

Component Acceptance Vibration Test Levels for Workmanship Screening

By Tom Irvine

Email: tom@vibrationdata.com

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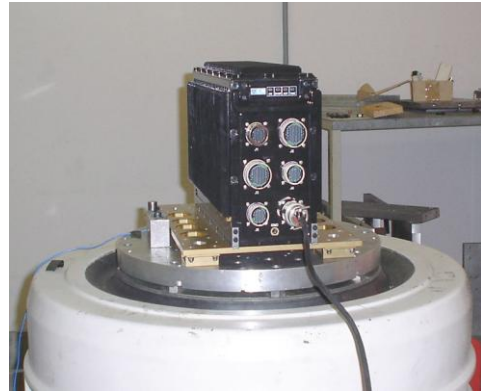
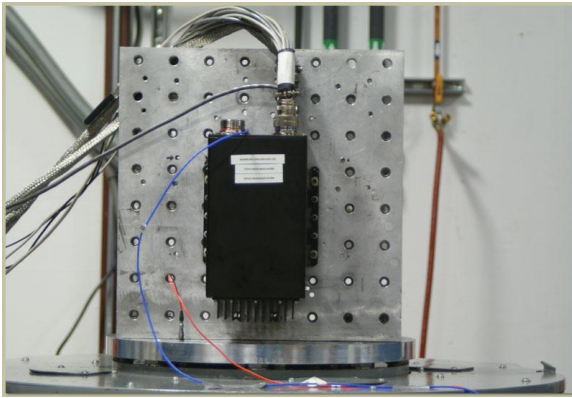


Figure 1. Avionics Component Testing on shaker Tables

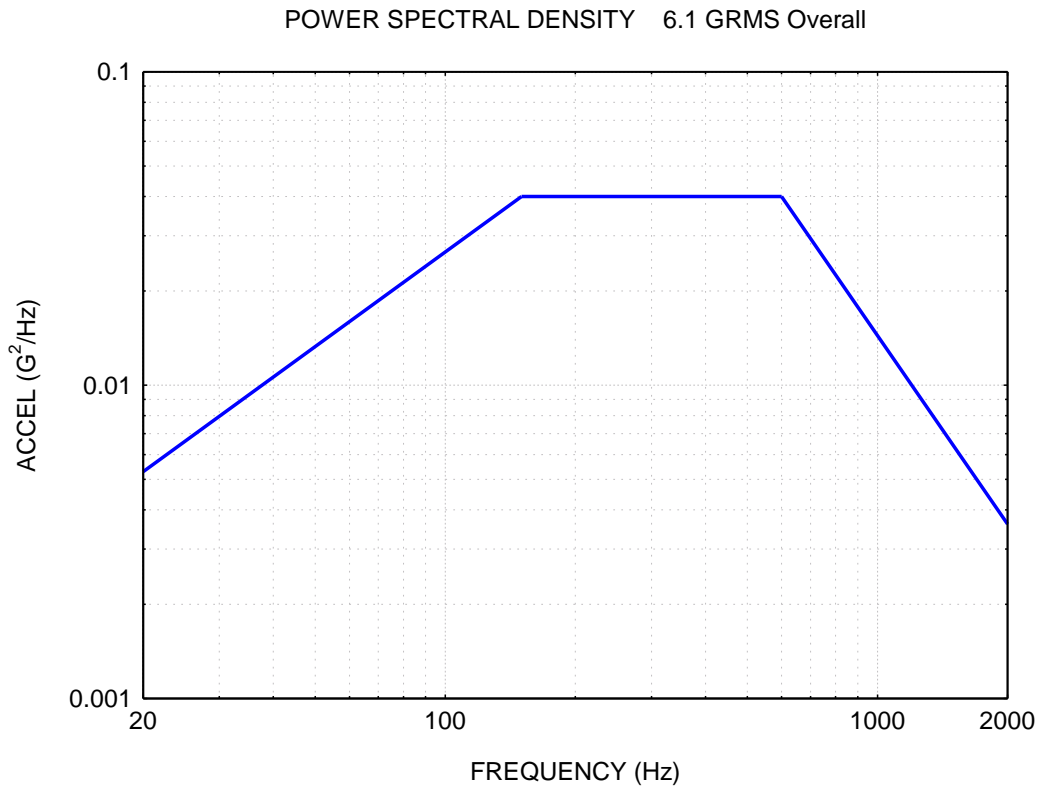
Introduction

Avionics components are subjected to acceptance random vibration tests to verify their parts and workmanship prior to flight. This is particularly important for circuit boards which have piece parts with vulnerable solder joints and lead wires. The acceptance test levels usually envelope the maximum expected flight environment as well. The acceptance test may thus serve two purposes.

