



National Technical Systems
Environmental & Dynamics Lab
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Longmont, CO 80503

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Fax: 303-776-7314

Date: 24 APRIL 2018

Customer:
Pro V&V
700 Blvd South
Huntsville, AL 35802

Purchase Order Number: 2017-015

- A. TEST: Bench Handling, Transportation Vibration, Low Temperature, High Temperature, Humidity, and Temperature/Power Variation
- B. TEST ITEMS: ExpressVote
See page 2 for Test Item Identification
- C. TEST SPECIFICATIONS:
1. MIL-STD 810D
 2. VVSG 1.0: 2005
 3. Pro V&V SOW
 4. ISO 17025:2005

D. RESULTS:

This report is to certify that the ExpressVote samples were subjected to the Bench Handling Test, Transportation Vibration, Low Temperature Test, High Temperature Test, Humidity Test, and Temperature/Power Variation Test according to the above specifications.

See Page 2 for Summary of Test Results. The UUT (unit under test) was returned to the customer for post-tests and final evaluation.

Test data, an equipment list, and photographs are attached.

John Radman,
Preparer

Bob Polverari,
Technical Reviewer

TEST ITEM IDENTIFICATION

Quantity	Sample Description	Serial Number
6	ExpressVote	EV0217390473, EV0217390480, EV0217390461, EV0217390646, EV0217390460, EV0217390506

SUMMARY OF TEST RESULTS

Upon completion of testing, the test samples were removed from the corresponding test fixtures/chambers and subjected to a visual inspection. No anomalies were noted. The test samples were returned to Pro V&V Inc.

Humidity Testing

Testing was started on 05 March 2018 and completed on 15 March 2018 by exposing samples S/N EV0217390480, EV0217390460, EV0217390506 (see Test Item Identification table above) to Humidity testing in accordance with MIL-STD-810D, method 507.2, non-operating.

The test samples were packaged in their shipping boxes, placed in the thermal chamber and exposed to 10 humidity cycles.

Bench Handling Testing

Testing was started and completed on 21 March 2018 by exposing samples S/N EV0217390480, EV0217390460, EV0217390506 (see Test Item Identification table above) to Bench Handling testing in accordance with MIL-STD-810D, method 506.3, procedure VI.

The Test Samples were set on a bench and were subjected to 6 – 4” drops as follows:

- 1st – Drop on front edge
- 2nd – Drop on right edge
- 3rd – Drop on left edge
- 4th – Drop on back edge



High Temperature Testing

Testing was started on 16 March 2018 and completed on 19 March 2018 by exposing samples S/N EV0217390480, EV0217390460, EV0217390506 (see Test Item Identification table above) to High Temperature testing in accordance with MIL-STD-810D, method 502.2, non-operating.

The test samples were packaged in their shipping boxes and placed in the thermal chamber. Temperature was ramped to 60°C with a 6 hour dwell. Temperature was then returned to ambient.

Low Temperature Testing

Testing was started on 19 March 2018 and completed on 20 March 2018 by exposing samples S/N EV0217390480, EV0217390460, EV0217390506 (see Test Item Identification table above) to Low Temperature testing in accordance with MIL-STD-810D, method 501.2, non-operating.

The test samples were packaged in their shipping boxes and placed in the thermal chamber. Temperature was ramped to -20°C with a 6 hour dwell. Temperature was then returned to ambient.

Temperature /Power Variation Testing

Testing was started on 26 March 2018 and completed on 30 March 2018 by exposing samples S/N EV0217390473, EV0217390480, EV0217390461, EV0217390646, EV0217390460, EV0217390506 (see Test Item Identification table above) to Power Variation testing in accordance with MIL-STD-810D, method 501.2 and 502.2 and Pro V&V SOW.

The test samples were placed in the chamber at 10°C with a bias voltage of 117 VAC and allowed to dwell for 4 hours. The test sequence listed in the Test Log (page 23) was followed.

Transportation Vibration Testing

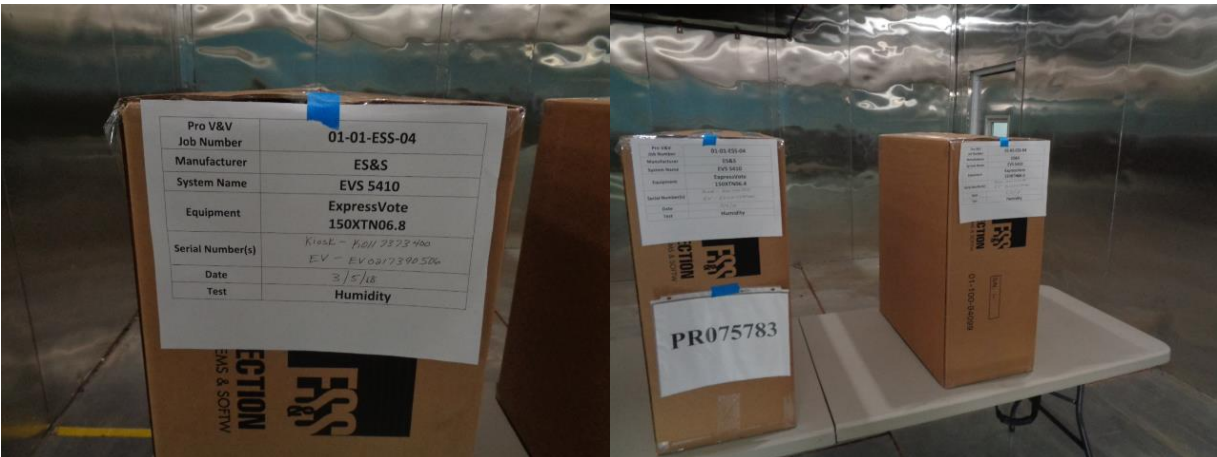
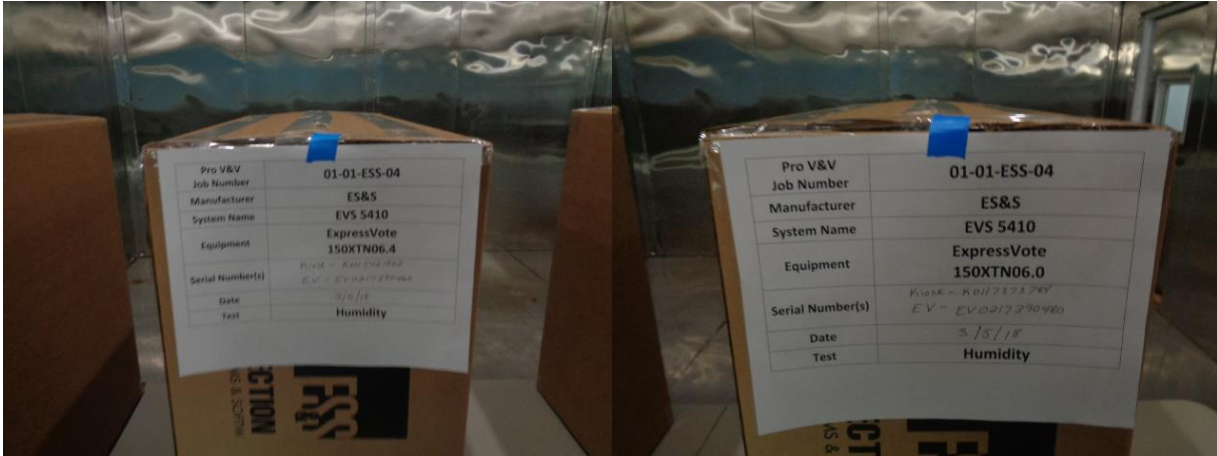
Testing was started on 20 March 2018 and completed on 21 March 2018 by exposing samples S/N EV0217390480, EV0217390460, EV0217390506 (see Test Item Identification table above) to Transportation Vibration testing in accordance with MIL-STD-810D, method 514.3, category 1, Basic Transportation Vibration per Figures 514.3-1 through 514.3-3 and Pro V&V SOW.

