

# National Technical Systems Test Report for Electromagnetic Interference (EMI) Testing of the Verity Controller with Touch and Touch with Access

**Prepared For**

SLI Compliance | 4720 Independence St. | Wheat Ridge, CO 80033

**Prepared By**

National Technical Systems | 1736 Vista View Drive | Longmont, CO. 80504 | (303) 776-7249 |

A handwritten signature in black ink, appearing to read "G. Gagne", written in a cursive style.

---

Greg Gagne  
Technical Writer

A handwritten signature in black ink, appearing to read "John W. Tate", written in a cursive style.

---

John Tate  
EMI Department Manager



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	ITR-PR104673	10/15/2019
1	Corrected manufacturer to Hart InterCivic; added "C1801827210" to Section 3.0 and Table 5.0-1; corrected calibration dates for Equipment ID 1013.	10/29/2019

### Table of Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>4</b>
<b>2.0</b>	<b>References .....</b>	<b>4</b>
<b>3.0</b>	<b>Product Selection and Description .....</b>	<b>4</b>
3.1	Security Classification .....	4
<b>4.0</b>	<b>General Test Requirements .....</b>	<b>4</b>
4.1	Test Equipment .....	4
4.2	Measurement Uncertainties .....	4
4.3	Notice of Deviation .....	5
<b>5.0</b>	<b>Test Descriptions and Results.....</b>	<b>5</b>
5.1	Electrostatic Discharge .....	6
5.2	Radiated RF Immunity .....	28
5.3	Electrical Fast Transient / Burst .....	34
5.4	Surge Immunity .....	49
5.5	Conducted RF Immunity .....	67
5.6	Power Frequency H-Field Immunity .....	72
5.7	Voltage Dips and Interruptions.....	77
<b>6.0</b>	<b>Test Log .....</b>	<b>89</b>
<b>7.0</b>	<b>Product Data Sheet.....</b>	<b>93</b>
<b>8.0</b>	<b>Laboratory Accreditations.....</b>	<b>98</b>

### List of Tables

Table 3.0-1: Product Identification - Equipment Under Test (EUT).....	4
Table 5.0-1: Summary of Test Information & Results .....	5

### 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) 20190820-01, dated 08/20/2019
- National Technical Systems (NTS) Quote(s) OP0528219, 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: VVSG 1.0

### 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 Controller with Touch Access	3005853	A1902481707
2	1	Verity Controller with Touch	3005854	T1902491007
3	1	Verity Controller	3005825	C1801827110; C1801827210

### 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 <sub>rms</sub>	N/A	-12.64%, +13.33%
RF Common Mode (BCI Method)	V <sub>rms</sub>	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	Longmont	10/02/2019 - 10/02/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110, C1801827210	Complies
5.2	Radiated RF Immunity	VVSG 1.0	Longmont	09/24/2019 - 09/24/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110	Complies
5.3	Electrical Fast Transient / Burst	VVSG 1.0	Longmont	09/30/2019 – 09/30/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110	Complies
5.4	Surge Immunity	VVSG 1.0	Longmont	09/27/2019 - 10/01/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110	Complies
5.5	Conducted RF Immunity	VVSG 1.0	Longmont	09/25/2019 - 09/25/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110	Complies
5.6	Power Frequency H-Field Immunity	VVSG 1.0	Longmont	10/01/2019 - 10/01/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110	Complies
5.7	Voltage Dips and Interruptions	VVSG 1.0	Longmont	09/26/2019 - 09/26/2019	3005853 , 3005854 , 3005825	A1902481707, T1902491007, C1801827110	Complies



5.1 Electrostatic Discharge

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GPI
Model:	3005853 (Touch with Access)	S/N:	Touch with Access: <b>A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
Temperature:	20.9°C	Humidity:	39%
Input Voltage:	120 VAC / 60 Hz	Pressure:	837 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-2.doc

FR0100

Test Location	Voltage Level (kV)	Polarity		Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
		+	-					
Indirect Discharge Points								
VCP	2, 4	x	x	10	1	Front Side	A	Pass
VCP	2, 4	x	x	10	1	Left Side	A	Pass
VCP	2, 4	x	x	10	1	Right Side	A	Pass
VCP	2, 4	x	x	10	1	Back Side	A	Pass
HCP	2, 4	x	x	10	1	Edge of HCP at Front of UUT	N/A	N/A
Contact Discharge Points - <b>RED</b> Arrows.								
Figure A2	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A3	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A4	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A5	2, 4	x	x	10	1	No discharge points found.	---	---
Air Discharge Points - <b>BLUE</b> Arrows.								
Figure A2	2, 4, 8	x	x	10	1		A	Pass
Figure A3	2, 4, 8	x	x	10	1		A	Pass
Figure A4	2, 4, 8	x	x	10	1		A	Pass
Figure A5	2, 4, 8	x	x	10	1		A	Pass
Figure A6	2, 4, 8	x	x	10	1		A	Pass

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
**A1902481707**  
Date: October 2, 2019

PR104673-4-2.doc

FR0100

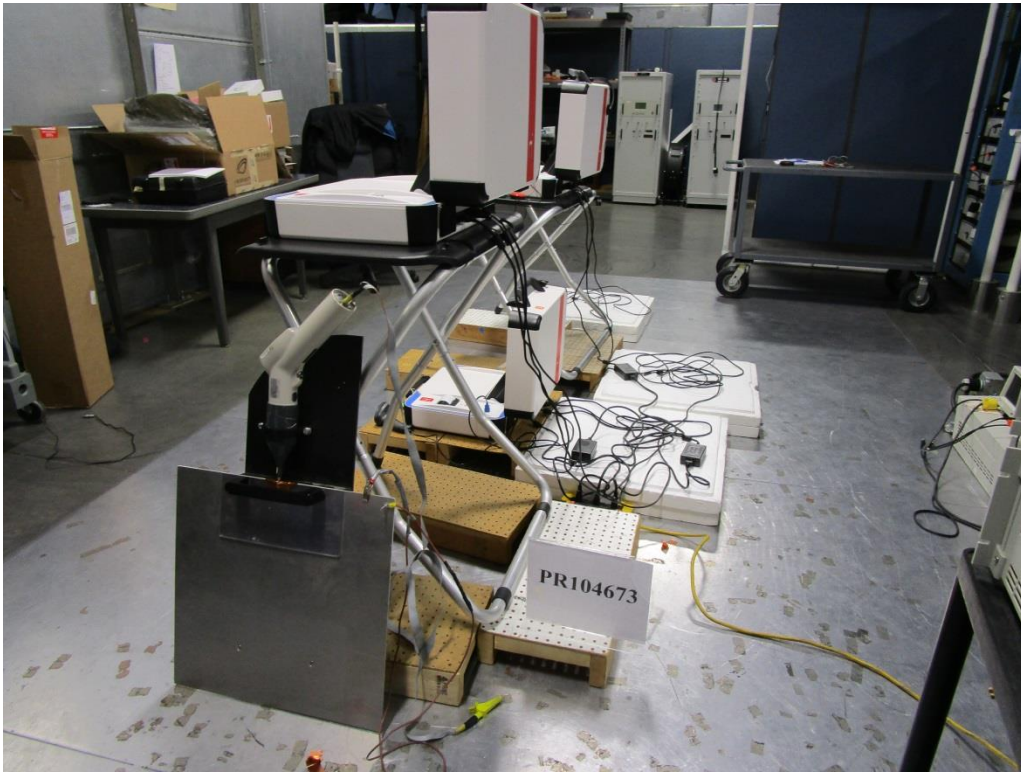


Figure A1. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
A1902481707  
Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A2. Electrostatic Discharge Test Setup.



---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
A1902481707  
Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A3. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
A1902481707  
Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A4. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
**A1902481707**  
Date: October 2, 2019

PR104673-4-2.doc

FR0100

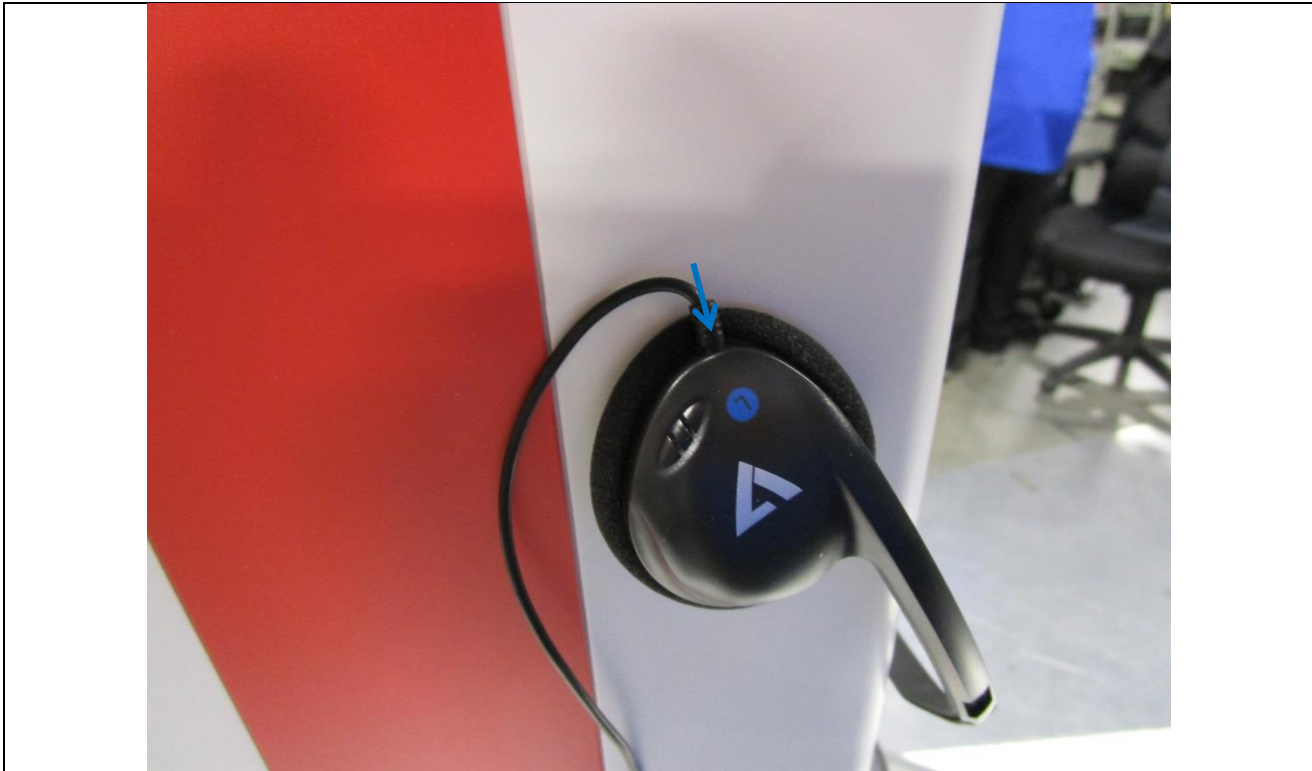


Figure A5. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
**A1902481707**  
Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A6. Electrostatic Discharge Test Setup.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access: <b>A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019

PR104673-4-2.doc FR0100

### 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
1281	EMC Partner	ESD3000	284	ESD Test System	01/16/2019	01/16/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



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

Manufacturer: <u>Hart InterCivic</u>	Project Number: <u>PR104673</u>
Customer Representative: <u>Darrick Forester</u>	Test Area: <u>GP1</u>
Model: <u>3005854 (Touch)</u>	S/N: <u>Touch: T1902491007</u>
Standard Referenced: <u>VVSG 1.0:</u>	Date: <u>October 2, 2019</u>
Temperature: <u>20.9°C</u> Humidity: <u>39%</u>	Pressure: <u>837 mb</u>
Input Voltage: <u>120 VAC / 60 Hz</u>	
Configuration of Unit: <u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>	
Test Engineer: <u>Casey Lockhart</u>	

PR104673-4-2.doc

FR0100

Test Location	Voltage Level (kV)	Polarity		Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
		+	-					
Indirect Discharge Points								
VCP	2, 4	x	x	10	1	Front Side	A	Pass
VCP	2, 4	x	x	10	1	Left Side	A	Pass
VCP	2, 4	x	x	10	1	Right Side	A	Pass
VCP	2, 4	x	x	10	1	Back Side	A	Pass
HCP	2, 4	x	x	10	1	Edge of HCP at Front of UUT	N/A	N/A
Contact Discharge Points - <b>RED</b> Arrows.								
Figure A2	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A3	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A4	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A5	2, 4	x	x	10	1	No discharge points found.	---	---
Air Discharge Points - <b>BLUE</b> Arrows.								
Figure A2	2, 4, 8	x	x	10	1	No discharge points found.	---	---
Figure A3	2, 4, 8	x	x	10	1		A	Pass
Figure A4	2, 4, 8	x	x	10	1	No discharge points found.	---	---
Figure A5	2, 4, 8	x	x	10	1		A	Pass

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch:  
T1902491007  
Date: October 2, 2019

PR104673-4-2.doc

FR0100

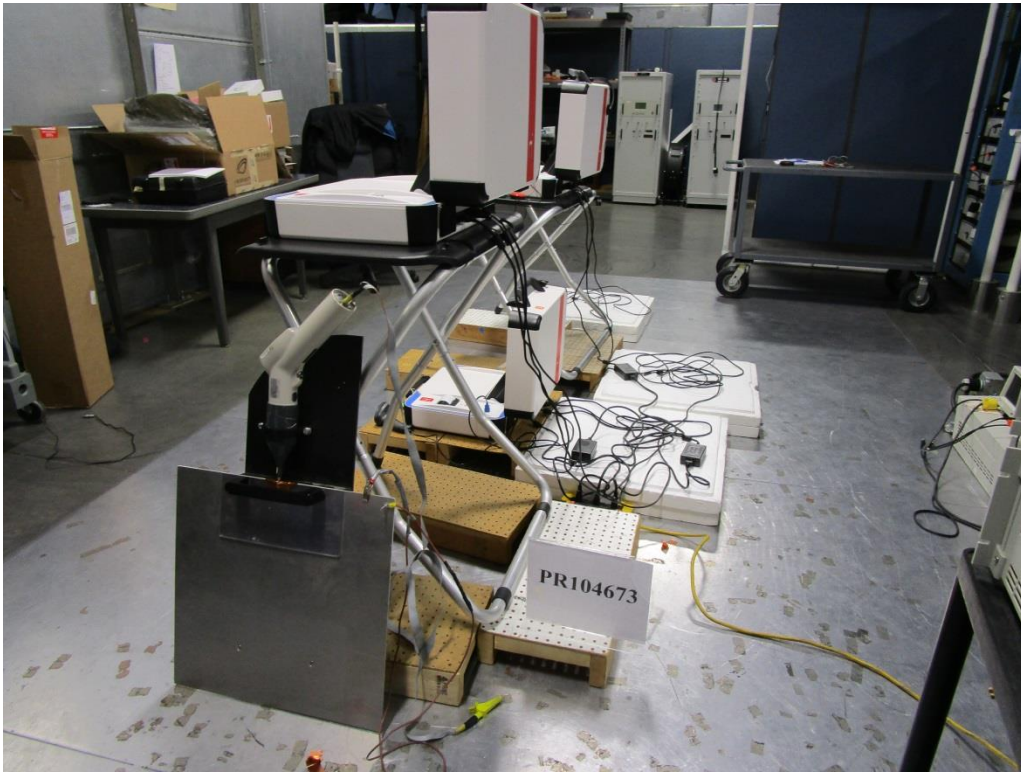


Figure A1. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch:  
T1902491007  
Date: October 2, 2019

PR104673-4-2.doc

FR0100

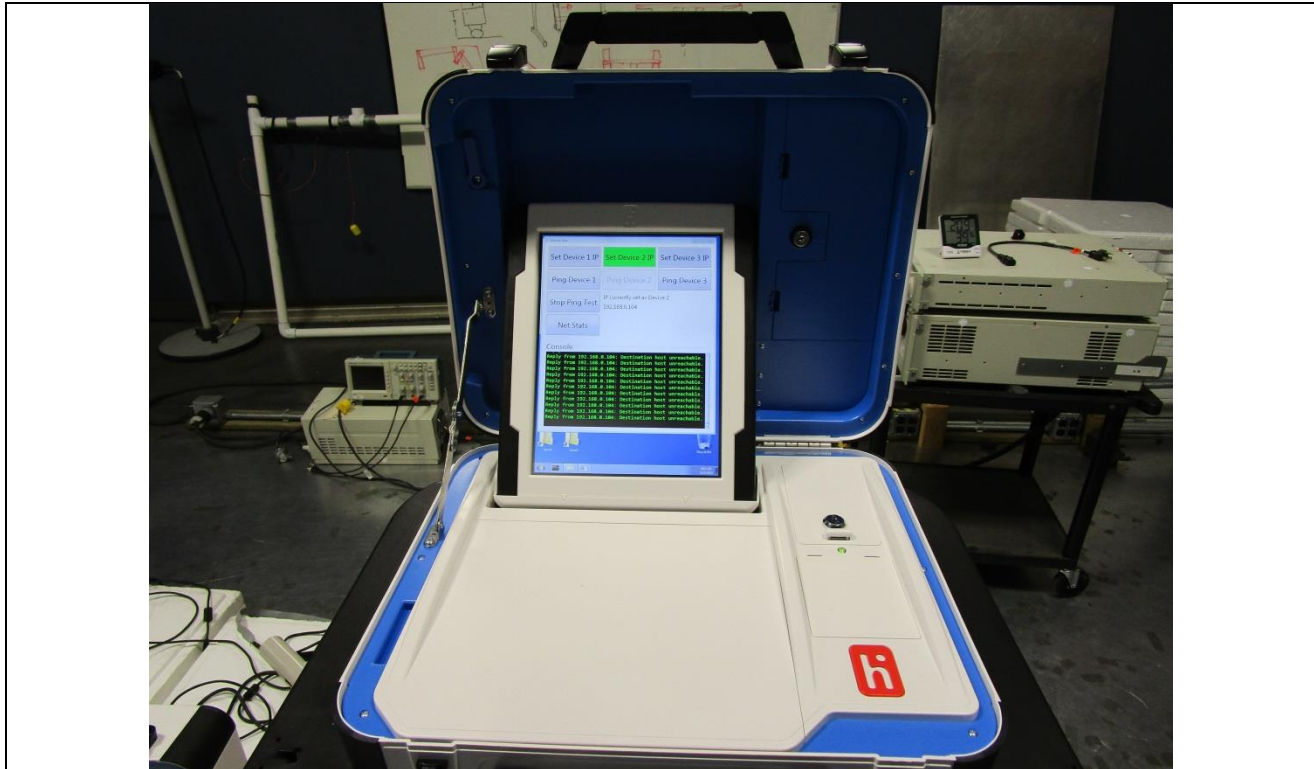


Figure A2. Electrostatic Discharge Test Setup.