A number of somewhat similar random vibration power spectral densities curves have been specified in historical references as “minimum workmanship” levels, as show in the following figures.

These levels typically apply to components whose mass does not exceed 23 kg (50 lbm).

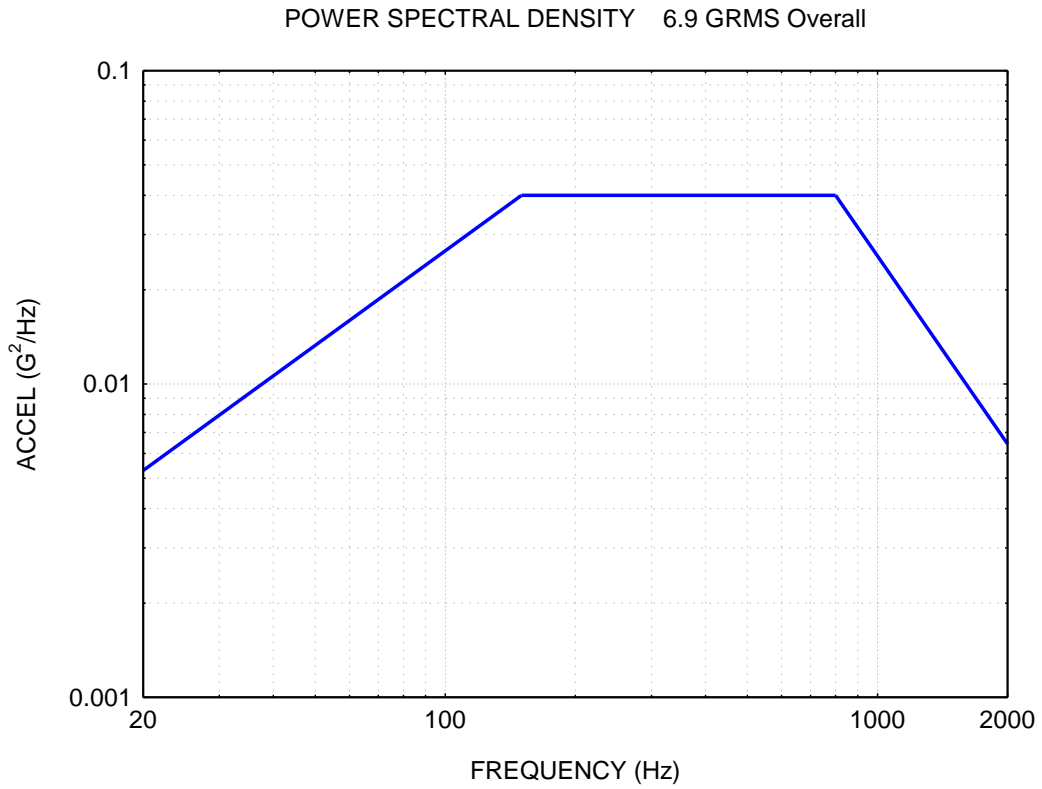
MIL-STD-1540B & C



Frequency (Hz)	PSD (G ² /Hz)
20	0.0053