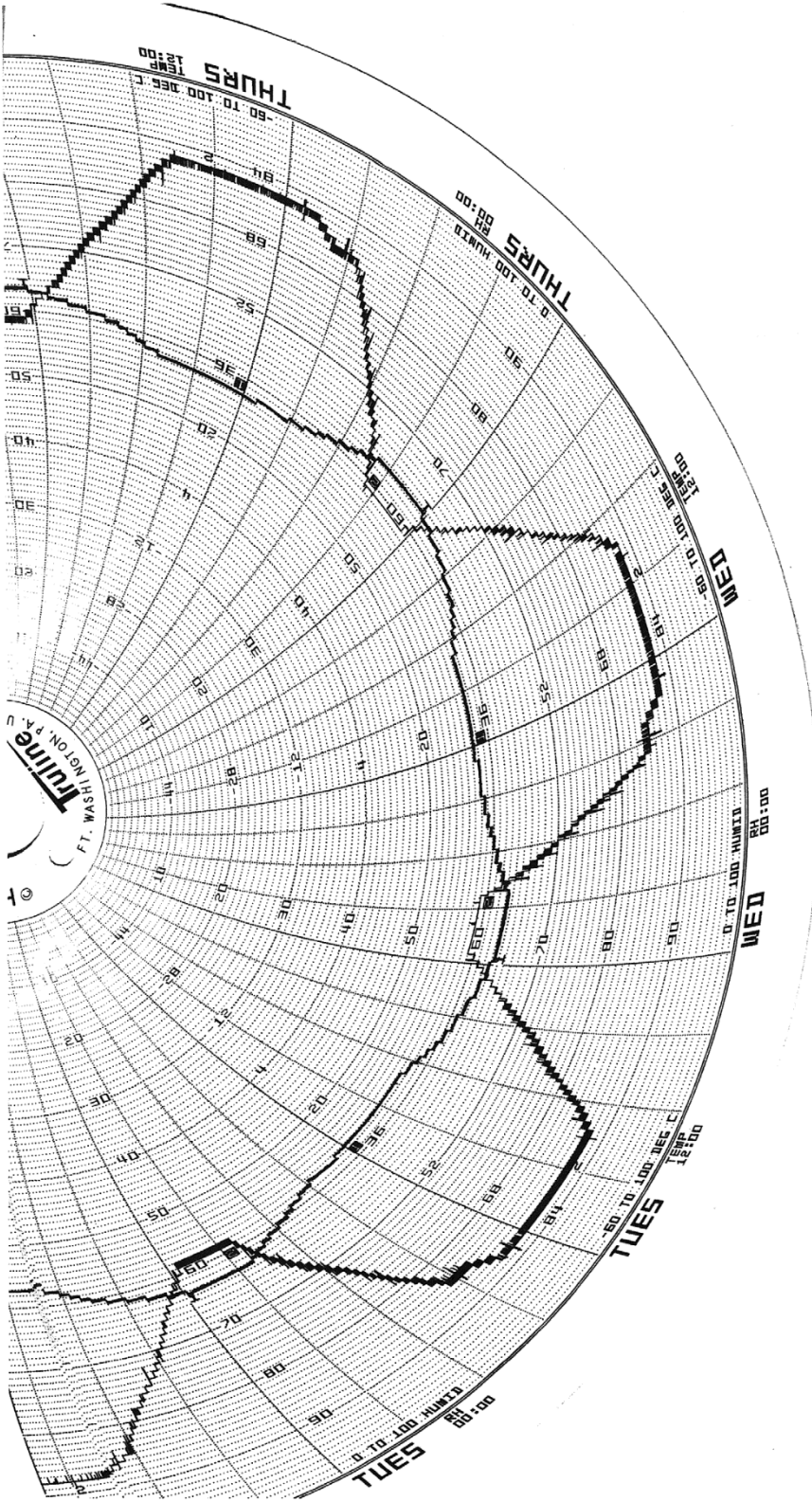
The test samples were packaged in their shipping boxes, secured to an electro-dynamic shaker and exposed to the random vibration test in each of the three (3) axes (Vertical, Transverse and Longitudinal). Vertical was exposed to 1.04 gRMS random vibration, Transverse was exposed to 0.2 gRMS random vibration and Longitudinal was exposed to 0.74 gRMS random vibration; each for a duration of 30 minutes.

