

# National Technical Systems Test Report for Electromagnetic Interference (EMI) Testing of the Central Count Scanners (DS950, DS450)

**Prepared For**

Pro V&V, Inc. | 6705 Odyssey Drive, Suite C | Huntsville, AL 35806

**Performed By**

National Technical Systems | 1736 Vista View Drive | Longmont, CO 80504-5242 | 303-776-7249 | [www.nts.com](http://www.nts.com)

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

Karen Norton  
Preparer

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

Eugene Devito  
EMI Project Engineer

This report and the information contained herein represent the results of testing articles/products identified and selected by the client. The tests were performed to specifications and/or procedures approved by the client. National Technical Systems (NTS) makes no representations expressed or implied that such testing fully demonstrates efficiency, performance, reliability, or any other characteristic of the articles being tested, or similar products. This report should not be relied upon as an endorsement or certification by NTS of the equipment tested, nor does it represent any statement whatsoever as to its merchantability or fitness of the test article or similar products for a particular purpose. This document shall not be reproduced except in full without written approval from NTS.



### Revision History

Rev.	Description	Issue Date
0	Initial Release	05/17/2022
1	Section 6.0: Deleted log entries in accordance with Pro V&V e-mail dated 05/19/2022.	05/19/2022

### Table of Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>5</b>
<b>2.0</b>	<b>References .....</b>	<b>5</b>
<b>3.0</b>	<b>Product Selection and Description.....</b>	<b>5</b>
3.1	Security Classification .....	5
<b>4.0</b>	<b>General Test Requirements.....</b>	<b>5</b>
4.1	Test Equipment .....	5
4.2	Measurement Uncertainties.....	5
<b>5.0</b>	<b>Test Descriptions and Results.....</b>	<b>6</b>
5.1	Electrostatic Discharge .....	7
5.1.1	Test Procedure .....	7
5.1.2	Test Result .....	7
5.1.3	Test Datasheets .....	8
5.1.4	Test Photographs .....	10
5.1.5	Test Equipment List .....	19
5.2	Radiated RF Immunity.....	20
5.2.1	Test Procedure .....	20
5.2.2	Test Result .....	20
5.2.3	Test Datasheets .....	20
5.2.4	Test Photographs .....	22
5.2.5	Test Equipment List .....	26
5.3	Electrical Fast Transient / Burst.....	27
5.3.1	Test Procedure .....	27
5.3.2	Test Result .....	27
5.3.3	Test Datasheets .....	27
5.3.4	Test Photographs .....	29
5.3.5	Test Equipment List .....	31
5.4	Surge Immunity .....	32
5.4.1	Test Procedure .....	32
5.4.2	Test Result .....	32
5.4.3	Test Datasheets .....	32
5.4.4	Test Photographs .....	38
5.4.5	Test Equipment List .....	40
5.5	Conducted RF Immunity.....	41
5.5.1	Test Procedure .....	41
5.4.2	Test Result .....	41
5.5.3	Test Datasheets .....	41
5.5.4	Test Photographs .....	43
5.5.5	Test Equipment List .....	45
5.6	Power Frequency H-Field Immunity.....	46
5.6.1	Test Procedure .....	46
5.6.2	Test Result .....	46
5.6.3	Test Datasheets .....	46
5.6.4	Test Photographs .....	48
5.6.5	Test Equipment List .....	52
5.7	Voltage Dips and Interruptions .....	53
5.7.1	Test Procedure .....	53
5.7.2	Test Result .....	53
5.7.3	Test Datasheets .....	53
5.7.4	Test Photographs .....	55
5.7.5	Test Equipment List .....	57
<b>6.0</b>	<b>Test Logs .....</b>	<b>58</b>

**List of Tables**

Table 3.0-1: Product Identification - Equipment Under Test (EUT) .....	5
Table 4.2-1: Measurement Uncertainties .....	5
Table 5.0-1: Summary of Test Information & Results .....	6
Table 5.1-1: Electrostatic Discharge Test Equipment List .....	19
Table 5.2-1: Radiated RF Immunity Test Equipment List.....	26
Table 5.3-1: Electrical Fast Transient / Burst Test Equipment List.....	31
Table 5.4-1: Surge Immunity Test Equipment List .....	40
Table 5.5-1: Conducted RF Immunity Test Equipment List .....	45
Table 5.6-1: Power Frequency H-Field Immunity Test Equipment List .....	52
Table 5.7-1: Voltage Dips and Interruptions Test Equipment List.....	57

### 1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Electromagnetic Interference (EMI) 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.

- Test Specifications: EAC 2005 VVSG
- IEC/EN 61000-4-2
- IEC/EN 61000-4-3
- IEC/EN 61000-4-4
- IEC/EN 61000-4-5
- IEC/EN 61000-4-6
- IEC/EN 61000-4-8
- IEC/EN 61000-4-11
- Pro V&V, Inc. Purchase Order(s) 2022-008, dated 03/15/2022
- National Technical Systems (NTS) Quote(s) OP0594543, dated 09/07/2021
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/1/2017

### 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	Model Number	Serial Number
1	2	Central Count Scanners	DS950	DS9521060544
2			DS450	DS4521063682

### 3.1 Security Classification

Non-classified

### 4.0 General Test Requirements

#### 4.1 Test Equipment

The instrumentation used in the performance of these tests is periodically calibrated and standardized within manufacturer's rated accuracies and are traceable to the National Institute of Standards and Technology. The calibration procedures and practices are in accordance with ANSI/NCSL Z540-1 and ISO 17025:2017. Certification of calibration is on file subject to inspection by authorized personnel.

#### 4.2 Measurement Uncertainties

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of CISPR and therefore no adjustment of the data for measurement uncertainty is required.

**Table 4.2-1: Measurement Uncertainties**

Measurement Type	Measurement Unit	Frequency Range
Radiated Immunity	V/m	80-2,700 MHz
ESD	kV	N/A
EFT	Voltage	N/A
	Timing	N/A
Surge	Voltage	N/A
RF Common Mode (CDN Method)	Vrms	N/A
RF Common Mode (BCI Method)	Vrms	N/A



## 5.0 Test Descriptions and Results

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

Section	Test	Specification	Test Facility	Test Date	Model #	Serial #	Test Result
5.1	Electrostatic Discharge	IEC/EN 61000-4-2	Longmont	02/21/2022 - 02/28/2022	DS950 DS450	DS9521060544 DS4521063682	Complies
5.2	Radiated RF Immunity	IEC/EN 61000-4-3	Longmont	02/01/2022 - 02/04/2022	DS950 DS450	DS9521060544 DS4521063682	Complies
5.3	Electrical Fast Transient / Burst	IEC/EN 61000-4-4	Longmont	02/07/2022 - 02/19/2022	DS950 DS450	DS9521060544 DS4521063682	Complies
5.4	Surge Immunity	IEC/EN 61000-4-5	Longmont	02/07/2022 - 02/19/2022	DS950 DS450	DS9521060544 DS4521063682	Complies
5.5	Conducted RF Immunity	IEC/EN 61000-4-6	Longmont	02/07/2022 - 02/19/2022	DS950 DS450	DS9521060544 DS4521063682	Complies
5.6	Power Frequency H-Field Immunity	IEC/EN 61000-4-8	Longmont	02/07/2022 - 02/19/2022	DS950 DS450	DS9521060544 DS4521063682	Complies
5.7	Voltage Dips and Interruptions	IEC/EN 61000-4-11	Longmont	04/04/2022 - 04/08/2022	DS950 DS450	DS9521060544 DS4521063682	Complies

**5.1 Electrostatic Discharge****5.1.1 Test Procedure**

IEC/EN 61000-4-2

**5.1.2 Test Result**

The DS950 and DS450 were subjected to the Electrostatic Discharge Test per IEC/EN 61000-4-2. No anomalies were noted as a result of the testing.

5.1.3 Test Datasheets

**Electrostatic Discharge per IEC / EN 61000-4-2**

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 10, 2022
Temperature:	17°C	Humidity:	31%
Input Voltage:	120Vac/60Hz	Pressure:	837 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-2.doc

FR0100

Test Location	Voltage Level (kV)	Polarity		Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
		+	-					
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
HCP	2, 4	x	x	10	1	Edge of HCP at Front of UUT	NA	NA
Contact Discharge Points - <b>RED</b> Arrows.								
Figure 1 (Config #1)	8	x	x	10	1		A	Pass
Figure 2 (Config #1)	2, 4	x	x	---	---	Bottom of EUT is floating – no contact discharges found	---	---
Figure 3 (Config #1)	2, 4	x	x	10	1		A	Pass
Figure 4 (Config #1)	2, 4	x	x	10	1		A	Pass
Figure 5 (Config #1)	2, 4	x	x	10	1		A	Pass
Figure 6 (Config #1)	2, 4	x	x	10	1		A	Pass
Air Discharge Points - <b>BLUE</b> Arrows.								
Figure 3 (Config #1)	2, 4, 8, 15	x	x	10	1		A	Pass
Figure 4 (Config #1)	2, 4, 8, 15	x	x	---	---	No air discharges found	---	---
Figure 5 (Config #1)	2, 4, 8, 15	x	x	---	---	No air discharges found	---	---
Figure 6 (Config #1)	2, 4, 8, 15	x	x	---	---	No air discharges found	---	---



### Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185F1N343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 11, 2022
Temperature:	19°C	Humidity:	31%
Input Voltage:	120Vac/60Hz	Pressure:	837 mb
Configuration of Unit:	Processing Ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-2.doc

FR0100

Test Location	Voltage Level (kV)	Polarity		Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
		+	-					
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
HCP	2, 4	x	x	10	1	Edge of HCP at Front of UUT	NA	NA
Contact Discharge Points - <b>RED</b> Arrows.								
Figure 1 (Config #2)	8	x	x	10	1		A	Pass
Figure 2 (Config #2)	2, 4	x	x	---	---	Bottom of EUT is floating – no contact discharges found	---	---
Figure 3 (Config #2)	2, 4	x	x	10	1		A	Pass
Figure 4 (Config #2)	2, 4	x	x	10	1		A	Pass
Figure 5 (Config #2)	2, 4	x	x	10	1		A	Pass
Figure 6 (Config #2)	2, 4	x	x	10	1		A	Pass
Air Discharge Points - <b>BLUE</b> Arrows.								
Figure 3 (Config #2)	2, 4, 8, 15	x	x	10	1		A	Pass
Figure 4 (Config #2)	2, 4, 8, 15	x	x	---	---	No air discharges found	---	---
Figure 5 (Config #2)	2, 4, 8, 15	x	x	---	---	No air discharges found	---	---
Figure 6 (Config #2)	2, 4, 8, 15	x	x	---	---	No air discharges found	---	---

