

National Technical Systems Test Report for Electromagnetic Interference (EMI) Testing of the Verity Touch Writer

Prepared For

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Revision History

Rev.	Description	Issue Date
0	ITR-PR104676	10/29/2019
1	Corrected configuration of unit for all tests to "Units powered up and running with all functions exercised I/O and ports being exercised"; corrected referenced standards throughout to include "Per VVSG 1.0: IEC 61000" and appropriate section; corrected company name in Section 6.0.	10/31/2019

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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.

- SLI Compliance Purchase Order(s) 20190820-02, dated 08/20/2019
- National Technical Systems (NTS) Quote(s) OP0528220, dated 08/15/2019
- NTS Corporate Quality Policy Manual, Revision 9, dated 9/20/2018
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/1/2017
- Test Specification: See Table 5.0-1.

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	Part Number	Serial Number
1	1	Verity Touch Writer	3005852	W1902352406

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

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.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
Conducted Emissions	dBuV or dBuA	150 kHz – 30 MHz	± 2.8 dB
Radiated Electric Field	dBuV/m	30-1,000 MHz	± 4.2 dB
		1,000-6,000 MHz	± 4.2 dB
Radiated Immunity	V/m	80-2,700 MHz	- 26.3%, + 29.97%
ESD	kV	N/A	± 8.6%
EFT	Voltage	N/A	± 5.98%
	Timing	N/A	± 8.60%
Surge	Voltage	N/A	± 4.92%
RF Common Mode (CDN Method)	V _{rms}	N/A	-12.64%, +13.33%
RF Common Mode (BCI Method)	V _{rms}	N/A	-13.45%, +15.32%

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	VVSG 1.0: IEC 61000-4-2	Longmont	09/26/2019	3005852	W1902352406	Complies
5.2	Radiated RF Immunity	VVSG 1.0: IEC 61000-4-3	Longmont	09/23/2019	3005852	W1902352406	Complies
5.3	Electrical Fast Transient / Burst	VVSG 1.0: IEC 61000-4-4	Longmont	09/24/2019	3005852	W1902352406	Complies
5.4	Surge Immunity	VVSG 1.0: IEC 61000-4-5	Longmont	09/25/2019	3005852	W1902352406	Complies
5.5	Conducted RF Immunity	VVSG 1.0: IEC 61000-4-6	Longmont	09/24/2019	3005852	W1902352406	Complies
5.6	Power Frequency H-Field Immunity	VVSG 1.0: IEC 61000-4-8	Longmont	09/26/2019	3005852	W1902352406	Complies
5.7	Voltage Dips and Interruptions	VVSG 1.0: IEC 61000-4-11	Longmont	09/24/2019	3005852	W1902352406	Complies



5.1 Electrostatic Discharge

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-2	Date:	September 26, 2019
Temperature:	23.3°C	Humidity:	36%
Input Voltage:	120 VAC / 60 Hz	Pressure:	836 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

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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	8	x	x	10	1	Edge of HCP at Front of UUT	N/A	N/A
Contact Discharge Points - RED Arrows.								
Figure A2	8	x	x	10	1	No discharge points found.	--	---
Figure A3	8	x	x	10	1		--	---
Figure A4	8	x	x	10	1		A	Pass
Figure A5	8	x	x	10	1		A	Pass
Figure A6	8	x	x	10	1		---	---
Figure A7	8	x	x	10	1		A	Pass
Figure A8	8	x	x	10	1		---	---
Air Discharge Points - BLUE Arrows.								
Figure A2	15	x	x	10	1		A	Pass
Figure A3	15	x	x	10	1		A	Pass
Figure A4	15	x	x	10	1	-15kV at Power button took windows out. Windows got blue screen. Client re-booted. Did not repeat.	A	Pass
Figure A5	15	x	x	10	1	No discharge found.	---	---
Figure A6	15	x	x	10	1	No discharge found.	---	---
Figure A7	15	x	x	10	1		---	---
Figure A8	15	x	x	10	1		A	Pass

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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Figure A1. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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Figure A2. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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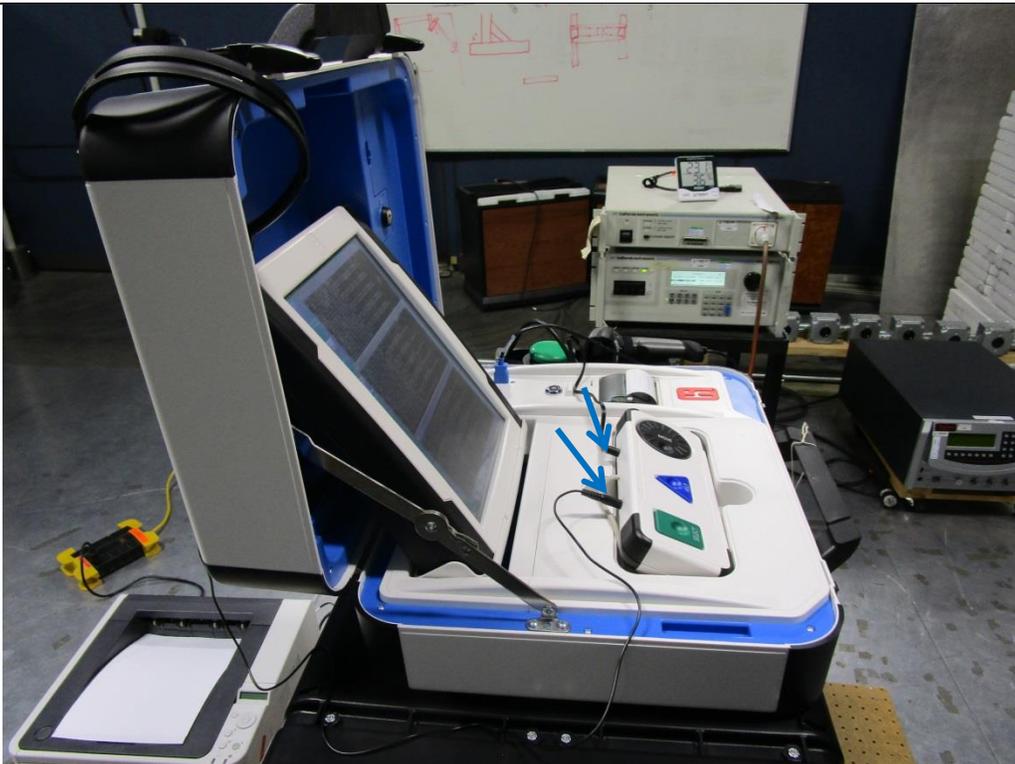


Figure A3. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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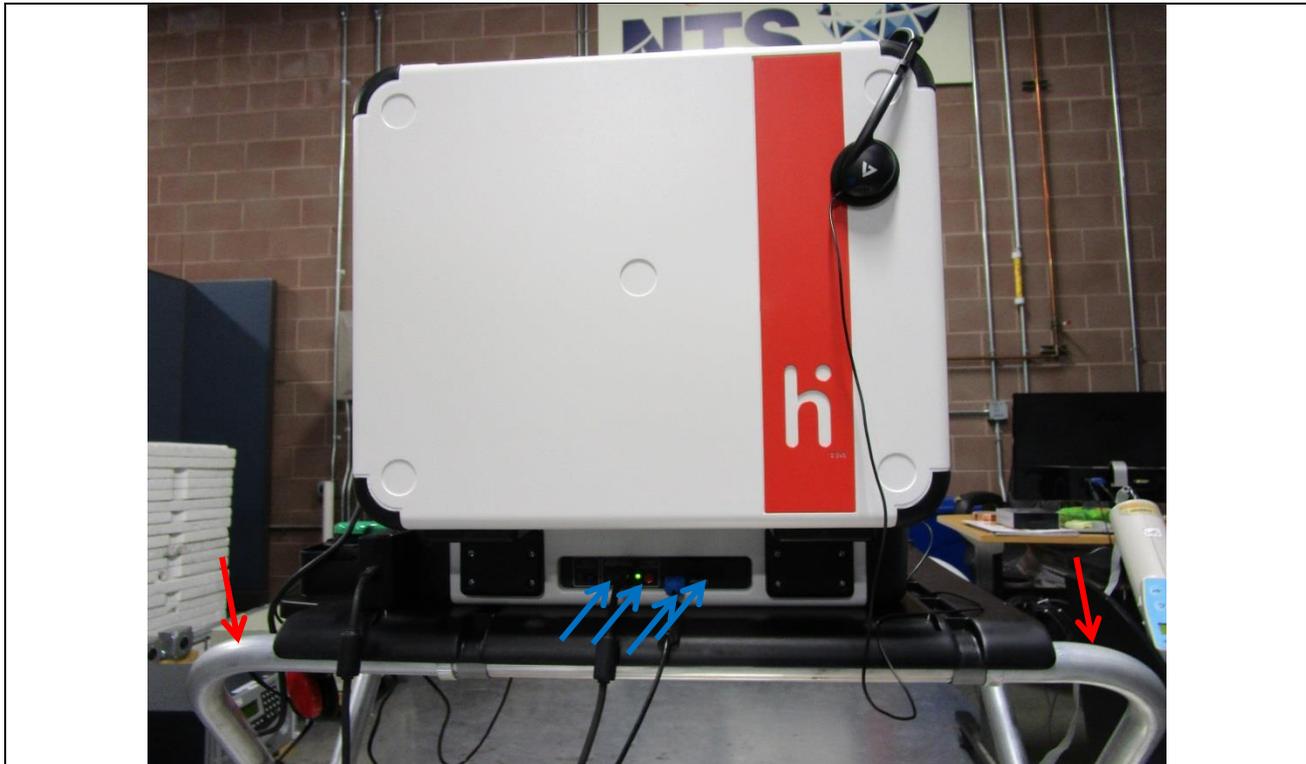


