National Technical Systems Test Report for Electromagnetic Interference (EMI) Testing of the ClearCast

Prepared For
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Prepared By
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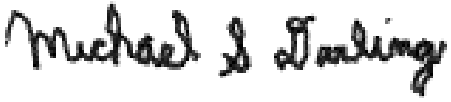
Greg Gagne
Technical Writer



Michael Darling
EMI Department Manager

Revision History

Rev.	Description	Issue Date
0	ITR-PR127745	04/01/2021

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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) 2020-010, dated 10/26/2020
- National Technical Systems (NTS) Quote(s) OP0565143, dated 10/15/2020
- 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: EAC 2005 VVSG

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	4	ClearCast	ClearVote 2.2	CCER0401007, CCER0401003, CCER0401004, CCER0401002

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 Measurement Uncertainties

Measurement uncertainty data is available upon request.

4.3 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	Electrostatic Discharge	EAC 2005 VVSG	Longmont	12/10/2020 - 12/10/2020	ClearVote 2.2	CCER0401004	Complied
5.2	Radiated RF Immunity	EAC 2005 VVSG	Longmont	03/16/2021 - 03/16/2021	ClearVote 2.2	CCER0401007	Complied
5.3	Electrical Fast Transient / Burst	EAC 2005 VVSG	Longmont	12/07/2020 - 12/07/2020	ClearVote 2.2	CCER0401002	Complied
5.4	Surge Immunity	EAC 2005 VVSG	Longmont	12/09/2020 - 12/09/2020	ClearVote 2.2	CCER0401002	Complied
5.5	Conducted RF Immunity	EAC 2005 VVSG	Longmont	12/08/2020 - 12/08/2020	ClearVote 2.2	CCER0401002	Complied
5.6	Power Frequency H-Field Immunity	EAC 2005 VVSG	Longmont	12/07/2020 - 12/07/2020	ClearVote 2.2	CCER0401002	Complied
5.7	Voltage Dips and Interruptions	EAC 2005 VVSG	Longmont	12/02/2020 - 12/03/2020	ClearVote 2.2	CCER0401003	Complied

*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 Electrostatic Discharge

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020
Temperature:	17˚C Humidity: 32%	Pressure:	837 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	Mike Tidquist		

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Test Location	Voltage Level (kV)	Polarity +	Polarity -	Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
Vertical Coupling Plane will be performed at 2 locations per side								
Indirect Discharge Points								
VCP	8	x	x	10	1	Front Side	A	Pass
VCP	8	x	x	10	1	Left Side	A	Pass
VCP	8	x	x	10	1	Right Side	A	Pass
VCP	8	x	x	10	1	Back Side	A	Pass
Contact Discharge Points - **RED** Arrows.								
Figure A2	8	x	x	10	1		A	Pass
Figure A3	8	x	x	10	1		A	Pass
Figure A4	8	x	x	10	1		A	Pass
Figure A5	8	x	x	---	---	No Contact Points	---	---
Figure A6	8	x	x	10	1		A	Pass
Figure A7	8	x	x	10	1		A	Pass
Air Discharge Points - **BLUE** Arrows.								
Figure A2	2, 4, 8, 15	x	x	10	1	At +/-8,15kV Discharges Occurred No disruption in operation	A	Pass
Figure A3	2, 4, 8, 15	x	x	10	1	No Air Discharges Occurred	---	---
Figure A4	2, 4, 8, 15	x	x	10	1	No Air Discharges Occurred	---	---
Figure A5	2, 4, 8, 15	x	x	10	1	No Air Discharges Occurred	---	---
Figure A6	2, 4, 8, 15	x	x	10	1	At +/-2,4,8,15kV Discharges occurred No disruption in operation	A	Pass
Figure A7	2, 4, 8, 15	x	x	10	1	No Air Discharges Occurred	---	---

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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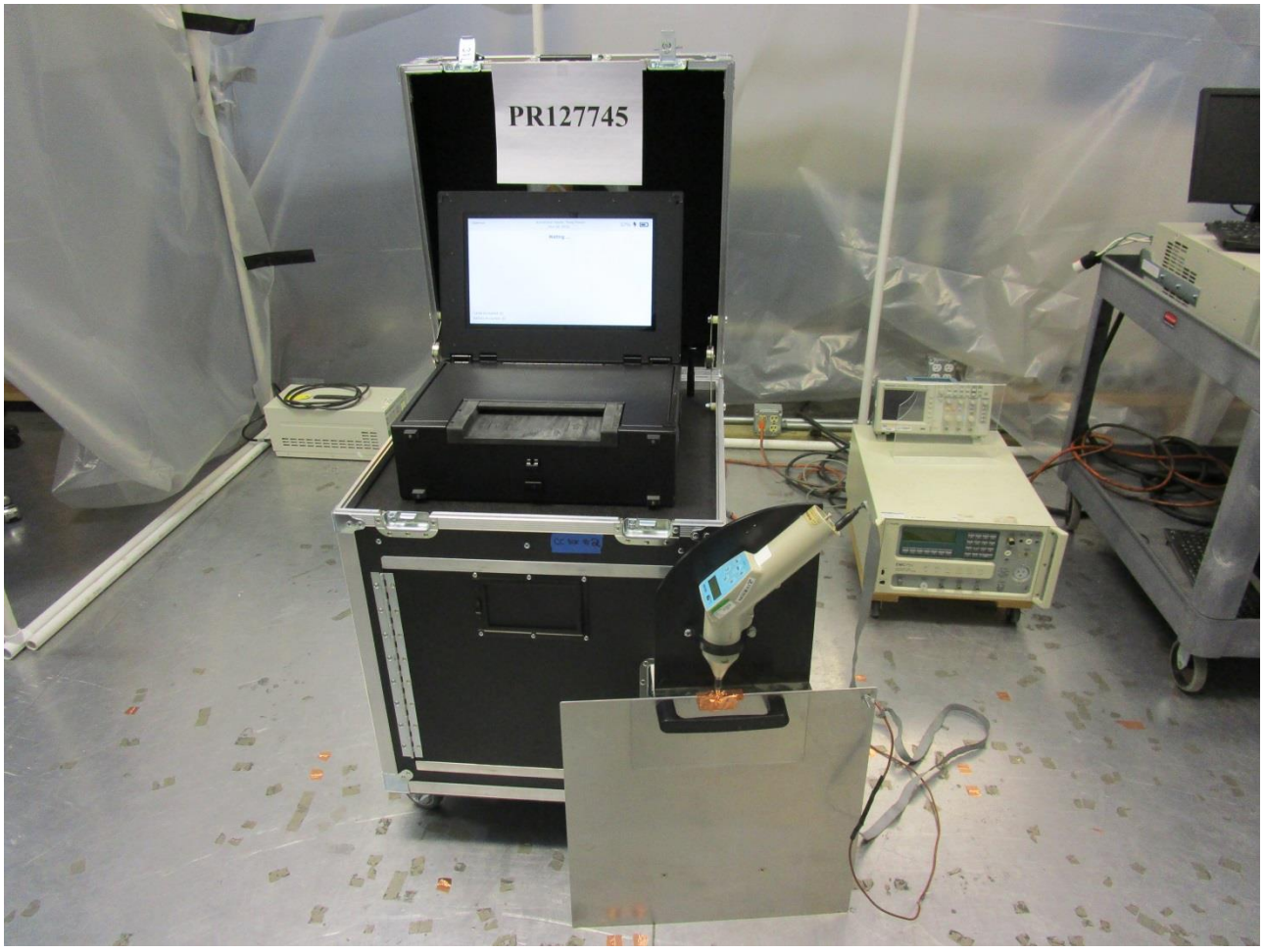

