

## Verification Test Report J11458-Val

**Product Tested:** VCCM600 Power Supplies

**Test Type:** Verification Testing

**Standard:** Customer Specified Environmental Testing  
– Non-operational and operational  
EN60068-2-27 Mechanical Shock  
EN60068-2-6 Sinusoidal Vibration  
EN60068-2-64 Random Vibration  
MIL STD 810G Method 514.6, Procedure I  
(General Vibration) Category 4, 7 and 24  
MIL STD 810G Method 503.5 Procedure I-C  
Multicycle 3 shocks

**Job #:** J11458-7814

**Date Received:** 21<sup>st</sup> Jul 2016

**Test Dates:** 21<sup>st</sup> Jul 2016 – 17<sup>th</sup> Jan 2017

**Report Date:** 14<sup>th</sup> Feb 2017



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### 1.0 Introduction

#### 1.1 Description

The purpose of this test report is to verify the Vox Power VCCM600M medical AC/DC conduction cooled configurable power supply (UUT). Validation testing was carried out on 7 Vox Power VCCM600M medical AC/DC conduction cooled configurable power supply (UUT).

During the validation testing the UUT were exposed to operational and non-operational environmental testing (temperature and humidity), operational and non-operational altitude and non-operational thermal shock testing.

The UUT were also subjected to operational and non-operational mechanical testing (vibration and mechanical shock) and a non-operational freefall shock test as outlined in the test product details table.

#### 1.2 Test Product Details

Model	Test Description	Qty	Result
VCCM600 PSU	Non-operational temperature and humidity	3	Passed
	Operational temperature and humidity	1	Passed
	Non-operational low pressure altitude testing	3	Passed
	Non-operational high pressure altitude testing	3	Passed
	Operational low pressure altitude testing	1	Passed
	Operational high pressure altitude testing	1	Passed
	IEC Sinusoidal Vibration - Operational	1	Passed
	IEC Random Vibration – Operational	1	Passed
	IEC Random Vibration – Non Operational	2	Passed
	IEC Mechanical Shock – Operational	1	Passed
	IEC Mechanical Shock – Non Operational	1	Passed
	MIL STD 810G Category 4 – Non Operational	2	Passed
	MIL STD 810G Category 7 – Non Operational	2	Passed
	MIL STD 810G Category 24 – Non Operational	2	Passed
	MIL STD 810G Method 503.5 Procedure 1-C Multi-Cycle 3 Shocks – Non Operational	3	Passed
	810G: Method 516.6, Procedure IV, Transit Drop	2	Passed

### 1.3 References

Test	Standard
*Temperature & Humidity	Customer Specified
*Altitude Testing	Customer Specified
Sinusoidal Vibration	IEC 60068-2-6, 2007, Test Fc
Random Vibration	IEC 60068-2-64, 2008, Test Fh
*Random Vibration	810G Method 514.6 Procedure 1 (General Vibration) Category 4 Trucks and Trailers, (composite wheeled vehicle) Figure 514.6C-3 Category 7 (Aircraft, Helicopter), Figure 514.6C-8, Table 514.6X General Category 24 (All minimum Integrity) Figure 514.6E-1
Thermal Shock	MIL-STD-810G Method 503.5 Procedure 1-C Multicycle 3 shocks
Mechanical Shock	IEC 60068-2-27, 2008, Test Ea
Transit Drop	810G: Method 516.6, Procedure IV,

\*denotes test or test parameters outside scope of ISO17025 accreditation

### 1.4 Observations

#### Non-operational Temperature and Humidity Testing

A functional and visual test was performed before and after the non-operational environmental temperature and humidity non-operational and there were no issues noted.

#### Operational Temperature and Humidity Testing

A functional and visual test was performed before and after the operational environmental temperature and humidity non-operational and there were no issues noted.

#### Vibration Profiles

A visual and functional test was performed before and after the various sinusoidal and random vibration profiles and there were no issues noted.

#### Mechanical Shock

A visual and functional test was performed before and after the mechanical shock test and there were no issues noted.

#### Mechanical Shock – Transit Drop

The UUT was powered after every drop and visually inspected for any issues. During the testing a second UUT and package was used as the carton original carton began to deteriorate following 6 freefall impacts, after a total of 17 impacts the UUT and the packaging was replaced, following a drop on the front top left (AC power side (front)) had been completed it was observed that RT1 and C1 were pushed in and the epoxy securing the components had broken off.

There were no other visual issues and the UUT powered up without any issues after every transit drop test. The UUT were returned to for further evaluation following completion of the testing.

### Altitude Testing

A functional and visual test was performed before and after the non-operational altitude test and there was no issue noted.

### Thermal shock

A functional and visual test was performed before and after the thermal shock in air profile test and there were no issues noted.

The UUT were returned to the customer following completion of the environmental testing for further evaluation.

## 1.5 Fixturing

During the environmental testing the UUT were placed on shelves and free air allowed to move about them. During the vibration and shock the UUT were secured with overhead clamps and vertical threaded bars. The UUT were using 230VAC and the load modules were connected to electronic loads during the operational temperature and humidity, operational altitude, and operational vibration tests. During the operational mechanical shock test the UUT was not loaded but powered at 230VAC.

## 1.6 Equipment

Equipment Make/ Model	Asset No.	Cal Due Date
Thermotron SM32CE-2 environmental chamber	ANO1139	01 Apr 2017
Votsch VCS 7048-20 environmental chamber	ANO2450	05 Sep 2017
Votsch VT7012S2 thermal shock	ANO0905	23 Jun 2017
Vacuum tank	ANO1325	N/A
Altitude high pressure controller	ANO1858	11 May 2017
Altitude low box	ANO1524	08 Mar 2017
Negative pressure transducer	ANO1259	08 Mar 2017
Crystal pressure calibrator IS33-2	ANO1360	04 Apr 2017
Quantum Countdown timer	ANO1722	20 Dec 2017
Array 3710A electronic load	ANO2410	14 Jul 2017
Array 3710A electronic load	ANO2411	14 Jul 2017
Array 3710A electronic load	ANO2412	14 Jul 2017
Array 3710A electronic load	ANO2413	14 Jul 2017
Temma 72-8345 DC power supply	ANO2397	08 Mar 2017
Type T Thermocouple	ANO1731	01 Nov 2017
Type T Thermocouple	ANO2200	01 Nov 2017
Type T Thermocouple	ANO1315	01 Nov 2017
Type T Thermocouple	ANO1345	01 Nov 2017
Type T Thermocouple	ANO1336	01 Nov 2017
Type T Thermocouple	ANO1759	01 Nov 2017
Type T Thermocouple	ANO2001	01 Nov 2017
Type T Thermocouple	ANO1343	01 Nov 2017
Type T Thermocouple	ANO1881	01 Nov 2017

Type T Thermocouple	ANO2232	01 Nov 2017
Type T Thermocouple	ANO2251	01 Nov 2017
Type T Thermocouple	ANO1343	01 Nov 2017
Type T Thermocouple	ANO1336	01 Nov 2017
HP34970	ANO2139	14 Jul 2017
Lansmont TP3 drop test software	ANO1085	01 Nov 2017
Lansmont PDT226 drop tester	ANO1065	N/A
5m Stanley measuring tape	ANO2345	01 Aug 2017
Avco SM110-2 mechanical shock	ANO1044	N/A
Dytran 350M42 shock accelerometer	ANO1622	04 April 2017
Dactron Dual DSP shaker control system	ANO2352	28 Sep 2016
CMR Charge Amplifier C/A2	ANO0793	15 Jan 2017
DJB A/20 Accelerometer	ANO1491	28 Sep 2016
Spectral dynamics vibration table	ANO1844	12 May 2017
PCB piezotronics accelerometer 357B03	ANO1844C	13 Jan 2017
PCB piezotronics charge amplifier 422E12	ANO1844D	14 Jan 2017
PCB piezotronics accelerometer 357B03	ANO1844E	15 Jan 2017
PCB piezotronics charge amplifier 422E12	ANO1844F	18 Jan 2017
PCB piezotronics accelerometer 357B03	ANO1844G	13 Jan 2017
PCB piezotronics charge amplifier 422E12	ANO1844H	14 Jan 2017



### 2.0 Non-operational Temperature and Humidity Profile

#### 2.1 Description

Three UUT were exposed to a temperature and humidity profile as described in the table below. The UUT were not operational throughout testing.