Figure A4. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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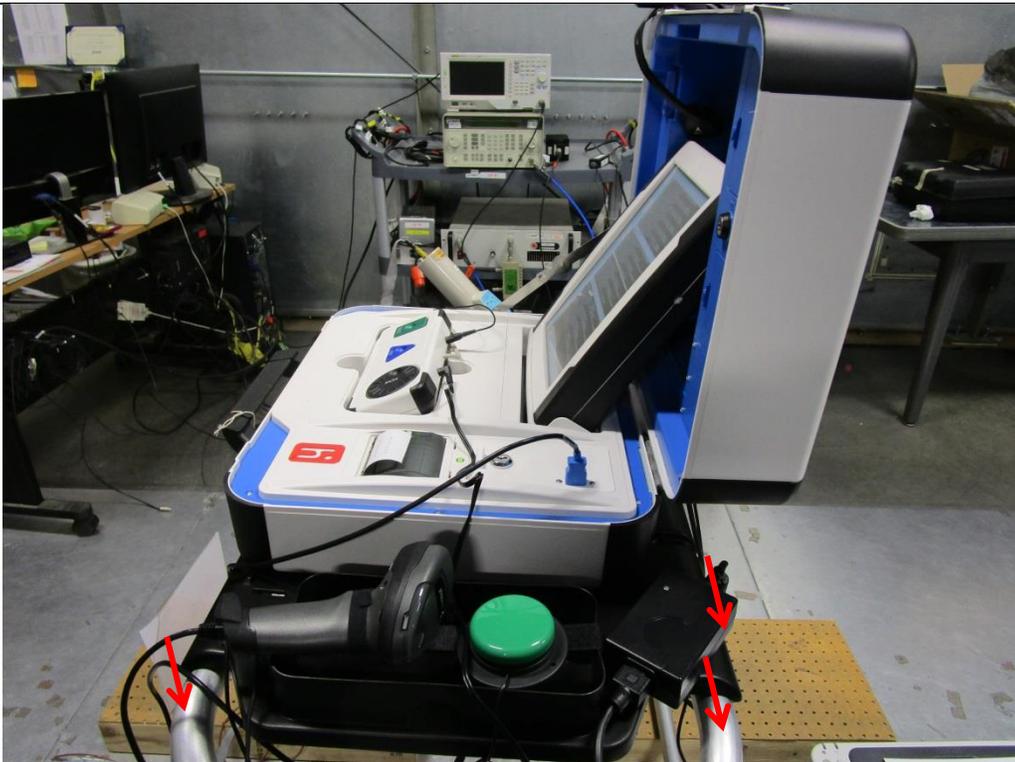


Figure A5. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0

Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Date: September 26, 2019

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Figure A6. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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Figure A7. Electrostatic Discharge Test Setup.

Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-2

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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Figure A8. Electrostatic Discharge Test Setup.



Electrostatic Discharge Per VVSG 1.0: IEC 61000-4-2

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-2	Date:	September 26, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1039	Fluke	83-3	69811227	Multimeter/Frequency Meter	02/14/2019	02/14/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1281	EMC Partner	ESD3000	284	ESD Test System	01/16/2019	01/16/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



5.2 Radiated RF Immunity

Radiated RF Immunity Per VVSG 1.0: IEC 61000-4-3

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-3	Date:	Monday, September 23, 2019
Temperature:	21.3°C	Humidity:	31%
Input Voltage:	120 VAC / 60 Hz – wall power	Pressure:	839mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Steve Cristanelli		

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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								
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 Lost audio at 309MHz	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass

Radiated RF Immunity Per VVSG 1.0: IEC 61000-4-3

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-3	Date:	Monday, September 23, 2019

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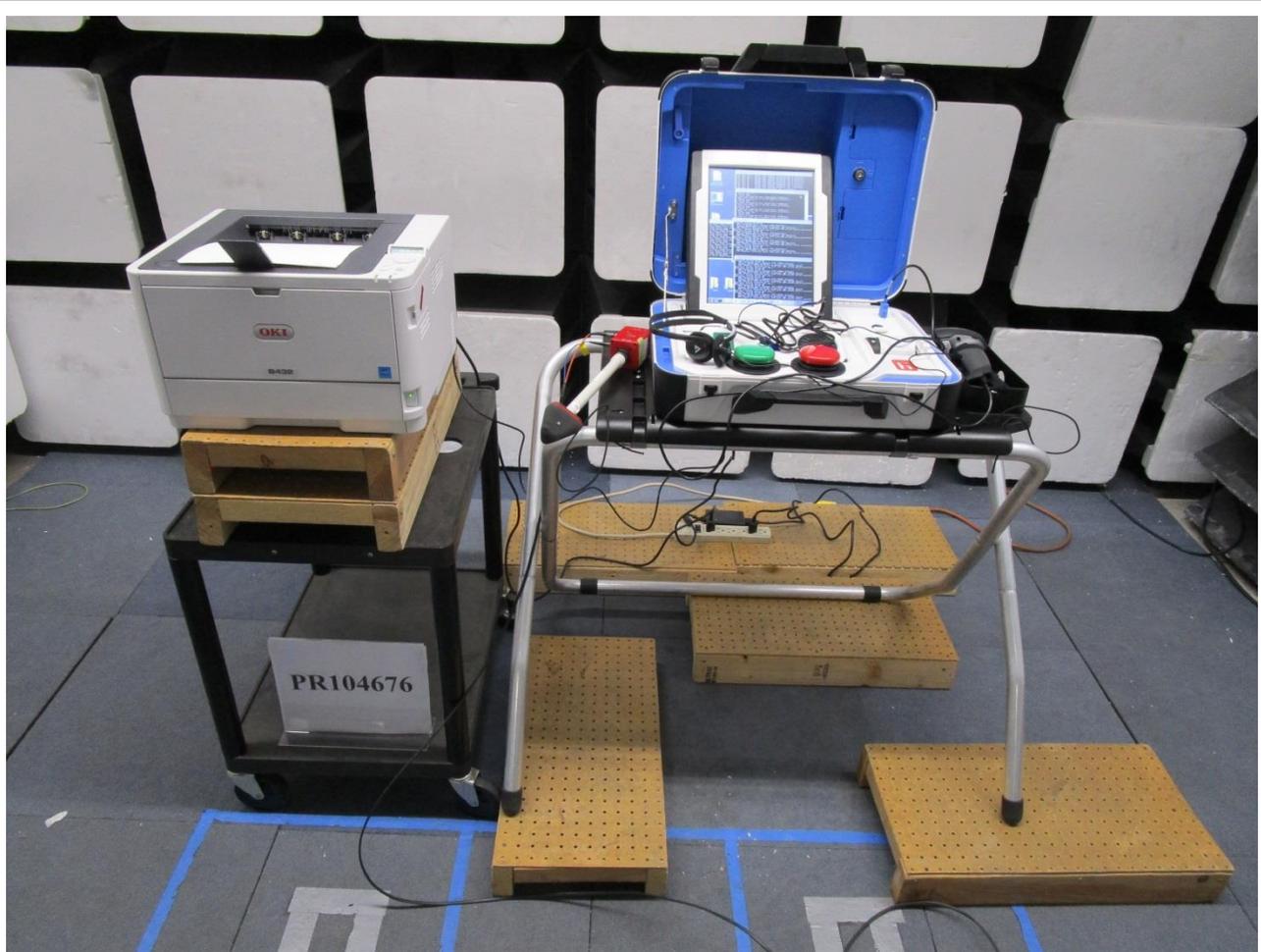


Figure B1. Radiated RF Immunity Test Setup – Front Side.