---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch:  
**T1902491007**  
Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A3. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch:  
**T1902491007**  
Date: October 2, 2019

PR104673-4-2.doc

FR0100

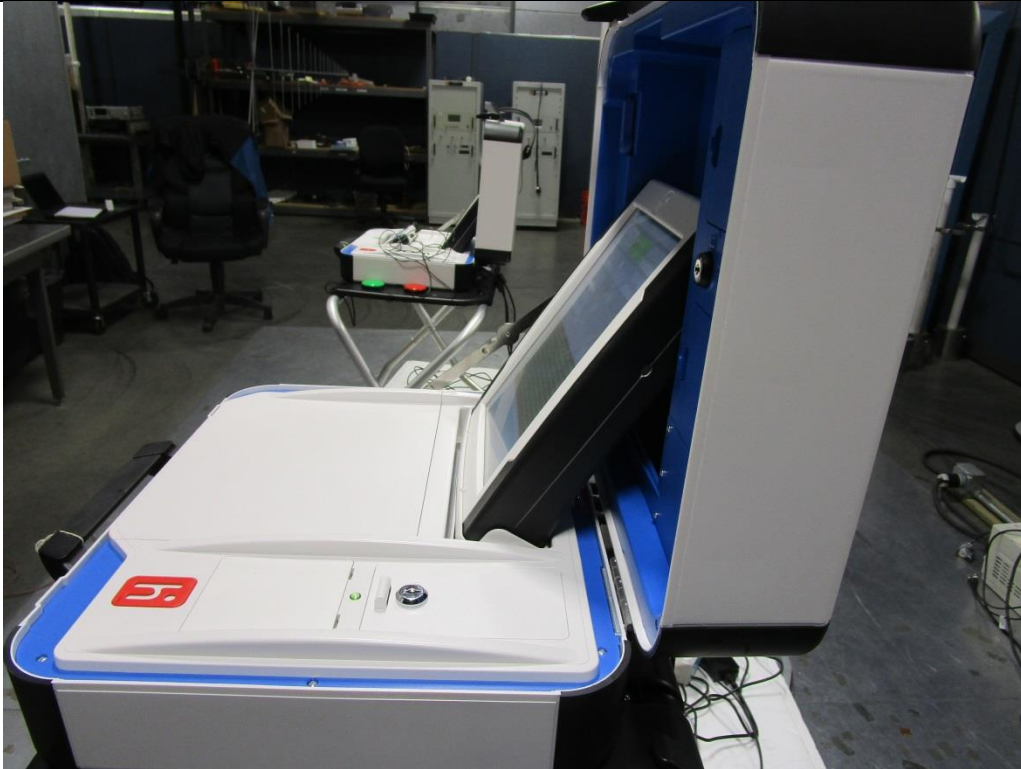


Figure A4. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch:  
T1902491007  
Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A5. Electrostatic Discharge Test Setup.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	Touch: <b>T1902491007</b>
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019

PR104673-4-2.doc FR0100

### 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
1281	EMC Partner	ESD3000	284	ESD Test System	01/16/2019	01/16/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



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

Manufacturer: <u>Hart InterCivic</u>	Project Number: <u>PR104673</u>
Customer Representative: <u>Darrick Forester</u>	Test Area: <u>GPI</u>
Model: <u>3005825 (Controller)</u>	S/N: <u>Controller: C1801827110 (NEW C1801827210)</u>
Standard Referenced: <u>VVSG 1.0:</u>	Date: <u>October 2, 2019</u>
Temperature: <u>20.9°C</u> Humidity: <u>39%</u>	Pressure: <u>837 mb</u>
Input Voltage: <u>120 VAC / 60 Hz</u>	
Configuration of Unit: <u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>	
Test Engineer: <u>Casey Lockhart</u>	

PR104673-4-2.doc

FR0100

Test Location	Voltage Level (kV)	Polarity		Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
		+	-					
Indirect Discharge Points								
VCP	2, 4	x	x	10	1	Front Side	A	Pass
VCP	2, 4	x	x	10	1	Left Side	A	Pass
VCP	2, 4	x	x	10	1	Right Side	A	Pass
VCP	2, 4	x	x	10	1	Back Side	A	Pass
HCP	2, 4	x	x	10	1	Edge of HCP at Front of UUT	N/A	N/A
Contact Discharge Points - <b>RED</b> Arrows.								
Figure A2	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A3	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A4	2, 4	x	x	10	1	No discharge points found.	---	---
Figure A5	2, 4	x	x	10	1	No discharge points found.	---	---
Air Discharge Points - <b>BLUE</b> Arrows.								
Figure A2	2, 4, 8	x	x	10	1		A	Pass
Figure A3	2, 4, 8	x	x	10	1		A	Pass
Figure A4	2, 4, 8	x	x	10	1		A	Pass
Figure A5	2, 4, 8	x	x	10	1	No discharge points found.	---	---

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
**C1801827110 (NEW**  
**C1801827210)**

Standard Referenced: VVSG 1.0:

Date: October 2, 2019

PR104673-4-2.doc

FR0100

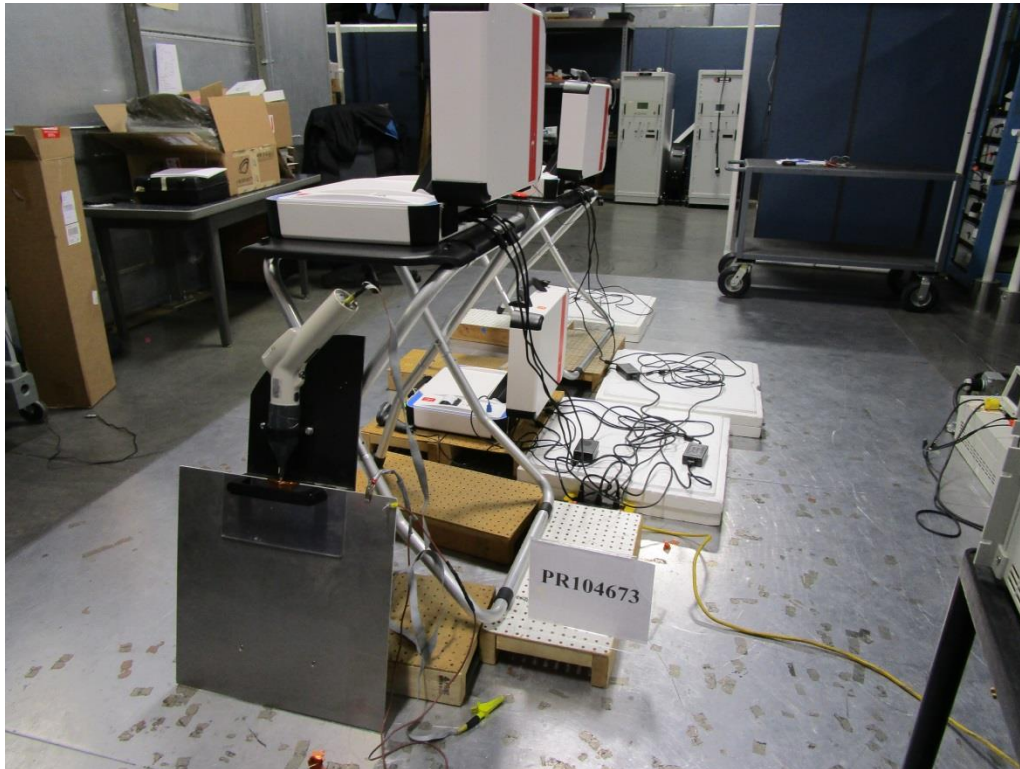


Figure A1. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
**C1801827110 (NEW**  
**C1801827210)**

Standard Referenced: VVSG 1.0:

Date: October 2, 2019

PR104673-4-2.doc

FR0100

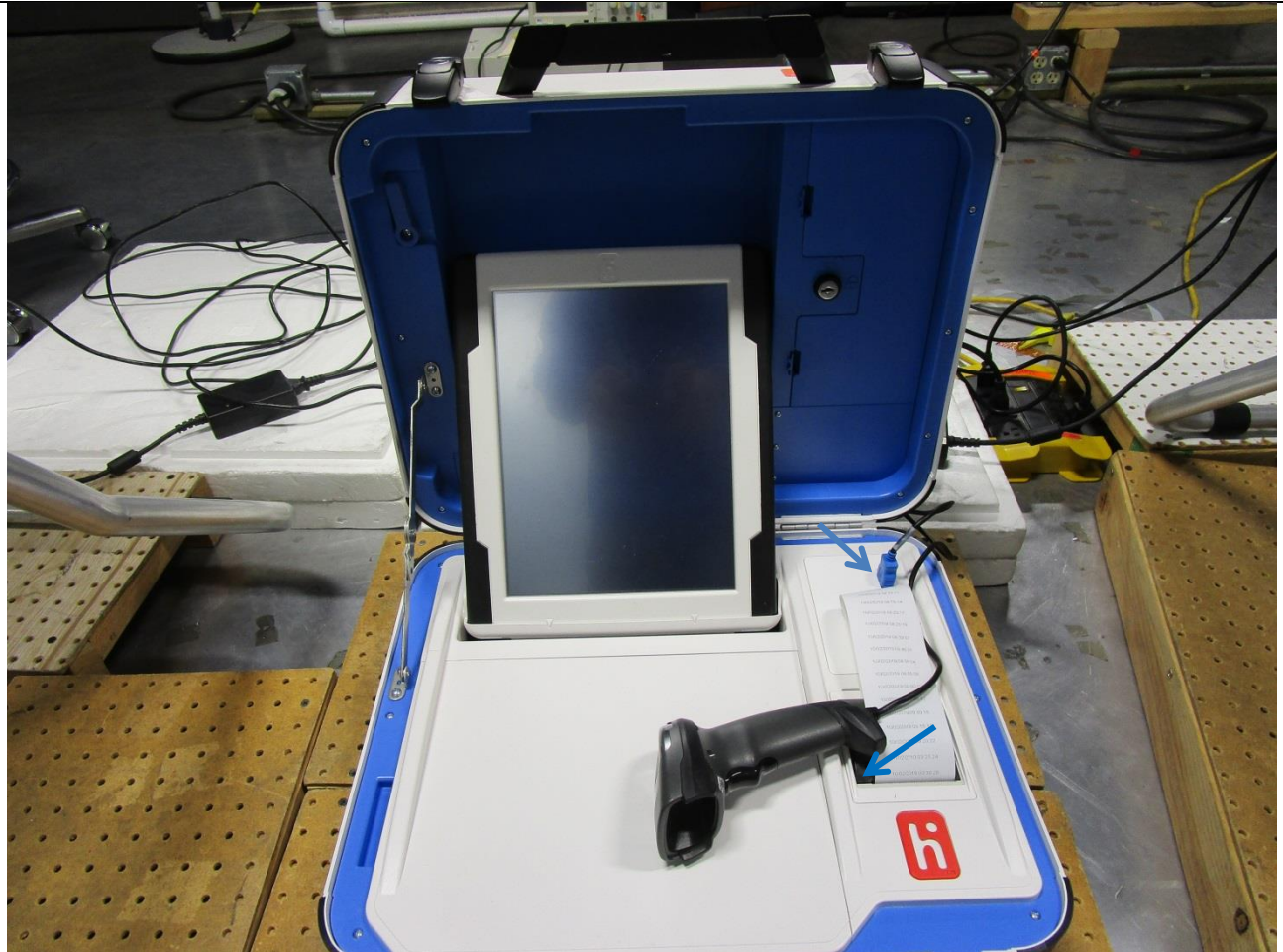


Figure A2. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
**C1801827110 (NEW**  
**C1801827210)**

Standard Referenced: VVSG 1.0:

Date: October 2, 2019

PR104673-4-2.doc

FR0100

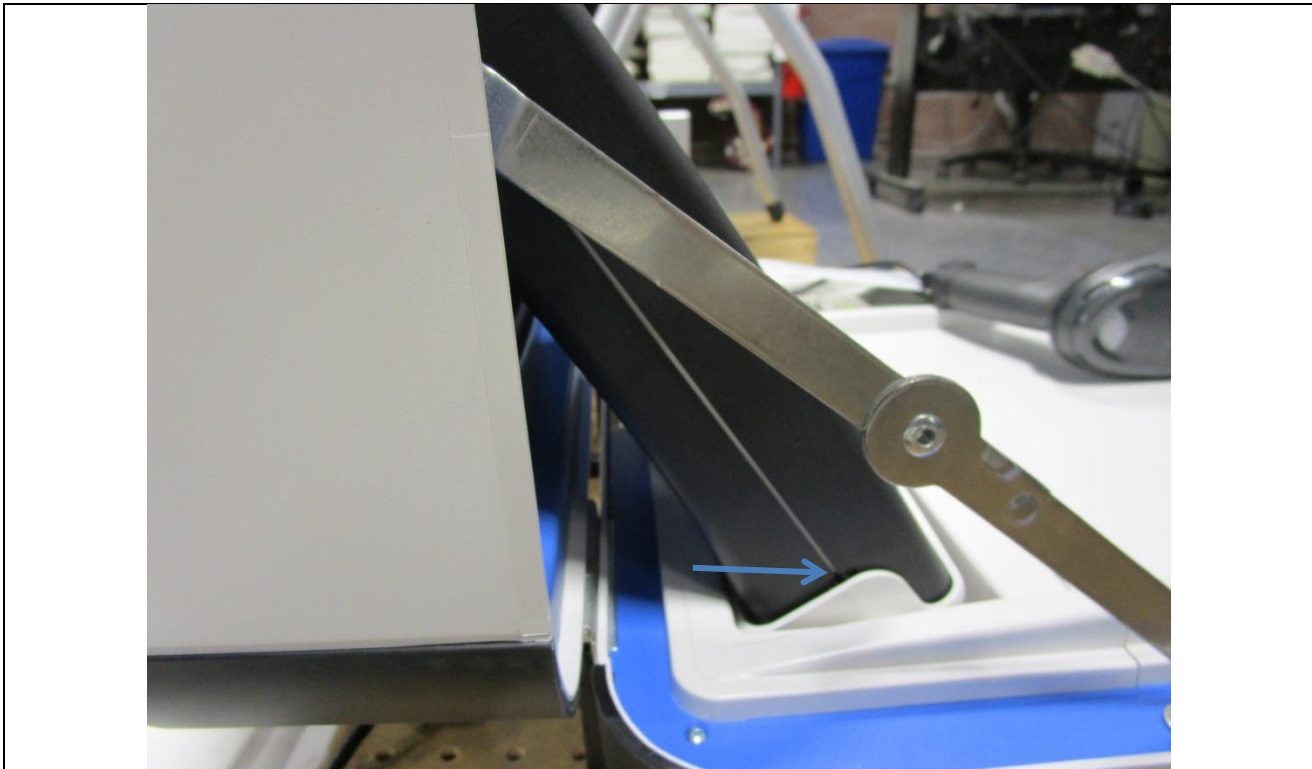


Figure A3. Electrostatic Discharge Test Setup.