Step	Temperature	Humidity	Time
1	-51 °C	-%	6 hrs
2	20 °C	95%	6 hrs
3	20 °C	5%	6 hrs
4	85 °C	5%	6 hrs
5	85 °C	50%	6 hrs
6	50 °C	95%	6 hrs

**Test parameters**

#### 2.2 Observations

A functional and visual test was performed before and after the non-operational environmental temperature and humidity non-operational and there were no issues noted.

The UUT were returned to the customer following completion of the environmental testing for further evaluation.



**Environmental chamber setup for the non-operational temperature and humidity**

## 3.0 Operational Temperature and Humidity Profile

### 3.1 Description

A UUT was exposed to temperature and humidity profile as described in the table below. The UUT was operational throughout testing.

Step	Temperature	Humidity	Electronic Load	Time
1	-40°C±2°C	Uncontrolled %	600W	6 hrs
2	20°C±2°C	95%±5%	600W	6 hrs
3	20°C±2°C	5%±5%	600W	6 hrs
4	70°C±2°C	5%±5%	300W	6 hrs
5	70°C±2°C	50%±5%	300W	6 hrs
6	50°C±2°C	95%±5%	300W	6 hrs

**Test parameters**

### 3.2 Observations

A functional and visual test was performed before and after the operational environmental temperature and humidity non-operational and there were no issues noted.

The UUT were returned to the customer following completion of the environmental testing for further evaluation.

### 4.0 Operational Sinusoidal Vibration

#### 4.1 Description

A UUT was subjected to a sinusoidal vibration test according to EN60068-2-6 Test Fc as described in the table below. The UUT was powered throughout the testing.

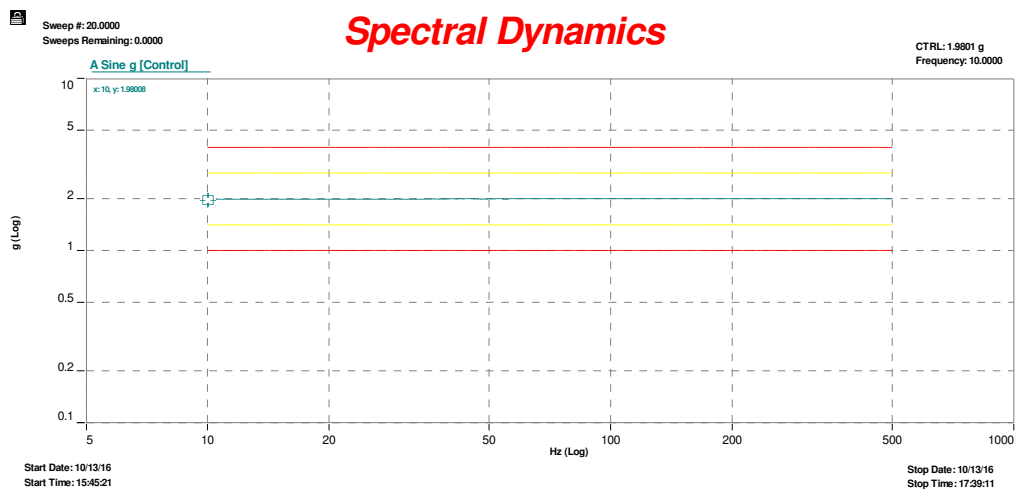
Description	Values
10Hz – 500Hz	2G
Rate / Duration	1 Oct / min
Number of Sweeps	20
Test Duration	
Z Axis	1hr 53 minutes
X Axis	1hr 53 minutes
Y Axis	1hr 53 minutes

**Sinusoidal vibration test parameters**

#### 4.2 Observations

During the sinusoidal vibration testing the UUT was monitored for functionality. A functional and visual test was performed before and after the sinusoidal operational test and there was no issue noted. Throughout the testing the load modules were at maximum load while connected to electronic loads located adjacent to the vibration table.

The UUT were returned to the customer following completion of the operational random vibration testing for further evaluation.



**IEC60068-2-6 - Typical sinusoidal vibration profile**



### 5.0 Non-Operational Random Vibration

#### 5.1 Description

Two UUT were subjected to a random vibration test according to EN60068-2-64 Test Fh as described in the table below. The UUT was not powered throughout the testing.

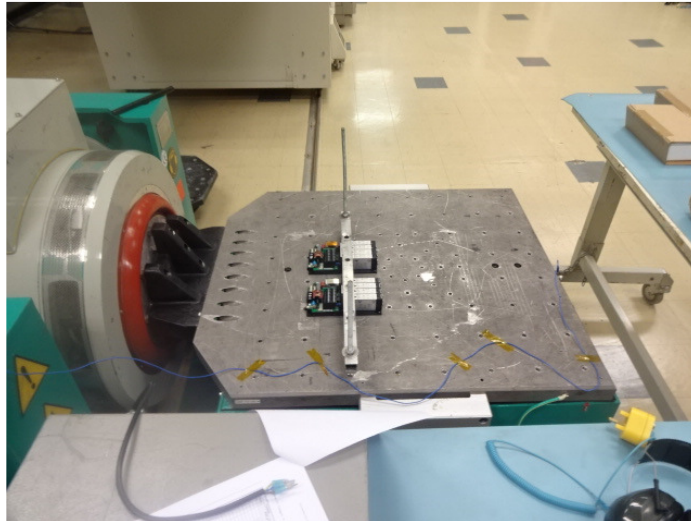
Description	Values
5Hz – 500Hz	0.02G <sup>2</sup> /Hz
Acceleration Spectral Density	3.15Grms
Test Duration	
Z Axis	30 minutes
X Axis	30 minutes
Y Axis	30 minutes

**Random vibration test parameters**

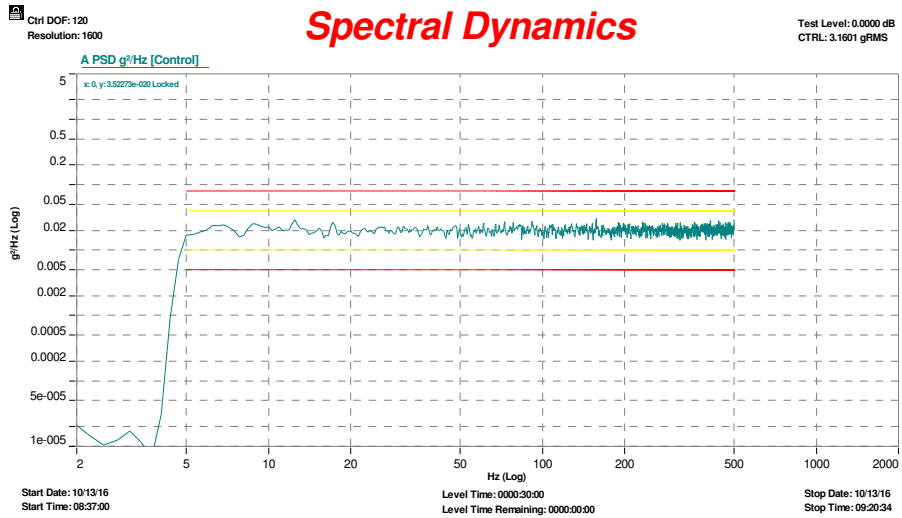
#### 5.2 Observations

A functional and visual test was performed before and after the non-operational random vibration profiles and there were no issues noted.