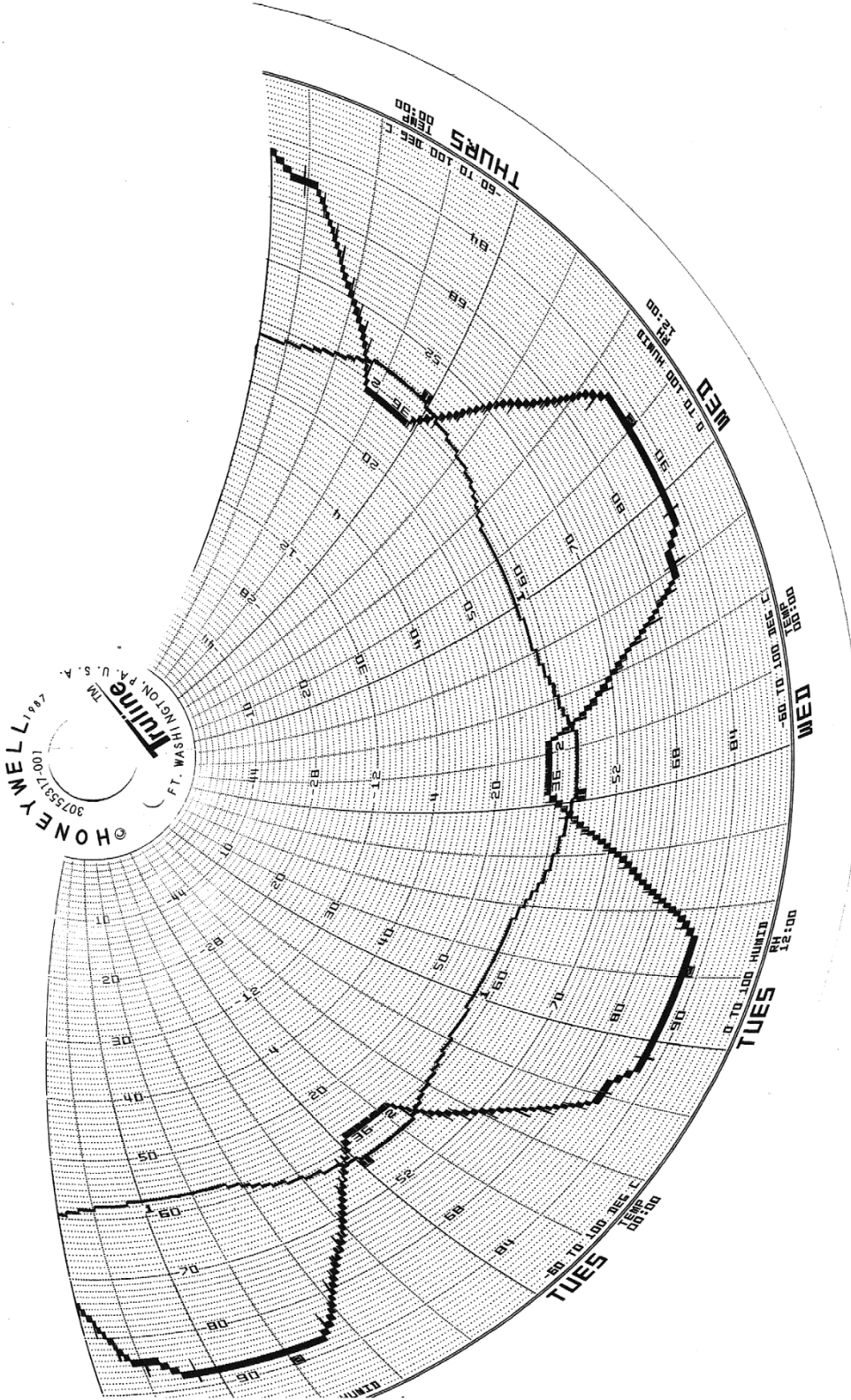


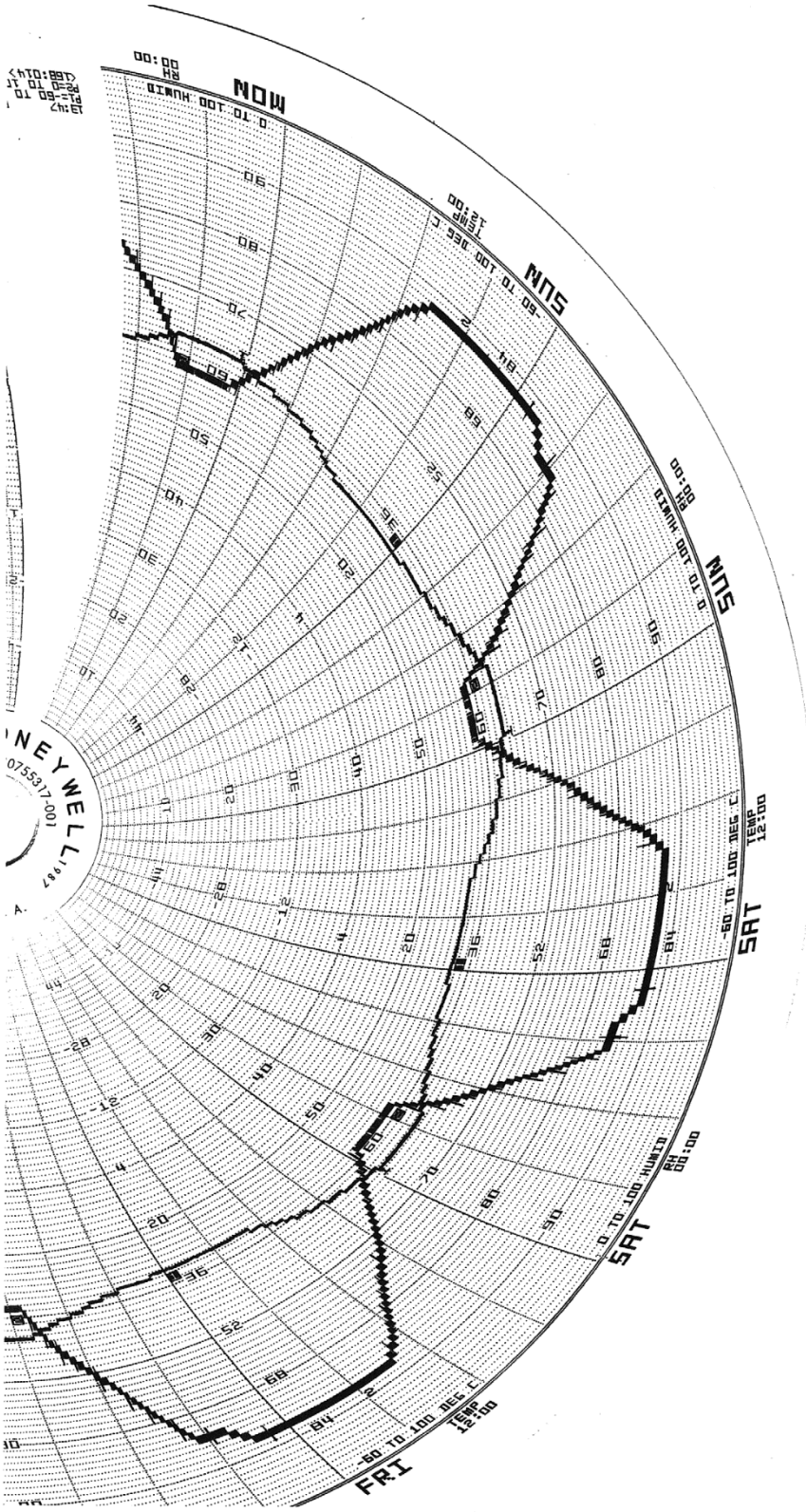
Upon completion of testing, the test samples were removed from the chamber/test fixtures. All passed fail criteria will be determined by Pro V and V. The test samples were returned to the customer.

HUMIDITY TEST











TEST		10 Day Humidity Test		MJO	PR075783
CUSTOMER		ES&S		P/N	S/N
				See Below	
TEST ITEM		Voting Koisk			
SPECIFICATION		MIL-STD-810D		PARA	
DATE	TIME	LOG ENTRIES	INITIALS		
		K0117373784 – EV0217390480K0115421503 – EV0217390460 K0117373400 – EV0217390506	KM		
03/05/18	10:37	Start 10 day humidity test	KM		
03/15/18	11:45	Test complete, stop program, open chambers doors and bring to ambient	KM		
03/15/18	11:45	Customer inspected product and will return in morning	KM		
		Note:All test pass or fail determinations decided by Pro V&V Inc.	KM		
PAGE 1 OF 1		TEST BY	Kerry Martin	DATE	3/15/18
		ENGINEER	N/A	GOV'T QAR	N/A



Test Title: 10 Day Humidity Test	
Customer: ES&S	Date: 03/05/18
Part Name: Voting Koisk	MJO No.: PR075783
Part No.: K0117373784 – EV0217390480 K0115421503 – EV0217390460	P.O. No.:
Serial No.: K0117373400 – EV0217390506	NTS Eng.:
Test Spec: MIL-STD-810D	Revision:

Equipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Chamber 59	Watlow F4	1653	09/28/17	Yes	09/28/18
Chart Recorder	Honeywell	1654	09/28/17	Yes	09/28/18

BENCH HANDLING









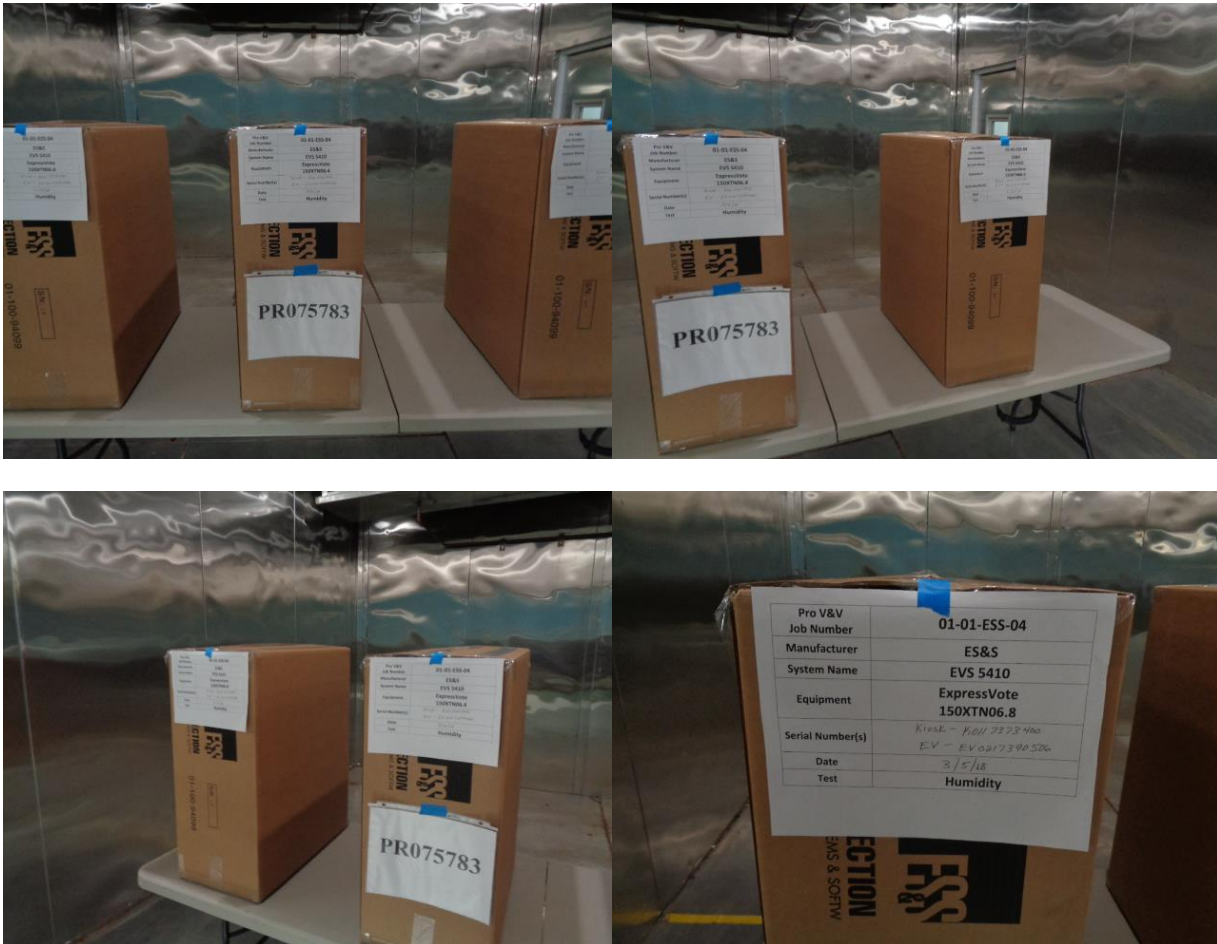
TEST	BENCH HANDLING	MJO	PR075783
CUSTOMER	ES&S	P/N	S/N See Below
TEST ITEM	Voting Koisk		
SPECIFICATION	MIL-STD-810D	PARA	
DATE	TIME	LOG ENTRIES	INITIALS
		K0117373784 – EV0217390480	
		K0115421503 – EV0217390460	
		K0117373400 – EV0217390506	KM
03/21/18	10:37	Start 6 drops per corner of UUT from 4 inches	KM
03/21/18		Total of 24 drops frm 4 inches complete	KM
		Note:All test pass or fail determinations decided by Pro V&V Inc.	KM

