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Test Report Number:	**TRB40441**
Report Type:	**Full Compliance Immunity**
Reference Standard:	**EN 61326-1: 2013 – Industrial Locations**
Date of Report:	**30 July 2014**
Product Name:	**ACX-250-1**
Model Number:	**ACX-250-1**
Serial Number:	**443-DX**
Manufacturer:	**Tensitron**
Representative:	**Chris Crosby**
Approved By:	Vincent W. Bruti

Prepared for:

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Revision	Description of Revision	Date:
Rev. -	Initial Release	30 July 2014

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1.0 TEST SUMMARY

1.1 Product Description

The unit under test (UUT) was the ACX-250-1. The Serial Number tested was 443-DX. This product is manufactured by Tensitron located in Longmont, Colorado. It is an electronic tension gauge designed for use in industrial locations. The product was continually exercised during testing, as described in the "Configuration of Unit" field of the data sheet. Additional product information may be found in the Product Data Sheet, located in Appendix H of this report.

1.2 Test Standards Used

The standard applied to this product was EN 61326-1: 2013, which is the product standard for laboratory equipment. The dated normative references (IEC and EN) of this standard define the test methods used for the immunity testing. These are summarized in Table 1-1.

Table 1-1

Requirement	Specification	Test Method	Performance Criteria
EN 61326-1: 2013, Electrical Equipment for Measurement, Control and Laboratory Use	Electrostatic Discharge	IEC 61000-4-2: 2008 EN 61000-4-2: 2009	(B) Self-Recovering
	Radiated RF Immunity	IEC 61000-4-3:, 2006 + A1: 2007 + A2: 2010 EN 61000-4-3:, 2006 + A1: 2008 + A2: 2010	(A) No Degradation
	Electrical Fast Transient/Burst	IEC 61000-4-4: 2004 + corr. 2007 + A1: 2010 IEC 61000-4-4: 2004 + A1: 2010	(B) Self-Recovering
	Surge Immunity	IEC 61000-4-5: 2005 + corr. 2010 EN 61000-4-5: 2006	(B) Self-Recovering
	Conducted RF Immunity	IEC 61000-4-6: 2008 EN 61000-4-6: 2009	(A) No Degradation
	Power Frequency H-field Immunity	IEC 61000-4-8: 2009 EN 61000-4-8: 2010	(A) No Degradation
	Voltage Dips, Interrupts	IEC 61000-4-11: 2004 EN 61000-4-11: 2004	(B) Self-Recovering

1.3 Immunity Test Results

The UUT **complied** with all the industrial immunity requirements defined by EN 61326-1: 2013. Test results are summarized in Table 1-2 (next page).

1.4 Modifications Required for Compliance

In order to comply with radiated RF immunity, it was necessary to remove the 4-20 mA cable. (This cable port will be marked as "Do Not Use" for production.)

Table 1-2

Specification	Test Method	Test Conditions	Result
Electrostatic Discharge	IEC 61000-4-2	±4 kV Contact / HCP, VCP / ±8 kV Air	Compliant
Radiated RF Immunity	IEC 61000-4-3	80 - 1000 MHz, 10 V/m, 80% 1 kHz AM 1.4-2 GHz, 3 V/m, 80% 1 kHz AM 2-2.7 GHz, 1 V/m, 80% 1 kHz AM	Compliant
EFT/Burst	IEC 61000-4-4	±1.0 kV I/O (>3 meters), ±2.0 kV AC mains	Compliant
Surge Immunity	IEC 61000-4-5	±2.0 kV comm. mode, ±1.0 kV diff. mode, AC mains	Compliant
Conducted RF Immunity	IEC 61000-4-6	150 kHz to 80 MHz, 3 Vrms, 80% 1 kHz AM, power and I/O > 3 meters	Compliant
Power Frequency H-field Immunity	IEC 61000-4-8	30 A/m, 50 & 60 Hz	Compliant
Voltage Dips and Interrupts	IEC 61000-4-11	0% for 1 cycle 40% for 10 cycles (50 Hz) 40% for 12 cycles (60 Hz) 70% for 25 cycles (50 Hz) 70% for 30 cycles (60 Hz) 0% for 250 cycles (50 Hz) 0% for 300 cycles (60 Hz)	Compliant

2.0 SCOPE

2.1 Purpose

This report documents the test efforts performed on the ACX-250-1 to verify compliance to the 2013 version of EN 61326-1, Electrical Equipment for Measurement, Control and Laboratory Use. Testing was performed to the environments specified for industrial locations. This was a formal qualification test and was conducted on the days of 7, 8 and 9 April and 23 July 2014.

2.2 Test Plan

The client provided a Product Data Sheet, which fulfills the test plan requirements defined by EN 61326-1. This document was submitted by the client prior to testing and defines, among other things, product configuration during testing, performance criteria and a top-level block diagram.

2.3 Test Parameters

During testing, the UUT was configured in a normal operating mode. Critical parameters of the product are defined in Section 4.0 of the Product Data Sheet, found in Appendix H of this report.

2.4 Definition of Performance Criterion for the UUT

The performance criteria for laboratory and measurement equipment are defined as follows:

Level A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Level B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Level C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Performance criteria, as applied to this product are defined in Section 4.0 of the Product Data Sheet, found in Appendix H of this report.

3.0 TEST ENVIRONMENT

3.1 Immunity Test Site

The immunity testing was performed at EMCI's test facility in Longmont, Colorado. The radiated field immunity testing was performed in a ferrite lined, shielded enclosure. The enclosure is 10' high x 12' wide x 20' long in size and meets the field uniformity requirements of IEC 61000-4-3. The size of the chamber allows 2-meter separation between the antenna and the UUT.

All other immunity testing was performed on a ground plane measuring 3 meters by 4.5 meters (13.5 square meters). The ground plane was connected to facility ground via the safety ground of the AC wire and extended beyond the UUT by greater than 0.5 meters, as required by the test standards.

3.2 Measurement Uncertainty

The measurement uncertainty for EMC Integrity's emissions test facility complies with the requirements defined in CISPR 16. The complete calculations of EMC Integrity's measurement uncertainty is contained in an EMCI memo, which is available upon request. However, a summary of EMCI's measurement uncertainty is given in Table 3-1.

Table 3-1

Test	Measurement Uncertainty	Reference
Electrostatic Discharge	Contact Voltage: 1.9% Risetime: 60 ps Peak Current: 2.8% 30 ns Current: 3.8% 60 ns Current: 9% Indicated Voltage: 1.9%	Accredited Calibration Data Sheet
Radiated RF Immunity	V-pole: 1.2 dB H-pole: 0.7 dB	Worksheets located at H:\EMCI\Administration\Calibration\Measurement Uncertainty
Electrical Fast Transient	Voltage: 0.01 kV Risetime: 0.45 nsec Pulse Width: 1.08 nsec	
Surge Immunity	O.C. Voltage: 0.01 kV Risetime: 0.1 usec Pulse Width: 1.76 usec S. C. Current: 0.91 A Risetime: 0.08 usec Pulse Width: 0.15 usec	
Conducted RF Immunity	0.24 dB	
Power Frequency H-field Immunity	0.87 dB	
Voltage Dips & Interruptions	Voltage: 10.38 Volts Duration: 0.23 msec	

4.0 IEC 61000-4-2, Electrostatic Discharge

4.1 Summary of Test Results

Electrostatic discharge (ESD) testing was performed in accordance with the test methods specified by IEC 61000-4-2. Contact discharge was performed at levels of ± 2 kV and ± 4 kV at applicable (conductive) test points. Air discharge was performed for non-conductive surfaces of the product at levels of ±2 kV, ± 4 kV and ± 8 kV. Indirect discharge testing to the horizontal coupling plane (HCP) and vertical coupling plane (VCP) was also performed to levels of ± 2 kV and ± 4 kV.

Note: In the event that no discharge occurs when ESD testing is performed on a product, the data sheet will state "no [contact or air] discharge points found".

The UUT exhibited no malfunctions and operated within specified tolerances and therefore, complies with the requirements of this test.

4.2 Test Setup

The UUT was set up per IEC 61000-4-2 and tested to the levels specified by EN 61326-1 for industrial locations.

4.3 Special Configurations

N/A

4.4 Performance Criteria: Level B

As defined in Section 2.4 of this report.

4.5 Deviations from Test Procedures

N/A

4.6 Test Data

See APPENDIX A for details.

4.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-2 test data sheet.

5.0 IEC 61000-4-3, Radiated RF Immunity

5.1 Summary of Test Results

Radiated RF immunity testing was performed on the UUT in accordance with IEC 61000-4-3. The UUT was placed on a non-conductive table, 80 cm above the floor of the completely anechoic-lined chamber (CALC). The UUT was at a distance of 2 meters from the radiating antenna, which was 1.5 meters above the floor of the chamber. Testing was performed in both horizontal and vertical antenna polarizations over the frequency range from 80 MHz to 1 GHz at 10 V/m. Testing was also performed from 1.4 to 2.0 GHz at 3 V/m and from 2.0 to 2.7 GHz at 1 V/m. The UUT was rotated on the table so that all four sides were illuminated in the field. The frequency was stepped in 1% increments and a dwell time of 3 seconds was used at each test frequency. The radiated field was amplitude modulated with a 1 kHz sine wave to a depth of 80%. Performance of the unit was monitored remotely (via Ethernet) with a support PC.

During all testing, the UUT exhibited no malfunctions and operated within specified tolerances and therefore, complies with the requirements of this test.

5.2 Test Setup

The UUT was set up per IEC 61000-4-3 and tested to the levels specified by EN 61326-1 for industrial locations.

5.3 Special Configurations

N/A

5.4 Performance Criteria: Level A

As defined in Section 2.4 of this report.

5.5 Deviations from Test Procedures

N/A

5.6 Test Data

See APPENDIX B for details.

5.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-3 test data sheet.

6.0 IEC 61000-4-4, Electrical Fast Transient/Burst

6.1 Summary of Test Results

Electrical fast transient/burst testing was performed on the UUT in accordance with IEC 61000-4-4. The AC power was tested via direct injection to ± 2.0 kV. I/O cabling greater than 3 meters in length was tested via capacitive clamp to a level of ±1.0 kV. During all testing, the UUT exhibited no malfunctions and operated within specified tolerances and therefore, complies with the requirements of this test.

6.2 Test Setup

The UUT was set up per IEC 61000-4-4 and tested to the levels specified by EN 61326-1 for industrial locations.

6.3 Special Configurations

N/A

6.4 Performance Criteria: Level B

As defined in Section 2.4 of this report.

6.5 Deviations from Test Procedures

N/A

6.6 Test Data

See APPENDIX C for details.

6.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-4 test data sheet.

7.0 IEC 61000-4-5, Surge Immunity

7.1 Summary of Test Results

Surge immunity testing was performed on the UUT in accordance with IEC 61000-4-5. The AC power of the UUT was tested via direct injection at levels of ±0.5 kV and ±1.0 kV for differential mode and at levels of ±0.5 kV, ±1.0 kV and ±2.0 kV for common mode. Surges were injected at 0 degrees, 90 degrees, 180 degrees and 270 degrees of the input ac waveform at a rate of one pulse per minute. Five pulses were injected for each test configuration.

The UUT exhibited no malfunctions or degradations in performance and therefore, passed all requirements of the test.

7.2 Test Setup

The UUT was set up per IEC 61000-4-5 and tested to the levels specified by EN 61326-1 for industrial locations.

7.3 Special Configurations

N/A

7.4 Performance Criteria: Level B

As defined in Section 2.4 of this report.

7.5 Deviations from Test Procedures

N/A

7.6 Test Data

See APPENDIX D for details.

7.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-5 test data sheet.

8.0 IEC 61000-4-6, Conducted RF Immunity

8.1 Summary of Test Results

Conducted RF immunity testing was performed on the UUT in accordance with IEC 61000-4-6. The UUT was subjected to injected RF signals on its input AC power cable. Injection on the AC leads was performed via a coupling/decoupling network (CDN). All I/O cabling greater than 3 meters in length was tested via EM clamp. The test frequency was stepped in 1% increments with a 3 second dwell time for each injection frequency. The injection level for all testing was 3 Vrms with 1 kHz sine wave AM to a depth of 80%.

At no time did the UUT exhibit any malfunctions or degradations in performance; thus, the UUT passed all portions of this test.

8.2 Test Setup

The UUT was set up per IEC 61000-4-6 and tested to the levels specified by EN 61326-1 for industrial locations.

8.3 Special Configurations

N/A

8.4 Performance Criteria: Level A

As defined in Section 2.4 of this report.