The UUT were returned to the customer following completion of the environmental testing for further evaluation.



**IEC60068-2-64 Typical non-operational random vibration setup (Y Setup)**



IEC60068-2-64 Typical non operational random vibration profile - IEC



### 6.0 Operational Random Vibration

#### 6.1 Description

A UUT were subjected to a random vibration test according to EN60068-2-64 Test Fh as described in the table below. The UUT was powered throughout the testing.

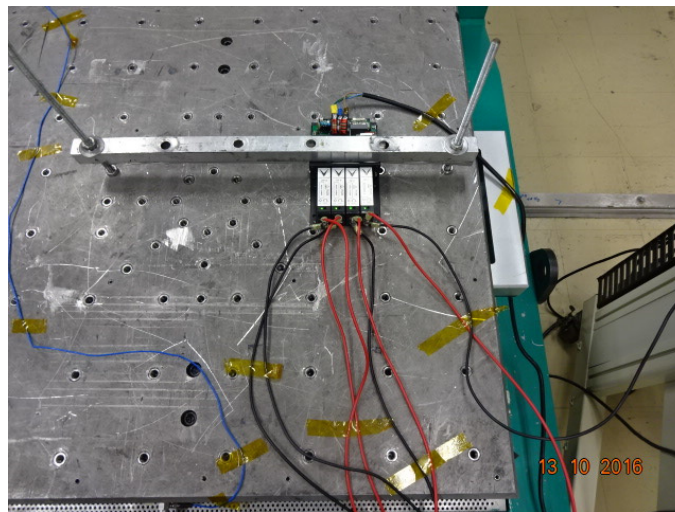
Description	Values
5Hz – 500Hz	0.0122G <sup>2</sup> /Hz
Acceleration Spectral Density	2.45Grms
Test Duration	
Z Axis	30 minutes
X Axis	30 minutes
Y Axis	30 minutes

**Random vibration test parameters**

#### 6.2 Observations

During the random vibration testing the UUT was monitored for functionality. A functional and visual test was performed before and after the random operational test and there was no issue noted. Throughout the testing the load modules were at maximum load while connected to electronic loads located adjacent to the vibration table.

The UUT were returned to the customer following completion of the operational random vibration testing for further evaluation.

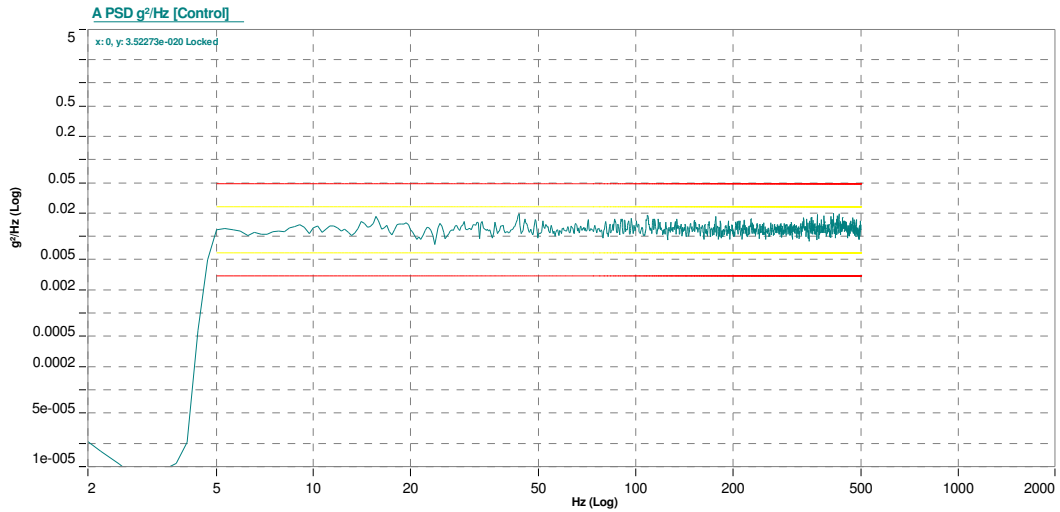


**IEC60068-2-64 Typical random operational setup**

Ctrl DOF: 120  
Resolution: 1600

### Spectral Dynamics

Test Level: 0.0000 dB  
CTRL: 2.5023 gRMS



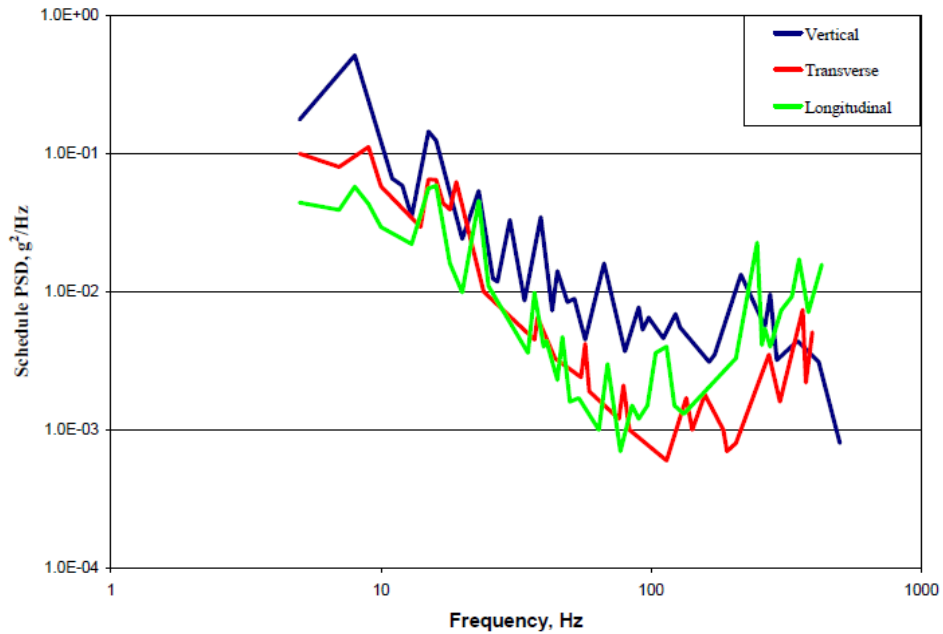
IEC60068-2-64 - Typical operational random vibration profile



### 7.0 Non-Operational Random Vibration – Category 4

#### 7.1 Description

Two UUT were subjected to a random vibration according to MIL STD 810G Table 514.6C-VI Category 4 Composite wheeled vehicle vibration exposure, breakpoints shown in figure 514.6C-3 for 2 hours per axis as described in the table below. The UUT were not operational throughout testing.