---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
**C1801827110 (NEW**  
**C1801827210)**

Standard Referenced: VVSG 1.0:

Date: October 2, 2019

PR104673-4-2.doc

FR0100



Figure A4. Electrostatic Discharge Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
**C1801827110 (NEW**  
**C1801827210)**

Standard Referenced: VVSG 1.0:

Date: October 2, 2019

PR104673-4-2.doc

FR0100

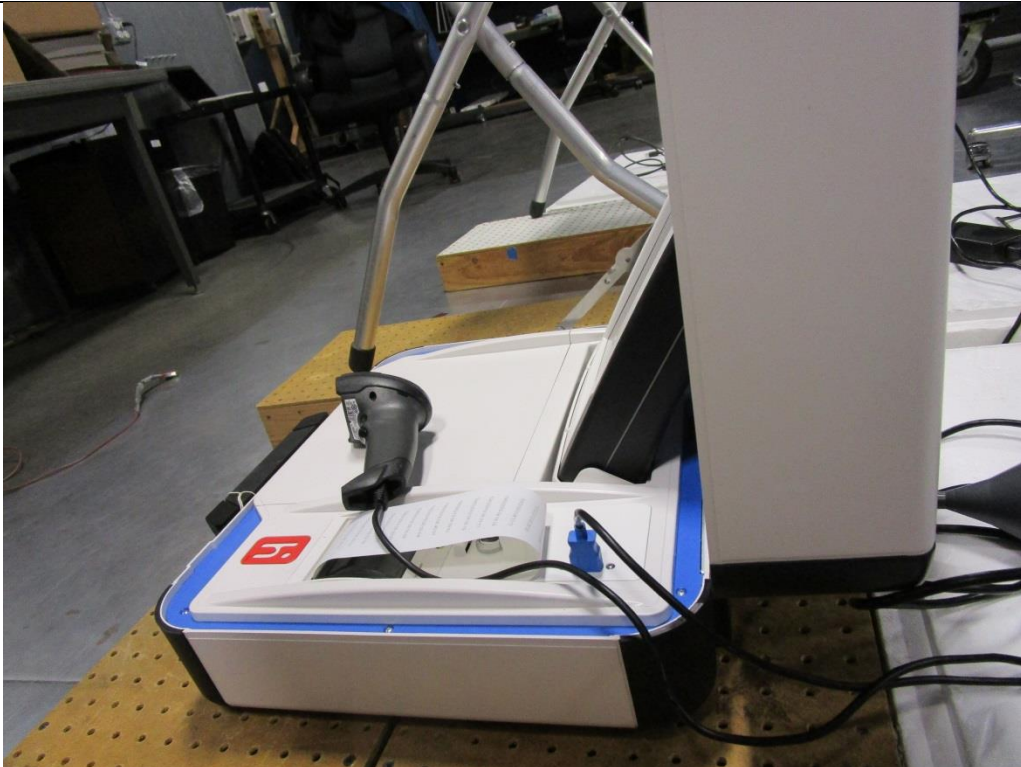


Figure A5. Electrostatic Discharge Test Setup.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller: <b>C1801827110 (NEW C1801827210)</b>
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019

PR104673-4-2.doc FR0100

### 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
1281	EMC Partner	ESD3000	284	ESD Test System	01/16/2019	01/16/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



5.2 Radiated RF Immunity

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	C1801827110 T1902491007 A1902481707
Standard Referenced:	VVSG 1.0:	Date:	Tuesday, September 24, 2019
Temperature:	22.8°C	Humidity:	31%
Input Voltage:	120 VAC / 60 Hz	Pressure:	838mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Steve Cristanelli		

PR104673-4-3.doc

FR0100

Frequency (MHz)	Modulation			Step Size (%)	Field (V/m)	Polarity (V or H)	Dwell (sec)	Comments	Criteria Met	Pass / Fail	
	Type	%	Freq								Form
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:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	C1801827110 T1902491007 A1902481707
Standard Referenced:	VVSG 1.0:	Date:	Tuesday, September 24, 2019

PR104673-4-3.doc

FR0100



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

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	C1801827110 T1902491007 A1902481707
Standard Referenced:	VVSG 1.0:	Date:	Tuesday, September 24, 2019

---

PR104673-4-3.doc

FR0100

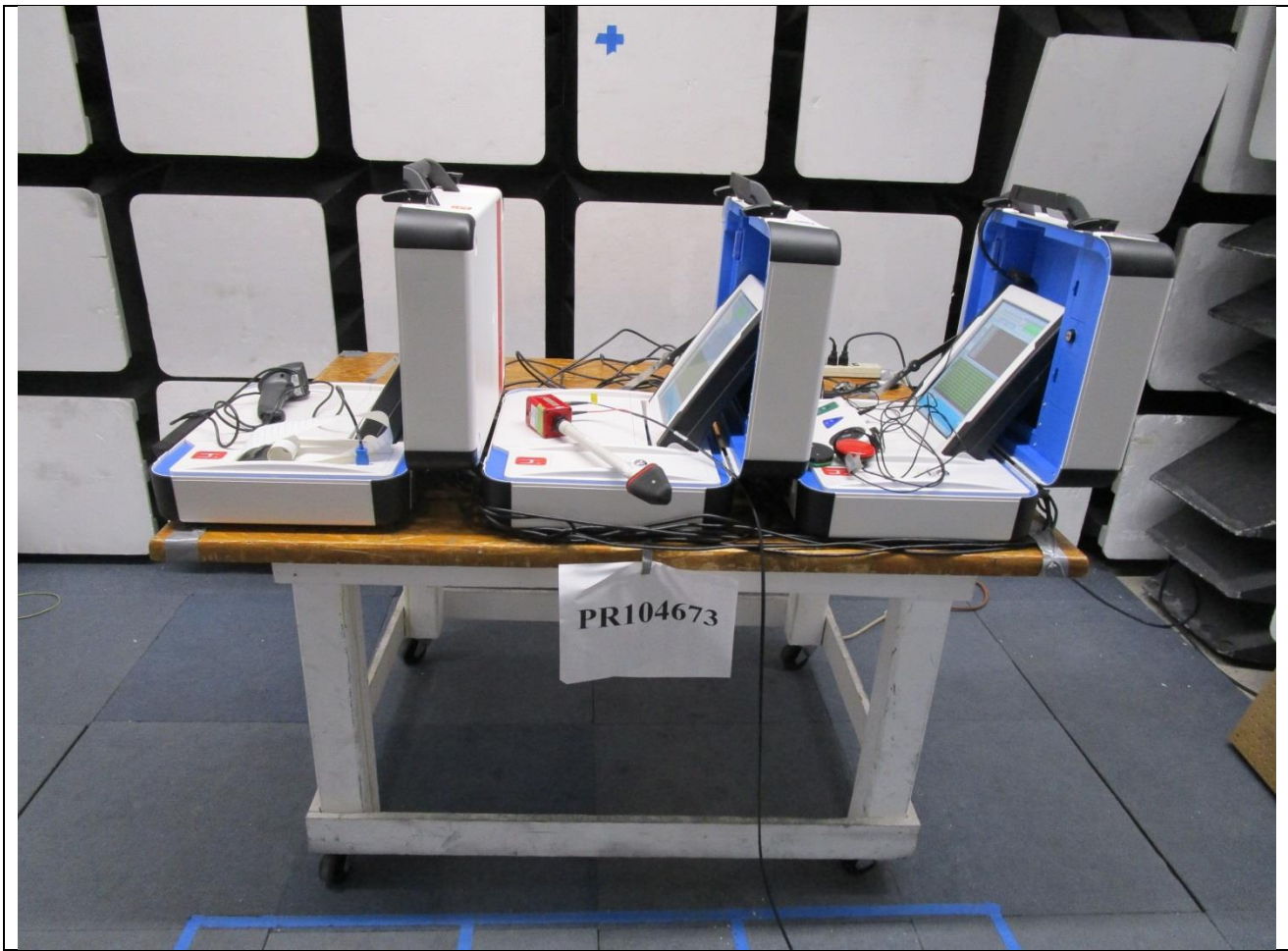


Figure B2. Radiated RF Immunity Test Setup – Right Side.

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	C1801827110 T1902491007 A1902481707
Standard Referenced:	VVSG 1.0:	Date:	Tuesday, September 24, 2019

---

PR104673-4-3.doc

FR0100

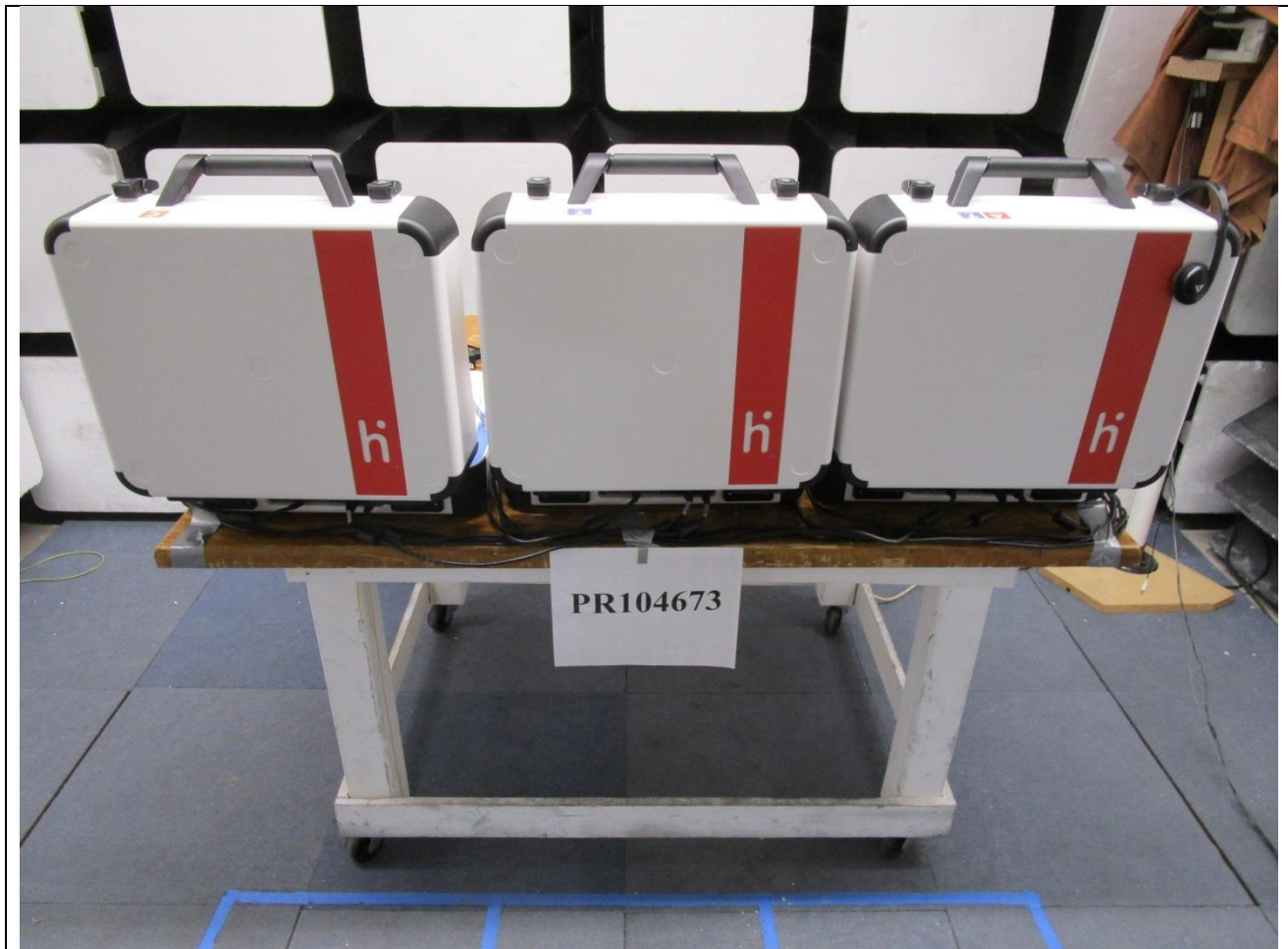


Figure B3. Radiated RF Immunity Test Setup – Back Side.

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005825 (Controller)	S/N:	C1801827110
	3005854 (Touch)		T1902491007
	3005853 (Touch with Access)		A1902481707
Standard Referenced:	VVSG 1.0:	Date:	Tuesday, September 24, 2019

PR104673-4-3.doc

FR0100

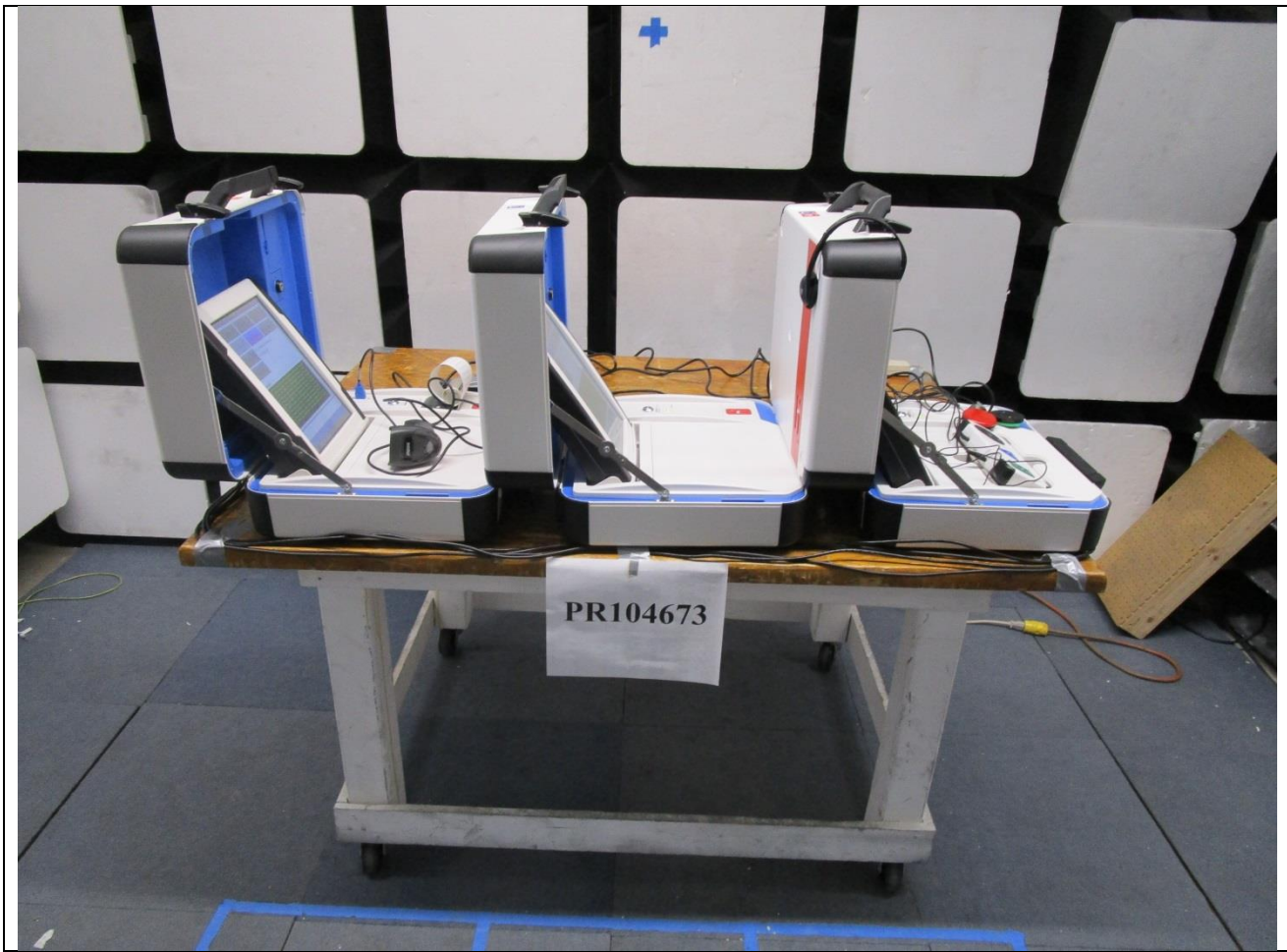


Figure B4. Radiated RF Immunity Test Setup – Left Side.





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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP0
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	C1801827110 T1902491007 A1902481707
Standard Referenced:	VVSG 1.0:	Date:	Tuesday, September 24, 2019

PR104673-4-3.doc

FR0100

### 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 IEC / EN 61000-4-4**

Manufacturer:	<u>Hart InterCivic</u>	Project Number:	<u>PR104673</u>
Customer Representative:	<u>Darrick Forester</u>	Test Area:	<u>GPI</u>
Model:	<u>3005853 (Touch with Access)</u>	S/N:	<u>Touch w/access A1902481707</u>
Standard Referenced:	<u>VVSG 1.0:</u>	Date:	<u>September 30, 2019</u>
Temperature:	<u>25.1°C</u>	Humidity:	<u>44%</u>
Input Voltage:	<u>120 VAC / 60 Hz</u>	Pressure:	<u>833 mb</u>
Configuration of Unit:	<u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>		
Test Engineer:	<u>Casey Lockhart</u>		

PR104673-4-4.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					100k Hz	AC	A	Pass
2.0		x	60	CDN	x					100k Hz		A	Pass
2.0	x		60	CDN		x				100k Hz		A	Pass
2.0		x	60	CDN		x				100k Hz		A	Pass
2.0	x		60	CDN					x	100k Hz		A	Pass
2.0		x	60	CDN					x	100k Hz		A	Pass
2.0	x		60	CDN	x	x			x	100k Hz		A	Pass
2.0		x	60	CDN	x	x			x	100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Ethernet Cable	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Daisy chain Network Cable	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch w/access  
A1902481707  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

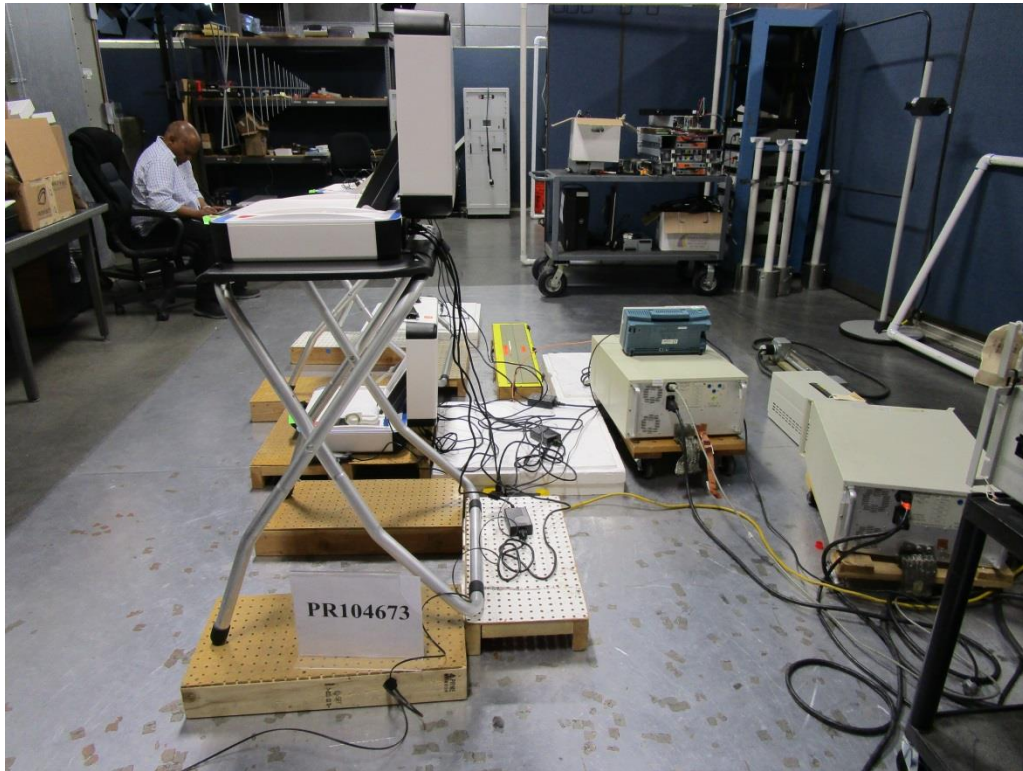


Figure C1. Electrical Fast Transient Test Setup – AC Mains \_ I/O Cable.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch w/access  
A1902481707  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