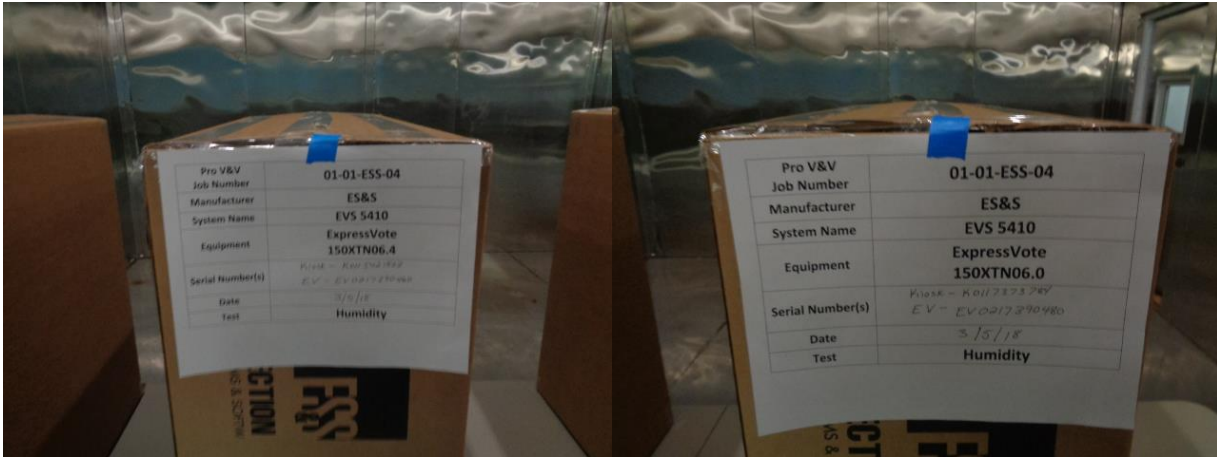


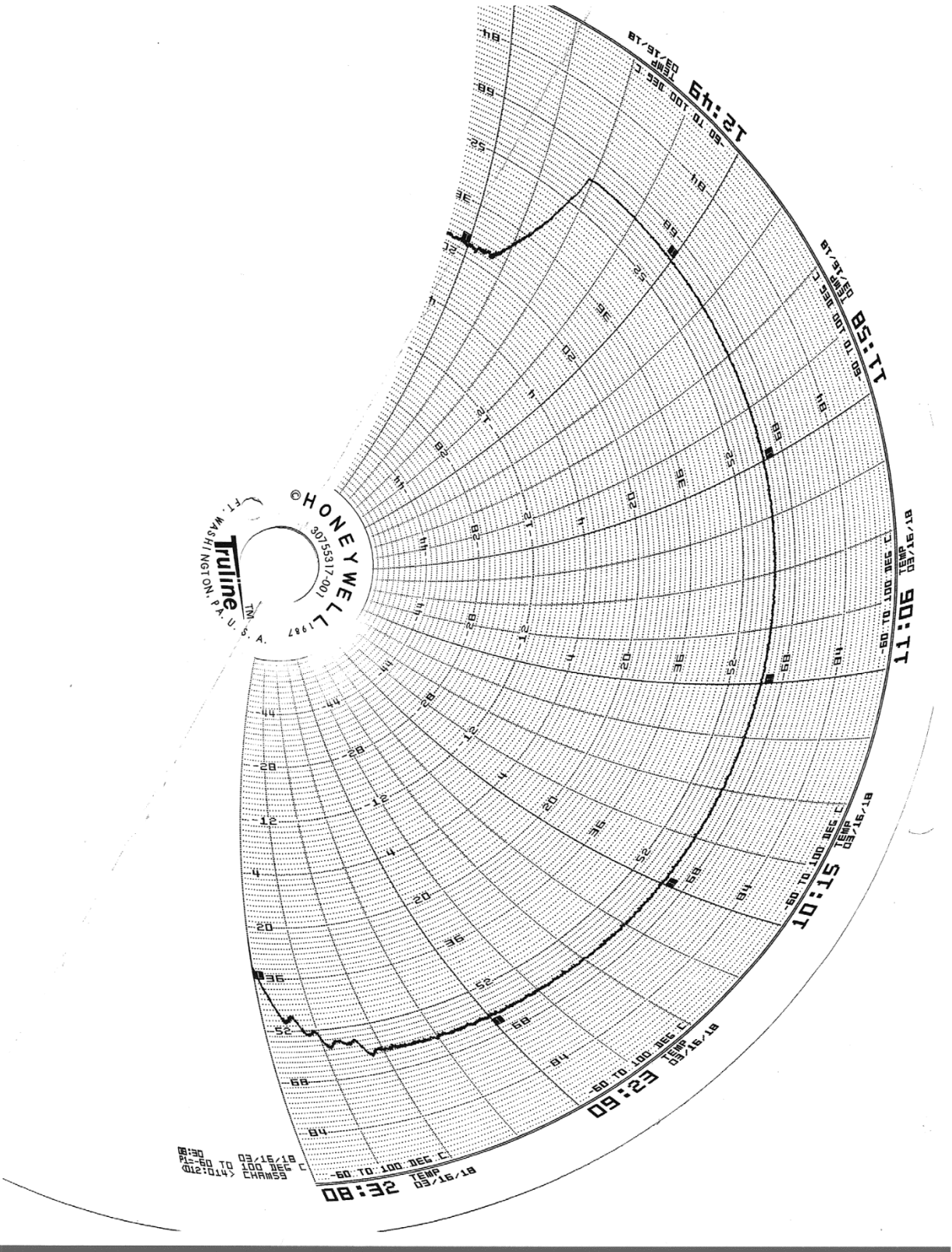
Test Title: Bench Handling	
Customer: ES&S	Date: 03/21/18
Part Name: Voting Koisk	MJO No.: PR075783
Part No.: K0117373784 – EV0217390480 K0115421503 – EV0217390460	P.O. No.:
Serial No.: K0117373400 – EV0217390506	NTS Eng.:
Test Spec: MIL-STD-810D	Revision:

Equipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
4 inch wooden block	NA	NA	NA	NA	NA

