

National Technical Systems Test Report for Environmental Testing of the Voting Ballot Reading System

Prepared For

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Prepared By

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A handwritten signature in black ink, appearing to read "Greg Gagne", written over a horizontal line.

Greg Gagne
Technical Writer

A handwritten signature in black ink, appearing to read "Robert Polverari", written over a horizontal line.

Robert Polverari
ENV Department Manager



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Revision History

Rev.	Description	Issue Date
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1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Environmental 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) 2019-008, dated 04/11/2019
- National Technical Systems (NTS) Quote(s) OP0518153-0, dated 04/11/2019
- 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 810

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	1	Voting Ballot Reading System	ClearVote 2.0	041902453

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	Bench Handling	MIL STD 810	Longmont	04/29/2019 - 05/03/2019	ClearVote 2.0	041902453	N/A
5.2	Transportation Vibration	MIL STD 810	Longmont	04/29/2019 - 05/03/2019	ClearVote 2.0	041902453	N/A
5.3	Temperature/Power Variation	MIL STD 810	Longmont	07/22/2019 - 07/26/2019	ClearVote 2.0	041902453	N/A



5.1 Bench Handling

5.1.1 Test Result

N/A

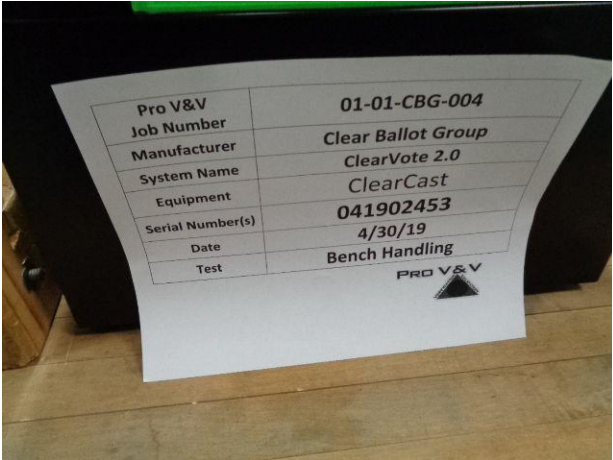
5.1.2 Test Procedure

See below.

5.1.3 Test Datasheets

Start Date: 04/30/19		End Date: 04/30/19	MJO No: PR097808	
Customer: Pro V&V (Clear Ballot)		Test Performed: Bench Test		Test By: KM
Part Name: Voting Ballot Reading System		Serial No: 041902453		Customer Witness: N/A
Page 1 of 1		Test Specification: MIL-STD_810D		
Date	Time	Remarks	Initials	
04/30/19	17:00	Start 6 drops per corner of UUT from 4 inches	KM	
	18:00	Total of 24 drops from 4 inches for UUT complete	KM	
		Note:All test pass or fail determinations decided by Pro V&V Inc.		

5.1.4 Test Photographs





5.1.6 Test Equipment List

Table 5.1-1: Bench Handling Test Equipment List

Asset Number	Manufacturer	Description	M/N	S/N	Range	Start Date	End Date	Last Calibration	Cal Interval (Months)	Cal Due	Notes
N/A	4 inch Wooden Block	Wooden Block	N/A	N/A	N/A	N/A	N/A	NCR	N/A	NCR	

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.2 Transportation Vibration

5.2.1 Test Result

N/A

5.2.2 Test Profiles

Vertical

Table	Schedule	Parameters	Limits	Channels	Data	Tables	Calc	R-o-R	S-o-R	S-o-R Param	Notch
		Frequency (Hz)	Amplitude (G ² /Hz)	Slope (dB/Oct)	Tolerance (+) (-)	Abort (+) (-)	dB				
1		10	0.015	> 0	3 3	6 9					
2		40	0.015	> -5.489	3 3	6 9					
» 3		500	0.00015								

Use single Tol/Abort setting

G RMS: 1.044 in/s RMS: 2.192 in pk-pk: 0.1328 Control Units: G²/Hz

Transverse

Table	Schedule	Parameters	Limits	Channels	Data	Tables	Calc	R-o-R	S-o-R	S-o-R Param	Notch
		Frequency (Hz)	Amplitude (G ² /Hz)	Slope (dB/Oct)	Tolerance (+) (-)	Abort (+) (-)	dB				
» 1		10	0.00013								
2		20	0.00065	> 6.99	3 3	6 9					
3		30	0.00065	> 0	3 3	6 9					
4		78	2e-05	> -10.97	3 3	6 9					
5		79	0.00019	> 532	3 3	6 9					
6		120	0.00019	> 0	3 3	6 9					
7		500	1e-05	> -6.211	3 3	6 9					