150	0.04
600	0.04
2000	0.0036

Figure 2. MIL-STD-1540 Random Vibration Spectrum

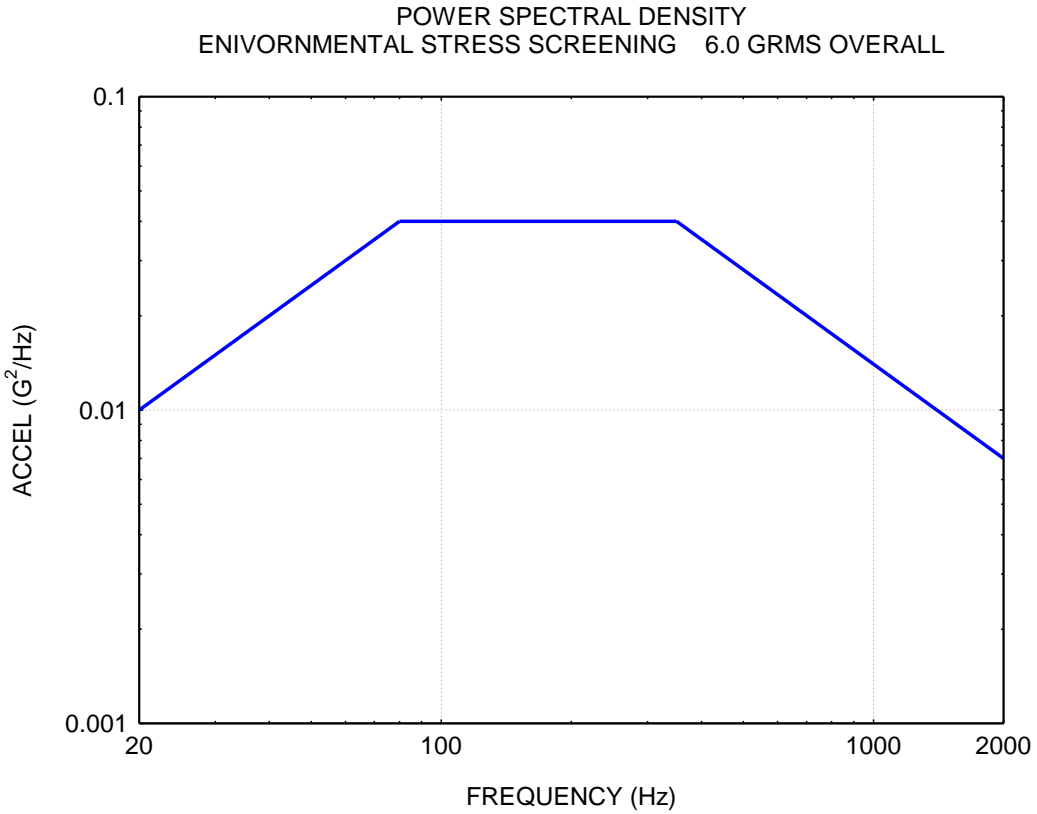
The minimum duration is 1 minute per axis.



Frequency (Hz)	PSD (G ² /Hz)
20	0.0053
150	0.04
800	0.04
2000	0.00644

Figure 3. Aerospace Random Vibration Spectrum

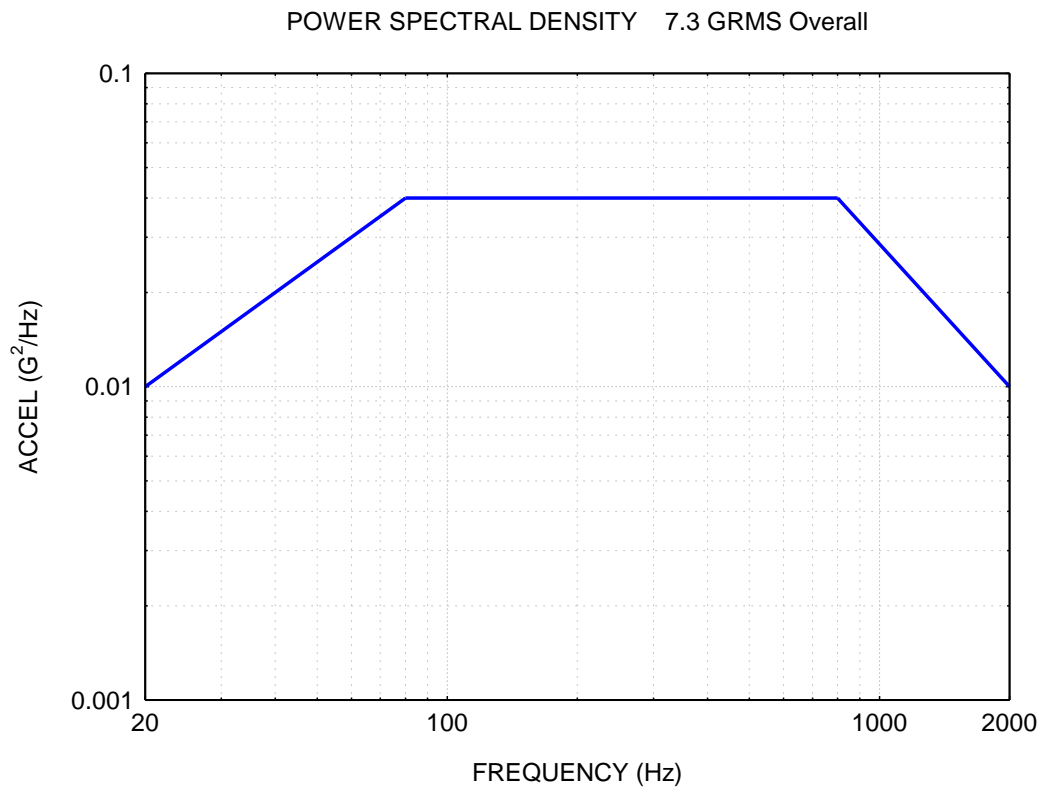
The minimum duration is 1 minute per axis.



