

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

Prepared For

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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 Ta-	10/29/2019
	ble 5.0-1; corrected calibration dates for Equipment ID 1013.	



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1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Electromagnetic Interference test program. The test program was conducted to assess the ability of the specified Equipment Under Test (EUT) to successfully satisfy the requirements listed in Section 2.0.

2.0 References

The following references listed below form a part of this document to the extent specified herein.

- SLI Compliance Purchase Order(s) 20190820-01, 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:

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			

Table 3.0-1: Product Identification - Equipment Under Test (EUT)

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	$\pm 2.8 \text{ dB}$
Dadiated Electric Field	dDuV/m	30-1,000 MHz	$\pm 4.2 \text{ dB}$
Radiated Electric Field	dBuV/m	1,000-6,000 MHz	$\pm 4.2 \text{ dB}$
Radiated Immunity	V/m	80-2,700 MHz	- 26.3%, + 29.97%
ESD	kV	N/A	$\pm 8.6\%$
DET	Voltage	N/A	$\pm 5.98\%$
EFI	Timing	N/A	$\pm 8.60\%$
Surge	Voltage	N/A	$\pm 4.92\%$
RF Common Mode (CDN Method)	Vrms	N/A	-12.64%, +13.33%
RF Common Mode (BCI Method)	Vrms	N/A	-13.45%, +15.32%



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 -	3005853,	A1902481707,	Complies
				10/02/2019	3005854,	T1902491007,	
					3005825	C1801827110,	
						C1801827210	
5.2	Radiated RF Immunity	VVSG 1.0	Longmont	09/24/2019 -	3005853,	A1902481707,	Complies
	-		-	09/24/2019	3005854,	T1902491007,	_
					3005825	C1801827110	
5.3	Electrical Fast Transient /	VVSG 1.0	Longmont	09/30/2019 -	3005853,	A1902481707,	Complies
	Burst		-	09/30/2019	3005854,	T1902491007,	_
					3005825	C1801827110	
5.4	Surge Immunity	VVSG 1.0	Longmont	09/27/2019 -	3005853,	A1902481707,	Complies
			-	10/01/2019	3005854,	T1902491007,	_
					3005825	C1801827110	
5.5	Conducted RF Immunity	VVSG 1.0	Longmont	09/25/2019 -	3005853,	A1902481707,	Complies
	-		-	09/25/2019	3005854,	T1902491007,	_
					3005825	C1801827110	
5.6	Power Frequency H-	VVSG 1.0	Longmont	10/01/2019 -	3005853,	A1902481707,	Complies
	Field Immunity		-	10/01/2019	3005854,	T1902491007,	_
	_				3005825	C1801827110	
5.7	Voltage Dips and Inter-	VVSG 1.0	Longmont	09/26/2019 -	3005853,	A1902481707,	Complies
	ruptions			09/26/2019	3005854,	T1902491007,	_
	_				3005825	C1801827110	



5.1 Electrostatic Discharge

Electrostat	tic Discha	rge p	per I	EC / EN	61000-4-2	2		
	Manufacture	r: H	art Inte	erCivic		Project Number:	PR104673	
Customer H	Representative	e: D	arrick	Forester		Test Area:	GP1	
	Mode	1: 30	05853	3 (Touch wit	h Access)	S/N:	Touch with A19024817	Access: 07
Standa	rd Referenced	1: V	VSG 1	.0:		Date:	October 2, 2	2019
	Temperature	e: 20).9°C		Humidity:	39% Pressure:	837 mb	
	Input Voltage	e: 12	20 VA	C / 60 Hz	-			
Configu	ration of Uni	t: U	nits po	wered up an	d running wi	ith all functions exercised I/O and ports bein	g exercised.	
	Test Engineer	r: Ca	asey L	ockhart				
PR104673-4-2.d	oc							FR0100
Test Location	Voltage Level (kV)	Pola +	arity -	Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
					Indirect Dis	charge Points		
VCP	2,4	x	x	10	1	Front Side	А	Pass
VCP	2, 4	х	х	10	1	Left Side	А	Pass
VCP	2,4	х	х	10	1	Right Side	А	Pass
VCP	2, 4	х	х	10	1	Back Side	А	Pass
	1		T		1			1
HCP	2,4	х	х	10	1	Edge of HCP at Front of UUT	N/A	N/A
	1		1	Contact	t Discharge I	Points - RED Arrows.		1
Figure A2	2, 4	х	х	10	1	No discharge points found.		
Figure A3	2,4	х	х	10	1	No discharge points found.		
Figure A4	2,4	х	х	10	1	No discharge points found.		
Figure A5	2,4	х	х	10	1	No discharge points found.		
	L			Air Di	ischarge Poir	nts - BLUE Arrows.		
Figure A2	2, 4, 8	х	х	10	1		А	Pass
Figure A3	2, 4, 8	х	х	10	1		А	Pass
Figure A4	2, 4, 8	x	х	10	1		А	Pass
Figure A5	2, 4, 8	x	х	10	1		А	Pass
Figure A6	2, 4, 8	х	х	10	1		А	Pass



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access:
			A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Privates		

Figure A1. Electrostatic Discharge Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A2. Electrostatic Discharge	Test Setup.	
	riguie A2. Electrostatic Discharge	r rest setup.	

Figure A2. Electrostatic Discharge Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access:
			A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A3. Electrostatic D	ischarge Test Setup.	



Customer Representative: Darrick Forester	Test Area:	GP1
Model: 3005853 (Touch with Access)	S/N:	Touch with Access: A1902481707
Standard Referenced: VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc		FR0100
Figure A4. Electrostatic Discharge	Test Setup	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A5 Electrostatic Discharge*	Fest Setup	
	Figure A5. Electrostatic Discharge	Fest Setup.	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access:
			A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100

Figure A6. Electrostatic Discharge Test Setup.



FR0100

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:
			A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019

PR104673-4-2.doc

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



	Manufacture	: Н	art Inte	erCivic		Project Number:	PR104673	
Customer Representative:		: D	Darrick Forester			Test Area:	GP1	
	Mode	1: 30	05854	(Touch)		S/N:	Touch: T19024910)7
Standa	Standard Referenced:		VSG 1	.0:		Date:	October 2, 2	019
	Temperature	: 20).9°C]	Humidity:	39% Pressure:	837 mb	
	Input Voltage	: 12	20 VA	C / 60 Hz	-			
Configu	ration of Uni	t: U	nits po	wered up an	d running wi	ith all functions exercised I/O and ports bein	g exercised.	
	Test Engineer	: C	asey L	ockhart				
PR104673-4-2.de	oc							FR0100
Test Location	Voltage Level (kV)	Pola +	arity -	Number of Pulses	Pulses Per Second	Comments	Criteria Met	Pass / Fail
	· · · ·				Indirect Dis	charge Points		
VCP	2,4	х	х	10	1	Front Side	А	Pass
VCP	2,4	х	х	10	1	Left Side	А	Pass
VCP	2,4	х	x	10	1	Right Side	А	Pass
VCP	2,4	х	х	10	1	Back Side	А	Pass
НСР	2,4	х	х	10	1	Edge of HCP at Front of UUT	N/A	N/A
				Contact	Discharge I	Points - RED Arrows.		
Figure A2	2,4	х	x	10	1	No discharge points found.		
Figure A3	2,4	Х	х	10	1	No discharge points found.		
Figure A4	2,4	х	x	10	1	No discharge points found.		
Figure A5	2,4	х	х	10	1	No discharge points found.		
Air Discharge Points - BLUE Arrows.								
Figure A2	2, 4, 8	х	х	10	1	No discharge points found.		
Figure A3	2, 4, 8	Х	х	10	1		А	Pass
Figure A4	2, 4, 8	Х	x	10	1	No discharge points found.		
Figure A5	2, 4, 8	х	х	10	1		А	Pass



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	Touch:
			T1902491007
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100





Figure A1. Electrostatic Discharge Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	Touch:
		_	T1902491007
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A2. Electrostatic Discharge	Test Setup.	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	Touch:
			T1902491007
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A3.	Electrostatic Discharge Test Setup.	