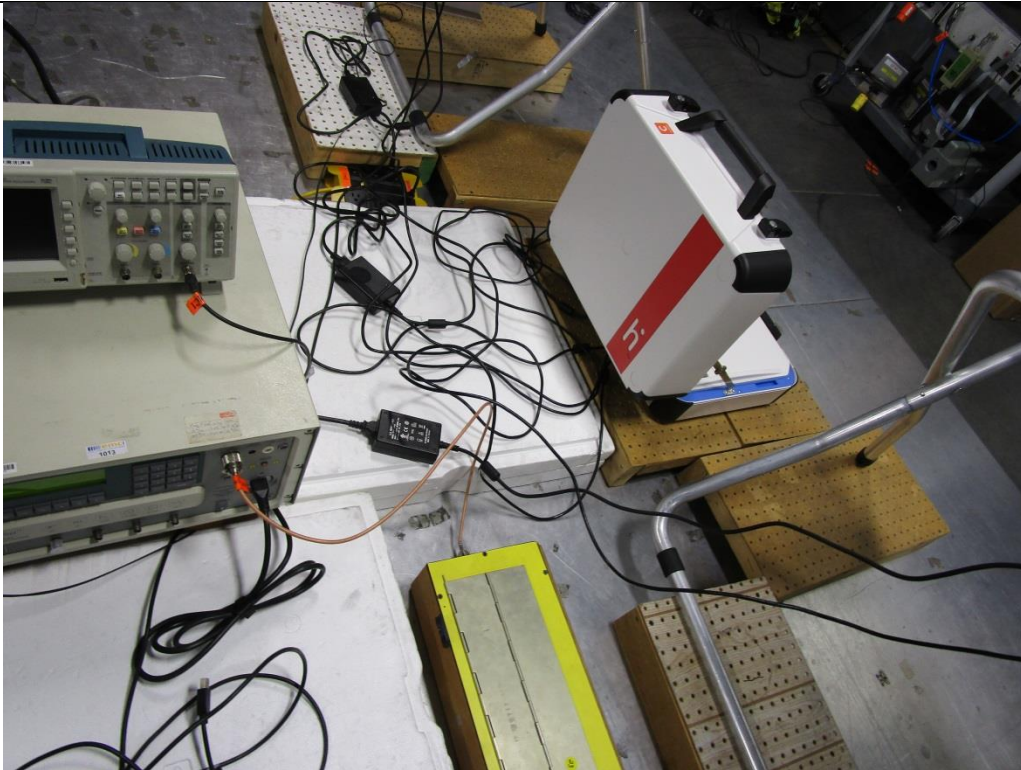


Figure C1. Electrical Fast Transient Test Setup – AC Mains \_ I/O Cable.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch w/access  
A1902481707  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

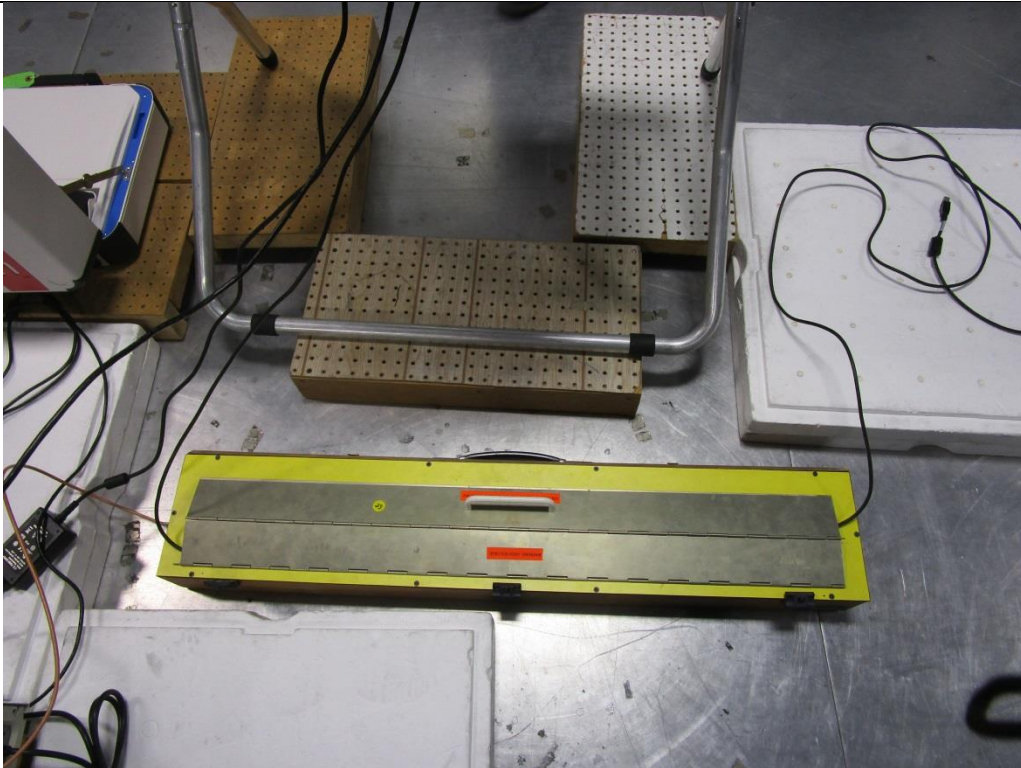


Figure C1. Electrical Fast Transient Test Setup – AC Mains \_ I/O Cable.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch w/access A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019

PR104673-4-4.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
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
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020
1019	Schaffner	CDN 125	445	Coupling Clamp	NA	NA



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

Manufacturer:	<u>Hart InterCivic</u>	Project Number:	<u>PR104673</u>
Customer Representative:	<u>Darrick Forester</u>	Test Area:	<u>GP1</u>
Model:	<u>3005854 (Touch)</u>	S/N:	<u>(Inj) T1902491007</u>
Standard Referenced:	<u>VVSG 1.0:</u>	Date:	<u>September 30, 2019</u>
Temperature:	<u>25.5°C</u>	Humidity:	<u>37%</u>
Input Voltage:	<u>120 VAC / 60 Hz</u>	Pressure:	<u>833 mb</u>
Configuration of Unit:	<u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>		
Test Engineer:	<u>Casey Lockhart</u>		

PR104673-4-4.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					100k Hz	AC	A	Pass
2.0		x	60	CDN	x					100k Hz		A	Pass
2.0	x		60	CDN		x				100k Hz		A	Pass
2.0		x	60	CDN		x				100k Hz		A	Pass
2.0	x		60	CDN					x	100k Hz		A	Pass
2.0		x	60	CDN					x	100k Hz		A	Pass
2.0	x		60	CDN	x	x			x	100k Hz		A	Pass
2.0		x	60	CDN	x	x			x	100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Ethernet Cable	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Daisy chain Network Cable	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj) T1902491007  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

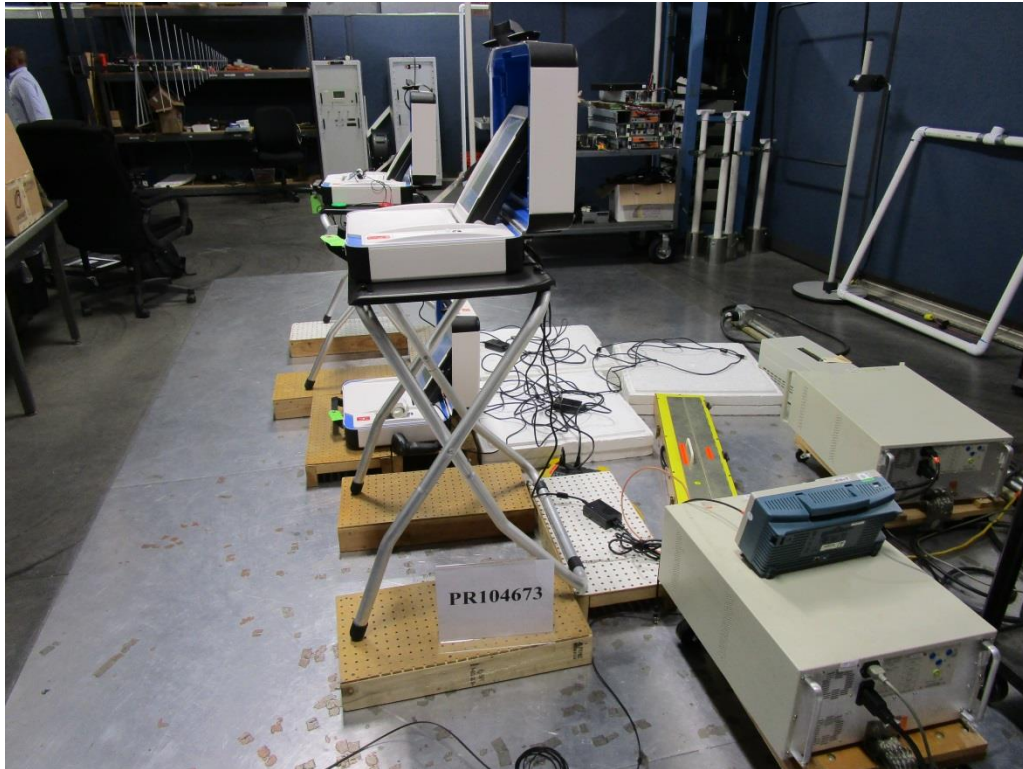


Figure C1. Electrical Fast Transient Test Setup.



---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj) T1902491007  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

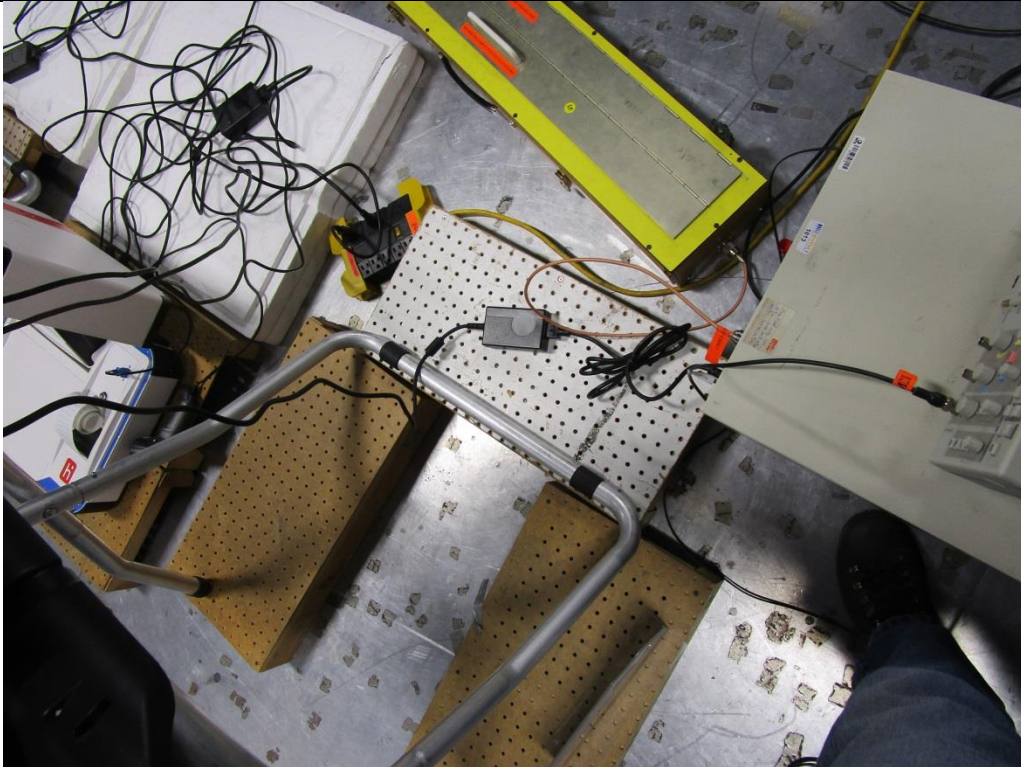


Figure C2. Electrical Fast Transient Test Setup – AC Mains.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj) T1902491007  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

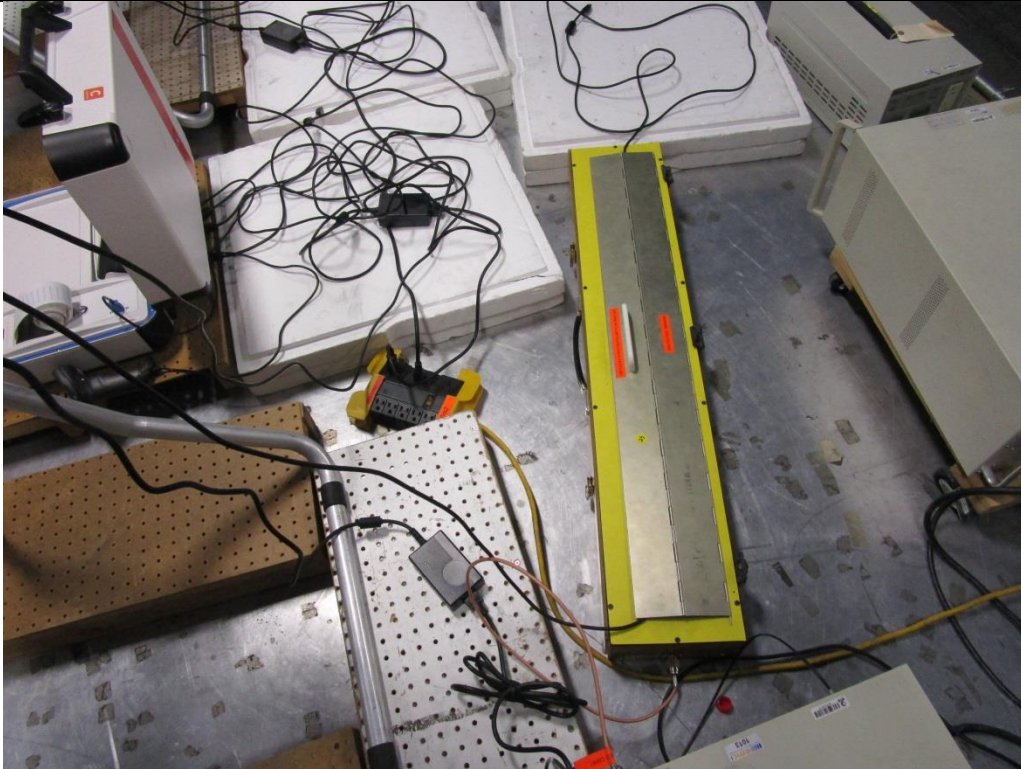


Figure C3. Electrical Fast Transient Test Setup – I/O Cable.



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

Manufacturer:	<u>Hart InterCivic</u>	Project Number:	<u>PR104673</u>
Customer Representative:	<u>Darrick Forester</u>	Test Area:	<u>GP1</u>
Model:	<u>3005854 (Touch)</u>	S/N:	<u>(Inj) T1902491007</u>
Standard Referenced:	<u>VVSG 1.0:</u>	Date:	<u>September 30, 2019</u>

PR104673-4-4.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
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
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019 8	09/22/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020
1019	Schaffner	CDN 125	445	Coupling Clamp	NA	NA



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

Manufacturer: <u>Hart InterCivic</u>	Project Number: <u>PR104673</u>
Customer Representative: <u>Darrick Forester</u>	Test Area: <u>GPI</u>
Model: <u>3005825 (Controller)</u>	S/N: <u>Controller (Inj) C1801827110</u>
Standard Referenced: <u>VVSG 1.0:</u>	Date: <u>September 30, 2019</u>
Temperature: <u>25.6°C</u> Humidity: <u>37%</u>	Pressure: <u>833 mb</u>
Input Voltage: <u>120 VAC / 60 Hz</u>	
Configuration of Unit: <u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>	
Test Engineer: <u>Casey Lockhart</u>	

PR104673-4-4.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					100k Hz	AC	A	Pass
2.0		x	60	CDN	x					100k Hz		A	Pass
2.0	x		60	CDN		x				100k Hz		A	Pass
2.0		x	60	CDN		x				100k Hz		A	Pass
2.0	x		60	CDN					x	100k Hz		A	Pass
2.0		x	60	CDN					x	100k Hz		A	Pass
2.0	x		60	CDN	x	x			x	100k Hz		A	Pass
2.0		x	60	CDN	x	x			x	100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Ethernet Cable w/capacitive clamp.	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Daisy chain Network Cable w/capacitive clamp	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass
1.0	x		60	Clamp						100k Hz	Bar code reader Cable W/capacitive clampB	A	Pass
1.0		x	60	Clamp						100k Hz		A	Pass

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Controller (Inj)  
C1801827110  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