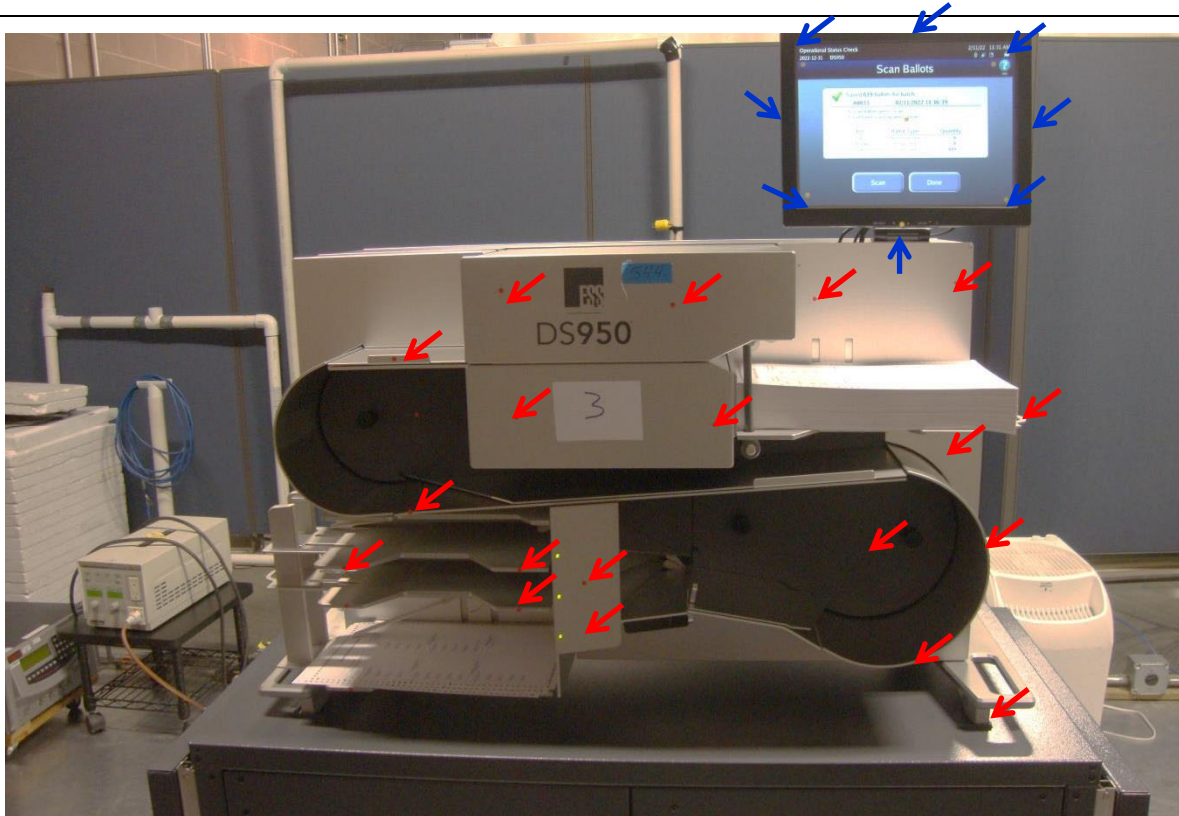
### 5.1.4 Test Photographs



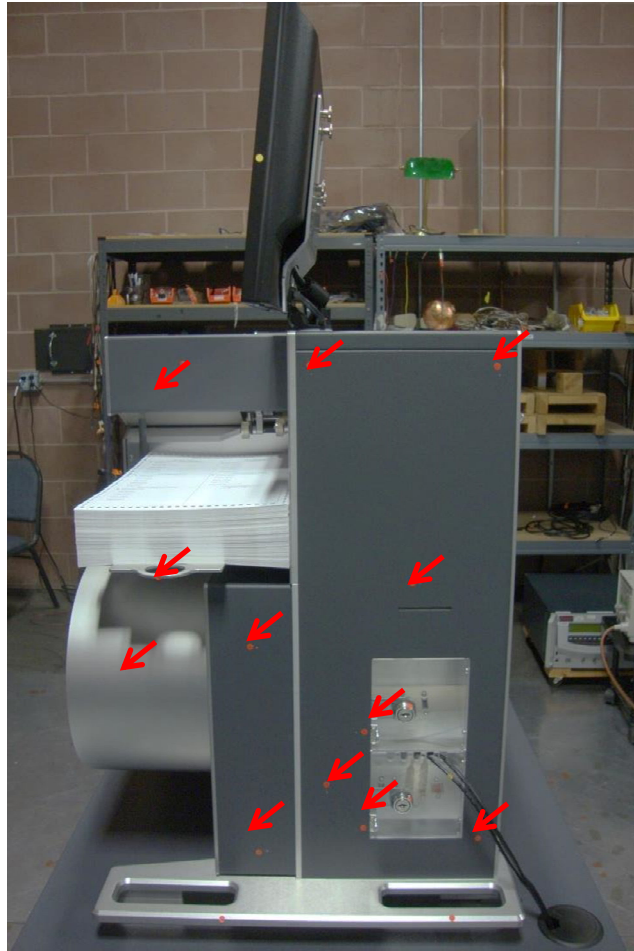
**Figure 1: Electrostatic Discharge Test Setup (Config #1)**



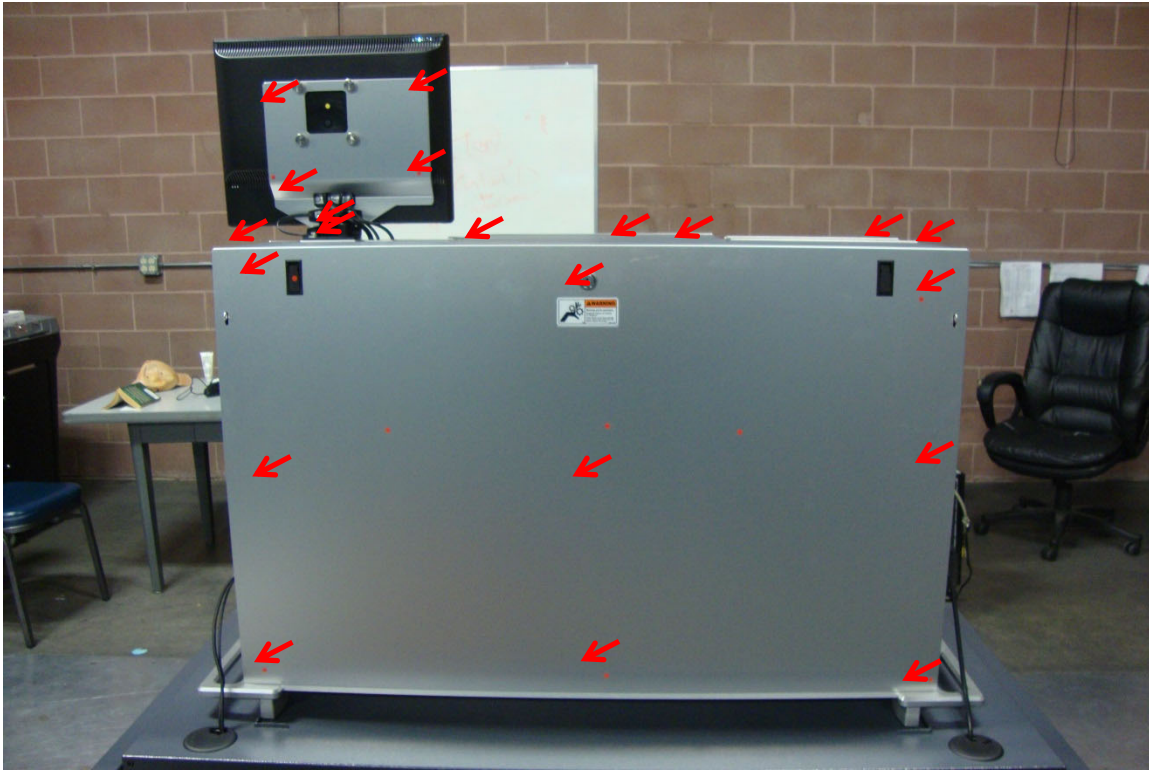
**Figure 2. Electrostatic Discharge Test Setup (Config #1)**



**Figure 3. Electrostatic Discharge Test Points (Config #1)**



**Figure 4. Electrostatic Discharge Test Points (Config #1)**



**Figure 5. Electrostatic Discharge Test Points (Config #1)**



**Figure 6. Electrostatic Discharge Test Points**



**Figure 1. Electrostatic Discharge Test Setup (Config #2)**



**Figure 2. Electrostatic Discharge Test Setup (Config #2)**

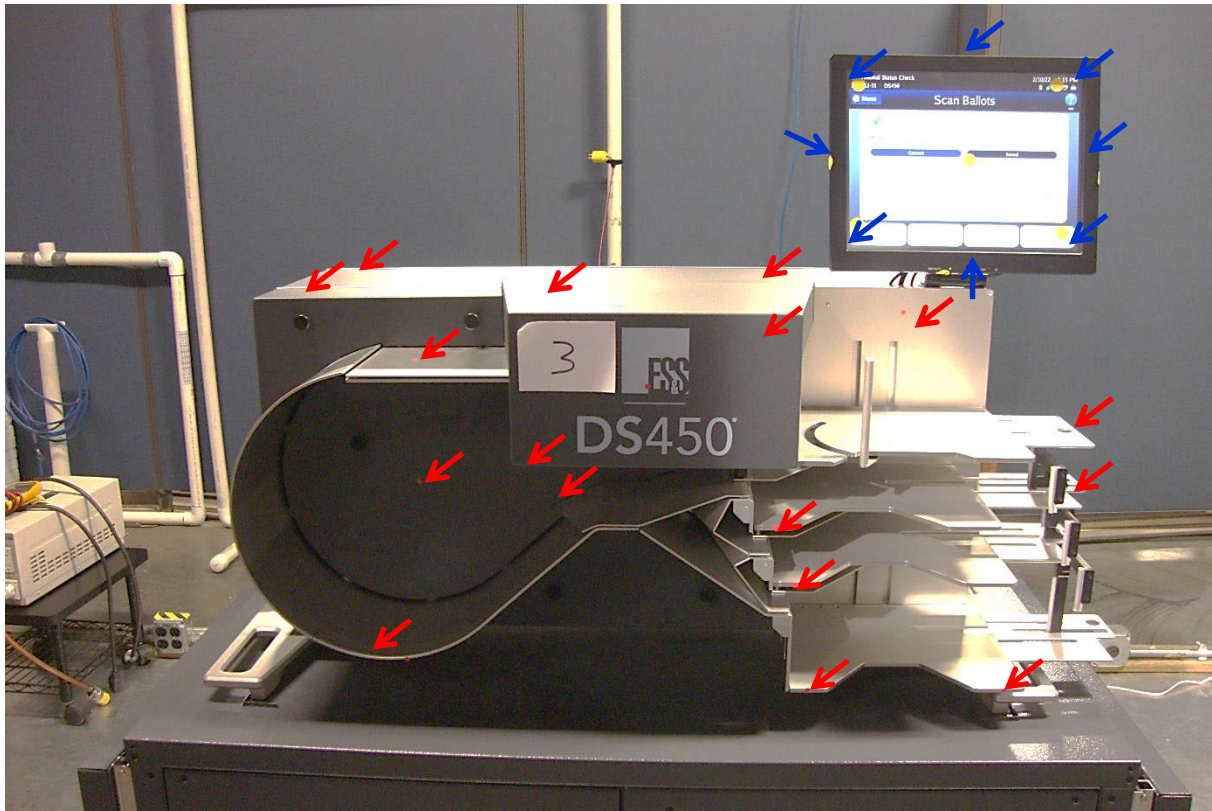


Figure 3. Electrostatic Discharge Test Points (Config #2)