Customer Representative: Darrick Forester Test Area: GP1 Model: 3005854 (Touch) S/N: Touch: T1902491007 Standard Referenced: VVSG 1.0: Date: October 2, 2019 PR104673-4.2.do FR100 FR100 FR100	Manufacturer:	Hart InterCivic	Project Number:	PR104673
Model: 3005854 (Touch) S.N: Touch: T1902491007 Standard Referenced: VVSG 1.0: Date: October 2, 2019 PR104673-4.2.dor FR0100	Customer Representative:	Darrick Forester	Test Area:	GP1
International definition of the second secon	Model:	3005854 (Touch)	S/N:	Touch:
Standard Referencett VVSG 1.0: FR0100 PR104673-4-2.doc FR0100				T1902491007
<text></text>	Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
	PR104673-4-2.doc			FR0100
Figure A4 Electrostatic Discharge Test Setup		Figure A4Electrostatic Discharge Test	Setup	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	Touch:
		-	T1902491007
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A5. Electrostatic Discharge	Test Setup.	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	Touch:
			T1902491007
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc		-	FR0100

			I cst Equip			
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

Test Equipment List



	Manufacturer	: Ha	art Inte	erCivic		Project Number:	PR104673	
Customer Representative:			Darrick Forester			Test Area:	GP1	
	Model	: 30	05825	(Controller))	S/N:	Controller:	
							C180182711 C180182721	10 (NEW 10)
Standar	rd Referenced	: V	VSG 1	.0:		Date:	October 2, 2	019
	Temperature	: 20).9°C]	Humidity:	39% Pressure:	837 mb	
	Input Voltage	: 12	20 VA	C / 60 Hz	_			
Configu	ration of Unit	: Ui	nits po	wered up an	d running wi	th all functions exercised I/O and ports bein	g exercised.	
	Test Engineer	: Ca	asey L	ockhart				
PR104673-4-2.de	bc							FR0100
Test	Voltage	Pola	arity	Number	Pulses	Comments	Criteria	Pass /
Location	Level	+	-	of Pulses	Per		Met	Fail
(KV)					Second Indirect Dis	aharga Dointa		
VCD	2.4			10		Eropt Side	٨	Daga
VCP	2,4	X	X	10	1		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	Х	10	1	Back Side	А	Pass
LICD	2.4			10	1	Edge of UCD at Front of LUIT	NI/A	NI/A
псг	2,4	А	Х	Contact	I Disaharga I	Points PED Arrows	IN/A	IN/A
Eigung A2	2.4			10		Ne discharge points found		
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	х	X	10	1	No discharge points found.		
Figure A5	2,4	Х	Х	10		No discharge points found.		
E: 40	2.4.0			Air Di	scharge Poir	its - BLUE Arrows.		D
Figure A2	2, 4, 8	Х	X	10	1		A	Pass
Figure A3	2, 4, 8	Х	X	10	1		A	Pass
Figure A4	2, 4, 8	Х	X	10	1		A	Pass
Figure A5	2, 4, 8	Х	Х	10	1	No discharge points found.		



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	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.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller:
			C1801827110 (NEW C1801827210)
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A2Electrostatic Discharge	Test Setup	
	Figure A2. Electrostatic Discharge	Test Setup.	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller:
			C1801827110 (NEW C1801827210)
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A3 Electrostatic Discharge*	Fest Setup	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller:
			C1801827110 (NEW C1801827210)
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A4 Electrostatic Discharge T	rest Setur.	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller:
			C1801827110 (NEW C1801827210)
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019
PR104673-4-2.doc			FR0100
	Figure A5 Electrostatic Discharge Te	est Setup	
	Figure A5. Electrostatic Discharge Te	est Setup.	



FR0100

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:
			C1801827110 (NEW C1801827210)
Standard Referenced:	VVSG 1.0:	Date:	October 2, 2019

PR104673-4-2.doc

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



80 - 1000

AM

80

1kHz

Sine

1

10

Н

3

А

Pass

5.2 Radiated RF Immunity

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

	Manufa	acturer	: Hart I	nterCivic					Project Number:	PR104673	
Customer	Represe	ntative	: Darric	k Forester	r				Test Area:	GP0	
		Model	: 30058 30058 30058	25 (Contr 54 (Touch 53 (Touch	oller) 1) 1 with Ac	ccess)			S/N:	C18018271 T19024910 A19024817	10 07 07
Stand	lard Refe	renced	: VVSC	G 1.0:					Date:	Tuesday, 5 24, 2019	September
	Tempe	erature	: 22.8°C	2	Hun	nidity: 3	31%		Pressure:	838mb	
	Input V	oltage	: 120 V	AC / 60 H	łz						
Config	guration of	of Unit	: Units	powered u	ip and ru	nning witl	n all function	ns exercise	d I/O and ports bein	g exercised.	
	Test En	igineer	: Steve	Cristanell	i						
PR104673-4-3.	.doc										FR0100
Frequency (MHz)	Туре	Мо %	dulation Freq	Form	Step Size (%)	Field (V/m)	Polarity (V or H)	Dwell (sec)	Comments	Criteria Met	Pass / Fail
80 - 1000	AM	80	1kHz	Sine	1	10	v	3	Front	Α	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	Н	3		А	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Right	А	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	Н	3		А	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Back	А	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	Н	3		Α	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Left	А	Pass



FR0100

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



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)	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





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
	h PR104673		
Fie	ure B3 Radiated RE Immunity Test S	etun 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
Fig	rure B4 Radiated RF Immunity Test S	etup – Left Side.	



FR0100

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

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&Schwa rz	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: Hart InterCivic Project Number: PR104673 Customer Representative: Darrick Forester Test Area: GP1 Touch Model: 3005853 (Touch with Access) S/N: w/access A1902481707 Standard Referenced: VVSG 1.0: September 30, 2019 Date: Temperature: 25.1°C Humidity: 44% 833 mb Pressure: Input Voltage: 120 VAC / 60 Hz Configuration of Unit: Units powered up and running with all functions exercised I/O and ports being exercised. Test Engineer: Casey Lockhart FR0100 PR104673-4-4.doc Voltage Polarity Time Injection L L L Ν Р Rep Comments Criteria Pass / 1 2 3 Е Freq. Met Fail (**k**V) (sec) Туре + 2.0 CDN 100k AC Α 60 х Pass х Hz 2.0 60 CDN х 100k А Pass х Hz 100k 2.0 CDN х 60 х А Pass Hz 2.0 60 CDN 100k А Pass х х Hz 100k 2.0х 60 CDN х А Pass Hz 100k 2.0 60 CDN Α Pass х х Hz CDN 100k 2.0х 60 х х х А Pass Hz 2.0 60 CDN х х 100k Α Pass х х Hz Pass 1.0100k х 60 Clamp Ethernet Cable А Hz 1.0 60 Clamp 100k Α Pass х Hz 100k 1.060 Clamp Daisy chain Network Cable А Pass х Hz 1.0х 60 Clamp 100k А Pass Hz



Electrical Fast Transi	ent/Burst per IEC / EN 61000-	4-4		
Manufacturer:	Hart InterCivic	Project Number:	PR104673	
Customer Representative:	Darrick Forester	rick 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	
	PRI04673			

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	






Electrical Fast Transi	ent/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
Figure C1	Electrical East Transient Test Setur-	- AC Mains VO C	
Ingule C1	. Electrical Past Hanstein Test Setup -		aute.



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

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



	М	anufa	cturer:	Hart InterCivi	c						Project Number:	PR	104673	
Custom	er Rep	presen	tative:	Darrick Forest	ter						Test Area:	GP	1	
		Ν	Aodel:	3005854 (Tou	ch)						S/N:	(Inj) T19024910	07
Sta	ndard	Refere	enced:	VVSG 1.0:							Date:	Sep	tember 30, 2	019
	Т	emper	rature:	25.5°C		Н	lumi	dity	:	37%	Pressure:	833	mb	
	In	put Vo	oltage:	120 VAC / 60	Hz									
Con	figura	tion of	f Unit:	Units powered	l up	and	run	ning	g wi	th all fun	ctions exercised I/O and ports bein	ng exe	ercised.	
	Te	est Eng	gineer:	Casey Lockha	rt									
PR104673-4	-4.doc												F	R0100
Voltage	Pola	arity	Time	Injection	L	L	L	N	Р	Rep	Comments		Criteria	Pass /
(kV)	+	-	(sec)	Туре	1	2	3		E	Freq.			Met	Fail
2.0	х		60	CDN	x					100k Hz	AC		А	Pass
2.0		х	60	CDN	x					100k Hz			А	Pass
2.0	х		60	CDN		х				100k Hz			А	Pass
2.0		х	60	CDN		x				100k Hz			А	Pass
2.0	х		60	CDN					x	100k Hz			А	Pass
2.0		х	60	CDN					x	100k Hz			А	Pass
2.0	х		60	CDN	x	x			x	100k Hz			А	Pass
2.0		х	60	CDN	x	x			x	100k Hz			А	Pass
1.0	х		60	Clamp						100k Hz	Ethernet Cable		А	Pass
1.0		х	60	Clamp						100k Hz			А	Pass
1.0	х		60	Clamp						100k Hz	Daisy chain Network Cable		А	Pass
1.0		х	60	Clamp						100k Hz			А	Pass



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 30, 2019
PR104673-4-4.doc		-	FR0100





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 30, 2019
PR104673-4-4.doc		-	FR0100





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



Electrical Fast Transi	ent/Burst per IEC / EN 61000-4-4		
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 30, 2019
PR104673-4-4.doc			FR0100
		Wing L/O Cabla	
Fig	ure C3. Electrical Fast Transient Test Se	etup – I/O Cable.	