Typical MIL STD Category 4 - Random vibration test profile



Vertical		Transverse		Longitudinal		
Frequency, Hz	PSD, g <sup>2</sup> /Hz	Frequency, Hz	PSD, g <sup>2</sup> /Hz	Frequency, Hz	PSD, g <sup>2</sup> /Hz	
5	0.1759	5	0.0998	5	0.0441	
8	0.5120	7	0.0799	7	0.0390	
11	0.0660	9	0.1115	8	0.0576	
12	0.0585	10	0.0577	9	0.0430	
13	0.0348	14	0.0294	10	0.0293	
15	0.1441	15	0.0651	13	0.0221	
16	0.1237	16	0.0646	15	0.0558	
20	0.0241	17	0.0436	16	0.0585	
23	0.0536	18	0.0393	18	0.0160	
26	0.0124	19	0.0622	20	0.0099	
27	0.0118	24	0.0100	23	0.0452	
30	0.0331	37	0.0045	25	0.0110	
34	0.0086	38	0.0065	35	0.0036	
39	0.0347	44	0.0033	37	0.0098	
43	0.0073	55	0.0024	40	0.0040	
45	0.0141	57	0.0042	41	0.0044	
49	0.0084	59	0.0019	45	0.0023	
52	0.0089	76	0.0012	47	0.0047	
57	0.0045	79	0.0021	50	0.0016	
67	0.0160	83	0.0010	54	0.0017	
80	0.0037	114	0.0006	64	0.0010	
90	0.0077	135	0.0017	69	0.0030	
93	0.0053	142	0.0010	77	0.0007	
98	0.0065	158	0.0018	85	0.0015	
99	0.0063	185	0.0010	90	0.0012	
111	0.0046	191	0.0007	97	0.0015	
123	0.0069	206	0.0008	104	0.0036	
128	0.0055	273	0.0035	114	0.0040	
164	0.0031	300	0.0016	122	0.0015	
172	0.0035	364	0.0074	132	0.0013	
215	0.0133	374	0.0022	206	0.0033	
264	0.0056	395	0.0051	247	0.0226	
276	0.0096	500	0.0012	257	0.0041	
292	0.0032	rms = 1.48 g		264	0.0054	
348	0.0044			276	0.0040	
417	0.0031			303	0.0073	
500	0.0008			332	0.0092	
rms = 2.24 g					353	0.0172
					382	0.0071
					428	0.0157
					500	0.0016
						rms = 1.90 g

Typical MIL STD Category 4 - Random vibration test parameters

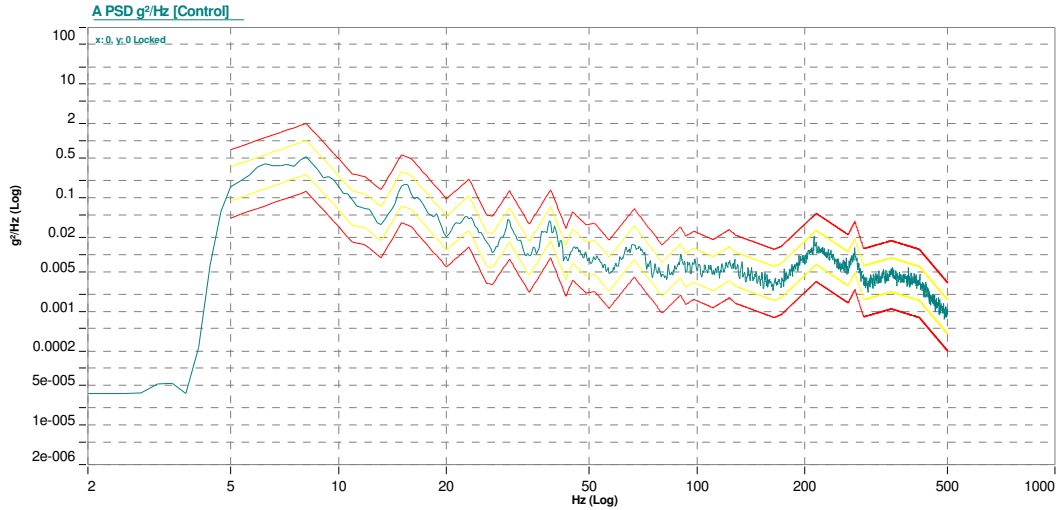
## 7.2 Observations

There were no visual or functional issues as a result of the random vibration testing. The UUT was powered on using 90VAC without load after every axis and no issues were recorded. The UUT was returned to the customer for further evaluation following completion of the testing.

Ctrl DOF: 120  
Resolution: 1600

### Spectral Dynamics

Test Level: 0.0000 dB  
CTRL: 2.3096 gRMS



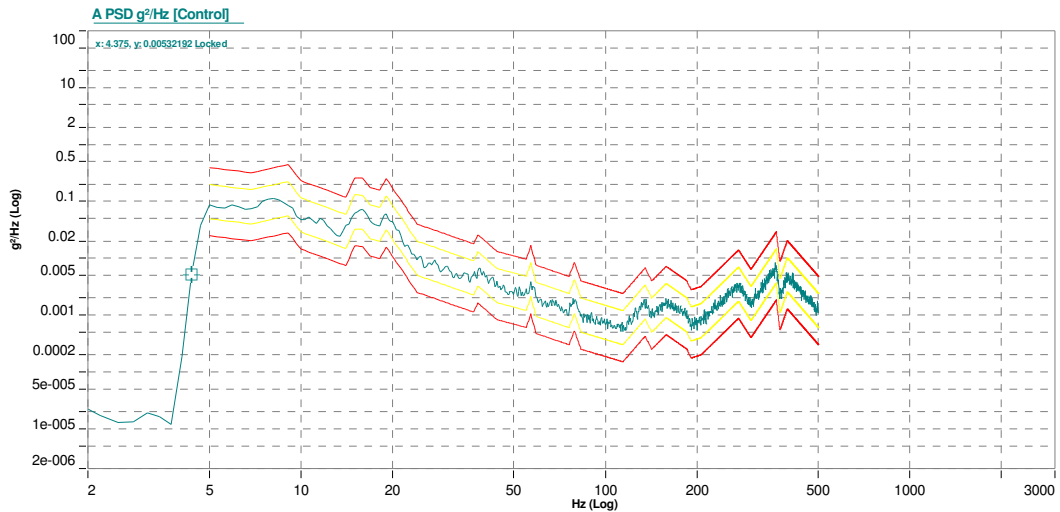
Start Date: 09/26/16  
Start Time: 13:04:49  
Level Time: 0002:00:00  
Level Time Remaining: 0000:00:00  
Stop Date: 09/26/16  
Stop Time: 15:18:21

Typical MIL STD Category 4 vertical random vibration profile

Ctrl DOF: 120  
Resolution: 1600

### Spectral Dynamics

Test Level: 0.0000 dB  
CTRL: 1.4608 gRMS



Start Date: 10/13/16  
Start Time: 10:13:42  
Level Time: 0002:00:00  
Level Time Remaining: 0000:00:00  
Stop Date: 10/13/16  
Stop Time: 12:26:20

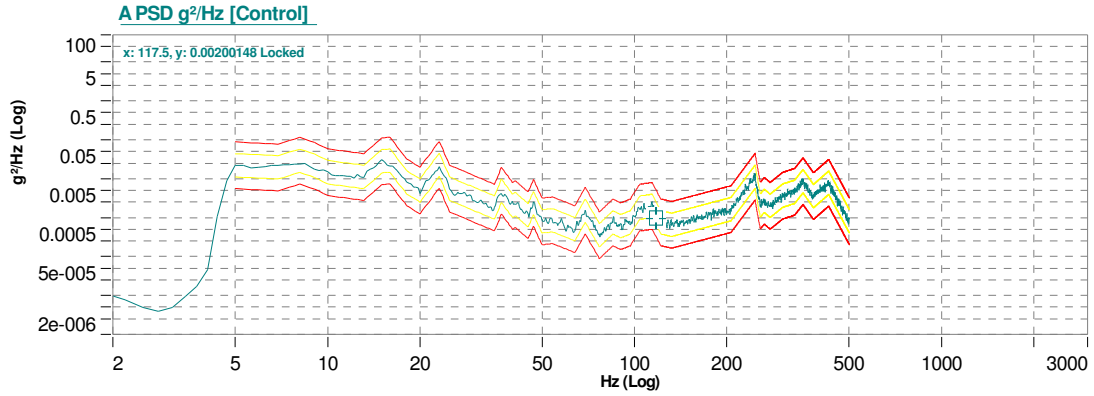
Typical MIL STD Category 4 Transverse random vibration profile



