

Appalachian Lighting Systems

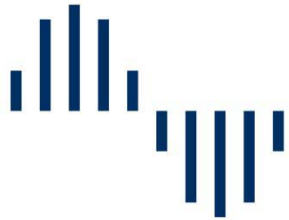


Type 1 Street Light

January 14th 2009

Report Number: 081233EC

Report Prepared By:



keystone compliance

EMC Test Report

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724-657-9940

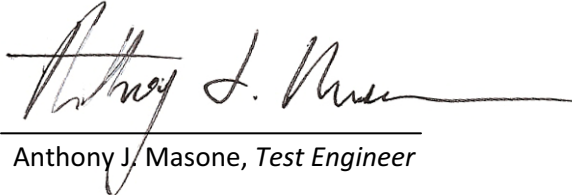
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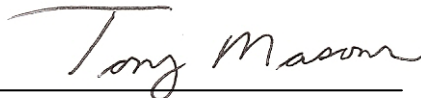
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Performed By: Keystone Compliance, LLC.
2861 W. State Street
New Castle, PA 16101

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Performed By: 
Anthony J. Masone, *Test Engineer*

Date: 01/14/09

Approved By: 
Tony Masone, *President*

Date: 01/14/09

Party Requesting the Test

Company Name:	Appalachian Lighting Systems
Address:	101 Randolph Street
City, State, Zip:	Elwood City, PA 16117
Test Requested By:	Mike Dolan
Description:	Type 1 Street Light
Model:	Type 1 Street Light
First Date of Test:	January 6 th , 2009
Last Date of Test:	January 9 th , 2009
Receipt Date of Samples:	January 5 th , 2009
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

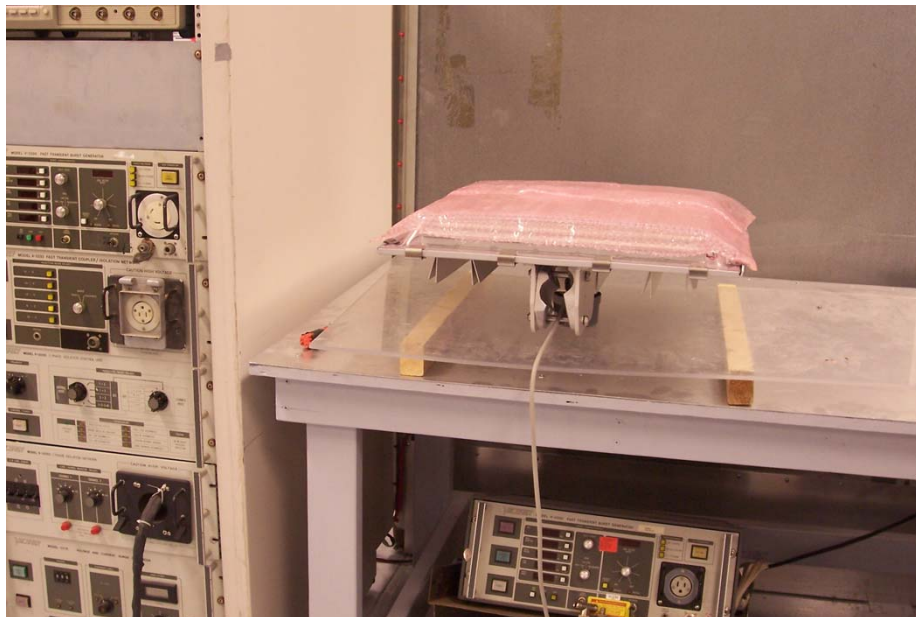
Operational Description of the EUT (Equipment Under Test):

Type 1 Street Light

Testing Objective:

To meet all surge immunity requirements for product specific standard IEEE Std C62.41.2 and Class B emissions requirements for product specific standards FCC Part 15, Subpart B.