Figure A1. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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Figure A2. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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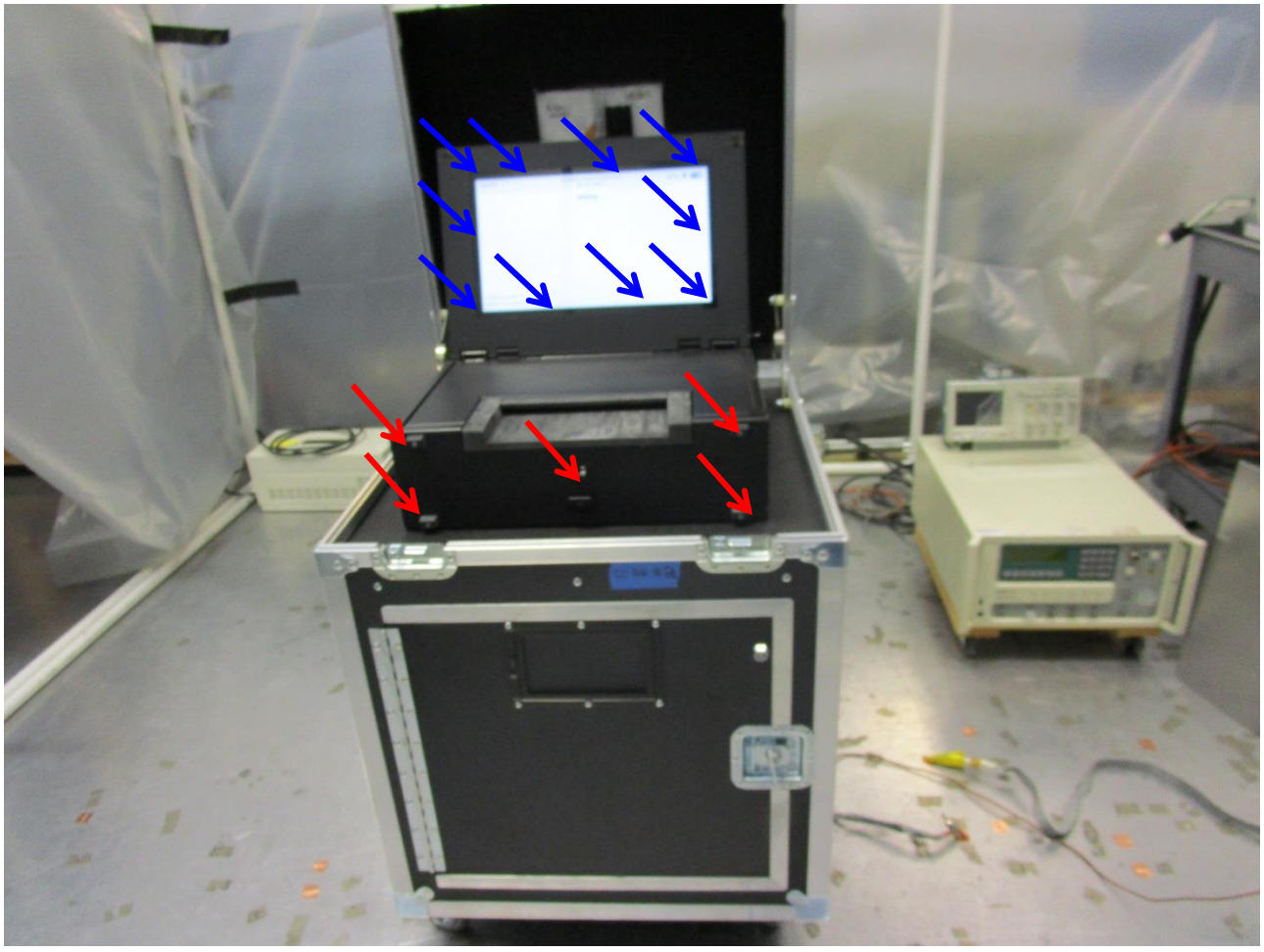

Figure A3. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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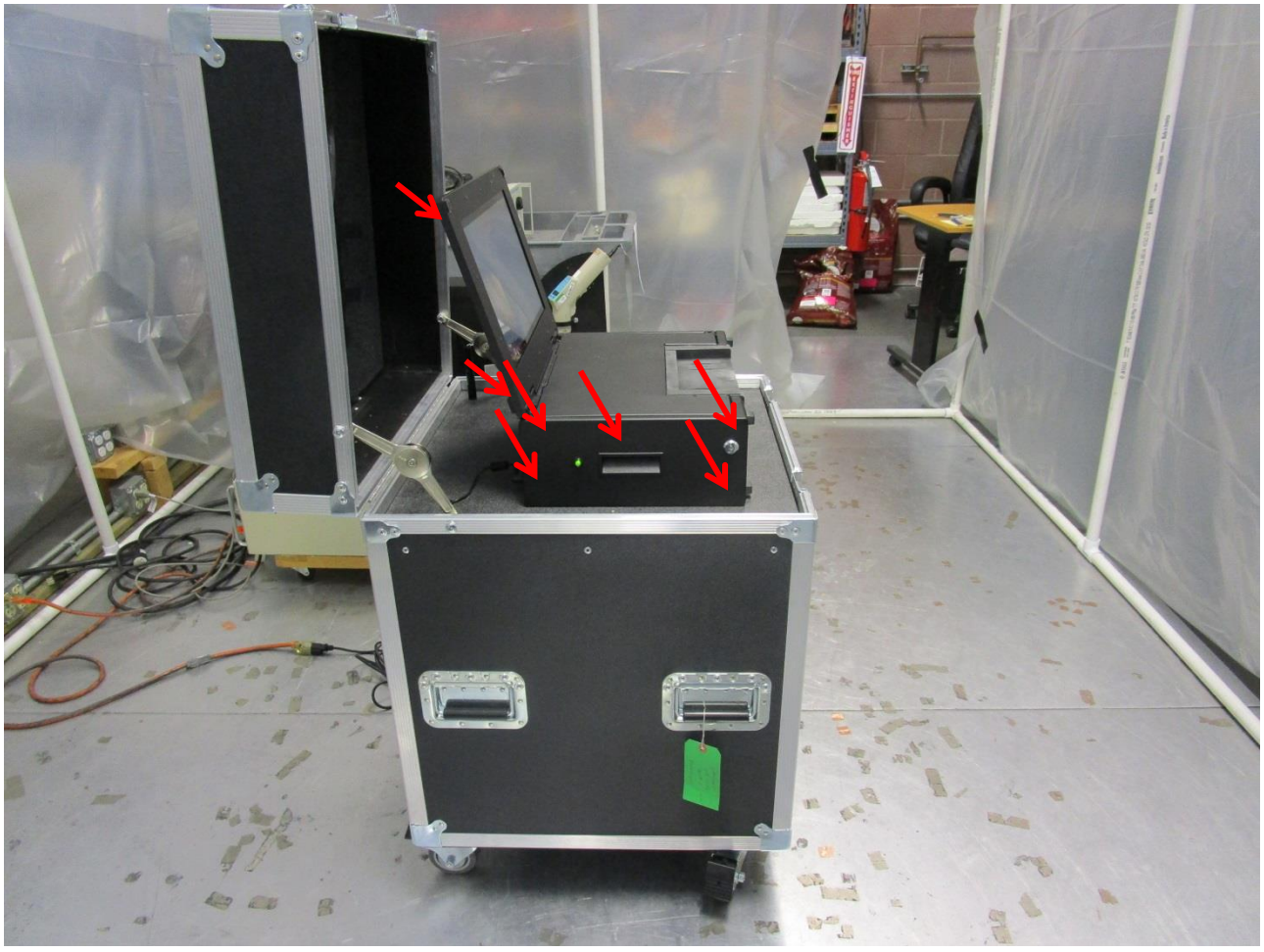

Figure A4. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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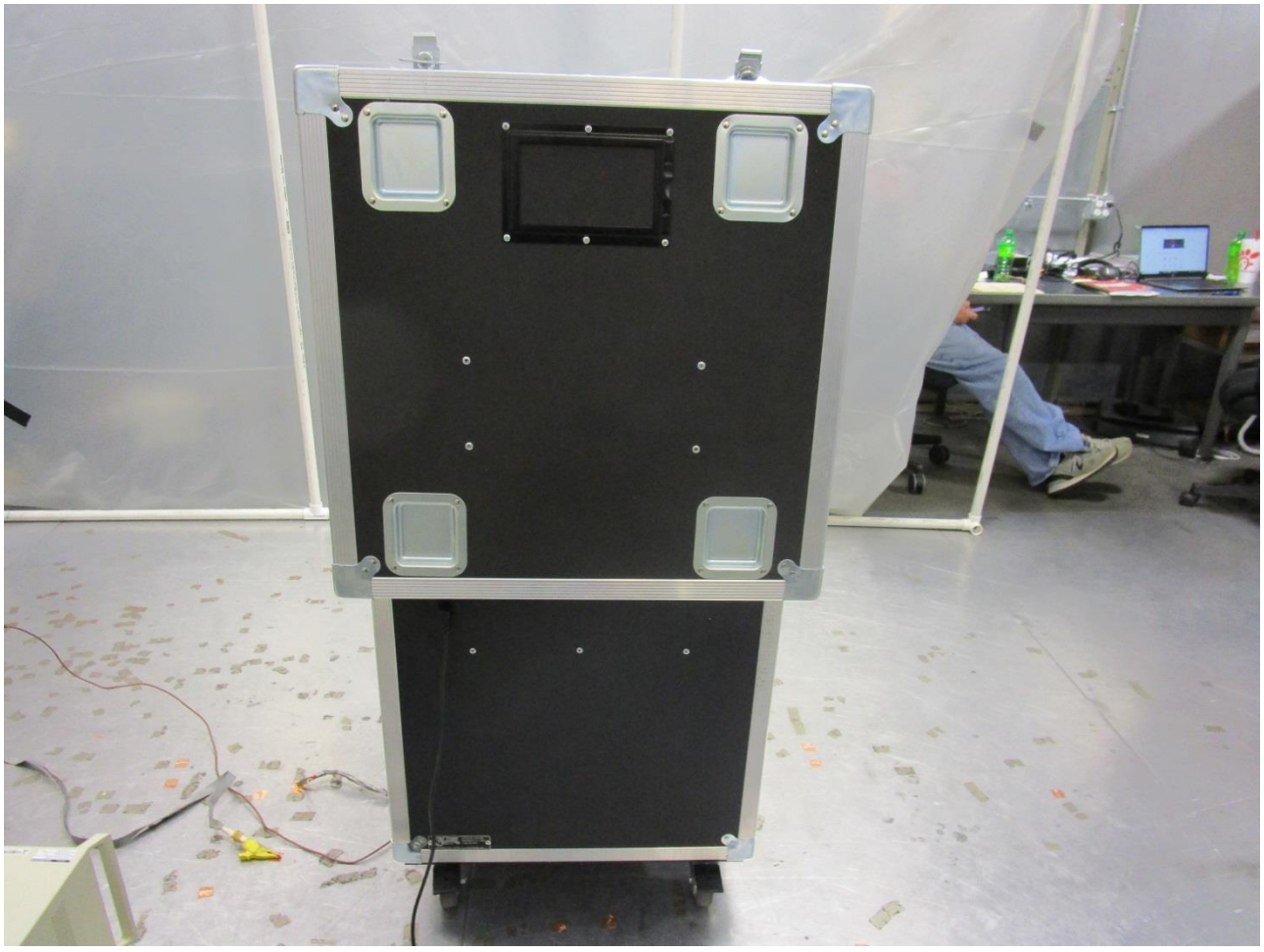