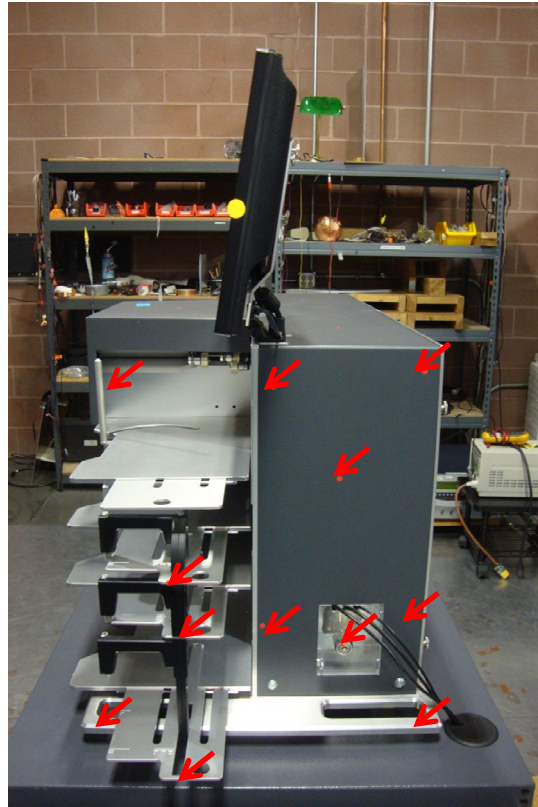


Figure 4. Electrostatic Discharge Test Points (Config #2)

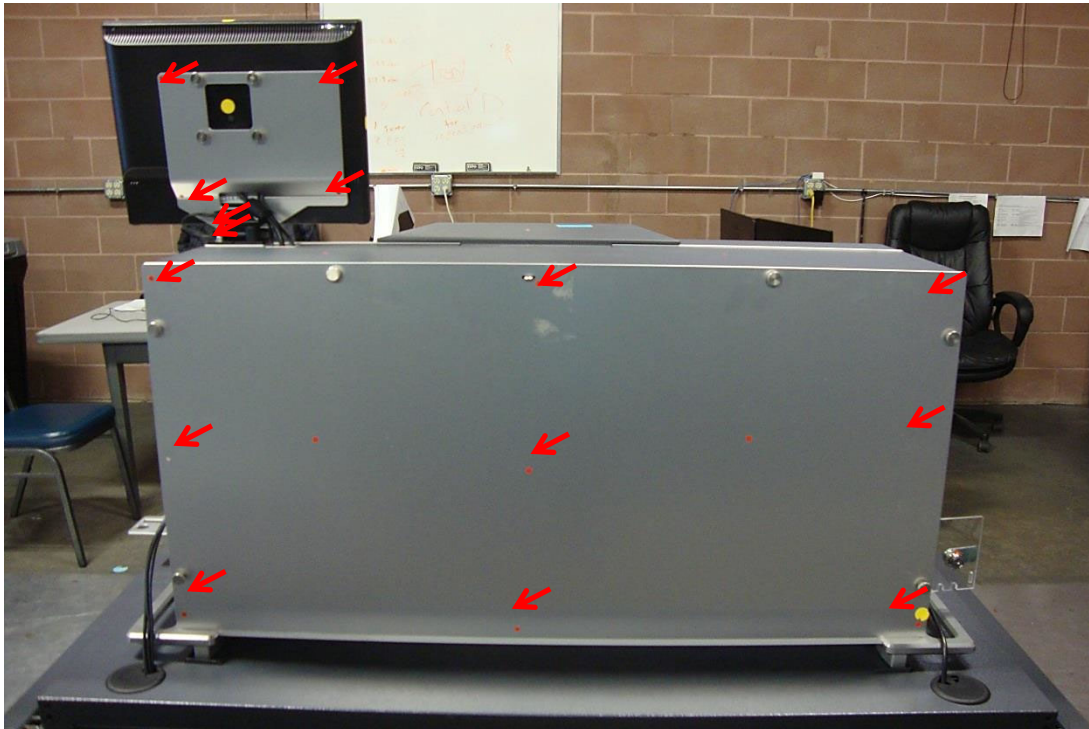
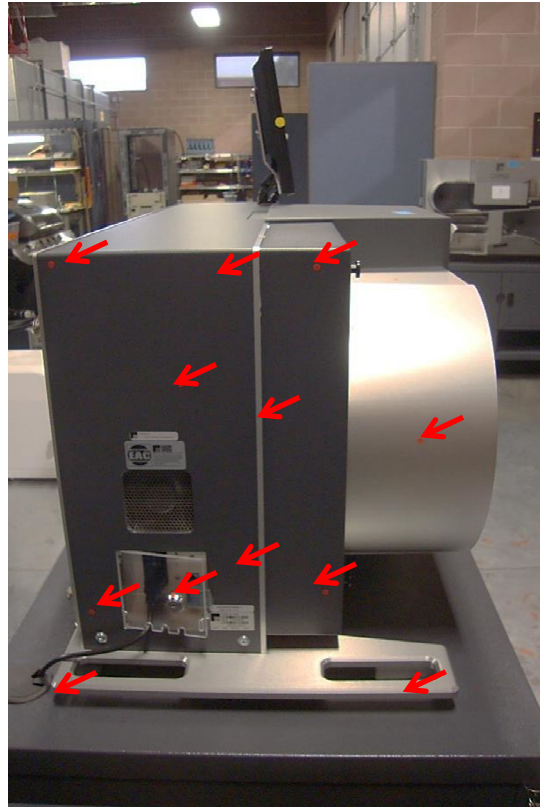


Figure 5. Electrostatic Discharge Test Points (Config #2)



**Figure 6. Electrostatic Discharge Test Points (Config #2)**



### 5.1.5 Test Equipment List

**Table 5.1-1: Electrostatic Discharge Test Equipment List**

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1040	Fluke	83-3	69811230	Multimeter/Frequency Meter (WC059669)	09/23/2021	09/23/2022
1281	EMC Partner	ESD3000	284	ESD Test System (WC059688)	02/10/2021	03/10/2022
1964	EXTECH	Datalogger 42270	1026959	Temperature and Humidity Meter	01/19/2022	01/19/2023

**5.2 Radiated RF Immunity**

**5.2.1 Test Procedure**

IEC/EN 61000-4-3

**5.2.2 Test Result**

The DS950 and DS450 were subjected to the Radiated RF Immunity Test per IEC/EN 61000-4-3. No anomalies were noted as a result of the testing.

**5.2.3 Test Datasheets**

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

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	DS950 Printer 1 UPS	S/N:	DS9521060544 U64185F1N343098 CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February3, 2022
Temperature:	23.7°C	Humidity:	9.0%
Input Voltage:	120Vac/60Hz	Pressure:	839 mb
Configuration of Unit:	Processing ballots Config#1		
Test Engineer:	Casey Lockhart		

PR145960-4-3.doc

FR0100

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

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

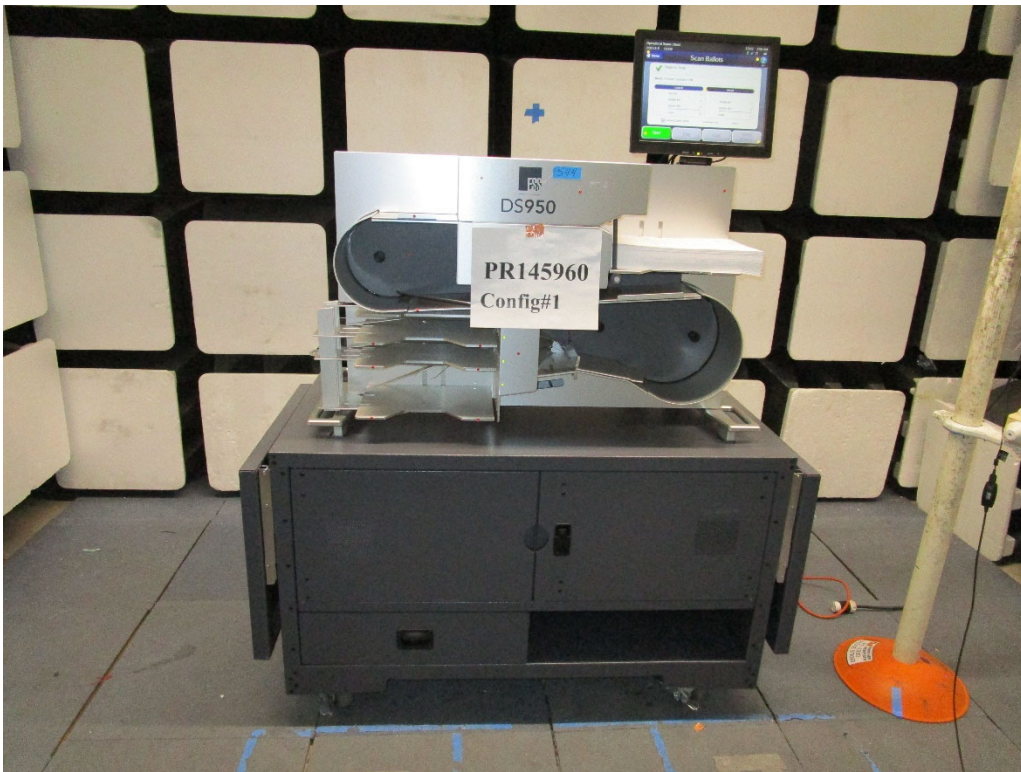
Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP0
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185FIN343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 2, 2022
Temperature:	23.7°C	Humidity:	9.0%
Input Voltage:	120Vac/60Hz	Pressure:	837 mb
Configuration of Unit:	Processing ballots Config#2		
Test Engineer:	Casey Lockhart		