Ctrl DOF: 120  
Resolution: 1600

### Spectral Dynamics

Test Level:  
CTRL:



Start Date: 09/29/2016  
Start Time: 14:10:16

Level Time:  
Level Time Remaining:

Stop Date: 09/29/2016  
Stop Time: 16:23:14

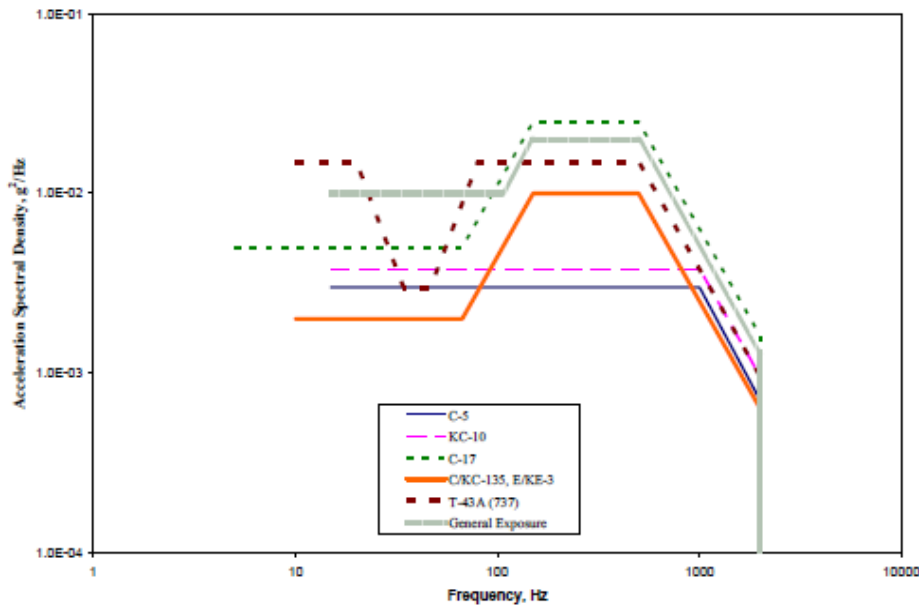
Typical MIL STD Category 4 Longitudinal random vibration profile



### 8.0 Non-Operational Random Vibration – Category 7

#### 8.1 Description

Two UUT were subjected to a random vibration according to MIL STD 810G Category 7 Method 514.6 Procedure I (General Vibration) as described in the table below. The UUT were not operational throughout testing.



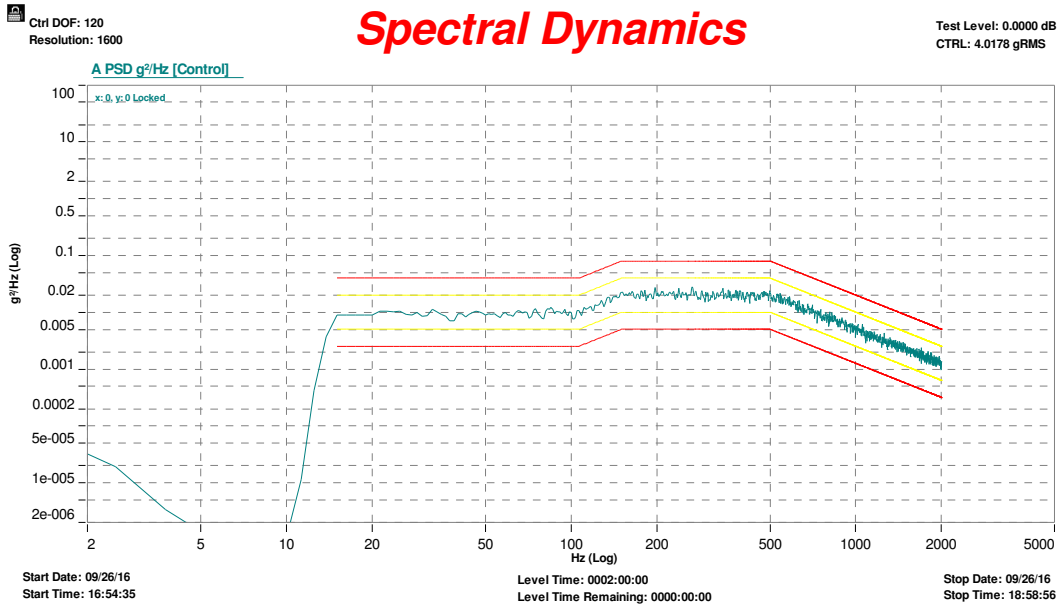
MIL STD 810G Category 7 Jet aircraft cargo method 514.6C-5 procedure I (general exposure)

Description	Values
15Hz – 105.94Hz	0.01G <sup>2</sup> /Hz
105.94Hz - 150Hz	6db
150.00Hz - 500Hz	0.02G <sup>2</sup> /Hz
500Hz – 2000Hz	-6db
Acceleration Spectral Density	4.02Grms
Test Duration	
Z Axis	120 minutes
X Axis	120 minutes
Y Axis	120 minutes

Typical MIL STD Category 7 -Random vibration test parameters

#### 8.2 Observations

There were no visual or functional issues as a result of the random vibration testing. The UUT was powered on using 90VAC without load after every axis and no issues were recorded. The UUT was returned to the customer for further evaluation following completion of the testing.



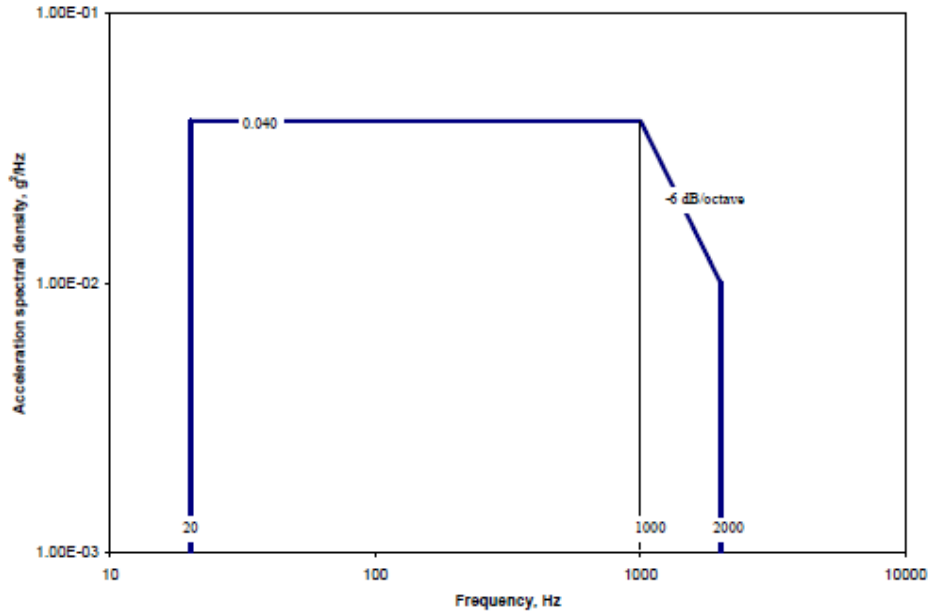
Typical MIL STD Category 7 - Typical random vibration profile



### 9.0 Non-Operational Random Vibration – Category 24

#### 9.1 Description

Two UUT were subjected to a random vibration test according to MIL STD Category 24 General Exposure Figure 514.6E-1 as described in the table below. The UUT was not powered throughout the testing.