Figure A5. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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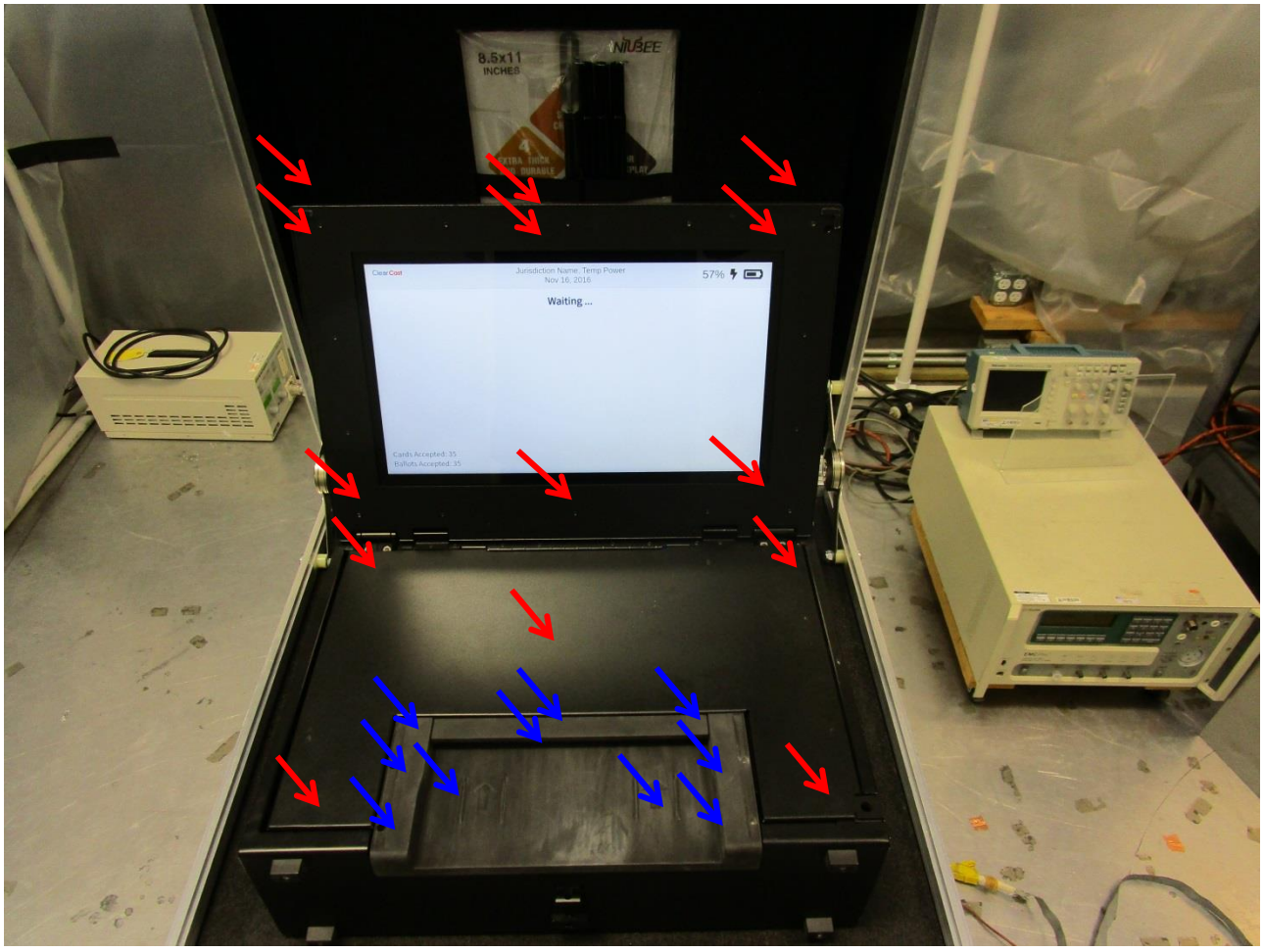

Figure A6. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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Figure A7. Electrostatic Discharge Test Setup.

Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401004
Standard Referenced:	EAC 2005 VVSG	Date:	December 10, 2020

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1041	Fluke	83-3	70130434	Multimeter/Frequency Meter (WC059692)	08/24/2020	08/24/2021
1333	EMC Partner	ESD3000	395	ESD Test System, including ESD3000DN1-1540 30kV Ad	12/19/2019	12/19/2020
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021

5.2 Radiated RF Immunity

Radiated RF Immunity per IEC / EN 61000-4-3

Manufacturer:	Pro V&V/BB-1	Project Number:	PR127745B80802
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401007
Standard Referenced:	EAC 2005 VVSG	Date:	March 16, 2021
Temperature:	23.5˚C Humidity: 24%	Pressure:	827 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	Casey Lockhart		

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Frequency (MHz)	Modulation				Step Size (%)	Field (V/m)	Polarity (V or H)	Dwell (sec)	Comments	Criteria Met	Pass / Fail
	Type	%	Freq	Form							
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Front**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Right**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Back**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Left**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass

Radiated RF Immunity per IEC / EN 61000-4-3

Manufacturer:	Pro V&V/BB-1	Project Number:	PR127745B80802
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401007
Standard Referenced:	EAC 2005 VVSG	Date:	March 16, 2021

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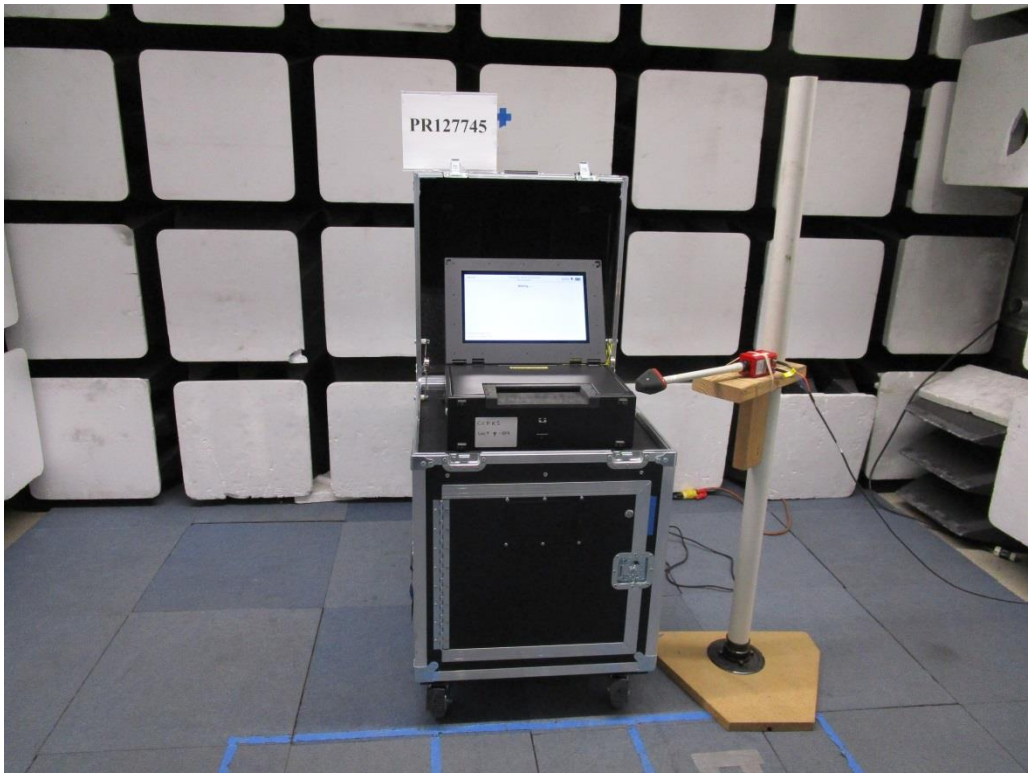

Figure B1. Radiated RF Immunity Test Setup – Front Side.