EUT Photo(s)



Revisions

Revision:	Description:
n/a	n/a
n/a	n/a

Executive Summary					
Test Specification(s): FCC Part 15, Subpart B, Class B; IEEE Std C62.41.2					
Item	Test	Modification(s)	Note(s)	Disposition of EUT	Test Result
1.	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT Remained at Keystone Compliance following the test.	Compliant
2.	Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT Remained at Keystone Compliance following the test.	Compliant
3.	Surge Immunity	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT Remained at Keystone Compliance following the test.	Compliant

FCC Part 15, Subpart B, Class B



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Modes Of Operation	
Normal	

Power Setting(s)	
115Vac/60Hz	

Frequency Range Investigated			
Start Frequency:	30MHz	Stop Frequency:	1000MHz

Sample Calculation	
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor – Amplifier Gain + Distance Adjustment Factor	

Test Equipment				
Description	Manufacturer	Model	Asset Number	Cal. Due
Cables	Various	n/a	n/a	06/07/09
Receiver	Hewlett Packard	8566B	KC136B	05/27/09
Bilog Antenna	Chase	CBL6111	KC124	10/27/09
Quasi-Peak	Hewlett Packard	85650A	KC109	05/27/09

Measurement Bandwidths			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01-0.15	1.0	0.2	0.2
0.15-30.0	10.0	9.0	9.0
30.0-1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

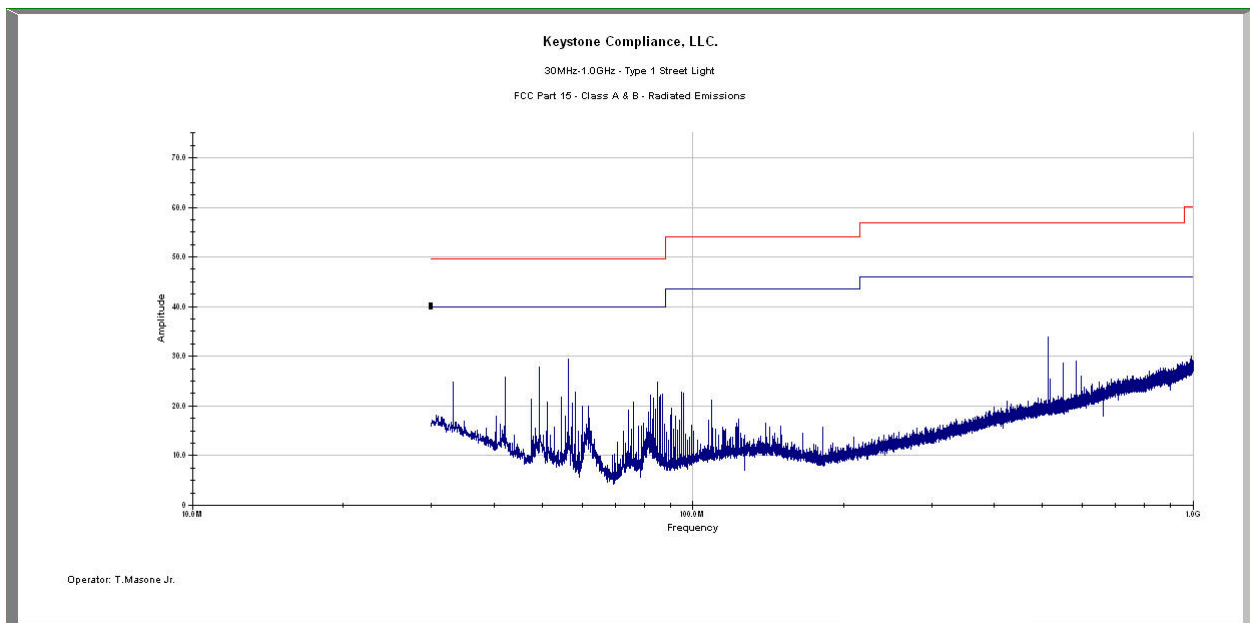
Measurement Uncertainty

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its “true” or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specifications. The measurement uncertainty for any test is available upon request.

