

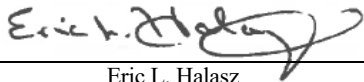
National Technical Systems Test Report for Electromagnetic Interference (EMI) Testing of the Verity Scan with Ballot Box

Prepared For

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Performed By

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Revision History

Rev.	Description	Issue Date
0	Initial Release	04/30/2022
1	ESD Test Log modified and added on Page 40.	05/24/2022

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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 (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 Specification: See Table 5.0-1
- SLI Compliance Purchase Order(s) 20220207-03, dated 02/07/2022
- National Technical Systems (NTS) Quote(s) OP0607062, dated 02/02/2022
- 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

SLI Compliance 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	Serial Number
1	1	Verity Scan with Ballot Box	S2115228806

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	Expanded Uncertainty
Radiated Immunity	V/m	80-10,000 MHz	- 26.3%, + 29.97%
ESD	kV	N/A	± 8.6%
Fast Transients	Voltage	N/A	± 5.98 %
	Timing	N/A	± 8.60 %
Surge	Voltage	N/A	± 4.92 %
RF Common Mode (CDN method)	Vrms	N/A	-12.64 %, +13.33 %
RF Common Mode (BCI method)	Vrms	N/A	-13.45 %, +15.32 %
Voltage Dips	Voltage	N/A	± 2.32 %
	Timing	N/A	± 0.08 mS
Magnetic Immunity	Amps	N/A	± 0.8%



5.0 Test Descriptions and Results

Table 5.0-1: Summary of Test Information & Results

Section	Test	Specification	Test Facility	Test Date	Serial #	Test Result
5.1	Electrostatic Discharge	IEC/EN 61000-4-2	Longmont	04/19/2022 - 04/21/2022	S2115228806	Conforms
5.2	Radiated RF Immunity	IEC/EN 61000-4-3	Longmont	03/24/2022 - 03/28/2022	S2115228806	Conforms
5.3	Electrical Fast Transient / Burst	IEC/EN 61000-4-4	Longmont	03/28/2022	S2115228806	Conforms
5.4	Surge Immunity	IEC/EN 61000-4-5	Longmont	03/25/2022 - 03/28/2022	S2115228806	Conforms
5.5	Conducted RF Immunity	IEC/EN 61000-4-6	Longmont	03/25/2022 - 03/28/2022	S2115228806	Conforms
5.6	Power Frequency H-Field Immunity	IEC/EN 61000-4-8	Longmont	03/28/2022	S2115228806	Conforms
5.7	Voltage Dips and Interruptions	IEC/EN 61000-4-11	Longmont	03/28/2022	S2115228806	Conforms



5.1 Electrostatic Discharge

5.1.1 Test Procedure

IEC/EN 61000-4-2

5.1.2 Test Result

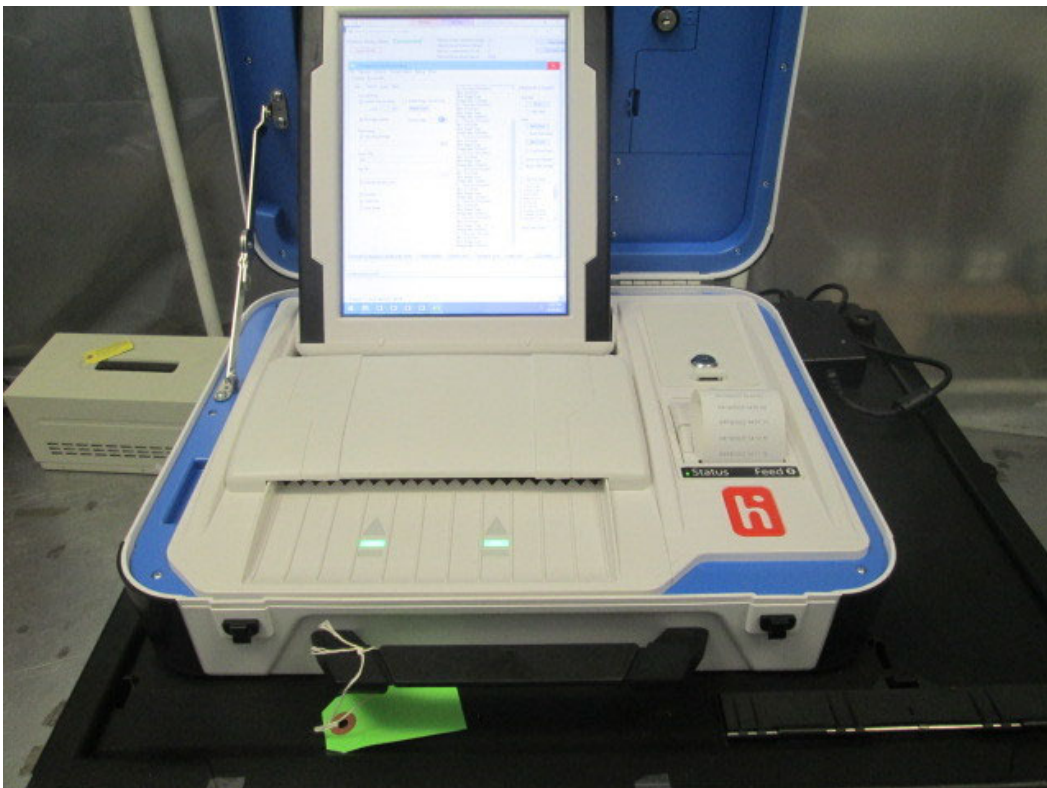
The Verity Scan with Ballot Box met the specification requirements for Electrostatic Discharge.

5.1.3 Test Datasheets

National Technical Systems				
Electrostatic Discharge per IEC / EN 61000-4-2				
Standard Referenced: EAC 2005 VVSG		Date: 4/19/2022		
Temperature: <u>22°C</u>	Humidity: <u>43%</u>	Pressure: <u>829mb</u>		
Input Voltage: <u>120V, 60Hz</u>				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: <u>W Koenig</u>				
Date	Time	Log Entries	Initials	Result
4/19/22	1230 - 1300	Setup for ESD Testing	WK	---
	1300 - 1530	Electrostatic Discharge (4.1.2.8) Electrostatic Discharge. +/- 8kV Contact, +/-2, 4, 8, 15kV Air. 120 VAC / 60 Hz	WK	Pass

National Technical Systems	
Electrostatic Discharge per IEC / EN 61000-4-2	
Standard Referenced: <u>EAC 2005 VVSG</u>	Date: <u>4/19/2022</u>
Temperature: <u>22°C</u> Humidity: <u>43%</u>	Pressure: <u>829mb</u>
Input Voltage: <u>120V, 60Hz</u>	
Configuration of Unit: <u>Verity Scan w/Ballot box fully exercising all features of product.</u>	
Test Engineer: <u>W Koenig</u>	

Test Location	Voltage Level	Polarity		Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass/Fail
	(kV)	+	-					
Indirect Discharge Points								
VCP	8	X	X	20/20	1	Front Side	A	Pass
VCP	8	X	X	20/20	1	Left Side	A	Pass
VCP	8	X	X	20/20	1	Right Side	A	Pass
VCP	8	X	X	20/20	1	Back Side	A	Pass
HCP		X	X	10	1	Edge of HCP at Front of UUT	N/A	N/A
Contact Discharge Points - RED Arrows.								
Figure 2.	8	X	X	10	1	ND	-	-
Figure 3	8	X	X	10	1	ND	-	-
Figure 4.	8	X	X	10	1	ND	-	-
Figure 5.	8	X	X	10	1	ND	-	-
Photo 6.	8	X	X	10	1	ND	-	-
Air Discharge Points - BLUE Arrows.								
Figure 2.	2, 4, 8, 15	X	X	10	1	ND	-	-
Figure 3	2, 4, 8, 15	X	X	10	1	ND	-	-
Figure 4.	2, 4, 8, 15	X	X	10	1	Right Side	A	Pass
Figure 5.	2, 4, 8, 15	X	X	10	1	ND	-	-
Figure 6.	2, 4, 8, 15	X	X	10	1	Power Brick	A	Pass
ND: No Discharge points found								