Use single Tol/Abort setting

G RMS: 0.2038 in/s RMS: 0.3488 in pk-pk: 0.01869 Control Units: G²/Hz

Longitudinal

Table	Schedule	Parameters	Limits	Channels	Data	Tables	Calc	R-o-R	S-o-R	S-o-R Param	Notch
	Frequency (Hz)	Amplitude (G ² /Hz)	Slope (dB/Oct)	Tolerance (+) (-)	Abort (+) (-)	dB					
» 1	10	0.0065	0	3 3	6 9						
2	20	0.0065	-5.849	3 3	6 9						
3	120	0.0002	982.3	3 3	6 9						
4	121	0.003	0	3 3	6 9						
5	200	0.003	-11.44	3 3	6 9						
6	240	0.0015	-33.81	3 3	6 9						
7	340	3e-05	12.56	3 3	6 9						
8	500	0.00015									

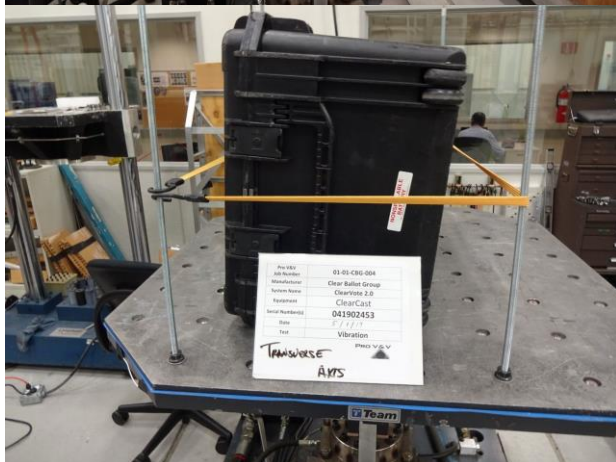
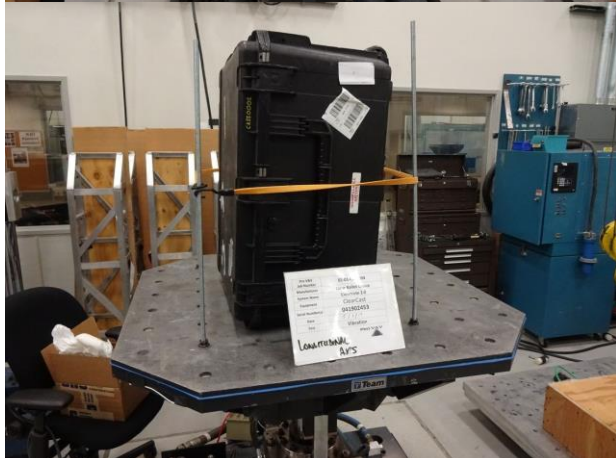
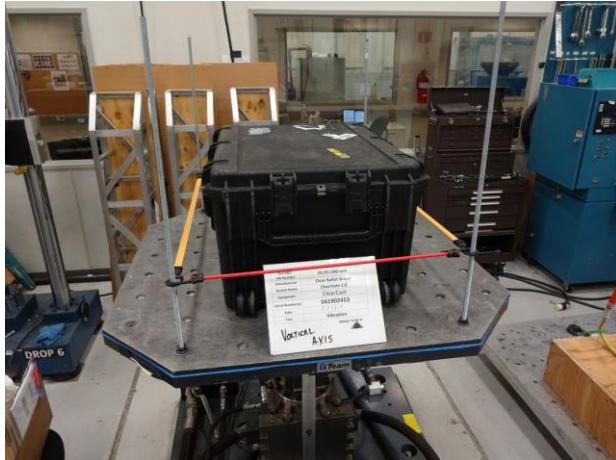
Use single Tol/Abort setting