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 30, 2019
PR104673-4-4.doc			FR0100

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



	М	anufa	cturer:	Hart InterCivio	с						Project Number:	PR1	04673	
Custom	er Rep	oresen	tative:	Darrick Forest	er						Test Area:	GP1		
		Ν	Aodel:	3005825 (Con	troll	er)					S/N:	Cont C180	roller)1827110	(Inj)
Sta	ndard	Refere	enced:	VVSG 1.0:							Date:	Septe	ember 30, 2	019
	Т	emper	rature:	25.6°C		Н	umi	dity	:	37%	Pressure:	833 1	mb	
	Inj	put Vo	oltage:	120 VAC / 60	Hz									
Con	figura	tion of	f Unit:	Units powered	l up	and	run	ning	g wi	th all fun	ctions exercised I/O and ports bein	g exer	cised.	
	Te	st Eng	gineer:	Casey Lockhar	rt									
PR104673-4	-4.doc												F	R0100
Voltage	Pola	rity	Time	Injection	L	L	L	N	Р	Rep	Comments		Criteria	Pass /
(kV)	+	-	(sec)	Туре	1	2	3		E	Freq.			Met	Fail
2.0	Х		60	CDN	X					100k Hz	AC		А	Pass
2.0		х	60	CDN	x					100k Hz			А	Pass
2.0	х		60	CDN		x				100k Hz			А	Pass
2.0		х	60	CDN		x				100k Hz			А	Pass
2.0	х		60	CDN					x	100k Hz			А	Pass
2.0		Х	60	CDN					X	100k Hz			А	Pass
2.0	x		60	CDN	x	x			x	100k Hz			А	Pass
2.0		х	60	CDN	x	x			x	100k Hz			А	Pass
1.0	х		60	Clamp						100k Hz	Ethernet Cable w/capacitive clar	np.	А	Pass
1.0		х	60	Clamp						100k Hz			А	Pass
1.0	х		60	Clamp						100k Hz	Daisy chain Network Cable w/capacitive clamp		А	Pass
1.0		х	60	Clamp						100k Hz			А	Pass
1.0	х		60	Clamp						100k Hz	Bar code reader Cable W/capacitive clampB		A	Pass
1.0		х	60	Clamp						100k Hz			А	Pass



Manufacturer:	Hart InterCivic	Project Number:	PR104673	
Customer Representative:	Darrick Forester	Test Area:	GP1	
Model:	3005825 (Controller)	S/N:	Controller C1801827110	(Inj)
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2	2019
PR104673-4-4.doc			F	R0100



Figure C1. Electrical Fast Transient Test Setup.



Electrical Fast Transient/Burst per IEC / EN 61000-4-4 Manufacturer: Hart InterCivic Project Number: PR104673 GP1 Customer Representative: Darrick Forester Test Area: Model: 3005825 (Controller) S/N: Controller (Inj) C1801827110 Standard Referenced: VVSG 1.0: September 30, 2019 Date: 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 Project Number: PR104673 GP1 Customer Representative: Darrick Forester Test Area: Model: 3005825 (Controller) S/N: Controller (Inj) C1801827110 Standard Referenced: VVSG 1.0: September 30, 2019 Date: PR104673-4-4.doc FR0100 Figure C3. Electrical Fast Transient Test Setup – I/O Cable.



Manufacturer:	Hart InterCivic	Project Number:	PR104673	
Customer Representative:	Darrick Forester	Test Area:	GP1	
Model:	3005825 (Controller)	S/N:	Controller C1801827110	(Inj)
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2	2019
PR104673-4-4.doc			I	FR0100

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

	anufac	cture	er:	Ha	art I	nter	Civic			Project Number:	PR104673				
Custom	er Rep	present	tativ	ve:	Da	arric	k F	orester				Test Area:	GP1		
		N	/lod	el:	3005853 (Touch with Access)							S/N:	(Inj)Touch A19024817	w/access 07	
Sta	ndard	Refere	ence	d:	V	vsc	G 1.0):				Date:	October 1, 2019		
	Т	emper	atu	re:	23.3°C Humidity: 40%					40%		Pressure:	835 mb		
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz							
Con	tion of	Un	it:	Uı	Units powered up and running with all functions exercised I/O and ports being exercised.										
	Te	st Eng	ine	er:	Са	asey	Lo	ckhart							
PR104673-4	-5.doc													FR0100	
Voltage	Pola	rity	L	L	L	N	P	Phase	Number	Delay		Comments	Criteria	Pass /	
(kV)	+	-	1	2	3		E	(deg)	of Pulses	(sec)			Met	Fail	
0.5	х		x			x		0	5	30	Differ	ential Mode	А	Pass	
0.5		х	х			х		0	5	30			А	Pass	
0.5	x		x			х		90	5	30			А	Pass	
0.5		х	x			x		90	5	30			А	Pass	
0.5	x		x			х		180	5	30			А	Pass	
0.5		х	x			х		180	5	30			А	Pass	
0.5	х		х			х		270	5	30			А	Pass	
0.5		х	х			х		270	5	30			А	Pass	
0.5	х		x				x	0	5	30	Comm	non Mode Line	А	Pass	
0.5		х	x				x	0	5	30			А	Pass	
0.5	х		x				x	90	5	30			А	Pass	
0.5		х	x				x	90	5	30			А	Pass	
0.5	х		x				x	180	5	30			А	Pass	
0.5		х	x				x	180	5	30			А	Pass	
0.5	х		x				x	270	5	30			А	Pass	
0.5		х	x				x	270	5	30			А	Pass	
0.5	х					X	x	0	5	30	Comm	non Mode Neutral	Α	Pass	
0.5		х				Х	х	0	5	30			A	Pass	
0.5	х					х	х	90	5	30			А	Pass	
0.5		Х				X	x	90	5	30			A	Pass	
0.5	х					X	x	180	5	30			A	Pass	
0.5		Х				X	x	180	5	30			A	Pass	
0.5	Х					х	х	270	5	30			A	Pass	
0.5		Х				X	X	270	5	30			A	Pass	



	Μ	lanufa	ctur	er:	Hart InterCivic						Project Number:	er: PR104673				
Custon	ner Rej	presen	tativ	ve:	D	arric	k F	orester			Test Area:	GP1				
		Ν	Aod	el:	30)058	53 ((Touch with	h Access)		S/N:	(Inj)Touch A19024817	w/access 07			
Sta	indard	Refer	ence	ed:	V	VSC	G 1.():			Date:	October 1, 2	.019			
]	Tempe	ratu	re:	23.3°C Humidity: 40%							835 mb				
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz								
Configuration of Unit					U	Units powered up and running with all functions exercised I/O and ports being exercised.										
	Te	est Eng	gine	er:	С	Casey Lockhart										
PR104673-4	-5.doc												FR0100			
Voltage (kV)	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		х	х			x		0	5	45		Α	Pass			
1.0	х		x			x		90	5	45		А	Pass			
1.0		х	х			х		90	5	45		А	Pass			
1.0	х		х			x		180	5	45		А	Pass			
1.0		x	x			x		180	5	45		А	Pass			
1.0	х		x			x		270	5	45		А	Pass			
1.0		х	х			x		270	5	45		А	Pass			
1.0	х		x				x	0	5	45	Common Mode Line	А	Pass			
1.0		х	Х				x	0	5	45		А	Pass			
1.0	х		х				x	90	5	45		А	Pass			
1.0		х	х				х	90	5	45		А	Pass			
1.0	х		Х				x	180	5	45		А	Pass			
1.0		x	х				x	180	5	45		А	Pass			
1.0	х		X				x	270	5	45		А	Pass			
1.0		x	X				x	270	5	45		А	Pass			
1.0	X					x	x	0	5	45	Common Mode Neutral	A	Pass			
1.0		X				X	х	0	5	45		A	Pass			
1.0	Х					X	х	90	5	45		A	Pass			
1.0		X				X	х	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		<u> </u>			X	X	270	5	45		A	Pass			
1.0		Х	-		-	X	х	270	5	45		A	Pass			
2.0			-					0	5	(0)	C MILL'					
2.0	X		X				X	0	5	60	Common Mode Line	A	Pass			
2.0		Х	Х				Х	0	5	60		A	Pass			



	anufac	cture	er:	Ha	art I	nter	Civic			Project Num	ber:	PR104673				
Custom	er Rep	present	tativ	ve:	Da	arric	k F	orester				Test A	rea:	GP1		
		Ν	/lod	el:	30	058	53 ((Touch with	n Access)			S	5/N:	(Inj)Touch A19024817(w/access)7	
Sta	ndard	Refere	ence	ed:	: VVSG 1.0:							D	ate:	October 1, 2	019	
	Т	emper	atu	re:	23	.3°C	2]	Humidity:	40%		Press	ure:	835 mb		
	oltag	ge:	12	20 V	AC	/ 60 Hz					-					
Con	figura	tion of	Un	it:	Uı	Units powered up and running with all functions exercised I/O and ports being exercised.										
	Te	est Eng	ine	er:	Са	Casey Lockhart										
PR104673-4	-5.doc														FR0100	
Voltage (kV)	Pola +	rity -	L 1	L 2	L 3	Ν	P E	Phase (deg)	Number of Pulses	Delay (sec)		Comments		Criteria Met	Pass / Fail	
2.0	х		x				х	90	5	60				А	Pass	
2.0		х	x				x	90	5	60				А	Pass	
2.0	x		х				x	180	5	60				А	Pass	
2.0		х	x				x	180	5	60				А	Pass	
2.0	x		х				x	270	5	60				А	Pass	
2.0		х	x				х	270	5	60				А	Pass	
2.0	x					x	x	0	5	60	Comm	non Mode Neutral		А	Pass	
2.0		х				x	x	0	5	60				А	Pass	
2.0	x					x	x	90	5	60				А	Pass	
2.0		х				x	x	90	5	60				А	Pass	
2.0	х					x	x	180	5	60				A	Pass	
2.0		х				x	х	180	5	60				А	Pass	
2.0	х					x	x	270	5	60				A	Pass	
2.0		х				x	x	270	5	60				А	Pass	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	(Inj)Touch w/access A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
PR104673-4-5.doc			FR0100



Figure D1. Surge Immunity Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	(Inj)Touch w/access A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
PR104673-4-5.doc			FR0100
	Einem D2 Europaine Tat Sala		
	rigure D2. Surge minumity Test Setu	p – AC Mains.	

