XMM Optical Monitor

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DEM Vibration test plan

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CHANGE RECORD

ISSUE	DATE	PAGES CHANGED	COMMENTS
Draft	3-May-94		skeleton

1 Sandia Vibration Testing Facilities

Sandia maintains several vibration testing facilities: one in building 860 in Area I, and one in building 6650 in Area III at the Albuquerque site. The area I facility is conveniently located with respect to building 890 where the XMM DEM box will be assembled. Although a number of shakers are available for testing the XMM DEM Unit, one will likely be chosen. Capabilities of this shaker are as follows:

Sine Vibration

1. - 84545 N zero to peak
2. - Displacement - 25mm peak to peak
3. - Maximum Velocity - 165 cm per second
4. - Bare Table G Level - 150 G
5. - Frequency - 5 Hz to 3000 Hz
6. - Temperature - -62 C to +107 C

Random Vibration

1. - 77870 N RMS
2. - Displacement - 25mm peak to peak
3. - Maximum Velocity - 165 cm per second
4. - Bare Table G Level - 138 G rms
5. - Frequency - 5 Hz to 3000 Hz
6. - Temperature - -62 C to +107 C

2 Test Plan

The Unit Under Test (UUT) will consist of one DEM Box, of which there will be several Qualification Units and several Flight Units. All units will be tested; Qualification Units will be tested to qualification levels while Flight Units will be tested to acceptance levels.

The UUT is bolted to a mounting plate that is then bolted to the shaker. Accelerometers are attached to the mounting plate and to selected location on the box to monitor and record vibration levels.

For each axis, the UUT is subjected to sinusoidal input at levels appropriate for electronic units as specified in section 6.5.3.2.1 of the Experiment Interface Document Part A. These levels (qualification levels) are listed below:

Frequency (Hz)	Level	Sweep Rate
5-22	+/-11 mm	2 Oct/min.
22-100	+/122.5 g	

As stated in the EID, acceptance levels are derived by dividing the qualification levels by a factor of 1.5 and are to be applied with a sweep rate of 4 Oct/min.

For each axis, the UUT is subjected to random vibration at levels appropriate for electronic units as specified in section 6.5.3.2.2 of the EID Part A. These levels (qualification levels) are listed below:

Frequency (Hz)	Level	g (RMS) Duration
20-100	+6 dB/Oct	2 min per
100-500	0.2 g**2/Hz	12.7 axis
500-2000	-6 dB/Oct	

As stated in the EID, acceptance levels are derived by dividing the qualification levels by a factor of 2.25 and are to be applied with a duration of 2 minutes per axis.

A limited performance test (LPT) will be performed before vibration testing begins and after each vibration test at each axis to demonstrate continued functionality.