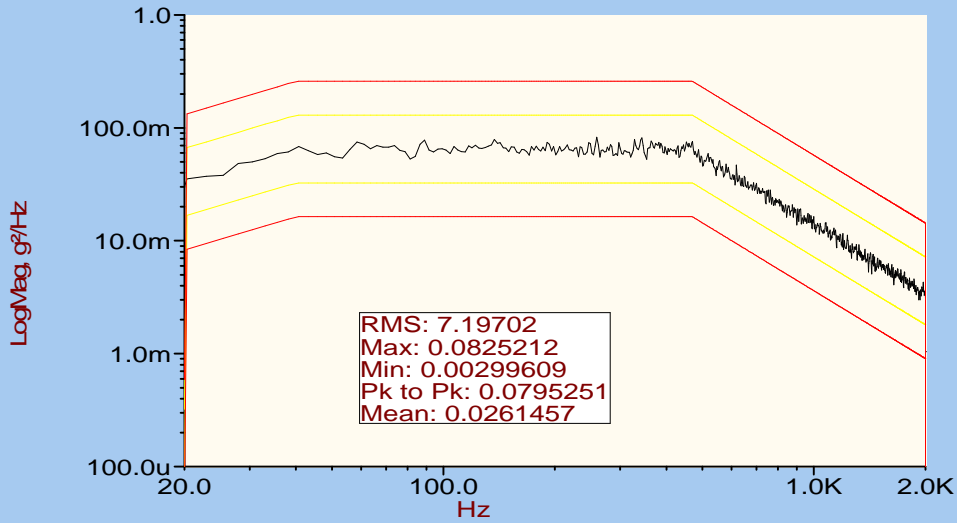
TOP CORNER RADIATOR Z AXIS



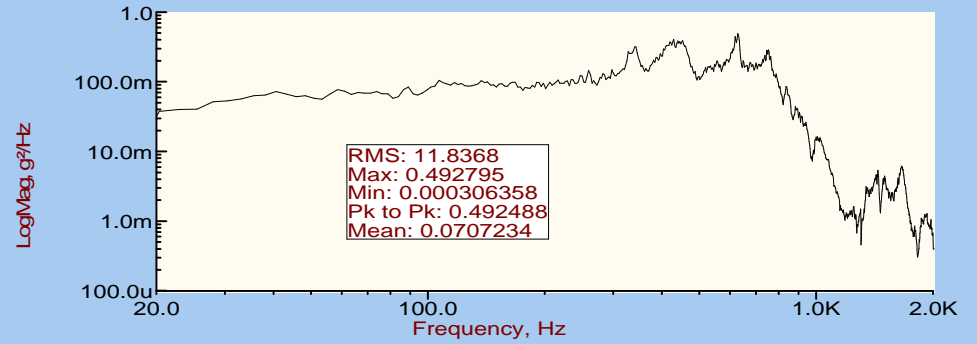
SMEI FLIGHT SPARE CAMERA RANDOM
RUN 00004
Y AXIS
18:11:52 19/12/2000