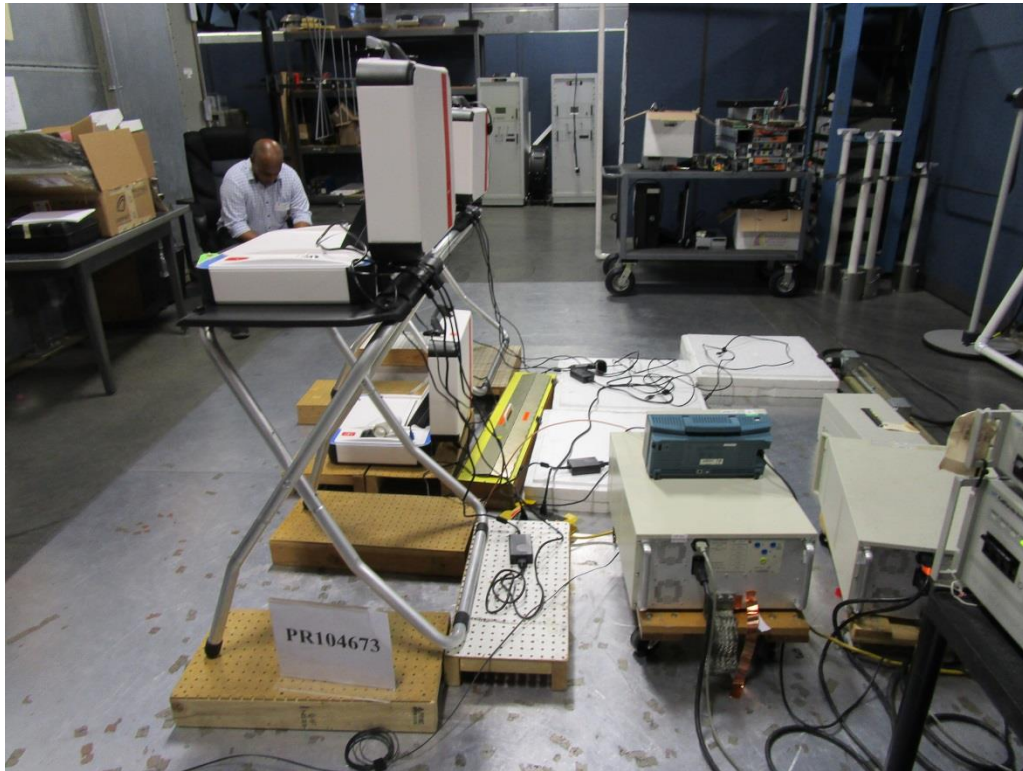


Figure C1. Electrical Fast Transient Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Controller (Inj)  
C1801827110  
Date: September 30, 2019

PR104673-4-4.doc

FR0100

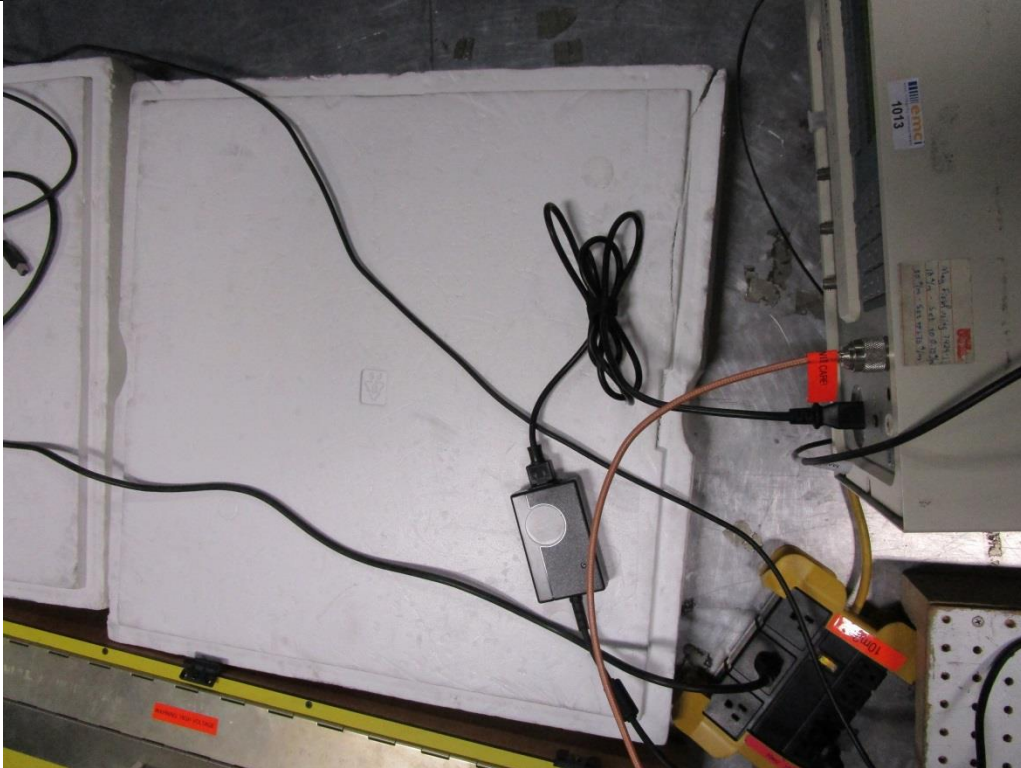


Figure C2. Electrical Fast Transient Test Setup – AC Mains.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller (Inj)  
C1801827110

Standard Referenced: VVSG 1.0:

Date: September 30, 2019

PR104673-4-4.doc

FR0100

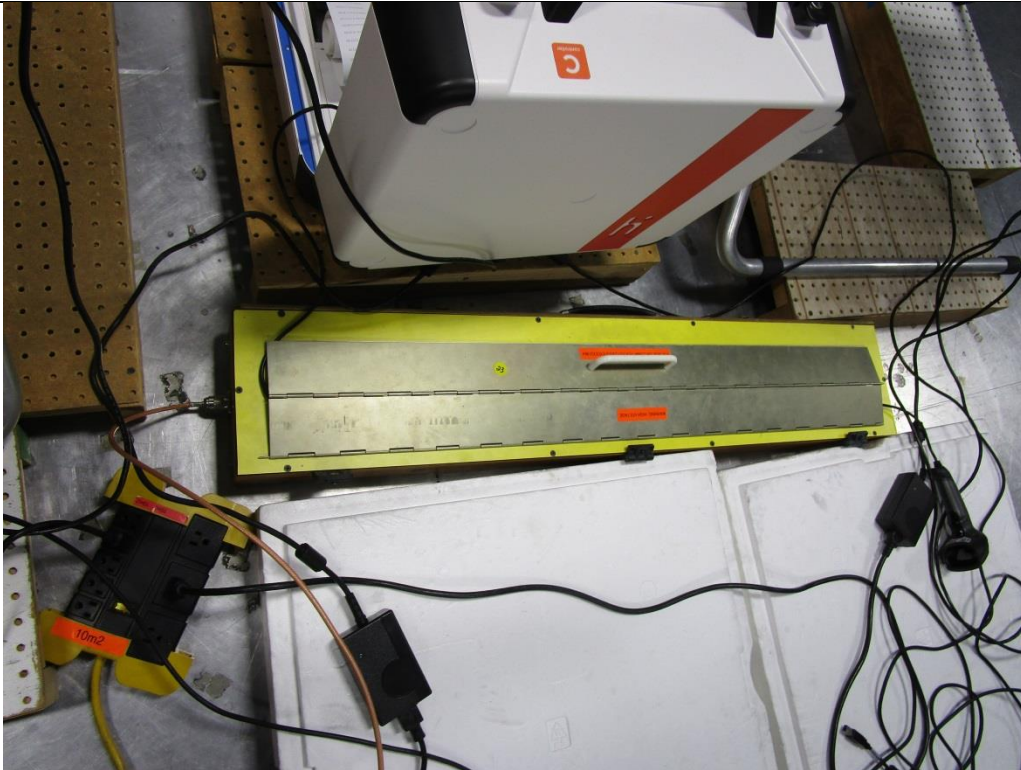


Figure C3. Electrical Fast Transient Test Setup – I/O Cable.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller (Inj) C1801827110
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019

PR104673-4-4.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
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
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020
1019	Schaffner	CDN 125	445	Coupling Clamp	NA	NA





5.4 Surge Immunity

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GPI
Model:	3005853 (Touch with Access)	S/N:	(Inj)Touch w/access <b>A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
Temperature:	23.3°C	Humidity:	40%
Input Voltage:	120 VAC / 60 Hz	Pressure:	835 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	(Inj)Touch w/access <b>A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
Temperature:	23.3°C	Humidity:	40%
Input Voltage:	120 VAC / 60 Hz	Pressure:	835 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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		0	5	45	Differential Mode	A	Pass
1.0		x	x			x		0	5	45		A	Pass
1.0	x		x			x		90	5	45		A	Pass
1.0		x	x			x		90	5	45		A	Pass
1.0	x		x			x		180	5	45		A	Pass
1.0		x	x			x		180	5	45		A	Pass
1.0	x		x			x		270	5	45		A	Pass
1.0		x	x			x		270	5	45		A	Pass
1.0	x		x			x		0	5	45	Common Mode Line	A	Pass
1.0		x	x			x		0	5	45		A	Pass
1.0	x		x			x		90	5	45		A	Pass
1.0		x	x			x		90	5	45		A	Pass
1.0	x		x			x		180	5	45		A	Pass
1.0		x	x			x		180	5	45		A	Pass
1.0	x		x			x		270	5	45		A	Pass
1.0		x	x			x		270	5	45		A	Pass
1.0	x					x	x	0	5	45	Common Mode Neutral	A	Pass
1.0		x				x	x	0	5	45		A	Pass
1.0	x					x	x	90	5	45		A	Pass
1.0		x				x	x	90	5	45		A	Pass
1.0	x					x	x	180	5	45		A	Pass
1.0		x				x	x	180	5	45		A	Pass
1.0	x					x	x	270	5	45		A	Pass
1.0		x				x	x	270	5	45		A	Pass
2.0	x		x			x		0	5	60	Common Mode Line	A	Pass
2.0		x	x			x		0	5	60		A	Pass



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	(Inj)Touch w/access <b>A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
Temperature:	23.3°C	Humidity:	40%
Input Voltage:	120 VAC / 60 Hz	Pressure:	835 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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	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: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj)Touch w/access  
A1902481707  
Date: October 1, 2019

PR104673-4-5.doc

FR0100



Figure D1. Surge Immunity Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj)Touch w/access  
A1902481707  
Date: October 1, 2019

PR104673-4-5.doc

FR0100

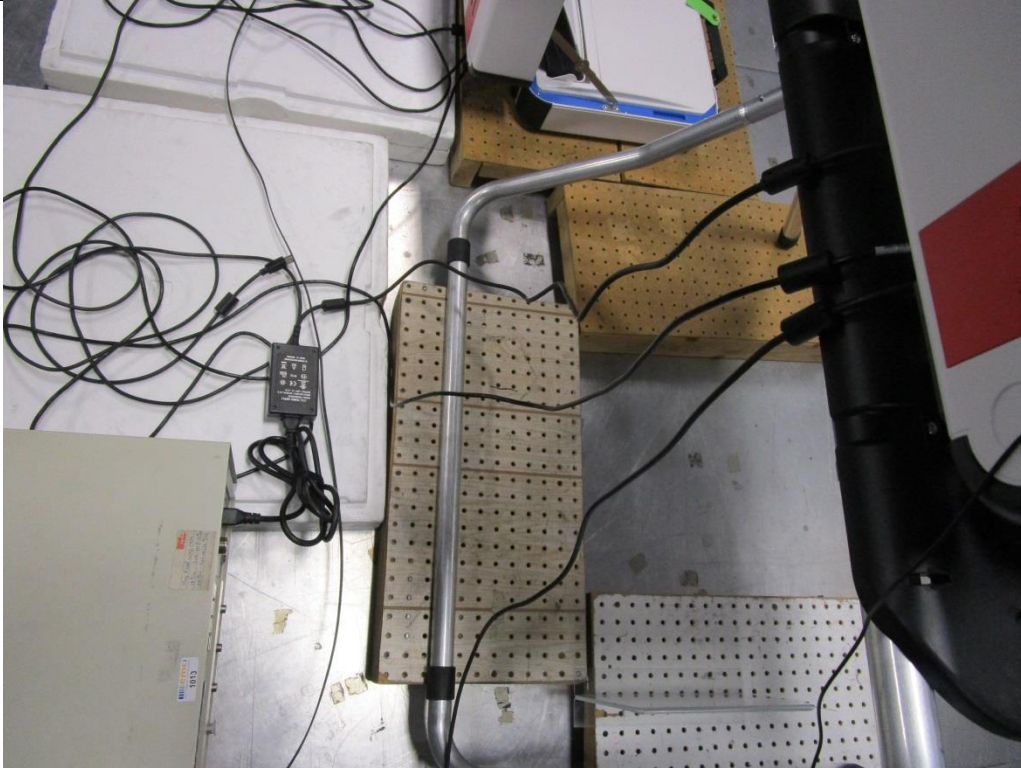


Figure D2. Surge Immunity Test Setup – AC Mains.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	(Inj)Touch w/access <b>A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019

PR104673-4-5.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
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



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	(Inj) T1902491007,
Standard Referenced:	VVSG 1.0:	Date:	September 27, 2019
Temperature:	23.1°C	Humidity:	32%
Input Voltage:	120 VAC / 60 Hz	Pressure:	833 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	(Inj) T1902491007,
Standard Referenced:	VVSG 1.0:	Date:	September 27, 2019
Temperature:	23.1°C	Humidity:	32%
Input Voltage:	120 VAC / 60 Hz	Pressure:	833 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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		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	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





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

Manufacturer:	<u>Hart InterCivic</u>	Project Number:	<u>PR104673</u>
Customer Representative:	<u>Darrick Forester</u>	Test Area:	<u>GP1</u>
Model:	<u>3005854 (Touch)</u>	S/N:	<u>(Inj) T1902491007,</u>
Standard Referenced:	<u>VVSG 1.0:</u>	Date:	<u>September 27, 2019</u>
Temperature:	<u>23.1°C</u>	Humidity:	<u>32%</u>
Input Voltage:	<u>120 VAC / 60 Hz</u>	Pressure:	<u>833 mb</u>
Configuration of Unit:	<u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>		
Test Engineer:	<u>Casey Lockhart</u>		

PR104673-4-5.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	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: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj) T1902491007,  
Date: September 27, 2019

PR104673-4-5.doc

FR0100

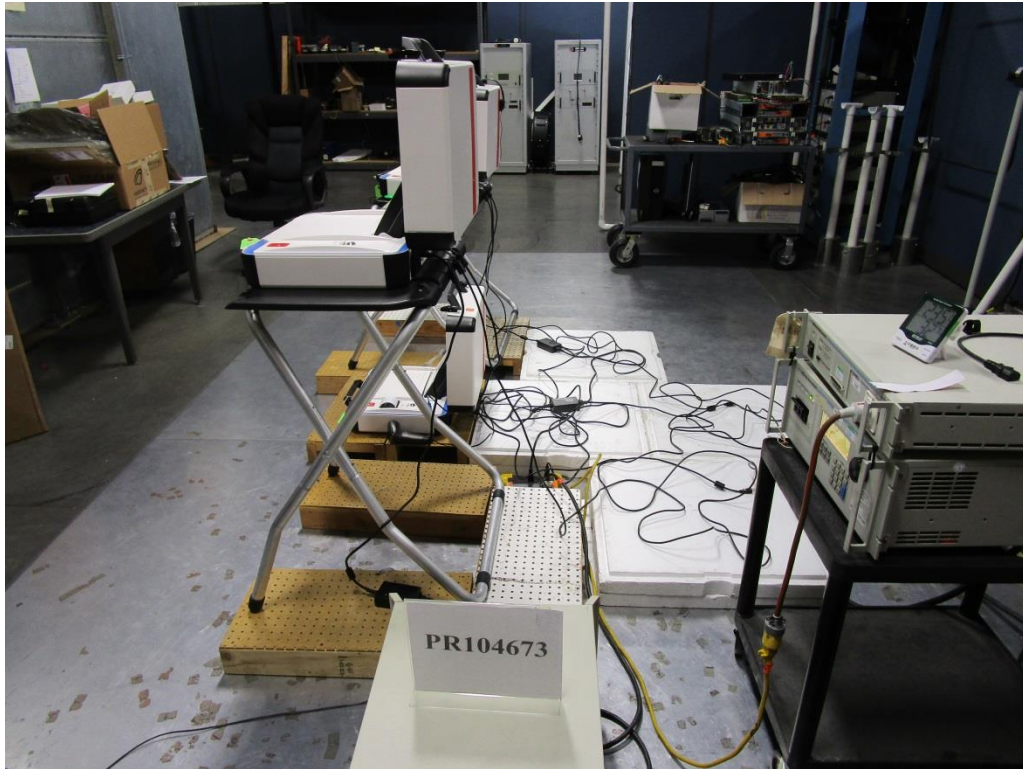


Figure D1. Surge Immunity Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj) T1902491007,  
Date: September 27, 2019

PR104673-4-5.doc

FR0100

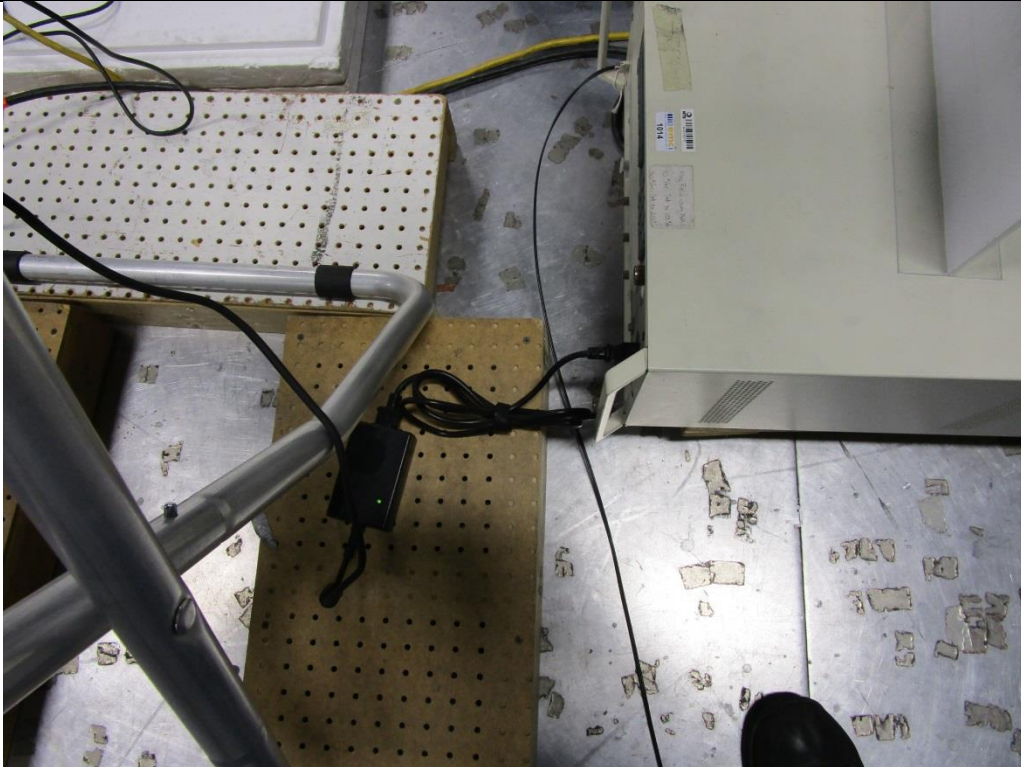


Figure D2. Surge Immunity Test Setup – AC Mains.