PR145960-4-3.doc

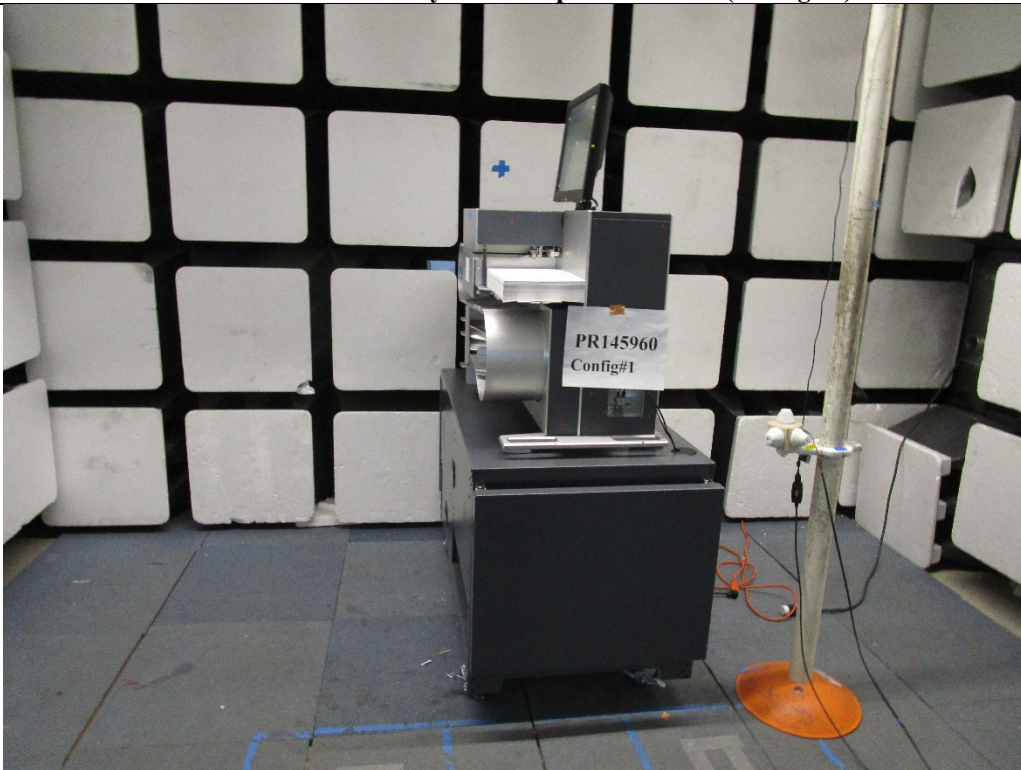
FR0100

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

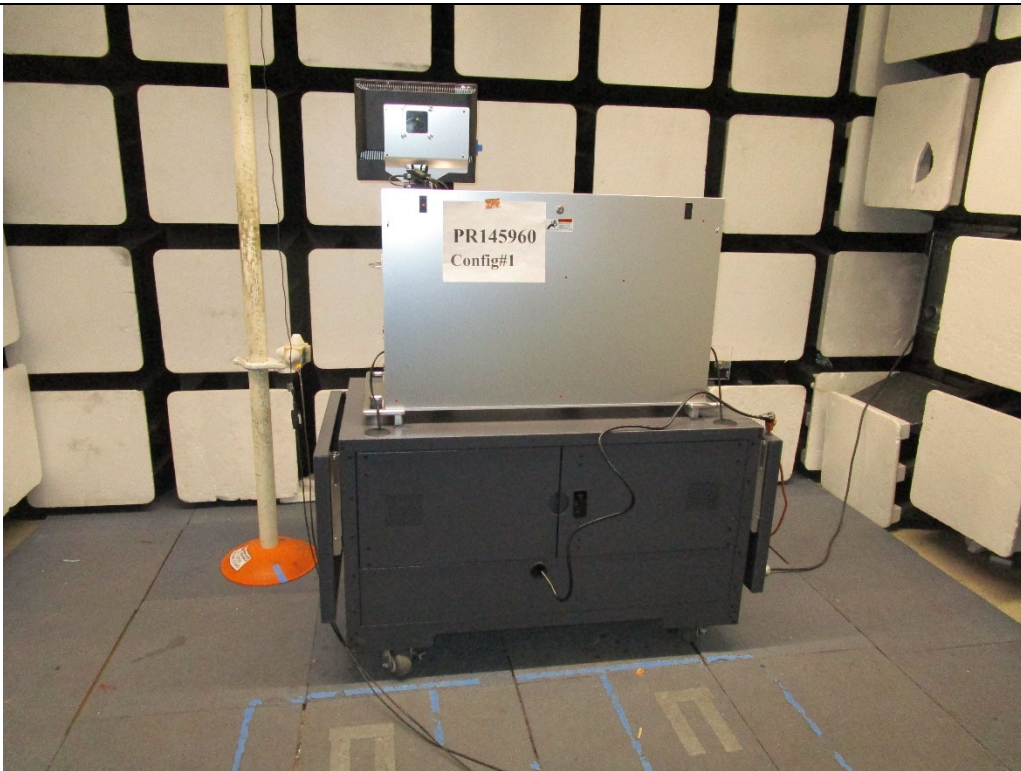
5.2.4 Test Photographs



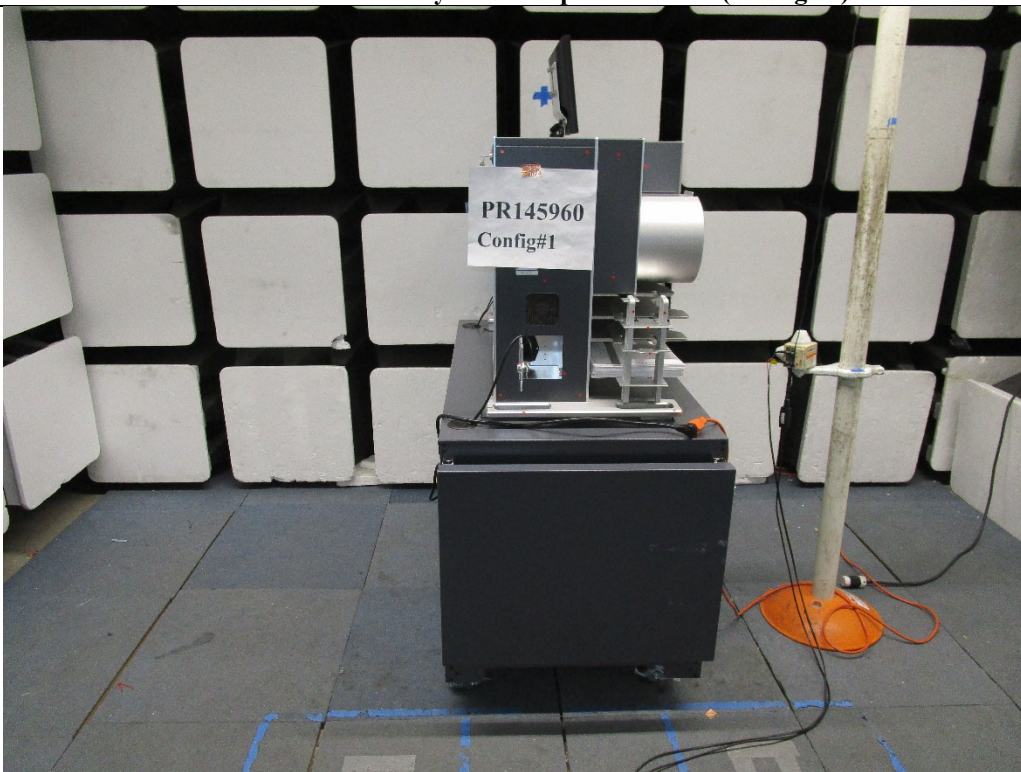
Radiated RF Immunity Test Setup – Front Side (Config #1)



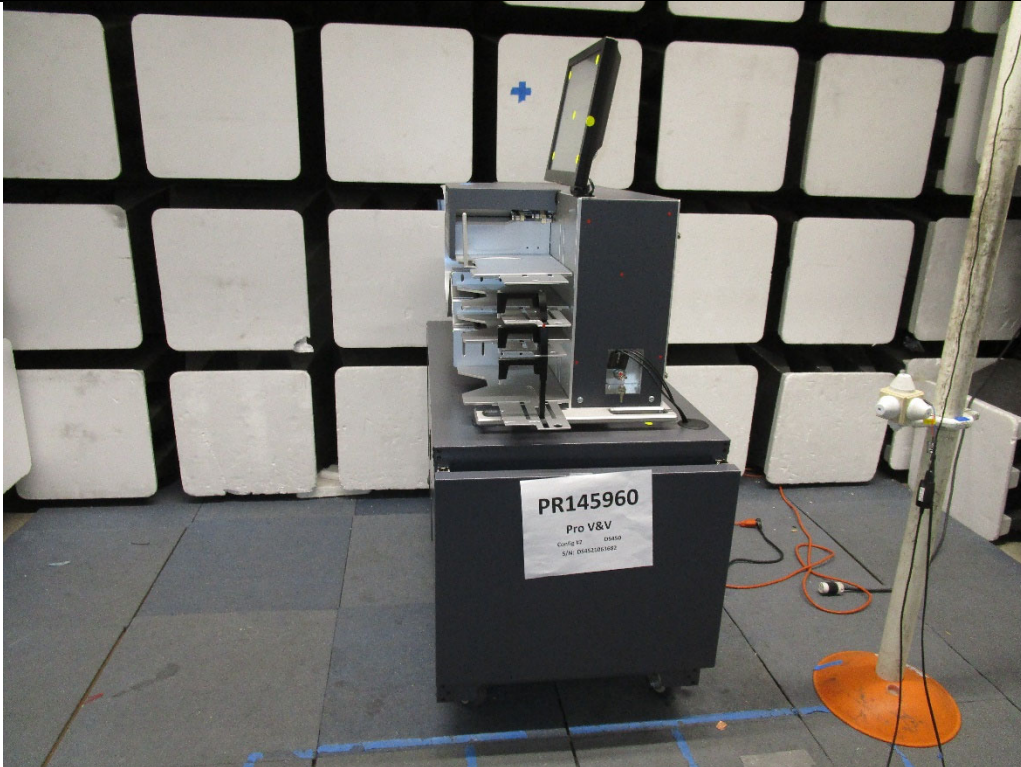
Radiated RF Immunity Test Setup – Right Side (Config #1)