FIG 11a

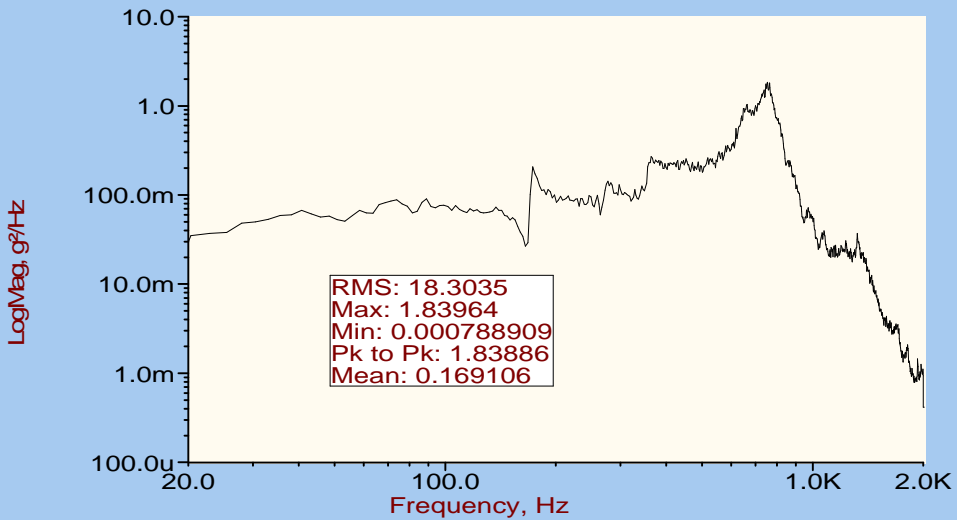
Control;AlarmLow;AlarmHigh;AbortLow;Abo



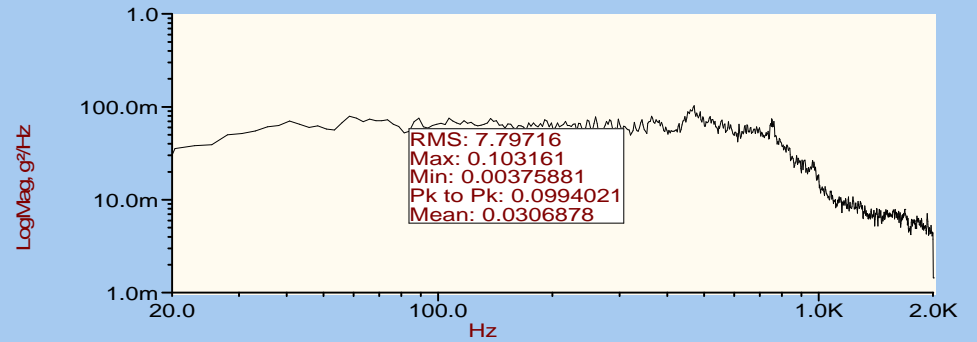
REAR TOP CORNER E BOX Y AXIS



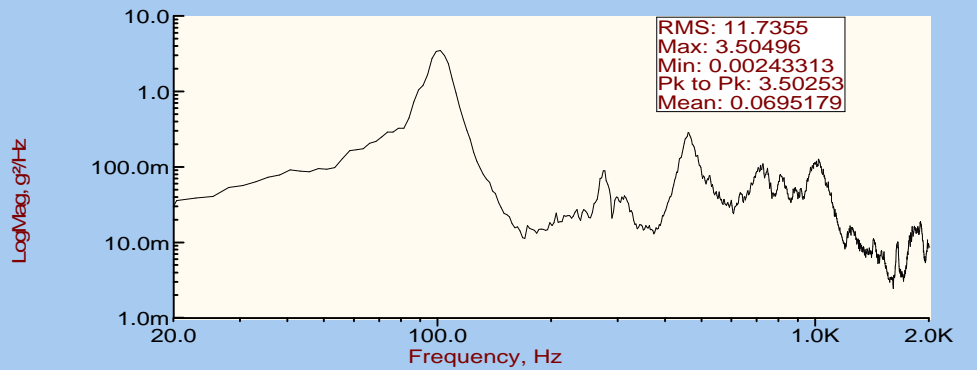
