

# NORTHWEST EMC

**Sunlight Supply, Inc.**

**ACDE Fusion Part# 906602**

**Report # SNSY0056**



NVLAP Lab Code: 200630-0

*This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report may only be duplicated in its entirety*

# CERTIFICATE OF TEST



Last Date of Test: November 12, 2015  
Sunlight Supply, Inc.  
Model: ACDE Fusion Part# 906602

## Emissions

### Standards

Specification	Method
FCC 18.305:2015 RF Lighting, Consumer Equipment	MP-5:1986
FCC 18.307:2015 RF Lighting, Consumer Equipment	MP-5:1986

### Results

Test Description	Applied	Results	Comments
Radiated Emissions	Yes	Pass	
Conducted Emissions	Yes	Pass	

### Deviations From Test Standards

None

### Approved By:

Kyle Holgate, Operations Manager

*Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.*

# REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

# ACCREDITATIONS AND AUTHORIZATIONS

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## United States

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**FCC** - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

**NVLAP** - Each laboratory is accredited by NVLAP to ISO 17025

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## Canada

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**IC** - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

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## European Union

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**European Commission** – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

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## Australia/New Zealand

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**ACMA** - Recognized by ACMA as a CAB for the acceptance of test data.

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## Korea

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**MSIP / RRA** - Recognized by KCC's RRA as a CAB for the acceptance of test data.

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## Japan

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**VCCI** - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

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## Taiwan

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**BSMI** – Recognized by BSMI as a CAB for the acceptance of test data.

**NCC** - Recognized by NCC as a CAB for the acceptance of test data.

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## Singapore

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**IDA** – Recognized by IDA as a CAB for the acceptance of test data.

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## Israel

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**MOC** – Recognized by MOC as a CAB for the acceptance of test data.

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## Hong Kong

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**OFCA** – Recognized by OFCA as a CAB for the acceptance of test data.

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## Vietnam

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**MIC** – Recognized by MIC as a CAB for the acceptance of test data.

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## SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>

<http://gsi.nist.gov/global/docs/cabs/designations.html>

# EMISSIONS MEASUREMENTS

## Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

## 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

*Measurements were made using the bandwidths and detectors specified. No video filter was used.*

## Sample Calculations

### Radiated Emissions:

Field Strength	=	Measured Level	+	Antenna Factor	+	Cable Factor	-	Amplifier Gain	+	Distance Adjustment Factor	+	External Attenuation
33.5	=	42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0

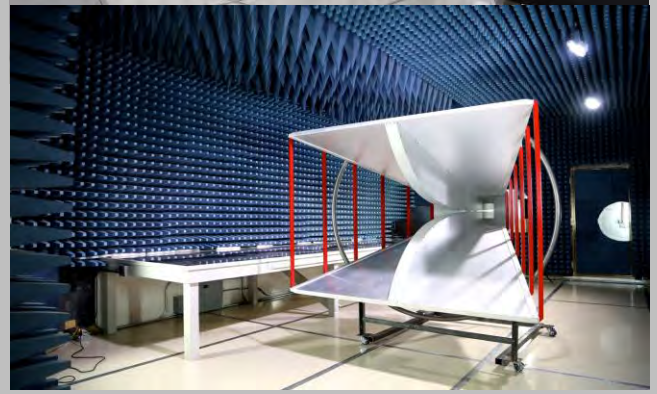
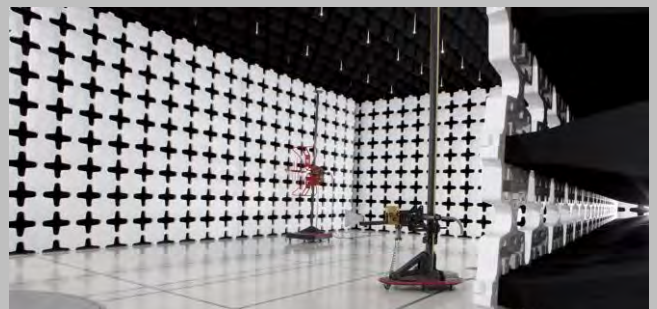
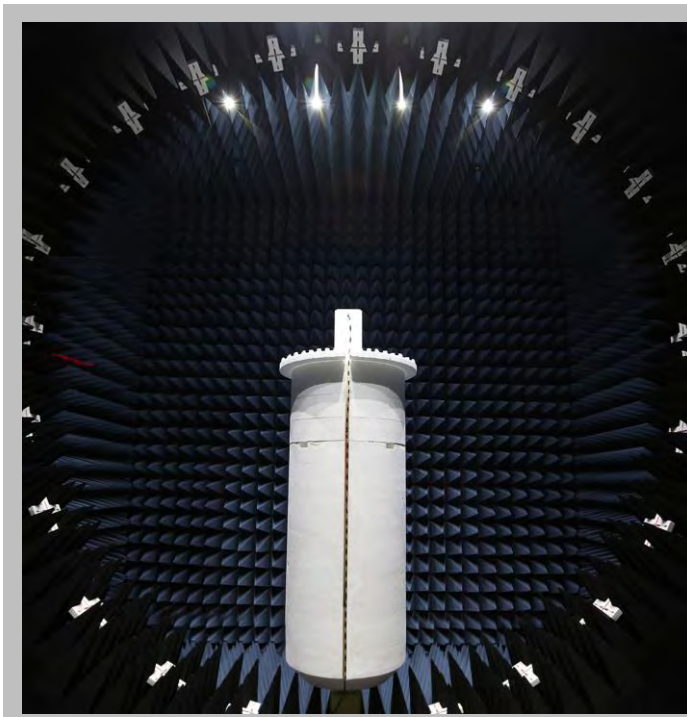
### Conducted Emissions:

Adjusted Level	=	Measured Level	+	Transducer Factor	+	Cable Factor	+	External Attenuation
47.1	=	26.7	+	0.3	+	0.1	+	20.0

# FACILITIES



<b>California</b> Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>New York</b> Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	<b>Oregon</b> Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 9801 (425)984-6600
<b>NVLAP</b>					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
<b>Industry Canada</b>					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
<b>BSMI</b>					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA</b>					
US0158	US0175	N/A	US0017	US0191	US0157



# PRODUCT DESCRIPTION

## Client and Equipment Under Test (EUT) Information

<b>Company Name:</b>	Sunlight Supply, Inc.
<b>Address:</b>	5408 NE 88th Street BLDG A, Suite 101
<b>City, State, Zip:</b>	Vancouver, WA 98665
<b>Test Requested By:</b>	Bruce LeBlanc
<b>Model:</b>	ACDE Fusion Part# 906602
<b>First Date of Test:</b>	October 06, 2015
<b>Last Date of Test:</b>	November 12, 2015
<b>Receipt Date of Samples:</b>	November 12, 2015
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

## Information Provided by the Party Requesting the Test

<b>Functional Description of the EUT:</b>
Air Cooled Reflector with Ballast Included
<b>Highest frequency generated or used in the device:</b>
Assumes < 108 MHz
<b>Testing Objective:</b>
Provide the specific EMC testing requested by the customer

# CONFIGURATIONS

## Configuration SNSY0056- 1

<b>EUT</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Air Cooled Reflector with Ballast Included	Sunlight Supply Incorporated	ACDE Fusion, Part Number: 906602	Un-serialized

<b>Peripherals in test setup boundary</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
1000W DE Lamp	DigiMax	Part Number: 901460	None Provided

<b>Cables</b>					
<b>Cable Type</b>	<b>Shield</b>	<b>Length (m)</b>	<b>Ferrite</b>	<b>Connection 1</b>	<b>Connection 2</b>
AC Power	No	2m	Yes	Air Cooled Reflector with Ballast Included	AC Mains



# MODIFICATIONS

## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	10/06/2015	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	11/12/2015	Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

# RADIATED EMISSIONS

## 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 measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level was detected. This required the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search was utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT. Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance was 3 meters or 10 meters (from antenna to boundary of EUT). At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna was increased so that the lowest point of the bottom of the antenna cleared the ground surface by at least 25 cm.