Figure D2. Surge Immunity Test Setup – AC Mains.



150/300

TDS2002B

445703

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

PR104673-4-5.doc

ID

Number

1013

1039 1184

1296

1371

1899

Instruments Corporation

Tektronix

EXTECH

oject Number:	PR104673
Test Area:	GP1
S/N:	(Inj)Touch w/access A1902481707
Date:	October 1, 2019
	FR0100

02/02/2019

06/10/2019

02/02/2020

06/10/2020

Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	09/22/2019	09/22/2020
Fluke	83-3	69811227	Multimeter/Frequency Meter	02/14/2019	02/14/2020
KeyTek	CEWare	4.0	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
California	5001IX208-	S59159	5k VA AC Power Source	08/02/2019	08/02/2020

Oscilloscope, 60 MHz, 2-channel

Hygrometer-Thermometer

C103483

1217



	anufa	ctur	er:	Ha	art I	nter	Civic			Project Number:	PR104673				
Custom	er Rep	oresen	tativ	ve:	Da	arric	k F	orester				Test Area:	GP1		
		Ν	/lod	el:	30	058	54	(Touch)				S/N:	(Inj) T1902	491007,	
Sta	ndard	Refere	ence	ed:	V	VSC	G 1.0	D:				Date:	September 2	27, 2019	
	Т	emper	atu	re:	23	.1°C	2]	Humidity:	32%		Pressure:	833 mb		
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz	· -						
Con	figura	- tion of	fUn	it:	Uı	nits	ром	vered up an	d running wi	th all func	ctions ex	ercised I/O and ports bein	ng exercised.		
	Те	st Eng	gine	er:	Са	Casey Lockhart									
PR104673-4	-5.doc					FR010									
Voltage	Pola	rity	L	L	L	N	Р	Phase	Number	Delay		Comments	Criteria	Pass /	
(kV)	+	_	1	2	3		E	(deg)	of Pulses	(sec)			Met	Fail	
0.5	х		x			x		0	5	30	Differ	ential Mode	А	Pass	
0.5		х	x			x		0	5	30			А	Pass	
0.5	х		x			х		90	5	30			А	Pass	
0.5		х	x			х		90	5	30			А	Pass	
0.5	x		х			х		180	5	30			А	Pass	
0.5		х	х			х		180	5	30			А	Pass	
0.5	х		x			x		270	5	30			А	Pass	
0.5		х	х			х		270	5	30			А	Pass	
0.5	х		х				x	0	5	30	Comm	on Mode Line	А	Pass	
0.5		х	х				x	0	5	30			А	Pass	
0.5	x		x				x	90	5	30			А	Pass	
0.5		х	x				x	90	5	30			А	Pass	
0.5	x		x				x	180	5	30			А	Pass	
0.5		х	x				x	180	5	30			А	Pass	
0.5	x		x				x	270	5	30			А	Pass	
0.5		х	x				x	270	5	30			А	Pass	
0.5	х					х	x	0	5	30	Comm	non Mode Neutral	А	Pass	
0.5		х				х	x	0	5	30			А	Pass	
0.5	х					х	x	90	5	30			А	Pass	
0.5		х				х	х	90	5	30			А	Pass	
0.5	х					х	x	180	5	30			А	Pass	
0.5		х				x	x	180	5	30			А	Pass	
0.5	х					x	x	270	5	30			А	Pass	
0.5		х				x	x	270	5	30			А	Pass	
1.0	х		x			x		0	5	45	Differ	ential Mode	А	Pass	
1.0		х	х			х		0	5	45			А	Pass	



	lanufa	ctur	er:	H	art I	nter	Civic	PR104673								
Custom	er Rej	presen	tativ	/e:	D	arric	k F	orester			Test Area:	GP1				
		N	Лod	el:	30)058	54	(Touch)			S/N:	(Inj) T1902	491007,			
Sta	ndard	Refer	ence	ed:	V	vso	G 1.0	0:	September 27, 2019							
	Г	empe	ratu	re:	23.1°C Humidity: 32% Pressure							833 mb				
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz	· -							
Con	figura	tion o	f Ur	it:	U	nits	pov	vered up an	d running wi	th all func	ctions exercised I/O and ports beir	ng exercised.				
	Te	est Eng	gine	er:	Ca	Casey Lockhart										
PR104673-4	-5.doc		-			FR0100										
Voltage	Pola	arity	L	L	L	N	Р	Phase	Number	Delay	Comments	Criteria	Pass /			
(kV)	+	-	1	2	3		Е	(deg)	of Pulses	(sec)		Met	Fail			
1.0	х		x			х		90	5	45		Α	Pass			
1.0		х	x			х		90	5	45		А	Pass			
1.0	х		x			х		180	5	45		А	Pass			
1.0		х	х			х		180	5	45		А	Pass			
1.0	х		х			х		270	5	45		А	Pass			
1.0		х	x			x		270	5	45		А	Pass			
1.0	х		x				х	0	5	45	Common Mode Line	А	Pass			
1.0		х	x				х	0	5	45		А	Pass			
1.0	х		x				х	90	5	45		А	Pass			
1.0		х	x				х	90	5	45		А	Pass			
1.0	х		x				х	180	5	45		А	Pass			
1.0		х	x				х	180	5	45		А	Pass			
1.0	х		х				х	270	5	45		А	Pass			
1.0		х	x				х	270	5	45		А	Pass			
1.0	х					х	х	0	5	45	Common Mode Neutral	А	Pass			
1.0		x				х	х	0	5	45		А	Pass			
1.0	х					х	х	90	5	45		А	Pass			
1.0		x				х	x	90	5	45		А	Pass			
1.0	х					х	х	180	5	45		А	Pass			
1.0		x				x	х	180	5	45		А	Pass			
1.0	х					х	x	270	5	45		А	Pass			
1.0		х				x	х	270	5	45		А	Pass			
2.0	х		x				x	0	5	60	Common Mode Line	А	Pass			
2.0		х	x				x	0	5	60		А	Pass			
2.0	Х		x				x	90	5	60		А	Pass			
2.0		х	x				x	90	5	60		А	Pass			



	Μ	lanufa	ctur	er:	Н	art I	nter	Civic			Project Number:	PR104673		
Custom	er Rej	presen	tativ	ve:	Da	arric	ck F	orester			Test Area:	GP1		
		Ν	Aod	el:	30	0058	354 ((Touch)			S/N:	(Inj) T1902	491007,	
Sta	ndard	Refere	ence	ed:	V	VSC	G 1.0	D:			Date:	Date: September 27, 2019		
	Г	Temper	ratu	re:	23	23.1°C Humidity: 32%					Pressure:	Pressure: 833 mb		
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz	_					
Con	figura	tion of	f Un	it:	U	nits	pow	vered up an	d running wi	th all func	ctions exercised I/O and ports bein	g exercised.		
	Те	est Eng	gine	er:	Са	asey	Lo	ckhart						
PR104673-4	-5.doc												FR0100	
Voltage	Pola	arity	L	L	L	Ν	Р	Phase	Number	Delay	Comments	Criteria	Pass /	
(kV)	+		1	2	3		Ē	(deg)	of Pulses	(sec)		Met	Fail	
2.0	х		x				x	180	5	60		А	Pass	
2.0		х	х				x	180	5	60		А	Pass	
2.0	х		х				x	270	5	60		А	Pass	
2.0		х	x				x	270	5	60		А	Pass	
2.0	х					х	х	0	5	60	Common Mode Neutral	А	Pass	
2.0		х				х	x	0	5	60		А	Pass	
2.0	x					х	x	90	5	60		А	Pass	
2.0		х				х	x	90	5	60		А	Pass	
2.0	х					х	x	180	5	60		А	Pass	
2.0		х				x	x	180	5	60		А	Pass	
2.0	x					x	x	270	5	60		A	Pass	
2.0		х				x	x	270	5	60		A	Pass	



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
PR104673-4-5.doc		-	FR0100





Figure D1. Surge Immunity Test Setup.



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
PR104673-4-5.doc			FR0100
	Figure D2 Surge Immunity Test Setur		
	Figure D2. Surge immunity Test Setup) – AC Mains.	

Figure D2. Surge Immunity Test Setup – AC Mains.



