

# National Technical Systems Test Report for Environmental Testing of the ExpressVote 2.1

**Prepared For**

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### Revision History

<b>Rev.</b>	<b>Description</b>	<b>Issue Date</b>
0	TR-PR120980-1	10/29/2020
1	Added Sections 5.2 and 5.3.	11/03/2020

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## 1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Electromagnetic Interference test program. The test program was conducted to assess the ability of the specified Equipment Under Test (EUT) to successfully satisfy the requirements listed in Section 2.0.

## 2.0 References

The following references listed below form a part of this document to the extent specified herein.

- Pro V&V, Inc. Purchase Order(s) 2020-004, dated 07/01/2020
- National Technical Systems (NTS) Quote(s) OP0554725, dated 06/24/2020
- NTS Corporate Quality Policy Manual, Revision 9, dated 9/20/2018
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/1/2017
- Test Specification: MIL-STD-810D

## 3.0 Product Selection and Description

Pro V&V, Inc. selected and provided the test sample(s) to be used as the Equipment Under Test. Details below:

**Table 3.0-1: Product Identification - Equipment Under Test (EUT)**

Item	Qty.	Name/Description	Part Number	Serial Number
1	3	ExpressVote 2.1	ExpressVote 2.1	EV0219400473, EV0219400561, K0119410645
2	1	ExpressVote	Boxed Sample	N/A

## 3.1 Security Classification

Non-classified

## 4.0 General Test Requirements

### 4.1 Test Equipment

NTS-provided equipment is calibrated according to ISO/IEC 17025:2017(E) and calibration is traceable to the National Institute of Standards and Technology (NIST). Calibration records are maintained on file at NTS.

### 4.2 Notice of Deviation

In accordance with NTS' quality procedures, when the EUT is observed to exceed or display susceptibility, a Notice of Deviation (NOD) document is generated by the technician performing the test. This NOD documents the requirement, how the EUT deviated from the requirement, and allows room for resolution of the deviation.

This document is reviewed and approved by the NTS Program Manager or Engineer and the NTS Quality Assurance Representative, and then forwarded to the customer contact. Once mitigated (or passed over), the steps taken to correct the deviation (or simply instruction from the customer to continue testing) are recorded in the NOD and a copy of the NOD is integrated into the body of the report, in the appropriate location.

## 5.0 Test Descriptions and Results

**Table 5.0-1: Summary of Test Information & Results**

Section	Test	Specification	Test Facility	Test Date	Part #	Serial #	Test Result*
5.1	Temperature/Power Variation	MIL-STD-810D	Longmont	09/28/2020 - 10/01/2020	ExpressVote 2.1	EV0219400473, EV0219400561	Customer Determined
5.2	Bench Handling	MIL-STD-810D	Longmont	09/23/2020 - 09/23/2020	ExpressVote 2.1	K0119410645	Customer Determined
5.3	Transportation Vibration	MIL-STD-810D	Longmont	09/24/2020 - 09/24/2020	Boxed Sample-Express Vote	N/A	Customer Determined

\*The decision rule used to state compliance is in accordance with the test specification used for testing. Unless otherwise noted, testing was performed in accordance with the latest published version of test specification at time of test.



**5.1 Temperature/Power Variation**

**5.1.1 Test Result**

Pass/Fail determination made by Pro V&V.

**5.1.2 Test Procedure**

See below.

**5.1.3 EUT Details/Test Datasheets**

Qty	Part Name	Part Number	Serial Number
1	ExpressVote 2.1	N/A	EV0219400473
1	ExpressVote 2.1	N/A	EV0219400561
1	UPS	N/A	GX1JV2000007
1	UPS	N/A	GX1JV2000012
1	OKI Printer	N/A	BW0102500860
1	OKI Printer	N/A	BW01025006C0