5.1.4 Test Photographs**Electrostatic Discharge Test Setup****Electrostatic Discharge Figure 2**



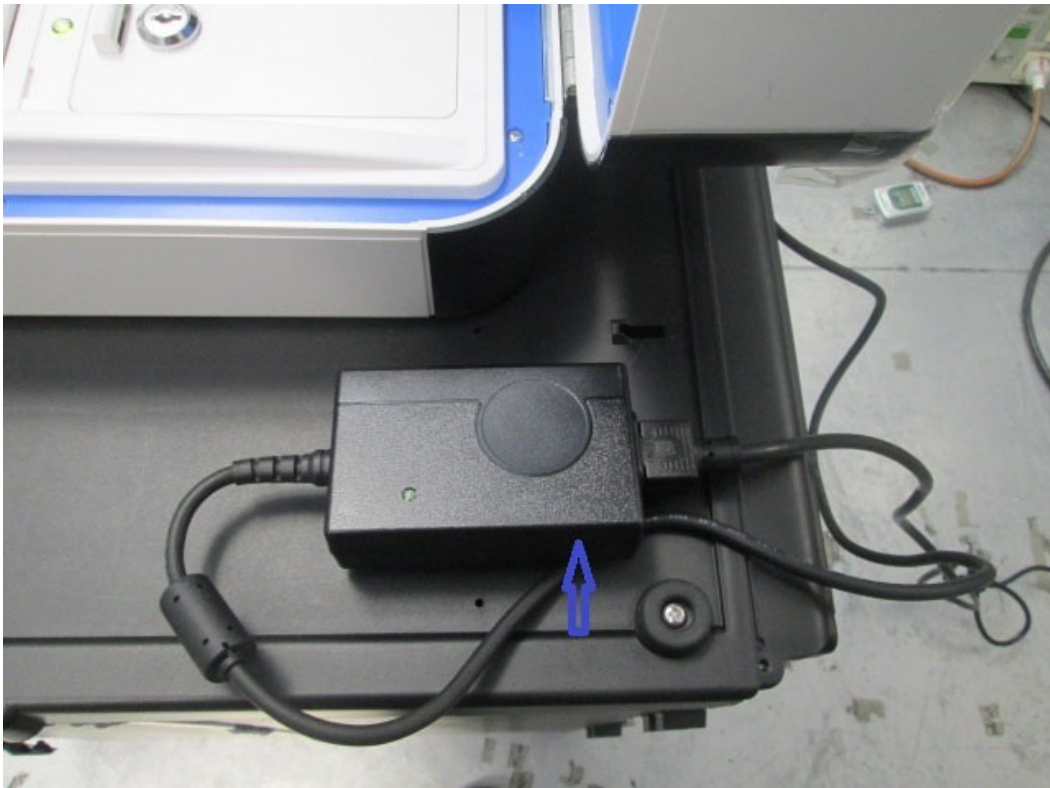
Electrostatic Discharge Figure 3



Electrostatic Discharge Figure 4



Electrostatic Discharge Figure 5



Electrostatic Discharge Figure 6



5.1.5 Test Equipment List

Table 5.1-1: Electrostatic Discharge Test Equipment List

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059917	Ground Plane (Fixed)	National Technical Systems	GP #1	NCR	NCR
WC059669	Meter (Digital Multimeter)	Fluke	83-3	09/23/2021	09/23/2022
WC059688	Gun (ESD Simulator)	EMC-Partner	ESD3000DN1	04/06/2022	04/06/2023
WC078488	TBD	Extech Instruments	Datalogger 42270	06/14/2021	01/19/2023

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.2 Radiated RF Immunity

5.2.1 Test Procedure

IEC/EN 61000-4-3

5.2.2 Test Result

The Verity Scan with Ballot Box met the specification requirements for Radiated RF Immunity.

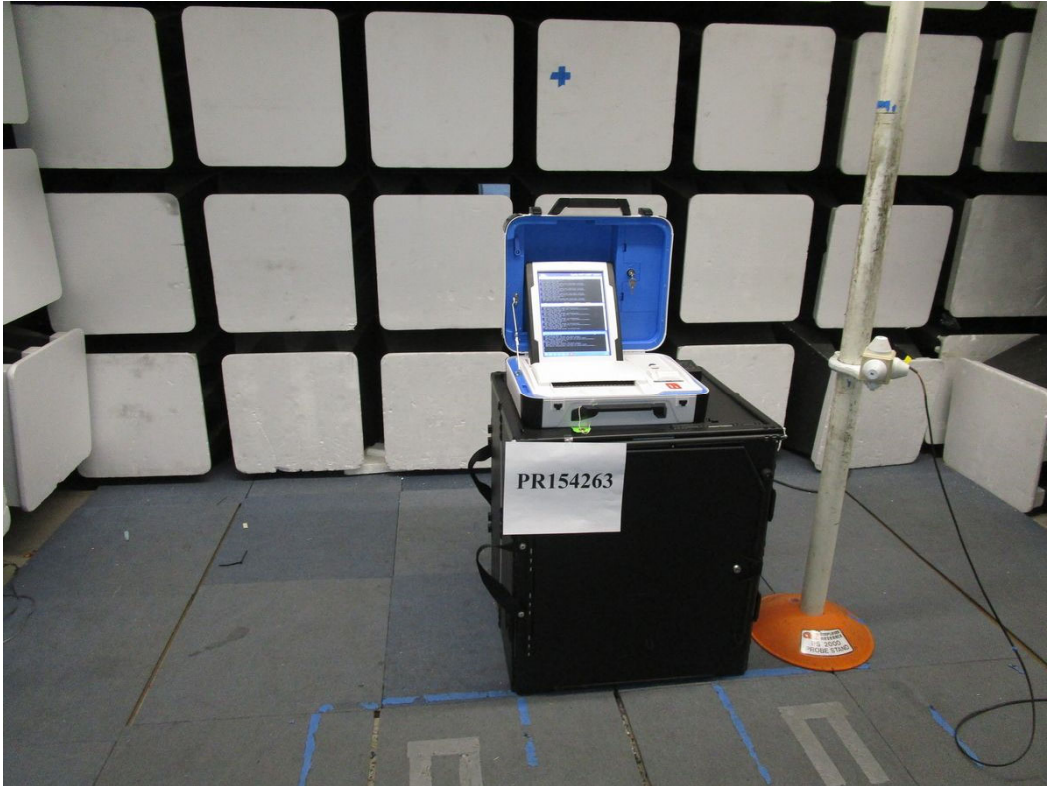
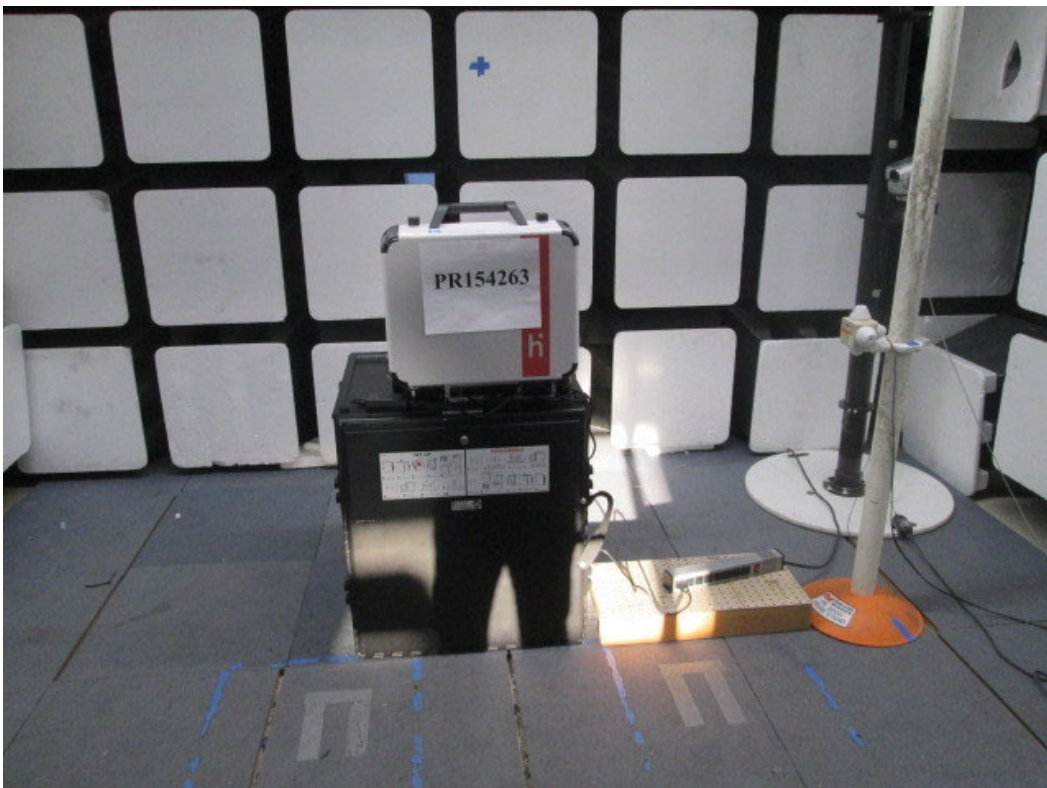
5.2.3 Test Datasheets