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
PR104673-4-5.doc			FR0100

ID Numbor	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
Number						
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



	Μ	Ianufa	ctur	er:	H	art I	nter	Civic				Project Number:	PR104673	
Custom	ner Rej	presen	tativ	ve:	D	arric	ck F	orester				Test Area:	GP1	
		N	Лod	el:	30)058	325	(Controller))			S/N:	Controller on) C18018	(Injected 27110
Sta	indard	Refer	ence	ed:	V	VSC	G 1.	0:				Date:	September 3	30, 2019
	Г	Temper	ratu	re:	23	3.4°0	C]	Humidity:	33%		Pressure:	833 mb	
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz	-					
Con	ıfigura	tion of	f Un	it:	U	Units powered up and running with all functions exercised I/O and ports being exercise						ng exercised.		
	Te	est Eng	gine	er:	С	asey	Lo	ckhart						
PR104673-4	-5.doc													FR0100
Voltage	Pola	arity	L 1	L 2	L	N	P F	Phase	Number of Pulses	Delay		Comments	Criteria Met	Pass / Fail
(kV)	+	-	1	-	5		12	(deg)	or r uises	(sec)			ivict	Fan
0.5	Х		Х			Х		0	5	30	Differ	rential 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	Х			X		90	5	30			A	Pass
0.5	X		Х			X		180	5	30			A	Pass
0.5		х	X			Х		180	5	30			A	Pass
0.5	X		Х			X		270	5	30			A	Pass
0.5		x	Х			X		270	5	30			A	Pass
0.5	х		X				х	0	5	30	Comn	non Mode Line	A	Pass
0.5		x	Х				Х	0	5	30			A	Pass
0.5	х		Х				Х	90	5	30			A	Pass
0.5		x	Х				Х	90	5	30			A	Pass
0.5	х		Х				Х	180	5	30			A	Pass
0.5		х	X				х	180	5	30			A	Pass
0.5	х		X				х	270	5	30			A	Pass
0.5		X	X				X	270	5	30			А	Pass
			<u> </u>			<u> </u>								
0.5	Х		-			Х	х	0	5	30	Comn	non Mode Neutral	A	Pass
0.5		X				X	Х	0	5	30			A	Pass
0.5	Х					Х	X	90	5	30			A	Pass
0.5		Х				Х	Х	90	5	30			A	Pass
0.5	х					X	X	180	5	30			A	Pass
0.5		X				X	X	180	5	30			A	Pass
0.5	Х					Х	X	270	5	30			А	Pass
0.5		Х				Х	X	270	5	30			А	Pass
1.0	Х		X		<u> </u>	X		0	5	45	Differ	ential Mode	A	Pass
1.0		Х	х			Х		0	5	45			А	Pass



	М	Ianufa	ctur	er:	Ha	art I	nter	Civic			Project Number:	PR104673		
Custon	ner Rej	presen	tativ	ve:	Da	arric	k F	orester			Test Area:	GP1		
		Ν	Лod	el:	30	058	325 ((Controller))		S/N:	Controller on) C18018	(Injected 27110	
Sta	indard	Refere	ence	ed:	V	VSC	G 1.():			Date:	September 3	30, 2019	
	Т	Temper	ratu	re:	23	8.4°0	C]	Humidity:	33%	Pressure:	833 mb		
	In	put Vo	oltag	ge:	12	20 V	AC	/ 60 Hz	_					
Con	ifigura	tion of	f Un	it:	U	Units powered up and running with all functions exercised I/O and ports being exercised.								
	Τe	est Eng	gine	er:	Са	asey	Lo	ckhart						
PR104673-4	-5.doc												FR0100	
Voltage	Pola	arity	L	L	L	N	Р	Phase	Number	Delay	Comments	Criteria	Pass /	
(kV)	+	-	1	2	3		E	(deg)	of Pulses	(sec)		Met	Fail	
1.0	х		х			х		90	5	45		А	Pass	
1.0		х	х			х		90	5	45		А	Pass	
1.0	х		x			х		180	5	45		А	Pass	
1.0		x	x			х		180	5	45		А	Pass	
1.0	х		x			х		270	5	45		А	Pass	
1.0		x	x			x		270	5	45		А	Pass	
1.0	х		х				x	0	5	45	Common Mode Line	А	Pass	
1.0		х	х				x	0	5	45		А	Pass	
1.0	х		х				x	90	5	45		А	Pass	
1.0		х	X				x	90	5	45		А	Pass	
1.0	х		X				x	180	5	45		А	Pass	
1.0		x	X				x	180	5	45		А	Pass	
1.0	х		X				x	270	5	45		Α	Pass	
1.0		х	х				х	270	5	45		Α	Pass	
1.0	х					х	х	0	5	45	Common Mode Neutral	А	Pass	
1.0		X				х	х	0	5	45		A	Pass	
1.0	х					Х	X	90	5	45		A	Pass	
1.0		X				X	X	90	5	45		A .	Pass	
1.0	X		<u> </u>		<u> </u>	X	X	180	5	45		A	Pass	
1.0		X	-		-	X	X	180	5	45		A	Pass	
1.0	Х		-		-	X	X	270	5	45		A	Pass	
1.0		Х				Х	х	270	5	45		A	Pass	
2.0	x		v				v	0	5	60	Common Mode Line	Δ	Pass	
2.0	^^	x	x				x	0	5	60		A	Pass	
2.0	x	Λ	x		-		x	90	5	60		A	Pass	
2.0		x	x				x	90	5	60		A	Pass	



	М	lanufa	cture	er:	Ha	art I	nter	Civic				Project Number:	PR104673	
Custom	er Rej	presen	tativ	ve:	Da	arric	k F	orester				Test Area:	GP1	
		Ν	/lod	el:	30	058	25 ((Controller))			S/N:	Controller on) C18018	(Injected 27110
Sta	ndard	Refere	ence	ed:	V	VSC	G 1.():				Date:	September 3	0, 2019
Temperature				re:	23	5.4°C	2]	Humidity:	33%		Pressure:	833 mb	
Input Voltage:					12	20 V	AC	/ 60 Hz	· -					
Con	figura	tion of	f Un	it:	Uı	nits	ром	vered up an	d running wi	th all func	tions ex	kercised I/O and ports bein	g exercised.	
	Te	est Eng	gine	er:	Са	asey	Lo	ckhart						
PR104673-4	-5.doc													FR0100
Voltage	Pola	arity	L	L	L	N	Р	Phase	Number	Delay		Comments	Criteria	Pass /
(kV)	+	-	I	2	3		E	(deg)	of Pulses	(sec)			Met	Fail
2.0	х		x				х	180	5	60			А	Pass
2.0		х	x				х	180	5	60			А	Pass
2.0	х		x				x	270	5	60			А	Pass
2.0		х	x				х	270	5	60			А	Pass
2.0	х					х	х	0	5	60	Comn	non Mode Neutral	А	Pass
2.0		х				x	х	0	5	60			А	Pass
2.0	х					x	x	90	5	60			А	Pass
2.0		x				x	x	90	5	60			А	Pass
2.0	х					x	x	180	5	60			А	Pass
2.0		х				х	x	180	5	60			А	Pass
2.0	x					x	x	270	5	60			А	Pass
2.0		х				x	x	270	5	60			А	Pass



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller (Injected on) C1801827110
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019
PR104673-4-5.doc			FR0100



Figure D1. Surge Immunity Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller (Injected on) C1801827110
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019
PR104673-4-5.doc			FR0100





Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005825 (Controller)	S/N:	Controller (Injected on) C1801827110
Standard Referenced:	VVSG 1.0:	Date:	September 30, 2019
PR104673-4-5.doc		-	FR0100

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

Conducte	d RF I	mmu	nity per	IEC / E	N 6100	0-4-6						
	Manufa	cturer:	Hart Inte	rCivic		Project Number:	PR104673					
Customer	Represen	tative:	Darrick F	Forester		Test Area:	Area: GP #2					
	Ν	Model:	3005825	(Controller	.)	S/N:	Controller:					
			3005854	(Touch)			C18018271	10				
			3005853	(Touch wit	h Access)		Touch:					
							T19024910	07				
							Touch with	Access:				
							A19024817	07				
Standa	ard Refer	enced:	VVSG 1.	0:		Date:	September 25, 2019					
	rature:	21°C		838 mb	838 mb							
Input Voltage:			120 VAC	C / 60 Hz								
Config	uration of	f Unit:	Units pov	Units powered up and running with all functions exercised I/O and ports being exercised.								
	Test Eng	gineer:	Mike Tid	Mike Tidquist								
PR104673-4-6.c	loc							FR0100				
Frequency	N	Iodulat	tion	Level	Dwell	Comments	Criteria	Pass /				
(MHz)	Туре	%	Freq	(Vrms)	(sec)		Met	Fail				
0.150 - 80.0	AM	80	1 kHz	10	3	AC using M3 CDN X 3	А	Pass				
0.150 - 80.0	AM	80	1 kHz	10	3	Ethernet Cable Terminated by EUT using EMClamp X 4	А	Pass				
0.150 - 80.0	AM	80	1 kHz	10	3	Ethernet Cable Unterminated using EMClamp X 2	А	Pass				



Manufacturer:	Hart InterCivic	Project Number:	PR104673	
Customer Representative:	Darrick Forester	Test Area:	GP #2	
Model:	3005825 (Controller)	S/N: Controller:		
	3005854 (Touch)	C1801827110		
	3005853 (Touch with Access)	Touch:		
			T1902491007	
			Touch with Access:	
		_	A1902481707	
Standard Referenced:	VVSG 1.0:	Date:	September 25, 2019	
PR104673-4-6.doc			FR0100	
		Sun -		



Figure E1. Conducted RF Immunity Test Setup.