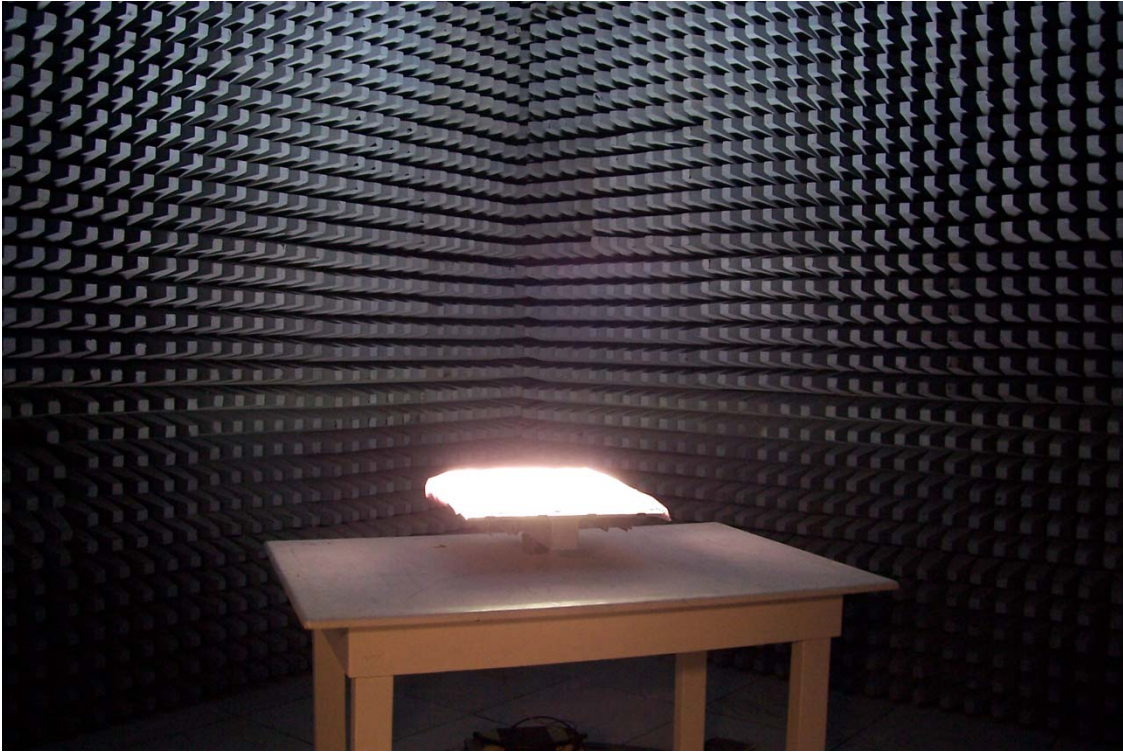
Test Description

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned) is also noted in this report.

Radiated Emissions Data Sheet					
EUT:	Type 1 Street Light			Job Number:	081233E
S/N:	n/a			Date:	01/06/09
Customer:	Appalachian Lighting Systems			Temperature:	22°C
Attendees:	n/a			Humidity:	33%
Project:	n/a	Config. #:	1	Barometric Pres.:	30.01
Tester:	Tony J. Masone	Power:	115Vac/60Hz	Job Site:	Keystone Compliance
Test Specifications					
Spec:	FCC Part 15, Subpart B, Class B			Method:	Antenna
Test Parameters					
Antenna Height(s) (m):	1-4		Test Distance (m):	3	
Comments					
None					
EUT Operating Modes					
Normal					
Deviations From Test Standard					
No deviations.					
Results					
Compliant					



Photos



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data; this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

Modes Of Operation
Normal

Power Setting(s)
115Vac/60Hz

Sample Calculation
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

Test Equipment				
Description	Manufacturer	Model	Asset Number	Cal. Due
LISN	EMCO	3825/2	n/a	06/11/09
Attenuator	Inmet	2N-10dB	n/a	UWCE
Cables	Various	n/a	n/a	06/07/09
Receiver	Hewlett Packard	8566B	KC136B	05/27/09
Quasi-Peak	Hewlett Packard	85650A	KC109	05/27/09

Measurement Bandwidths			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01-0.15	1.0	0.2	0.2
0.15-30.0	10.0	9.0	9.0
30.0-1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