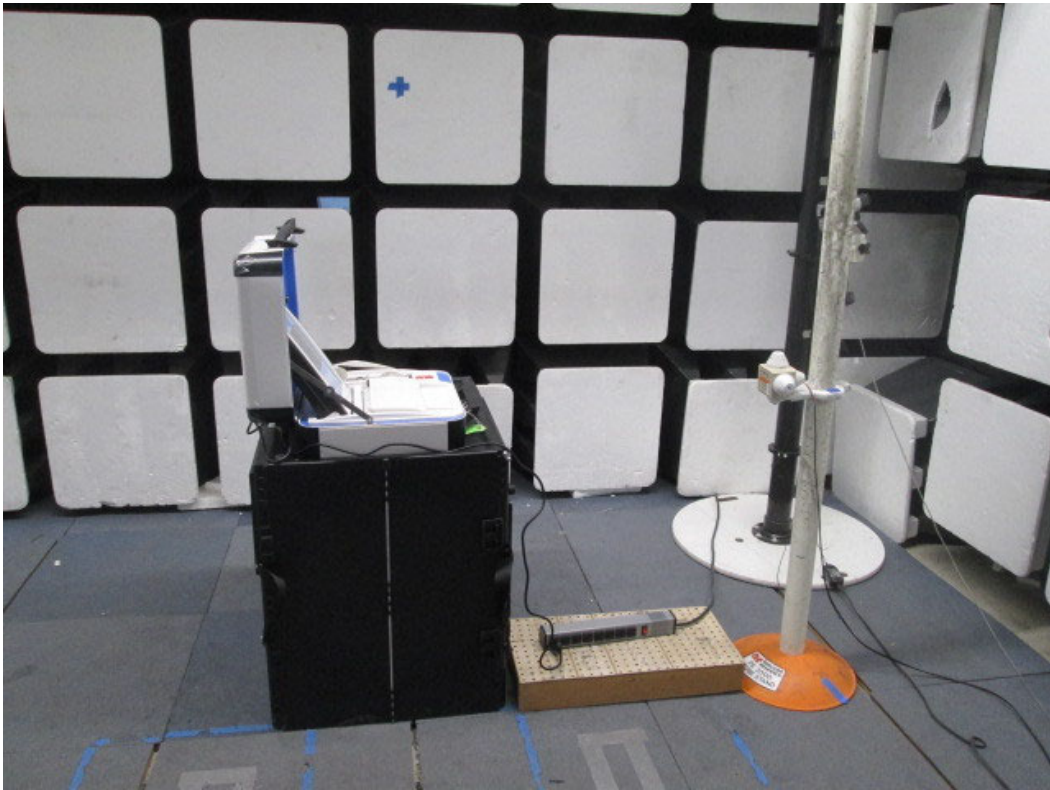
National Technical Systems				
Radiated RF Immunity per IEC / EN 61000-4-3				
Standard Referenced: EN 61000-4-3		Date: 3/23/2022		
Temperature: 20°C	Humidity: 13%	Pressure: 837 mb		
Input Voltage: 230V, 50Hz				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: T. Wittig / W. Koenig				
Date	Time	Log Entries	Initials	Result
3/23/22	1200 - 1530	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz (4.1.2.10) Stopped for the day at H-Pole back side.	CL	---
3/24/22	0800 - 0930	Continuing Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz (4.1.2.10) Testing completed.	TW / WK	Pass



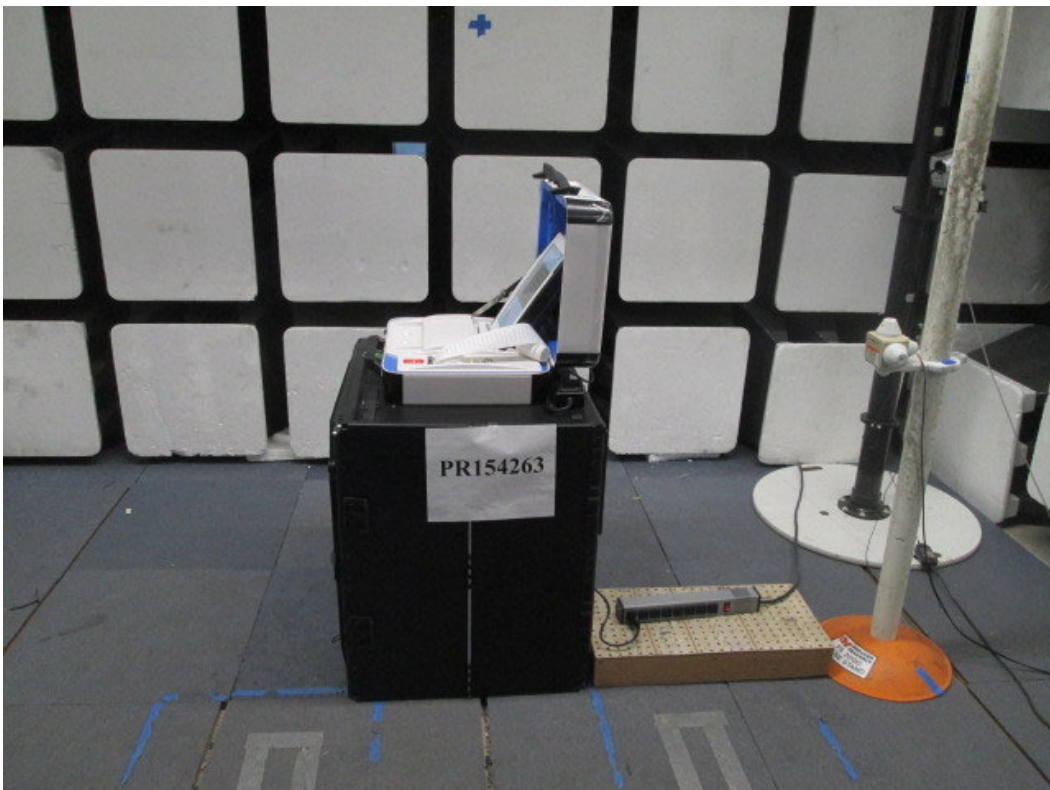
National Technical Systems	
Radiated RF Immunity per IEC / EN 61000-4-3	
Standard Referenced:	EN 61000-4-3
Date:	3/23/2022
Temperature:	20°C
Humidity:	13%
Pressure:	837 mb
Input Voltage:	230V, 50Hz
Configuration of Verity Scan w/Ballot box fully exercising all features of Unit: product.	
Test Engineer: T. Wittig / W. Koenig	