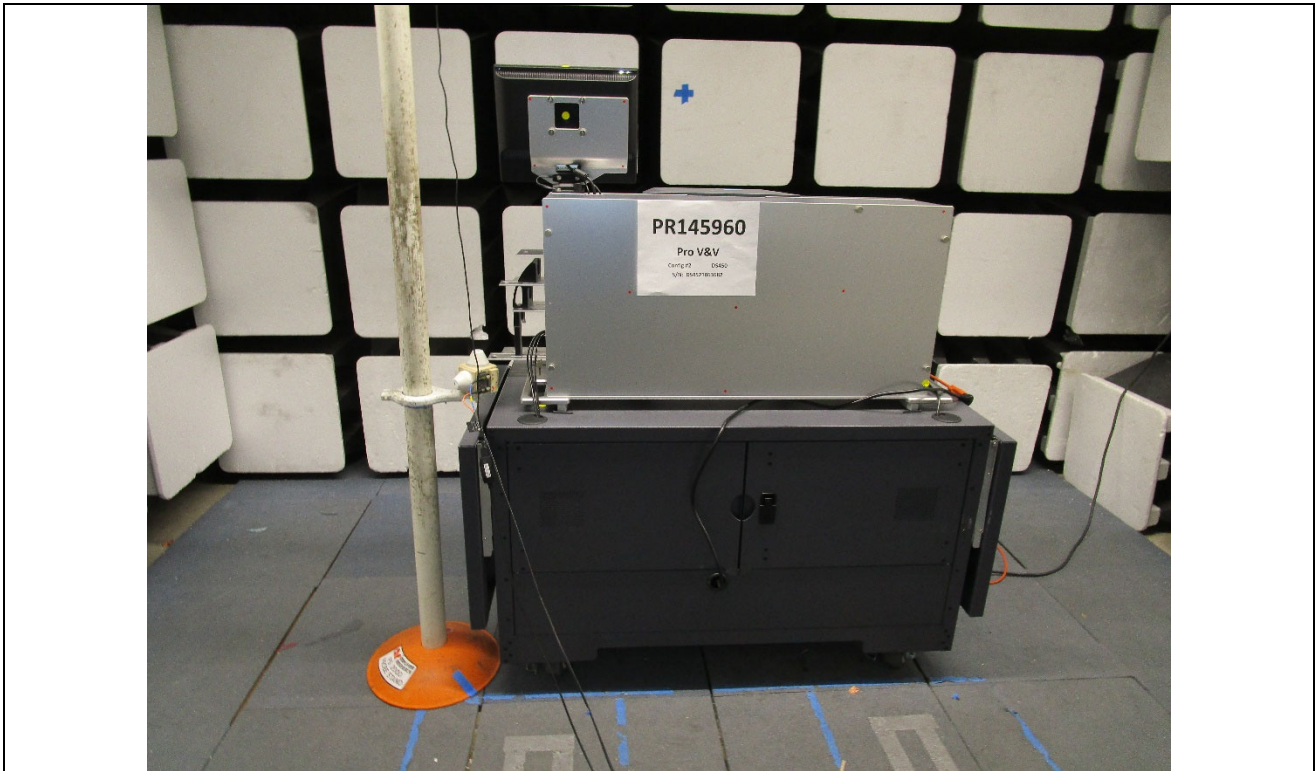
**Radiated RF Immunity Test Setup – Back Side (Config #1)**



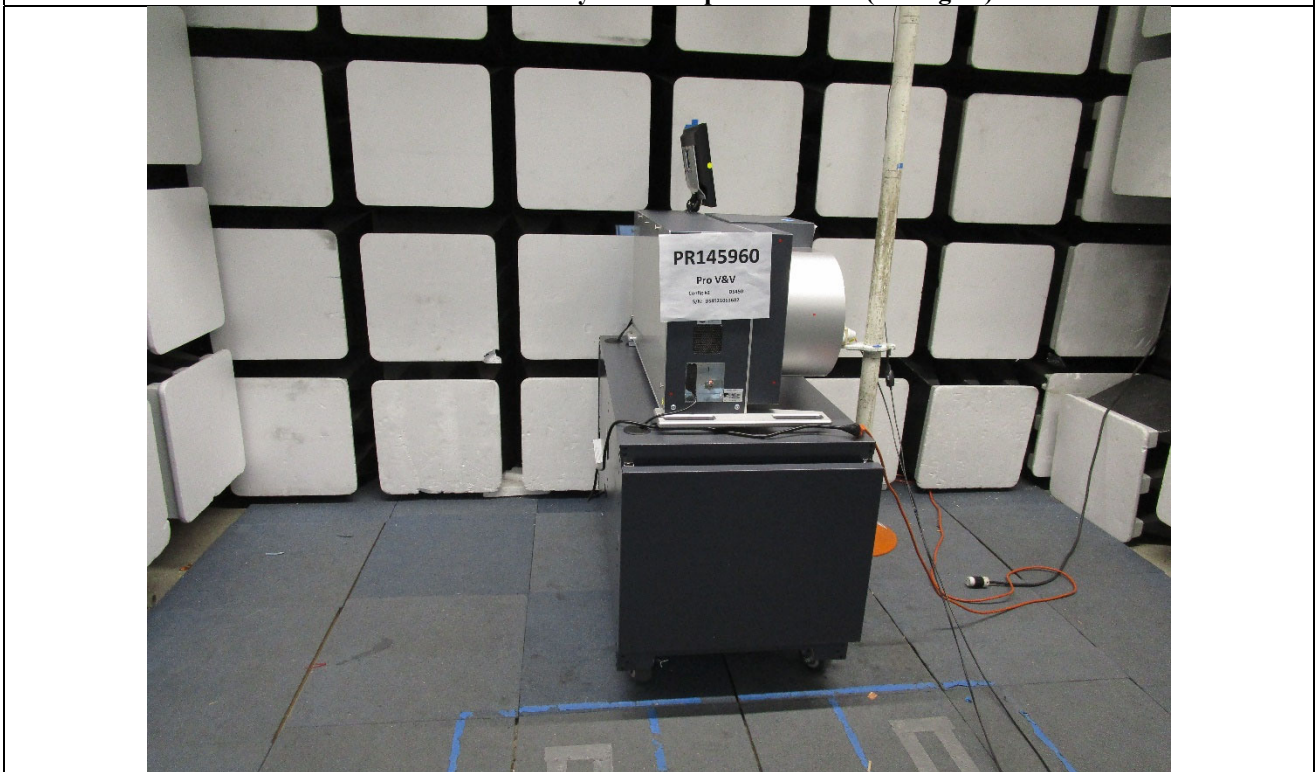
**Radiated RF Immunity Test Setup – Left Side (Config #1)**

**Radiated RF Immunity Test Setup – Front Side (Config #2)****Radiated RF Immunity Test Setup – Right Side (Config #2)**





**Radiated RF Immunity Test Setup – Back Side (Config #2)**



**Radiated RF Immunity Test Setup – Left Side (Config #2)**



### 5.2.5 Test Equipment List

**Table 5.2-1: Radiated RF Immunity Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059916	Ground Plane (Fixed)	National Technical Systems	GP #0	NCR	NCR
WC059710	Amplifier (Pre/RF/Low Noise)	Ophir RF	5127F	09/17/2012	NCR
WC059712	Coupler (Bi-Directional)	Werlatone	C3908-10	06/14/2021	06/14/2022
WC059797	Generator (Signal)	Wiltron	68369B	05/17/2021	05/17/2022
WC059805	Antenna (Log Periodic)	ETS-Lindgren	3142B	NCR	NCR
WC070468	Meter (Power)	Giga-Tronics	GT-8888A	07/27/2021	07/27/2022
WC070507	Software	EMC Integrity	RFS	NCR	NCR
WC078463	Probe (E-Field/Near Field)	ETS-Lindgren	FP5000	06/08/2021	06/08/2022
WC078486	Meter (Hydrometer)	Extech Instruments	Datalogger 42270	06/14/2021	06/14/2022

**Calibration Abbreviations**

CAL: Calibration

NCR: No Calibration Required

**5.3 Electrical Fast Transient / Burst**

**5.3.1 Test Procedure**

IEC/EN 61000-4-4

**5.3.2 Test Result**

The DS950 and DS450 were subjected to the Electrical Fast Transient/Burst Test per IEC/EN 61000-4-4. No anomalies were noted as a result of the testing.