The EUT arrangement is configured as equivalent to that occurring in normal use. Tabletop equipment is placed on a 0.8 meter high non-conductive table & for Floor-standing equipment, it is placed on, but insulated from a ground reference plane by the use of its own rollers or stand-off supports. If measurements above 1 GHz were required, the test setup was modified to meet the regulatory requirements for higher frequency measurements. If required, RF absorber was placed on the floor between the measurement antenna and EUT. If required, per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables.

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3141	AXG	7/7/2015	7/7/2018
Cable	None	10m Test Distance Cable	EVL	5/11/2015	5/11/2016
Amplifier - Pre-Amplifier	Miteq	AM-1551	AOY	5/11/2015	5/11/2016
Analyzer - Spectrum Analyzer	Agilent	E4443A	AFB	3/17/2015	3/17/2016

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.8 dB	-3.8 dB

## FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

## POWER INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

SNSY0052-1

## MODES INVESTIGATED

Knob was on 1000W setting

# RADIATED EMISSIONS

EUT:	ACDE Fusion part # 906602	Work Order:	SNSY0052
Serial Number:	None	Date:	10/06/2015
Customer:	Sunlight Supply, Inc.	Temperature:	22.2°C
Attendees:	None	Relative Humidity:	40.5%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Brandon Hobbs	Job Site:	EV11
Power:	110VAC/60Hz	Configuration:	SNSY0052-1

## TEST SPECIFICATIONS

Specification: RF Lighting, Consumer Equipment FCC 18.305:2015	Method: MP-5:1986
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## TEST PARAMETERS

Run #:	2	Test Distance (m):	10	Ant. Height(s) (m):	1 to 4(m)
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## COMMENTS

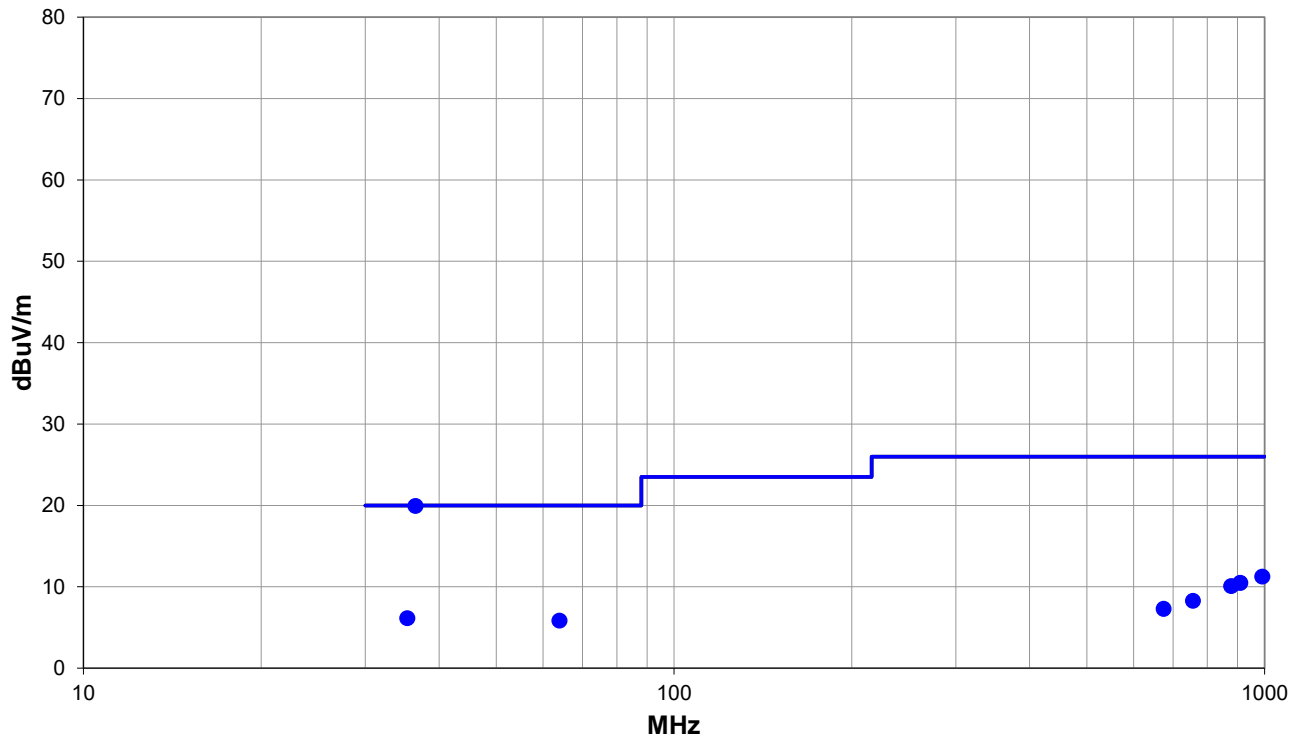
There was a twenty minute warm up period. No fan.