Description	Values
20Hz – 1000Hz	0.04G <sup>2</sup> /Hz
1000Hz – 2000Hz	-6db
Acceleration Spectral Density	7.7Grms
Test Duration	
Z Axis	60 minutes
X Axis	60 minutes
Y Axis	60 minutes

Typical MIL STD Category 24 - Random vibration test parameters

#### 9.2 Observations

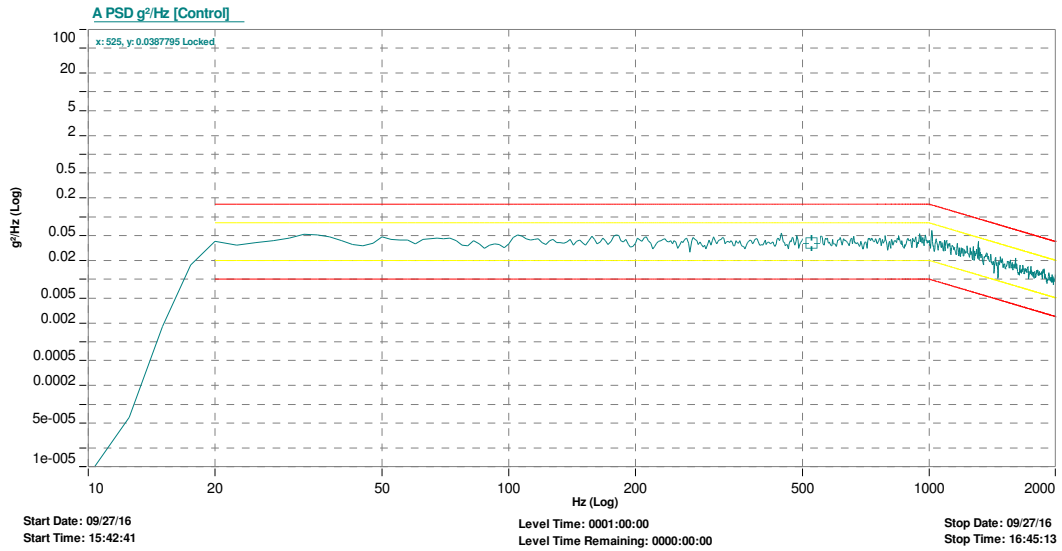
There were no visual or functional issues as a result of the random vibration testing. The UUT was powered on using 90VAC without load after every axis and no issues were recorded. The UUT was returned to the customer for further evaluation following completion of the testing.



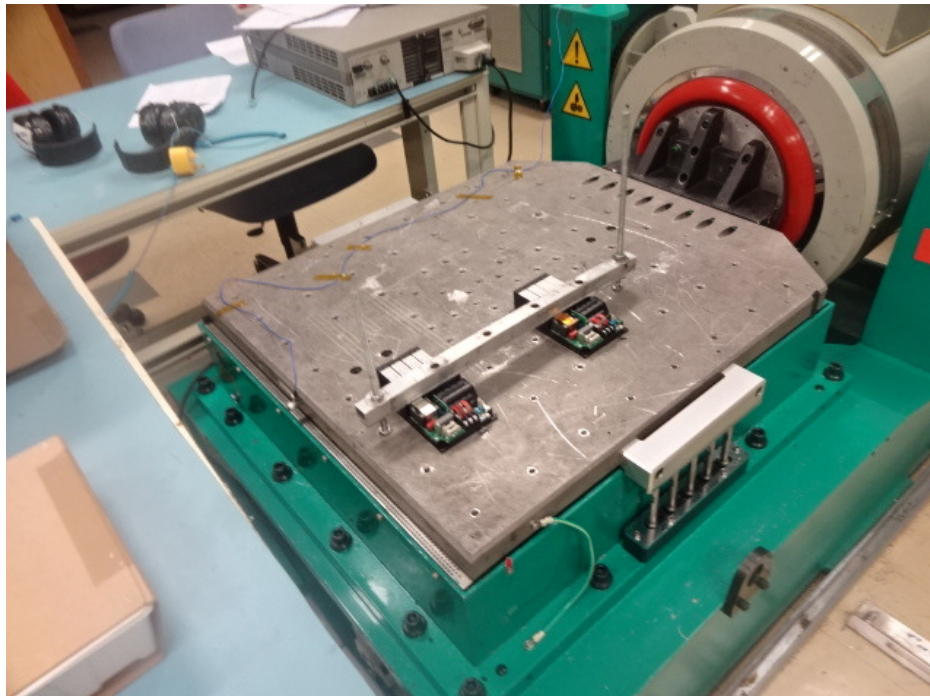
Ctrl DOF: 120  
Resolution: 800

### Spectral Dynamics

Test Level: 0.0000 dB  
CTRL: 7.7181 gRMS



Typical MIL STD Category 24 random vibration profile



Typical MIL STD Category 24 random vibration test setup image

### 10.0 Non-Operational Thermal Shock in Air

#### 10.1 Description

A UUT was exposed to a thermal shock in air profile according to MIL STD 810G Method 503.5 Procedure - IC as described in the table below. The thermal shock in air cycle was started in the cold chamber.

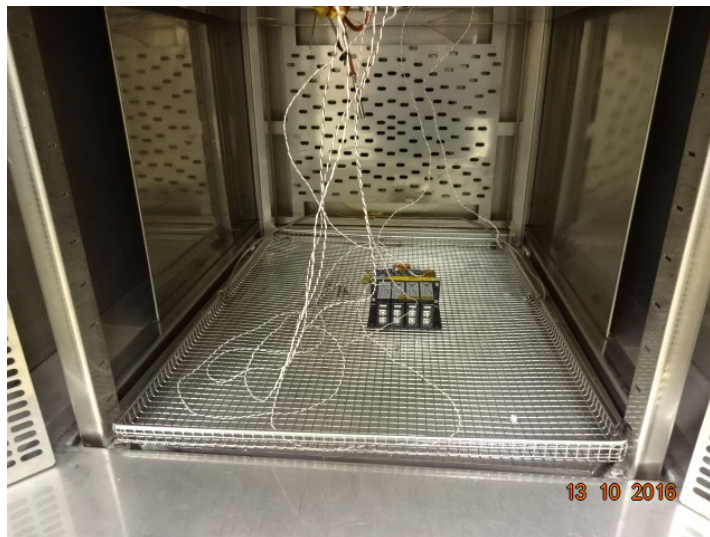
Description	Value
Hot Temperature	85 °C
Cold Temperature	-51 °C
Dwell Time	60 minutes
Number of Cycles	3
Operational	No

**Test parameters**

#### 10.2 Observations

A functional and visual test was performed before and after the thermal shock in air profile test and there were no issues noted.

The UUT were returned to the customer following completion of the environmental testing for further evaluation.



**Environmental chamber setup for the thermal shock in air profile**



### 11.0 Non-Operational Transit Drop

#### 11.1 Description

Two packaged UUT were subjected to a freefall drop test according to MIL STD 810G Method 516.6 Procedure IV Transit Drop as described in the table below. The UUT were not powered during the testing and was placed in its packaged form surrounded by the outer cover. The packaged UUT was dropped onto a 2" plywood over concrete surface from a height of 48".