Radiated RF Immunity Per VVSG 1.0: IEC 61000-4-3

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-3	Date:	Monday, September 23, 2019

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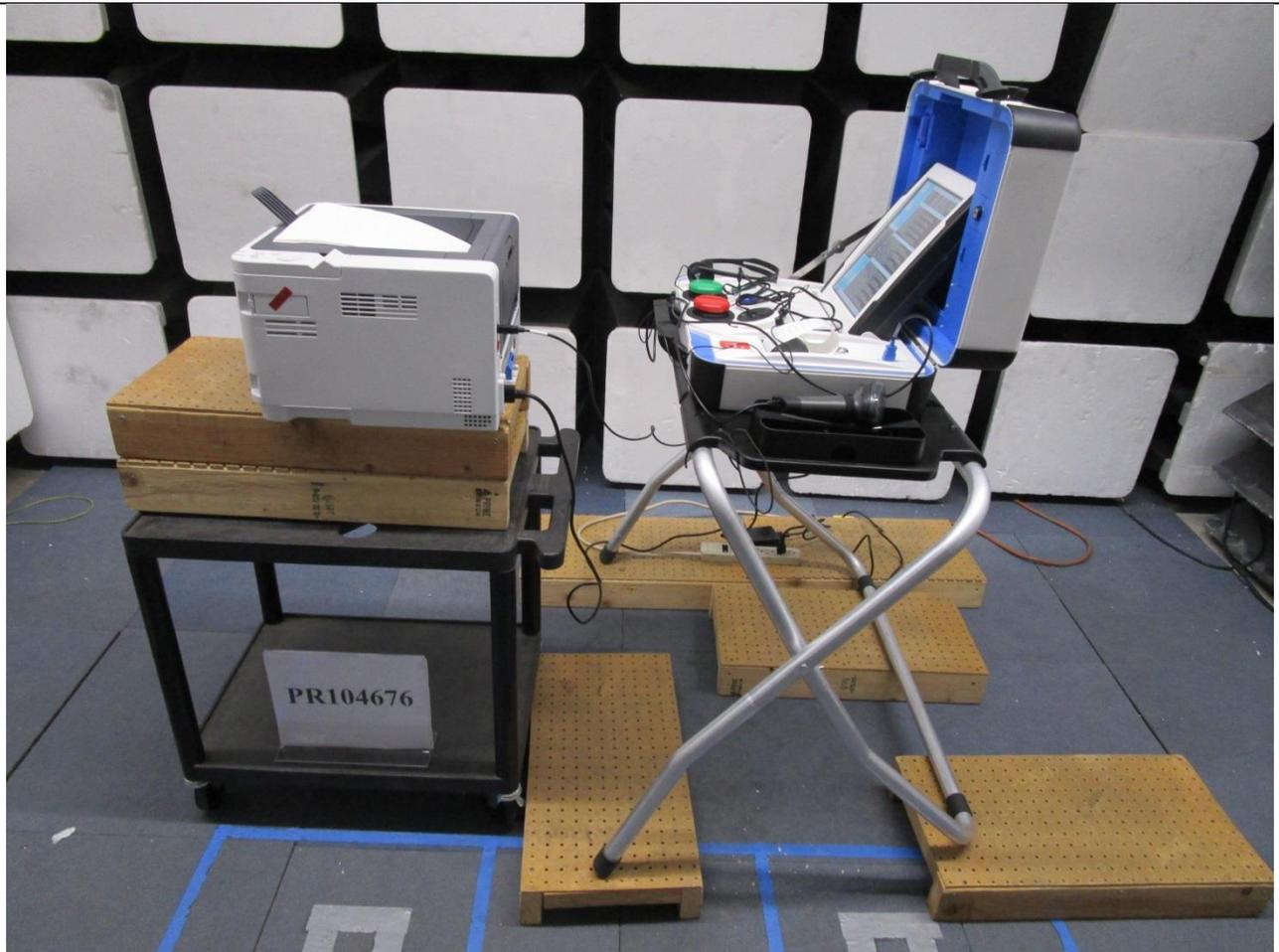


Figure B2. Radiated RF Immunity Test Setup – Right Side.

Radiated RF Immunity Per VVSG 1.0: IEC 61000-4-3

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-3	Date:	Monday, September 23, 2019

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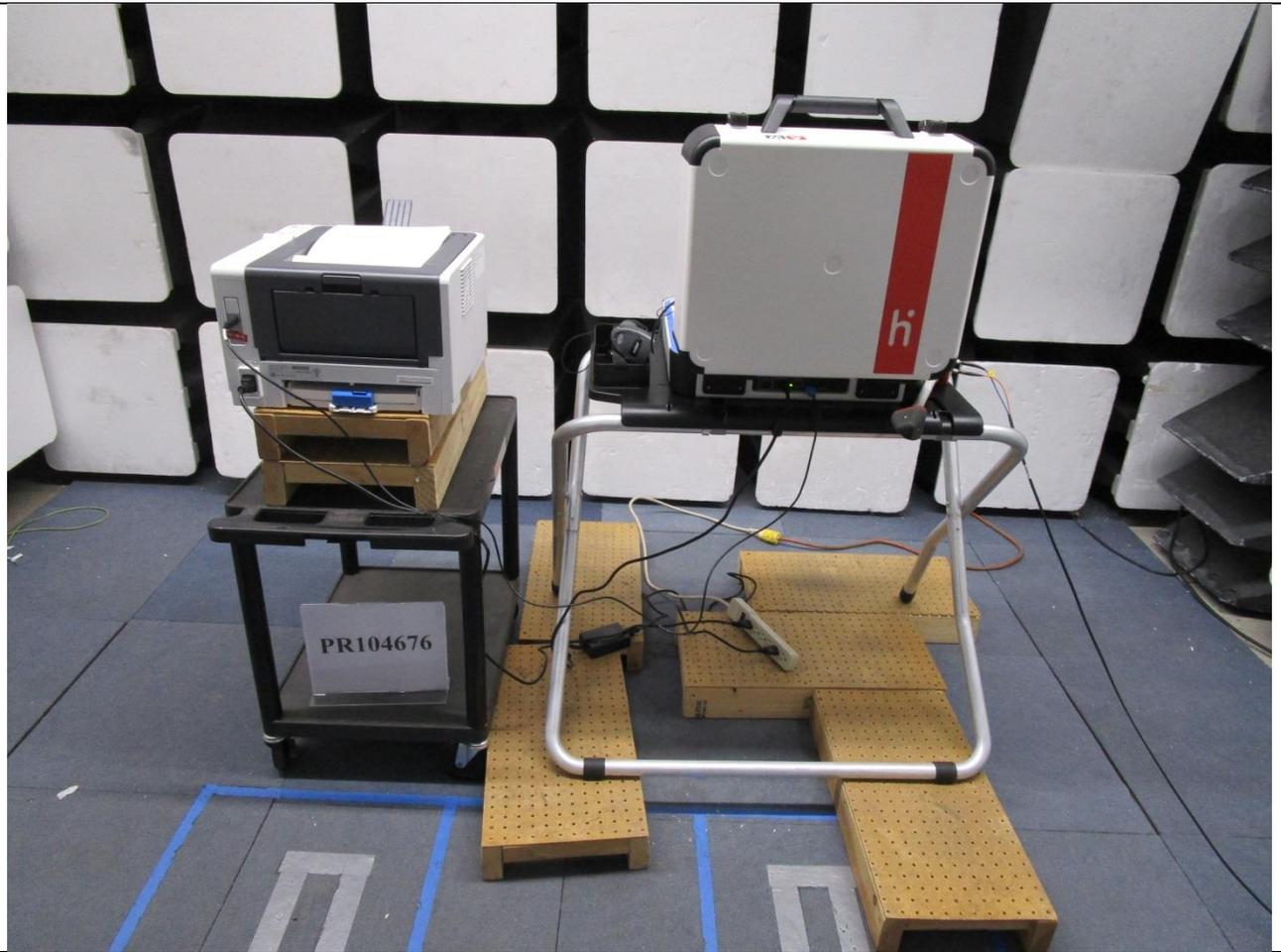


Figure B3. Radiated RF Immunity Test Setup – Back Side.