**5.3.3 Test Datasheets**

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

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950 Printer 1 UPS	S/N:	DS9521060544 U64185F1N343098 CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 9, 2022
Temperature:	20°C	Humidity:	18%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-4.doc

FR0100

Voltage (kV)	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					100kHz	AC Mains	A	Pass
2.0		x	60	CDN	x					100kHz		A	Pass
2.0	x		60	CDN		x				100kHz		A	Pass
2.0		x	60	CDN		x				100kHz		A	Pass
2.0	x		60	CDN					x	100kHz		A	Pass
2.0		x	60	CDN					x	100kHz		A	Pass
2.0	x		60	CDN	x	x			x	100kHz		A	Pass
2.0		x	60	CDN	x	x			x	100kHz		A	Pass



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

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185F1N343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 9, 2022
Temperature:	19°C	Humidity:	19%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Processing ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-4.doc

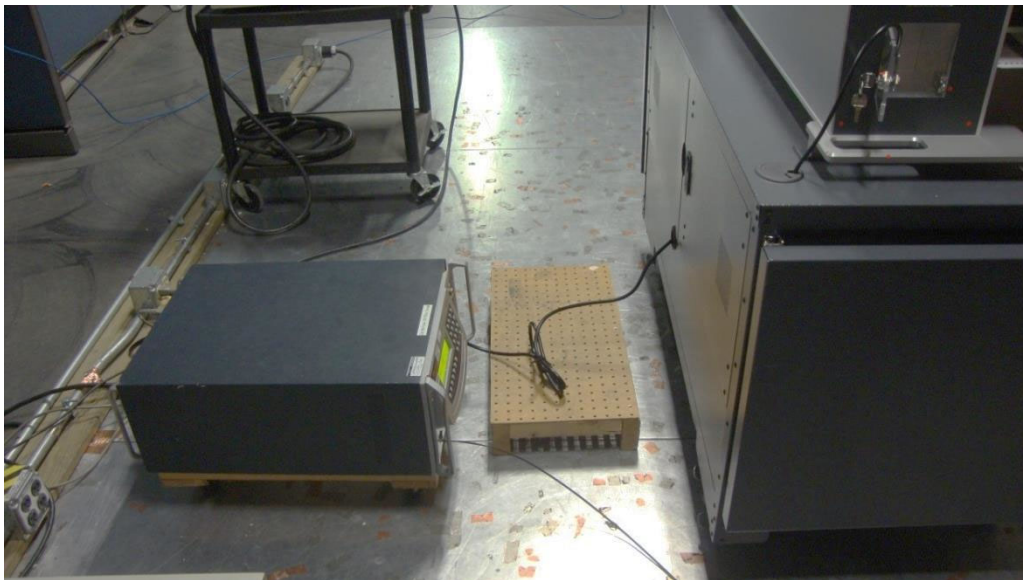
FR0100

Voltage (kV)	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					100kHz	AC Mains	A	Pass
2.0		x	60	CDN	x					100kHz		A	Pass
2.0	x		60	CDN		x				100kHz		A	Pass
2.0		x	60	CDN		x				100kHz		A	Pass
2.0	x		60	CDN					x	100kHz		A	Pass
2.0		x	60	CDN					x	100kHz		A	Pass
2.0	x		60	CDN	x	x			x	100kHz		A	Pass
2.0		x	60	CDN	x	x			x	100kHz		A	Pass

### 5.3.4 Test Photographs



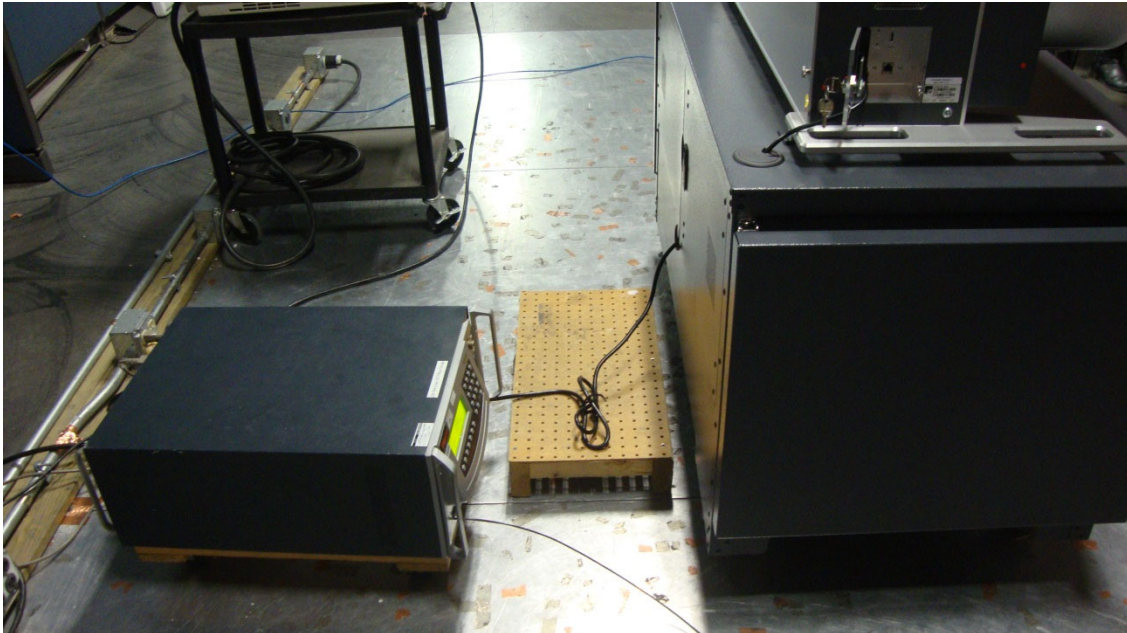
**Electrical Fast Transient Test Setup (Config #1)**



**Electrical Fast Transient Test Setup – AC Mains (Config #1)**



**Electrical Fast Transient Test Setup (Config #2)**



**Electrical Fast Transient Test Setup – AC Mains (Config #2)**



5.3.5 Test Equipment List

Table 5.3-1: Electrical Fast Transient / Burst Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1040	Fluke	83-3	69811230	Multimeter/Frequency Meter (WC059669)	09/23/2021	09/23/2022
1184	KeyTek	CE Ware	4.0	KeyTek EMC Pro Control Software for EFT, Surge, H-F	NA	NA
1284	ThermoFischer Scientific	EMC Pro Plus - USA	0705276	EFT, Surge, H-field & PQF Immunity Test Generator	11/11/2021	11/11/2022
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel (WC059683)	07/02/2021	07/02/2022
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	NA	NA
1964	EXTECH	Datalogger 42270	1026959	Temperature and Humidity Meter	01/19/2022	01/19/2023

**5.4 Surge Immunity**

**5.4.1 Test Procedure**

IEC/EN 61000-4-5

**5.4.2 Test Result**

The DS950 and DS450 were subjected to the Surge Immunity Test per IEC/EN 61000-4-5. No anomalies were noted as a result of the testing.

**5.4.3 Test Datasheets**

**Surge Immunity per IEC / EN 61000-4-5**

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 7, 2022
Temperature:	23°C	Humidity:	18%
Input Voltage:	120Vac/60Hz	Pressure:	844 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-5.doc

FR0100

Voltage (kV)	Polarity		L 1	L 2	L 3	N	P E	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



### Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 7, 2022
Temperature:	23°C	Humidity:	18%
Input Voltage:	120Vac/60Hz	Pressure:	844 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-5.doc

FR1010

Voltage (kV)	Polarity		L 1	L 2	L 3	N	P E	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
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
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	x	0	5	45	Common Mode Line	A	Pass
1.0		x	x			x	x	0	5	45		A	Pass
1.0	x		x			x	x	90	5	45		A	Pass
1.0		x	x			x	x	90	5	45		A	Pass
1.0	x		x			x	x	180	5	45		A	Pass
1.0		x	x			x	x	180	5	45		A	Pass
1.0	x		x			x	x	270	5	45		A	Pass
1.0		x	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

### Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 7, 2022
Temperature:	23°C	Humidity:	18%
Input Voltage:	120Vac/60Hz	Pressure:	844 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-5.doc

FR0100

Voltage (kV)	Polarity		L 1	L 2	L 3	N	P E	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
	+	-											
2.0	x		x			x		0	5	60	Differential Mode	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 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:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185F1N343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 8, 2022
Temperature:	19°C	Humidity:	19%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Tabulating Ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-5.doc

FR0100

Voltage (kV)	Polarity		L 1	L 2	L 3	N	P E	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
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



### Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185F1N343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 8, 2022
Temperature:	19°C	Humidity:	19%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Tabulating Ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-5.doc

FR0100

Voltage (kV)	Polarity		L 1	L 2	L 3	N	P E	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
	+	-											
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	60	Differential Mode	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



### Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185F1N343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 8, 2022
Temperature:	19°C	Humidity:	19%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Tabulating Ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-5.doc

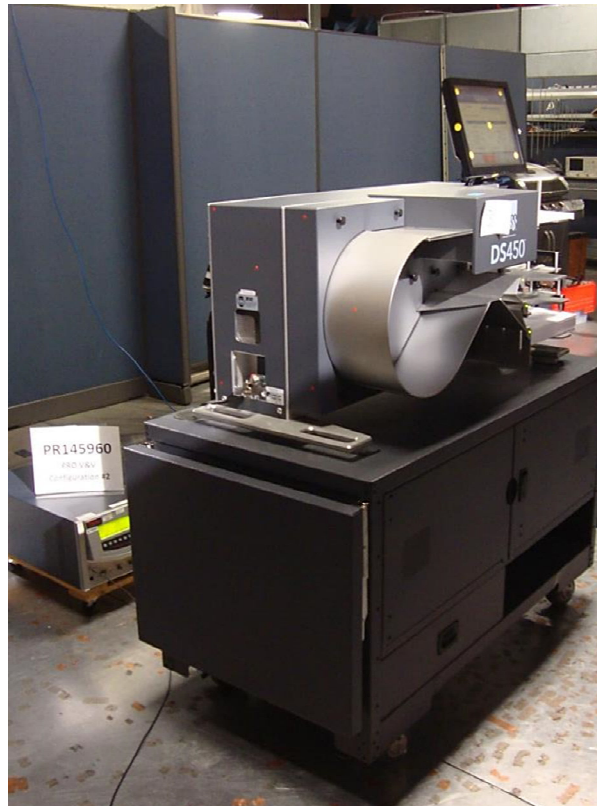
FR0100

Voltage (kV)	Polarity		L 1	L 2	L 3	N	P E	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass / Fail
	+	-											
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 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

#### 5.4.4 Test Photographs



**Surge Immunity Test Setup – AC Mains (Config #1)**



**Surge Immunity Test Setup – AC Mains (Config #2)**



#### 5.4.5 Test Equipment List

**Table 5.4-1: Surge Immunity Test Equipment List**

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1040	Fluke	83-3	69811230	Multimeter/Frequency Meter (WC059669)	09/23/2021	09/23/2022
1184	KeyTek	CE Ware	4.0	KeyTek EMC Pro Control Software for EFT, Surge, H-F	NA	NA
1284	ThermoFischer Scientific	EMC Pro Plus - USA	0705276	EFT, Surge, H-field & PQF Immunity Test Generator	11/11/2021	11/11/2022
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel (WC059683)	07/02/2021	07/02/2022
1964	EXTECH	Datalogger 42270	1026959	Temperature and Humidity Meter	01/19/2022	01/19/2023



**5.5 Conducted RF Immunity**

**5.5.1 Test Procedure**

IEC/EN 61000-4-6

**5.4.2 Test Result**

The DS950 and DS450 were subjected to the Conducted RF Immunity Test per IEC/EN 61000-4-6. No anomalies were noted as a result of the testing.