High Temperature Test









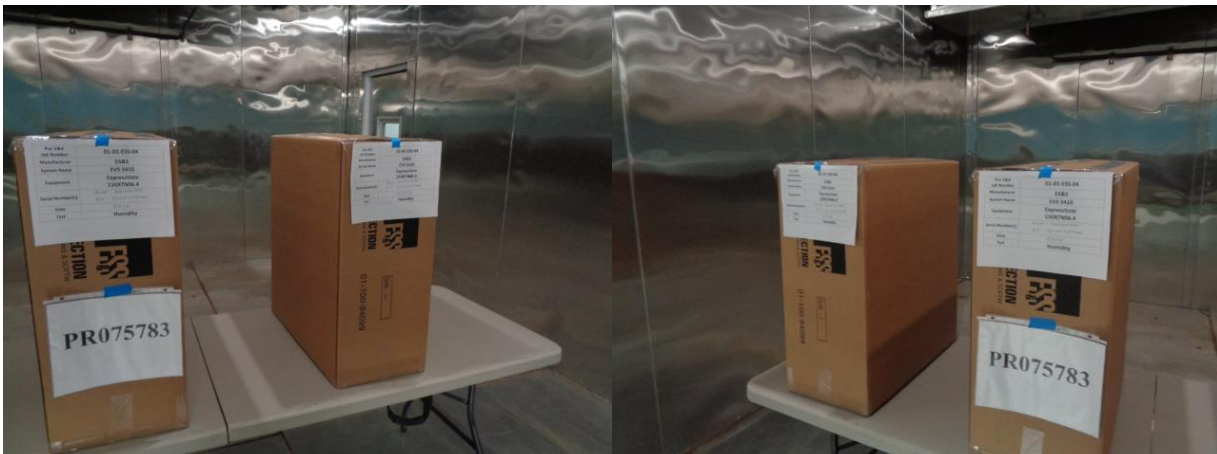
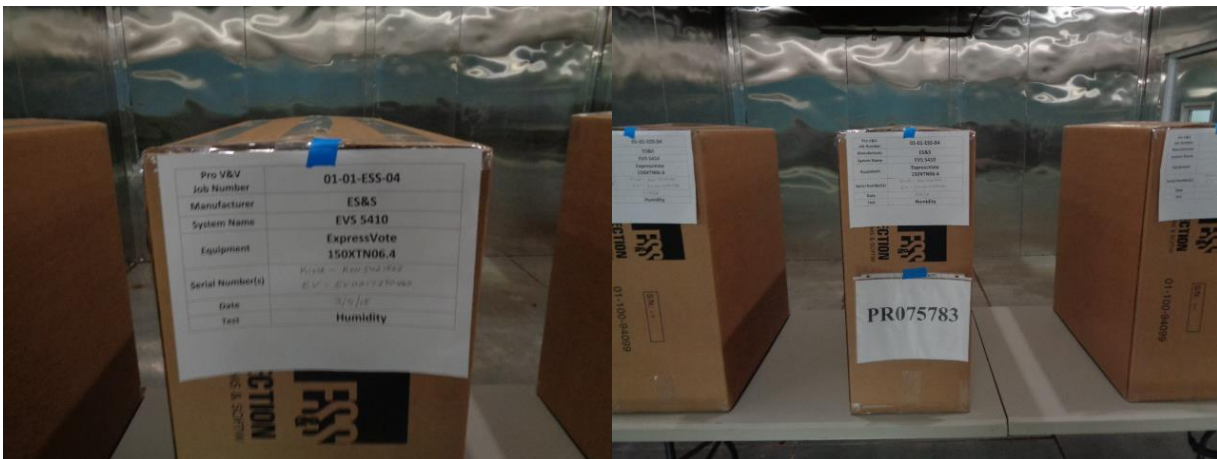
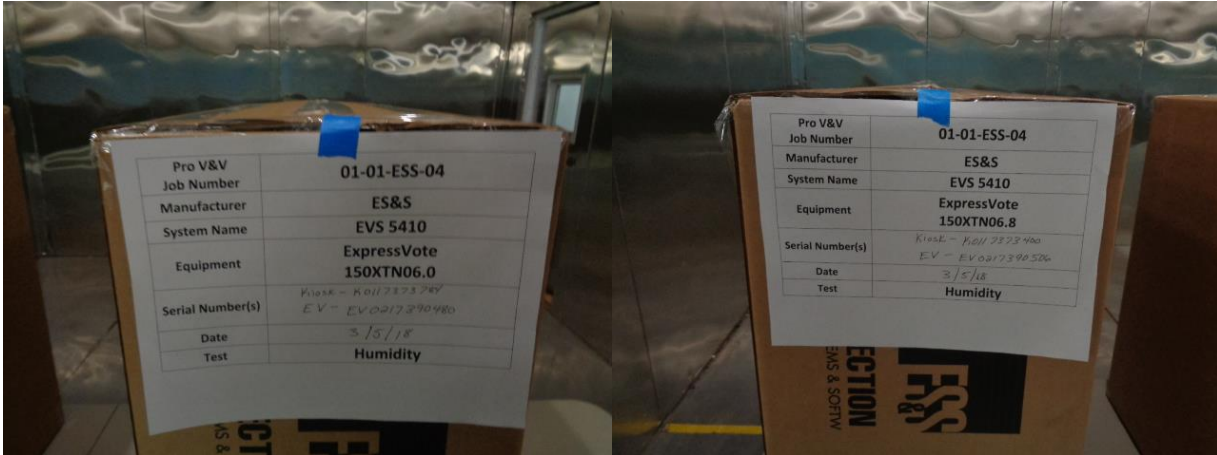
TEST		High Temp 60cTest	MJO	PR075783
CUSTOMER		ES&S	P/N	S/N
TEST ITEM		Voting Koisk	See Below	
SPECIFICATION		MIL-STD-810D	PARA	
DATE	TIME	LOG ENTRIES	INITIALS	
		K0117373784 – EV0217390480 K0115421503 – EV0217390460 K0117373400 – EV0217390506	KM	
03/16/18	09:30	Ramp to 60c at 5c per minute	KM	
03/16/18	10:00	Start 4hr dwell at 60c	KM	
03/16/18	14:50	Bring chamber to ambient and open chamber door	KM	
03/19/18		Customer performed post test on UUT's - Test Passed	KM	
03/19/18		Test complete	KM	
		Note:All test pass or fail determinations decided by Pro V&V Inc.	KM	

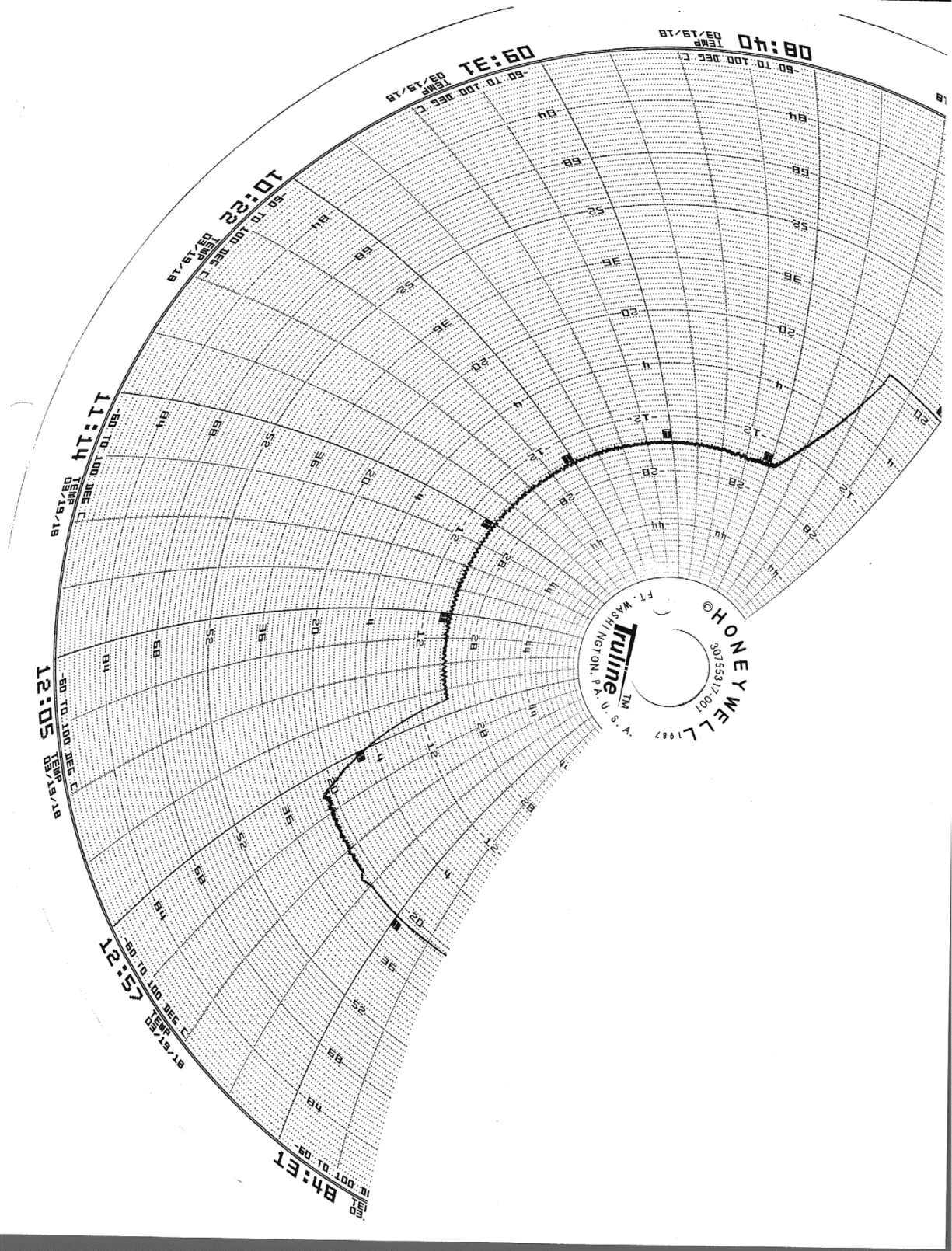


Test Title:	High Temperature 60cTest	
Customer:	ES&S	Date: 03/16/18
Part Name:	Voting Koisk	MJO No.: PR075783
Part No.:		P.O. No.:
	K0117373784 – EV0217390480	
	K0115421503 – EV0217390460	
Serial No.:	K0117373400 – EV0217390506	NTS Eng.:
Test Spec:	MIL-STD-810D	Revision:

Equipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Chamber 59	Watlow F4	1653	09/28/17	Yes	09/28/18
Chart Recorder	Honeywell	1654	09/28/17	Yes	09/28/18

LOW TEMPERATURE TEST







TEST	LOW TEMPERATURE -20C	MJO	PR075783
CUSTOMER	ES&S	P/N	S/N See Below
TEST ITEM	Voting Koisk		
SPECIFICATION	MIL-STD-810D	PARA	