Radiated RF Immunity per IEC / EN 61000-4-3

Manufacturer:	Pro V&V/BB-1	Project Number:	PR127745B80802
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401007
Standard Referenced:	EAC 2005 VVSG	Date:	March 16, 2021

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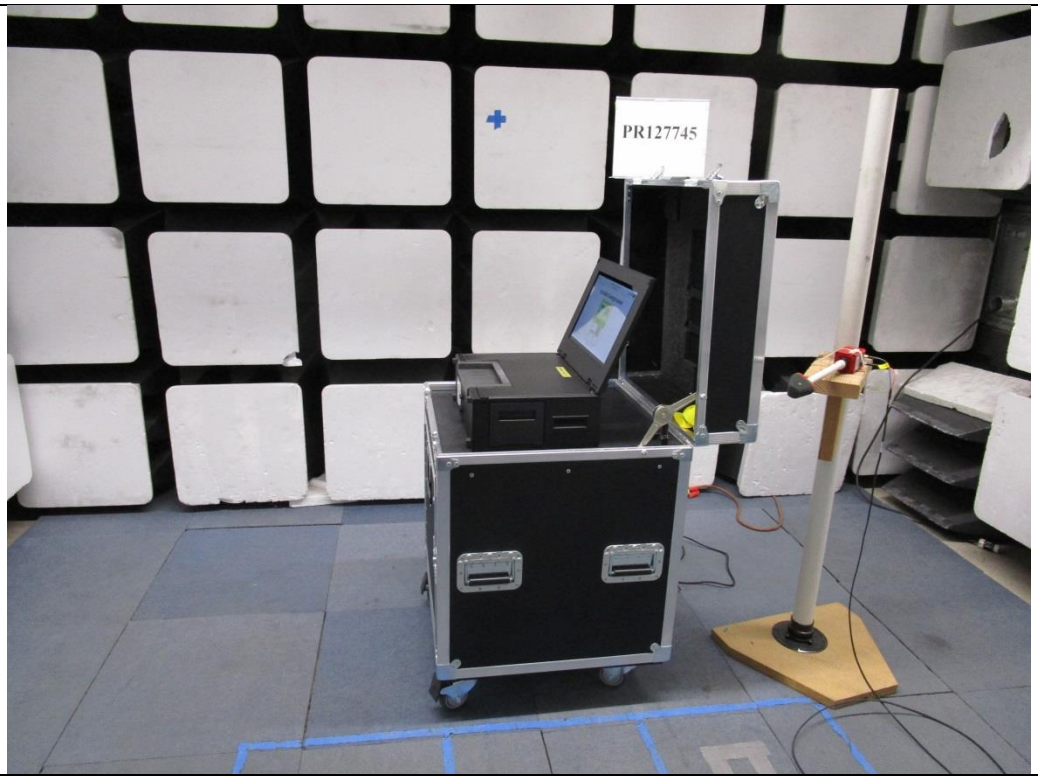

Figure B2. Radiated RF Immunity Test Setup – Right Side.

Radiated RF Immunity per IEC / EN 61000-4-3

Manufacturer:	Pro V&V/BB-1	Project Number:	PR127745B80802
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401007
Standard Referenced:	EAC 2005 VVSG	Date:	March 16, 2021

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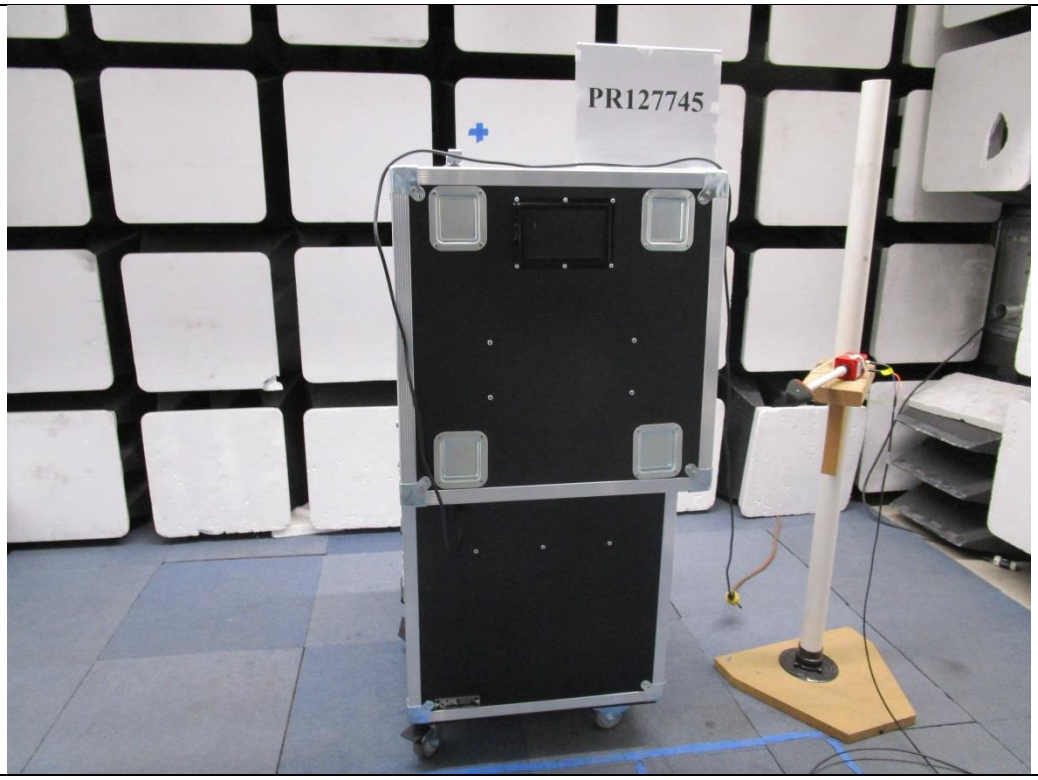

Figure B3. Radiated RF Immunity Test Setup –Back Side.

Radiated RF Immunity per IEC / EN 61000-4-3

Manufacturer:	Pro V&V/BB-1	Project Number:	PR127745B80802
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401007
Standard Referenced:	EAC 2005 VVSG	Date:	March 16, 2021

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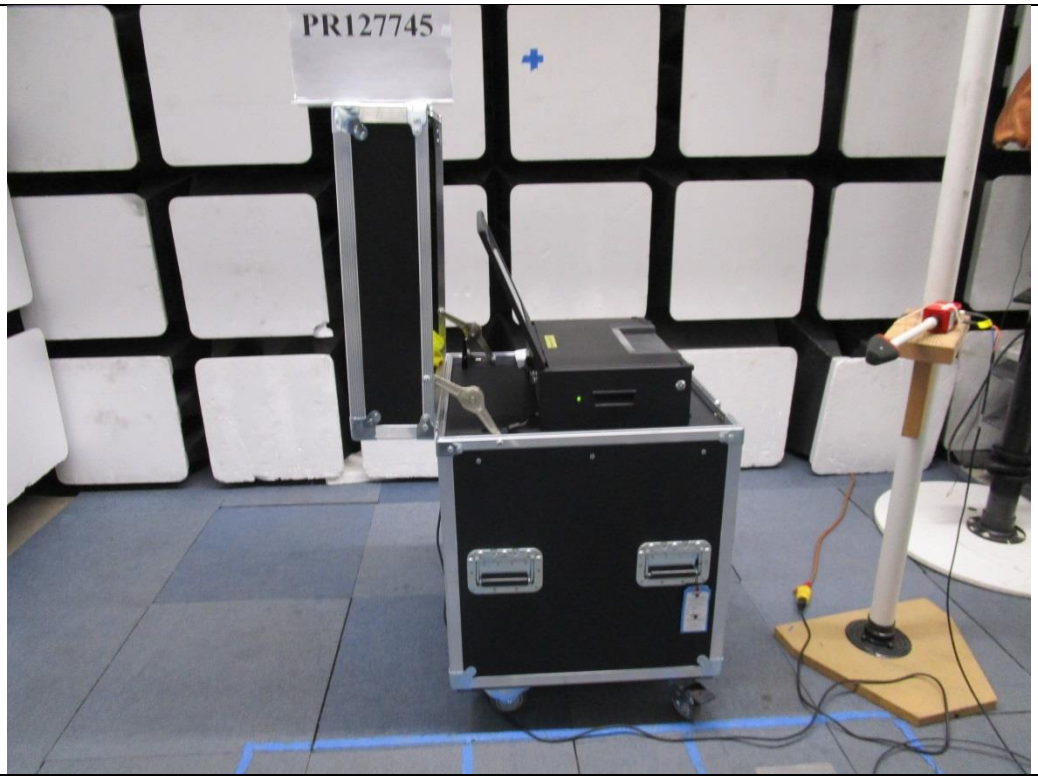

Figure B4. Radiated RF Immunity Test Setup – Left Side.