8.5 Deviations from Test Procedures

N/A

8.6 Test Data

See APPENDIX E for details.

8.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-6 test data sheet.

9.0 IEC 61000-4-8, Power Frequency H-field Immunity

9.1 Summary of Test Results

Power frequency H-field immunity testing was performed on the UUT in accordance with the test methods specified by IEC 61000-4-8. The UUT was exposed to a 30 A/m field at both 50 and 60 Hz. All three axes (x, y, and z) were immersed in the field for a period of 60 seconds for each configuration. A 13 cm coil was used for this test and the proximity method was used.

These magnetic fields had no effect on the UUT, which passed the requirements of this test.

9.2 Test Setup

The UUT was set up per IEC 61000-4-8 and tested to the levels specified by EN 61326-1 for industrial locations.

9.3 Special Configurations

N/A

9.4 Performance Criteria

As defined in Section 2.4 of this report.

9.5 Deviations from Test Procedures

N/A

9.6 Test Data

See APPENDIX F for data sheets and test setup pictures.

9.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-8 test data sheet.

10.0 IEC 61000-4-11, Voltage Dips and Interrupts

10.1 Summary of Test Results

Voltage dip and interrupt testing was performed on the UUT, in accordance with IEC 61000-4-11. The UUT was subjected to the following voltage fluctuations on its AC power input:

0% for 1 cycle	
40% for 10 cycles (50 Hz	40% for 12 cycles (60 Hz)
70% for 25 cycles (50 Hz)	70% for 30 cycles (60 Hz)
0% for 250 cycles (50 Hz)	0% for 300 cycles (60 Hz)

These variations in AC line voltage affected the UUT within the performance criteria allowed by the standard. Therefore, the UUT passed the requirements of this test.

10.2 Test Setup

The UUT was set up per IEC 61000-4-11 and tested to the levels specified by EN 61326-1 for industrial locations.

10.3 Special Configurations

N/A

10.4 Performance Criteria: Level B

As defined in Section 2.4 of this report.

10.5 Deviations from Test Procedures

N/A

10.6 Test Data

See APPENDIX F for details.

10.7 Temperature and Humidity

Temperature, relative humidity and barometric pressure are located in the header table for the IEC 61000-4-11 test data sheet.

APPENDIX A

Electrostatic Discharge Test Data

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014
Temperature:	22.8˚C Humidity: 41%	Pressure:	836 mb
Input Voltage:	230Vac/50Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-2.doc FR0100

Test Location	Voltage Level (kV)	Polarity +	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	A	Pass
Contact Discharge Points - **RED** Arrows.								
Figure A2	2, 4	x	x	10	1		A	Pass
Figure A3	2, 4	x	x	10	1		A	Pass
Figure A4	2, 4	x	x	10	1		A	Pass
Figure A5	2, 4	x	x	10	1		A	Pass
Figure A6	2, 4	x	x	10	1		A	Pass
Figure A7	2, 4	x	x	---	---	No Contact Discharge Points found	---	---
Air Discharge Points - **BLUE** Arrows.								
Figure A2	2, 4, 8	x	x	10	1	+4kV & +/-8kV discharges to display.	A	Pass
Figure A3	2, 4, 8	x	x	---	---	No Air Discharge Points found	---	---
Figure A4	2, 4, 8	x	x	---	---	No Air Discharge Points found	---	---
Figure A5	2, 4, 8	x	x	---	---	No Air Discharge Points found	---	---
Figure A6	2, 4, 8	x	x	---	---	No Air Discharge Points found	---	---
Figure A7	2, 4, 8	x	x	---	---	No Air Discharge Points found	---	---

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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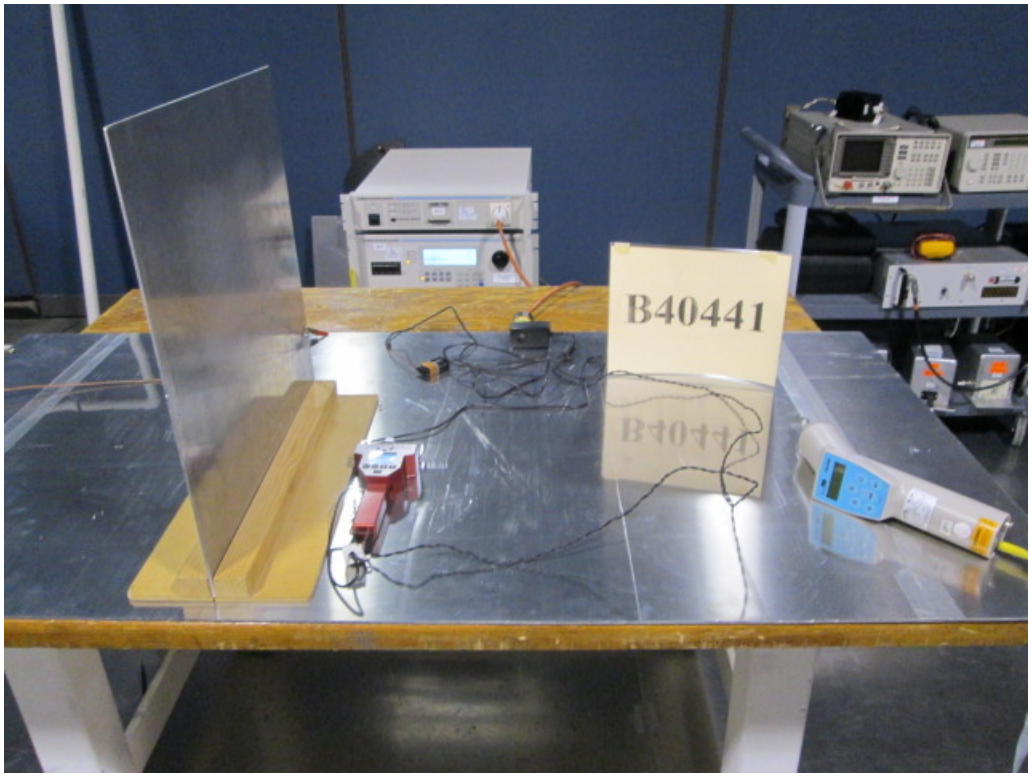

Figure A1. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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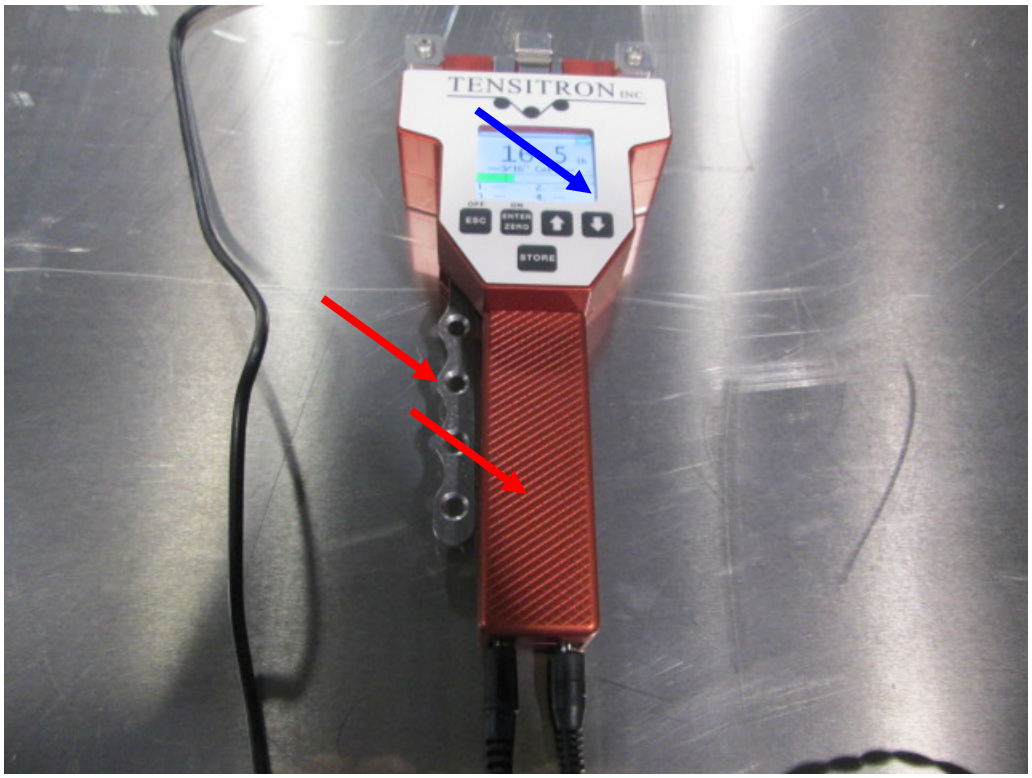

Figure A2. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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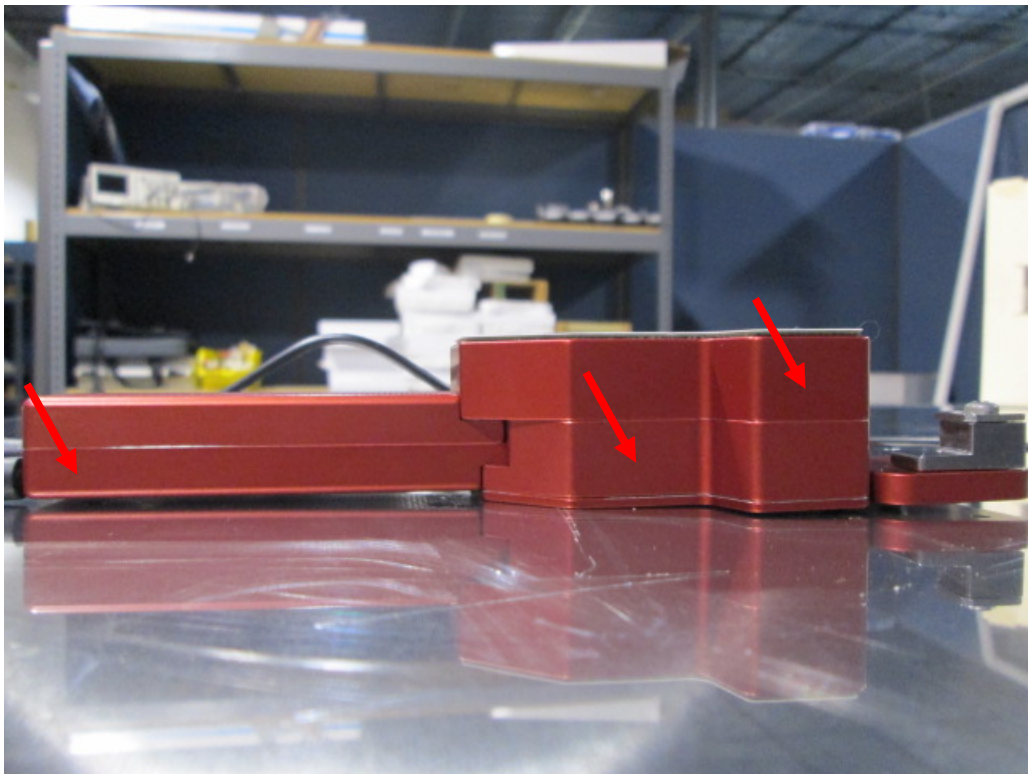

Figure A3. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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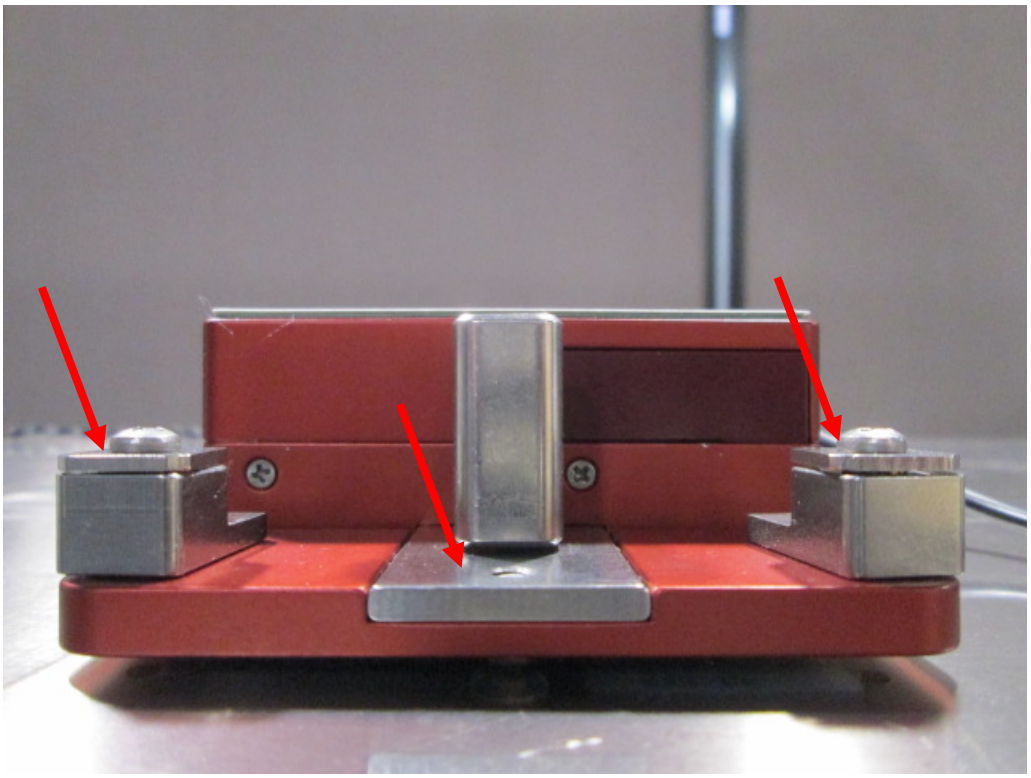