---

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: (Inj) T1902491007,  
Date: September 27, 2019

PR104673-4-5.doc

FR0100

### 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
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/02/2019	02/02/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller <b>(Injected on) C1801827110</b>
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019
Temperature:	23.4°C	Humidity:	33%
Input Voltage:	120 VAC / 60 Hz	Pressure:	833 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller <b>(Injected on) C1801827110</b>
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019
Temperature:	23.4°C	Humidity:	33%
Input Voltage:	120 VAC / 60 Hz	Pressure:	833 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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		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	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



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller <b>(Injected on) C1801827110</b>
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019
Temperature:	23.4°C	Humidity:	33%
Input Voltage:	120 VAC / 60 Hz	Pressure:	833 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-5.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	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: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Controller (Injected on) C1801827110  
Date: September 30, 2019

PR104673-4-5.doc

FR0100

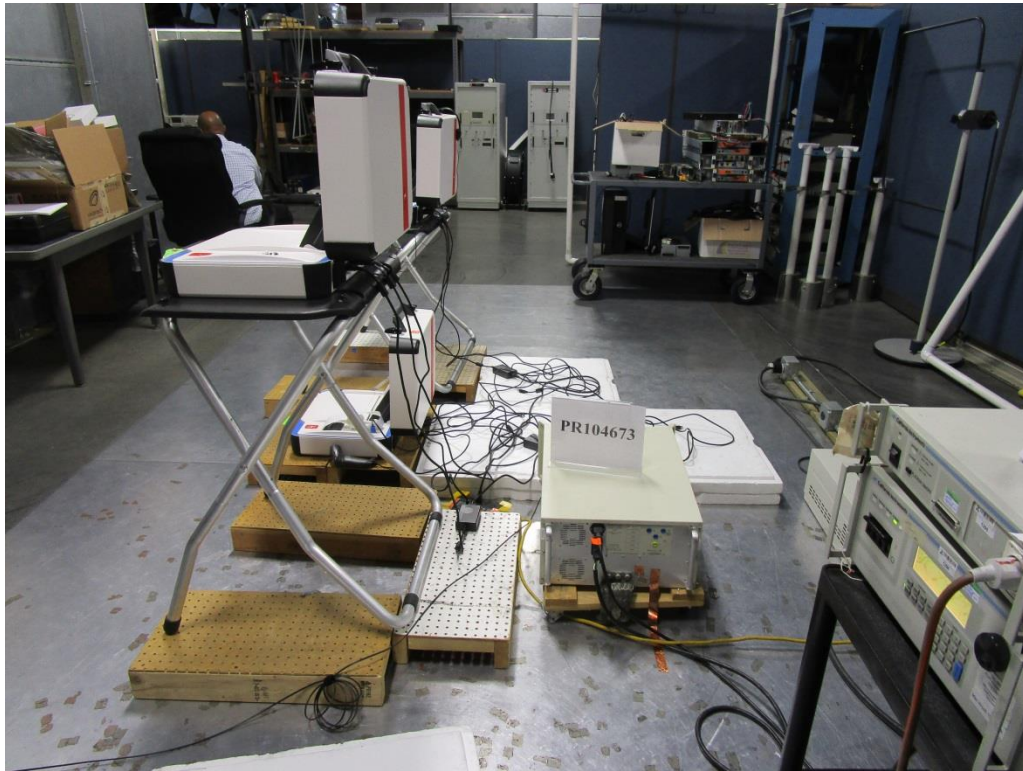


Figure D1. Surge Immunity Test Setup.



---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller (**Injected on**) C1801827110

Standard Referenced: VVSG 1.0:

Date: September 30, 2019

PR104673-4-5.doc

FR0100

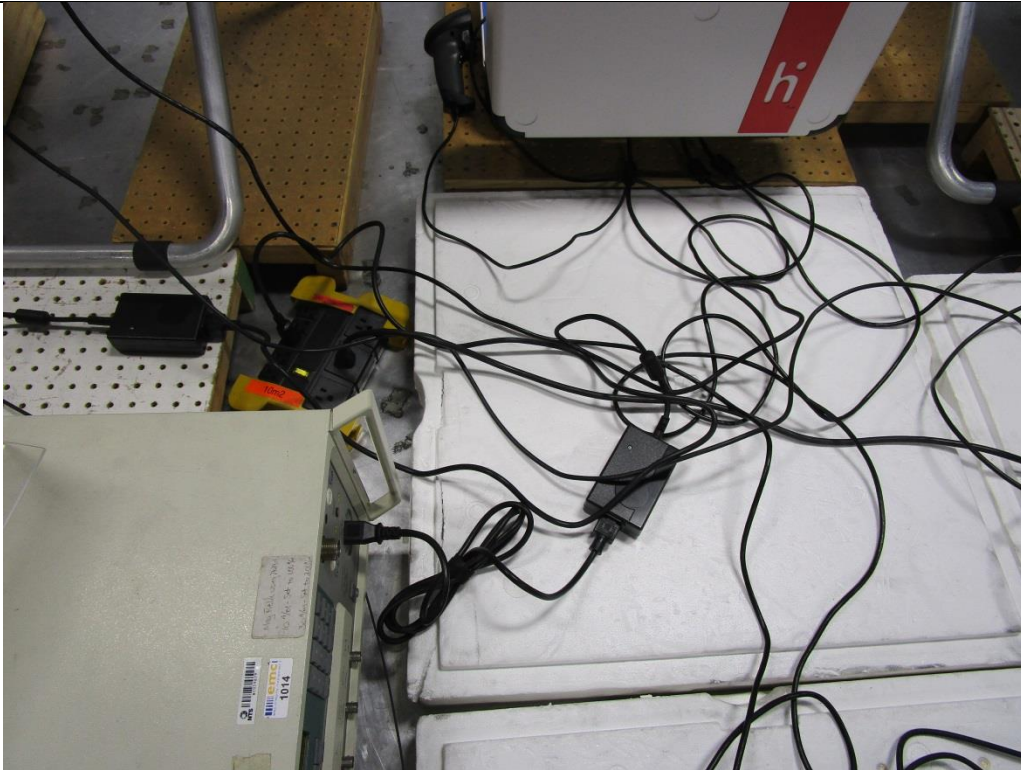


Figure D2. Surge Immunity Test Setup – AC Mains.



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller <b>(Injected on) C1801827110</b>
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019

PR104673-4-5.doc FR0100

**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
1371	Tektronix	TDS2002B	C103483	Oscilloscope, 60 MHz, 2-channel	02/02/2019	02/02/2020
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020
1184	KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA



5.5 Conducted RF Immunity

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP #2
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	Controller: C1801827110 Touch: T1902491007 Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 25, 2019
Temperature:	21°C	Humidity:	32%
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:	Mike Tidquist		

PR104673-4-6.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 X 3	A	Pass
0.150 – 80.0	AM	80	1 kHz	10	3	Ethernet Cable Terminated by EUT using EMClamp X 4	A	Pass
0.150 – 80.0	AM	80	1 kHz	10	3	Ethernet Cable Unterminated using EMClamp X 2	A	Pass

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
3005854 (Touch)  
3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP #2  
S/N: Controller:  
C1801827110  
Touch:  
T1902491007  
Touch with Access:  
A1902481707  
Date: September 25, 2019

PR104673-4-6.doc

FR0100

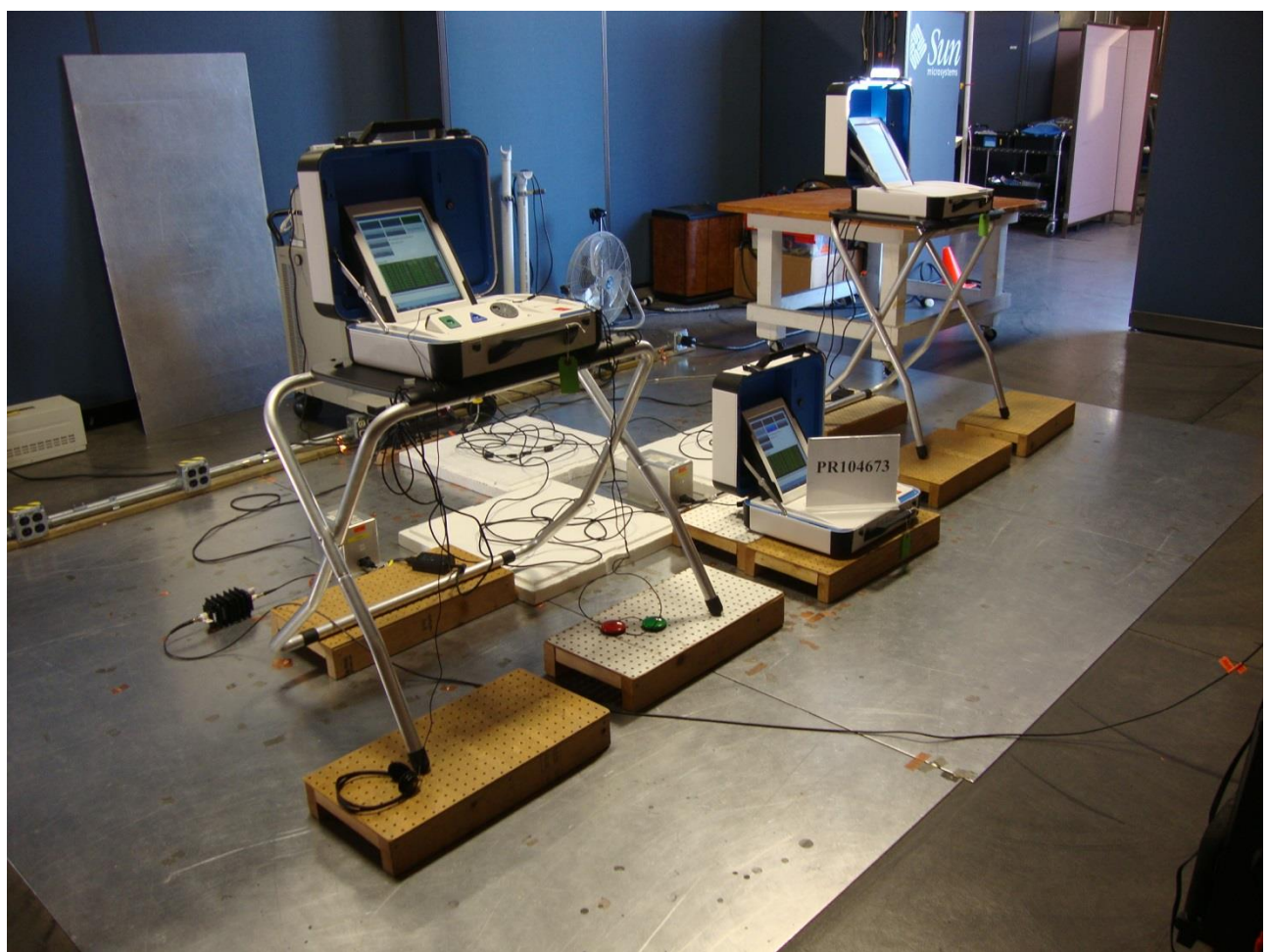


Figure E1. Conducted RF Immunity Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
3005854 (Touch)  
3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP #2  
S/N: Controller:  
C1801827110  
Touch:  
T1902491007  
Touch with Access:  
A1902481707  
Date: September 25, 2019

PR104673-4-6.doc

FR0100

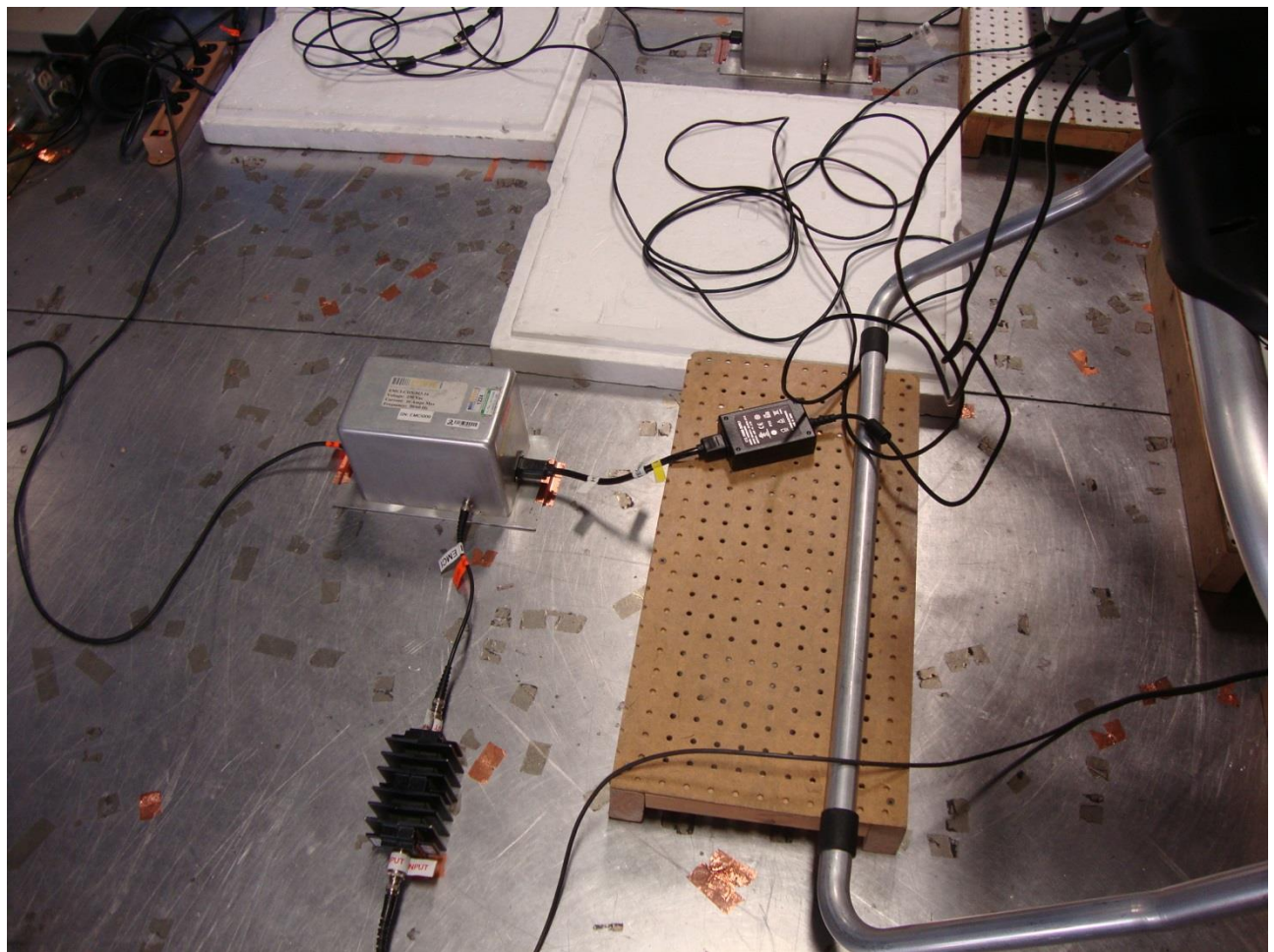


Figure E2. Conducted RF Immunity Test Setup – AC Mains.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
3005854 (Touch)  
3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP #2  
S/N: Controller:  
C1801827110  
Touch:  
T1902491007  
Touch with Access:  
A1902481707  
Date: September 25, 2019

PR104673-4-6.doc

FR0100

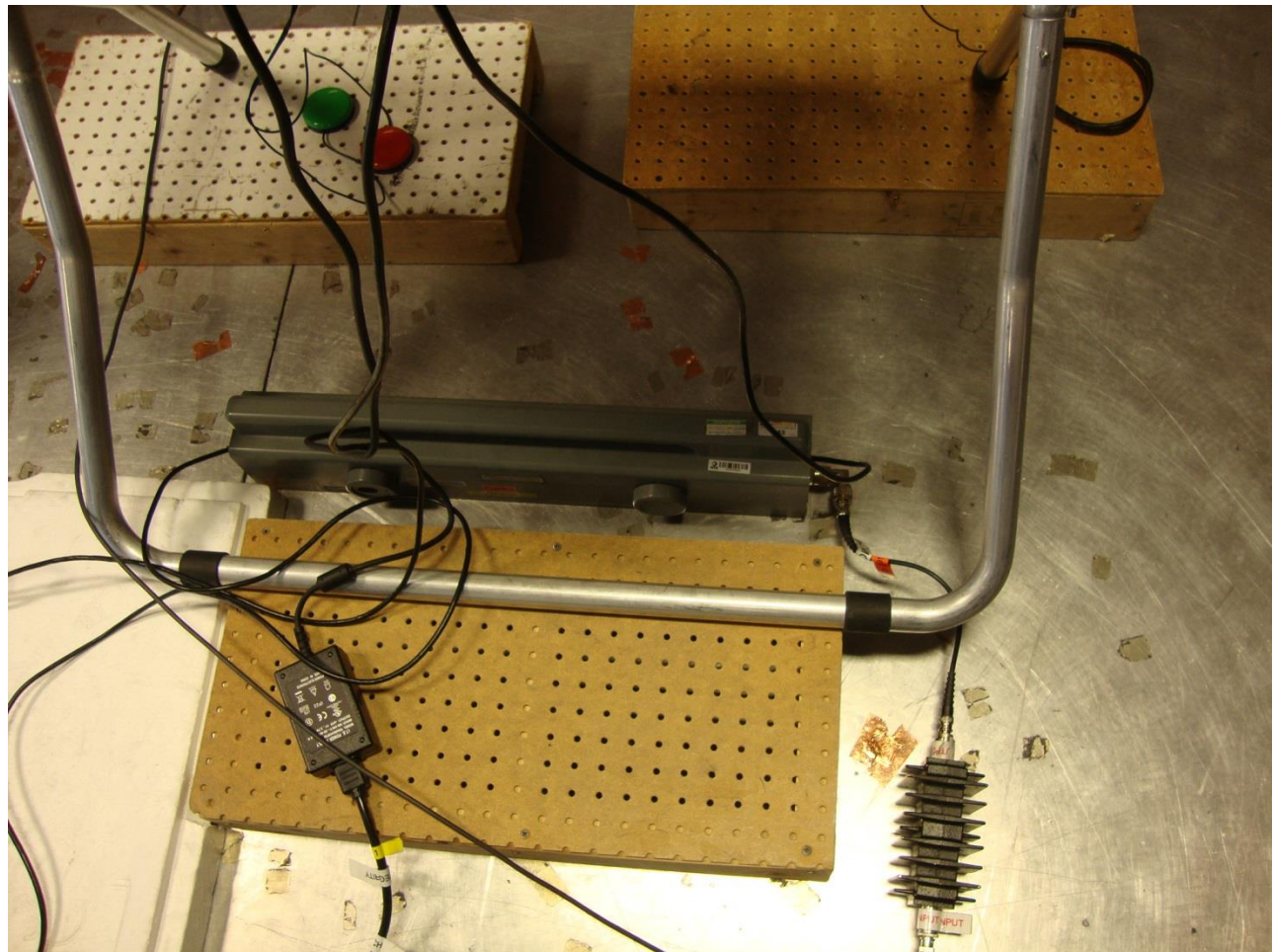


Figure E3. Conducted RF Immunity Test Setup – I/O Cable.