Radiated RF Immunity per IEC / EN 61000-4-3

Manufacturer:	Pro V&V/BB-1	Project Number:	PR127745B80802
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401007
Standard Referenced:	EAC 2005 VVSG	Date:	March 16, 2021

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1453	Giga-tronics	GT-8888A	8888A0336	10 MHz to 8 GHz, +20 dBm, 25 Vdc Power Meter (WC07	07/20/2020	07/20/2021
1456	Werlatone	C3908-10	98095	1500 Watts, 50 dB Dual Directional Coupler (WC0597	06/29/2020	06/29/2021
1478	Ophir	5127F	1100	RF Amplifier, 200 Watt, 20 - 1000 MHz	NA	NA
1525	ANRITSU	69367B	010404	Synthesized Signal Generator, 10 MHz - 40 GHz (WC0	12/31/2020	12/31/2021
1565	ETS-Lindgren	HI-6053	00166681	Electric Field Probe, 10 MHz - 40 GHz	05/29/2020	05/29/2021
1761	Braden Shielding Systems	RF Shield Room	N/A	GP0	05/15/2020	05/15/2021
1763	Narda	766-20	N/A	20 watt anttenuator (WC070299)	05/15/2020	05/15/2021
1764	Narda	3022	75369	Bi directional coupler	05/15/2020	05/15/2021
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021

5.3 Electrical Fast Transient / Burst

Electrical Fast Transient/Burst per IEC / EN 61000-4-4

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020
Temperature:	18˚C Humidity: 37%	Pressure:	846 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	Mike Tidquist		

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Voltage (kV)	Polarity +	Polarity -	Time (sec)	Injection Type	L 1	L 2	L 3	N	P E	Rep Freq.	Comments	Criteria Met	Pass / Fail
2.0	x		60	CDN	x					5kHz	AC	A	Pass
2.0		x	60	CDN	x					5kHz		A	Pass
2.0	x		60	CDN		x				5kHz		A	Pass
2.0		x	60	CDN		x				5kHz		A	Pass
2.0	x		60	CDN					x	5kHz		A	Pass
2.0		x	60	CDN					x	5kHz		A	Pass
2.0	x		60	CDN	x	x			x	5kHz		A	Pass
2.0		x	60	CDN	x	x			x	5kHz		A	Pass

Electrical Fast Transient/Burst per IEC / EN 61000-4-4

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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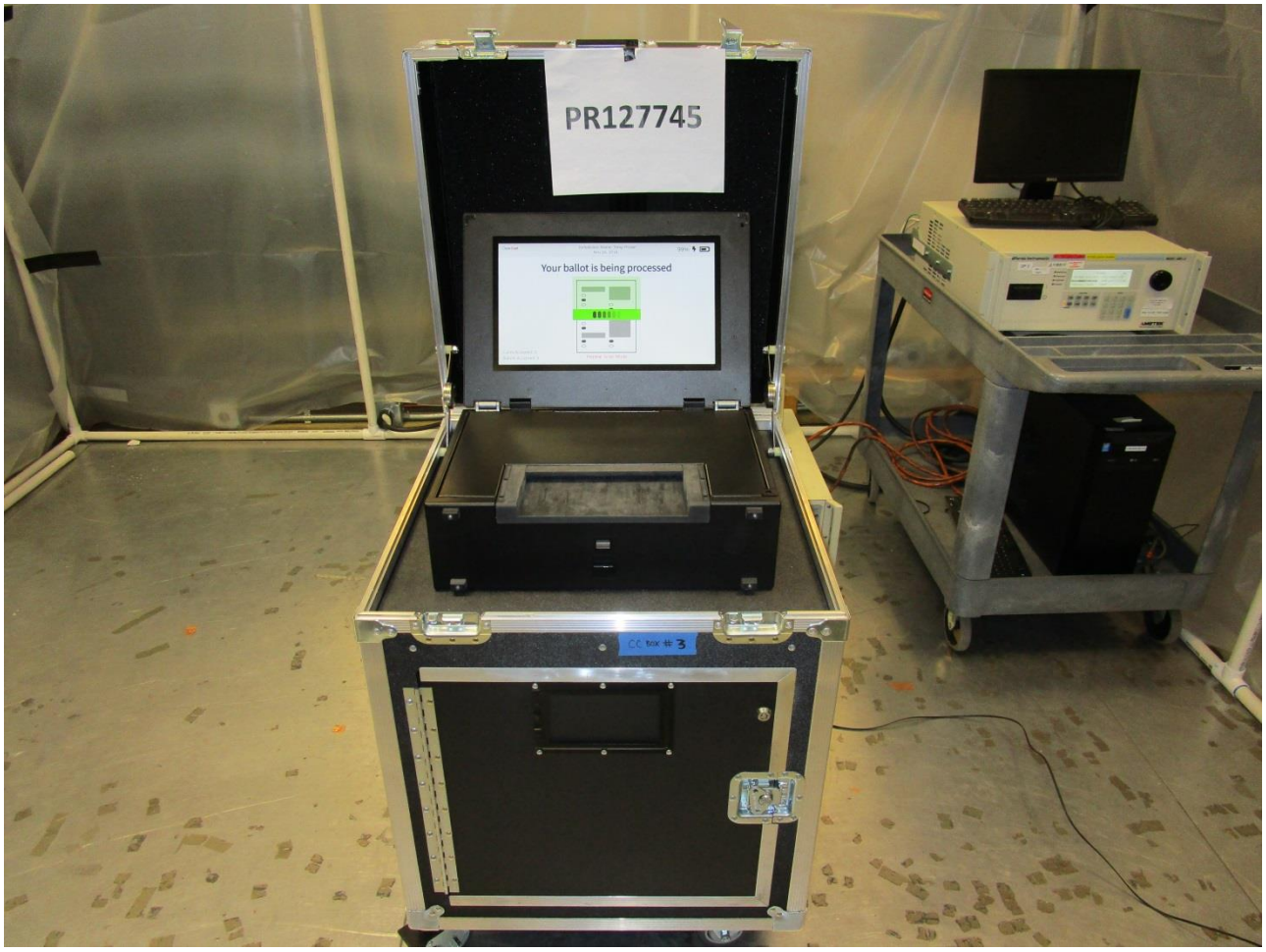

Figure C1. Electrical Fast Transient Test Setup.

Electrical Fast Transient/Burst per IEC / EN 61000-4-4

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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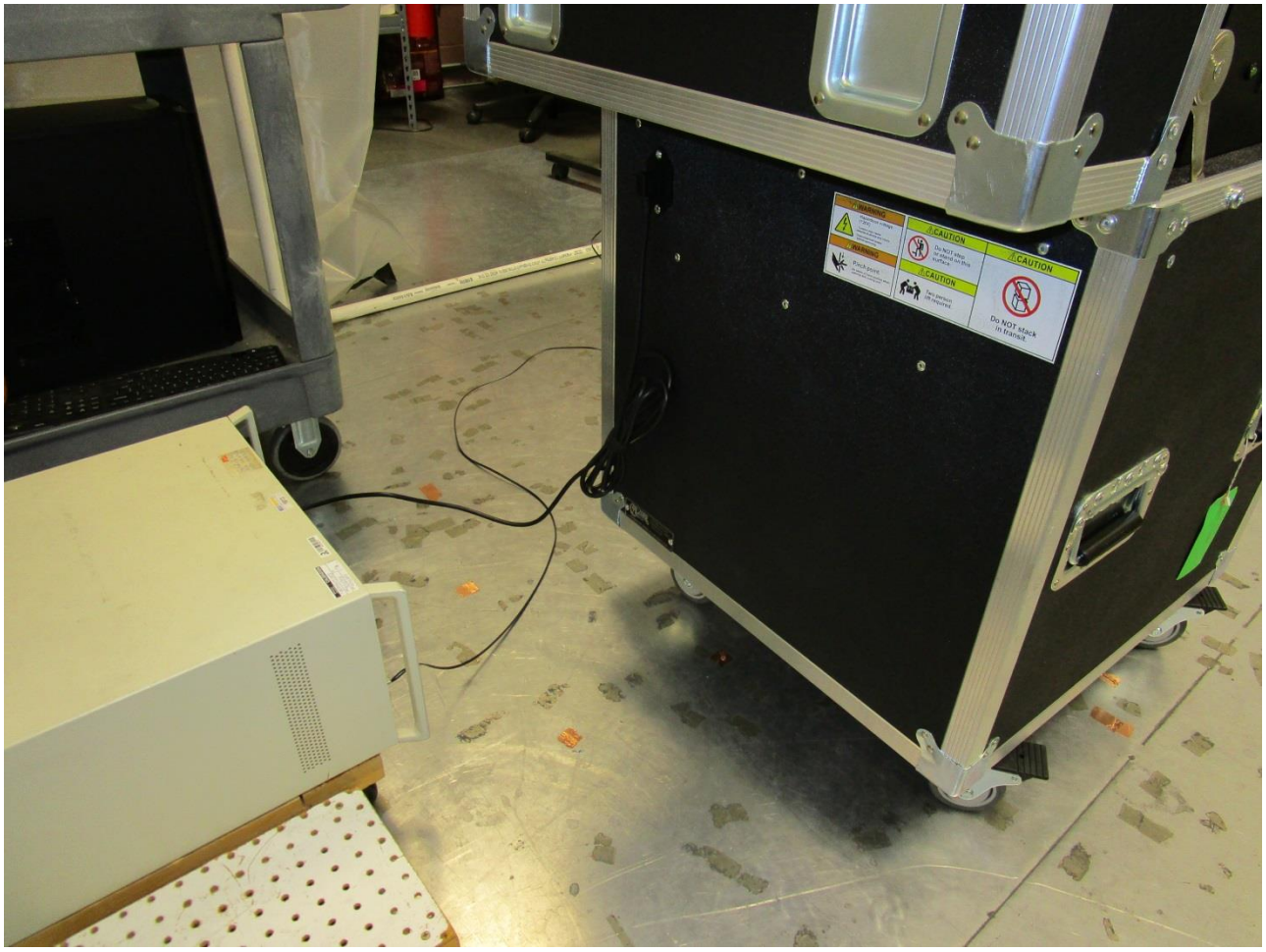

Figure C1. Electrical Fast Transient Test Setup – AC Mains.