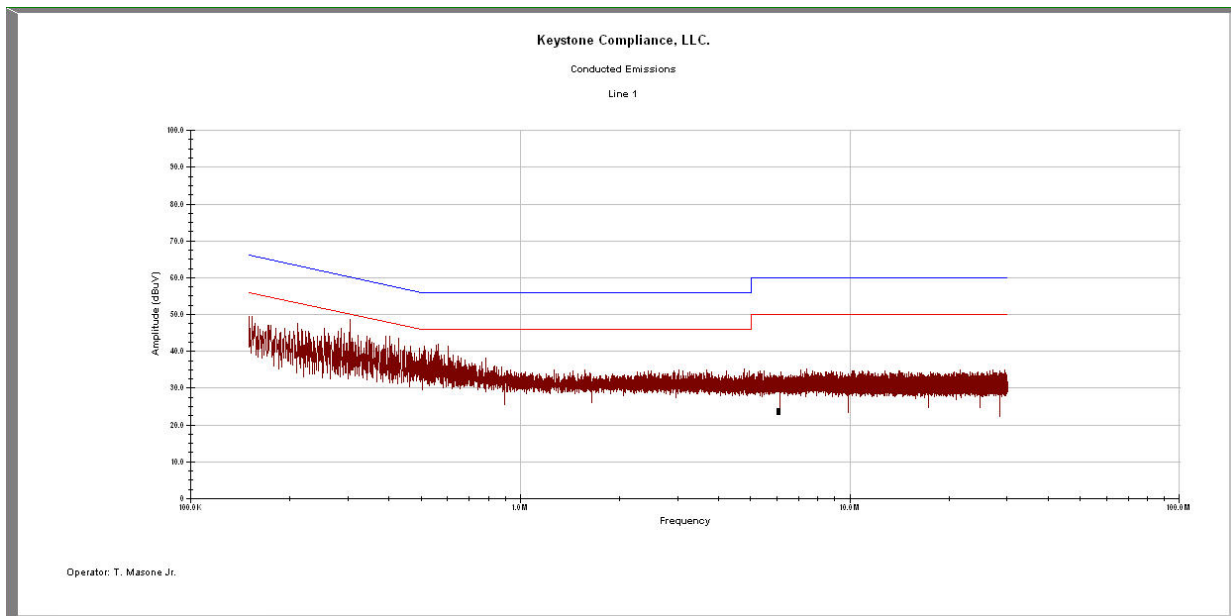
Measurement Uncertainty

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its “true” or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specifications. The measurement uncertainty for any test is available upon request.