Radiated RF Immunity Per VVSG 1.0: IEC 61000-4-3

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-3

Project Number: PR104676
Test Area: GP0
S/N: W1902352406
B432dnAK77024728
A0
Date: Monday, September 23, 2019

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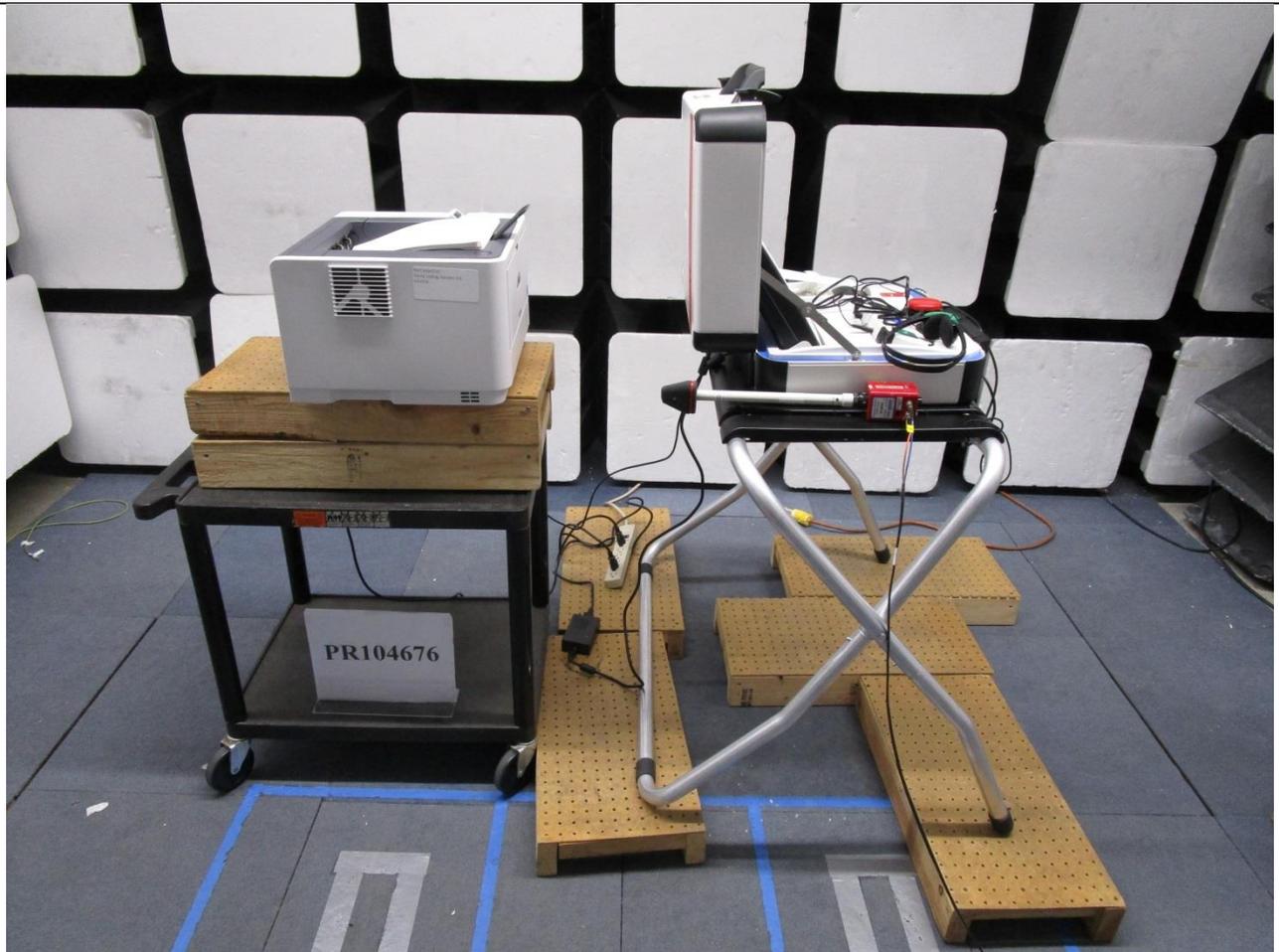


Figure B4. Radiated RF Immunity Test Setup – Left Side.



Radiated RF Immunity Per VVSG 1.0: IEC 61000-4-3

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-3	Date:	Monday, September 23, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1181	EMCI	RFS	V2.5.8	Initial Release 02 July 2004	NA	NA
1323	Rohde&Schwarz	SMT03	100204	Signal Generator, 5 kHz to 3 GHz	02/07/2019	02/07/2020
1453	Giga-tronics	GT-8888A	8888A0336	10 MHz to 8 GHz, +20 dBm, 25 Vdc Power Meter	03/26/2019	03/26/2020
1456	Werlatone	C3908-10	98095	1500 Watts, 50 dB Dual Directional Coupler	03/26/2019	03/26/2020
1476	ETS Lindgren	HI-6053	00144805	10 MHz to 40 GHz Isotropic Electric Field Probe	03/27/2019	03/27/2020
1478	Ophir	5127F	1100	RF Amplifier, 200 Watt, 20 - 1000 MHz	NA	NA
1722	ETS -Lindgren	3142B	1624	Antenna	NA	NA
1761	Braden Shielding Systems	RF Shield Room	N/A	GP0	04/22/2019	04/22/2020
1902	EXTECH	445703	1218-1	Hygrometer-Thermometer	06/10/2019	06/10/2020



5.3 Electrical Fast Transient / Burst

Electrical Fast Transient/Burst Per VVSG 1.0: IEC 61000-4-4

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GPI
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-4	Date:	September 24, 2019
Temperature:	23.6°C	Humidity:	36%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

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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					100 kHz	AC	A	Pass
2.0		x	60	CDN	x					100 kHz		A	Pass
2.0	x		60	CDN		x				100 kHz		A	Pass
2.0		x	60	CDN		x				100 kHz		A	Pass
2.0	x		60	CDN					x	100 kHz		A	Pass
2.0		x	60	CDN					x	100 kHz		A	Pass
2.0	x		60	CDN	x	x			x	100 kHz		A	Pass
2.0		x	60	CDN	x	x			x	100 kHz		A	Pass

Electrical Fast Transient/Burst Per VVSG 1.0: IEC 61000-4-4

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-4

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 24, 2019

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Figure C1. Electrical Fast Transient Test Setup.

Electrical Fast Transient/Burst Per VVSG 1.0: IEC 61000-4-4

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0: IEC 61000-4-4

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 24, 2019

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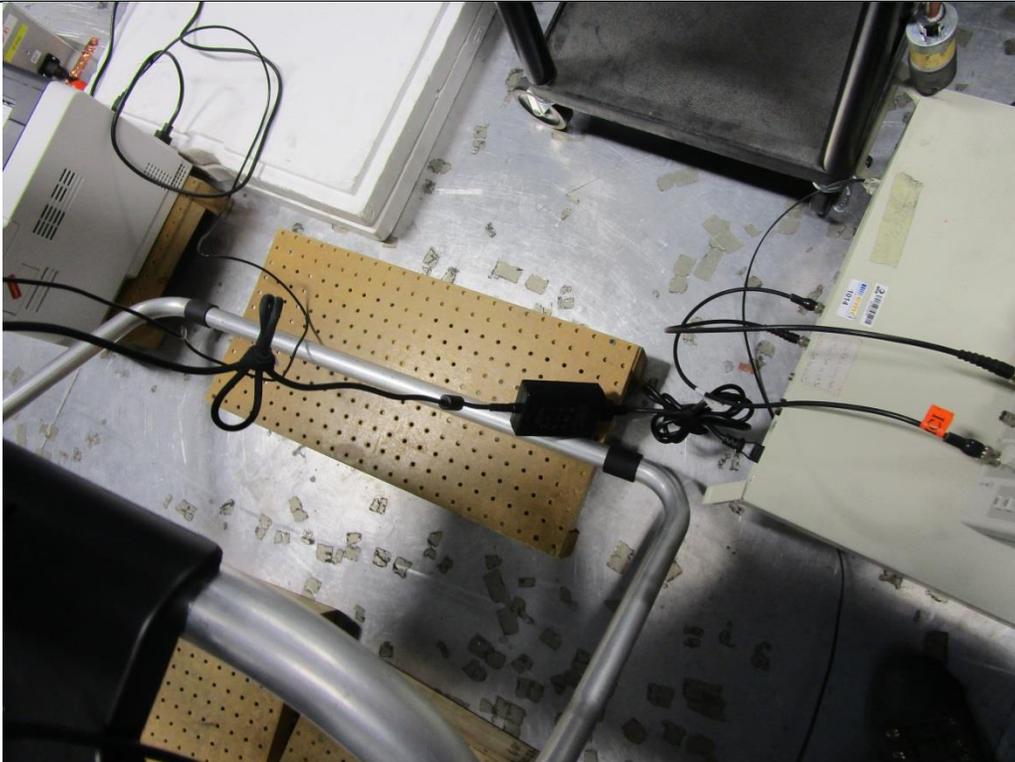


Figure C2. Electrical Fast Transient Test Setup – AC Mains.