Start Date: 09/28/20		End Date: 10/01/20		<b>MJO No: PR120980</b>	
Customer: Pro V&V		Test Performed: Temperature Power Variation Test		Test By: KM	
Part Name: ExpressVote 2.1		Serial No & Name: See UUT Details Sheet		Customer Witness: Yes	
Page 1 of 1		Test Specification: MIL-STD_810D		Temp: +10c to +35c Voltage: 105vlts to 129vlts	
Date	Time	Remarks	Initials		
09/28/20	08:00	Set VAC to 117vlts & ramp to +10c	RSP		
09/28/20	08:15	Start dwell at 117vlts & +10c for 4hrs	RSP		
09/28/29	12:15	Lower VAC to 105vlts & dwell for 4hrs	MN		
09/28/20	16:15	Raise VAC to 129vlts & dwell for 4hrs	RSP		
09/28/20	20:15	Lower VAC to 117vlts & Raise temperature to +35c & dwell for 4hrs	KM		
09/29/20	00:15	Lower VAC to 105vlts & dwell for 4hrs	KM		
09/29/20	04:15	Raise VAC to 129vlts & dwell for 4hrs	KM		
09/29/20	08:15	Lower VAC to 117vlts & Lower temperature to +10c & dwell for 4hrs	GM		
09/29/20	12:15	Lower VAC to 105vlts & dwell for 4hrs	GM		
09/29/20	16:15	Raise VAC to 129vlts & dwell for 4hrs	GM		
09/29/20	20:15	Lower VAC to 117vlts & Raise temperature to +35c & dwell for 4hrs	KM		
09/30/20	00:15	Lower VAC to 105vlts & dwell for 4hrs	KM		
09/30/20	04:15	Raise VAC to 129vlts & dwell for 4hrs	KM		

09/30/20	08:15	Lower VAC to 117vlt & ramp to +23c ambient	KM
09/30/20	08:15	Temperature and power variation portion of test has completed	KM
09/30/20	08:15	Test will continue to run at +23c ambient for another 37hrs	KM
10/01/20	22:00	All Testing complete for a total of 85hrs	KM
		Note: All test pass or fail determinations decided by Pro V&V Inc.	