Manufacturer:
Customer Representative:
Model:

Hart InterCivic
Darrick Forester
3005825 (Controller)
3005854 (Touch)
3005853 (Touch with Access)

Project Number:	PR104673
Test Area:	GP #2
S/N:	Controller:
	C1801827110
	Touch:
	T1902491007
	Touch with Access:
	A1902481707
Date:	September 25, 2019
	FR0100

Standard Referenced: VVSG 1.0:

PR104673-4-6.doc



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



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP #2
Model:	3005825 (Controller)	S/N:	Controller:
	3005854 (Touch)		C1801827110
	3005853 (Touch with Access)		Touch:
			T1902491007
			Touch with Access:
		_	A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 25, 2019
PR104673-4-6.doc			FR0100



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



Manufacturer:	Hart InterCivic	Project Number:	PR104673	
Customer Representative:	Darrick Forester	Test Area:	GP #2	
Model:	3005825 (Controller)	S/N:	Controller:	
	3005854 (Touch)		C1801827110	
	3005853 (Touch with Access)		Touch:	
			T1902491007	
			Touch with Access:	
			A1902481707	
Standard Referenced: VVSG 1.0:		Date:	September 25, 2019	
104673-4-6.doc			FR0100	

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 Communicatio ns	F2031-23mm	329	EM Injection Clamp	10/12/2018	10/12/2019
1496	Rigol Technologies, Inc.	DSA815	DSA8B150500 096	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 Progammable 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	Frequen	cy H-fi	eld Immunit	y per II	EC / EN 61000-4-8			
	Manu	facturer:	Hart InterCivic			Project Number:	t Number: PR104673	
Custo	Customer Representative: Darrick Forester					Test Area:	GP1	
Model:			3005825 (Controller),3005854 (Touch),3005853 (Touch with Access)			S/N:	Controller: C1801827110 Touch: T1902491007	
		_					Touch with A19024817	Access: 07
S	tandard Ref	erenced:	iced: VVSG 1.0: Dat			Date:	October 1, 2019	
	Temp	perature:	24.4°C	Humid	Iumidity: 38% Pressure: 835 mb			
	Input	Voltage:	tage: 120 VAC / 60 Hz					
Co	onfiguration	of Unit:	Unit: Units powered up and running with all functions exercised I/O and ports being exer			g exercised.		
Test Engineer: Casey Lockhart								
PR104673-	-4-8.doc							FR0100
Frequei 50	ncy (Hz) 60	Field Strength (A/m)	EUT Axis Location	Dwell Time (sec)	Com	ments	Criteria Met	Pass / Fail
х		30	X	60			А	Pass
	X	30	X	60			А	Pass
x		30	Y	60			Α	Pass
	X	30	Y	60			A	Pass
х		30	Z	60			Α	Pass
	x	30	Z	60			А	Pass


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
Fid	ware E1 Power Frequency H-field Immy	unity Test Setup	
Fig	gure F1. Power Frequency H-field Imm	unity Test Setup.	



Power Frequency H-f	ield 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:
			Touch with Access:
			A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
PR104673-4-8.doc			FR0100
Fig	with the second secon	unity Test Setup.	



Power Frequency H-f	ield 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:
Standard Pafarancad	VVSC 1 0	Date	A1902481707
PR 104673-4-8 doc	¥ ¥ 50 1.0.	Date.	FR0100
Fig	gure F3. Power Frequency H-field Imm	unity 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	S/N:	Controller:
	(Touch with Access)		C1801827110
			Touch:
			T1902491007
			Touch with Access:
			A1902481707
Standard Referenced:	VVSG 1.0:	Date:	October 1, 2019
PR104673-4-8.doc			FR0100

FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
Number						
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

	Manufact	urer:	Hart In	terCivio	2			Project Number:	PR104673	
Customer	Representa	tive:	Darrick	c Forest	er			Test Area:	GP1	
	Μ	odel:	300585	53 (Tou	ch with A	Access)		S/N:	Touch with A19024817	Access: 07
Stand	lard Referer	nced:	VVSG	1.0:				Date:	September 2	26, 2019
	Tempera	ture:	22°C		Hu	midity: 37%		Pressure:	836 mb	
	Input Vol	tage:	120Va	c\60Hz						
Config	guration of	Unit:	Units p	owered	up and r	unning with al	l functions ex	kercised I/O and ports beir	g exercised.	
	Test Engi	neer:	Mike T	idquist/	Casey Lo	ockhart				
PR104673-4-1	1.doc									FR0100
% Nominal	No. of Cycles] 0	Phase A 90	ngle (de 180	eg) 270	Time between dropouts (sec)	Number of tests	Comments	Criteria Met	Pass / Fail
	Tes	sting w	ill inclu	de 3 se	parate m	achines (Cont	roller, Touc	h, and Touch with Acces	ss)	
70%	0.6	х				10	3		А	Pass
70%	0.6		х			10	3		А	Pass
70%	0.6			х		10	3		А	Pass
70%	0.6				х	10	3		Α	Pass
40%	60	x				10	3		A	Pass
40%	60		х			10	3		А	Pass
40%	60			х		10	3		А	Pass
40%	60				x	10	3		Α	Pass
0%	300	x				10	3		A	Pass
0%	300			х		10	3		А	Pass
					Line	e Voltage Vari	ation tests			
129Vac Line	Voltage Va	riation	s (+7.5%	6 of nor	ninal 120	OV) 1hrs.			А	Pass
105Vac Line	Voltage Va	riation	s (-12.59	% of no	minal 12	0V) 1 Hrs.			A	Pass
Surges of $\pm 15\%$ line variations of nominal voltage (138V) 5 Hrs						А	Pass			
541505 01 712			or nonill		uge (150	, ,				1 400
Surges of -15	% line varia	ations (of nomin	al volta	ge (102V	7).5 Hrs.			А	Pass



FR0100

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:	Touch with Access:
		_	A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019

PR104673-4-11.doc



Figure G1. Voltage Dips and Interruptions Test Setup.



Voltage Dips and Inte	rrupts 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:	Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019
PR104673-4-11.doc			FR0100
I	Figure G2. Voltage Dips and Interruption	ons Test Setup.	



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005853 (Touch with Access)	S/N:	Touch with Access: A1902481707
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019
104673-4-11.doc			FR0100

PR104673-4-11.doc

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 Progammable Power Supply	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



	Manufact	urer:	Hart InterCivic				Project Number:	PR104673			
Customer	Representa	tive:	Darrick Forester					Test Area:	GP1		
	Me	odel:	300585	64 (Touc	ch)			S/N:	T19024910()7	
Stand	ard Referer	nced:	VVSG	1.0:				Date:	September 2	September 26, 2019	
	Tempera	ture:	22°C		Hu	midity: 37%		Pressure:	836 mb		
	Input Vol	tage:	120Va	c\60Hz							
Config	uration of U	Unit:	Units p	owered	up and r	unning with all	functions ex	ercised I/O and ports bein	g exercised.		
	Test Engi	neer:	Mike T	'idquist/	Casey Lo	ockhart					
PR104673-4-11	.doc									FR0100	
%	No. of		Phase A	ngle (de	eg)	Time	Number	Comments	Criteria	Pass /	
Nominal	Cycles	0	90	180	270	between dropouts	of tests		Met	Fail	
						(sec)					
	Tes	sting v	vill inclu	de 3 sej	oarate m	achines (Cont	roller, Touc	h, and Touch with Acces	s)		
70%	0.6	x				10	3		А	Pass	
70%	0.6		х			10	3		А	Pass	
70%	0.6			х		10	3		А	Pass	
70%	0.6				х	10	3		А	Pass	
40%	60	х				10	3		А	Pass	
40%	60		х			10	3		А	Pass	
40%	60			х		10	3		А	Pass	
40%	60				х	10	3		А	Pass	
0%	300	х				10	3		А	Pass	
0%	300			х		10	3		А	Pass	
					Line	Voltage Vari	ation tests				
129Vac Line Voltage Variations (+7.5% of nominal 120V) 1hrs.						А	Pass				
105Vac Line Voltage Variations (-12.5% of nominal 120V) 1 Hrs.							А	Pass			
Surges of +15	% line vari	ations	of nomi	nal volta	age (138V	/) .5 Hrs.			А	Pass	
Surges of -15% line variations of nominal voltage (102V) .5 Hrs.							А	Pass			



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	T1902491007
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019
PR104673-4-11.doc		-	FR0100



Figure G1. Voltage Dips and Interruptions Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	T1902491007
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019
PR104673-4-11.doc		-	FR0100





Figure G2. Voltage Dips and Interruptions Test Setup.