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

5.2.4 Test Photographs**Radiated RF Immunity Front****Radiated RF Immunity Back**



Radiated RF Immunity Left



Radiated RF Immunity Right



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
WC059669	Meter (Digital Multimeter)	Fluke	83-3	09/23/2021	09/23/2022
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
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 Verity Scan with Ballot Box met the specification requirements for Electrical Fast Transient/Burst.

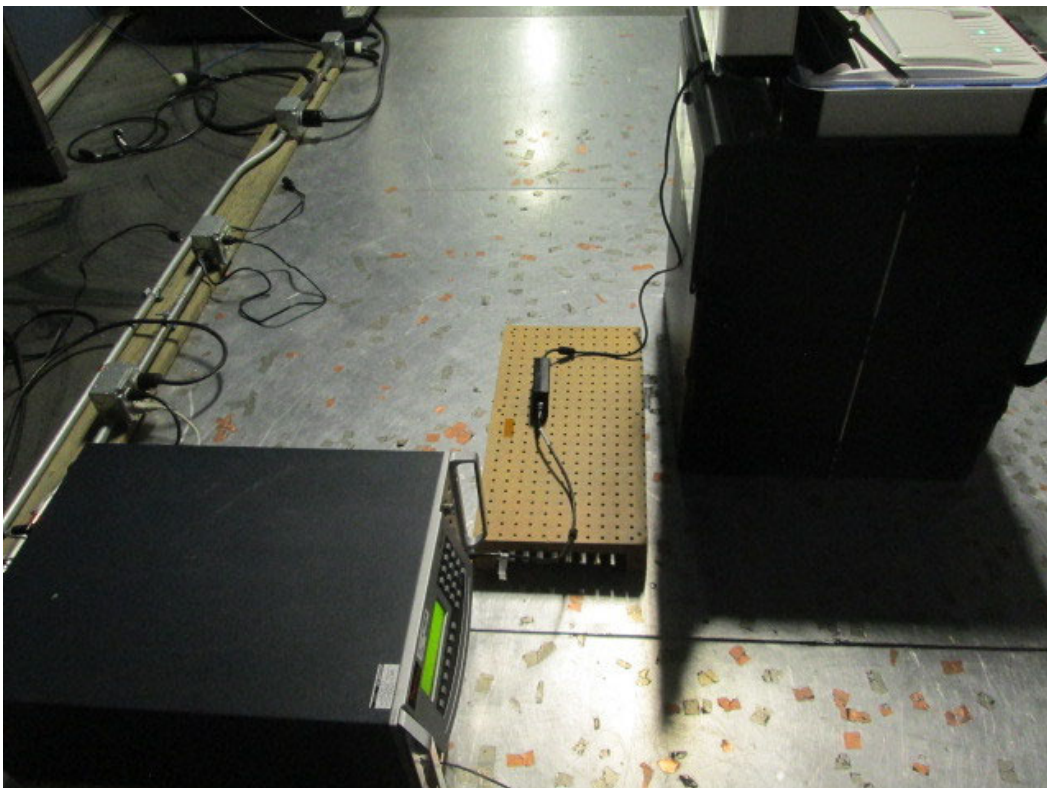
5.3.3 Test Datasheets

National Technical Systems				
Electrical Fast Transient/Burst per IEC / EN 61000-4-4				
Standard Referenced: EN 61000-4-4		Date: 3/28/2022		
Temperature: 21°C		Humidity: 24%		Pressure: 831 mb
Input Voltage: 230V, 50Hz				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: T.Wittig / W.Koenig				
Date	Time	Log Entries	Initials	Result
3/28/22	0800 - 0830	Setup for Electrical Fast Transient / Burst	TW / WK	---
	0830 - 0930	Electrical Fast Transient / Burst. Mains: +/- 2kV, I/O: +/- 1kV. One AC main, No I/O 120 VAC / 60 Hz	TW / WK	Pass



National Technical Systems	
Electrical Fast Transient/Burst per IEC / EN 61000-4-4	
Standard Referenced: EN 61000-4-4	Date: 3/28/2022
Temperature: 21°C Humidity: 24%	Pressure: 831 mb
Input Voltage: 230V, 50Hz	
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.	
Test Engineer: T.Wittig / W.Koenig	

Voltage (kV)	Polarity +/-	Time (sec)	Injection Type	L1	L2	L3	N	PE	Rep Freq.	Comments	Criteria Met	Pass/Fail
1.0	±	60	CDN	X					5kHz	AC	A	Pass
1.0	±	60	CDN		X				5kHz	AC	A	Pass
1.0	±	60	CDN					X	5kHz	AC	A	Pass
1.0	±	60	CDN		X	X		X	5kHz	AC	A	Pass

5.3.4 Test Photographs**Electrical Fast Transient/Burst Test Setup****Electrical Fast Transient/Burst Test Setup**



5.3.5 Test Equipment List

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

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059917	Ground Plane (Fixed)	National Technical Systems	GP #1	NCR	NCR
WC059439	Meter (Digital Multimeter)	Fluke	85	07/30/2021	07/30/2022
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
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