TOP END COLD FINGER Y AXIS



REAR END BAFFLE Y AXIS



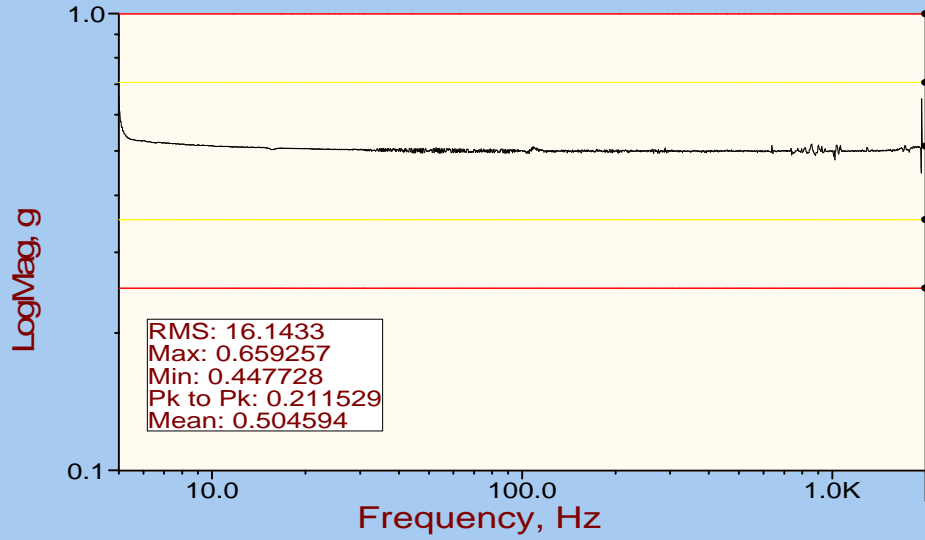
TOP CORNER BAFFLES Y AXIS



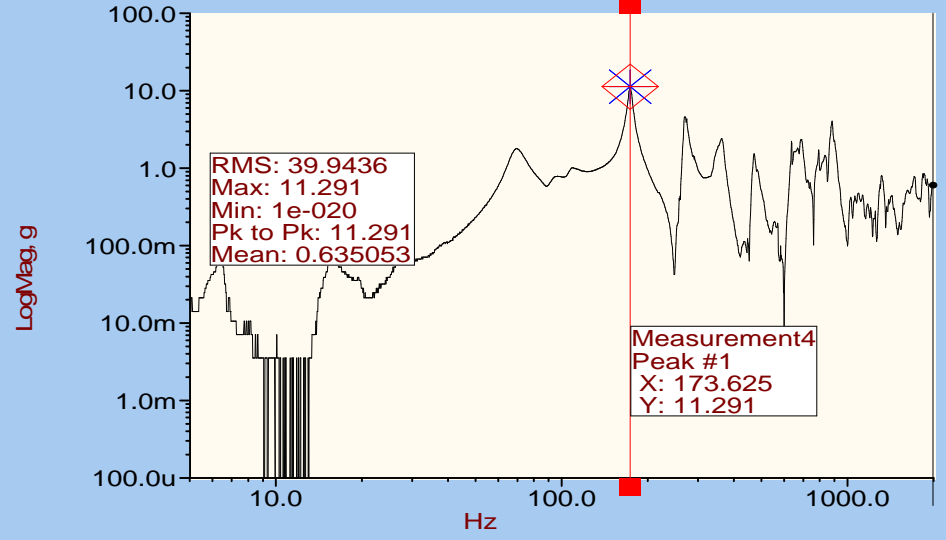
SMEI FLIGHT SPARE CAMERA RANDOM
RUN 00004
Y AXIS
18:11:52 19/12/2000