**5.5.3 Test Datasheets**

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

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 9, 2022
Temperature:	19°C	Humidity:	19%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-6.doc

FR0100

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:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185FIN343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 9, 2022
Temperature:	19°C	Humidity:	19%
Input Voltage:	120Vac/60Hz	Pressure:	838 mb
Configuration of Unit:	Tabulating Ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-6.doc

FR0100

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 using M3 CDN	A	Pass

### 5.5.4 Test Photographs



**Conducted RF Immunity Test Setup – AC Mains (Config #1)**



**Conducted RF Immunity Test Setup – AC Mains (Config #2)**



### 5.5.5 Test Equipment List

**Table 5.5-1: Conducted RF Immunity Test Equipment List**

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1479	EMCI	EMCI- CDN_M3-16	EMCI014	M3 CDN, 16A, 250 VAC	02/03/2022	02/03/2023
1499	Rigol Technologies, Inc.	DSA815	DSA8B1503000 53	9 kHz to 1.5 GHz Spectrum Analyzer (WC059693)	10/04/2021	10/04/2022
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	NA	NA
1528	Aeroflex/Weinschel	40-6-34	SB031	Hi power atten 6 dB	02/03/2022	02/03/2023
1532	Werlatone	C9475-13	102545	100 Watt Dual Directional Coupler, 10 kHz to 250 M	02/03/2022	02/03/2023
1541	Amplifier Research	75A250A	0445076	75 Watt Amplifier (10kHz - 250MHz)	NA	NA
1544	IFR	2023A	202305/809	9 kHz - 1.2 GHz Signal Generator (WC059591)	05/06/2021	05/06/2022
1594	EMCI	CI	V2.5.0	Conducted Immunity Software	NA	NA

**5.6 Power Frequency H-Field Immunity**

**5.6.1 Test Procedure**

IEC/EN 61000-4-8

**5.6.2 Test Result**

The DS950 and DS450 were subjected to the Power Frequency H-Field Immunity Test per IEC/EN 61000-4-8. No anomalies were noted as a result of the testing.

**5.6.3 Test Datasheets**

---

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

---

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 10, 2022
Temperature:	17°C	Humidity:	27%
Input Voltage:	120Vac/60Hz	Pressure:	837 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-8.doc

FR0100

Frequency (Hz)		Field Strength (A/m)	EUT Axis Location	Dwell Time (sec)	Comments	Criteria Met	Pass / Fail
50	60						
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
x		30	Z1	60		A	Pass
	x	30	Z1	60		A	Pass

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

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185FIN343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 10, 2022
Temperature:	17°C	Humidity:	27%
Input Voltage:	120Vac/60Hz	Pressure:	837 mb
Configuration of Unit:	Processing Ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-8.doc

FR0100

Frequency (Hz)		Field Strength (A/m)	EUT Axis Location	Dwell Time (sec)	Comments	Criteria Met	Pass / Fail
50	60						
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
x		30	Z1	60		A	Pass
	x	30	Z1	60		A	Pass

5.6.4 Test Photographs



Power Frequency H-field Immunity Test Setup (Config #1)

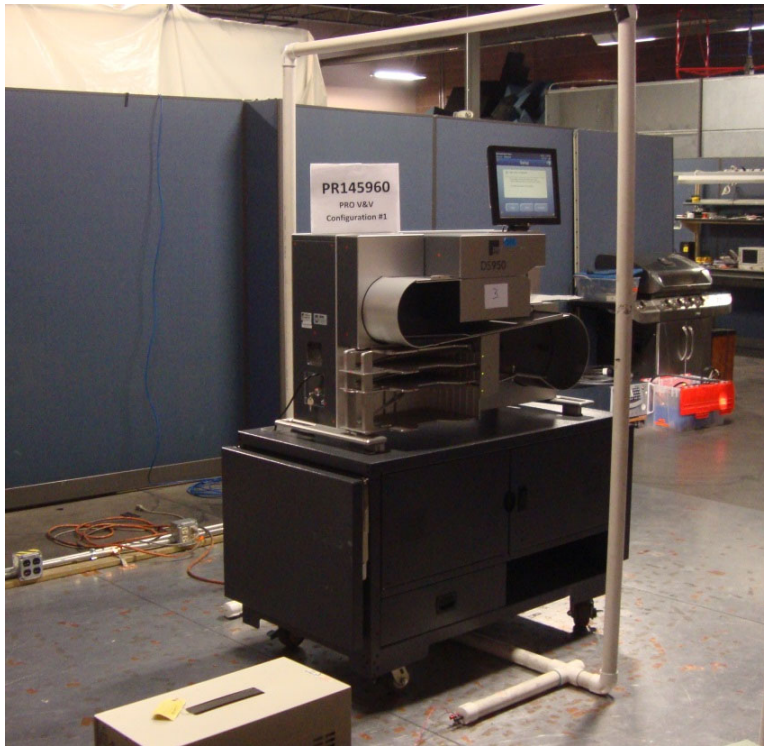


Power Frequency H-field Immunity Test Setup (Config #1)





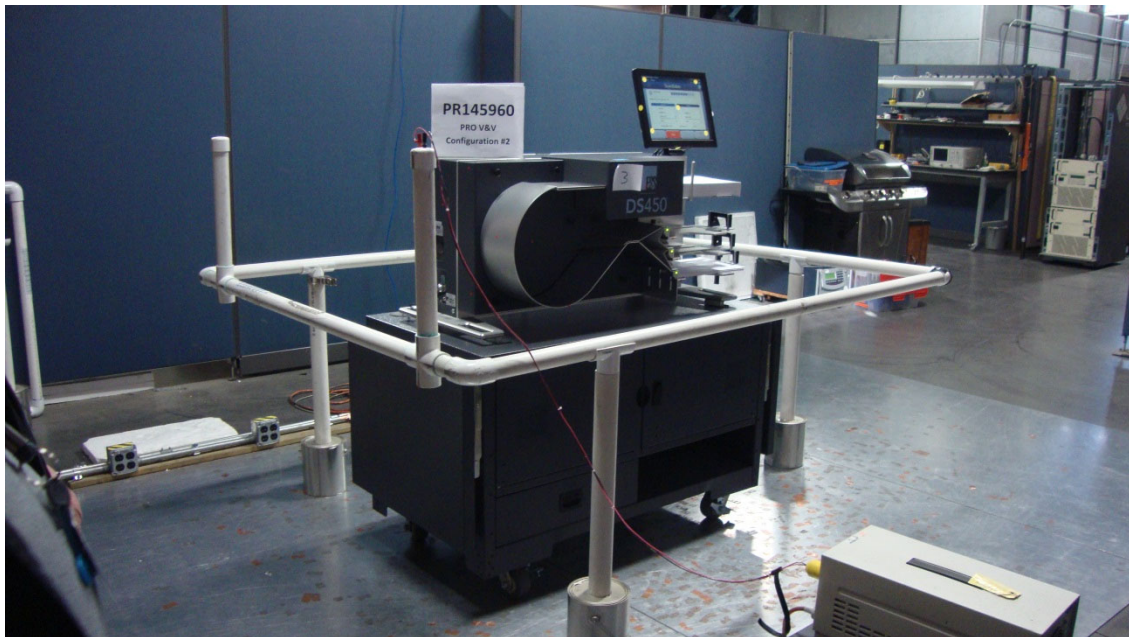
**Power Frequency H-field Immunity Test Setup (Config #1)**



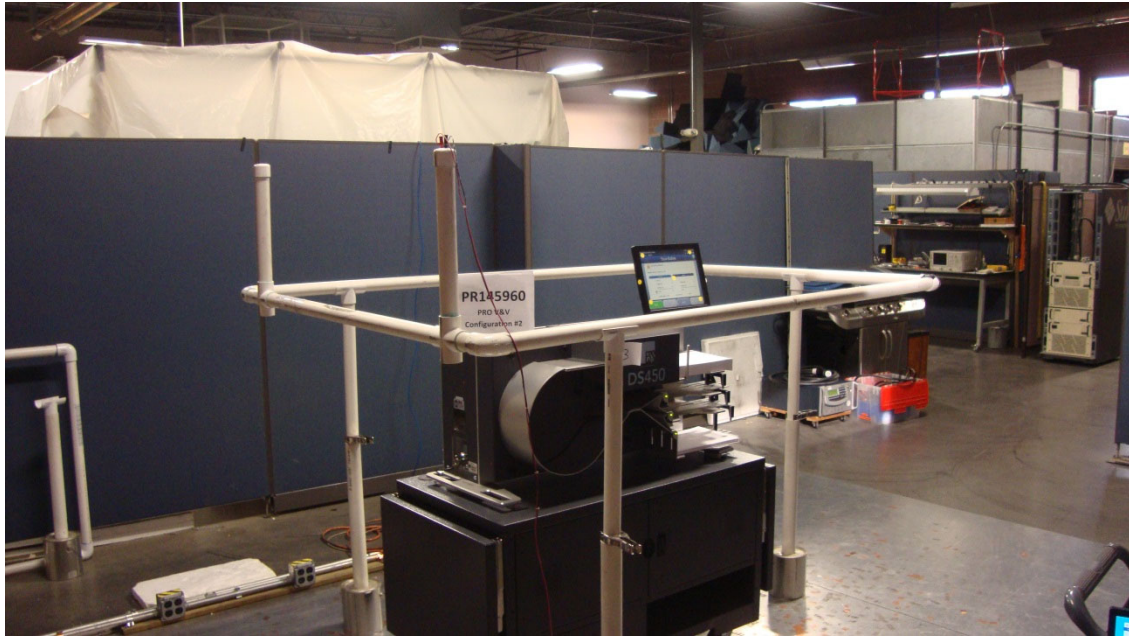
**Power Frequency H-field Immunity Test Setup (Config #1)**



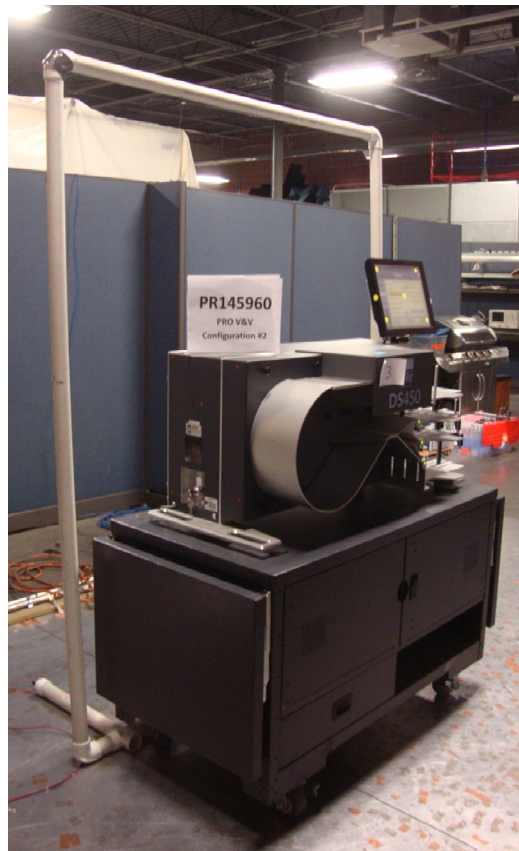
**Power Frequency H-field Immunity Test Setup (Config #2)**