5.4 Surge Immunity

5.4.1 Test Procedure

IEC/EN 61000-4-5

5.4.2 Test Result

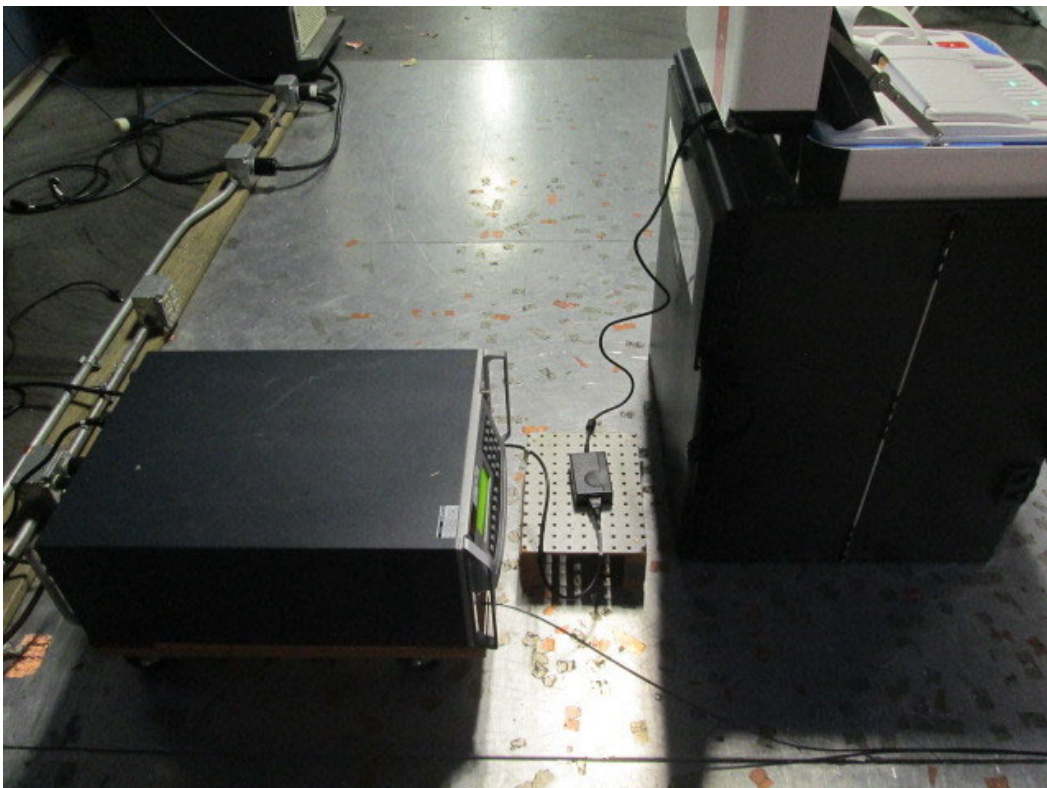
The Verity Scan with Ballot Box met the specification requirements for Surge Immunity.

5.4.3 Test Datasheets

National Technical Systems				
Surge Immunity per IEC / EN 61000-4-5				
Standard Referenced: EN 61000-4-5		Date: 3/25/2022		
Temperature: <u>21°C</u> Humidity: <u>18%</u>		Pressure: <u>843mb</u>		
Input Voltage: <u>230V, 50Hz</u>				
Configuration of Unit: <u>Verity Scan w/Ballot box fully exercising all features of product.</u>				
Test Engineer: <u>T. Wittig / W.Koenig</u>				
Date	Time	Log Entries	Initials	Result
3/25/22	0930 - 0945	Setup for Surge Immunity	TW / WK	---
	0945 - 1515	Surge Immunity. Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) One AC main 120 VAC / 60 Hz	TW / WK	Pass

National Technical Systems	
Surge Immunity per IEC / EN 61000-4-5	
Standard Referenced: EN 61000-4-5	Date: 3/25/2022
Temperature: 21°C Humidity: 18%	Pressure: 843mb
Input Voltage: 230V, 50Hz	
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.	
Test Engineer: T. Wittig / W.Koenig	

Voltage (kV)	Polarity +/-	L1	L2	L3	N	PE	Phase (deg)	Number of Pulses	Delay (sec)	Comments	Criteria Met	Pass/Fail
0.5	±	X			X		0	5	30	Differential Mode	A	Pass
0.5	±	X			X		90	5	30		A	Pass
0.5	±	X			X		180	5	30		A	Pass
0.5	±	X			X		270	5	30		A	Pass
0.5	±	X				X	0	5	45	Common Mode Line	A	Pass
0.5	±	X				X	90	5	45		A	Pass
0.5	±	X				X	180	5	45		A	Pass
0.5	±	X				X	270	5	45		A	Pass
0.5	±				X	X	0	5	45	Common Mode Neutral	A	Pass
0.5	±				X	X	90	5	45		A	Pass
0.5	±				X	X	180	5	45		A	Pass
0.5	±				X	X	270	5	45		A	Pass
1.0	±	X				X	0	5	60	Differential Mode	A	Pass
1.0	±	X				X	90	5	60		A	Pass
1.0	±	X				X	180	5	60		A	Pass
1.0	±	X				X	270	5	60		A	Pass
1.0	±	X				X	0	5	60	Common Mode Line	A	Pass
1.0	±	X				X	90	5	60		A	Pass
1.0	±	X				X	180	5	60		A	Pass
1.0	±	X				X	270	5	60		A	Pass
1.0	±				X	X	0	5	60	Common Mode Neutral	A	Pass
1.0	±				X	X	90	5	60		A	Pass
1.0	±				X	X	180	5	60		A	Pass
1.0	±				X	X	270	5	60		A	Pass
2.0	±	X			X		0	5	60	Differential Mode	A	Pass
2.0	±	X			X		90	5	60		A	Pass
2.0	±	X			X		180	5	60		A	Pass
2.0	±	X			X		270	5	60		A	Pass
2.0	±				X	X	0	5	60	Common Mode Line	A	Pass
2.0	±				X	X	90	5	60		A	Pass
2.0	±				X	X	180	5	60		A	Pass
2.0	±				X	X	270	5	60		A	Pass
2.0	±				X	X	0	5	60		A	Pass

5.4.4 Test Photographs**Surge Immunity Test Setup****Surge Immunity Test Setup**



5.4.5 Test Equipment List

Table 5.4-1: Surge Immunity Test Equipment List

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059917	Ground Plane (Fixed)	National Technical Systems	GP #1	NCR	NCR
WC059439	Meter (Digital Multimeter)	Fluke	85	07/30/2021	07/30/2022
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
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