FIG11b

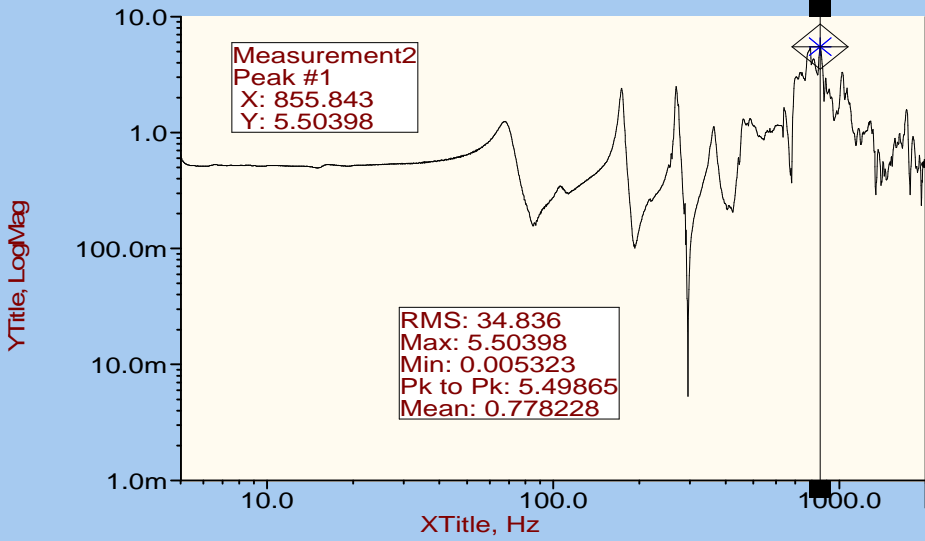
Control;AlarmLow;AlarmHigh;AbortLow;Abo



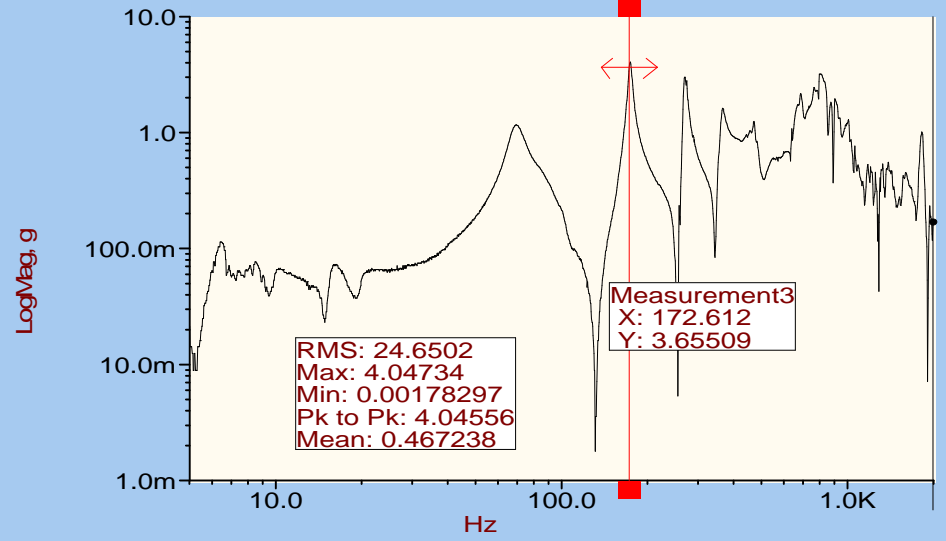
TOP CORNER RADIATOR X AXIS



TOP CORNER RADIATOR Y AXIS



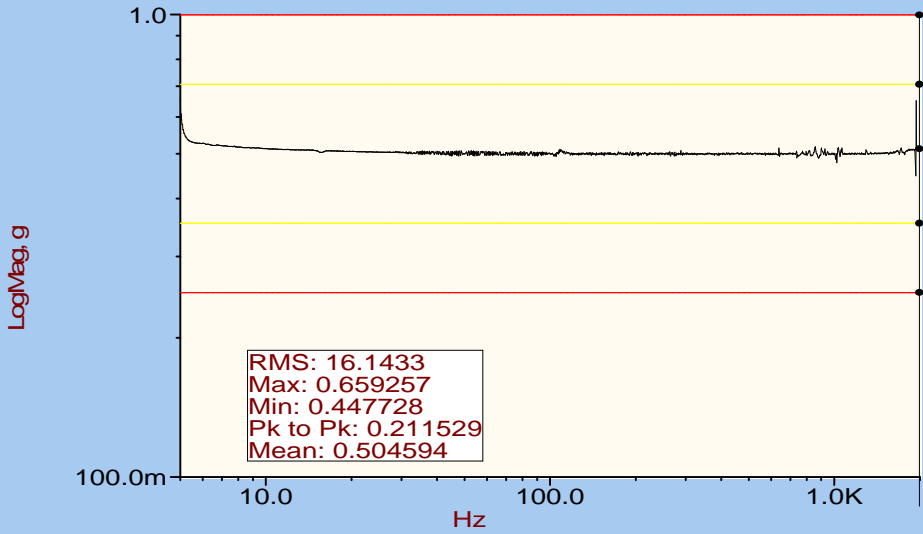
TOP CORNER RADIATOR Z AXIS



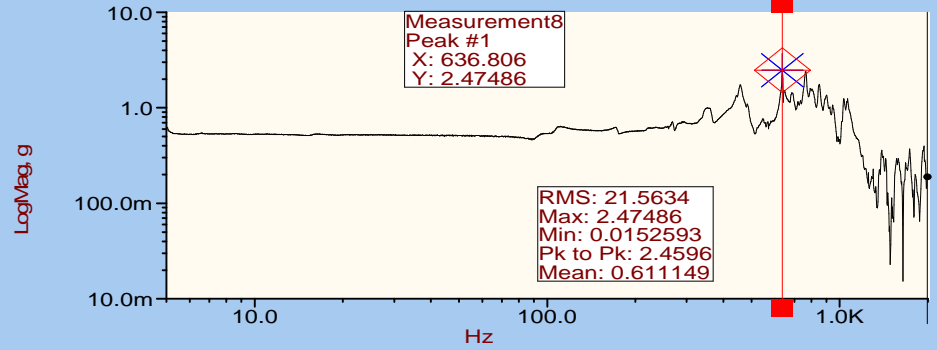
SMEI FLIGHT SPARE CAMERA POST RANDOM SINE SURVEY
RUN 00008
Y AXIS
18:14:10 19/12/2000