### 5.1.4 Test Photographs

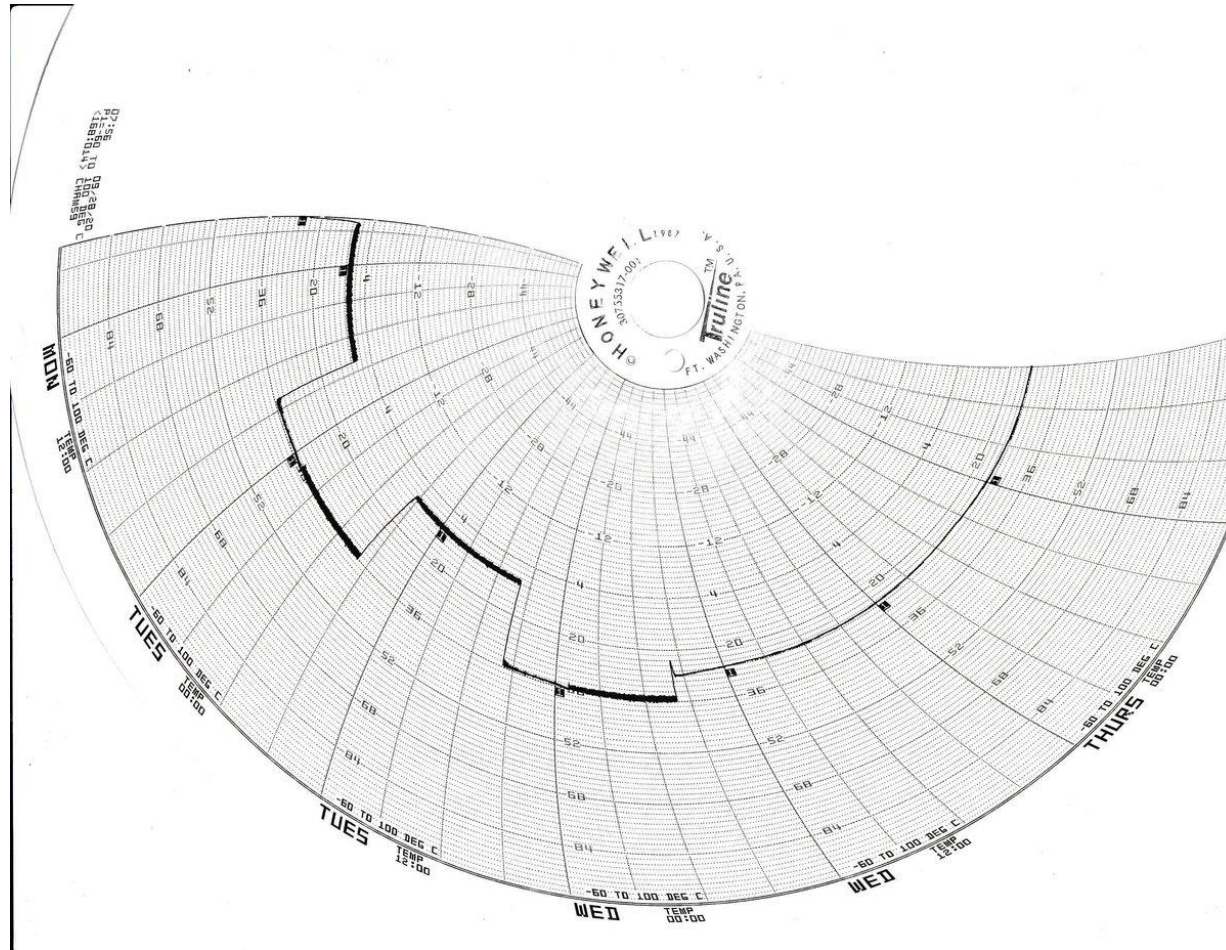
PR120980



PR120980



5.1.5 Test Data



Temp\_Pwr\_Var\_Graph\_Data



### 5.1.6 Test Equipment List

**Table 5.1-1: Temperature/Power Variation Test Equipment List**

Asset Number	Mfct	Description	M/N	S/N	Range	Start Date	End Date	Last Cal	Cal Interval (Months)	Cal Due	Notes
WC061559	StorageTek	Temp/Hum chamber, CH 59	N/A			