5.5 Conducted RF Immunity

5.5.1 Test Procedure

IEC/EN 61000-4-6

5.5.2 Test Result

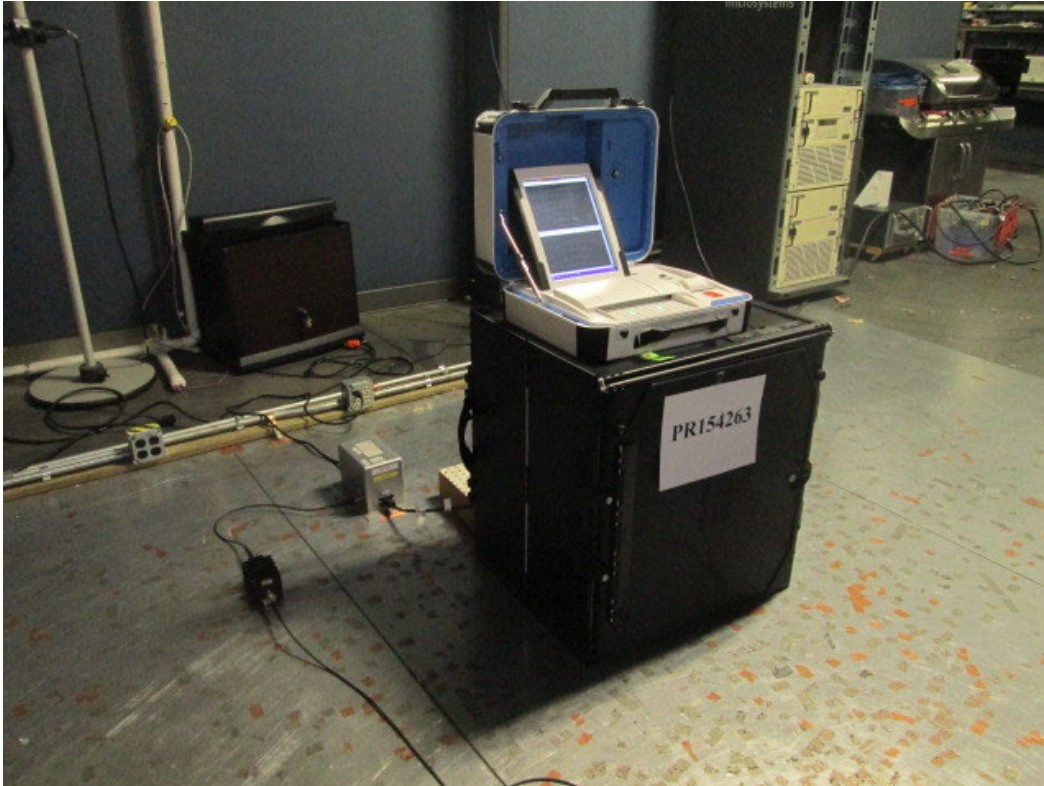
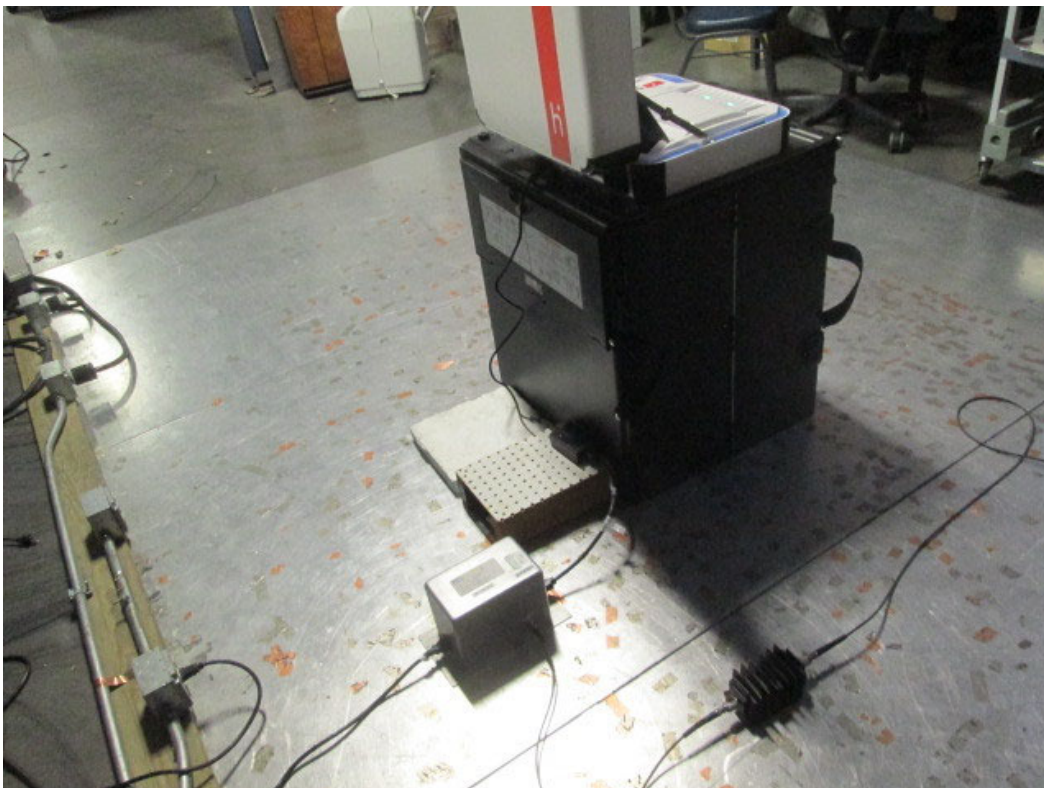
The Verity Scan with Ballot Box met the specification requirements for Conducted RF Immunity.

5.5.3 Test Datasheets

National Technical Systems				
Conducted RF Immunity per IEC / EN 61000-4-6				
Standard Referenced: EN 61000-4-6		Date: 3/25/2022		
Temperature: 21°C	Humidity: 18%	Pressure: 843mb		
Input Voltage: 230V, 50Hz				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: T.Wittig / W.Koenig				
Date	Time	Log Entries	Initials	Result
3/25/22	0800 - 0815	Setup for Conducted Immunity	TW / WK	---
	0815 - 0930	Conducted RF Immunity. 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell. One AC main, No I/O 120 VAC / 60 Hz	TW / WK	Pass

National Technical Systems				
Conducted RF Immunity per IEC / EN 61000-4-6				
Standard Referenced: EN 61000-4-6		Date: 3/25/2022		
Temperature: 21°C	Humidity: 18%	Pressure: 843mb		
Input Voltage: 230V, 50Hz				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: T.Wittig / W.Koenig				

Frequency (MHz)	Modulation			Level (V/m)	Dwell (sec)	Comments	Criteria Met	Pass/Fail
	Type	%	Freq					
0.150 - 80.0	AM	80	1KHz	10	3	AC using M3 CDN	A	Pass

5.5.4 Test Photographs**Conducted RF Immunity Test Setup****Conducted RF Immunity Test Setup**



5.5.5 Test Equipment List

Table 5.5-1: Conducted RF Immunity Test Equipment List

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059917	Ground Plane (Fixed)	National Technical Systems	GP #1	NCR	NCR
WC059591	Generator (Signal)	IFR	2023A	05/06/2021	05/06/2022
WC059693	Analyzer (Spectrum)	Rigol Technologies	DSA815	10/04/2021	10/04/2022
WC059695	Attenuator (Coaxial)	Aeroflex/Weinschel	40-6-34	02/03/2022	02/03/2023
WC059698	Network (Coupling/Decoupling)	EMC Integrity	EMCI-CDN M3-16	04/06/2022	02/03/2023
WC059764	Amplifier (Pre/RF/Low Noise)	Amplifier Research	75A250A	04/22/2014	NCR
WC078470	Software	ETS-Lindgren	C47213	NCR	NCR
WC078488	TBD	Extech Instruments	Datalogger 42270	06/14/2021	01/19/2023

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.6 Power Frequency H-Field Immunity

5.6.1 Test Procedure

IEC/EN 61000-4-8

5.6.2 Test Result

The Verity Scan with Ballot Box met the specification requirements for Power Frequency H-Field Immunity.

5.6.3 Test Datasheets

National Technical Systems				
Power Frequency H-field Immunity per IEC / EN 61000-4-8				
Standard Referenced: EN 61000-4-8		Date: 3/28/2022		
Temperature: 20°C		Humidity: 14%	Pressure: 831mb	
Input Voltage: 230V, 50Hz				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: .Koenig / T.Wittig				
Date	Time	Log Entries	Initials	Result
3/28/22	0930 - 0945	Setup for Power Frequency H-Field Immunity	---	WK /TW
	0945 - 1045	Power Frequency H-Field Immunity. 30A/m, 50 / 60 Hz, 3 axes. 120 VAC / 60 Hz	Pass	WK /TW



National Technical Systems	
Power Frequency H-field Immunity per IEC / EN 61000-4-8	
Standard Referenced: EN 61000-4-8	Date: 3/28/2022
Temperature: <u>20°C</u> Humidity: <u>14%</u>	Pressure: <u>831mb</u>
Input Voltage: <u>230V, 50Hz</u>	
Configuration of Unit: <u>Verity Scan w/Ballot box fully exercising all features of product.</u>	
Test Engineer: <u>.Koenig / T.Wittig</u>	