DATE	TIME	LOG ENTRIES	INITIALS
		K0117373784 – EV0217390480 K0115421503 – EV0217390460 K0117373400 – EV0217390506	KM
03/19/18	08:40	Ramp to -20c at 5c per minute	KM
03/19/18	09:45	Start 4hr dwell at -20c	KM
03/19/18	13:50	Bring chamber to ambient and open chamber door	KM
03/20/18		Customer performed post test on UUT's - Test Passed	KM
03/20/18		Test complete	KM
		Note:All test pass or fail determinations decided by Pro V&V Inc.	KM

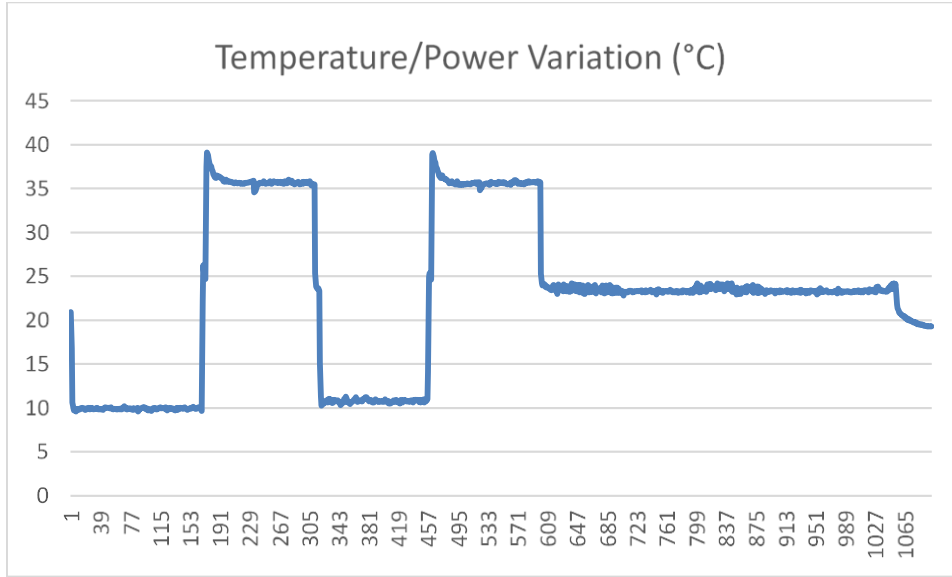


Test Title: Low Temperature -20cTest	
Customer: ES&S	Date: 03/19/18
Part Name: Voting Koisk	MJO No.: PR075783
Part No.:	P.O. No.:
K0117373784 – EV0217390480	
K0115421503 – EV0217390460	
Serial No.: K0117373400 – EV0217390506	NTS Eng.:
Test Spec: MIL-STD-810D	Revision:

Equipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Chamber 59	Watlow F4	1653	09/28/17	Yes	09/28/18
Chart Recorder	Honeywell	1654	09/28/17	Yes	09/28/18

TEMPERATURE / POWER VARIATION







TEST	Temperature Power Variation Test		MJO	PR075783
CUSTOMER	ES&S	P/N	S/N	See Below
TEST ITEM	Voting Koisk			
SPECIFICATION	MIL-STD-810D	PARA		

DATE	TIME	LOG ENTRIES	INITIALS
		K0117373783 – EV0217390473 K0117373784 – EV0217390480 K0115421500 – EV0217390461 K0115421502 – EV0217390646 K0115421503 – EV0217390460 K0117373400 – EV0217390506	KM
03/26/18		Set VAC to 117vlts	KM
	12:00 PM	Set temperature to 10c & start 4hr dwell	KM
	4:00 PM	Lower VAC to 105vlts	KM
	8:00 PM	Raise VAC to 129vlts	KM
	11:30 PM	Lower VAC to 117vlts & set temperature to 23c	KM
	12:00 AM	Raise temperature to 35c & start 4hr dwell	KM



03/27/18	04:00 AM	Lower VAC to 105vlts	KM
	08:00 AM	Raise VAC to 129vlts	KM
	11:30 AM	Lower VAC to 117vlts & set temperature to 23c	KM
	KM	Lower temperature to 10 & start 4hr dwell	KM
	4:00 PM	Lower VAC to 105vlts	KM
	8:00 PM	Raise VAC to 129vlts	KM
	11:30 PM	Lower VAC to 117vlts & set temperature to 23c	KM
03/28/18	12:00 AM	Raise temperature to 35c & start 4hr dwell	KM
	04:00 AM	Lower VAC to 105vlts	KM
	08:00	Raise VAC to 129vlts	KM
	11:30 AM	Lower VAC to 117vlts & set temperature to 23c	KM
	12:00 PM	End of power test systems will continue to run at ambient for 37hrs	KM
03/30/18		Test completed	KM
		Note:Used the following voltages to attain 105, 117 & 129vlts - 105.6, 117.4, 129.4	KM
		Note:All test pass or fail determinations decided by Pro V&V Inc.	KM



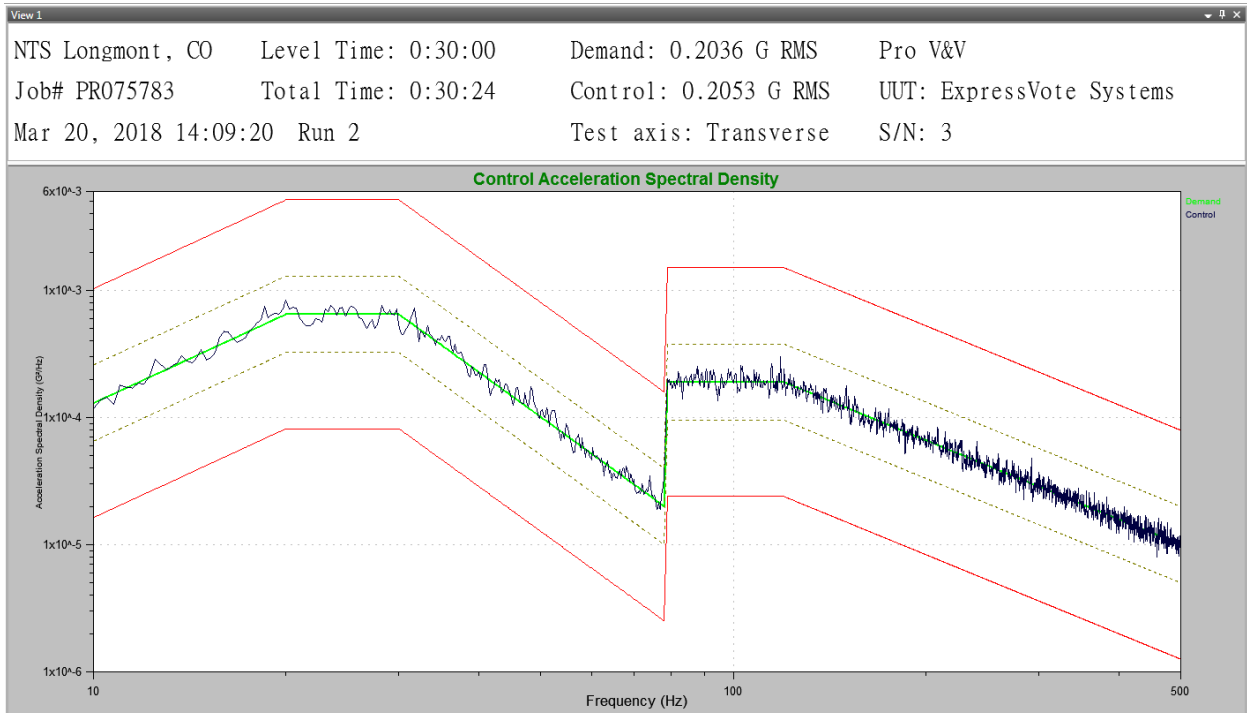
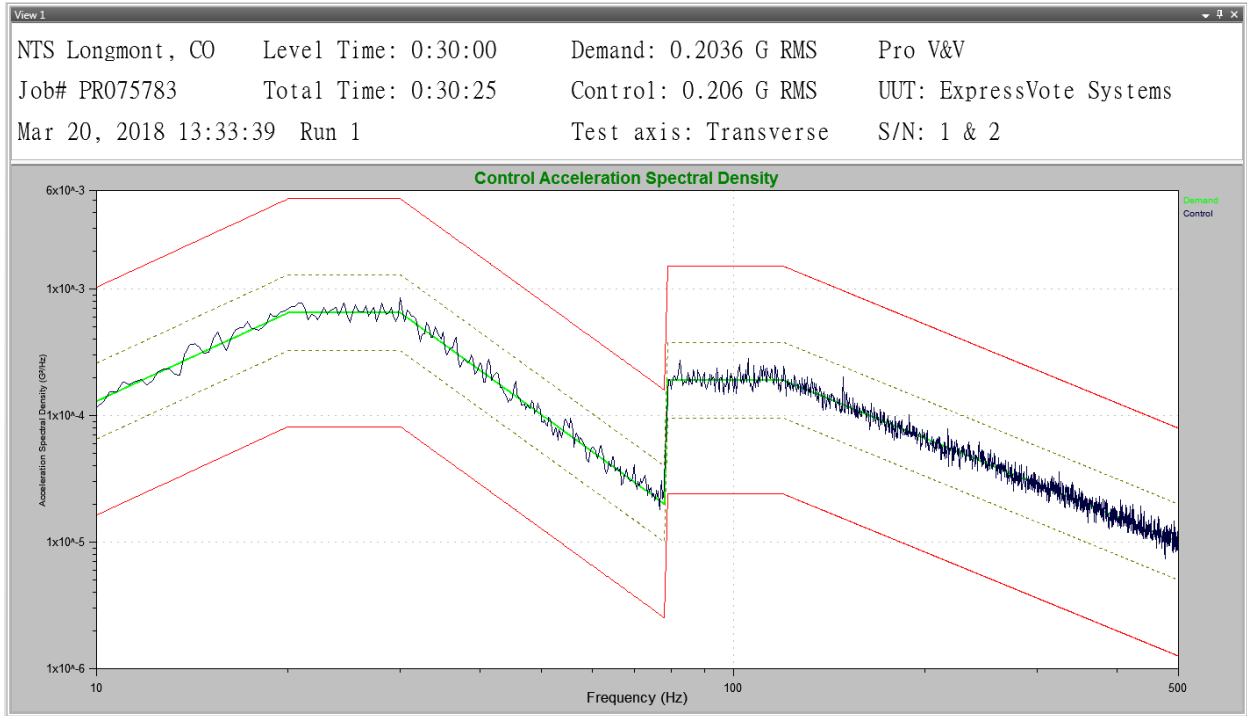
Test Title: Temp Power Variationt	
Customer: ES&S	Date: 03/26/18
Part Name: Voting Koisk	MJO No.: PR075783
Part No.:	P.O. No.:
K0117373783 – EV0217390473	
K0117373784 – EV0217390480	
K0115421500 – EV0217390461	
K0115421502 – EV0217390646	
K0115421503 – EV0217390460	
Serial No.: K0117373400 – EV0217390506	NTS Eng.:
Test Spec: MIL-STD-810D	Revision:

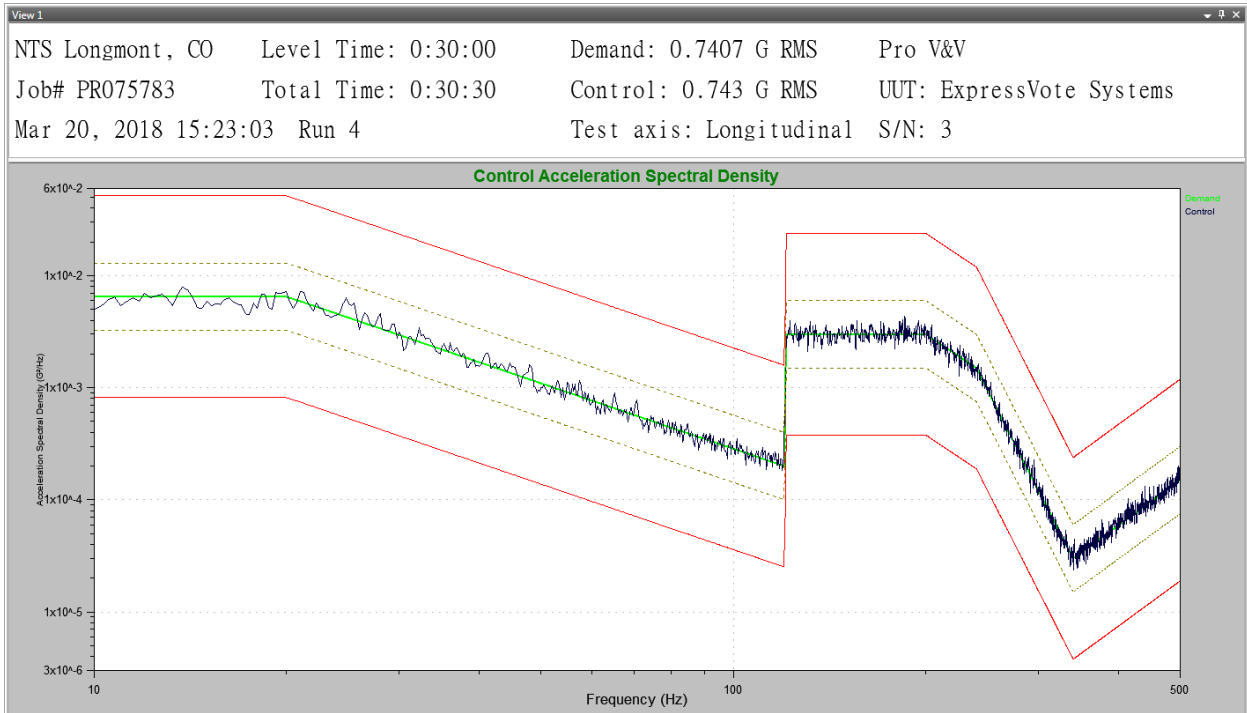
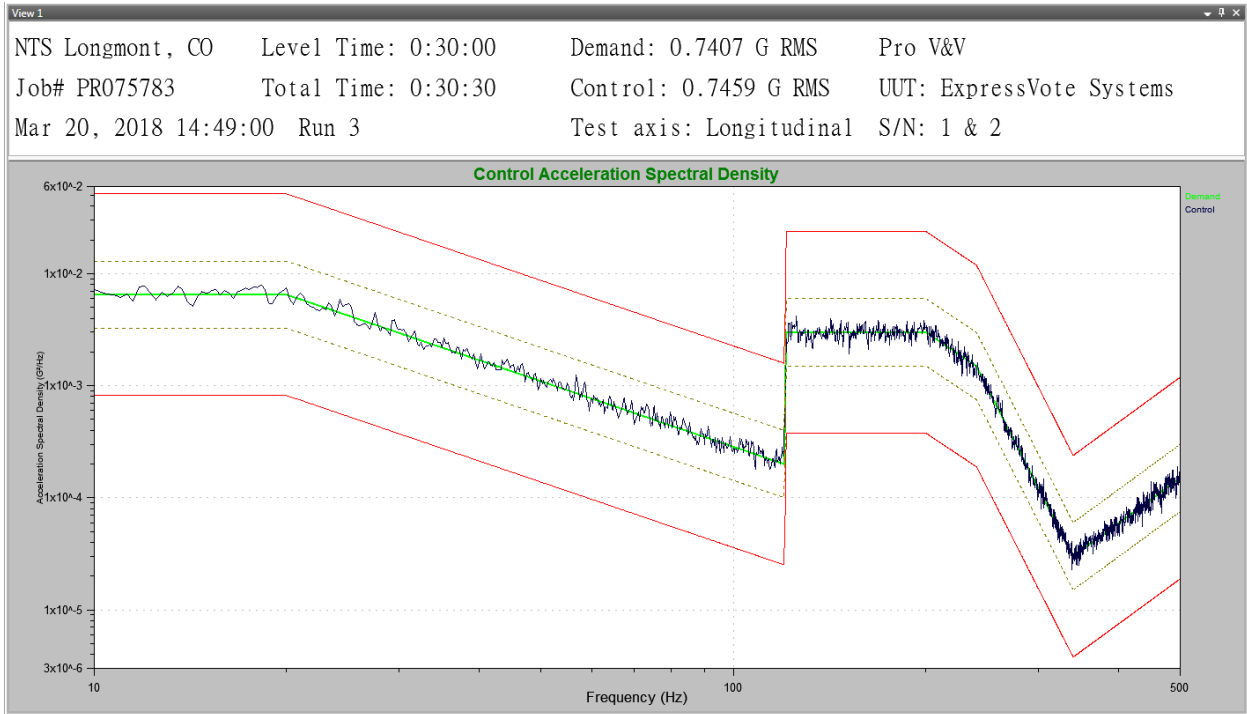
Equipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Chamber 59	Watlow F4	1653	09/28/17	Yes	09/28/18
Chart Recorder	Honeywell	1654	09/28/17	Yes	09/28/18