Figure A4. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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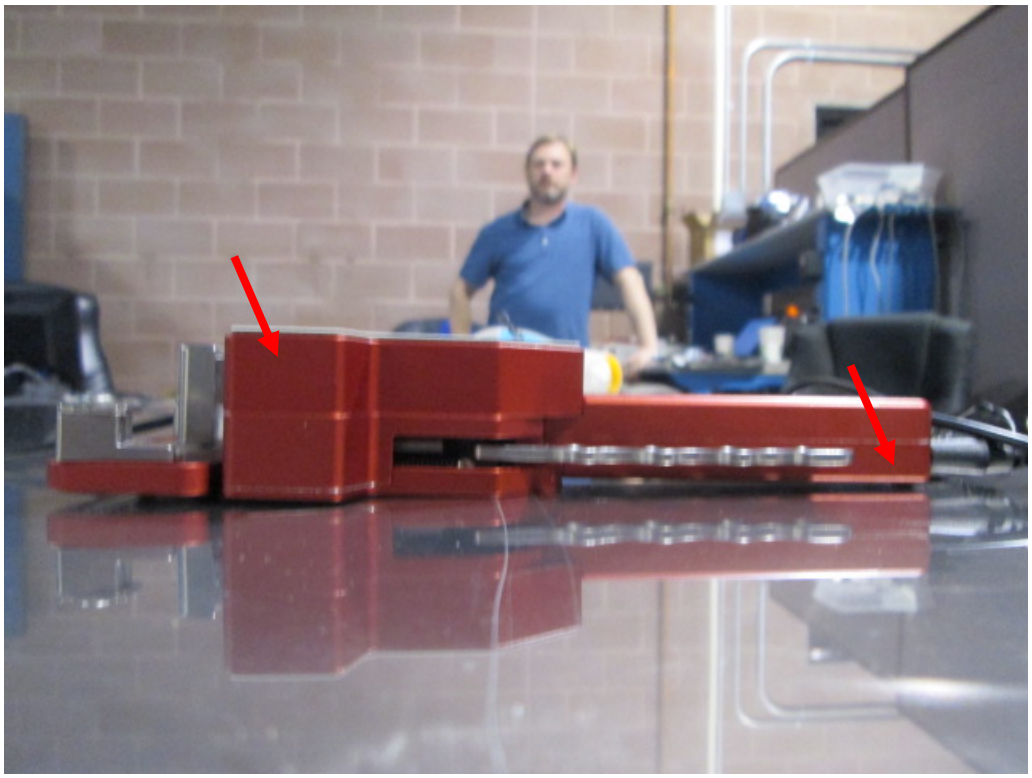

Figure A5. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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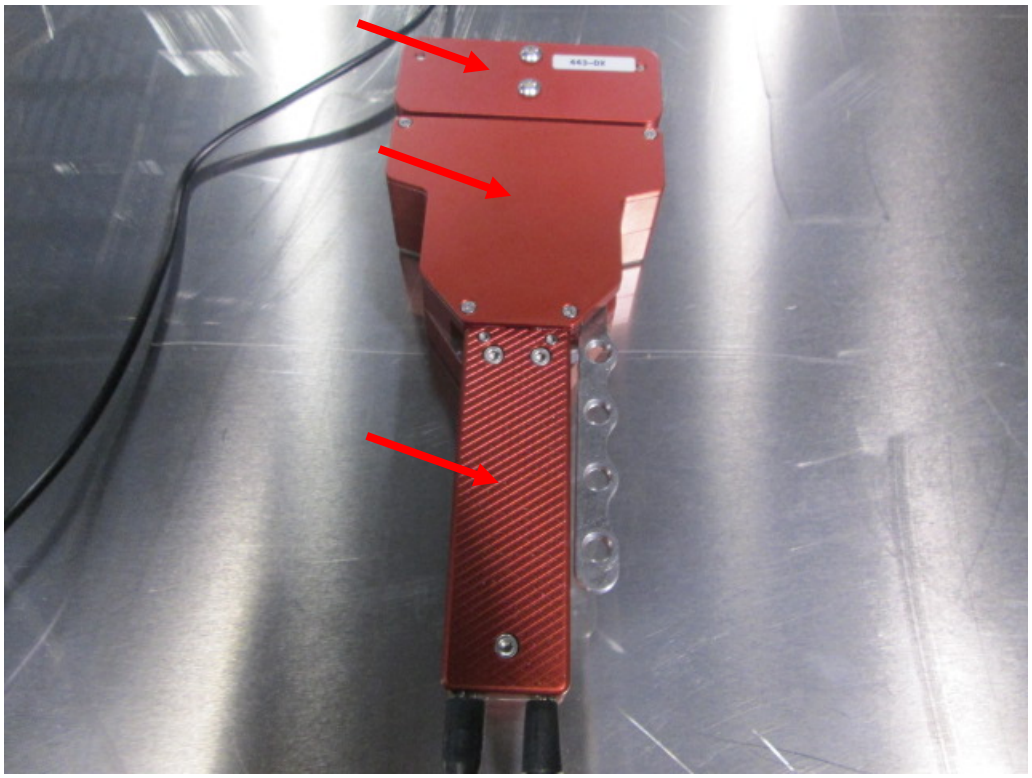

Figure A6. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

B40441-4-2.doc FR0100

Figure A7. Electrostatic Discharge Test Setup.

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Electrostatic Discharge per IEC / EN 61000-4-2

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 10, 2014

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1015	KeyTek	MZ-15/EC	0010280/00102 79	Mini Zap ESD Gun	09/06/2013	09/06/2014
1281	EMC Partner	ESD3000	284	ESD Test System	02/28/2014	02/28/2015
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	11/08/2013	11/08/2014
1537	Extech Instuments	445715	Z315813	Hygro-Thermometer	03/21/2014	03/21/2015

APPENDIX B

Radiated RF Immunity Test Data

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014
Temperature:	24.3˚C Humidity: 69%	Pressure:	846 mb
Input Voltage:	230 VAC/50Hz		
Configuration of Unit:	Pre-set load reading, no user intervention required.		
Test Engineer:	Casey Lockhart		

B40441-4-3.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	**Front**	A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	V	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	V	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	H	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Right**	A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	V	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	V	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	H	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Back**	A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	V	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	V	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	H	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Left**	A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	V	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	V	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	H	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Top**	A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	V	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	V	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	H	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Bottom**	A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	V	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	V	3		A	Pass

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014
Temperature:	24.3˚C Humidity: 69%	Pressure:	846 mb
Input Voltage:	230 VAC/50Hz		
Configuration of Unit:	Pre-set load reading, no user intervention required.		
Test Engineer:	Casey Lockhart		

B40441-4-3.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	H	3		A	Pass
1000-2000	AM	80	1kHz	Sine	1	3	H	3		A	Pass
2000 - 2700	AM	80	1kHz	Sine	1	3	H	3		A	Pass

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

B40441-4-3.doc FR0100

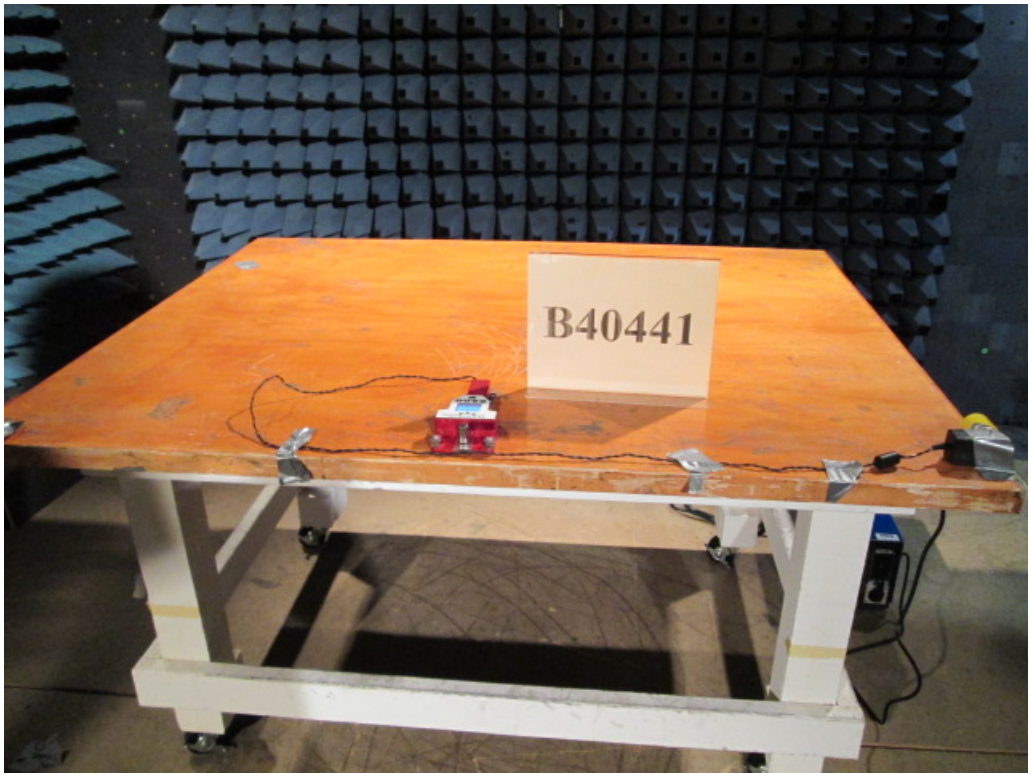

Figure B1. Radiated RF Immunity Test Setup – Front Side.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

B40441-4-3.doc FR0100

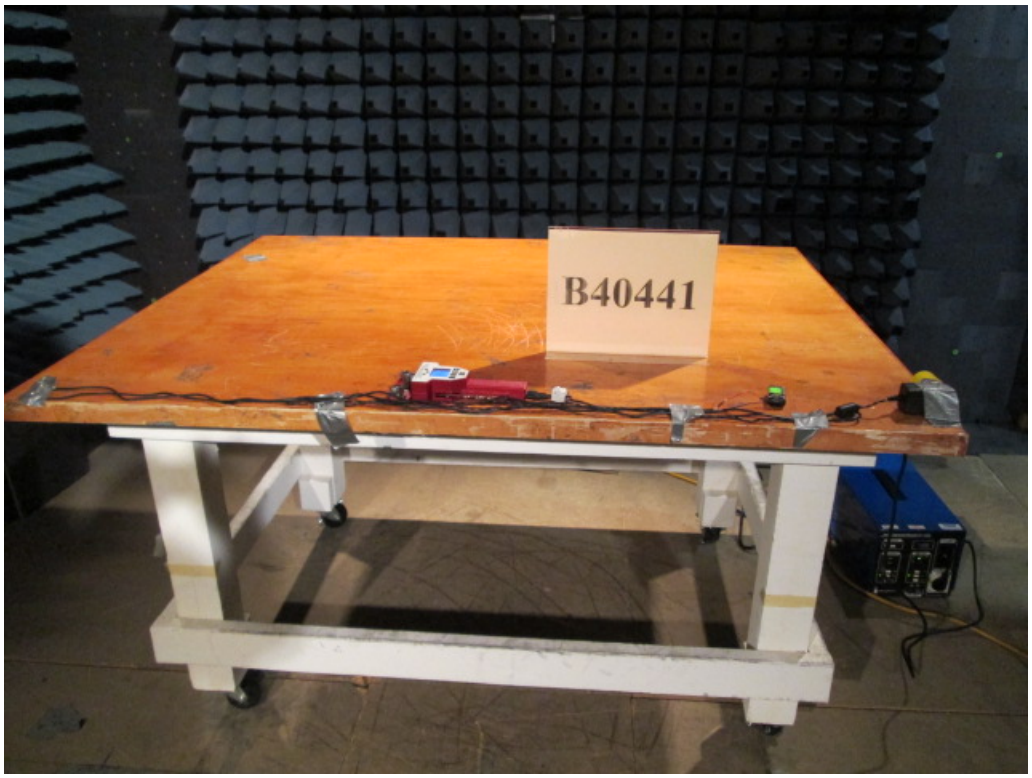

Figure B2. Radiated RF Immunity Test Setup – Right Side.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