Frequency (Hz)		Field Strength	EUT Location	Dwell Time	Comments	Criteria Met	Pass/Fail
50	60	(A/m)	(Axis)	(sec)			
X		1	X	60		A	Pass
	X	1	X	60		A	Pass
X		1	Y	60		A	Pass
	X	1	Y	60		A	Pass
X		1	Z	60		A	Pass
	X	1	Z	60		A	Pass

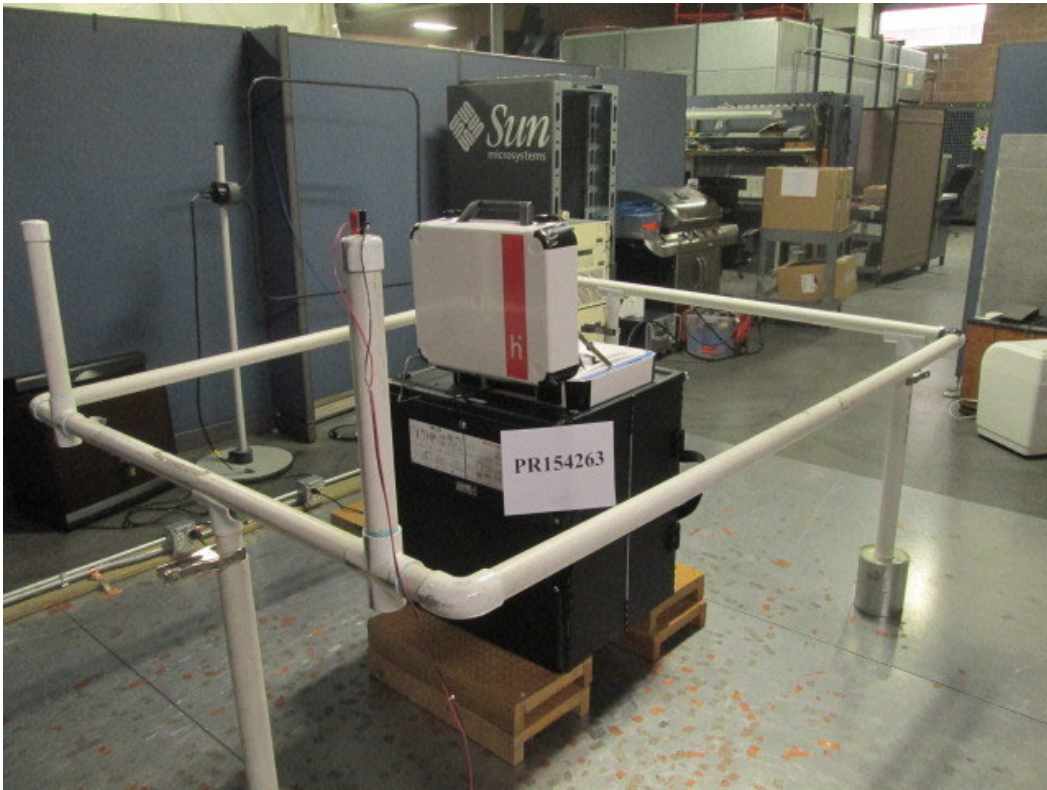
5.6.4 Test Photographs



Power Frequency H-Field Immunity Test Setup



Power Frequency H-Field Immunity Test Setup



Power Frequency H-Field Immunity Test Setup



5.6.5 Test Equipment List

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

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059917	Ground Plane (Fixed)	National Technical Systems	GP #1	NCR	NCR
WC059669	Meter (Digital Multimeter)	Fluke	83-3	09/23/2021	09/23/2022
WC059675	Power Supply (AC)	California Instruments	5001IX208-150/300	07/08/2021	07/08/2022
WC059683	Oscilloscope (Digital)	Tektronix	TDS2002B	07/02/2021	07/02/2022
WC070286	Antenna (Loop)	EMC Integrity	EMCI-4-8-2m-1.5m	12/13/2018	NCR

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.7 Voltage Dips and Interruptions

5.7.1 Test Procedure

IEC/EN 61000-4-11

5.7.2 Test Result

The Verity Scan with Ballot Box met the specification requirements for Voltage Dips and Interruptions.

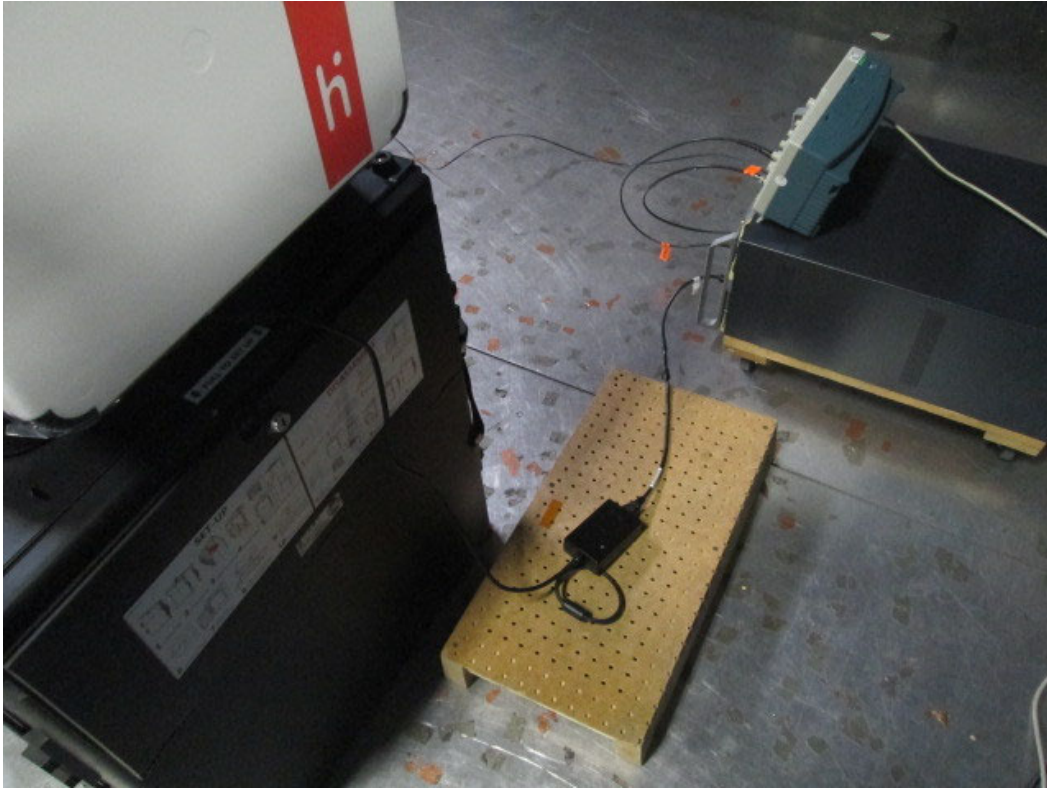
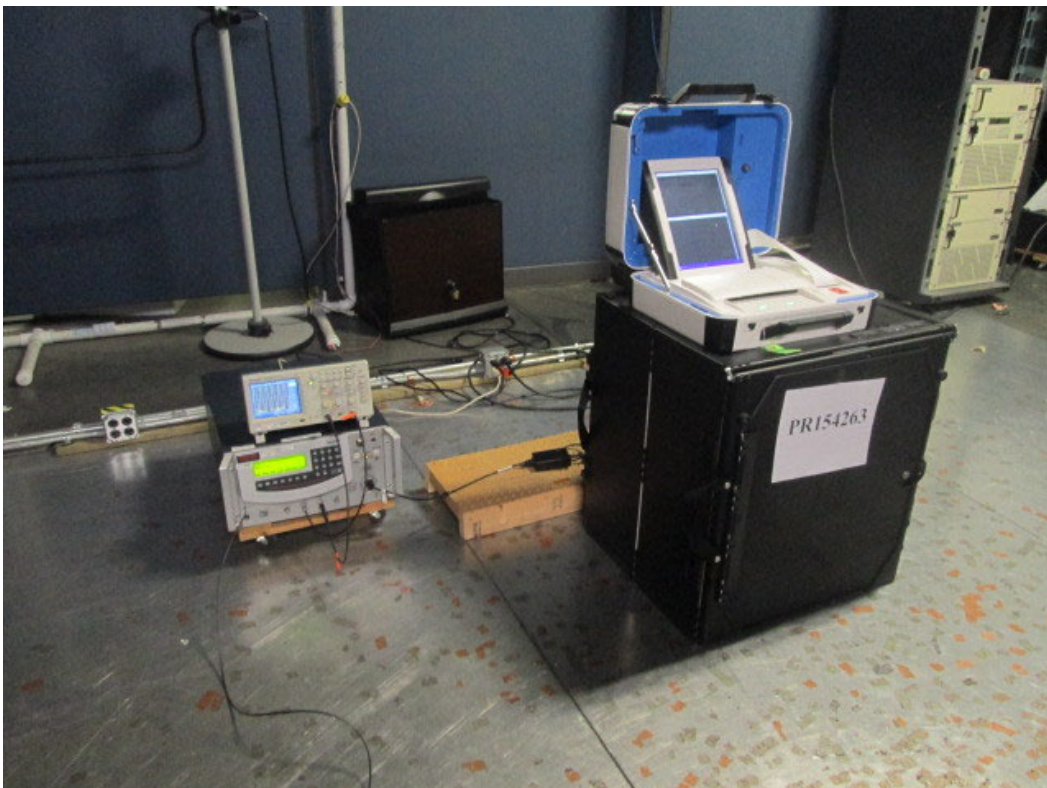
5.7.3 Test Datasheets