Drop	Drop Orientation	Packaged UUT
1	Left	1
2	Right	1
3	Front	1
4	Back	1
5	Bottom	1
6	Top	1
7	Top left edge	1
8	Top right edge	1
9	Bottom right edge	1
10	Bottom Left edge	1
11	Top Front edge	1
12	Top Back edge	1
13	Bottom Back edge	1
14	Bottom Front edge	1
15	Front Left edge	1
16	Front Right edge	1
17	Bottom Right edge	1
18	Bottom Left edge	1
19	*Front Top left corner (Repeated again)	1
-	*Front Top left corner	2
20	Front Left Bottom corner	2
21	Front Right Top corner	2
22	Front Right Bottom corner	2
23	Bottom Left Top corner	2
24	Bottom Back Top corner	2
25	Bottom Right Bottom corner	2
26	Bottom left Bottom corner	2

#### Mechanical Shock – Freefall test parameters

\*Changed UUT from UUT1 to UUT2 as packaging deteriorated.

#### 11.2 Observations

The UUT was powered after every drop and visually inspected for any issues. Following the 19th impact on the first UUT (drop on the front top left corner (AC power side (front))) it was observed that RT1 and C1 were pushed in and the epoxy securing the components had broken off. At this point a second UUT and package was used to complete the testing.

The packaged UUT was powered up after every drop and there were no visual or functional issues as a result of the freefall drop test. The UUT were returned to for further evaluation following completion of the testing.



Typical freefall drop test



RT1 and C1 pushed in following Front top left drop



Internal packaging following 17 / 26 freefall impacts

### 12.0 Non-Operational Mechanical Shock

#### 12.1 Description

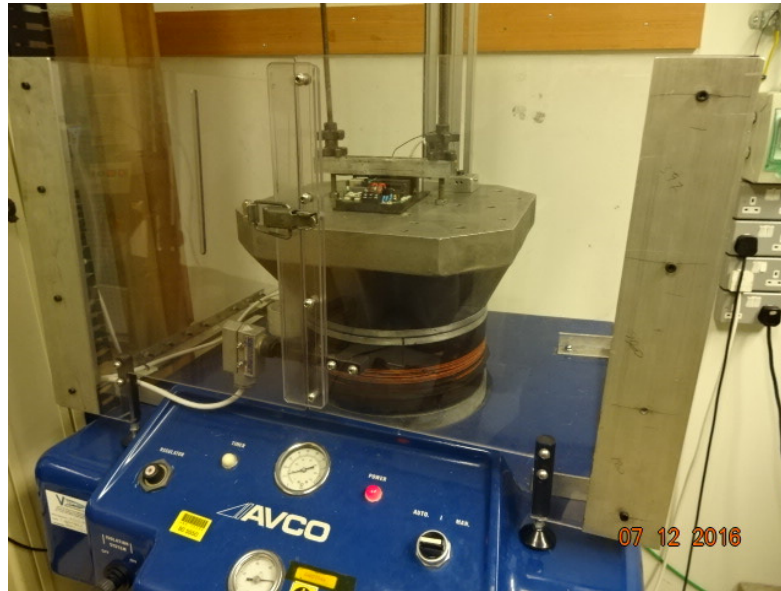
A UUT was subjected to a mechanical shock test according to IEC60068-2-27 as described in the table below. The UUT was not powered throughout the testing.

Description	Values
Peak Acceleration	30G
Pulse Width	18mS
Pulse Shape	Half Sine
No.of Shocks per axis	6 (+/-X, +/-Y, +/-Z)
Total No of Shocks	18


**Mechanical shock test parameters**

#### 12.2 Observations

There were no visual or functional issues as a result of the mechanical shock testing. The UUT was powered on using 230VAC without load and no issues were recorded. The UUT was returned to the customer for further evaluation following completion of the testing.



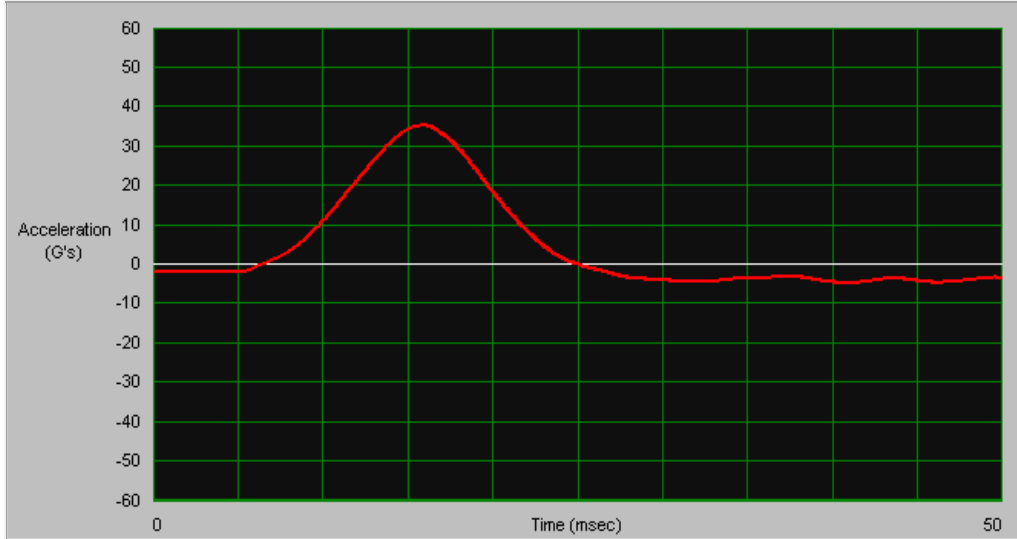
**Typical mechanical shock test setup (Z Axis)**



**TEST  
PARTNER**

### Acceleration vs Time

	Channel Description:	G's	msec	In/S	Filter Hz	Max G's	Min G's
Ch1	Channel 1	35.08	18.05	122.69	500.00	35.08	-4.81



**Mechanical shock non operational profile**



### 13.0 Operational Mechanical Shock

#### 13.1 Description

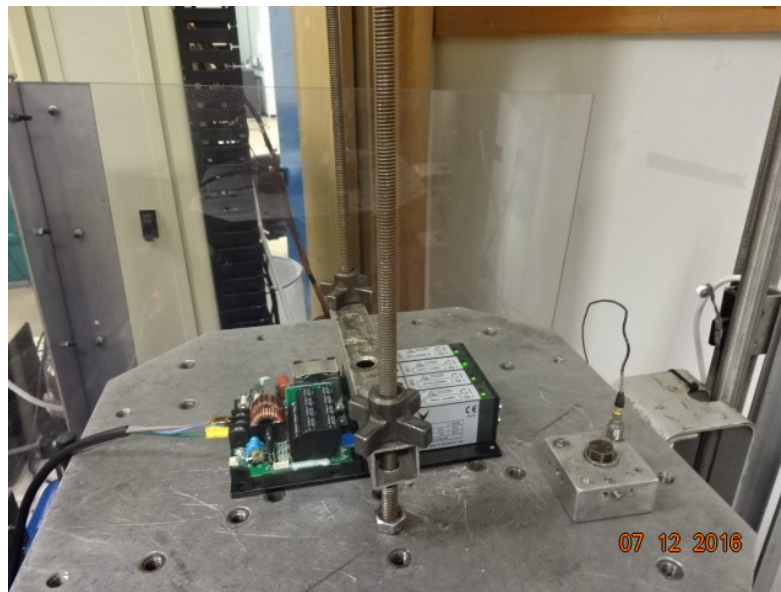
A UUT was subjected to a mechanical shock test according to IEC60068-2-27 as described in the table below. The UUT was powered throughout the testing.

Description	Values
Peak Acceleration	50G
Pulse Width	11mS
Pulse Shape	Half Sine
No.of Shocks per axis	6 (+/-X, +/-Y, +/-Z)
Total No of Shocks	18

**Mechanical shock test parameters**

#### 13.2 Observations

There were no visual or functional issues as a result of the mechanical shock testing. The UUT was powered on using 230VAC without load and no issues were recorded. The UUT was returned to the customer for further evaluation following completion of the testing.