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP #2
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	Controller: C1801827110 Touch: T1902491007 Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 25, 2019

PR104673-4-6.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1038	Fluke	85	66180455	Multimeter/Frequency Meter	02/14/2019	02/14/2020
1055	Marconi	2024	112113/027	Signal Generator (10 kHz - 2.4 GHz)	05/13/2019	05/13/2020
1224	EMCI	EMCI-CDN-M3-16	EMCI009	M3 CDN, 16A, 250 VAC	10/12/2018	10/12/2019
1226	EMCI	EMCI-CDN-M3-16	EMCI011	M3 CDN, 16A, 250 VAC	10/12/2018	10/12/2019
1274	IFI	M100	L594-0108	100W Power Amplifier, 0.01 MHz to 220 MHz	NA	NA
1353	Fischer Custom Communications	F2031-23mm	329	EM Injection Clamp	10/12/2018	10/12/2019
1496	Rigol Technologies, Inc.	DSA815	DSA8B150500096	9 kHz to 1.5 GHz Spectrum Analyzer	03/29/2019	03/29/2020
1526	Aeroflex/Wein-schel	40-6-34	RX850	Hi power attenuator 6dB	10/11/2018	10/11/2019
1569	California Instruments by Ametek	5001IX-208-CTS, Series II	1514A02227	5kV Programmable Power Supply	08/02/2019	08/02/2020
1594	EMCI	CI	V2.5.0	Conducted Immunity Software	NA	NA
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



**5.6 Power Frequency H-Field Immunity**

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GPI
Model:	3005825 (Controller),3005854 (Touch),3005853 (Touch with Access)	S/N:	Controller: C1801827110 Touch: T1902491007 Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
Temperature:	24.4°C	Humidity:	38%
Input Voltage:	120 VAC / 60 Hz	Pressure:	835 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Casey Lockhart		

PR104673-4-8.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



---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller),3005854 (Touch),3005853 (Touch with Access)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller: C1801827110  
Touch: T1902491007  
Touch with Access: A1902481707

Standard Referenced: VVSG 1.0:

Date: October 1, 2019

PR104673-4-8.doc

FR0100

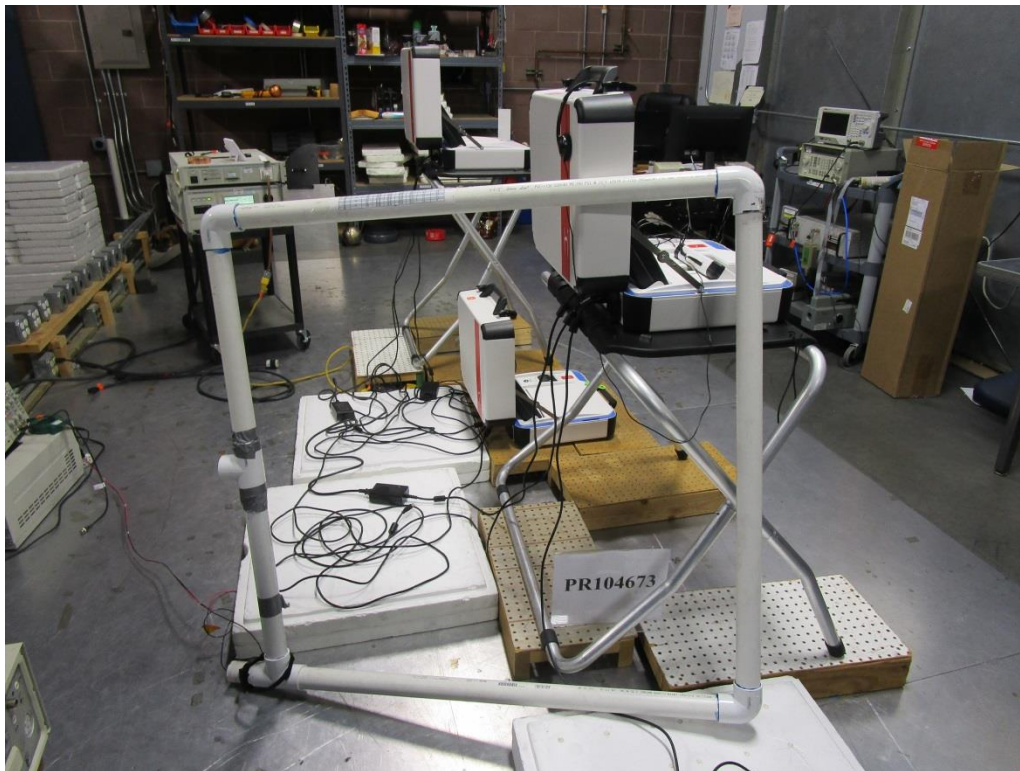


Figure F1. Power Frequency H-field Immunity Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller),3005854 (Touch),3005853 (Touch with Access)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller: C1801827110  
Touch: T1902491007  
Touch with Access: A1902481707

Standard Referenced: VVSG 1.0:

Date: October 1, 2019

PR104673-4-8.doc

FR0100



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

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller),3005854 (Touch),3005853 (Touch with Access)

Project Number: PR104673  
Test Area: GP1  
S/N: Controller: C1801827110  
Touch: T1902491007  
Touch with Access: A1902481707

Standard Referenced: VVSG 1.0:

Date: October 1, 2019

PR104673-4-8.doc

FR0100

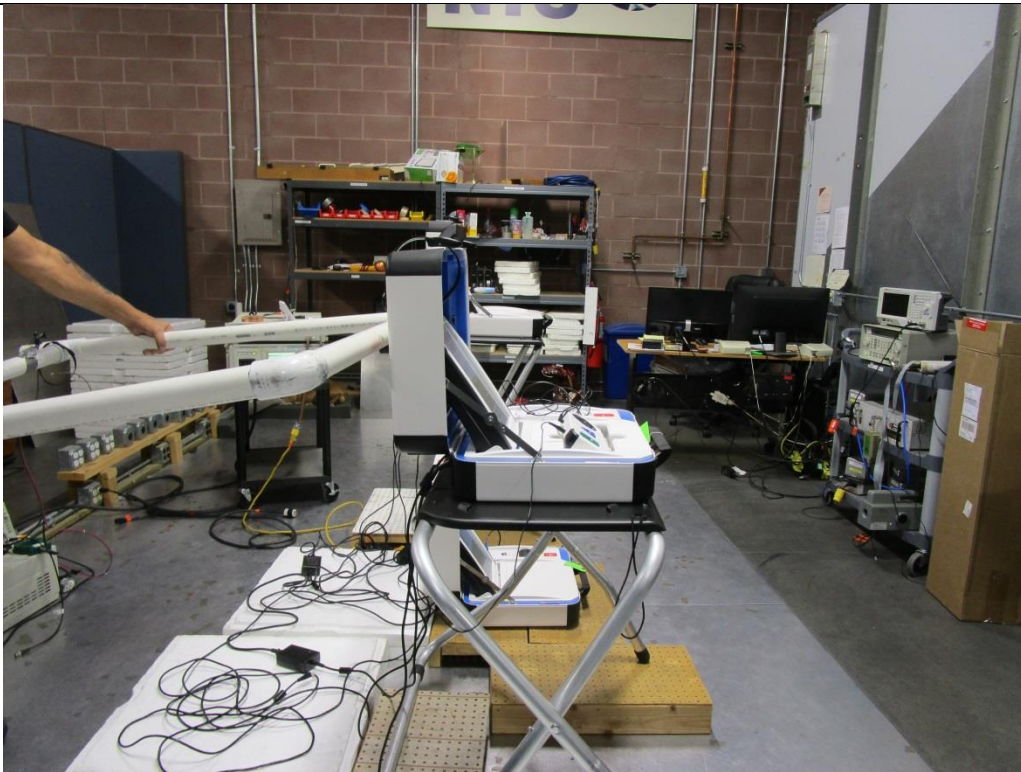


Figure F3. Power Frequency H-field Immunity Test Setup.



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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller),3005854 (Touch),3005853 (Touch with Access)	S/N:	Controller: C1801827110 Touch: T1902491007 Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019

PR104673-4-8.doc FR0100

**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
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
1718	NTS	1mx1m loop	001	H Loop antenna	01/06/2017	01/06/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



**5.7 Voltage Dips and Interruptions**

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

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	<b>Touch with Access: A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019
Temperature:	22°C	Humidity:	37%
Input Voltage:	120Vac\60Hz	Pressure:	836 mb
Configuration of Unit:	Units powered up and running with all functions exercised I/O and ports being exercised.		
Test Engineer:	Mike Tidquist/Casey Lockhart		

PR104673-4-11.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					
<b>Testing will include 3 separate machines (Controller, Touch, and Touch with Access)</b>										
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
<b>Line Voltage Variation tests</b>										
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 IEC / EN 61000-4-11

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
A1902481707  
Date: September 26, 2019

PR104673-4-11.doc

FR0100

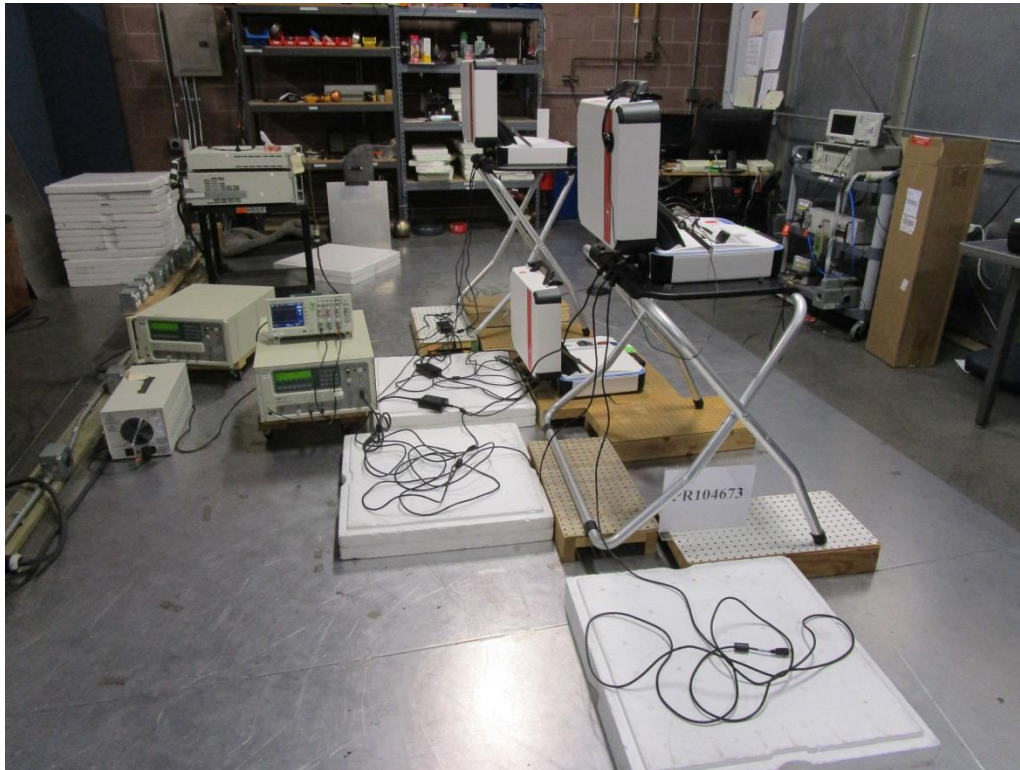


Figure G1. Voltage Dips and Interrupts Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005853 (Touch with Access)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Touch with Access:  
A1902481707  
Date: September 26, 2019

PR104673-4-11.doc

FR0100



Figure G2. Voltage Dips and Interruptions Test Setup.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	<b>Touch with Access: A1902481707</b>
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019

PR104673-4-11.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
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
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1569	California Instruments by Ametek	5001IX-208-CTS, Series II	1514A02227	5kV Programmable Power Supply	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020





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

Manufacturer: <u>Hart InterCivic</u>	Project Number: <u>PR104673</u>
Customer Representative: <u>Darrick Forester</u>	Test Area: <u>GP1</u>
Model: <u>3005854 (Touch)</u>	S/N: <u>T1902491007</u>
Standard Referenced: <u>VVSG 1.0:</u>	Date: <u>September 26, 2019</u>
Temperature: <u>22°C</u> Humidity: <u>37%</u>	Pressure: <u>836 mb</u>
Input Voltage: <u>120Vac\60Hz</u>	
Configuration of Unit: <u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>	
Test Engineer: <u>Mike Tidquist/Casey Lockhart</u>	

PR104673-4-11.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					
<b>Testing will include 3 separate machines (Controller, Touch, and Touch with Access)</b>										
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
<b>Line Voltage Variation tests</b>										
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 IEC / EN 61000-4-11

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: T1902491007  
Date: September 26, 2019

PR104673-4-11.doc

FR0100



Figure G1. Voltage Dips and Interrupts Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: T1902491007  
Date: September 26, 2019

PR104673-4-11.doc

FR0100

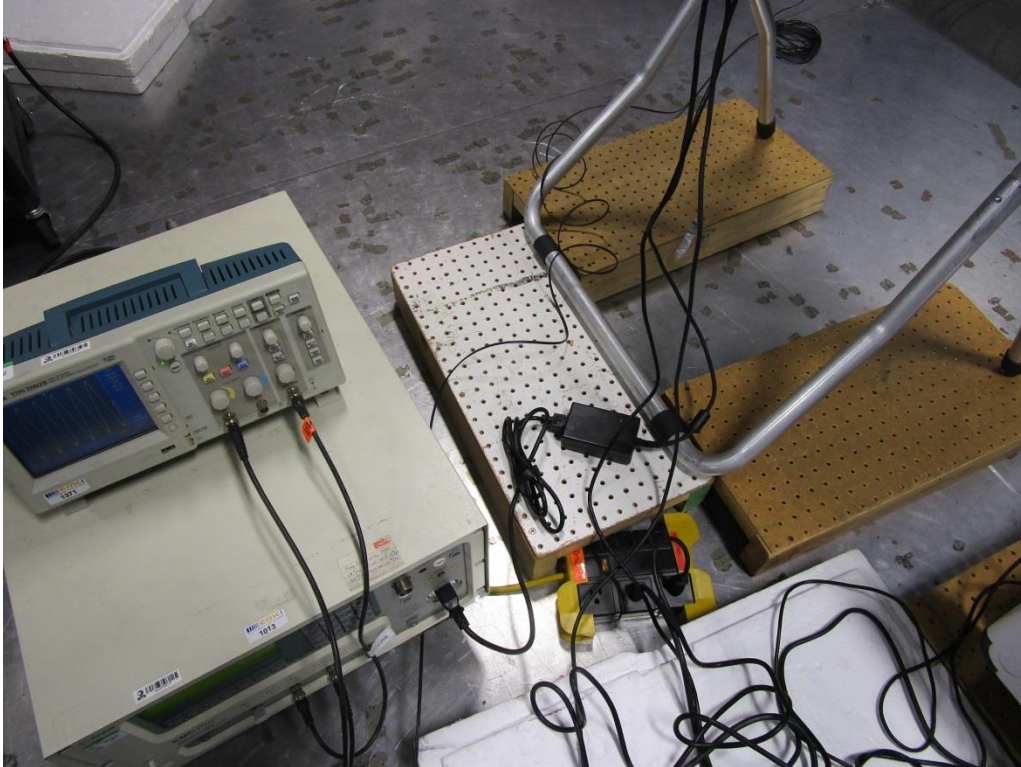


Figure G2. Voltage Dips and Interrupts Test Setup.