09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061560	Watlow	TEMPERATURE CONTROLLER	F4	6165	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061561	Honeywell	CHART RECORDER	DR45A T	'0350Y3 6134090 0004	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	

#### Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



## 5.2 Bench Handling

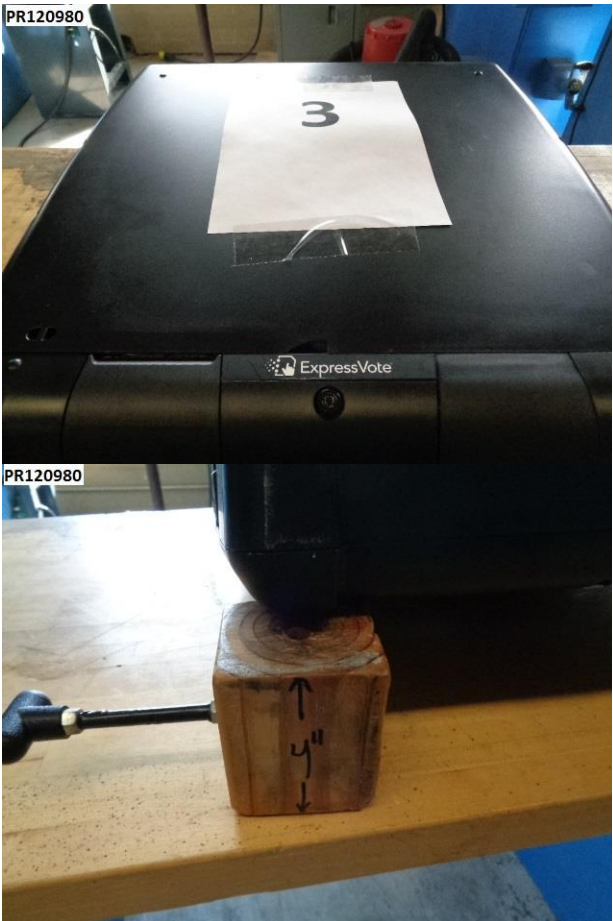
### 5.2.1 Test Result

Pass/Fail determinations made by Pro V&V.