Electrical Fast Transient/Burst Per VVSG 1.0: IEC 61000-4-4

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0: IEC 61000-4-4	Date:	September 24, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1014	KeyTek	EMC Pro	0203270	Advanced EMC Immunity Tester	08/07/2019	08/07/2020
1039	Fluke	83-3	69811227	Multimeter/Frequency Meter	02/14/2019	02/14/2020
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/02/2019	02/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



5.4 Surge Immunity

Surge Immunity Per VVSG 1.0: IEC 61000-4-5

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GPI
Model:	3005852 (Touch Writer)	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-5	Date:	September 25, 2019
Temperature:	22.6°C	Humidity:	34%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

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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	x	0	5	30	Common Mode Line	A	Pass
0.5		x	x			x		0	5	30		A	Pass
0.5	x		x			x	x	90	5	30		A	Pass
0.5		x	x			x		90	5	30		A	Pass
0.5	x		x			x	x	180	5	30		A	Pass
0.5		x	x			x		180	5	30		A	Pass
0.5	x		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 VVSG 1.0: IEC 61000-4-5

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer)	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-5	Date:	September 25, 2019
Temperature:	22.6°C	Humidity:	34%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104676-4-5.doc

FR0100

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



Surge Immunity Per VVSG 1.0: IEC 61000-4-5

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer)	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-5	Date:	September 25, 2019
Temperature:	22.6°C	Humidity:	34%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104676-4-5.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 VVSG 1.0: IEC 61000-4-5

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0

Standard Referenced: Per VVSG 1.0:IEC 61000-4-5

Date: September 25, 2019

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Figure D1. Surge Immunity Test Setup – AC Mains.

Surge Immunity Per VVSG 1.0: IEC 61000-4-5

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0

Standard Referenced: Per VVSG 1.0:IEC 61000-4-5

Date: September 25, 2019

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Figure D2. Surge Immunity Test Setup – AC Mains.



Surge Immunity Per VVSG 1.0: IEC 61000-4-5

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-5	Date:	September 25, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1014	KeyTek	EMC Pro	0203270	Advanced EMC Immunity Tester	08/07/2019	08/07/2020
1039	Fluke	83-3	69811227	Multimeter/Frequency Meter	02/14/2019	02/14/2020
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/02/2019	02/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



5.5 Conducted RF Immunity

Conducted RF Immunity Per VVSG 1.0: IEC 61000-4-6

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GPI
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-6	Date:	September 24, 2019
Temperature:	25.4°C	Humidity:	29%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104676-4-6.doc

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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 using M3 CDN	A	Pass

Conducted RF Immunity Per VVSG 1.0: IEC 61000-4-6

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-6

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 24, 2019

PR104676-4-6.doc

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Figure E1. Conducted RF Immunity Test Setup.

Conducted RF Immunity Per VVSG 1.0: IEC 61000-4-6

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-6

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 24, 2019

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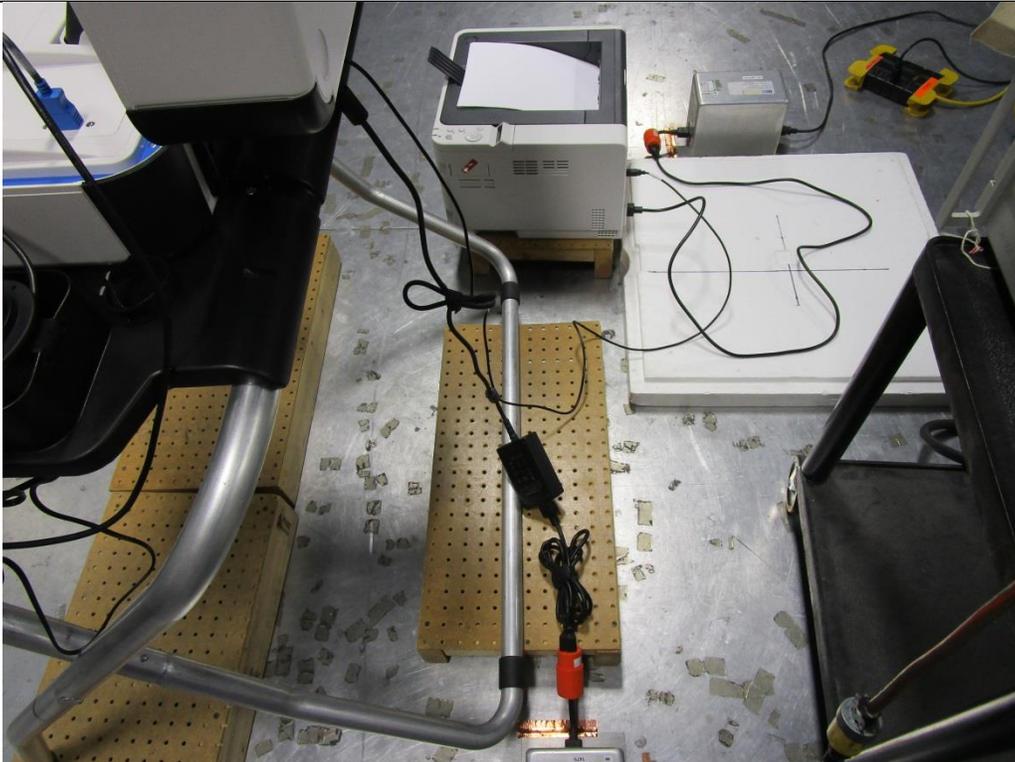


Figure E2. Conducted RF Immunity Test Setup – AC Mains.

Conducted RF Immunity Per VVSG 1.0: IEC 61000-4-6

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-6	Date:	September 24, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1379	IFI	M100	O1200-0111	100W Power Amplifier, 0.01 MHz to 220 MHz	NA	NA
1477	Hewlett Packard	8648A	3636A02899	Signal Generator, 100 kHz to 1 GHz	02/07/2019	02/07/2020
1479	EMCI	EMCI-CDN_M3-16	EMCI014	M3 CDN, 16A, 250 VAC	11/07/2018	11/07/2019
1482	EMCI	EMCI-CDN-M3-16	EMCI016	M3 CDN, 16A, 250 VAC	11/07/2018	11/07/2019
1528	Aeroflex/Wein schel	40-6-34	SB031	Hi power atten 6 dB	10/12/2018	10/12/2019
1532	Werlatone	C9475-13	102545	100 Watt Dual Directional Coupler, 10 kHz to 250 M	10/25/2018	10/25/2019
1547	Rigol Technologies, Inc	DSA815	DSA8A160300184	9 kHz to 1.5 GHz Spectrum Analyzer	05/09/2019	05/09/2020
1594	EMCI	CI	V2.5.0	Conducted Immunity Software	NA	NA
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020
1915		CI Rack GP #1	N/A	1528,1379,1532,1479,1480,1486,1481,1494,1482,1594	NA	NA



5.6 Power Frequency H-Field Immunity

Power Frequency H-field Immunity Per VVSG 1.0: IEC 61000-4-8

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-8	Date:	September 26, 2019
Temperature:	21.9°C	Humidity:	37%
Input Voltage:	120 VAC / 60 Hz	Pressure:	836 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104676-4-8.doc

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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

Power Frequency H-field Immunity Per VVSG 1.0: IEC 61000-4-8

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-8

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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

Power Frequency H-field Immunity Per VVSG 1.0: IEC 61000-4-8

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-8

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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

Power Frequency H-field Immunity Per VVSG 1.0: IEC 61000-4-8

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-8

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 26, 2019

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Figure F3. Power Frequency H-field Immunity Test Setup Z axis.



Power Frequency H-field Immunity Per VVSG 1.0: IEC 61000-4-8

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-8	Date:	September 26, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1039	Fluke	83-3	69811227	Multimeter/Frequency Meter	02/14/2019	02/14/2020
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/02/2019	02/02/2020
1550	California Instruments/A metek	1251P	1423A05346	AC Power Supply	NA	NA
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1262	EMCI	EMCI-4-8-2m-1.5m	0001	HField Loop, 2m x 1.5m	NA	NA
1484	Pearson Electronics	110A	88593	Current Monitor, 1 Hz to 20 MHz	11/06/2018	11/06/2019



5.7 Voltage Dips and Interruptions

Voltage Dips and Interrupts Per VVSG 1.0: IEC 61000-4-11

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-11	Date:	September 24, 2019
Temperature:	23.8°C	Humidity:	37%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104676-4-11.doc

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% 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%	0.6				x	10	3		A	Pass
40%	60	x				10	3		A	Pass
40%	60		x			10	3		A	Pass
40%	60			x		10	3		A	Pass
40%	60				x	10	3		A	Pass
0%	300	x				10	3		A	Pass
0%	300			x		10	3		A	Pass
Line Voltage Variation tests										
129Vac Line Voltage Variations (+7.5% of nominal 120V) 1hrs.									A	Pass
105Vac Line Voltage Variations (-12.5% of nominal 120V) 1 Hrs.									A	Pass
Surges of +15% line variations of nominal voltage (138V) .5 Hrs.									A	Pass
Surges of -15% line variations of nominal voltage (102V) .5 Hrs.									A	Pass

Voltage Dips and Interrupts Per VVSG 1.0: IEC 61000-4-11

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-11

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 24, 2019

PR104676-4-11.doc

FR0100



Figure G1. Voltage Dips and Interrupts Test Setup.