**Typical mechanical shock test setup (Z Axis)**

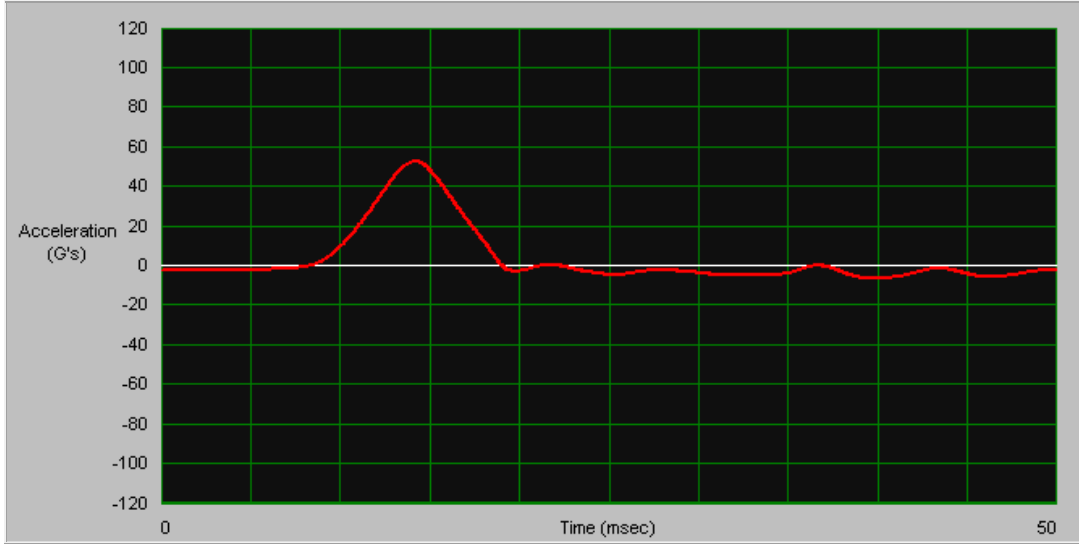


**TEST PARTNER**

3/25/11 10:25

### Acceleration vs Time

	Channel Description:	G's	msec	In/S	Filter Hz	Max G's	Min G's
Ch1	Channel 1	52.40	11.00	109.43	500.00	52.40	-6.82



**Mechanical shock operational profile**



## 14.0 Non-Operational Atmospheric Altitude Testing

### 14.1 Description

Three UUT was subjected to a non-operational atmospheric altitude test as described in the table below. The UUT was not powered throughout the testing.

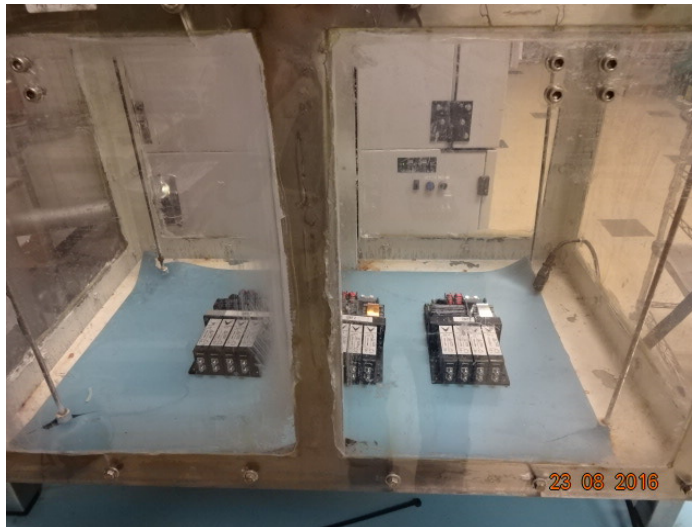
Description	High Pressure	Low Pressure
Setpoint	-200m Min (+24mbar(g))	+5000m (-475mbar(g))
Dwell	4 hrs	4 hrs
Ramp Time	10 minutes	10 minutes

**Test parameters**

### 14.2 Observations

A functional and visual test was performed before and after the non-operational altitude test and there was no issue noted.

The UUT were returned to the customer following completion of the altitude testing for further evaluation.



**Atmospheric non-operational setup**

## 15.0 Operational Atmospheric Altitude Testing

### 15.1 Description

A UUT was subjected to an atmospheric altitude test according as described in the table below. The UUT was powered throughout the testing.

Description	High Pressure	Low Pressure
Setpoint	-200m Min (+24mbar(g))	+3000m (-316mbar)
Dwell	4 hrs	4 hrs
Ramp Time	10 minutes	10 minutes

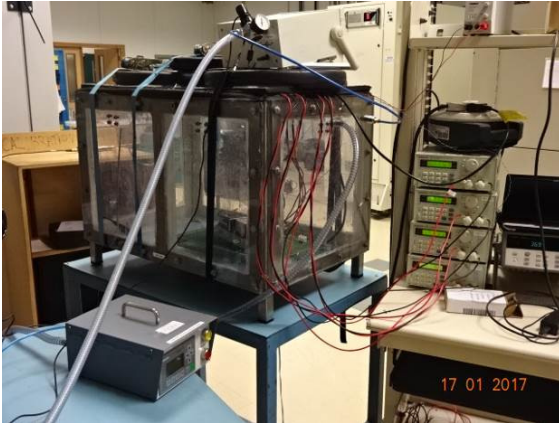
**Test parameters**

### 15.2 Observations

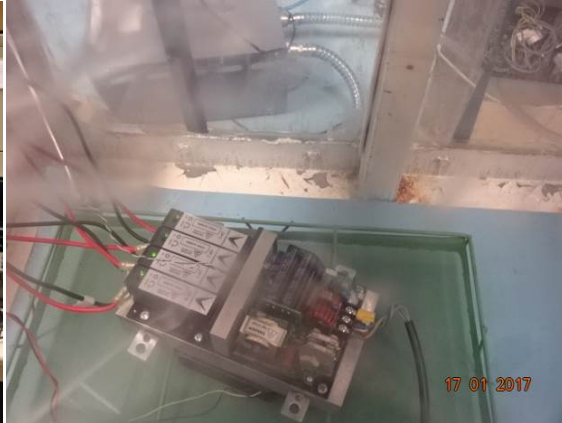
During the altitude testing the UUT was monitored for functionality and that its baseplate temperature did not increase above 85C A functional and visual test was performed before and after the operational altitude test and there was no issue noted. Throughout the testing the load modules were at maximum load while connected to electronic loads located adjacent to the atmospheric chamber.

The UUT were returned to the customer following completion of the operational altitude testing for further evaluation.

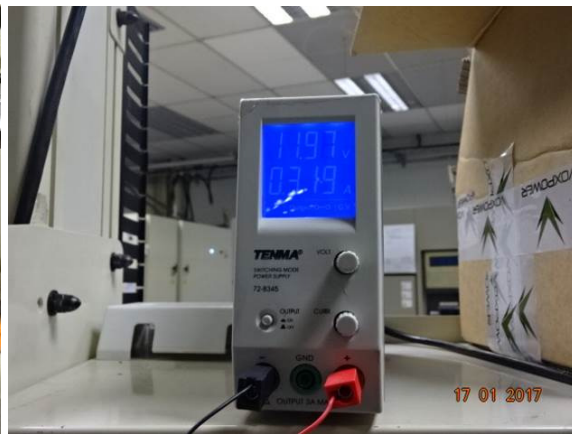




**Atmospheric operational setup**



**Baseplate internal temperature during test**



**Baseplate cooled using 12VDC psu.**