Electrical Fast Transient/Burst per IEC / EN 61000-4-4

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	10/22/2020	10/22/2021
1040	Fluke	83-3	69811230	Multimeter/Frequency Meter (WC059669)	08/24/2020	08/24/2021
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel (WC059683)	06/29/2020	06/29/2021
1377	Tektronix	P5100	NA	100X 2500 V 250 MHz Oscilloscope Probe	08/24/2020	08/24/2021
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	NA	NA
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021

5.4 Surge Immunity

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 9, 2020
Temperature:	19˚C Humidity: 25%	Pressure:	841 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	T. Wittig		

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Voltage (kV)	Polarity +	Polarity -	L1	L2	L3	N	PE	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
0.5	x		x			x		0	5	30	Differential Mode	A	Pass
0.5		x	x			x		0	5	30		A	Pass
0.5	x		x			x		90	5	30		A	Pass
0.5		x	x			x		90	5	30		A	Pass
0.5	x		x			x		180	5	30		A	Pass
0.5		x	x			x		180	5	30		A	Pass
0.5	x		x			x		270	5	30		A	Pass
0.5		x	x			x		270	5	30		A	Pass
0.5	x		x				x	0	5	30	Common Mode Line	A	Pass
0.5		x	x				x	0	5	30		A	Pass
0.5	x		x				x	90	5	30		A	Pass
0.5		x	x				x	90	5	30		A	Pass
0.5	x		x				x	180	5	30		A	Pass
0.5		x	x				x	180	5	30		A	Pass
0.5	x		x				x	270	5	30		A	Pass
0.5		x	x				x	270	5	30		A	Pass
0.5	x					x	x	0	5	30	Common Mode Neutral	A	Pass
0.5		x				x	x	0	5	30		A	Pass
0.5	x					x	x	90	5	30		A	Pass
0.5		x				x	x	90	5	30		A	Pass
0.5	x					x	x	180	5	30		A	Pass
0.5		x				x	x	180	5	30		A	Pass
0.5	x					x	x	270	5	30		A	Pass
0.5		x				x	x	270	5	30		A	Pass

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 9, 2020
Temperature:	19˚C Humidity: 25%	Pressure:	841 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	T. Wittig		

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Voltage (kV)	Polarity +	Polarity -	L1	L2	L3	N	PE	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
1.0	x		x			x		0	5	45	Differential Mode	A	Pass
1.0		x	x			x		0	5	45		A	Pass
1.0	x		x			x		90	5	45		A	Pass
1.0		x	x			x		90	5	45		A	Pass
1.0	x		x			x		180	5	45		A	Pass
1.0		x	x			x		180	5	45		A	Pass
1.0	x		x			x		270	5	45		A	Pass
1.0		x	x			x		270	5	45		A	Pass
1.0	x		x				x	0	5	45	Common Mode Line	A	Pass
1.0		x	x				x	0	5	45		A	Pass
1.0	x		x				x	90	5	45		A	Pass
1.0		x	x				x	90	5	45		A	Pass
1.0	x		x				x	180	5	45		A	Pass
1.0		x	x				x	180	5	45		A	Pass
1.0	x		x				x	270	5	45		A	Pass
1.0		x	x				x	270	5	45		A	Pass
1.0	x					x	x	0	5	45	Common Mode Neutral	A	Pass
1.0		x				x	x	0	5	45		A	Pass
1.0	x					x	x	90	5	45		A	Pass
1.0		x				x	x	90	5	45		A	Pass
1.0	x					x	x	180	5	45		A	Pass
1.0		x				x	x	180	5	45		A	Pass
1.0	x					x	x	270	5	45		A	Pass
1.0		x				x	x	270	5	45		A	Pass
2.0	x		x			x		0	5	30	Differential Mode	A	Pass

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 9, 2020
Temperature:	19˚C Humidity: 25%	Pressure:	841 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	T. Wittig		

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Voltage (kV)	Polarity +	Polarity -	L1	L2	L3	N	PE	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
2.0		x	x			x		0	5	30		A	Pass
2.0	x		x			x		90	5	30		A	Pass
2.0		x	x			x		90	5	30		A	Pass
2.0	x		x			x		180	5	30		A	Pass
2.0		x	x			x		180	5	30		A	Pass
2.0	x		x			x		270	5	30		A	Pass
2.0		x	x			x		270	5	30		A	Pass
2.0	x		x				x	0	5	60	Common Mode Line	A	Pass
2.0		x	x				x	0	5	60		A	Pass
2.0	x		x				x	90	5	60		A	Pass
2.0		x	x				x	90	5	60		A	Pass
2.0	x		x				x	180	5	60		A	Pass
2.0		x	x				x	180	5	60		A	Pass
2.0	x		x				x	270	5	60		A	Pass
2.0		x	x				x	270	5	60		A	Pass
2.0	x					x	x	0	5	60	Common Mode Neutral	A	Pass
2.0		x				x	x	0	5	60		A	Pass
2.0	x					x	x	90	5	60		A	Pass
2.0		x				x	x	90	5	60		A	Pass
2.0	x					x	x	180	5	60		A	Pass
2.0		x				x	x	180	5	60		A	Pass
2.0	x					x	x	270	5	60		A	Pass
2.0		x				x	x	270	5	60		A	Pass

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 9, 2020

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Figure D1. Surge Immunity Test Setup – AC Mains

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 9, 2020

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1184	KeyTek	CE Ware	4.0	KeyTek EMC Pro Control Software for EFT, Surge, H-F	NA	NA
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021
1038	Fluke	85	66180455	Multimeter/Frequency Meter	05/26/2020	05/26/2021
1283	KeyTek	EMC Pro Plus	0601237	Advanced EMC Immunity Tester	10/22/2020	10/22/2021
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source (WCO95675)	08/20/2020	08/20/2021
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/24/2020	02/24/2021

5.5 Conducted RF Immunity

Conducted RF Immunity per IEC / EN 61000-4-6

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 8, 2020
Temperature:	24˚C Humidity: 23%	Pressure:	843 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	T. Wittig		

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Frequency (MHz)	Modulation			Level (Vrms)	Dwell (sec)	Comments	Criteria Met	Pass / Fail
	Type	%	Freq					
0.150 – 80.0	AM	80	1 kHz	10	3	AC Mains using M3 CDN	A	Pass

Conducted RF Immunity per IEC / EN 61000-4-6

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 8, 2020

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Figure E1. Conducted RF Immunity Test Setup

Conducted RF Immunity per IEC / EN 61000-4-6

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 8, 2020

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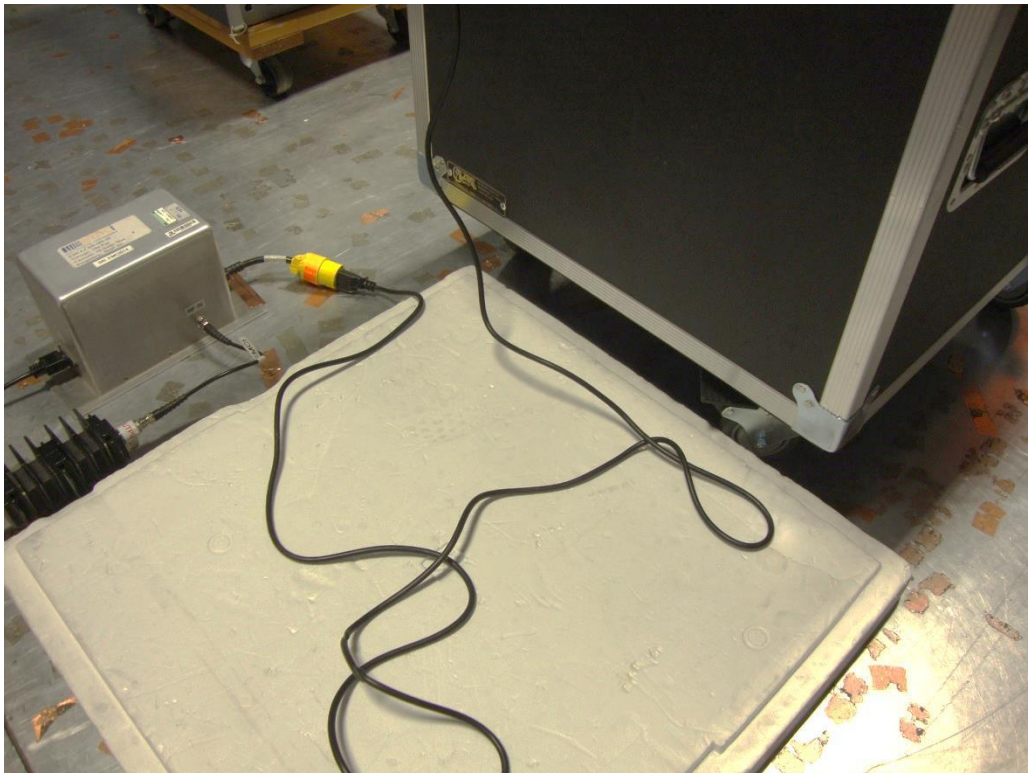