Voltage Dips and Interrupts Per VVSG 1.0: IEC 61000-4-11

Manufacturer: Hart InterCivic
Customer Representative: Darrick Forester
Model: 3005852 (Touch Writer)
B432DN Okidata
Standard Referenced: Per VVSG 1.0:IEC 61000-4-11

Project Number: PR104676
Test Area: GP1
S/N: W1902352406
B432dnAK77024728
A0
Date: September 24, 2019

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Figure G2. Voltage Dips and Interrupts Test Setup.



Voltage Dips and Interrupts Per VVSG 1.0: IEC 61000-4-11

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432dnAK77024728 A0
Standard Referenced:	Per VVSG 1.0:IEC 61000-4-11	Date:	September 24, 2019

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1014	KeyTek	EMC Pro	0203270	Advanced EMC Immunity Tester	08/07/2019	08/07/2020
1039	Fluke	83-3	69811227	Multimeter/Frequency Meter	02/14/2019	02/14/2020
1184	KeyTek	CEWare	4.0	KeyTek EMCPro 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	07/05/2018	10/05/2019
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/02/2019	02/02/2020

6.0 Test Log

EMI/ENV Test Log

Manufacturer:	Hart InterCivic	Project Number:	PR104676
Model:	3005852 (Touch Writer) B432DN Okidata	S/N:	W1902352406 B432DNAK77024728A0
Customer Representative:	Darrick Forester		
Standard Referenced:	Per VVSG 1.0: FCC Part 15		

FR0105

Ground Planes / CALC

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
---	6001	Monday, September 23, 2019 0800 - 0900	Initial Product Setup Initial Product Setup		1	Complete	SC
4-3	4354	Monday, September 23, 2019 0900 - 1200	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz		3	Pass	SC
---	---	1200 - 1230	lunch		---	---	SC
---	---	1230 - 1400	continue		1.5	---	SC
4-6	4622	September 24, 2019 1030 - 1200	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (AC main & No I/O >3m) 120 VAC / 60 Hz		1.5	Pass	CL
4-4	4411	1230 - 1330	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV, rep rate 100 kHz. (AC main & No I/O >3m) 120 VAC / 60 Hz		1.0	Pass	CL
---	---	1330 - 1400	Post test		.5	Pass	CL
4-11	4192	1400 - 1500	Voltage Dips and Interruptions Power increases of 7.5% and reductions of 12.5% of nominal power, one hr each +/-. 129VAC/60Hz		1.0	Pass	CL
---	---	1500 - 1600	Voltage Dips and Interruptions Power increases of 7.5% and reductions of 12.5% of nominal power, one hr each +/-. 105VAC/60Hz		1.0	Pass	CL
---	---	September 25, 2019 0800 - 0830	Client getting UUT running.		.5	---	CL
---	4191	0830 - 0930	Voltage Dips and Interruptions Surges of +15% line variations of nominal line voltage. (See Protocol) TBD 138VAC/60Hz for 30min. 102VAC/60Hz for 30 min.		1.0	Pass	CL

Ground Planes / CALC

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
---	4191	0930 - 1000	Voltage Dips and Interruptions 70% nom, 0.6 cycles / 40% nom, 60 cycles / 0% nom, 300 cycles (Verified change with Pat S.) 120 VAC / 60 Hz Need to Re-run, 0% dropout did not run. EMCPro issue.		.5	---	CL
4-5	4596	1000 - 1600	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz		6.0	Pass	CL
---	---	1600 - 1630	Post test		.5	---	CL
4-11	---	September 26, 2019 0800 - 0830	Voltage Dips and Interruptions 70% nom, 0.6 cycles / 40% nom, 60 cycles / 0% nom, 300 cycles (Verified change with Pat S.)		.5	Pass	CL
4-8	4831	0830 - 0930	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120 VAC / 60 Hz		1.0	Pass	CL
4-2	4294	0930 - 1330	Electrostatic Discharge +/- 8kV Contact, +/- 15kV Air (See 4.1.2.8 of VVSG) 120 VAC / 60 Hz Note: -15kV on power button, took windows down, blue screen had to re-boot. Repeated 10 hits on power button and did not re-peat.		4.0	Pass	CL



Project #:
PR104676
B90818

Work Order #: 2019082201

PO#:
Amount:

Company: SLI Compliance

Contact: Darrick Forester

Model#:

Email:
dforester@slicompliance.com

Serial #:

Phone: 303-384-5606

Fax:

Test Notes: Formal Testing
RE/CE: FCC Class B limits
ESD: COTS printer is support equipment. No ESD testing to the printer, per client.
Immunity: Test per Client's protocol
PQF: Two additional tests requested, see protocol
Provide client with formal test reports

Quoted Work						
Date	Test Code	Description	Standard	Result	Cost	Billed
September 24, 2019	1342	Radiated Emissions, 30 MHz - 1 GHz Perform Testing at 10 Meter Distance 120 VAC / 60 Hz	FCC Part 15, Class B	Pass		
September 27, 2019	1342	Radiated Emissions, 1 GHz - 10 GHz Perform Testing at 3 Meter Distance 120 VAC / 60 Hz	FCC Part 15, Class B	Pass		
September 24, 2019	2341	Conducted Emissions, 150 kHz - 30 MHz -- 120 VAC / 60 Hz	FCC Part 15, Class B	Pass		
September 26, 2019	4294	Electrostatic Discharge +/- 8kV Contact, +/- 15kV Air (See 4.1.2.8 of VVSG) 120 VAC / 60 Hz	EN61000-4-2	Pass		
Monday, September 23, 2019	4354	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz	EN61000-4-3	Pass		
September 24, 2019	4411	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV, rep rate 100 kHz. (AC main & No I/O >3m) 120 VAC / 60 Hz	EN61000-4-4	Pass		
September 25, 2019	4596	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz	EN61000-4-5	Pass		
September 24, 2019	4622	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (AC main & No I/O >3m) 120 VAC / 60 Hz	EN61000-4-6	Pass		



Quoted Work						
Date	Test Code	Description	Standard	Result	Cost	Billed
September 26, 2019	4831	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120 VAC / 60 Hz	EN61000-4-8	Pass		
September 25, 2019	4191	Voltage Dips and Interruptions Surges of +15% line variations of nominal line voltage. (See Protocol) TBD	EN61000-4-11	Pass		
September 26, 2019	4191	Voltage Dips and Interruptions 70% nom, 0.6 cycles / 40% nom, 60 cycles / 0% nom, 300 cycles 120 VAC / 60 Hz	EN61000-4-11	Pass		
September 24, 2019	4192	Voltage Dips and Interruptions Power increases of 7.5% and reductions of 12.5% of nominal power, one hr each +/-. TBD	EN61000-4-11	Pass		
September 23, 2019	6001	Initial Product Setup Initial Product Setup ---	--	Complete		
	9040	Emissions Test Report - Soft Copy -- --	--			
	9010	Immunity Test Report - Soft Copy -- --	--			
	9901	NRE - NTS Project Setup NRE - NTS Project Setup --	--			

Unquoted Work				
Date	Test Code	Description	Cost	Billed

Modifications Required For Compliance		
Test	Description of Modification	Client Initials



7.0 Product Data Sheet

Client Information

Client Information	
Manufacturer Name	Hart InterCivic
Address	15500 Wells Port Drive
City	Austin
State	TX
Zip Code	78728
Client Representative	Darrick Forester
Title	Hardware Test Engineer
Phone	303-384-5606
Fax	
Email	dforester@slicompliance.com