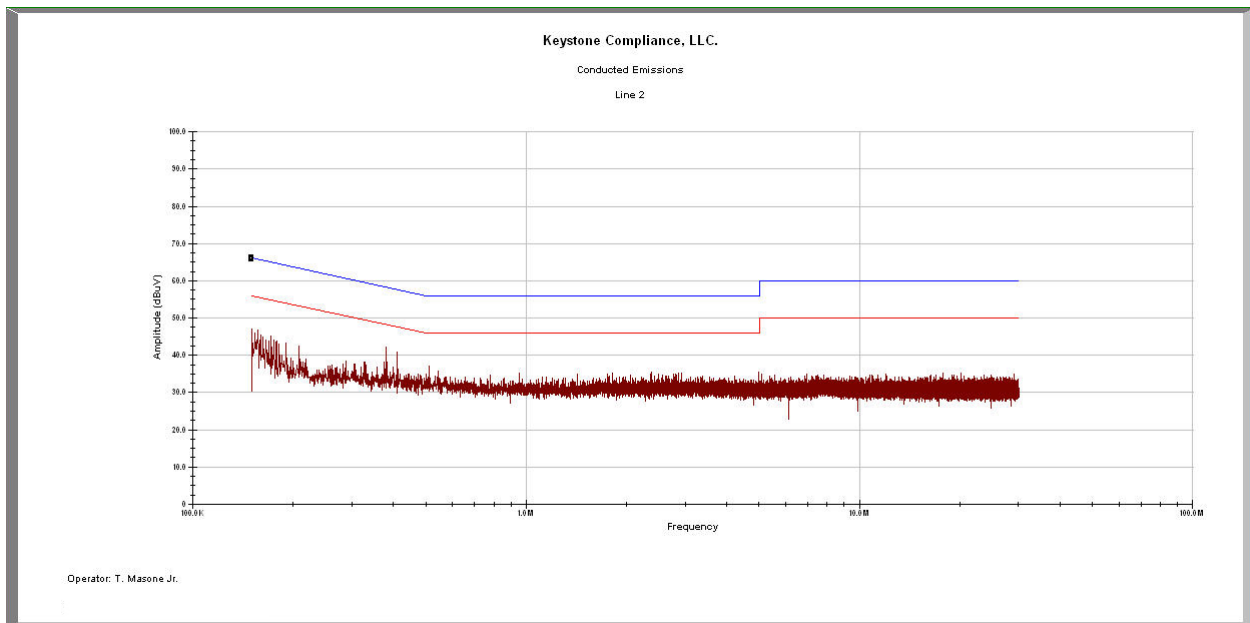
Test Description

Using the mode of operation and configuration noted within this report, Conducted Emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150kHz-30MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50 Ω .

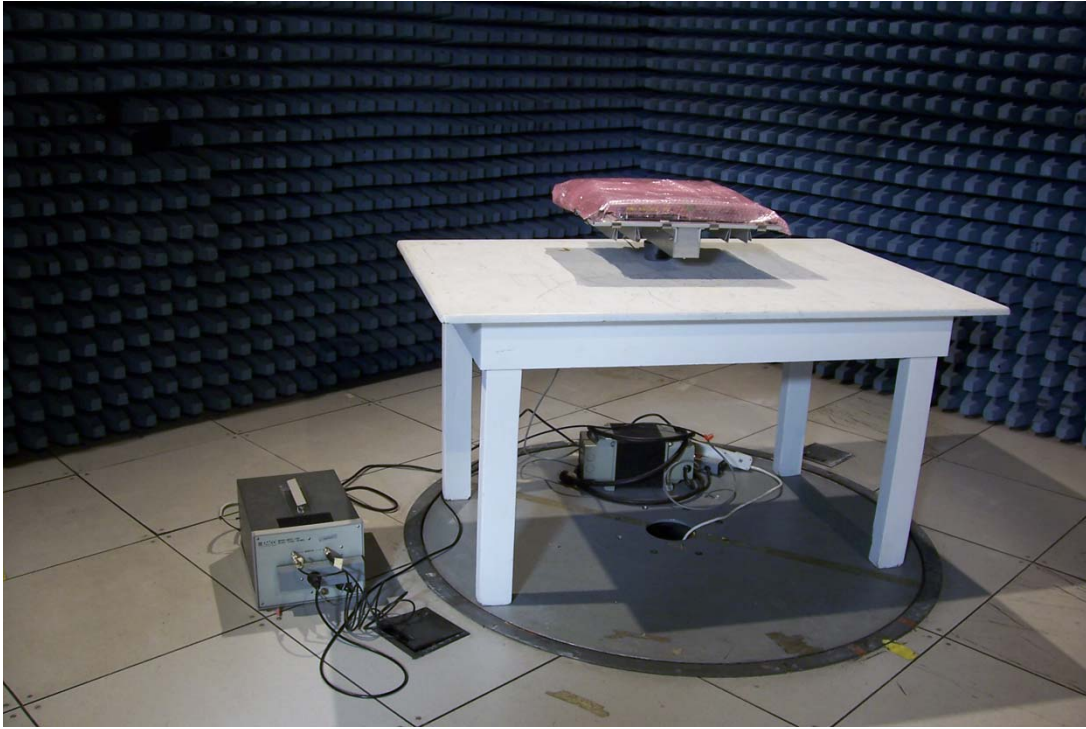
Conducted Emissions Data Sheet					
EUT:	Type 1 Street Light			Job Number:	081233E
S/N:	n/a			Date:	01/06/09
Customer:	Appalachian Lighting Systems			Temperature:	22°C
Attendees:	n/a			Humidity:	33%
Project:	n/a	Config. #:	1	Barometric Pres.:	30.01
Tester:	Tony J. Masone	Power:	115Vac/60Hz	Job Site:	Keystone Compliance
Test Specifications					
Spec:	FCC Part 15, Subpart B, Class B			Method:	LISN
Test Parameters					
Run#:	1	Line:	High Line	Ext. Attn:	20db
Comments					
None					
EUT Operating Modes					
Normal					
Deviations From Test Standard					
No deviations.					
Results					
Compliant					