B40441-4-3.doc FR0100

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

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

B40441-4-3.doc FR0100

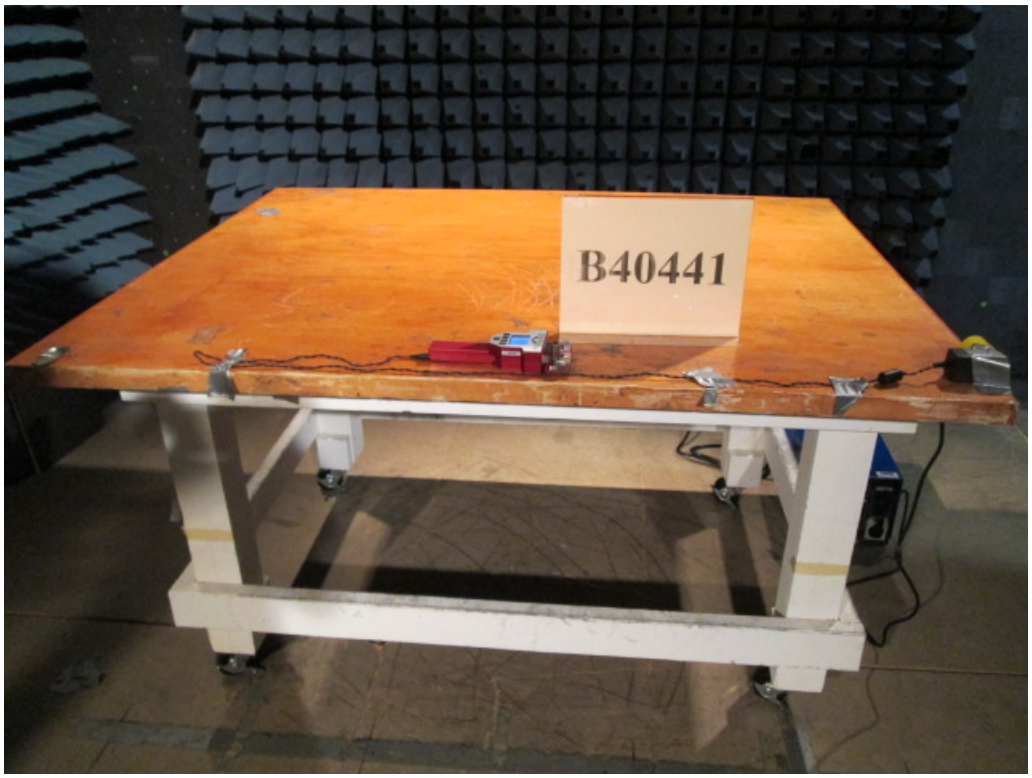

Figure B4. Radiated RF Immunity Test Setup – Left Side.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

B40441-4-3.doc FR0100

Figure B5. Radiated RF Immunity Test Setup – Top Side.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

B40441-4-3.doc FR0100

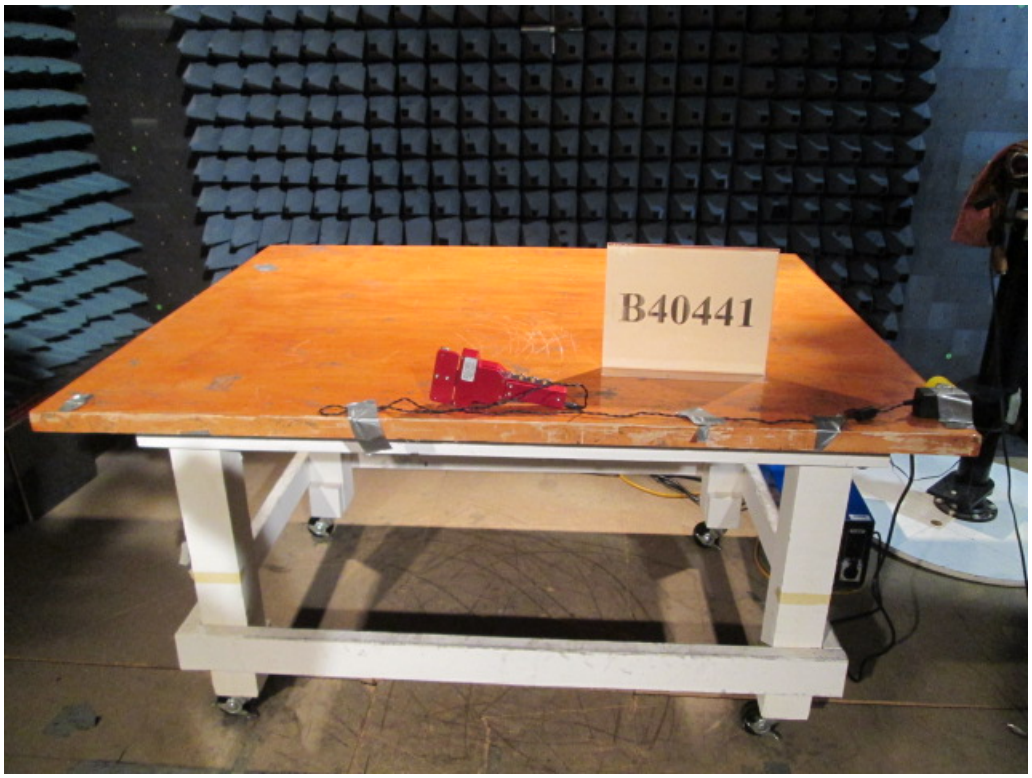

Figure B6. Radiated RF Immunity Test Setup – Bottom Side.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby (CEPD)	Test Area:	CALC
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1:2006 (Industrial)	Date:	July 23, 2014

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1005	EMCO	3140	1012	Biconilog Antenna	NA	NA
1056	Marconi	2041	119332/001	Signal Generator 10kHz - 2.7GHz		
1058	Ray Proof	RF Shield Room	6698	Completely Anechoic Lined Chamber	07/02/2013	08/02/2014
1181	EMCI	RFS	NA	Initial Release 02 July 2004	NA	NA
1278	Ophir RF	5163F	1049	RF Amplifier, 0.8 - 4.2 GHz, 50W	NA	NA
1285	ETS-Lindgren	HI-6053	00082800	Isotropic Field Probe 10 MHz-40 GHz	02/05/2014	02/05/2015
1375	A.H Systems Inc.	SAS-571	592	DRG Horn Antenna 700 MHz-18 GHz	NA	NA
1406	EXTECH Instruments	445715	N/A	Hygro-Thermometer		
1455	Giga-tronics	GT-8888A	8888A03337	10 MHz to 8 GHz, +20 dBm, 25 Vdc Power Meter	05/13/2014	05/13/2015
1456	Werlatone	C3908-10	98095	1500 Watts, 50 dB Dual Directional Coupler 80 MHz	05/29/2014	05/29/2015
1478	Ophir	5127F	1100	RF Amplifier, 200 Watt, 20 - 1000 MHz	NA	NA
1542	Interpower	1251PC	L40704	100-240 Vac Power Supply (CALC)	NA	NA

APPENDIX C

Electrical Fast Transients/Burst Test Data

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014
Temperature:	22.4˚C Humidity: 42%	Pressure:	841 mb
Input Voltage:	230Vac/50Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-4.doc FR0100

Voltage (kV)	Polarity +	Polarity -	Time (sec)	Injection Type	L 1	L 2	L 3	N	P E	Comments	Criteria Met	Pass / Fail
1.0	x		60	CDN	x					AC	A	Pass
1.0		x	60	CDN	x						A	Pass
1.0	x		60	CDN		x					A	Pass
1.0		x	60	CDN		x					A	Pass
1.0	x		60	CDN					x		A	Pass
1.0		x	60	CDN					x		A	Pass
1.0	x		60	CDN	x	x			x		A	Pass
1.0		x	60	CDN	x	x			x		A	Pass
0.5	x		60	Clamp						Cable	A	Pass
0.5		x	60	Clamp							A	Pass

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-4.doc FR0100

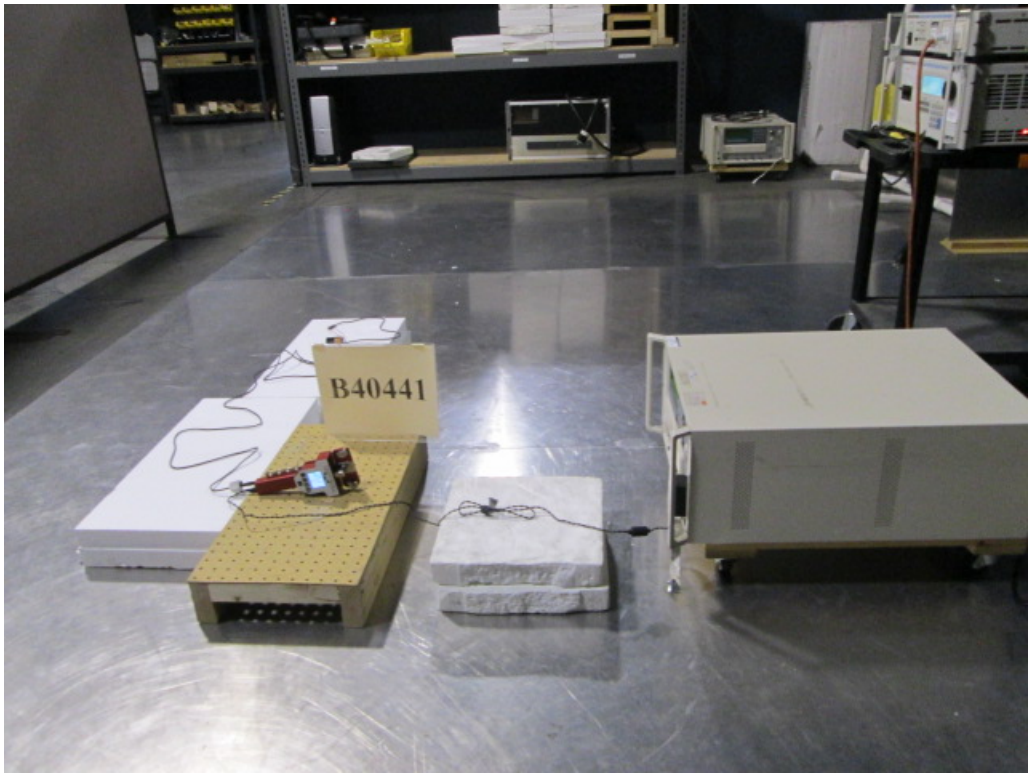

Figure C1. Electrical Fast Transient Test Setup – AC Mains

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-4.doc FR0100

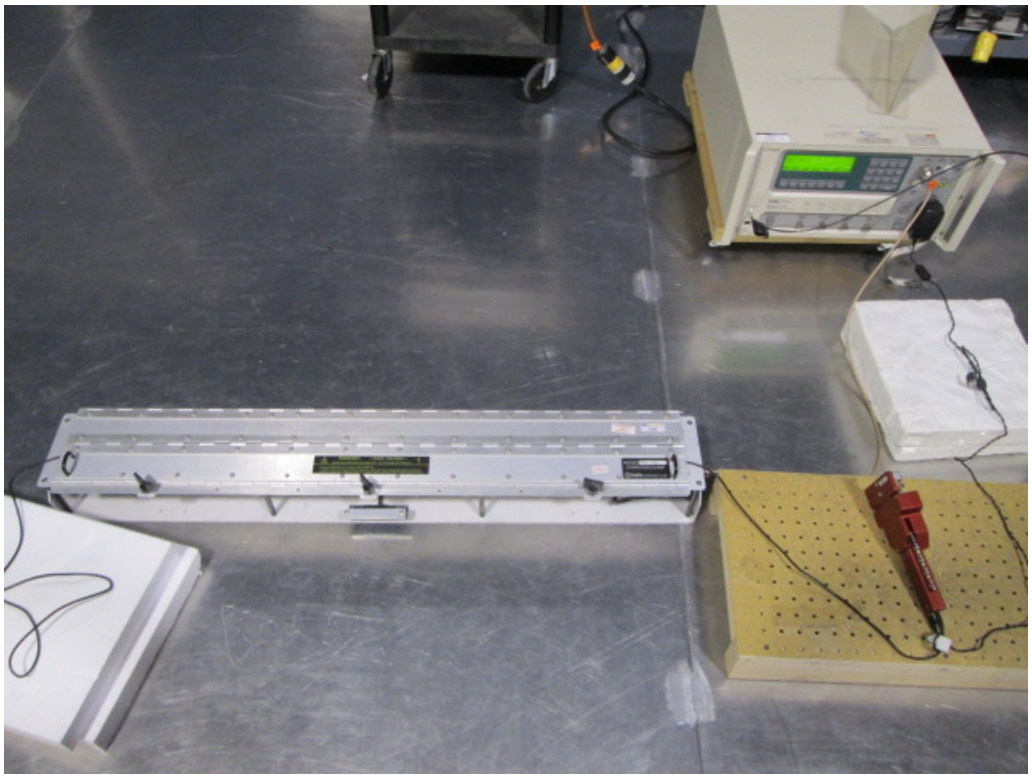

Figure C2. Electrical Fast Transient Test Setup – I/O Cable.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-4.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	10/10/2013	10/10/2014
1184	KeyTek	CEWare32	NA	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
1358	KeyTec Instrument Corp	Pro-CCL	0003200	EM Capcitive Clamp	NA	NA
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel	01/05/2014	01/05/2015
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	11/08/2013	11/08/2014
1537	Extech Instuments	445715	Z315813	Hygro-Thermometer	03/21/2014	03/21/2015