Frequency (Hz)	PSD (G ² /Hz)
20	0.01
80	0.04
350	0.04
2000	0.007

Figure 4. NAVMAT Random Vibration Spectrum

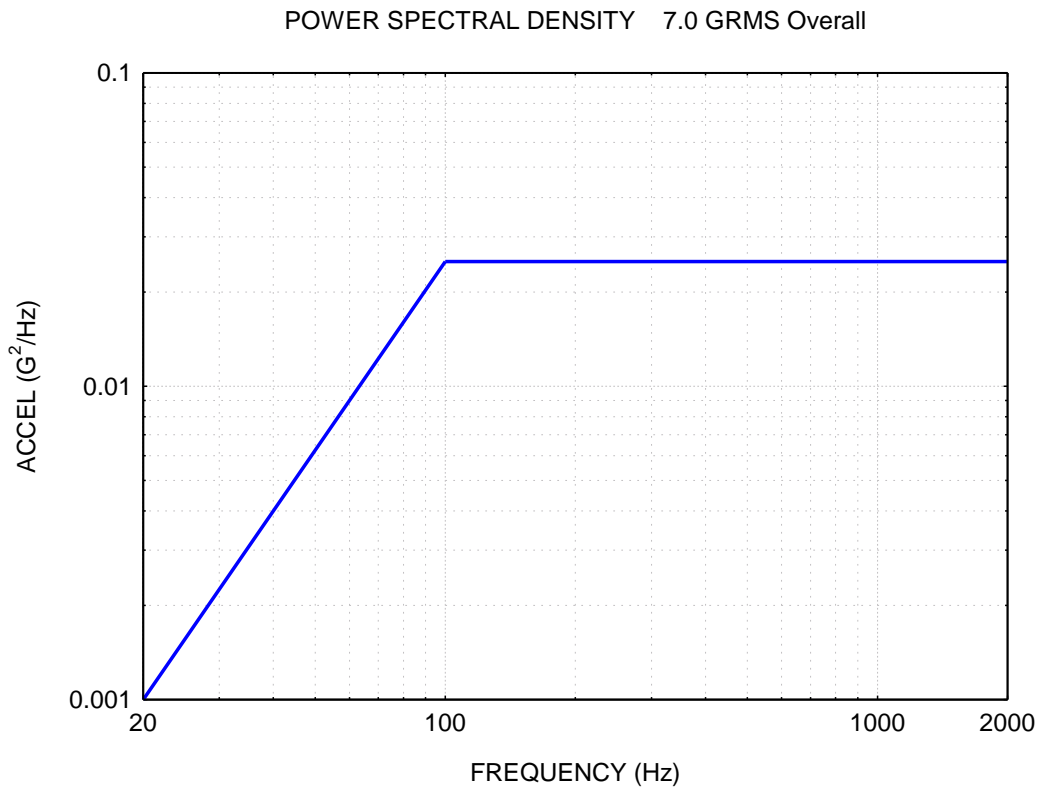
The duration of random vibration should be at least ten minutes if a single axis is sufficient. Where vibration in more than one axis is required, the duration of random vibration should be at least five minutes in each axis.



Frequency (Hz)	PSD (G ² /Hz)
20	0.01
80	0.04
800	0.04
2000	0.01

Figure 5. NASA Random Vibration Spectrum

The minimum duration is 1 minute per axis.



Frequency (Hz)	PSD (G ² /Hz)
20	0.001
100	0.025
2000	0.025

Figure 6. Air Force Geophysics Laboratory Random Vibration Spectrum

The duration is 1 minute per axis.