Product Information - General

Product Information	
Product Name (as it should appear on test report)	Verity Touch Writer
Model Number (of UUT to be tested)	3005852 (Touch Writer)
Functional description of product (what is it, what does it do, etc.)	Voting equipment. Polling Place Ballot Marking Device for voters that require an accessible way to mark a paper ballot.
List all modes of operation	<ul style="list-style-type: none"> - Printing to thermal printer - Writing data to USB flash drive - Bar code scanner plugged in and actively scanning (trigger held down). - Printing to laser printer (SE)
Can modes be operated simultaneously? If so, explain.	Yes, these are multitasking systems
What mode(s) will be used for testing?	Touch Writer will be running diagnostic software which exercises all modes during test.
Product type (IT, Medical, Scientific, Industrial, etc.)	IT
Is the product an intentional radiator	No
Product Dimensions	Touch Writer Storage Dimensions (approx.) 19" wide x 18" deep x 8" high Operational Dimensions (approx.) 19" wide x 22" deep x 21" high
Product Weight	Touch Writer 27lbs
Will fork lift be required	No
Applicable Standards, if known	Per VVSG 1.0: FCC Class B Radiated and Conducted emissions per ANSI C63.4. IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-11

Describe all environment(s) where product will be used (residential, commercial, industrial, etc.)	Office, Industrial					
Does product consist of multiple components? (If yes, please describe each system component)	Yes, the Touch Writer will sit on an Accessible Booth. A COTS laser printer (SE) will sit on a tabletop. The full product suite consists of both tabletop and floor-standing equipment.					
Cycle time > 3 seconds? (If yes, how long?)	Tests running continuously					
Highest internally generated frequency	1.91GHz					
Product Set-up Time	15 minutes					
Boot up time in the event of an unintentional power down	5 minutes					
Identify ALL I/O connections on the unit(s) under test, as well as MAXIMUM associated cable lengths below						
Model No.	Description	I/O Type		Length (m)	Patient Connect? (See Note)	QTY
		UUT-UUT	UUT-SE			
3005852	USB A to RJ50 Cable to Bar Code scanner		X	1.8		1
3005852	Headphones to Touch with Access accessibility controller		X	1.8		1
3005852	Red/Green Jelly switches to Touch with Access accessibility controller		X	1.5		1
3005852	USB A to USB B Cable to laser printer		X	1.8		1
<i>Note: "Patient Connect" column applies only to medical devices.</i>						

Power

Power Requirements	
Does/can product connect to AC mains? (If so, can the UUT function when connected to AC?)	No, the UUT itself does not connect to the AC mains. An approved AC/DC desktop style power supply on each unit connects to the 120VAC mains. The desktop style AC/DC power supply is an SL Power TE60 series supply (24VDC, 2.7A output) or approved equivalent
Input Voltage Rating as it appears on unit, power supply, or power brick	100-240VAC, 50-60Hz, 1.5A
Input Current (specify @ 230 Vac/50 Hz)	1.5A (100-240VAC, 50-60Hz)
Single or Multi-Phase (If multi-phase, specify delta or wye)	Single Phase
Is input power connector two-prong (Hot & Neutral) or 3-prong (H, N, Ground)	3-prong (IEC320-C14)
Does UUT have more than 1 power cord? (If yes, explain.)	No

Unit Under Test (UUT) – Detailed Information

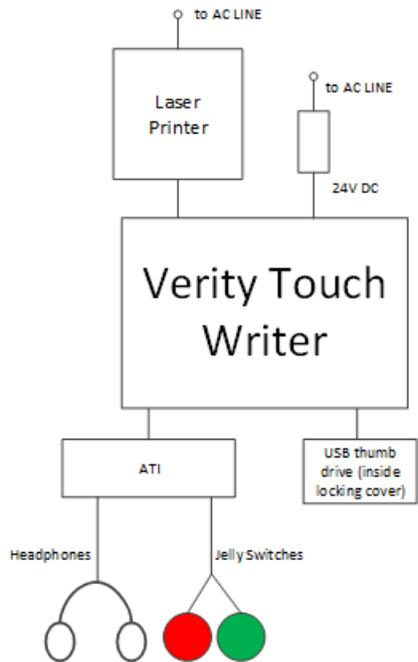
UUT Hardware			
Condition	Verity Touch Writer connected to SE laser printer via USB cable, powered up and running with all functions exercised, I/O and ports being exercised.		
Configuration During Test	Verity Touch Writer on Accessible booth and SE laser printer on tabletop. Units powered up and running with all functions exercised, I/O and ports being exercised.		
Input Power	120VAC/UUT device		
UUT Components			
Name	Model No.	Serial No.	Description
Verity Touch Writer	3005852	TBD	Verity Touch Writer device
I/O Cabling			
See Section 2.0 for details			
UUT Software/Firmware			
Name	Version/Revision	Functionality	
WES	7, SP1	Operating System	
Test Applications	N/A	Exercises the functionality of the system and the ports.	
UUT Operating Conditions			
List all frequencies generated/used by the product.	1.91GHz, 0.307MHz, 10MHz, 12MHz, 24MHz, 25MHz crystals/oscillators.		
How will product be exercised during test?	Device and SE powered up and running. All ports will be exercised during test with diagnostic test software.		
How will product be monitored during test?	Watch LCD screens and monitor peripherals		
What are the product's critical parameters?			
Specify tolerance of all critical parameters.			



Support Equipment (SE) – Detailed Information

Support Equipment (SE)				
Name	Model No.	Serial No.	Description	
AutoBallot (barcode scanner)	Hart P/N 3005174 Motorola/Zebra DS4308- SR7U2100AZW	TBD	Optional COTS barcode scanner. This is an option for and does not ship with the unit as a default configuration.	
Red/Green Jelly Switches	N/A	n/a	Red/Green jelly switches for disabled use. These are COTS switches that do not ship with the unit and are typically provided by an accessible user	
Headphones	Hart: P/N 2005230 v7 brand HA300-2NP	n/a	Optional COTS Headphones for listening to audio.	
Laser Printer	Hart: P/N 3005534 OKI Data B432DN	TBD	COTS laser printer for printing a marked paper ballot.	
SE I/O Cabling				
Model No.	Description	Shielded?	Length	Quantity
Motorola/Zebra DS4308- SR7U2100AZW	Custom USB A to RJ50 Cable to Barcode scanner 6' long	Yes	1.8m	1
Red/Green Jelly Switches	Red/Green Jelly switches – cord is 5' long	Not sure	1.5m	1
V7 HA300-2NP Headphones	Headphones – cord is 4' long	No	1.2m	1
OKI Data B432DN	USB A to USB B. Cord is 6' long	Yes	1.8m	1
SE Software/Firmware				
Name	Version/Revision	Functionality		
N/A				

Block Diagram



Important note: The product data sheet is a critical piece of documentation which is used as the basis for any test reports that NTS will generate; it must be completed *prior* to testing. It should be reviewed carefully by the client. If incorrect information is provided resulting in revisions to test reports, the client will be subject to report revision fees.

8.0 Laboratory Accreditations



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

NATIONAL TECHNICAL SYSTEMS (NTS) - LONGMONT
1736 Vista View Drive
Longmont, CO 80504-5242
Mr. Eric Loucks Phone: 870 574 0031

ELECTRICAL

Valid To: February 29, 2020

Certificate Number: 0214.43

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility/Interference (EMC/EMI), Lightning, Transient, Surge, and Product Safety tests:

<u>Test Technology:</u>	<u>Test Method(s)^{1,2}:</u>
<i>Emissions</i>	
Radiated and Conducted	CFR 47 FCC, Parts 15B (using ANSI C63.4:2014), and 18 (using MP-5:1986); ANSI C63.4:2009; CISPR 32, Ed. 1 (2012-01); EN 55032:2012/AC:2013; AS/NZS CISPR 22 (2002); AS/NZS 3548 (1997); AS/NZS CISPR 14-1 (2003); IEC/CISPR 14-1, Ed. 4 (2003); IEC 61000-3-12, Ed. 2.0 (2011); EN 61000-3-12 (2011); IEC 61000-6-1, Ed. 2 (2005-03); IEC 61000-6-2, Ed. 2.0 (2005-01); IEC 61000-6-3 (1996); EN 61000-6-3 (2001) + A1 (2004); EN 61000-6-4 (2007); KN 32:2015 (Annex 11); KN 22; KN 11
Harmonics	IEC 61000-3-2, Ed. 2.2 (2004-11); IEC 61000-3-2, Ed. 3.0 (2005) + A1 (2008) + A2 (2009); IEC 61000-3-2, Ed. 4.0 (2014-05)
Flicker	IEC 61000-3-3, Ed. 1.1 (2002-03); EN 61000-3-3 + A1 (2001); IEC 61000-3-3, Ed. 1.1 (2003) + A2 (2005); IEC 61000-3-3, Ed. 3.0 (2013-05)
<i>Immunity</i>	
Electrostatic Discharge (ESD)	IEC 61000-4-2 (2001); EN 61000-4-2 (2001) + A2 (2001); EN 61000-4-2 + A1 (1998) + A2 (2001); IEC 61000-4-2, Ed. 2.0 (2008-12); EN 61000-4-2 (2009-05); KN 61000-4-2; KN 61000-4-2 (2008-5); KN 61000-4-2 (Annex 1-1)
Radiated	IEC/EN 61000-4-3, Ed. 2.1 (2002) + A1 (2002); EN 61000-4-3; IEC 61000-4-3 (1995) + A1 (1998) + A2 (2000); EN 61000-4-3 (2002) + A1 (2002); IEC 61000-4-3, Ed. 3.0 (2006-02) + A1 (2007) + A2 (2010); EN 61000-4-3 (2006) + A1 (2008) + A2 (2010); KN 61000-4-3; KN 61000-4-3 (2008-5); KN 61000-4-3 (Annex 1-2)