FIG 12a

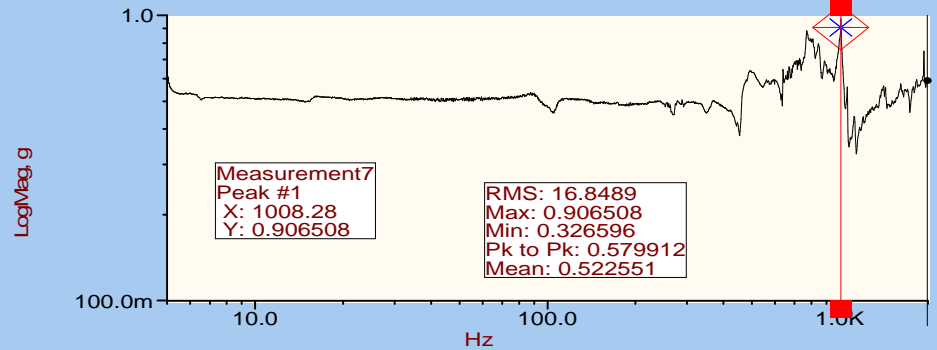
Control;AlarmLow;AlarmHigh;AbortLow;Abo



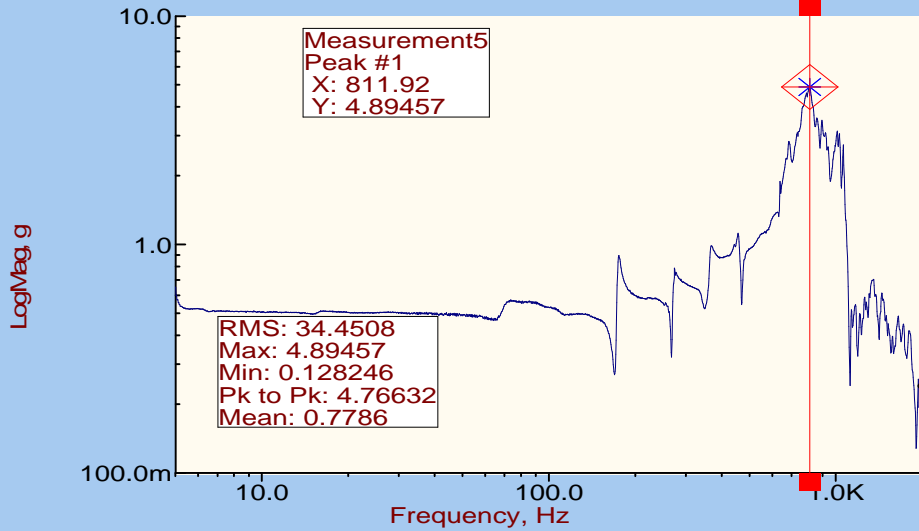
REAR TOP CORNER E BOX Y AXIS



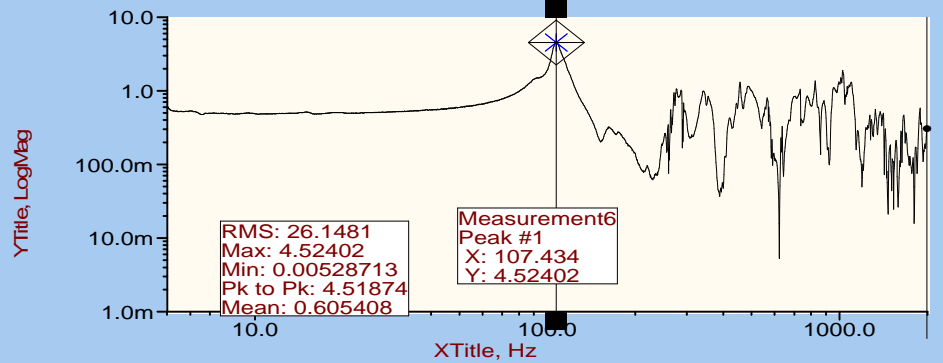
REAR END BAFFLE Y AXIS



TOP END COLD FINGER Y AXIS



TOP CORNER BAFFLE Y AXIS



SMEI FLIGHT SPARE CAMERA POST RANDOM SINE SURVEY
 RUN 00008
 Y AXIS
 18:14:10 19/12/2000

FIG 12b