G RMS: 0.7428 in/s RMS: 1.347 in pk-pk: 0.09105 Control Units: G²/Hz

5.2.3 Test Datasheets

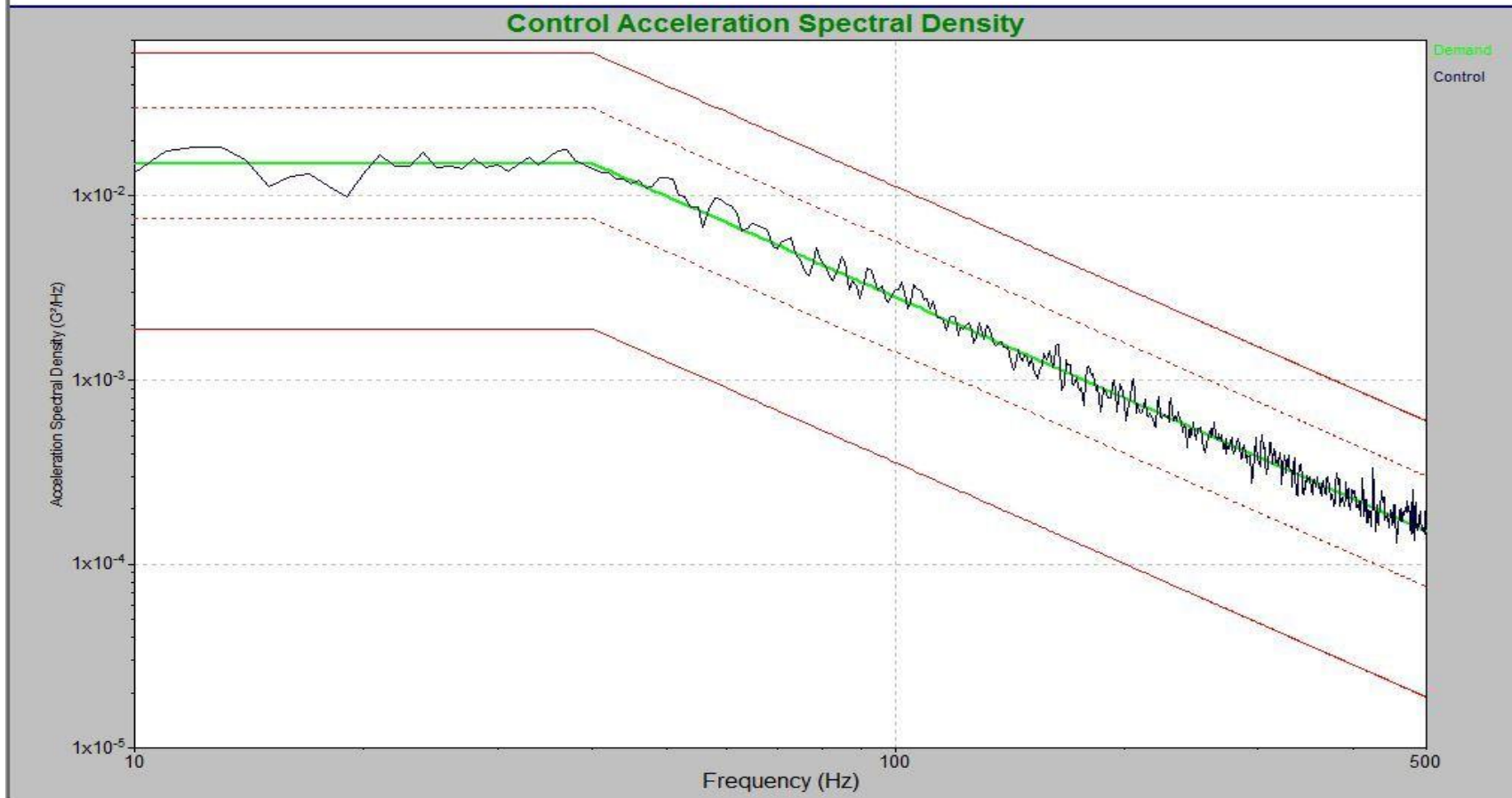
Start Date: 5-1-19		End Date: 5-1-19		MJO No: PR097808		
Customer: Pro V&V		Test Performed: Random Vibration		Test Engineer: G. Mathews		
Part Name: ClearVote 2.0		Serial numbers: 041902453		Customer Witness: Stephen Han		
Test Specification:		MIL-STD 810D Fig 514.3-1		Temp: 70° Humidity: 24%		
Date	Time	Axis	Run No.	Serial No.	Remarks	Initials
5-1-19				041902453	Set up the UUT on shaker #HYD06 for testing in the Vertical axis.	GM
5-1-19	0922	Vertical	1	041902453	Run the 1.04 gRMS random profile for 30 minutes in the Vertical axis.	GM
5-1-19				041902453	Set up both UUT's on shaker #HYD06 for testing in the Longitudinal axis.	GM
5-1-19	1004	Longitudinal	2	041902453	Run the 0.74 gRMS random profile for 30 minutes in the Longitudinal axis.	GM
5-1-19				041902453	Set up the UUT on shaker #HYD06 for testing in the Transverse axis.	GM
5-1-19	1041	Transverse	3	041902453	Run the 1.04 gRMS random profile for 30 minutes in the Transverse axis.	GM