Manufacturer:	Hart InterCivic	Project Number:	PR104673
Customer Representative:	Darrick Forester	Test Area:	GP1
Model:	3005854 (Touch)	S/N:	T1902491007
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 Progammable Power Supply	08/02/2019	08/02/2020
1899	EXTECH	445703	1217	Hygrometer-Thermometer	06/10/2019	06/10/2020



	Manufact	urer:	Hart In	terCivic	;			Project Number:	PR104673	
Customer Representative:		tive:	Darrick	Forest	er			Test Area:	GP1	
	Me	odel:	300582	5 (Cont	roller)			S/N:	Controller:	
									C180182711	10
Stand	ard Referen	ced:	VVSG	1.0:				Date:	September 2	6, 2019
	Tempera	ture:	22°C		Hu	midity: <u>37%</u>		Pressure:	836 mb	
	Input Vol	tage:	120Vac	c\60Hz						
Config	uration of U	Unit:	Units p	owered	up and r	unning with all	functions ex	ercised I/O and ports bein	g exercised.	
	Test Engi	neer:	Mike T	idquist/	Casey Lo	ockhart				
PR104673-4-11	.doc									FR0100
%	No. of	•	Phase A	ngle (de	eg)	Time	Number	Comments	Criteria	Pass /
Nominal	Cycles	0	90	180	270	between dropouts	of tests		Met	Fail
						(sec)				
	Tes	ting w	vill inclu	de 3 ser	oarate m	achines (Cont	roller, Touc	h, and Touch with Acces	s)	
70%	0.6	x				10	3		А	Pass
70%	0.6		Х			10	3		А	Pass
70%	0.6			х		10	3		А	Pass
70%	0.6				х	10	3		А	Pass
40%	60	Х				10	3		А	Pass
40%	60		х			10	3		А	Pass
40%	60			х		10	3		А	Pass
40%	60				х	10	3		А	Pass
0%	300	х				10	3		А	Pass
0%	300			х		10	3		А	Pass
					Line	Voltage Varia	ation tests			
129Vac Line	Voltage Va	riation	s (+7.5%	of non	ninal 120	V) 1hrs.			А	Pass
105Vac Line Voltage Variations (-12.5% of nominal 120V) 1 Hrs.					А	Pass				
Surges of +15% line variations of nominal voltage (138V) .5 Hrs.					А	Pass				
Surges of -15% line variations of nominal voltage (102V) .5 Hrs.							А	Pass		



FR0100

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:	Controller:
		_	C1801827110
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019

PR104673-4-11.doc



Figure G1. Voltage Dips and Interruptions Test Setup.



Manufacturar	Hart InterCivi	ia Droiget Numb		1672
Customer Representative:	Darrick Fores	ster Test Ar	a: GP1	1073
Model:	3005825 (Con	ntroller) S	N: Contr C1801	oller: 1827110
Standard Referenced:	VVSG 1.0:	Da	e: Septer	mber 26, 2019
PR104673-4-11.doc				FR0100
	Figure G2	Woltage Dips and Interruptions Test Setup.		
I	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:	3005825 (Controller)	S/N:	Controller:							
			C1801827110							
Standard Referenced:	VVSG 1.0:	Date:	September 26, 2019							
PR104673-4-11.doc			FR0100							

PR104673-4-11.doc

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 Progammable 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)	S/N:	Controller:
	3005854 (Touch)		C1801827110
	3005853 (Touch with Access)		Touch:
			T1902491007
			Touch with Access:
			A1902481707
Customer Representative:	Darrick Forester	_	
Standard Referenced:	VVSG 1.0,	_	

FR0105

Ground Planes / CALC

Test	Test	Date	Event	OT	Time	Result	Ini-
	Code				(hrs)		tials
4-3	4356	Tuesday,	Radiated RF Immunity		4	Pass	SC
		September	10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine,				
		24, 2019	3s dwell				
		0800 - 1200	120 VAC / 60 HZ				80
		1200 - 1230					SC
4.6	4(210	1230 - 1330	Continue		1 8.0		SC
4-0	46210	25 2010	10Vrms 0.15 80 MHz 1% Stop 80% AM 1kHz		8.0		IVI I
		0800-1600	sine 3s dwell				
		0000-1000	(3 AC mains & 3 I/O Interconnect)				
			120 VAC / 60 Hz				
			(Distance between EUT and AC input and all Intercon-				
			nect cables is 80cm)				
			AC Input on Touch still needs completed				
4-6		September	Continue:		2.0	Pass	MT
		26, 2019	Conducted RF Immunity				
		0800-1000	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 Intercon-				
4.11	4106	1000 1600	nect cables is 80cm)		6.0	D	
4-11	4196	1000-1600	Voltage Dips and Interruptions Device increases of 7.5% and reductions of 12.5% of		6.0	Pass	MT
			Power increases of 7.5% and reductions of 12.5% of				
			$\pm 7.5\% = 129$ Vac/60Hz $\pm 12.5\% = 105$ Vac/60Hz				
4-5	45918	September	Surge Immunity		5.5	Pass	CL
	10710	27, 2019	Maine: $\frac{1}{2kV}CM + \frac{1}{2kV}DM (0.00, 180, 270)$		010	1 400	02
		1100 - 1630	(See Protocol for Specifics)				
			120 VAC / 60 Hz Note: Injected on T1002401007				
		Santambar	120 VAC / 00 Hz Note. Injected on 1190249100/		5.5	Decc	CI
		30 2019	Surge Immunity		5.5	F 888	CL
		0800 - 1330	Mains: $+/-2kv CM$, $+/-2kv DM$, (0, 90, 180, 270)				
		0000 1550	(See Protocol for Specifics)				
		1000 1100	120 VAC / 60 Hz Injected on C1801827110				
4-4	4412	1330 - 1430	Electrical Fast Transient / Burst		1.0	Pass	CL
			Mains: +/- 2kV, I/O: +/- 1kV, rep rate 100 kHz.				
			(3 AC mains & 3 I/O)				
			120 VAC / 60 Hz Injected on all three UUT sepa-				
			rately.				



Ground Planes / CALC

Test	Test	Date	Event		Time	Result	Ini-
	Code				(hrs)		tials
	4193	1430 - 1530	Voltage Dips and Interruptions		1.0	Pass	CL
			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				
4-5	45918	October 1,	Surge Immunity		5.5	Pass	CL
		2019	Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270)				
		0700 - 1230	(See Protocol for Specifics)				
			120 VAC / 60 Hz Note: Injected on A1902481707				
4-11	4192	1230 - 1330	Voltage Dips and Interruptions		1.0	Pass	CL
			Surges of +15% line variations of nominal line voltage.				
			(See Protocol)				
			138Vac/60Hz and 102Vac/60Hz all three UUT's.				
		1330 - 1400	Post-test check		.5		CL
	4832	1400 - 1500	Power Frequency H-Field Immunity		1.0	Pass	CL
			30A/m, 50 / 60 Hz, 3 axes				
			120 VAC / 60 Hz				
4-2	4296	1500 - 1600	Electrostatic Discharge		1.0		CL
			+/- 8kV Contact, +/- 15kV Air				
			(See 4.1.2.8 of VVSG)				
			120 VAC / 60 Hz				
		October 2,	Electrostatic Discharge		4.0	Pass	CL
		2019	+/- 8kV Contact, +/- 15kV Air				
		0800 - 1200	(See 4.1.2.8 of VVSG)				
			120 VAC / 60 Hz Note: Injecting on Controller S/N				
			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.				



Project # PR10467 B90817	t: Work 73	Order #:	2019082202	PO#: Amount:	
Company:	SLI Global Solutions	Contact:	Darrick Forester Email: dforester@slicompliance.com	Model#: Serial #:	
	Phone: 303-384-5606 Fax:		-		
Test Notes:	Formal Testing RE/CE: FCC Class B lim Unit has three(3) AC mai Immunity: Test per Clien EFT/CI: 3 AC main & 3 I PQF: Two additional tests Provide client with forma	its ns 's protocol /O s requested, l test reports	see protocol		

Quoted Work Test Description Billed Date Standard Result Cost Code September 23, 1342 Radiated Emissions, 30 MHz - 1 GHz FCC Part 15, Pass 2019 Perform Testing at 10 Meter Distance Class B 120 VAC / 60 Hz FCC Part 15, Pass September 27, 1342 Radiated Emissions, 1 GHz - 10 GHz 2019 Class B Perform Testing at 3 Meter Distance 120 VAC / 60 Hz September 23, 2342 Conducted Emissions, 150 kHz - 30 MHz FCC Part 15, Pass 2019 3 AC mains Class B 120 VAC / 60 Hz 4296 Electrostatic Discharge EN61000-4-2 October 1, Pass 2019 +/- 8kV Contact, +/- 15kV Air (See 4.1.2.8 of VVSG) 120 VAC / 60 Hz Tuesday, Sep-4356 Radiated RF Immunity EN61000-4-3 Pass tember 24, 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz 2019 sine, 3s dwell 120 VAC / 60 Hz 4412 Electrical Fast Transient / Burst EN61000-4-4 Pass September 30, 2019 Mains: +/- 2kV, I/O: +/- 1kV, rep rate 100 kHz. (3 AC mains & 3 I/O) 120 VAC / 60 Hz September 27, 45918 Surge Immunity EN61000-4-5 Pass 2019 Mains: +/- 2kV CM, +/- 2kV DM, (0, 90, 180, 270) (See Protocol for Specifics) 120 VAC / 60 Hz Pass September 25, 46210 Conducted RF Immunity EN61000-4-6 2019 10Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (3 AC mains & 3 I/O Interconnect) 120 VAC / 60 Hz