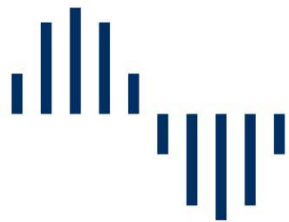
Conducted Emissions Data Sheet					
EUT:	Type 1 Street Light			Job Number:	081233E
S/N:	n/a			Date:	01/06/09
Customer:	Appalachian Lighting Systems			Temperature:	22°C
Attendees:	n/a			Humidity:	33%
Project:	n/a	Config. #:	1	Barometric Pres.:	30.01
Tester:	Tony J. Masone	Power:	115Vac/60Hz	Job Site:	Keystone Compliance
Test Specifications					
Spec:	FCC Part 15, Subpart B, Class B			Method:	LISN
Test Parameters					
Run#:	2	Line:	Neutral	Ext. Attn:	20db
Comments					
None					
EUT Operating Modes					
Normal					
Deviations From Test Standard					
No deviations.					
Results					
Compliant					



Photos



IEEE Std C62.41.2



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Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data; this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

Modes Of Operation
Normal

Power Setting(s)
115Vac/50Hz

Test Equipment				
Description	Manufacturer	Model	Asset Number	Cal. Due
Oscilloscope	Tektronix	TDS540	KC111	05/27/09
EFT Surge System	Velonex	587E	n/a	UWCE
Power Supply	Calif. Instruments	4500L	KC126	UWCE

Measurement Uncertainty

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its “true” or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specifications. The measurement uncertainty for any test is available upon request.

Test Description

Using the mode of operation and configuration noted within this report, a Surge Immunity test was performed. The task of the defined laboratory is to find the reaction of the EUT under specified operational conditions caused by surge voltages from switching and lightning effects at certain threat levels.

The major mechanisms by which lightning produces surge voltages are the following:

- a) A direct lightning strike to an external circuit (outdoor) injecting high currents producing voltages by either flowing through earth resistance or flowing through the impedance of the external circuit.
- b) An indirect lightning strike (i.e. a strike between or within clouds or to nearby objects which produces electromagnetic fields) that induces voltages/currents on the conductors outside and/or inside a building; Lightning earth current flow resulting from nearby direct-to-earth discharges coupling into the common earth paths of the earthing system of the installation.

Surge Data Sheet								
EUT:	Type 1 Street Light			Job Number:	081233E			
S/N:	n/a			Date:	01/09/09			
Customer:	Appalachian Lighting Systems			Temperature:	22°C			
Attendees:	n/a			Humidity:	33%			
Project:	N/A	Config. #:	1	Barometric Pres.:	30.01			
Tester:	Tony J. Masone	Power:	115Vac/60Hz	Job Site:	Keystone Compliance			
Test Specifications								
Spec:	IEEE Std C62.41.2			Method:	Surge			
Test Parameters								
Open Circuit Voltage, Risetime:	1.2μs ± 30%		Short Circuit Current Risetime:	8μs ± 20%				
			Surge Repetition Rate:	<= 1/minute				
Open Circuit Voltage, Time to ½ Value:	50μs ± 20%		Short-Circuit Current Time to ½ Value	20μs ± 20%				
Comments								
None								
EUT Operating Modes								
Normal								
Deviations From Test Standard								
No deviations.								
Results								
Performance Criteria:	A							
<i>*Criteria – The EUT exhibited no change in performance when operating as specified by the manufacturer.</i>								
Note: 5 surges each setting								
Line to Line (2Ω Impedance)								
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
0 Phase:	o	o	o	o	o	o	o	o
90 Phase:	o	o	o	o	o	o	o	o
180 Phase:	o	o	o	o	o	o	o	o
270 Phase:	o	o	o	o	o	o	o	o
High & Low Line to Ground (2Ω Impedance)								
	+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
0 Phase:	o	o	o	o	o	o	o	o
90 Phase:	o	o	o	o	o	o	o	o
180 Phase:	o	o	o	o	o	o	o	o
270 Phase:	o	o	o	o	o	o	o	o
EUT Stopped operating and did not recover from Surge after 5kV Line to Ground.								
Key:	o=No EUT response observed			-=Not tested				

Photos