Figure E2. Conducted RF Immunity Test Setup – AC Mains

Conducted RF Immunity per IEC / EN 61000-4-6

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401002 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 8, 2020

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1023	Amplifier Research	75A250	28844	75 Watt Amplifier (10 kHz - 250 MHz)	NA	NA
1038	Fluke	85	66180455	Multimeter/Frequency Meter	05/26/2020	05/26/2021
1055	Marconi	2024	112113/027	Signal Generator (10 kHz - 2.4 GHz) WC059595	05/27/2020	05/27/2021
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source (WCO95675)	08/20/2020	08/20/2021
1479	EMCI	EMCI-CDN_M3-16	EMCI014	M3 CDN, 16A, 250 VAC	02/11/2020	02/11/2021
1496	Rigol Technologies, Inc.	DSA815	DSA8B150500096	9 kHz to 1.5 GHz Spectrum Analyzer (WC059772)	05/09/2020	05/09/2021
1532	Werlatone	C9475-13	102545	100 Watt Dual Directional Coupler, 10 kHz to 250 M	02/11/2020	02/11/2021
1594	EMCI	CI	V2.5.0	Conducted Immunity Software	NA	NA
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021

5.6 Power Frequency H-Field Immunity

Power Frequency H-field Immunity per IEC / EN 61000-4-8

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020
Temperature:	20˚C Humidity: 37%	Pressure:	846 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	Mike Tidquist		

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Frequency (Hz) 50	Frequency (Hz) 60	Field Strength (A/m)	EUT Axis Location	Dwell Time (sec)	Comments	Criteria Met	Pass / Fail
x		30	X	60		A	Pass
	x	30	X	60		A	Pass
x		30	Y	60		A	Pass
	x	30	Y	60		A	Pass
x		30	Z	60		A	Pass
	x	30	Z	60		A	Pass

Power Frequency H-field Immunity per IEC / EN 61000-4-8

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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Figure F1. Power Frequency H-field Immunity Test Setup. X Axis

Power Frequency H-field Immunity per IEC / EN 61000-4-8

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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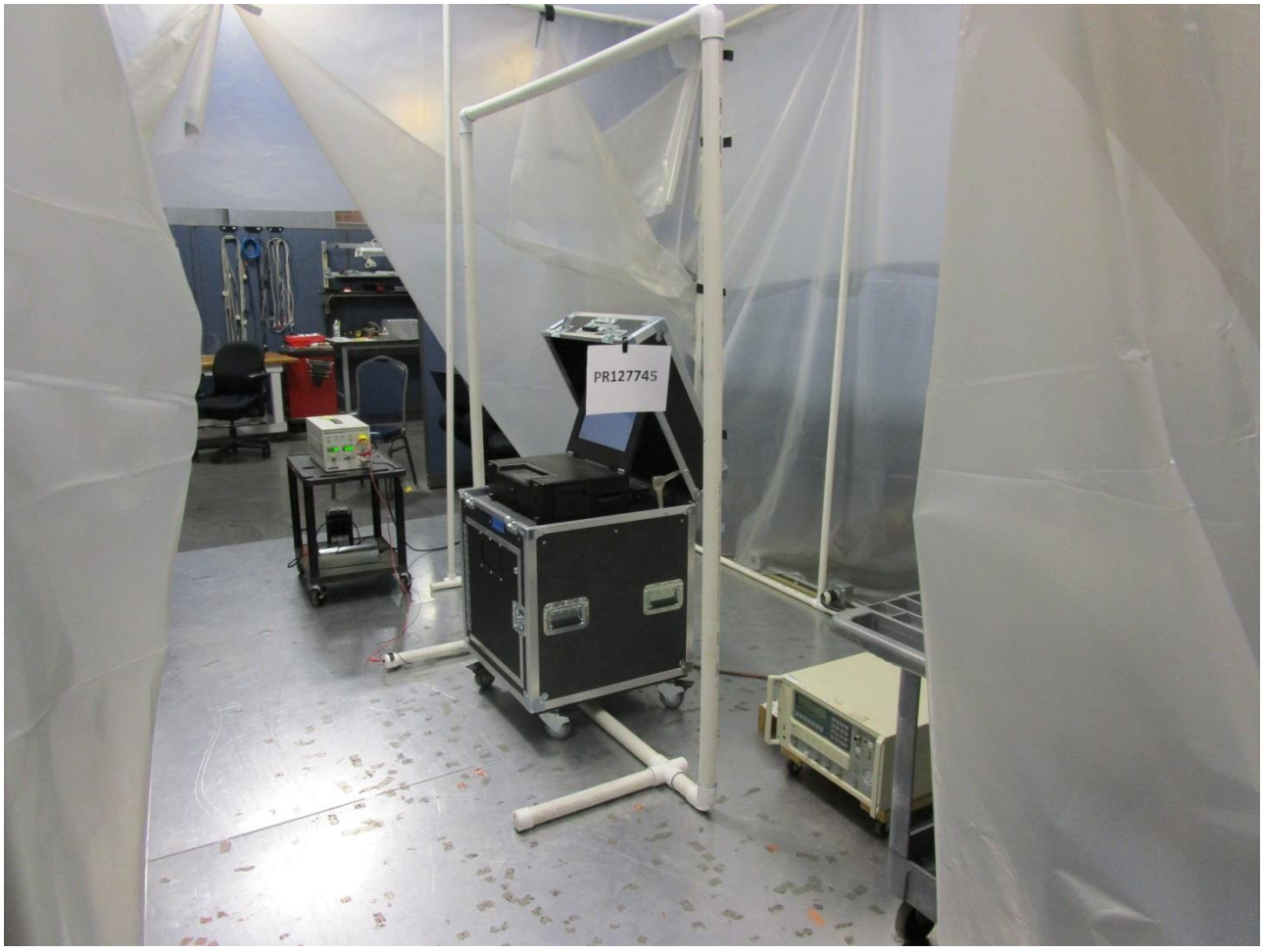

Figure F2. Power Frequency H-field Immunity Test Setup. Y Axis

Power Frequency H-field Immunity per IEC / EN 61000-4-8

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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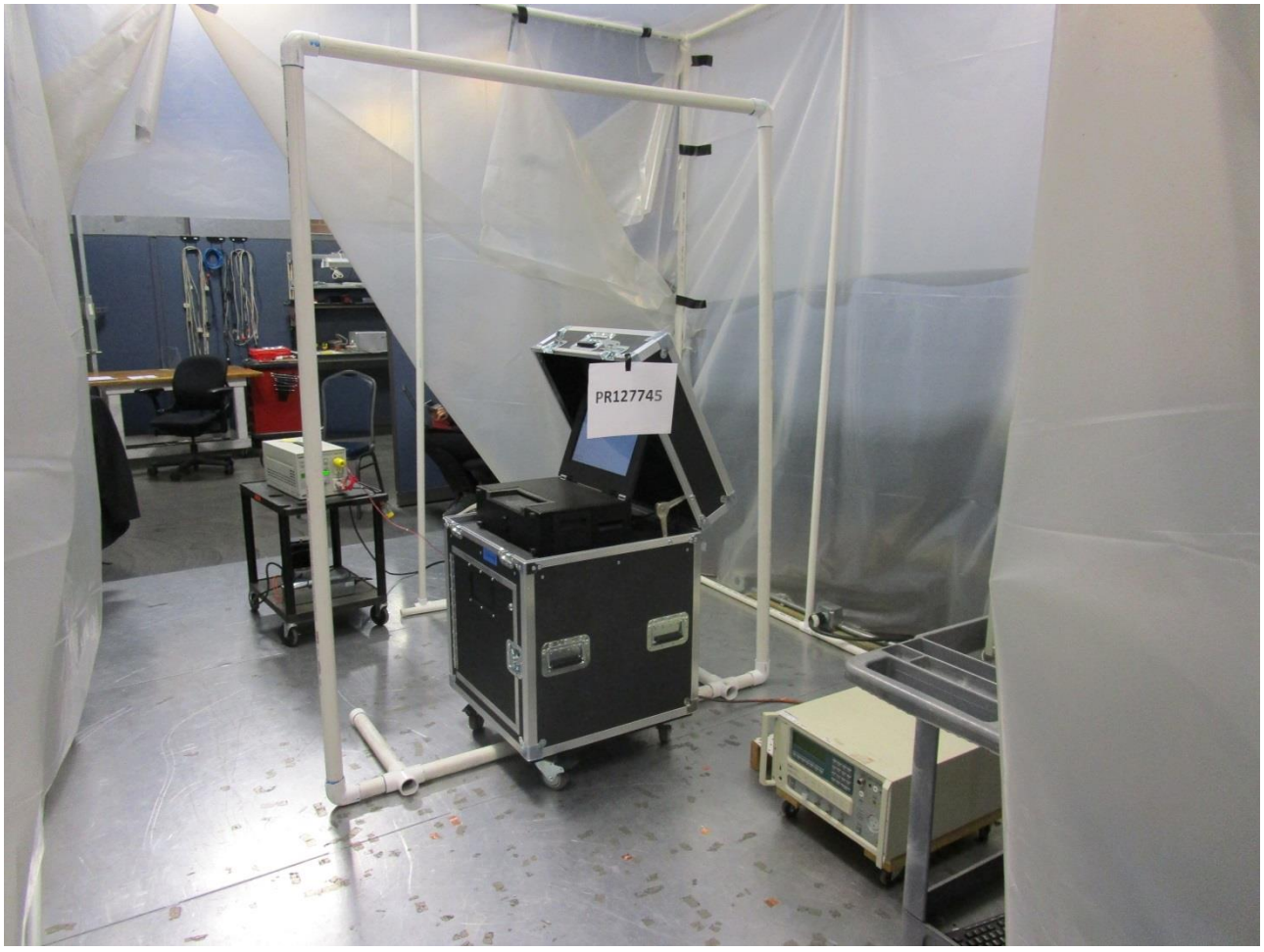