5.2.4 Test Photographs



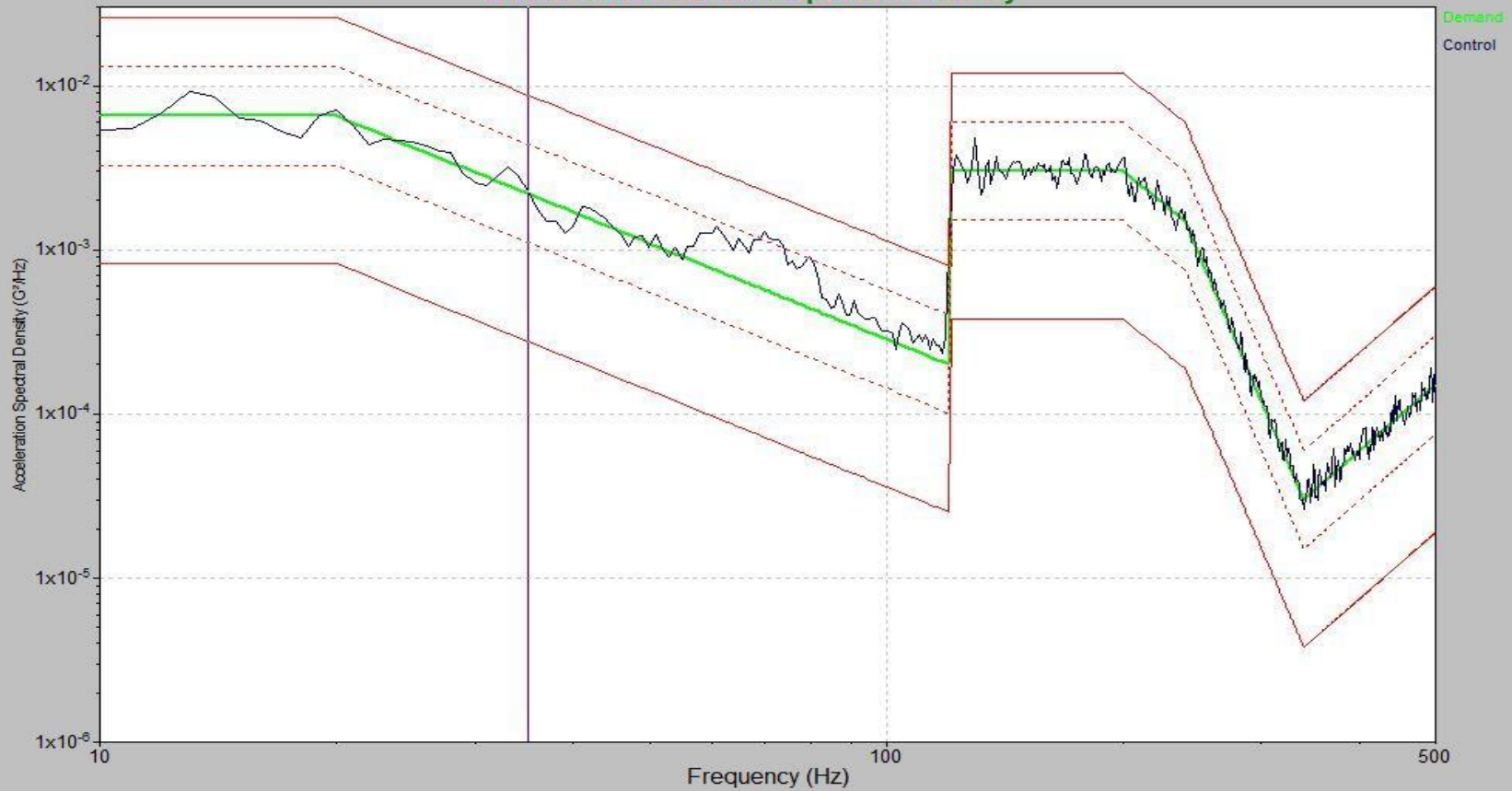
5.2.5 Test Data

NTS Longmont, CO	Level Time: 0:30:00	Demand: 1.047 G RMS	Pro V&V
Job#: PR094591	Total Time: 0:30:11	Control: 1.061 G RMS	UUT: ClearVote 2.0
May 01, 2019 09:22:30	Run 1	Test axis: Vertical	SN: 041902453