National Technical Systems				
Voltage Dips and Interrupts per IEC / EN 61000-4-11				
Standard Referenced: EN 61000-4-11		Date: 3/24/2022		
Temperature: _____ °C		Humidity: % _____	Pressure: mb _____	
Input Voltage: 230V, 50Hz				
Configuration of Unit: Verity Scan w/Ballot box fully exercising all features of product.				
Test Engineer: W.Koenig / T.Wittig				
Date	Time	Log Entries	Initials	Result
24-Mar-22	1000 - 1015	Setup for Voltage dips and Interruptions	TW / WK	---
	1015 - 1115	Voltage Dips and Interruptions. 70% nom, 0.6 cycles / 40% nom, 6 cycles & 1 sec. / 0% nom, 300 cycles. One AC main 120 VAC / 60 Hz	TW / WK	Pass



National Technical Systems	
Voltage Dips and Interrupts per IEC / EN 61000-4-11	
Standard Referenced: EN 61000-4-11	Date: 3/24/2022
Temperature: _____ °C Humidity: _____ %	Pressure: _____ mb
Input Voltage: 230V, 50Hz	
Configuration of Verity Scan w/Ballot box fully exercising all features of Unit: product.	
Test Engineer: W.Koenig / T.Wittig	

% Nominal	No. of Cyc	Phase Angle (deg)				Time between dropouts (sec)	Number of tests	Comments	Criteria	Pass / Fail
		0	90	180	270				Met	
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%	0.6				x	10	3		A	Pass
40%	6	x				10	3		A	Pass
40%	6		x			10	3		A	Pass
40%	6			x		10	3		A	Pass
40%	6				x	10	3		A	Pass
40%	60	x				10	3		A	Pass

5.7.4 Test Photographs**Voltage Dips and Interruptions - AC Mains****Voltage Dips and Interruptions - Test Setup**



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
WC059917	Ground Plane (Fixed)	National Technical Systems	GP #1	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
WC059684	Generator (Spike/Transient)	Thermo Fisher Scientific	EMC Pro Plus - USA	11/11/2021	11/11/2022
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:	SLI Compliance	Project Number:	PR154263/ B90817
Model:	Verity Scan w/Ballot box	S/N:	S2115228806
Customer Representative:	Darrick Forester		
Standard Referenced:	VVSG1.0 IEC 61000		

FR0105

Ground Planes / CALC

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
4-3	---	March 23, 2022 1200 - 1530	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz (4.1.2.10)		3.5	---	CL
			Start on H-pol back side.				
4-3	---	March 24, 2022 0800 - 0930	Continuing Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz (4.1.2.10) Continue H- pol back side. Finish with H-pol left side.		1.5	Pass	WK/TW
4-11	---	1000 – 1200	Voltage Dips and Interruptions. Electric power increases of 7.5% and reductions of 12.5% of nominal specified power. One AC main 120 VAC / 60 Hz (Inc./Red. of Nom. Voltage)		2.0	Pass	WK/TW
4-11	---	1300 - 1400	Voltage Dips and Interruptions. Surge of +/- 15% line variation of nominal line voltage. One AC main 120 VAC / 60 Hz (Surge of +/- 15%)		1.0	Pass	WK/TW
4-11	---	1430 - 1500	Voltage Dips and Interruptions. 70% nom, 0.6 cycles / 40% nom, 6 cycles & 1 sec. / 0% nom, 300 cycles. One AC main 120 VAC / 60 Hz		0.5	Pass	WK/TW
4-6		March 25, 2022 0800 - 0815	Setup for Conducted Immunity		0.25	---	WK
4-6		0815 - 0930	Conducted RF Immunity. 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell. One AC main, No I/O 120 VAC / 60 Hz		1.25	Pass	WK
4-5		0930 - 0945	Setup for Surge Immunity		.25	---	WK



EMI Test Log

Manufacturer:	<u>SLI Compliance</u>	Project Number:	<u>PR154263/ B90817</u>
Model:	<u>Verity Scan w/Ballot box</u>	S/N:	<u>S2115228806</u>
Customer Representative:	<u>Darrick Forester</u>		
Standard Referenced:	<u>VVSG1.0 IEC 61000</u>		

FR0105

Ground Planes / CALC

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
4-5		0945 - 1515	Surge Immunity. Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) One AC main 120 VAC / 60 Hz		5.5	Pass	WK
4-4		March 28, 2022 0800 - 0830	Setup for Electrical Fast Transient / Burst		0.5	---	WK
4-4		0830 - 0930	Electrical Fast Transient / Burst. Mains: +/- 2kV, I/O: +/- 1kV. One AC main, No I/O 120 VAC / 60 Hz		1.0	Pass	WK
		0930 - 0945	Setup for Power Frequency H-Field Immunity		.25	---	WK
4-8		0945 - 1045	Power Frequency H-Field Immunity. 30A/m, 50 / 60 Hz, 3 axes. 120 VAC / 60 Hz		1.0	Pass	WK
4-2		April 19, 2022 1230-1300	Setup for ESD Test		0.5	---	WK
		1300-1530	Electrostatic Discharge (4.1.2.8) Electrostatic Discharge +/-8kV Contact, +/-2, 4, 8, 15kV Air. 120 VAC / 60 Hz		2.5	Pass	WK

End of Test Report