**Power Frequency H-field Immunity Test Setup (Config #2)**



**Power Frequency H-field Immunity Test Setup (Config #2)**



**Power Frequency H-field Immunity Test Setup (Config #2)**



### 5.6.5 Test Equipment List

**Table 5.6-1: Power Frequency H-Field Immunity Test Equipment List**

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1040	Fluke	83-3	69811230	Multimeter/Frequency Meter (WC059669)	09/23/2021	09/23/2022
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel (WC059683)	07/02/2021	07/02/2022
1484	Pearson Electronics	110A	88593	Current Monitor, 1 Hz to 20 MHz (WC070471)	07/12/2020	07/12/2022
1505	EMCI	EMCI-4-8-2m-1.5m	0002	HField Loop, 2m x 1.5m	NA	NA
1548	California Instruments/Ametek	1251P	1423A06347	AC Power supply	NA	NA
1964	EXTECH	Datalogger 42270	1026959	Temperature and Humidity Meter	01/19/2022	01/19/2023



**5.7 Voltage Dips and Interruptions**

**5.7.1 Test Procedure**

IEC/EN 61000-4-11

**5.7.2 Test Result**

The DS950 and DS450 were subjected to the Voltage Dips and Interruptions Test per IEC/EN 61000-4-11. No anomalies were noted as a result of the testing.

**5.7.3 Test Datasheets**

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

Manufacturer:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS950	S/N:	DS9521060544
	Printer 1		U64185F1N343098
	UPS		CXXLU2000322
Standard Referenced:	EAC 2005 VVSG	Date:	February 2, 2022
Temperature:	23°C	Humidity:	18%
Input Voltage:	120Vac/60Hz	Pressure:	837 mb
Configuration of Unit:	Processing Ballots (Configuration #1)		
Test Engineer:	T. Wittig		

PR145960-4-11.doc

FR0100

% Nominal	No. of Cycles	Phase Angle (deg)				Time between dropouts (sec)	Number of tests	Comments	Criteria Met	Pass / Fail
		0	90	180	270					
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
0%	300	x				10	3		A	Pass
0%	300			x		10	3		A	Pass
<b>Line Voltage Variation Tests</b>										
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:	Pro V&V	Project Number:	PR145960
Customer Representative:	Michael Walker	Test Area:	GP #2
Model:	DS450	S/N:	DS4521063682
	Printer 1		U64185F1N343282
	Printer 2		AKSB019674E0
	UPS		CXXLT2001799
Standard Referenced:	EAC 2005 VVSG	Date:	February 1, 2022
Temperature:	19°C	Humidity:	21%
Input Voltage:	120Vac/60Hz	Pressure:	834 mb
Configuration of Unit:	Processing ballots (Configuration #2)		
Test Engineer:	T. Wittig		

PR145960-4-11.doc

FR0100

% Nominal	No. of Cycles	Phase Angle (deg)				Time between dropouts (sec)	Number of tests	Comments	Criteria Met	Pass / Fail
		0	90	180	270					
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
0%	300	x				10	3		A	Pass
0%	300			x		10	3		A	Pass
<b>Line Voltage Variation tests</b>										
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

**5.7.4 Test Photographs**



**Voltage Dips and Interruptions Test Setup (Config #1)**



**Voltage Dips and Interruptions Test Setup (Config #2)**





5.7.5 Test Equipment List

**Table 5.7-1: Voltage Dips and Interruptions Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059736	Chamber (EMI, Semi-Anechoic)	CIR Enterprises	CH 1	04/03/2022	04/03/2024
WC059916	Ground Plane (Fixed)	National Technical Systems	GP #0	NCR	NCR
WC059918	Ground Plane (Fixed)	National Technical Systems	GP #2	NCR	NCR
WC059669	Meter (Digital Multimeter)	Fluke	83-3	09/23/2021	09/23/2022
WC059683	Oscilloscope (Digital)	Tektronix	TDS2002B	07/02/2021	07/02/2022
WC059768	Generator (Spike/Transient)	Thermo Fisher Scientific	EMC Pro Plus	11/09/2021	11/09/2022
WC059770	Power Supply (AC)	California Instruments	5001IX-CTS	03/30/2018	NCR
WC070508	Software	Keytek	CEWare	NCR	NCR
WC078488	TBD	Extech Instruments	Datalogger 42270	06/14/2021	01/19/2023

**Calibration Abbreviations**

CAL: Calibration

NCR: No Calibration Required



6.0 Test Logs

**EMI Test Log**

Manufacturer:	Pro V&V, Inc.	Project Number:	PR145960/B91114
Model:	1 <sup>st</sup> EUT DS950 UPS Printer	S/N:	DS9521060544 U64185F1N343320 CXXLU2000357
	2 <sup>nd</sup> EUT DS450 Printer UPS		DS4521063682 U64185F1N343092 CXXLU2000319
Customer Representative:	Michael Walker		
Standard Referenced:	VVSG/FCC Part 15 Class B		

FR0105

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
4-11		February 1, 2022 1245	Voltage Dips and Interruptions (Inc./Red. of Nom. Voltage) (4.1.2.5) (Config. #2)		6.0	Pass	TW
4-3	---	February 2, 2022 0800 -	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell. 120 VAC / 60 Hz (4.1.2.10) (Config. #3) UUT had errors at 328.6435 Front side Vertical. See Photo of fix.		---	---	CL
4-3	---	1300 - 1630	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell. 120 VAC / 60 Hz (4.1.2.10) (Config. #2)		3.0	---	CL
---	---	February 3, 2022 0800 - 1300	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell. 120 VAC / 60 Hz (4.1.2.10) (Config. #1)		5.0	Pass	CL
4-11		February 2-4, 2022	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. 120 VAC / 60 Hz (Surge of +/- 15%) (4.1.2.5) (Config. #1)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. 120 VAC / 60 Hz (Surge of +/- 15%) (4.1.2.5) (Config. #1)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. 70% nom, 0.6 cycles / 40% nom, 6 cycles & 1 sec. / 0% nom, 300 cycles. 120 VAC / 60 Hz (4.1.2.5) (Config. #1)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. 120 VAC / 60 Hz (Surge of +/- 15%) (4.1.2.5) (Config. #2)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. 120 VAC / 60 Hz (Surge of +/- 15%) (4.1.2.5) (Config. #2)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. 70% nom, 0.6 cycles / 40% nom, 6 cycles & 1 sec. / 0% nom, 300 cycles. 120 VAC / 60 Hz (4.1.2.5) (Config. #2)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. 120 VAC / 60 Hz (Surge of +/- 15%) (4.1.2.5) (Config. #3)		2.0	Pass	TW
4-11		February 2-4, 2022	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. 120 VAC / 60 Hz (Surge of +/- 15%) (4.1.2.5) (Config. #3)		2.0	Pass	TW

### EMI Test Log

Manufacturer:	Pro V&V, Inc.	Project Number:	PR145960/B91114
Model:	1 <sup>st</sup> EUT DS950 UPS Printer	S/N:	DS9521060544 U64185F1N343320 CXXLU2000357
	2 <sup>nd</sup> EUT DS450 Printer UPS		DS4521063682 U64185F1N343092 CXXLU2000319
Customer Representative:	Michael Walker		
Standard Referenced:	VVSG/FCC Part 15 Class B		

FR0105

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
4-11		February 2-4, 2022	Voltage Dips and Interruptions. 70% nom, 0.6 cycles / 40% nom, 6 cycles & 1 sec. / 0% nom, 300 cycles. 120 VAC / 60 Hz (4.1.2.5) (Config. #3)		2.0	Pass	TW
4-5		February 4, 2022 1000	Surge Immunity (4.1.2.7) (Config. #3) Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) 120 VAC / 60 Hz (4.1.2.7) (Config. #3) 120Vac/60Hz		6.0	Pass	TW
4-5		February 7, 2022 0800	Surge Immunity (4.1.2.7) (Config. #3) Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) 120 VAC / 60 Hz (4.1.2.7) (Config. #1) 120Vac/60Hz		6.0	Pass	TW
4-5		February 8, 2022 0800	Surge Immunity (4.1.2.7) (Config. #3) Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) 120 VAC / 60 Hz (4.1.2.7) (Config. #2) 120Vac/60Hz		6.0	Pass	TW
4-4		February 9, 2022 0800	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV 120/60 VAC Configuration #2		1.0	Pass	TW
4-4		0900	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV 120/60 VAC Configuration #1		05	Pass	TW
4-4		0930	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV 120/60 VAC Configuration #3		05	Pass	TW
4-6		1000	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120/60 VAC Configuration #3		2.0	Pass	TW
4-6		1200	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120/60 VAC Configuration #1		2.0	Pass	TW
4-6		1400	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120/60 VAC Configuration #3		2.0	Pass	TW

### EMI Test Log

Manufacturer:	Pro V&V, Inc.	Project Number:	PR145960/B91114
Model:	1 <sup>st</sup> EUT DS950	S/N:	DS9521060544
	UPS		U64185F1N343320
	Printer		CXXLU2000357
	2 <sup>nd</sup> EUT DS450		DS4521063682
	Printer		U64185F1N343092
	UPS		CXXLU2000319
Customer Representative:	Michael Walker		
Standard Referenced:	VVSG/FCC Part 15 Class B		

FR0105

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
4-8		1530	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120/60 VAC Configuration #3		---	Pass	TW
4-8		1600	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120/60 VAC Configuration #1		---	Pass	TW
		1630	Done for the day				
4-8		February 11, 2022 0900	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120/60 VAC Configuration #2		---	Pass	TW
4-2		1000	Setup and performed ESD pre-test verification prior to testing, bleed-off cable 938k ohms		---	---	---
4-2		1030	Electrostatic Discharge. +/- 8kV Contact, +/-2, 4, 8, 15kV Air. 120Vac/60Hz (4.1.2.8) Configuration #2		---	Pass	TW
4-2		1330	Electrostatic Discharge. +/- 8kV Contact, +/-2, 4, 8, 15kV Air. 120Vac/60Hz (4.1.2.8) Configuration #1		---	Pass	TW



**End of Test Report**