---

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005854 (Touch)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: T1902491007  
Date: September 26, 2019

PR104673-4-11.doc

FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
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
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1569	California Instruments by Ametek	5001IX-208-CTS, Series II	1514A02227	5kV Programmable Power Supply	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



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

Manufacturer:	<u>Hart InterCivic</u>	Project Number:	<u>PR104673</u>
Customer Representative:	<u>Darrick Forester</u>	Test Area:	<u>GP1</u>
Model:	<u>3005825 (Controller)</u>	S/N:	<b><u>Controller: C1801827110</u></b>
Standard Referenced:	<u>VVSG 1.0:</u>	Date:	<u>September 26, 2019</u>
Temperature:	<u>22°C</u>	Humidity:	<u>37%</u>
Input Voltage:	<u>120Vac\60Hz</u>	Pressure:	<u>836 mb</u>
Configuration of Unit:	<u>Units powered up and running with all functions exercised I/O and ports being exercised.</u>		
Test Engineer:	<u>Mike Tidquist/Casey Lockhart</u>		

PR104673-4-11.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					
<b>Testing will include 3 separate machines (Controller, Touch, and Touch with Access)</b>										
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
<b>Line Voltage Variation tests</b>										
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 IEC / EN 61000-4-11

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
C1801827110  
Date: September 26, 2019

PR104673-4-11.doc

FR0100

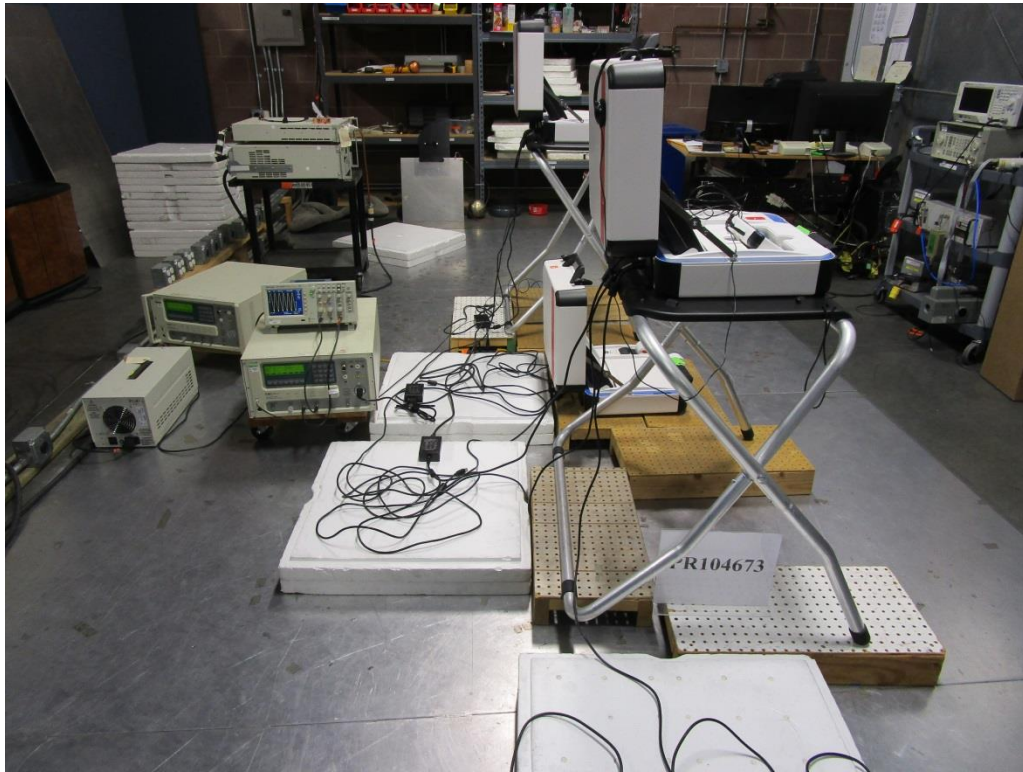


Figure G1. Voltage Dips and Interrupts Test Setup.

---

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

---

Manufacturer: Hart InterCivic  
Customer Representative: Darrick Forester  
Model: 3005825 (Controller)  
Standard Referenced: VVSG 1.0:

Project Number: PR104673  
Test Area: GP1  
S/N: Controller:  
C1801827110  
Date: September 26, 2019

PR104673-4-11.doc

FR0100

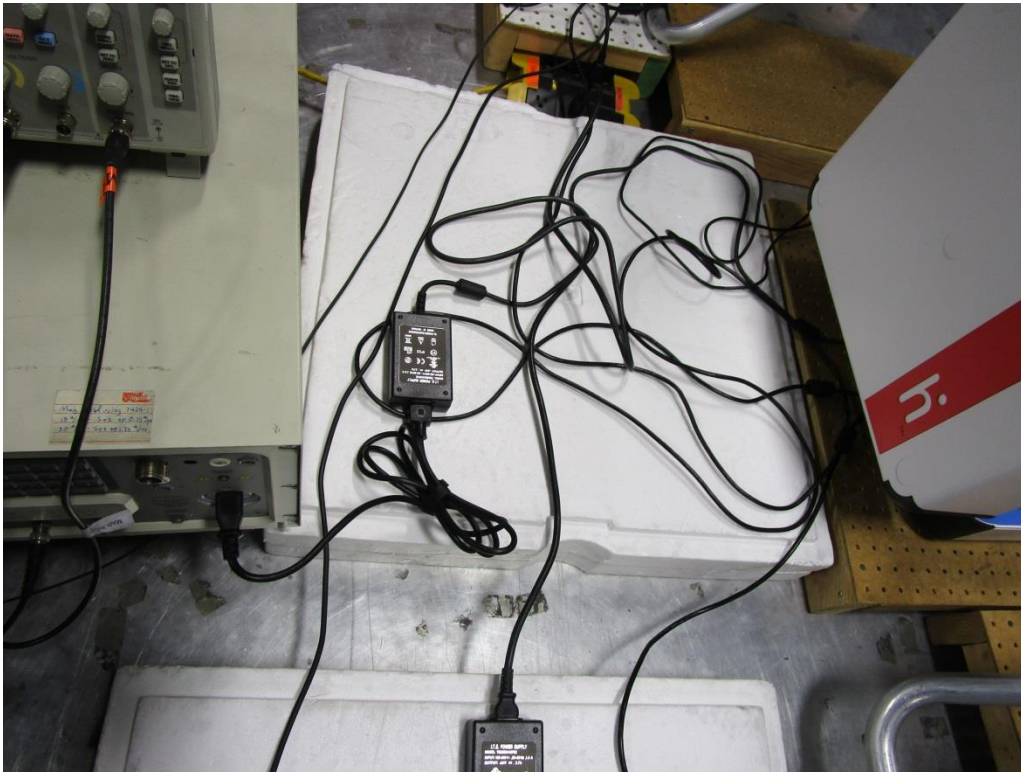


Figure G2. Voltage Dips and Interrupts Test Setup.



---

---

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

---

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	<b>Controller: C1801827110</b>
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019

PR104673-4-11.doc FR0100

### Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
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
1296	California Instruments Corporation	5001IX208-150/300	S59159	5k VA AC Power Source	08/02/2019	08/02/2020
1569	California Instruments by Ametek	5001IX-208-CTS, Series II	1514A02227	5kV Programmable Power Supply	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



**6.0 Test Log**

**EMI/ENV Test Log**

Manufacturer:	Hart InterCivic	Project Number:	PR104673
Model:	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)	S/N:	Controller: C1801827110 Touch: T1902491007 Touch with Access: A1902481707
Customer Representative:	Darrick Forester		
Standard Referenced:	VVSG 1.0,		

FR0105

**Ground Planes / CALC**

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
4-3	4356	Tuesday, September 24, 2019 0800 - 1200	Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz		4	Pass	SC
---	---	1200 - 1230	lunch		---	---	SC
---	---	1230 - 1330	continue		1	---	SC
4-6	46210	September 25, 2019 0800-1600	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (3 AC mains & 3 I/O Interconnect) 120 VAC / 60 Hz (Distance between EUT and AC input and all Interconnect cables is 80cm) AC Input on Touch still needs completed		8.0	---	MT
4-6		September 26, 2019 0800-1000	Continue: Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (3 AC mains & 3 I/O Interconnect) 120 VAC / 60 Hz (Distance between EUT and AC input and all Interconnect cables is 80cm)		2.0	Pass	MT
4-11	4196	1000-1600	Voltage Dips and Interruptions Power increases of 7.5% and reductions of 12.5% of nominal power, one hr each +/- 3 AC mains + 7.5% = 129Vac/60Hz, -12.5% = 105Vac/60Hz		6.0	Pass	MT
4-5	45918	September 27, 2019 1100 - 1630	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz Note: Injected on T1902491007		5.5	Pass	CL
---	---	September 30, 2019 0800 - 1330	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz Injected on C1801827110		5.5	Pass	CL
4-4	4412	1330 - 1430	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV, rep rate 100 kHz. (3 AC mains & 3 I/O) 120 VAC / 60 Hz Injected on all three UUT separately.		1.0	Pass	CL

### Ground Planes / CALC

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
	4193	1430 - 1530	Voltage Dips and Interruptions 70% nom, 0.6 cycles / 40% nom, 60 cycles / 0% nom, 300 cycles. 3 AC mains 120 VAC / 60 Hz S/N A1902481707, C1801827110, T1902491007		1.0	Pass	CL
4-5	45918	October 1, 2019 0700 - 1230	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz Note: Injected on A1902481707		5.5	Pass	CL
4-11	4192	1230 - 1330	Voltage Dips and Interruptions Surges of +15% line variations of nominal line voltage. (See Protocol) 138Vac/60Hz and 102Vac/60Hz all three UUT's.		1.0	Pass	CL
---	---	1330 - 1400	Post-test check		.5	---	CL
	4832	1400 - 1500	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120 VAC / 60 Hz		1.0	Pass	CL
4-2	4296	1500 - 1600	Electrostatic Discharge +/- 8kV Contact, +/- 15kV Air (See 4.1.2.8 of VVSG) 120 VAC / 60 Hz		1.0	---	CL
---	---	October 2, 2019 0800 - 1200	Electrostatic Discharge +/- 8kV Contact, +/- 15kV Air (See 4.1.2.8 of VVSG) 120 VAC / 60 Hz Note: Injecting on Controller S/N <b>C1801827110, +8kV indirect contact on the back of the UUT, got blue screen, rebooted, did not repeat. At -15kV on back of UUT at Power cord, screen went blank, repeated. NEW Control UUT installed. Repeated +/- 15kV on New Control UUT. Passed.</b>		4.0	Pass	CL



Project #:  
PR104673  
B90817

Work Order #: 2019082202

PO#:  
Amount:

Company: SLI Global Solutions  
Phone: 303-384-5606  
Fax:

Contact: Darrick Forester  
Email: dforester@slicompliance.com

Model#:  
Serial #:

Test Notes: Formal Testing  
RE/CE: FCC Class B limits  
Unit has three(3) AC mains  
Immunity: Test per Client's protocol  
EFT/CI: 3 AC main & 3 I/O  
PQF: Two additional tests requested, see protocol  
Provide client with formal test reports

Quoted Work						
Date	Test Code	Description	Standard	Result	Cost	Billed
September 23, 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 23, 2019	2342	Conducted Emissions, 150 kHz - 30 MHz 3 AC mains 120 VAC / 60 Hz	FCC Part 15, Class B	Pass		
October 1, 2019	4296	Electrostatic Discharge +/- 8kV Contact, +/- 15kV Air (See 4.1.2.8 of VVSG) 120 VAC / 60 Hz	EN61000-4-2	Pass		
Tuesday, September 24, 2019	4356	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 30, 2019	4412	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV, rep rate 100 kHz. (3 AC mains & 3 I/O) 120 VAC / 60 Hz	EN61000-4-4	Pass		
September 27, 2019	45918	Surge Immunity Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz	EN61000-4-5	Pass		
September 25, 2019	46210	Conducted RF Immunity 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (3 AC mains & 3 I/O Interconnect) 120 VAC / 60 Hz	EN61000-4-6	Pass		



Quoted Work						
Date	Test Code	Description	Standard	Result	Cost	Billed
October 1, 2019	4832	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 120 VAC / 60 Hz	EN61000-4-8	Pass		
October 1, 2019	4192	Voltage Dips and Interruptions Surges of +15% line variations of nominal line voltage. (See Protocol) TBD	EN61000-4-11	Pass		
September 30, 2019	4193	Voltage Dips and Interruptions 70% nom, 0.6 cycles / 40% nom, 60 cycles / 0% nom, 300 cycles. 3 AC mains 120 VAC / 60 Hz	EN61000-4-11	Pass		
September 26, 2019	4196	Voltage Dips and Interruptions Power increases of 7.5% and reductions of 12.5% of nominal power, one hr each +/- . 3 AC mains 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 Controller with Touch and Touch with Access
Model Number (of UUT to be tested)	3005825 (Controller) 3005854 (Touch) 3005853 (Touch with Access)
Functional description of product (what is it, what does it do, etc.)	<p>Voting equipment.</p> <p><b>Controller</b> is a poll worker device use for management of voting devices.</p> <p><b>Touch</b> is a DRE touch screen voting device.</p> <p><b>Touch with Access</b> is a DRE voting device that is identical to the Touch DRE except it adds a Verity Access controller.</p> <p>They are networked together via a daisy-chain network cable (100Mbit Ethernet over a proprietary cable).</p>
List all modes of operation	<p><b>Controller, Touch, Touch with Access</b> units are daisy-chained via network cables.</p> <p><b>Controller:</b></p> <ul style="list-style-type: none"> <li>- Printing to thermal printer</li> <li>- Writing data to USB flash drive</li> <li>- Bar code scanner plugged in and actively scanning (trigger held down).</li> <li>- Network data transfer to/from Touch/Touch with Access devices.</li> </ul> <p><b>Touch (unit 1):</b></p> <ul style="list-style-type: none"> <li>- Network data transfer to/from Controller</li> </ul> <p><b>Touch with Access (unit 2):</b></p> <ul style="list-style-type: none"> <li>- Network data transfer to/from Controller</li> </ul>
Can modes be operated simultaneously? If so, explain.	Yes, these are multitasking systems

What mode(s) will be used for testing?	Controller, Touch, and Touch with Access will be running diagnostic software which exercises all modes during test.					
Product type (IT, Medical, Scientific, Industrial, etc.)	ITE					
Is the product an intentional radiator	No					
Product Dimensions	Storage Dimensions (approx.) 19" wide x 18" deep x 8" high  Operational Dimensions (approx.) 19" wide x 22" deep x 21" high					
Product Weight	28 lbs.					
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 Controller will sit atop a tabletop. The Verity Touch will sit on a Standard Booth while the Touch with Access will sit on a Accessible Booth.  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 <b>ALL</b> I/O connections on the unit(s) under test, as well as <b>MAXIMUM</b> associated cable lengths below						
Model No.	Description	I/O Type		Length (m)	Patient Connect? (See Note)	QTY
		UUT-UUT	UUT-SE			
3005825	Daisy-chain Network (100Mbit Ethernet) Note: this is Ethernet over a USB 3.0 cable One cable to/from the Touch One cable bundled and unterminated	X		5		2
3005825	USB A to RJ50 Cable to Bar Code scanner		X	1.8		1
3005854	Daisy-chain Network (100Mbit Ethernet) Note: this is Ethernet over a USB 3.0 cable One cable to/from Controller One cable to/from Touch with Access	X		5		2
3005853	Daisy-chain Network (100Mbit Ethernet) Note: this is Ethernet over a USB 3.0 cable One cable to/from Touch One cable bundled and unterminated	X		5		2

3005853	Headphones to Touch with Access accessibility controller		X	1.8		1
3005853	Red/Green Jelly switches to Touch with Access accessibility controller		X	1.5		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.)	Each device has a power cord. Complete UUT will consist of 3 devices.

## Unit Under Test (UUT) – Detailed Information

UUT Hardware			
Condition	Verity Controller, Touch, and Touch with Access units connected via daisy-chain network cable, units powered up and running with all functions exercised, I/O and ports being exercised.		
Configuration During Test	Verity Controller on tabletop, Touch on Standard Booth, and Touch with Access on Accessible Booth, all connected via daisy-chain network cable. 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 Controller	3005825	TBD	Verity Controller device
Verity Touch	3005854	TBD	Verity Touch device
Verity Touch with Access	3005853	TBD	Verity Touch with Access device
I/O Cabling			
See Section 2.0 for details			

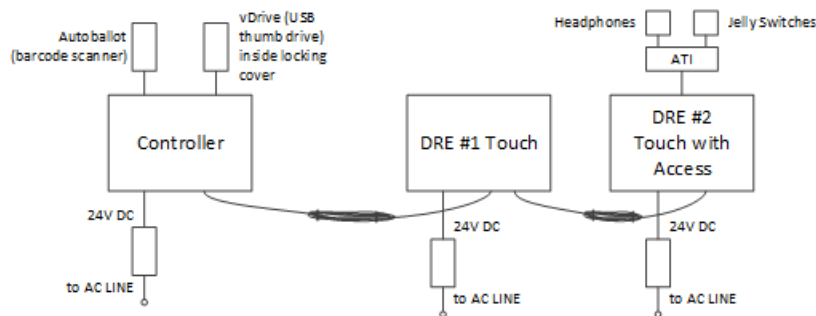
<b>UUT Software/Firmware</b>		
<b>Name</b>	<b>Version/Revision</b>	<b>Functionality</b>
WES	7, SP1	Operating System
Test Applications	N/A	Exercises the functionality of the system and the ports.
<b>UUT Operating Conditions</b>		
List all frequencies generated/used by the product.	1.91GHz, 0.307MHz, 10MHz, 12MHz, 24MHz, 25MHz crystals/oscillators.	
How will product be exercised during test?	All units 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 the <b>Controller</b> 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 with Access Controller on the Touch with Access unit. 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 from the Touch with Access unit.		
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
ATI module	ATI module to Touch Writer Duo		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)<sup>1,2</sup>:</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

 Page 1 of 4

<u>Test Technology:</u>	<u>Test Method(s)<sup>1,2</sup>:</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)<sup>1,2</sup>:</u>
<p><i>Generic/Product Family Standards and Industry Standards (cont'd)</i></p> <p>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>

<sup>1</sup> 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.

<sup>2</sup> 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.1<sup>3</sup>

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

<sup>3</sup> 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 8<sup>th</sup> 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**