(A2LA Cert. No. 0214.43) 10/08/2018



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<u>Test Technology:</u>	<u>Test Method(s)^{1,2}:</u>
<i>Immunity (cont'd)</i>	
Electrical Fast Transient/Burst	IEC 61000-4-4, Ed. 2.0 (2004-07); EN 61000-4-4 (2004); EN 61000-4-4:2012; IEC 61000-4-4 (2012-04); KN 61000-4-4; KN 61000-4-4 (2008-5); KN 61000-4-4 (Annex 1-3)
Surge	IEC 61000-4-5, Ed. 2.0 (2005-11); EN 61000-4-5; IEC 61000-4-5, Ed. 3.0 (May 2014); BS EN 61000-4-5 (2006); EN 61000-4-5: 2014; KN 61000-4-5; KN 61000-4-5 (2008-5); KN 61000-4-5 (Annex 1-4); IEEE C62.41.1 (2002); IEEE C62.41.2 (2002); IEEE C62.45 (2002)
Conducted	IEC 61000-4-6, Ed. 2.1 (2004); EN 61000-4-6; EN 61000-4-6 (1996) + A1 (2001); IEC 61000-4-6, Ed. 2.2 (2006-05); IEC 61000-4-6, Ed. 3.0 (2008); IEC 61000-4-6, Ed. 4.0 (2013); EN 61000-4-6 (2009); EN 61000-4-6 (2014); KN 61000-4-6; KN 61000-4-6 (2008-5); KN 61000-4-6 (Annex 1-5)
Power Frequency Magnetic Field	IEC 61000-4-8 (2001) + A1 (2000); EN 61000-4-8 (2001) + A1 (2000); EN 61000-4-8 (1993) + A1 (2001); IEC 61000-4-8 (2009); EN 61000-4-8:2010; KN 61000-4-8; KN 61000-4-8 (2008-5); KN 61000-4-8 (Annex 1-6)
Voltage Dips, Short Interruptions, and Voltage Variations	IEC 61000-4-11, Ed. 2 (2004-03); EN 61000-4-11; EN 61000-4-11 (1994) + A1 (2001); EN 61000-4-11 (2004); KN 61000-4-11; KN 61000-4-11 (2008-5); KN 61000-4-11 (Annex 1-7)
<i>Product Safety</i>	
Medical Electrical Equipment	IEC 60601-1-2, Ed. 3.0 (2007); KN 60601-1-2 (2008-5); IEC 60601-1-2, Ed. 4, (2014-02); EN 60601-1-2 (2007); EN 60601-1-2 (2015)
<i>Generic/Product Family Standards and Industry Standards</i>	
Generic Standards	EN 61326-1: 2013; KN 35: 2015
Information Technology Equipment	IEC/CISPR 22 (1997); EN 55022 (1998) + A1 (2000); IEC/CISPR 22 (1993); EN 55022 (1994); IEC/CISPR 22 (1993); EN 55022 (1994) + A1 (1995) + A2 (1997); CNS 13438 (1997); IEC/CISPR 22, Ed. 4 (2003-04); EN 55022 (1998); IEC/CISPR 22, Ed. 5 (2005); EN 55022 (1998); IEC/CISPR 22, Ed. 5 (2005) + A1 (2005); EN 55022 (1998) + A1 (2000) + A2 (2003);

<u>Test Technology:</u>	<u>Test Method(s)^{1,2}:</u>
<p><i>Generic/Product Family Standards and Industry Standards (cont'd)</i> Information Technology Equipment (cont'd)</p>	<p>CNS 13438 (2006) (up to 6 GHz); IEC/CISPR 22, Edition 5.2 (2006-03); EN 55022 (2006); EN 55022 (2006) + A1 (2007); EN 55022:2010; IEC/CISPR 22 (2008-09); AS/NZS CISPR 22 (2009); TCVN 7189:2009 (CISPR 22:2006); VCCI V-3 (2009.04, 2011.04, 2013.04, 2014.04, 2015.04) (up to 6 GHz); CISPR 24 Ed 2.0 (2010-08); EN 55024 (2010); KN 24</p>
<p>Industrial, Scientific, and Medical (ISM) Equipment</p>	<p>AS/NZS CISPR 11 (2002); IEC/CISPR 11, Ed. 4.1 (2004-06); AS/NZS CISPR 11 (2004); IEC/CISPR 11, Ed. 4.1 (2004-06) + A1 (2004); EN 55011 (1998) + A1 (1999) + A2 (2002); IEC/CISPR 11 (2003); EN 55011 (1998) + A2(2002); EN 55011 (2009) + A1 (2010); IEC/CISPR 11 Ed. 5 (2009-05); CISPR 11 Ed. 5.1 (2010)</p>
<p>Measure</p>	<p>IEC 61326-1 Ed. 2.0 (2013)</p>
<p>Military/Defense</p>	<p>MIL-STD-461F, G Method CE101 (30 Hz to 10 kHz); MIL-STD-461F, G Method CE102 (10 kHz to 10 MHz); MIL-STD-461F, G Method CE106 (10 kHz to 40 GHz); MIL-STD-461F, G Method CS101 (30 Hz to 150 kHz); MIL-STD-461F, G Method CS106; MIL-STD-461F, G Method CS114 (10 kHz to 200 MHz); MIL-STD-461F, G Method CS115; MIL-STD-461F, G Method CS116 (10 kHz to 100 MHz); MIL-STD-461F, G Method RE101 (30 Hz to 100 kHz); MIL-STD-461F, G Method RE102 (10 kHz to 18 GHz); MIL-STD-461F, G Method RE103 (10 kHz to 40 GHz); MIL-STD-461F, G Method RS101 (30 Hz to 100 kHz); MIL-STD-461F, G Method RS103 (2 MHz to 40 GHz); MIL-STD-704 D, E, F; MIL-HDBK-704-8 Method LDC101; MIL-HDBK-704-8 Method LDC102; MIL-HDBK-704-8 Method LDC103; MIL-HDBK-704-8 Method LDC104; MIL-HDBK-704-8 Method LDC105; MIL-HDBK-704-8 Method LDC201; MIL-HDBK-704-8 Method LDC301; MIL-HDBK-704-8 Method LDC302; MIL-HDBK-704-8 Method LDC401; MIL-HDBK-704-8 Method LDC501; MIL-HDBK-704-8 Method LDC601</p>

¹ When the date, revision or edition of a test method standard is not identified on the scope of accreditation, the laboratory is expected to be using the current version within one year of the date of publication, per part C., Section 1 of A2LA R101 - *General Requirements- Accreditation of ISO-IEC 17025 Laboratories*. If a specifier/regulator imposes a different transition period, this will supersede the A2LA one-year implementation period.

² The laboratory is only accredited for testing activities outlined within the test methods listed above. Reference to any other activity within these standards, such as risk management or risk assessment, does not fall within the laboratory's accredited capabilities.

On the following types of products:

Telecommunication Equipment, Network Equipment, Industrial and Commercial Equipment, Electronic (Digital) Equipment, Medical, Aerospace, Military, Information Technology Equipment, Multimedia Equipment, Scientific Equipment

Testing Activities Performed in Support of FCC Declaration of Conformity and Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.1³

Rule Subpart/Technology	Test Method	Maximum Frequency (MHz)
<u>Unintentional Radiators</u> Part 15B	ANSI C63.4:2014	18000
<u>Industrial, Scientific, and Medical Equipment</u> Part 18	FCC MP-5 (February 1986)	18000

³ Accreditation does not imply acceptance to the FCC equipment authorization program. Please see the FCC website (<https://apps.fcc.gov/oetcf/eas/>) for a listing of FCC approved laboratories.



Accredited Laboratory

A2LA has accredited

NATIONAL TECHNICAL SYSTEMS (NTS) - LONGMONT

Longmont, CO

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 8th day of October 2018.



President and CEO
For the Accreditation Council
Certificate Number 0214.43
Valid to February 29, 2020

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.



End of Report