APPENDIX D

Surge Immunity Test Data

emc integrity incorporated

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 9, 2014
Temperature:	21.0˚C Humidity: 31%	Pressure:	836 mb
Input Voltage:	230Vac/50Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-5.doc FR0100

Voltage (kV)	Polarity +	Polarity -	L 1	L 2	L 3	N	PE	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	60	Differential Mode	A	Pass
1.0		x	x			x		0	5	60		A	Pass
1.0	x		x			x		90	5	60		A	Pass
1.0		x	x			x		90	5	60		A	Pass
1.0	x		x			x		180	5	60		A	Pass
1.0		x	x			x		180	5	60		A	Pass
1.0	x		x			x		270	5	60		A	Pass
1.0		x	x			x		270	5	60		A	Pass
1.0	x		x				x	0	5	45	Common Mode Line	A	Pass
1.0		x	x				x	0	5	45		A	Pass

emc integrity incorporated

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 9, 2014
Temperature:	21.0˚C Humidity: 31%	Pressure:	836 mb
Input Voltage:	230Vac/50Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-5.doc FR0100

Voltage (kV)	Polarity +	Polarity -	L 1	L 2	L 3	N	PE	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 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
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

emc integrity incorporated

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 9, 2014

B40441-4-5.doc FR0100

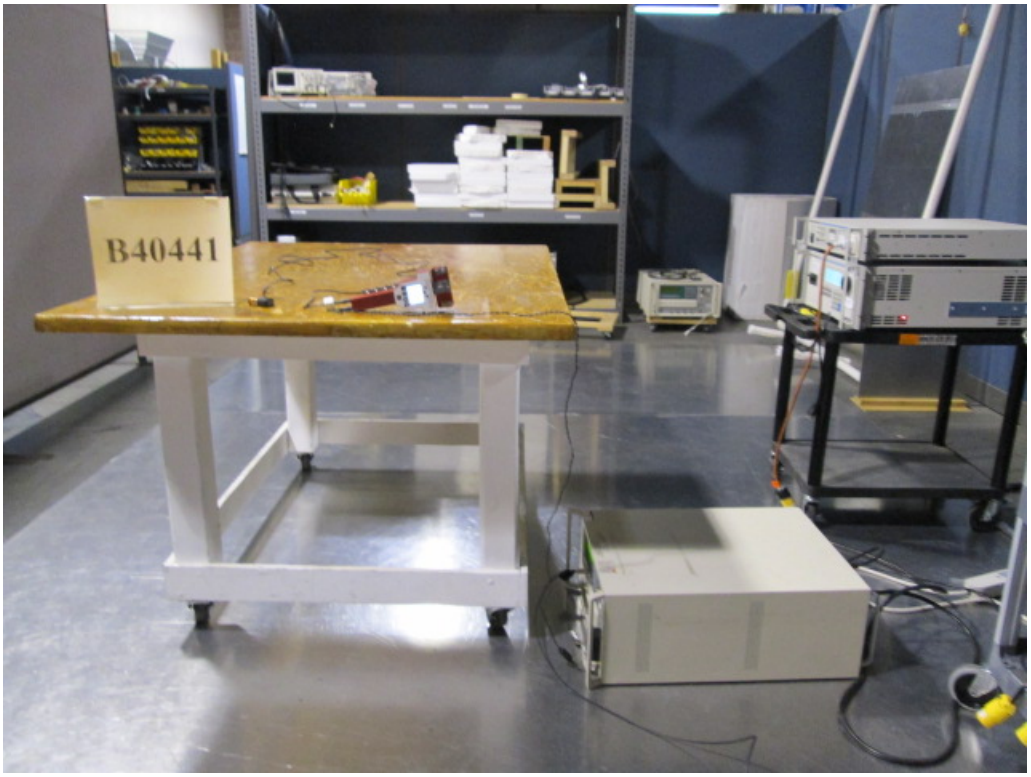

Figure D1. Surge Immunity Test Setup – AC Mains

emc integrity incorporated

Surge Immunity per IEC / EN 61000-4-5

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 9, 2014

B40441-4-5.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	10/10/2013	10/10/2014
1184	KeyTek	CEWare32	NA	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel	01/05/2014	01/05/2015
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	11/08/2013	11/08/2014
1537	Extech Instuments	445715	Z315813	Hygro-Thermometer	03/21/2014	03/21/2015

APPENDIX E

Conducted RF Immunity Test Data

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014
Temperature:	21.8˚C Humidity: 38%	Pressure:	841 mb
Input Voltage:	230Vac/50Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-6.doc FR0100

Frequency (MHz)	Modulation Type	%	Freq	Level (Vrms)	Dwell (sec)	Comments	Criteria Met	Pass / Fail
0.150 – 80.0	AM	80	1 kHz	3	3	AC using M3 CDN	A	Pass
Spot Frequencies	AM	80	1 kHz	3	10	See PDS Section 4.0	A	Pass
0.150 – 80.0	AM	80	1 kHz	3	3	Cable using EMClamp	A	Pass
Spot Frequencies	AM	80	1 kHz	3	10	See PDS Section 4.0	A	Pass

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-6.doc FR0100

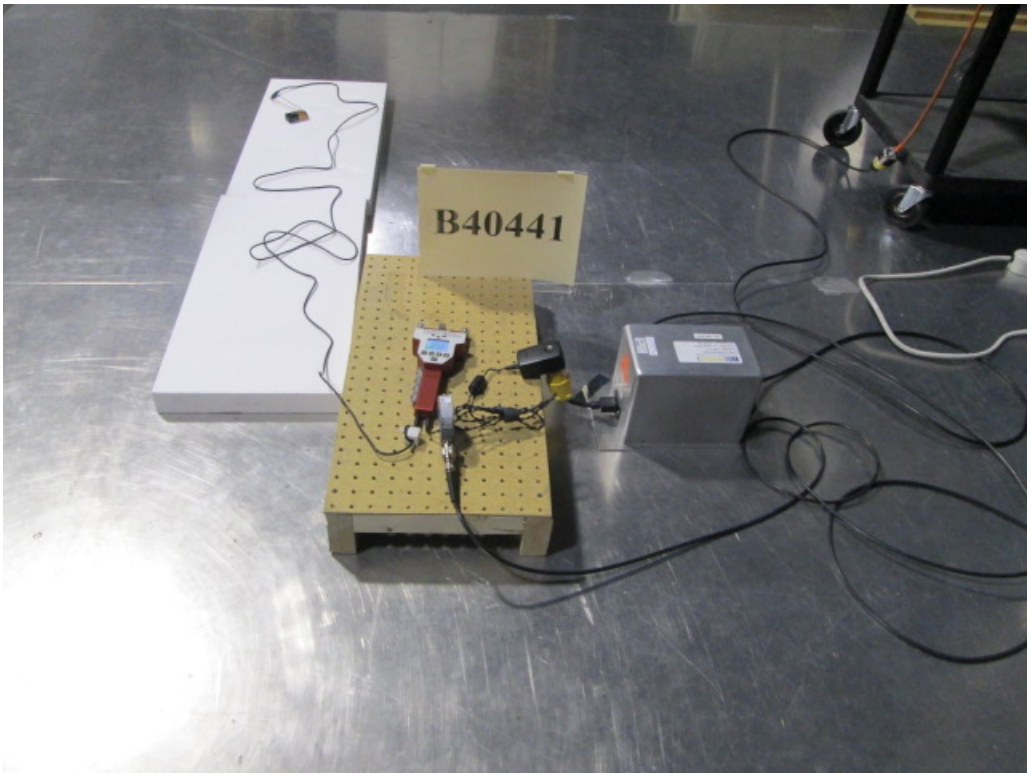

Figure E1. Conducted RF Immunity Test Setup – AC Mains

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-6.doc FR0100

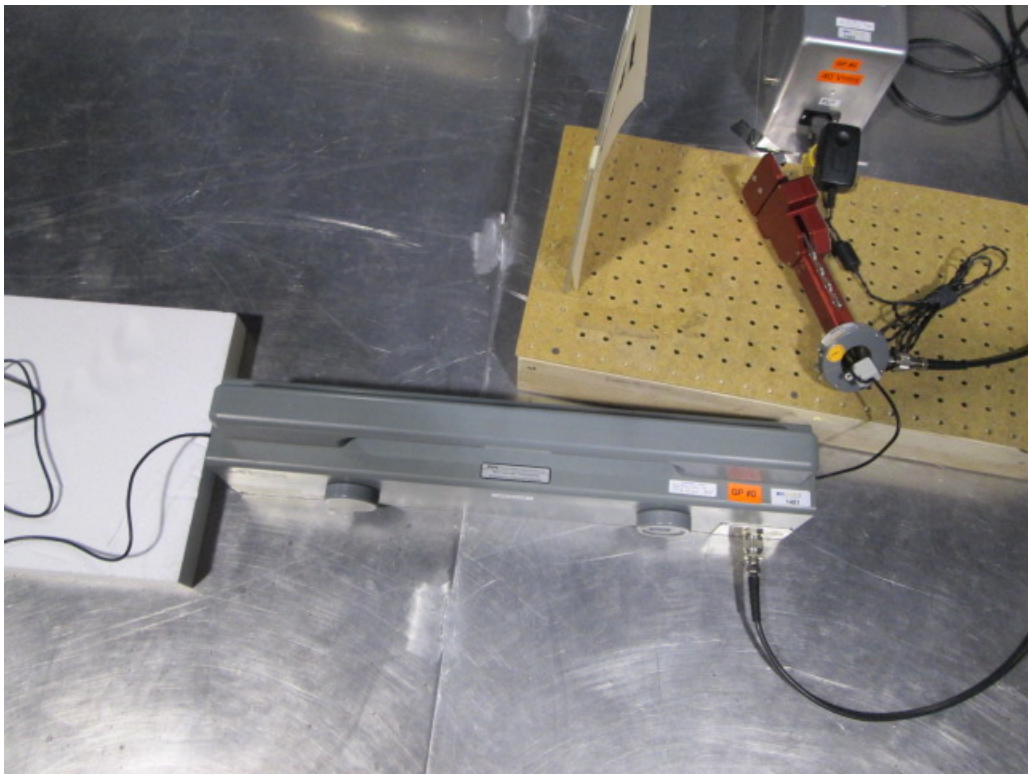

Figure E2. Conducted RF Immunity Test Setup –I/O Cable.