Figure F2. Power Frequency H-field Immunity Test Setup. Z Axis

Power Frequency H-field Immunity per IEC / EN 61000-4-8

Manufacturer:	Pro V&V/CBG	Project Number:	PR127745/B80802
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401002
Standard Referenced:	EAC 2005 VVSG	Date:	December 7, 2020

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1040	Fluke	83-3	69811230	Multimeter/Frequency Meter (WC059669)	08/24/2020	08/24/2021
1262	EMCI	EMCI-4-8-2m-1.5m	0001	HField Loop, 2m x 1.5m	NA	NA
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel (WC059683)	06/29/2020	06/29/2021
1484	Pearson Electronics	110A	88593	Current Monitor, 1 Hz to 20 MHz (WC070471)	07/12/2020	07/12/2021
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	NA	NA
1549	California Instruments/Ametek	1251P	1423A05348	AC power supply	NA	NA
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021

5.7 Voltage Dips and Interruptions

Voltage Dips and Interrupts per IEC / EN 61000-4-11

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401003 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 2, 2020
Temperature:	24˚C Humidity: 31%	Pressure:	848 mb
Input Voltage:	120Vac/60Hz		
Configuration of Unit:	Normal operating mode		
Test Engineer:	T. Wittig		

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% Nominal	No. of Cycles	Phase Angle (deg) 0	90	180	270	Time between dropouts (sec)	Number of tests	Comments	Criteria Met	Pass / Fail
70%	0.6	x				10	3		A	Pass
70%	0.6		x			10	3		A	Pass
70%	0.6			x		10	3		A	Pass
70%	0.5				x	10	3		A	Pass
40%	6.0	x				10	3		A	Pass
40%	6.0		x			10	3		A	Pass
40%	6.0			x		10	3		A	Pass
40%	6.0				x	10	3		A	Pass
40%	60.0	x				10	3		A	Pass
40%	60.0		x			10	3		A	Pass
40%	60.0			x		10	3		A	Pass
40%	60.0				x	10	3		A	Pass
0%	300	x				10	3		A	Pass
0%	300			x		10	3		A	Pass
Line Voltage Variation Testing										
129Vac Line Voltage Variations (+7.5% of nominal 120V) 2hrs.									A	Pass
105Vac Line Voltage Variations (-12.5% of nominal 120V) 2 Hrs.									A	Pass
Surges of +15% line variations of nominal voltage (138V) 2 Hrs.									A	Pass
Surges of -15% line variations of nominal voltage (102V) 2 Hrs.									A	Pass

Voltage Dips and Interrupts per IEC / EN 61000-4-11

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401003 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 2, 2020

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Figure G1. Voltage Dips and Interruptions Test Setup

Voltage Dips and Interrupts per IEC / EN 61000-4-11

Manufacturer:	CBG	Project Number:	PR127745
Customer Representative:	Michael Walker	Test Area:	GP #1
Model:	ClearVote 2.2 (ClearCast) Ballot Box	S/N:	CCER0401003 #3
Standard Referenced:	EAC 2005 VVSG	Date:	December 2, 2020

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	10/22/2020	10/22/2021
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/24/2020	02/24/2021
1901	EXTECH	445703	0617	Hygrometer-Thermometer (WC059899)	06/29/2020	06/29/2021
1038	Fluke	85	66180455	Multimeter/Frequency Meter	05/26/2020	05/26/2021
1184	KeyTek	CE Ware	4.0	KeyTek EMC Pro Control Software for EFT, Surge, H-F	NA	NA
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	NA	NA

6.0 Test Log

EMI Test Log

Manufacturer:	CBG	Project Number:	PR127745/B80802
Model:	ClearVote 2.2 (ClearCast)	S/N:	CCER0401003
	Ballot Box		#3
	ClearVote 2.2 (ClearCast)		CCER0401002
	ClearVote 2.2 (ClearCast)		CCER0401004
	Ballot Box		#2 Retest # is CCER0401007
Customer Representative:	Michael Walker		
Standard Referenced:	EAC 2005 VVSG		

FR0105

10m Emissions

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
4-3		January 12, 2021 0800-1630	Radiated RF Immunity 10V/m, 80 -1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120/60 VAC Unit has stopped processing ballot on the right side at 335,345,359, 366 and 370, V-pole Switching ballots did not help. Client trying 2 ferrites on the USB lines Unit still failing Client adding shield Unit still failing in the 370MHz range. Client trying ferrites on the scanner and printer cable. Unit did not stop after applying ferrites to these cables. Ferrites removed from the scanner cable. Unit did not stop. Re-running the range with just the printer cable. Unit stopped at 312 and 651MHz Client put ferrites back on the scanner cable. Re-ran V-pole with no problems Unit stopped processing ballots at 150MHz H-pole, reset and unit stopped at 164MHz, H-pole Client changing UUT'S. Starting right side H-pole. Unit failed at 370MHz. Re-trying. Unit failed again 36MHz H-pole. Client unplugged the audio speaker. Unit failed at 360MHz			Fail	KJ

Ground Planes / CALC

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
		December 2, 2020	Setup		1.0	Complete	TW
4-11	---	1030	Voltage Dips and Interruptions (Inc./Red. of Nom. Voltage) Electric power increases of 7.5% and reductions of 12.5% of nominal specified power, 120/60 Vac/60Hz		4.0	Pass	TW
---	---		Voltage Dips and Interruptions (Surge of +/- 15%) Surge of +/- 15% line variation of nominal line voltage, 120Vac/60 Hz		2.0	Pass	TW
			Note: Need to complete Surges of -15% line variations of nominal voltage (102V) 2 Hrs.		---	---	TW
		December 3, 2020	Setup Client took ballot box for other testing, this unit was tested on table-top		---	---	TW
		0820	Resumed Surges of -15% line variations of nominal voltage (102V) 2 Hrs.		2.0	---	TW
		1030	Completed		---	---	TW
		1600-1630	Voltage Dips and Interruptions 70% nom, 0.6 cycles / 40% nom, 6 cycles & 1 sec. / 0% nom, 300 cycles 120Vac/60Hz		0.5	Pass	TW
EUT Was Switched New S/N CCER0401002							
4-4		December 7, 2020 0900-0930	Electrical Fast Transient / Burst Mains: +/2kV 120/60 VAC		0.5	Pass	MT
4-8		1030-1100	Power Frequency HField Immunity 30A/m, 50 / 60 Hz, 3 axes 120/60 VAC		0.5	Pass	MT
4-6		December 8, 2020 1330	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120/60 VAC SN: CCER0401002		1.0	Pass	TW
4-5		December 9, 20200 800-1400	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) 120Vac/60Hz		6.0	Pass	TW
4-3	---	March 16, 2021 0800 - 0930	Set-up. Given wrong number by management. Re-test.		1.5	---	CL
---	---	0930 - 1200	Radiated RF Immunity 10V/m, 80 -1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell, 120/60 VAC Note: @ 434 Mhz ballot got hung, restarted after closing and opening election. Did not re-peat.		2.5	---	CL
---	---	1200 - 1230	Lunch		---	---	CL

Ground Planes / CALC

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
---	---	1230 - 1400	Radiated RF Immunity 10V/m, 80 -1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell, 120/60 VAC Note: on Left side, H pol, around 545, same issue as last time. Did not repeat.		1.5	Pass	CL

Shield Room

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
ESD Pretest performed, OK to continue							
4-2		December 10, 2020 0800-1030	Electrostatic Discharge +/8kV Contact, +/2,4, 8, 15kV Air 120/60 VAC New S/N: CCER0401004		2.5	Pass	MT

End of Report