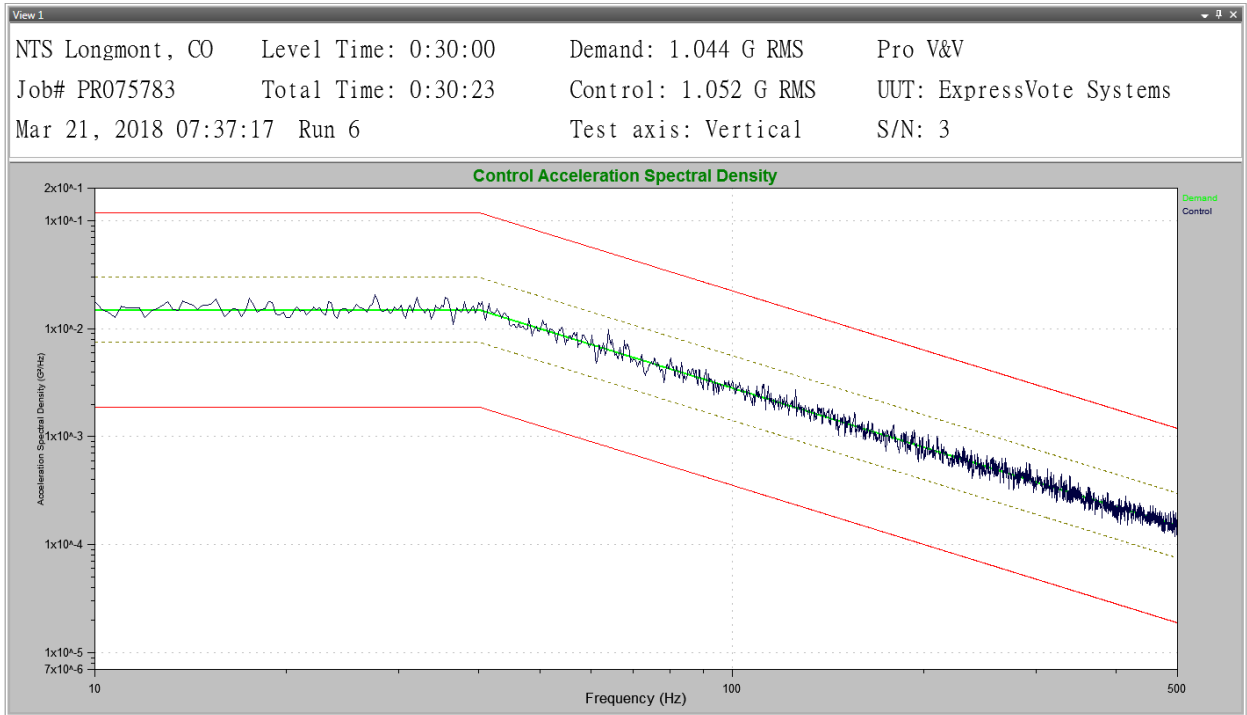
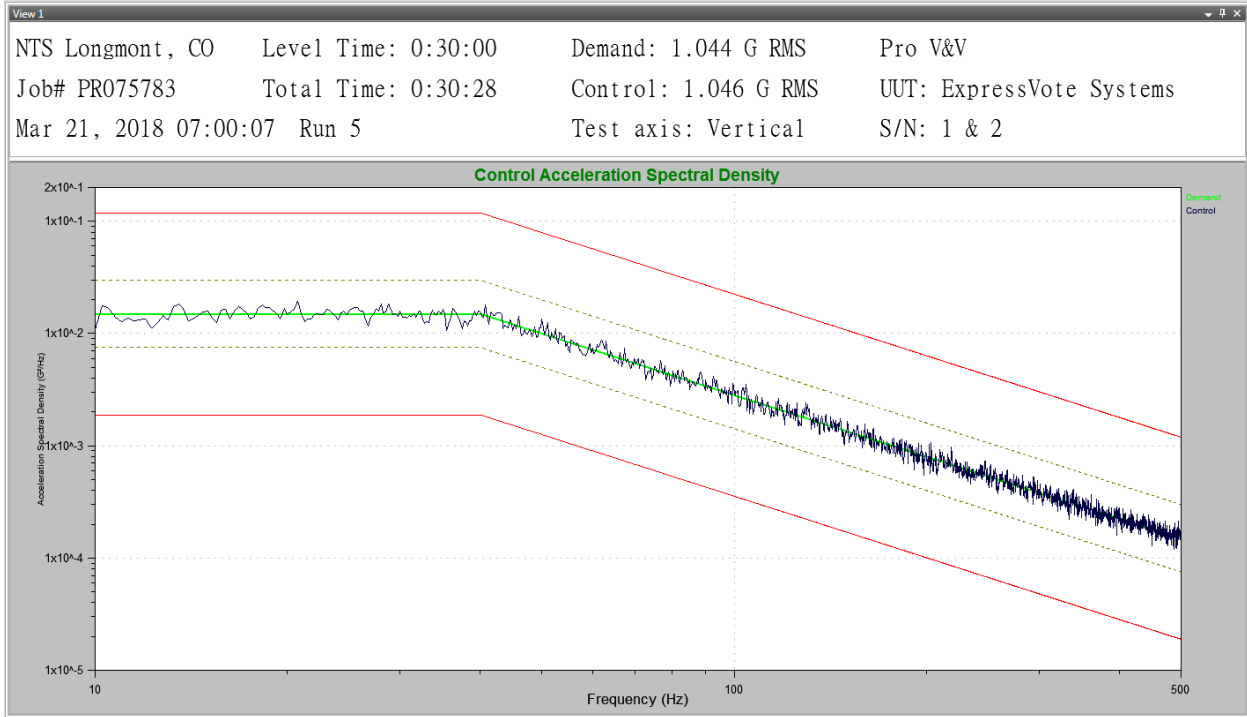
TRANSPORTATION VIBRATION













Start Date: 3/20/2018	End Date: 3/21/2018	MJO No: PR075783
Customer: Pro V&V	Test Performed: Transportation Vibration	Test Engineer: Michael Nash
Part Name: ExpressVote	Serial numbers: See below	Customer Witness: N/A
Page 1 of 1	Test Specification: Mil-STD-810D	Temp: 70° Humidity: 45%

Date	Time	Axis	Plot No.	Serial No.	Remarks	Initials
					UUT 1-P/N: 150XTN06.8 S/N: K0117373400 & EV0217390506 UUT 2-P/N: 150XTN06.4 S/N: K0115421503 & EV0217390460 UUT 3-P/N: 150XTN06.0 S/N: K0117373784 & EV0217390480	MN
3/20/18	1250	Trans			Setup UUT's 1&2 on shaker HYD05 in the Transverse-Axis	MN
	1333		1	UUT 1&2	Run .20 gRMS random vibration on packaged UUT's in the Transverse-Axis	MN
	1405				Changeover to UUT 3 in the Transverse-Axis	MN
	1409		2	UUT 3	Run .20 gRMS random vibration on packaged UUT in the Transverse-Axis	MN
	1440	Long			Changeover to UUT's 1&2 in the Longitudinal-Axis	MN
	1449		3	UUT 1&2	Run .74 gRMS random vibration on packaged UUT's in the Longitudinal-Axis	MN
	1520				Changeover to UUT 3 in the Longitudinal-Axis	MN
	1523		4	UUT 3	Run .74 gRMS random vibration on packaged UUT in the Longitudinal-Axis	MN
	1554	Vert			Setup UUT's 1&2 on shaker HYD06 in the Vertical-Axis	MN
3/21/18	0700		5	UUT 1&2	Run 1.04 gRMS random vibration on packaged UUT's in the Vertical-Axis	MN
	0731				Changeover to UUT 3 in the Vertical-Axis	MN
	0737		6	UUT 3	Run 1.04 gRMS random vibration on packaged UUT in the Vertical-Axis	MN
					Units were functionally tested and worked to design. Testing complete.	MN



TEST EQUIPMENT

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1750	Team	80/10.5	544	Shaker System HYD06	For reference only	
1751	Team	483 48-16	494	Shaker System HYD05	For reference only	
1704	Vibration Research	VR9500	9521DE37	Vibration Controller	9-29-17	9-29-18
1697	PCB	353B34	LW204221	Accelerometer	10/04/17	10/04/18
1698	PCB	353B34	LW204222	Accelerometer	11-13-17	11-13-18
1807	CDI Torque products	1002MFRMH	0816900632	Torque wrench	11-16-17	11-16-18
1536	Extech	445715	Z315811	Temp Humidity meter	4-17-17	4-17-18



END OF REPORT