### 5.2.2 Test Datasheets

Start Date: 09/23/20		End Date: 09/23/20	<b>MJO No: PR120980</b>
Customer: Pro V&V		Test Performed: Bench Test	Test By: KM
Part Name: ExpressVote 2.1		Serial No: K0119410645	Customer Witness: N/A
Page 1 of 1		Test Specification: MIL-STD_810D	Temp: N/A Humidity: N/A
Date	Time	Remarks	Initials
09/23/20	09:00	Start 6 drops per corner of UUT from 4 inches	KM
09/23/20	10:00	Total of 24 drops from 4 inches for UUT complete	KM
09/23/20	11:00	Test Complete and customer performed posttest	KM
		Note: All test pass or fail determinations decided by Pro V&V Inc.	

### 5.2.3 Test Photographs





#### 5.2.4 Test Equipment List

**Table 5.2-1: Bench Handling Test Equipment List**

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
N/A	N/A	N/A	N/A	4 inch wooden block	NCR	NCR

**Calibration Abbreviations**  
CAL: Calibration  
NCR: No Calibration Required



**5.3 Transportation Vibration**

**5.3.1 Test Result**

Pass/Fail determinations made by Pro V&V.

**5.3.2 Test Procedure**

See below.

**5.3.3 Test Datasheets**

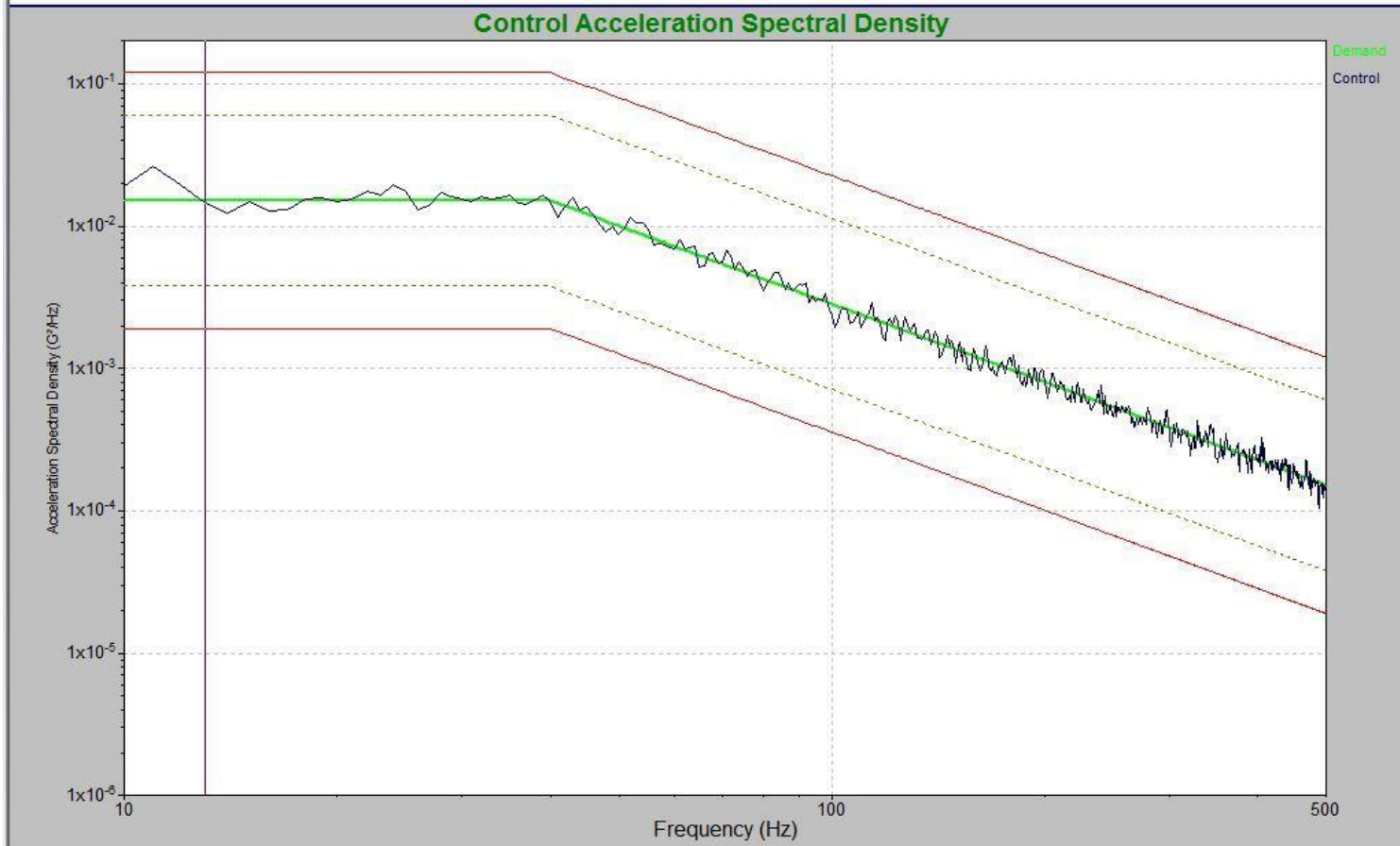
Start Date: 9-24-20		End Date: 9-24-20		<b>MJO No: PR120980</b>		
Customer: Pro V&V		Test Performed: Random Vibration		Test Engineer: G. Mathews		
Part Name: Boxed sample-Express Vote		Serial numbers: N/A		Customer Witness: n/a		
Page of		Test Specification: Customer SOW & MIL-STD-810D		Temp: 67° Humidity: 45%		
Date	Time	Axis	Plot No.	Serial No.	Remarks	Initials
9-24-20	0857	Vertical			Setup UUT on shaker HYD06 in the Vertical-Axis	GM
			Run 1		Run 1.04 gRMS random vibration profile on the UUT in the Vertical-Axis	GM
	1003	Longitudinal			Setup UUT on shaker HYD06 in the Transverse - Axis	GM
			Run 2		Run 0.74 gRMS random vibration profile on the UUT in the Transverse-Axis	GM
	1108	Transverse			Setup UUT on shaker HYD06 in the Longitudinal - Axis	GM
			Run 3		Run 0.2 gRMS random vibration profile on the UUT in the Longitudinal-Axis	GM
					Testing complete	GM