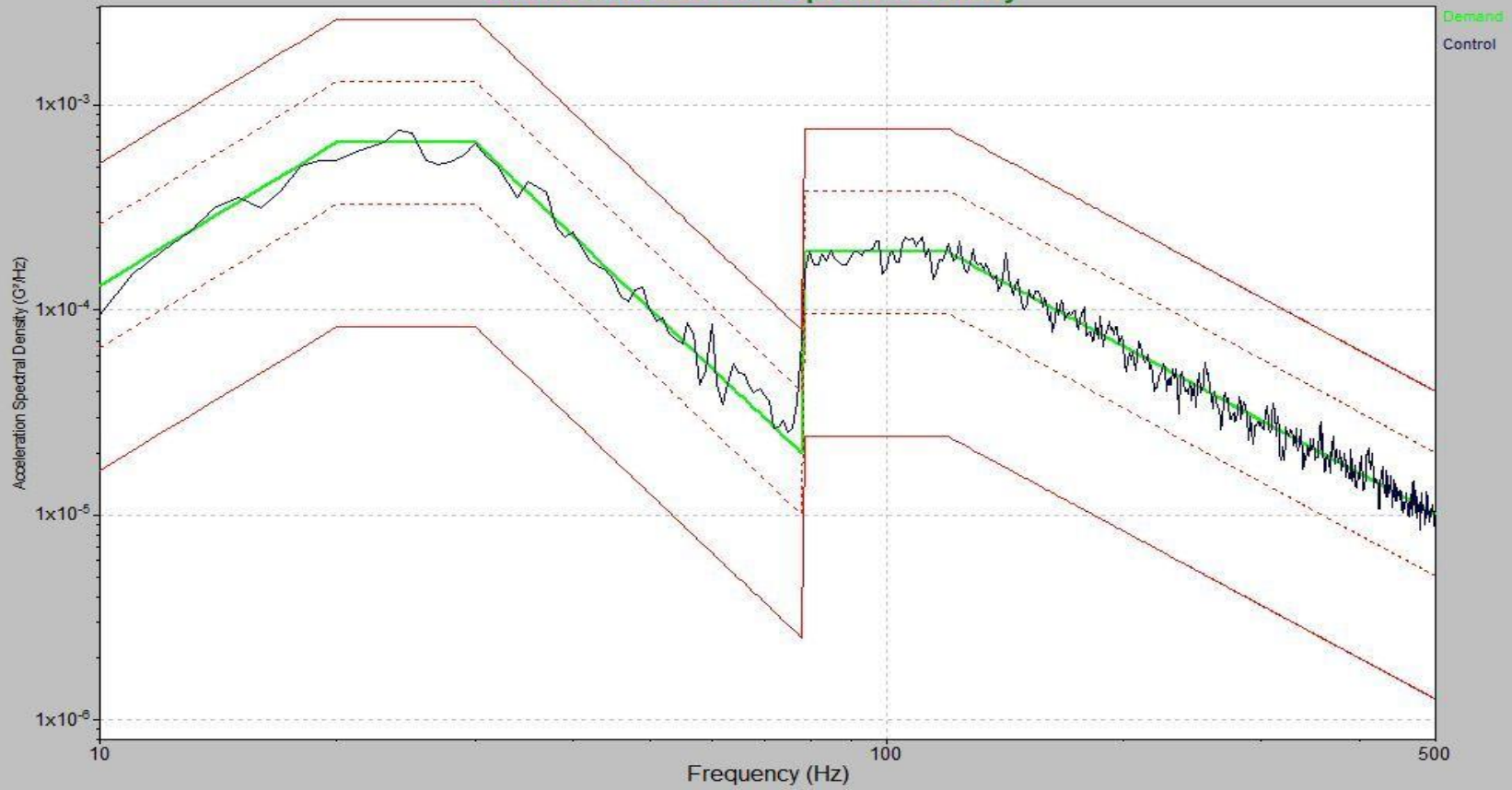
NTS Longmont, CO	Level Time: 0:30:00	Demand: 0.7428 G RMS	Pro V&V
Job#: PR094591	Total Time: 0:30:10	Control: 0.7594 G RMS	UUT: ClearVote 2.0
May 01, 2019 10:04:35	Run 2	Test axis: Longitudinal	SN: 041902453

Control Acceleration Spectral Density



NTS Longmont, CO	Level Time: 0:30:00	Demand: 0.2038 G RMS	Pro V&V
Job#: PR094591	Total Time: 0:30:11	Control: 0.2019 G RMS	UUT: ClearVote 2.0
May 01, 2019 10:41:58	Run 3	Test axis: Transverse	SN: 041902453