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-6.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1047	Hewlett Packard	8591A	2943A00554	Spectrum Analyzer, 9 kHz - 1.8 GHz w/ Tracking Gen	04/30/2013	04/30/2014
1258	Hewlett Packard	8648C	3537A01572	Signal Generator, 100kHz to 3.2GHz	09/18/2013	09/18/2014
1378	Hewlett Packard	8595E	3624A02084	9 kHz- 6.5 GHz Spectrum Analyzer	06/05/2013	06/05/2014
1481	Fischer Custom Communications	F-2031	443	EM Injection Clamp, 10 kHz to 1000 MHz	03/12/2014	03/12/2015
1482	EMCI	EMCI-CDN-M3-16	EMCI016	M3 CDN, 16A, 250 VAC	03/12/2014	03/12/2015
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	11/08/2013	11/08/2014
1537	Extech Instuments	445715	Z315813	Hygro-Thermometer	03/21/2014	03/21/2015

APPENDIX F

Power Frequency H-field Immunity Test Data

emc integrity incorporated

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014
Temperature:	22.8˚C Humidity: 38%	Pressure:	841 mb
Input Voltage:	230Vac/50Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-8.doc FR0100

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

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-8.doc FR0100

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

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-8.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1214	California Instruments	1251P	10223	AC Power Source	NA	NA
1262	EMCI	EMCI-4-8-2m-1.5m	0001	HField Loop, 2m x 1.5m	08/15/2013	08/15/2014
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	11/08/2013	11/08/2014
1537	Extech Instuments	445715	Z315813	Hygro-Thermometer	03/21/2014	03/21/2015

APPENDIX G

Voltage Dip and Interrupts Test Data

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014
Temperature:	25.9˚C Humidity: 38%	Pressure:	841 mb
Input Voltage:	230Vac/50Hz – 60Hz		
Configuration of Unit:	Pre-set load reading		
Test Engineer:	Dean Wyant		

B40441-4-11.doc FR0100

% Nominal	No. of Cycles	Phase Angle (deg) 0	90	180	270	Time between dropouts (sec)	Number of tests	Comments	Criteria Met	Pass / Fail
50Hz										
0%	1.0	x				10	3		A	Pass
0%	1.0		x			10	3		A	Pass
0%	1.0			x		10	3		A	Pass
0%	1.0				x	10	3		A	Pass
40%	10	x				10	3		A	Pass
40%	10		x			10	3		A	Pass
40%	10			x		10	3		A	Pass
40%	10				x	10	3		A	Pass
70%	25	x				10	3		A	Pass
70%	25		x			10	3		A	Pass
70%	25			x		10	3		A	Pass
70%	25				x	10	3		A	Pass
0%	250	x				10	3		A	Pass
0%	250			x		10	3		A	Pass
60Hz										
40%	12	x				10	3		A	Pass
40%	12		x			10	3		A	Pass
40%	12			x		10	3		A	Pass
40%	12				x	10	3		A	Pass
70%	30	x				10	3		A	Pass
70%	30		x			10	3		A	Pass
70%	30			x		10	3		A	Pass
70%	30				x	10	3		A	Pass
0%	300	x				10	3		A	Pass
0%	300			x		10	3		A	Pass

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-11.doc FR0100

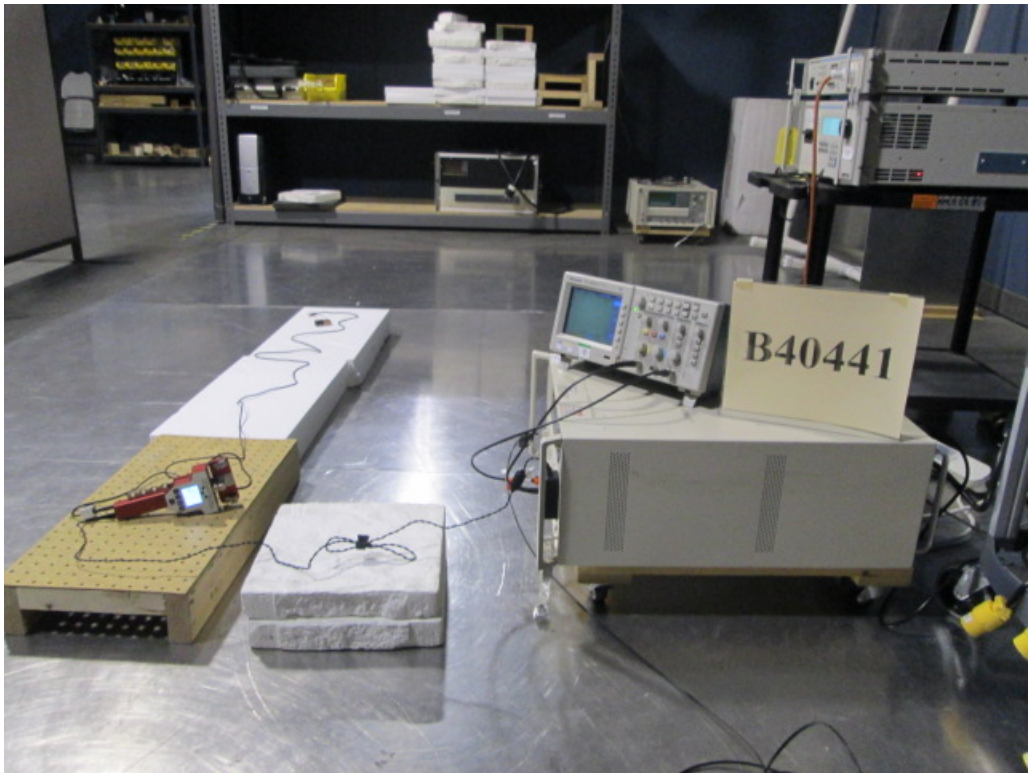

Figure G1. Voltage Dips and Interruptions Test Setup.

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

Manufacturer:	Tensitron	Project Number:	B40441
Customer Representative:	Chris Crosby	Test Area:	10m2
Model:	ACX250-1	S/N:	443-DX
Standard Referenced:	EN 61326-1: 2006 (Industrial)	Date:	April 8, 2014

B40441-4-11.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1013	KeyTek	EMC Pro	0008347	Advanced EMC Immunity Tester	10/10/2013	10/10/2014
1184	KeyTek	CEWare32	NA	KeyTek EMCPro Control Software for EFT, Surge, H-F	NA	NA
1372	Tektronix	TDS2002B	C103489	Oscilloscope, 60 MHz, 2-channel	01/05/2014	01/05/2015
1520	California Instruments (AMETEK)	5001IX-CTS	1341A03198	5kVA AC Power Source	11/08/2013	11/08/2014
1537	Extech Instuments	445715	Z315813	Hygro-Thermometer	03/21/2014	03/21/2015

APPENDIX H

Product Data Sheet

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www.emcintegrity.com
1736 Vista View Drive | Longmont, CO 80504 | tel: 303.776.7249 | fax: 303.776.7314 | info@emcintegrity.com

1.0 Client Information

Client Information	
Manufacturer Name	Tensitron
Address	733 South Bowen Street
City	Longmont
State	CO
Zip Code	80501
Client Representative	Chris Crosby (CEPD)
Title	President
Phone	(303) 415-1112 Ext 13
Fax	(720) 306-4445
Email	ccrosby@cepd.com

2.0 Product Information - General

Product Information	
Product Name (**as it should appear on test report**)	ACX-250-1
Model Number (of UUT to be tested)	ACX250-1
Functional description of product (what is it, what does it do, etc.)	Electronic Tension Gauge
List all modes of operation	BATTERY POWER AND/OR POWER SUPPLY
Can modes be operated simultaneously? If so, explain.	YES
What mode(s) will be used for testing?	POWER SUPPLY
Product type (IT, Medical, Scientific, Industrial, etc.)	Industrial
Is the product an intentional radiator	No
Product Dimensions	7" X 9.8" X 2.23"
Product Weight	2-3/4 LBS
Will fork lift be required	No
Applicable Standards, if known	EN 61326-1: 2006 (Industrial)
Describe all environment(s) where product will be used (residential, commercial, industrial, etc.)	INDUSTRIAL
Does product consist of multiple components? (If yes, please describe each system component)	NO
Cycle time > 3 seconds? (If yes, how long?)	No
Highest internally generated frequency	6 MHz
Product Set-up Time	30 minutes
Boot up time in the event of an unintentional power down	< 10 seconds

Identify **ALL** I/O connections on the unit(s) under test, as well as **MAXIMUM** associated cable lengths below

Model No.	Description	I/O Type		Length (m)	Patient Connect? (See Note)	QTY
		UUT-UUT	UUT - SE			
EMSA090170-P7P-SZ-C	Power supply			1.5		
n/a	4-20mA cable			3		

Note: "Patient Connect" column applies only to medical devices.

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3.0 Power

Power Requirements	
Does/can product connect to AC mains? (If so, can the UUT function when connected to AC?)	Yes
Input Voltage Rating as it appears on unit, power supply, or power brick	100-240, 50/60 Hz
Input Current (specify @ 230 Vac/50 Hz)	Less than 0.3A
Single or Multi-Phase (If multi-phase, specify delta or wye)	Single
Is input power connector two-prong (Hot & Neutral) or 3-prong (H, N, Ground)	Two-prong
Does UUT have more than 1 power cord? (If yes, explain.)	No

4.0 Unit Under Test (UUT) – Detailed Information

UUT Hardware	
Condition	New
Configuration During Test	Charger connected
Input Power	Battery powered and with changer connected

UUT Components			
Name	**Model No.**	**Serial No.**	**Description**
STX250-1	STX250-1	443-DX	Aircraft Tension Meter

I/O Cabling
See Section 2.0 for details

UUT Software/Firmware		
Name	**Version/Revision**	**Functionality**
Tensitron_LCD	2.01.109	Full function, production firmware

UUT Operating Conditions	
List all frequencies generated/used by the product.	6MHz, 500KHz, both internal to the unit.
How will product be exercised during test?	Pre-set load reading, no user intervention required.
How will product be monitored during test?	Visual monitoring of display
What are the product's critical parameters?	Display reading to stay within +/-2% during testing
Specify tolerance of all critical parameters.	Tension reading, +/- 2%

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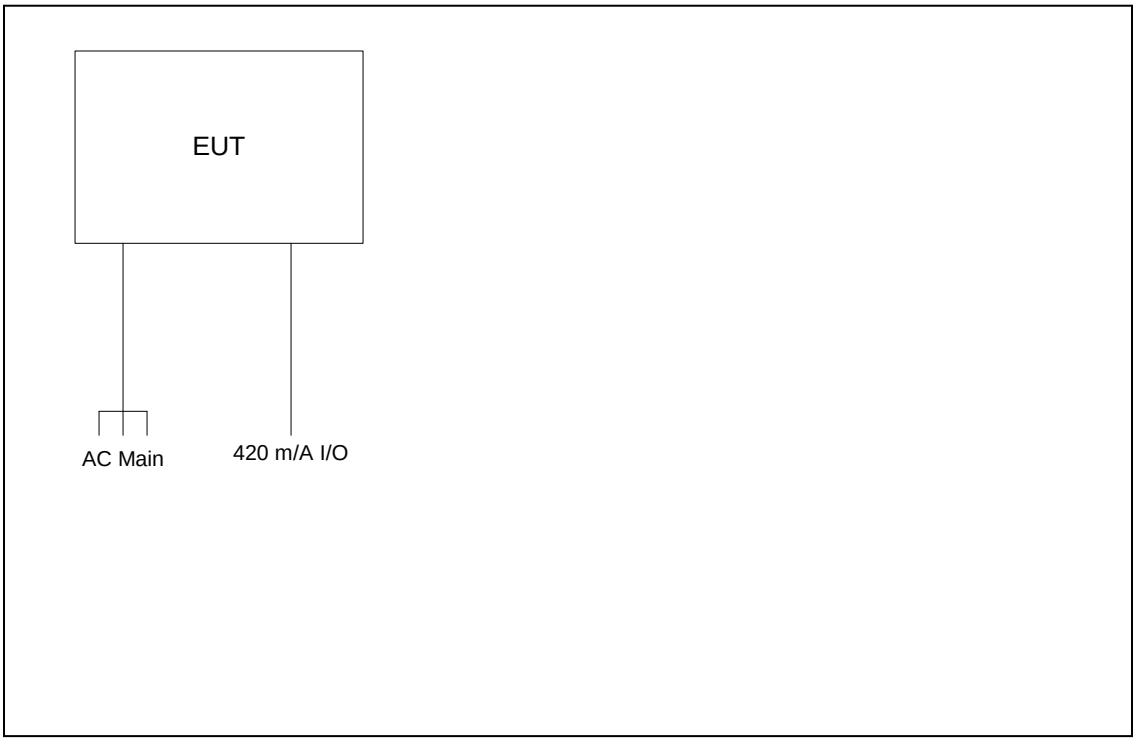
5.0 Support Equipment (SE) – Detailed Information

Support Equipment (SE)			
Name	**Model No.**	**Serial No.**	**Description**
None			

SE I/O Cabling				
Model No.	**Description**	**Shielded?**	**Length**	**Quantity**
None				