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 volt- age. (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 		Com- plete			
	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 Ac-
	cess
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	Voting equipment.
do, etc.)	Controller is a poll worker device use for manage-
	ment of voting devices.
	Touch is a DRE touch screen voting device.
	Touch with Access is a DRE voting device that is
	identical to the Touch DRE except it adds a Verity
	Access controller.
	They are networked together via a daisy-chain net-
	work cable (100Mbit Ethernet over a proprietary ca-
	ble).
List all modes of operation	Controller, Touch, Touch with Access units are
	daisy-chained via network cables.
	Controller:
	- Printing to thermal printer
	- Writing data to USB flash drive
	- Bar code scanner plugged in and actively
	scanning (trigger held down).
	- Network data transfer to/from
	Touch/Touch with Access devices.
	Touch (unit 1):
	- Network data transfer to/from Controller
	Touch with Access (unit 2):
	- Network data transfer to/from Controller
	The work data transfer to, from controller
Can modes be operated simultaneously? If so, explain.	Yes, these are multitasking systems



What mode(s) w	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	Product type (IT, Medical, Scientific, Industrial, etc.)								
Is the product an	intentional radiator	No							
Product Dimensi	ons	Storage x 8" hig	Dimen: 2h	sions (ap	pprox.) 1	9" wide x 18	3" deep		
			2						
		Operati	onal Di	mension	s (approx	x.) 19" wide	x 22"		
		deep x	21" higł	1					
Product Weight	· .	28 lbs.							
Will fork lift be	required	NO Don V/V	<u>SC 1 0.</u>						
Applicable Stand	lards, 11 known	Per v v	5G 1.0:		odiated a	nd conducto	damis		
			sions r	Jass D I	1 C63 4		u enns-		
			IEC 6	1000-4-2))				
			IEC 6	1000-4-3	3				
			IEC 6	1000-4-4	1				
			IEC 6	1000-4-5	5				
			IEC 6	1000-4-6	5				
			IEC 6	1000-4-8	3				
			IEC 6	1000-4-1	11				
Describe all envi (residential, com	ronment(s) where product will be used mercial, industrial, etc.)	Office, Industrial							
Does product con	nsist of multiple components? (If yes,	Yes, the Controller will sit atop a tabletop.							
please describe e	ach system component)	The Verity Touch will sit on a Standard Booth							
		while the Touch with Access will sit on a Accessi-							
		ble Booth.							
	The full product suite consists of both tableton and								
		floor-standing equipment.							
Cycle time > 3 so	econds? (If yes, how long?)	Tests ru	inning c	ontinuo	usly				
Highest internall	y generated frequency	1.91GE	Iz		2				
Product Set-up T	ime	15 minutes.							
Boot up time in t	he event of an unintentional power down	5 minutes							
Identify ALL I/C	connections on the unit(s) under test, as w	vell as M		U M asso	ociated ca	ble lengths b	below		
			I/O	Гуре	Length	Patient	OTT		
Model No.	Description		UUT-	UUT	(m)	(See Note)	QTY		
	Daisy-chain Network (100Mbit Ether	met)	001	- 512					
2005025	Note: this is Ethernet over a USB 3.0 a				-				
3005825	One cable to/from the Touch		Х		5		2		
One cable bundled and unterminate									
3005825	USB A to RJ50 Cable to Bar Code sca		Х	1.8		1			
	Daisy-chain Network (100Mbit Ether	met)					2		
3005854	Note: this is Ethernet over a USB 3.0 c	cable	x		5				
5005054	One cable to/from Controller				5		2		
	One cable to/from Touch with Acce	ss							
	Daisy-chain Network (100Mbit Ether	net)							
3005853	Note: this is Ethernet over a USB 3.0 c	cable	X			2			
	One cable bundled and unterminete	d							
	One capie bundled and unterminate	u	1	l					



3005853	Headphones to Touch with Access accessibility controller		X	1.8	1
3005853	Red/Green Jelly switches to Touch with Access accessibility controller		Х	1.5	1
Note: "Patient Connect" column applies only to medical devices.					

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 Hardw	are					
Condition		Verity C cable, un ercised.	Controller, Touch, and nits powered up and r	Touch with Access units connected via daisy-chain network running with all functions exercised, I/O and ports being ex-		
Configuration Dur- ing Test		Verity C cessible with all	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	C/UUT device			
UUT Compo	onents					
Name	Mod	el No.	Serial No.	Description		
Verity Con- troller	300	5825	TBD	Verity Controller device		
Verity Touch	300	5854	TBD	Verity Touch device		
Verity Touch with Access	300	5853	TBD	Verity Touch with Access device		
1/O Cabling						
See Section 2	2.0 for de	etails				



UUT Software	UUT Software/Firmware					
Name	Version/Revision	Functionality				
WES	7, SP1	Operating System				
Test Applica- tions	N/A	Exercises the functionality of the system and the ports.				
UUT Operating Conditions						
List all frequencies generated/used by the		1.91GHz, 0.307MHz, 10MHz, 12MHz, 24MHz, 25MHz crys-				
product.		tals/oscillators.				
How will product be exercised during test?		All units powered up and running. All ports will be exercised dur-				
How will product be exercised during test?		ing test with diagnostic test software.				
How will product be monitored during test?		Watch LCD screens and monitor peripherals				
What are the pro	duct's critical parameters?					
Specify tolerance	e of all critical parameters.					



Support Equipment (SE) – Detailed Information

Support Equipment (SE)							
Name	Model No.	Seria	l No.		Descrip	tion	
AutoBallot (barcode scanner)	Hart P/N 3005174 Motorola/Zebra DS4308- SR7U2100AZW	TB	SD	Optional COTs the Controller	barcode scan and does not s fault configu	ner. This is a hip with the uration.	n option for unit as a de-
Red/Green Jelly Switches	N/A	n/-	a	Red/Green jelly Controller on t COTS switche typically	y switches for he Touch with s that do not sl y provided by a	disabled use values of Access unit. hip with the use an accessible	with Access These are init and are user
Headphones	Hart: P/N 2005230 v7 brand	n/-	a	Optional COTS Headphones for listening to a from the Touch with Access unit.		g to audio t.	
HA300-2NP							
SE I/O Cabling			•			T (1	0
Model No.		Descr	ription		Shielded?	Length	Quantity
DS4308- SR7U2100AZ	Custom USE	Custom USB A to RJ50 Cable to Ba 6' long			Yes	1.8m	1
Red/Green Je Switches	lly Red/Gre	Red/Green Jelly switches – cord is 5' long			Not sure	1.5m	1
V7 HA300-21 Headphones	NP H	Headphones – cord is 4' long		ong	No	1.2m	1
ATI module	e ATI	module to T	Souch Write	er Duo	Yes	1.8m	1
SE Software	e/Firmware				-		
Name	Version/R	evision]	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 <u>Electromagnetic Compatibility/Interference (EMC/EMI)</u>, <u>Lightning</u>, <u>Transient</u>, <u>Surge</u>, and <u>Product Safety tests</u>:

Test Technology:	Test Method(s) ^{1,2} :
Emissions 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)
Immunity	
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 (XN 61000 4 3 (2008 5); KN 61000 4 3 (Amer 1 2)
	Allex 1-2)
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Test Technology:	Test Method(s) ^{1,2} :
Immunity (cont'd) 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) + AI (2001); EN 61000-4-11 (2004); KN 61000-4-11; KN 61000-4-11 (2008-5); KN 61000-4-11 (Annex 1-7)
Product Safety 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)
Generic/Product Family Standards and Industry Standards 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);

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Test Technology:	Test Method(s) ^{1.2} :
Generic/Product Family Standards and Industry Standards (cont'd) Information Technology Equipment (cont'd)	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
Industrial, Scientific, and Medical (ISM) Equipment	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)
Measure	IEC 61326-1 Ed. 2.0 (2013)
Military/Defense	 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 RE101 (30 Hz to 100 kHz); MIL-STD-461F, G Method RE103 (10 kHz to 18 GHz); MIL-STD-461F, G Method RS101 (30 Hz to 100 kHz); MIL-STD-461F, G Method RS101 (30 Hz to 100 kHz); MIL-STD-461F, G Method RS103 (2 MHz to 40 GHz); MIL-STD-461F, G Method LDC101; MIL-STD-704 D, E, F; 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 LDC401; MIL-HDBK-704-8 Method LDC401; MIL-HDBK-704-8 Method LDC501; MIL-HDBK-704-8 Method LDC501;

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

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

On the following types of products:

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

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

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

³Accreditation 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.

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Accredited Laboratory

A2LA has accredited

NATIONAL TECHNICAL SYSTEMS (NTS) - LONGMONT

Longmont, CO

for technical competence in the field of

Electrical Testing

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



Presented this 8th day of October 2018.

President and CEO

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

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



End of Report