Control Acceleration Spectral Density





5.2.6 Test Equipment List

Table 5.2-1: Transportation Vibration Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1751	Team	483 48-16	494	Shaker System HYD05	NCR	
	Vibration Research	VR9500	95268B57	Vibration Controller	9/18/2018	9/18/2019
1671	PCB	333A12	30540	Control accelerometer	8/17/2018	8/17/2019
1673	PCB	333A12	30641	Control accelerometer	8/17/2018	8/17/2019
1869	PCB	352C34	LW256906	Control accelerometer	10/1/2018	10/1/2019
1870	PCB	352C34	LW256907	Control accelerometer	10/1/2018	10/1/2019
1766	Fluke	971	3623064	Temperature/Humidity meter	4/24/2019	4/24/2020
1858	CDI Torque Products	1002MF RMH	518704072	Torque Wrench	5/23/2018	5/23/2019

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



5.3 Temperature/Power Variation

5.3.1 Test Result

N/A

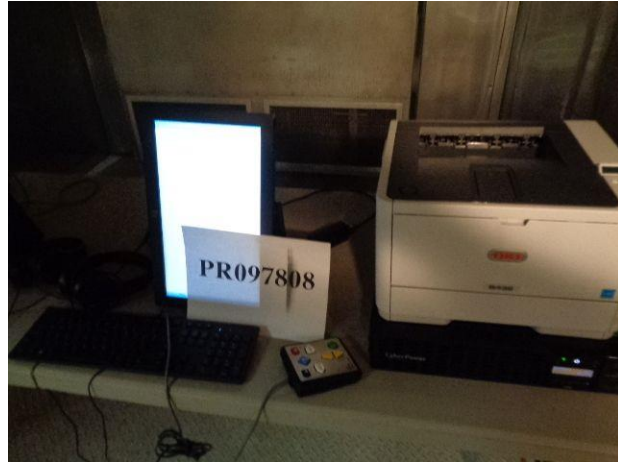
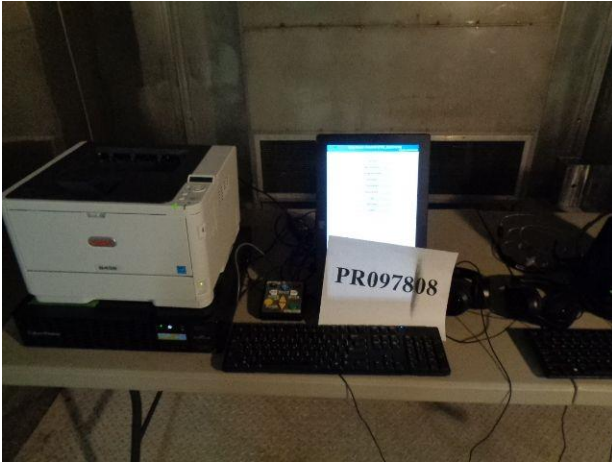
5.3.2 Test Procedure

See below.