## EUT OPERATING MODES

Knob on 1000W Setting

## DEVIATIONS FROM TEST STANDARD

none



Run #: 2

■ PK    ◆ AV    ● QP

# RADIATED EMISSIONS

## RESULTS - Run #2

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Ant. Height (m)	Azimuth (deg.)	Test Dist. (m)	Ext. Atten. (dB)	Polar. Trans. Type	Detect.	Dist. Adjust. (dB)	Adj. (dBuV/m)	Spec. Limit (dBuV/m)	Margin. (dB)
36.474	53.7	-24.2	1.3	216.0	10.0	0.0	Vert	QP	-9.5	19.9	20.0	-0.1
35.339	39.3	-23.6	1.8	216.0	10.0	0.0	Horz	QP	-9.5	6.1	20.0	-13.9
63.968	46.6	-31.2	2.8	97.0	10.0	0.0	Vert	QP	-9.5	5.8	20.0	-14.2
991.021	30.2	-9.4	2.1	73.0	10.0	0.0	Horz	QP	-9.5	11.2	26.0	-14.8
909.136	30.8	-10.8	2.8	59.0	10.0	0.0	Vert	QP	-9.5	10.5	26.0	-15.5
877.746	30.9	-11.3	3.5	244.0	10.0	0.0	Horz	QP	-9.5	10.1	26.0	-15.9
756.123	30.9	-13.1	4.0	242.0	10.0	0.0	Horz	QP	-9.5	8.3	26.0	-17.7
674.409	30.8	-14.0	1.5	40.0	10.0	0.0	Vert	QP	-9.5	7.3	26.0	-18.7

## CONCLUSION

Pass



Tested By

# CONDUCTED EMISSIONS

## 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 150 kHz to 30 MHz 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  $\Omega$  measuring port is terminated by a 50  $\Omega$  EMI meter or a 50  $\Omega$  resistive load. All 50  $\Omega$  measuring ports of the LISN are terminated by 50 $\Omega$ .

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, TQQ	EVGA	5/12/2015	5/12/2016
Receiver	Rohde & Schwarz	ESCI	ARH	3/11/2015	3/11/2016
LISN	Solar Electronics	9252-50-R-24-BNC	LIN	1/27/2015	1/27/2016

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

## CONFIGURATIONS INVESTIGATED

SNSY0056-1
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## MODES INVESTIGATED

On (1000W)
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# CONDUCTED EMISSIONS

EUT:	ACDE Fusion Part# 906602	Work Order:	SNSY0056
Serial Number:	None	Date:	11/12/2015
Customer:	Sunlight Supply, Inc.	Temperature:	21.8°C
Attendees:	Bruce LeBlanc	Relative Humidity:	39.8%
Customer Project:	None	Bar. Pressure:	1026 mbar
Tested By:	Luke Richardson	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	SNSY0056-1

## TEST SPECIFICATIONS

Specification: RF Lighting, Consumer Equipment	Method:
FCC 18.307:2015	MP-5:1986

## TEST PARAMETERS

Run #:	3	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

No Fan. 15 min. warm-up.