SE Software/Firmware		
Name	**Version/Revision**	**Functionality**
None		

6.0 Block Diagram



APPENDIX I

EMI Test Log

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EMI Test Log

Manufacturer:	Tensitron	Project Number:	B40441
Model:	STX250-1	S/N:	443-DX
Customer Representative:	Chris Crosby		
Standard Referenced:			

FR0105

10m Emissions

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
RE	1122	April 7, 2014 0800-1000	Test#1: 30MHz – 1GHz, 8 rads, 4 heights, 3 second dwell, ref level = 80dB, test distance= 10 meters 230Vac/50Hz Pretest validation complete		2.0	Pass	KJ
CE	2121	1000-1100	Test#2: 150kHz – 30MHz 230Vac/50Hz		1.0	Pass	KJ

Regular hours:	3.0
Overtime/Prem hours:	
Total hours:	3.0

Ground Planes / CALC

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
4-3	4388	April 7, 2014 1100-1200	Setup, removing CE back plane and setting tiles for RI		1.0	Complete	KJ
		1230-1630	Radiated RF Immunity 10V/m, 80MHz-1GHz, 3V/m, 1.4-2GHz, 1V/m, 2-2.7GHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (6 sides) 230 VAC / 50 Hz Performed in 10m2 Baseline reading is 17.5		4.0	Fail	KJ
			Unit read to 28 at 355MHz, right side, H-pole. Unit read to 35.5 at 381MHz, back side, H-pole Unit read to 47 at 397MHz, left side, H-pole Re-running left side, H-pole with fresh 9 volt battery-no change Unit went to 73 at 370MHz on top side, H-pole Finished front, right, back and top sides -80MHz – 1GHz. Still need the bottom side 80MHz-1GHz and all sides 1.4 to 2.7GHz				KJ

Ground Planes / CALC

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
4-3		April 8, 2014 0800-1100	Baseline reading is 22.5 Re-running top side, H-pole: Unit read 52 at 394MHz Re-running top side without analog cable, H-pole: unit read 23 at 394. Re-running top with ferrite on analog out cable, H-pole: unit read 32.5 at 398MHz Re-running top with ferrite with 2 turns on analog cable, H-pole: unit read 29.5 at 398MHz Re-running top with 2 turns on a A6 WE ferrite, H-pole: unit read 38.5 at 400MHz Re-running top with 2 turns on a B2 We ferrite ,H-pole: unit read 27.5 at 400MHz		3.0	Complete	KJ
			Running bottom side		--	--	KJ
			Running top side 1.4 to 2.7 GHz-OK Running left side 1.4 to 2.7 GHz-OK Running back side 1.4 to 2.7 GHz-OK Running right side 1.4 to 2.7 GHz-OK Running front side 1.4 to 2.7 GHz-OK Running back side 1.4 to 2.7 GHz-OK		--	--	KJ
4-6	4613	1100-1200	Conducted RF Immunity 3Vrms, 0.15 - 80 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (AC main & one I/O) 230 VAC / 50 Hz		---	---	DW
		1200-1230	Lunch		---	---	DW
		1230-1400	Continued CI testing to completion.		2.5	Pass	DW
4-4	4411	1400-1430	Electrical Fast Transient / Burst Mains: +/- 2kV, I/O: +/- 1kV (AC main & one I/O) 230 VAC / 50 Hz		0.5	Pass	DW
4-11	4171	1430-1530	Voltage Dips and Interruptions 0% nom, 1 cycle / 40% nom, 10/12 cycles / 70% nom, 25 cycles / 0% nom, 250 cycles 230 VAC / 50 Hz		1.0	Pass	DW
4-8	4831	1530-1630	Power Frequency H-Field Immunity 30A/m, 50 / 60 Hz, 3 axes 230 VAC / 50 Hz		1.0	Pass	DW
4-5	4515	April 9, 2014 0800-1300	Surge Immunity Mains: +/- 2kV CM, +/- 1kV DM, (0, 90, 180, 270) 230 VAC / 50 Hz		5.0	Pass	DW
4-2	4223	1300-	Electrostatic Discharge +/- 2, 4kV Contact, +/-2, 4, 8kV Air 230 VAC / 50 Hz		---	---	DW
		1430	At +8kV to lower corner of display caused display to blank. Reset EUT and it will no longer read tension.		1.5	---	DW
		April 10, 2014 1330-1430	Client returned for Repeat ESD Testing. Previous failure was a calibration problem with the EUT. Could not repeat failure. Retested all of ESD and it passed.		1.0	Pass	DW

Ground Planes / CALC

Test	Test Code	Date	Event	OT	Time (hrs)	Result	Initials
4-3	4388	July 23, 2014 0800 - 1200	Radiated RF Immunity (Re-test) 10V/m, 80MHz-1GHz, 3V/m, 1.4-2GHz, 1V/m, 2-2.7GHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (6 sides) 230 VAC / 50 Hz Note: Failures w/ 4-20 ma cable, cable removed and port to be labeled “service only”.		4.0	---	CL
---	---	1200 - 1230	Lunch		---	---	CL
Client removed 4-20 ma cable, port will be marked “Do not use”.							
---	---	1230 - 1630	Radiated RF Immunity (Re-test) 10V/m, 80MHz-1GHz, 3V/m, 1.4-2GHz, 1V/m, 2-2.7GHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (6 sides) 230 VAC / 50 Hz		4.0	---	CL
---	---	July 24, 2014 0800 - 0900	Radiated RF Immunity (Re-test) 10V/m, 80MHz-1GHz, 3V/m, 1.4-2GHz, 1V/m, 2-2.7GHz, 1% Step, 80% AM, 1kHz sine, 3s dwell (6 sides) 230 VAC / 50 Hz. **NOTE: No unquoted work for the extra hour per Pat S.**		1.0	Pass	CL

Regular hours:	8.0
Overtime/Prem hours:	
Total hours:	

APPENDIX J

Laboratory Accreditations

Nemko Laboratory Authorization

Authorization: ELA 215

EMC Laboratory: **EMC Integrity, Inc.**
1736 Vista View Drive
Longmont, Colorado 80504
USA

Scope of Authorization: **All CENELEC standards [ENs] for EMC that are listed on the accompanying page, and all of the corresponding CISPR, IEC and ISO EMC standards that are listed on the accompanying page.**

Nemko has assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through June 30, 2015.

Dallas, Texas, USA.

For and on behalf of Nemko AS:

T.B. Ketterling,
Nemko ELA Co-ordinator
Region: North America

SCOPE OF AUTHORIZATION

Capability to perform a basic test implies also that any product (family) standard calling up this basic test is also within the scope if mentioned below or not.

Generic & Product –Family Standards		
EN 55011 :1998+A1 :1999 +A2 :2002 EN 55011:2007 +A2:2007 EN 55011:2009 +A1:2010 CISPR 11:1997 (Modified) + A1:1999 + A2:2002 CISPR 11 Ed. 4.1 CISPR 11 Ed 5.1 (2010-7)	EN55014:1997 +A1:2008 EN 55014-1:2006 +A1:2009 EN 55014-1:2000 + A1:2001 + A2:2002 CISPR 14-1:2000 + A1:2001 + A2:2002 CISPR 14-1:2005 +A1:2008 CISPR 14-1 Ed. 5.0	EN 55014-2:1997 + A1:2001 CISPR 14-2:1997 + A1:2001 +A2:2008 CISPR 14-2 Ed. 1.2
EN 55022: 1998+ A1:2000, +A2:2003 CISPR 22: 2003+ A1:2004 CISPR 22:2005 (Modified) EN55022:2006 CISPR 22 Ed. 5.2 CISPR 22 Ed. 6.0 (2008-09) EN 55022 +A1: 2007 EN 55022:2010	EN 55024: 1998 +A1:2001, +A2:2003 CISPR 24: 1997 +A1:2001, +A2:2002 CISPR 24 Ed. 1.0 EN 55024:2010	EN 61000-6-1 :2007 IEC 61000-6-1 Ed. 2.0 EN 61000-6-1: 2001
EN 61000-6-2:2005 IEC 61000-6-2 Ed. 2.0	EN 61000-6-3 :2007 IEC 61000-6-3 Ed. 2.0 EN 61000-6-3: 2001 + A1 :2004	IEC 61000-6-2 Ed. 2.0 EN 61000-6-2: 2005 IEC 61000-6-2: 2005 EN 61000-6-2: 2001
EN 61326:1997 +A1:1998 + A2:2001 +A3:2003 IEC 61326:1997 + A1:1998 + A2:2000 EN 61326-1 Ed. 1.0 EN 61326-1 :2013 IEC 61326-1 Ed. 2.0 (2012-07) IEC 61326:2006	EN 60601-1-2:2001 + A1:2006 IEC 60601-1-2:2001 EN 60601-1-2:2007 IEC 60601-1-2:2007 (Ed. 3.0)	EN 55103-1:1996 EN 55103-2 :1996 EN 55103-1:2005 EN 55103-2:2005
EN 300 386 V.1.3.1 EN 300 386 V.1.3.3 EN 300 386 V.1.4.1	EN 61000-3-3: 1995, +A1:2001 +A2:2005 IEC 61000-3-3: 1994, +A1:2001 +A2:2005 EN 61000-3-3:2008	EN 61000-3-2: 2000 +A2 :2005 IEC 61000-3-2: 2000 (Modified) +A1:2001 +A2:2004 EN 61000-3-2:2006
EN 50130-4: 1995 + A1:1998 + A2:2002 EN 50130-4:2011	ETSI EN 301 489-x ETSI EN 300 220-x	ETSI EN 300 339 Ed. 1

TBKetterling

T.B. Ketterling, Nemko ELA Co-ordinator

2(3)

NLA 3 ED3

Basic Standards		
EN 61000-4-2:1995, +A1:1998, +A2:2000 IEC 61000-4-2:1995, +A1:1998, +A2:2000 EN 61000-4-2 : 2009 EN 61000-4-2 :2008 (ed. 2) IEC 61000-4-2:2001 (ed. 1.2)	EN 61000-4-3:2002, +A1:2002 IEC 61000-4-3:2002, +A1:2002 EN 61000-4-3 :2006 +A1 :2006 +A2 :2006 IEC 61000-4-3 (Ed. 3.0) +A1 :2007 +A2 :2010	EN 61000-4-4:1995, +A1:2002, +A2:2002 IEC 61000-4-4:1995, +A1:2000, +A2:2001 EN 61000-4-4:2004 IEC 61000-4-4 Ed. 2.0 IEC 61000-4-4:2012
EN 61000-4-5:1995, +A1:2001 IEC 61000-4-5:1995, +A1:2000 EN 61000-4-5 :2006 IEC 61000-4-5 Ed. 2.0	EN 61000-4-6:1996, +A1:2001 IEC 61000-4-6:1996, +A1:2000 EN 61000-4-6 : 2009 IEC 61000-4-6 Ed. 2.2 IEC 61000-4-6 :2008	EN 61000-4-8:1994,+A1:2001 IEC 61000-4-8:1994, +A1:2001 IEC 61000-4-8 Ed. 1.1 IEC 61000-4-8 :2001 IEC 61000-4-8 :2009 EN 61000-4-8 :2010
EN 61000-4-11:2004 IEC 61000-4-11 Ed. 2.0 EN 61000-4-11:1994, +A1:2000 IEC 61000-4-11:1994, +A1:2000	BLANK	BLANK

TBKetterling T.B. Ketterling, Nemko ELA Co-ordinator

3(3) NLA 3 ED3

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200737-0

EMC Integrity, Inc.
Longmont, CO

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2014-07-01 through 2015-06-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMC Integrity, Inc.
1736 Vista View Drive
Longmont, CO 80504
Mr. Vincent W. Greb
Phone: 303-776-7249 Fax: 303-776-7314
E-Mail: vinceg@emcintegrity.com
URL: http://www.emcintegrity.com

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2014-07-17

NVLAP Code	*Designation / Description*
Emissions Test Methods	
12/100063c	IEC 61000-6-3 (1996), EN 61000-6-3 (2001), A1 (2004): Electromagnetic Compatibility (EMC) - Part 6: Generic standards - Section 3: Emission standard for residential, commercial, and light-industrial environments.
12/610006m	EN 61000-6-4 (2007): Electromagnetic Compatibility (EMC) - Part 6-4: Generic Standards - Emission Standard for Industrial Environments
12/61326da	IEC 61326-1 Ed. 2.0 (2012): Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
12/CIS11f	AS/NZS CISPR 11 (2002): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11g	IEC/CISPR 11, Ed. 4.1 (2004-06): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurements
12/CIS11h	AS/NZS CISPR 11 (2004): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11i	IEC/CISPR 11, Ed. 4.1 (2004-06) + A1(2004): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement

2014-07-01 through 2015-06-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2014-07-17

NVLAP Code	*Designation / Description*
12/CIS11j	EN 55011 (1998) + A1(1999), A2(2002): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11k	IEC/CISPR 11 (2003), EN 55011 (1998), A2(2002): Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment
12/CIS11m2	EN 55011 (2009) + A1 (2010): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11p	IEC/CISPR 11 Ed. 5 (2009-05): Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
12/CIS14b1	AS/NZS CISPR 14-1 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS14x	IEC/CISPR 14-1, Ed. 4 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/CIS22a4	IEC/CISPR 22 (1993) & EN 55022 (1994)+A1(1995), A2(1997): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/CIS22c	IEC/CISPR 22, Fourth Edition (2003-04) & EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

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12/CIS22c1	IEC/CISPR 22, Edition 5 (2005) and EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22c3	IEC/CISPR 22, Edition 5 (2005) + A1(2005): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22c4	EN 55022 (1998) + A1(2000) + A2(2003): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22f	CNS 13438 (2006) (up to 6GHz): LImits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/CIS22i	IEC/CISPR 22, Edition 5.2 (2006-03): Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment
12/CIS22j	EN 55022 (2006): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22j1	EN 55022 (2006) + A1 (2007): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22j2	EN 55022:2010: Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
12/CIS22k	IEC/CISPR 22 (2008-09): Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment
12/EM02d	IEC 61000-3-2, Edition 2.2 (2004-11): Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)
12/EM02k	GB 17625.1 (2003): Electromagnetic compatibility (EMC) - Part 3: Limits - Section 2. Limits for harmonic current emissions (equipment input current <= 16A per phase)
12/EM03b	IEC 61000-3-3, Edition 1.1(2002-03) & EN 61000-3-3, A1(2001): EMC - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections

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12/EM03g	IEC 61000-3-3, Edition 1.1 (2003) +A2 (2005): EMC Part 3-3: Limits - Limitations of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connections
12/EM12c	IEC 61000-3-12 Ed. 2.0 (2011): Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and = 75 A per phase
12/EM12d	EN 61000-3-12 (2011): Electromagnetic Compatibility (EMC) - PART 3-12: Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current greater than 16A and less than or equal to 75A
12/F18	FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment)
12/FCC15b	ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/FCC15bb	ANSI C63.4 (2009) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/KN11d1	KN11 (Annex 3) with RRA Announce 2008-11 (Dec. 16, 2008): Conformity Assessment Procedure for Electromagnetic Interference; With KN 11 (Annex 3)
12/KN16	Korea RRA Notice No. 2008-11 (Dec. 16, 2008): Conformity Assessment Procedures for Electromagnetic Interference using KN 16-1-1, KN 16-1-2, KN 16-1-3, KN 16-1-4, KN 16-1-5, KN 16-2-1, KN 16-2-2, KN 16-2-3, KN 16-2-4 (2008-05)
12/KN22	KN22 with RRL Notice No. 2005-82 (Sept. 29, 2005): RRL Notice No. 2005-82: Technical Requirements for Electromagnetic Interference Annex 8 (KN-22), RRL Notice No. 2005-131: Conformity Assessment Procedures for Electromagnetic Interference
12/KN22e	KN22 (2008-5) with RRL Notice No. 2008-3 (May 20, 2008): Conformity Assessment Procedure for Electromagnetic Interference; With KN 22
12/KN22f	KN22 (Annex 5) with RRA Announce 2010-5 (Dec 24, 2010): Conformity Assessment Procedure for Electromagnetic Interference; With KN 22 (Annex 5)

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NVLAP Code	*Designation / Description*
12/RRA04a	RRA 2014-8 and RRA 2014-37 (June 23, 2014): Technical Requirements and Test Methods for Electromagnetic Interference; K only (See specific Annexes listed on scope)
12/RRA105	RRA Announce 2010-5, K only (December 24, 2010): Conformity Assessment Procedure for Electromagnetic Interference (K only)
12/RRA1118	RRA Public Notification 2011-18, K only (July 5, 2011): Technical Requirements for Electromagnetic Interference (K only)
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment
12/T51b1	AS/NZS CISPR 22 (2009): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/TCVNa	TCVN 7189:2009 (CISPR 22:2006): Information Technology Equipment-Radio disturbance characteristics - Limits and methods of measurement
12/VCCIe	Agreement of VCCI V-3 (2009.04): Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2009.04 (radiated disturbance above 1 GHz)
12/VCCIg	Agreement of VCCI V-3 (2011.04): Agreement of VCCI Council - Technical Requirements: V-3/2011.04 (including radiated disturbance above 1 GHz)
12/VCCIi	Agreement of VCCI V-3 (2013.04): Agreement of VCCI Council - Technical Requirements: V-3/2013.04 (including radiated disturbance above 1 GHz)

Immunity Test Methods

12/610006h	IEC 61000-6-1, 2nd edition (2005-03): Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 1: Immunity for residential, commercial and light-industrial environments
12/610006i	IEC 61000-6-2, Edition 2.0 (2005-01): Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

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12/61326aa	EN 61326-1:2013: Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
12/CIS24g	CISPR 24 ed2.0 (2010-08): Information technology equipment - Immunity characteristics - Limits and methods of measurement
12/CIS24h	EN 55024 (2010): Information technology equipment. Immunity characteristics. Limits and methods of measurement
12/I01b	IEC 61000-4-2 (2001); EN 61000-4-2 (2001), A2 (2001): Electrostatic Discharge Immunity Test
12/I01c	EN 61000-4-2 +A1(1998) +A2(2001): Electrostatic Discharge Immunity Test
12/I01d	IEC 61000-4-2, Ed. 2.0 (2008-12): Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
12/I01f	EN 61000-4-2 (2009-05): Electromagnetic compatibility (EMC) - Part 4-2 : Testing and measurement techniques - Electrostatic discharge immunity test
12/I02b	IEC/EN 61000-4-3, Ed. 2.1 (2002), A1 (2002); EN 61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test
12/I02c	IEC 61000-4-3 (1995), A1(1998), A2(2000): Radiated, radio-frequency, electromagnetic field immunity test
12/I02f	EN 61000-4-3 (2002) + A1(2002): Radiated, radio-frequency, electromagnetic field immunity test
12/I02ggg	IEC 61000-4-3, Ed. 3.0 (2006-02) + A1 (2007) + A2 (2010): Electromagnetic compatibility (EMC) - Part 4-3: Testing measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
12/I02hhh	EN 61000-4-3 (2006) +A1 (2008) + A2 (2010): Electromagnetic compatibility (EMC). Testing and measurement techniques. Radiated, radio- Frequency, electromagnetic field immunity test

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12/I03c	IEC 61000-4-4, Ed. 2.0 (2004-07): Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
12/I03e	EN 61000-4-4 (2004): Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
12/I04aa	IEC 61000-4-5, Ed. 2.0 (2005-11); EN 61000-4-5: Electromagnetic Compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
12/I04b	IEC 61000-4-5 (2001), A1(2000); EN 61000-4-5(2001), A1(2000): Surge Immunity Test
12/I04d	BS EN 61000-4-5 (2006): Electromagnetic compatibility (EMC). Testing and measurement techniques. Surge immunity test
12/I05d	IEC 61000-4-6, Ed. 2.1 (2004); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/I05e	EN 61000-4-6 (1996) + A1 (2001): Immunity to Conducted Disturbances, Induced by Radio Frequency Fields
12/I05f1	IEC 61000-4-6 Ed. 3.0 (2008): Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/I05j	EN 61000-4-6 (2009): Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/I06b	IEC 61000-4-8 (2001), A1(2000); EN 61000-4-8 (2001),A1(2000): Power Frequency Magnetic Field Immunity Test
12/I06c	EN 61000-4-8 (1993) + A1 (2001): Power Frequency Magnetic Field Immunity Test
12/I06e	IEC 61000-4-8 (2009): Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test

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NVLAP Code	*Designation / Description*
12/I06f	EN 61000-4-8:2010: Electromagnetic compatibility (EMC). Testing and measurement techniques. Power frequency magnetic field immunity test
12/I07c	IEC 61000-4-11, Ed. 2 (2004-03) & EN 61000-4-11: Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
12/I07e	EN 61000-4-11 (1994), A1 (2001): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/I07f	EN 61000-4-11 (2004): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11a	KN 61000-4-11 with RRL Notice No. 2005-130 (Dec 27, 2005): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11f	KN 61000-4-11 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11h	KN 61000-4-11 (Annex 1-7) RRA Announce 2010-6 (Dec.24, 2010): Conformity Assessment Procedure for EMS (Voltage Dips, Short Interruptions and Voltage Variations Immunity tests)
12/KN24	KN24 (December 2005) with RRL Notice No. 2005-83: Information Technology Equipment - immunity charateristics - limits and methods of measurements
12/KN24d	KN 24 (2008-5) with RRL Notice No. 2008-4 (May 20, 2008): Information Technology Equipment - immunity charateristics - limits and methods of measurements
12/KN24e	KN 24 (Annex 5) with RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Information technology equipment - Immunity characteristics - Limits and methods of measurement)
12/KN2a	KN 61000-4-2 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electrostatic Discharge Immunity Test

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NVLAP Code	*Designation / Description*
12/KN2c	KN 61000-4-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Electrostatic Discharge Immunity Test
12/KN2e	KN 61000-4-2 (Annex 1-1) RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Electrostatic Discharge Immunity Test)
12/KN3a	KN 61000-4-3 with RRL Notice No. 2005-130 (Dec. 27, 2005): Radiated, radio-frequency, electromagnetic field immunity test
12/KN3c	KN 61000-4-3 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Radiated, radio-frequency, electromagnetic field immunity test
12/KN3e	KN 61000-4-3 (Annex 1-2) RRA Announce 2010-6 (Dec. 24, 2010): Radiated, radio-frequency, electromagnetic field immunity test
12/KN4a	KN 61000-4-4 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immun
12/KN4c	KN 61000-4-4 (2008-5); RRL Notice No. 2008-5 (May 20, 2008): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test
12/KN4e	KN 61000-4-4 (Annex 1-3) RRA Announce 2010-6 (Dec. 24, 2010): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test
12/KN5a	KN 61000-4-5 with RRL Notice No. 2005-130 (Dec. 27, 2005): Surge Immunity Test
12/KN5c	KN 61000-4-5 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Surge Immunity Test
12/KN5e	KN 61000-4-5 (Annex 1-4) RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Surge Immunity Test)
12/KN6a	KN 61000-4-6 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances,

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12/KN6c	KN 61000-4-6 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/KN6e	KN 61000-4-6 (Annex 1-5) RRA Announce 2010-6 (Dec. 24, 2010): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/KN8a	KN 61000-4-8 with RRL Notice No. 2005-130 (Dec. 27, 2005): Power Frequency Magnetic Field Immunity Test
12/KN8c	KN 61000-4-8 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Power Frequency Magnetic Field Immunity Test
12/KN8e	KN 61000-4-8 (Annex 1-6) RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Power Frequency Magnetic Field Immunity Test)
12/RRA04b	RRA 2014-09 and RRA 2014-38 (June 23, 2014) K only: Technical Requirements and Test Methods for Electromagnetic Susceptibility; Korean only (See specific annexes listed on scope)
12/RRA106	RRA Public Notification 2010-6, December 24, 2010 (K only): Conformity Assessment Procdure for Electromagneitc Susceptibility (K only)
12/RRA1117	RRA Public Notification 2011-17, K only (July 5, 2011): Technical Requirements for Electromagnetic Susceptibility, K only
Product Safety Test Methods	
12/60601ab	IEC 60601-1-2, Ed. 3.0 (2007): Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: Electromagnetic compatibility - Requirements and tests
12/60601ac	KN 60601-1-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Medical electrical equipment - Part 1-2: general requirements for safety - collateral standard: electromagnetic compatibility - requirements and tests

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12/60601h1	EN 60601-1-2 (2007): Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: EMC - Requirements and tests

MIL-STD-462 : Conducted Emissions

12/A20	MIL-STD-461 Version F Method CE102
12/A21	MIL-STD-461 Version F Method CE106

MIL-STD-462 : Radiated Emissions

12/D11	MIL-STD-461 Version F Method RE102
12/D12	MIL-STD-461 Version F Method RE103

MIL-STD-462 : Radiated Susceptibility

12/E16	MIL-STD-461 Version F Method RS103

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