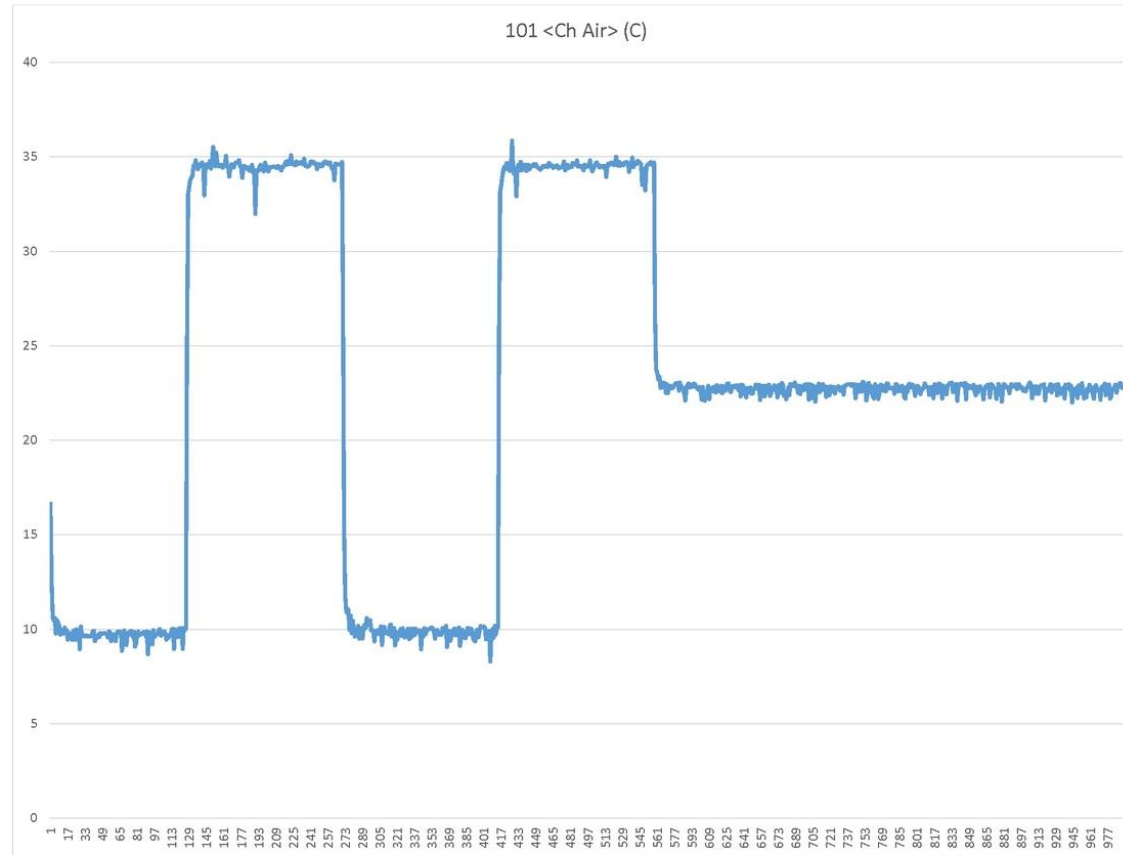
5.3.3 Test Datasheets

Start Date: 07/22/19		End Date: 07/25/19	MJO No: PR097808	
Customer: Pro V&V (Clear Ballot)		Test Performed: Temperature Power Variation Test	Test By: KM & RSP	
Part Name: Voting Ballot Reading System		Part No: See UUT Details spreadsheet	Customer Witness: N/A	
Page of	Test Specification: MIL-STD_810D		Temp: +10c to +35c Voltage: 105vlts to 129vlts	
Date	Time	Remarks	Initials	
07/22/19	07:30	Set VAC to 117vlts & ramp to +10c	RSP	
	08:00	Start dwell at 117vlts & +10c for 4hrs	RSP	
	12:00	Lower VAC to 105vlts & dwell for 4hrs	RSP	
	16:00	Raise VAC to 129vlts & dwell for 4hrs	RSP	
	20:00	Lower VAC to 117vlts & Raise temperature to +35c & dwell for 4hrs	KM	
07/23/19	24:00	Lower VAC to 105vlts & dwell for 4hrs	KM	
	04:00	Raise VAC to 129vlts & dwell for 4hrs	KM	
	08:00	Lower VAC to 117vlts & Lower temperature to +10c & dwell for 4hrs	RSP	
	12:00	Lower VAC to 105vlts & dwell for 4hrs	RSP	
	16:00	Raise VAC to 129vlts & dwell for 4hrs	RSP	
	20:00	Lower VAC to 117vlts & Raise temperature to +35c & dwell for 4hrs	KM	
07/24/19	24:00	Lower VAC to 105vlts & dwell for 4hrs	KM	
	04:00	Raise VAC to 129vlts & dwell for 4hrs	KM	
	08:00	Lower VAC to 117vlts & ramp to +23c ambient	RSP	
	08:00	Temperature and power variation portion of test has completed	KM	
	08:00	Test will continue to run at +23c ambient for another 37hrs	KM	
07/25/19	21:00	All Testing complete for a total of 85hrs	KM	
		Note: All test pass or fail determinations decided by Pro V&V Inc.		