### 5.3.4 Test Photographs



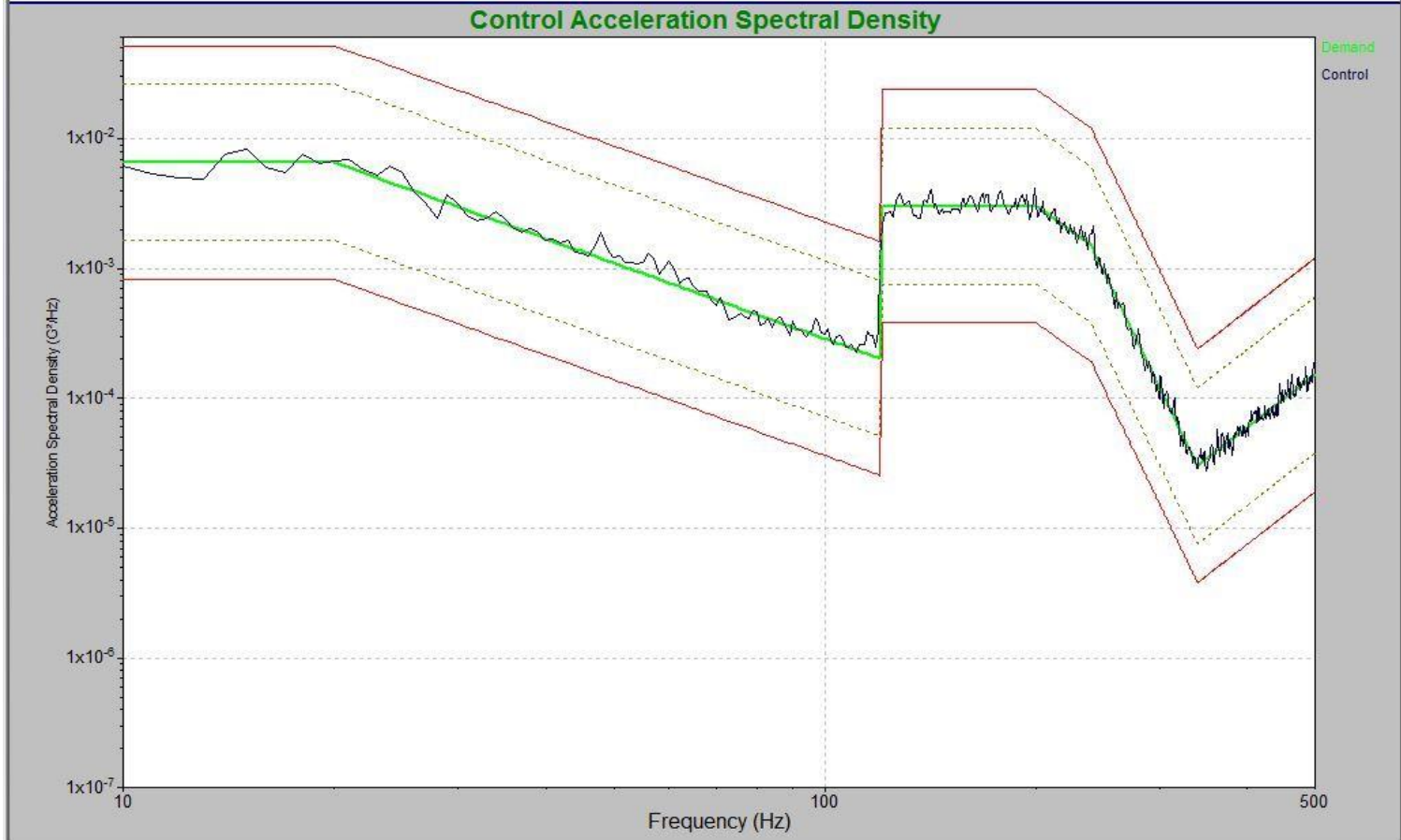
### 5.3.5 Test Data

NTS Longmont, CO	Level Time: 1:00:00	Demand: 1.047 G RMS	Pro V&V
Job#: PR121029 and PR120980	Total Time: 1:00:10	Control: 1.068 G RMS	UUT: Boxed samples
Sep 24, 2020 08:57:04	Run 1	Test axis: Vertical	SN:



Run 1

NTS Longmont, CO	Level Time: 1:00:00	Demand: 0.7428 G RMS	Pro V&V
Job#: PR121029 and PR120980	Total Time: 1:00:10	Control: 0.7555 G RMS	UUT: Boxed samples
Sep 24, 2020 10:03:03	Run 2	Test axis: Longitudinal	SN:



Run 2

NTS Longmont, CO

Level Time: 1:00:00

Demand: 0.2038 G RMS

Pro V&V

Job#: PR121029 and PR120980

Total Time: 1:00:08

Control: 0.203 G RMS

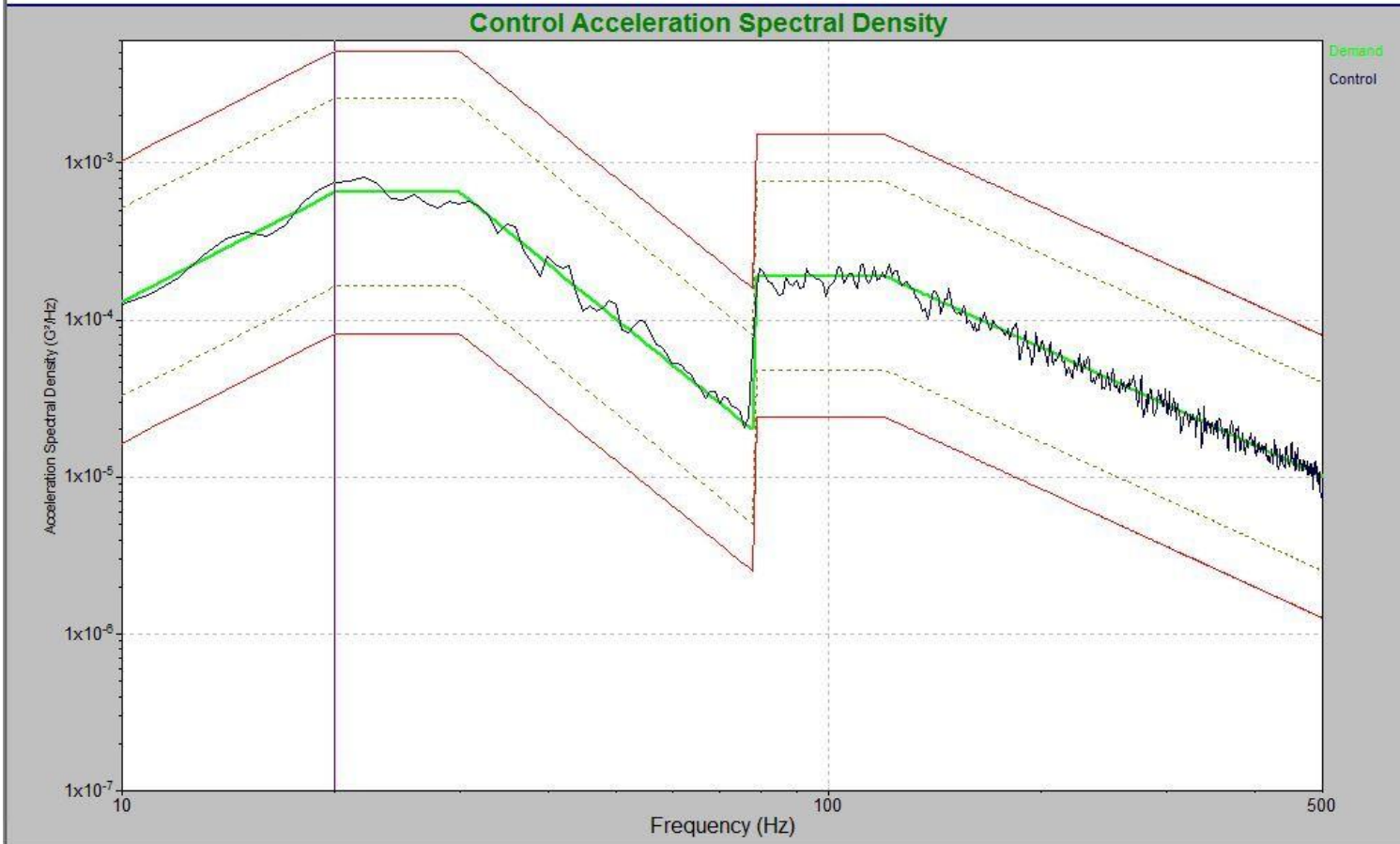
UUT: Boxed samples

Sep 24, 2020 11:08:38

Run 3

Test axis: Transverse

SN:



Run 3



### 5.3.6 Test Equipment List

**Table 5.3-1: Transportation Vibration Test Equipment List**

ID Number	WC Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1750	WC061429	Team	80/10.5	544	Shaker System HYD06	NCR	
1676	WC061504	PCB	353B34	82374	Accelerometer	4/14/2020	4/30/2021
1698	WC070242	PCB	353B34	LW204222	Accelerometer	10/4/2019	1698
1872	WC059875	Vibration Research	VR9500	95268B57	Vibration Controller	6/4/2020	6/4/2021
1766	WC070466	Fluke	971	3623064	Temp/Humidity Meter	4/15/2020	4/15/2021

**Calibration Abbreviations**

CAL: Calibration

NCR: No Calibration Required





**End of Report**