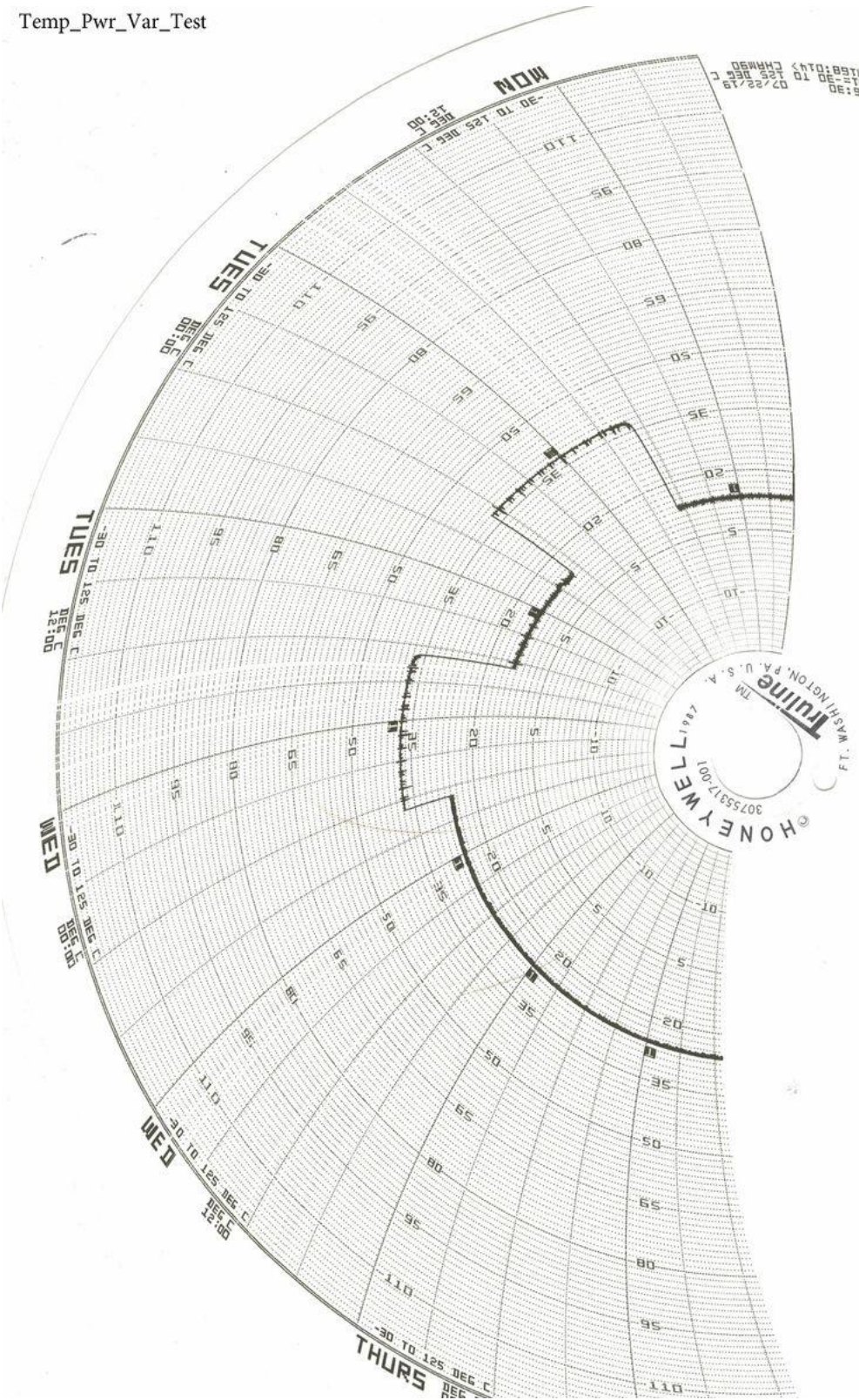
5.3.4 Test Photographs



5.3.5 Test Data



Temp_Pwr_Var_Test





5.3.6 Test Equipment List

Table 5.3-1: Temperature/Power Variation Test Equipment List

Asset Number	Manufacturer	Description	M/N	S/N	Range	Start Date	End Date	Last Calibration	Cal Interval (Months)	Cal Due	Notes
WC061556	American Cooler Technologies	Walk-In temp/humidity chamber, CH 90		23-9349		04/29/2019	05/03/2019	09/20/2018	12	09/20/2019	
WC059833	Agilent Technologies	Data Acquisition Switch Unit	34970A	MY410 34389	Multi / Mfg	07/22/2019	07/26/2019	04/28/2018	12	04/28/2020	
WC061557	Watlow	TEMPERATURE CONTROLLER	F4	'005179	Multi / Mfg	07/22/2019	07/26/2019	09/20/2018	12	09/20/2019	
WC061558	Honeywell	CHART RECORDER	DR4500	9836Y8 380203 00006	Multi / Mfg	07/22/2019	07/26/2019	09/20/2018	12	09/20/2019	
WC070363	Agilent Technologies	Data Acq mux cards	34901A	MY410 33277	±2 ohms	07/22/2019	07/26/2019	01/17/2019	12	01/17/2020	

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



End of Report