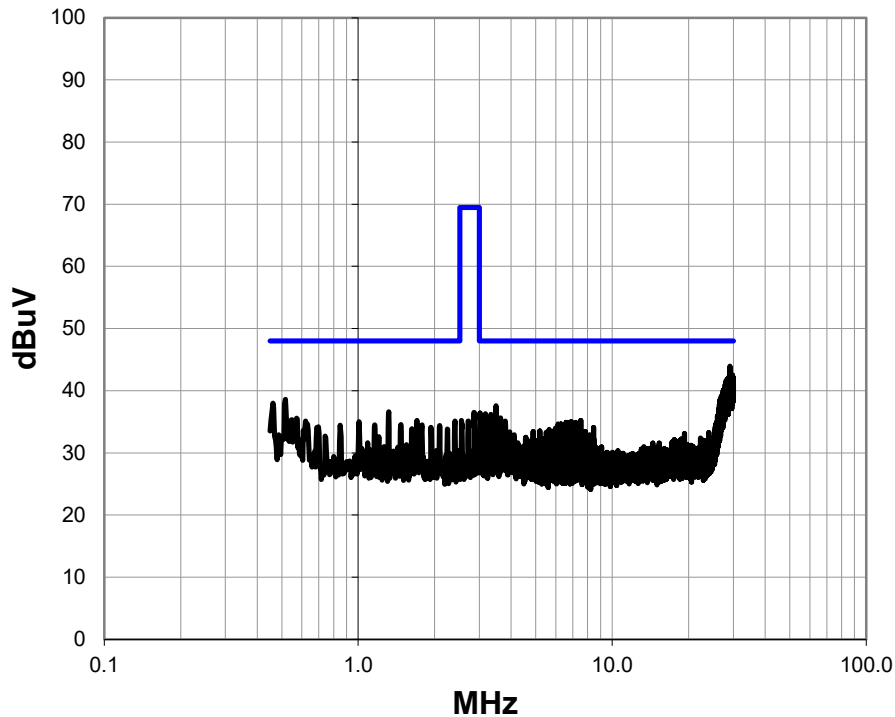
## EUT OPERATING MODES

Knob on 1000W Setting

## DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



# CONDUCTED EMISSIONS

## RESULTS - Run #3

Peak Data – vs – Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
29.125	22.1	21.9	44.0	48.0	-4.0
29.775	20.6	21.9	42.5	48.0	-5.5
29.239	20.6	21.9	42.5	48.0	-5.5
28.988	20.6	21.8	42.4	48.0	-5.6
29.686	20.4	21.9	42.3	48.0	-5.7
29.553	20.4	21.9	42.3	48.0	-5.7
29.727	20.3	21.9	42.2	48.0	-5.8
29.073	20.3	21.8	42.1	48.0	-5.9
29.978	20.2	21.9	42.1	48.0	-5.9
28.696	20.3	21.8	42.1	48.0	-5.9
29.627	20.2	21.9	42.1	48.0	-5.9
29.900	20.1	21.9	42.0	48.0	-6.0
28.866	20.1	21.8	41.9	48.0	-6.1
28.375	20.0	21.8	41.8	48.0	-6.2
29.834	19.8	21.9	41.7	48.0	-6.3
29.346	19.8	21.9	41.7	48.0	-6.3
28.087	19.8	21.8	41.6	48.0	-6.4
28.951	19.7	21.8	41.5	48.0	-6.5
28.523	19.7	21.8	41.5	48.0	-6.5
28.619	19.6	21.8	41.4	48.0	-6.6
28.582	19.6	21.8	41.4	48.0	-6.6
28.323	19.5	21.8	41.3	48.0	-6.7
28.730	19.4	21.8	41.2	48.0	-6.8
28.253	19.4	21.8	41.2	48.0	-6.8
27.876	19.2	21.8	41.0	48.0	-7.0
28.434	19.1	21.8	40.9	48.0	-7.1

## CONCLUSION

Pass



Tested By

# CONDUCTED EMISSIONS

EUT:	ACDE Fusion Part# 906602	Work Order:	SNSY0056
Serial Number:	None	Date:	11/12/2015
Customer:	Sunlight Supply, Inc.	Temperature:	21.8°C
Attendees:	Bruce LeBlanc	Relative Humidity:	39.8%
Customer Project:	None	Bar. Pressure:	1026 mbar
Tested By:	Luke Richardson	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	SNSY0056-1

## TEST SPECIFICATIONS

Specification: RF Lighting, Consumer Equipment	Method:
FCC 18.307:2015	MP-5:1986

## TEST PARAMETERS

Run #:	4	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

No Fan. 15 min. warm-up.

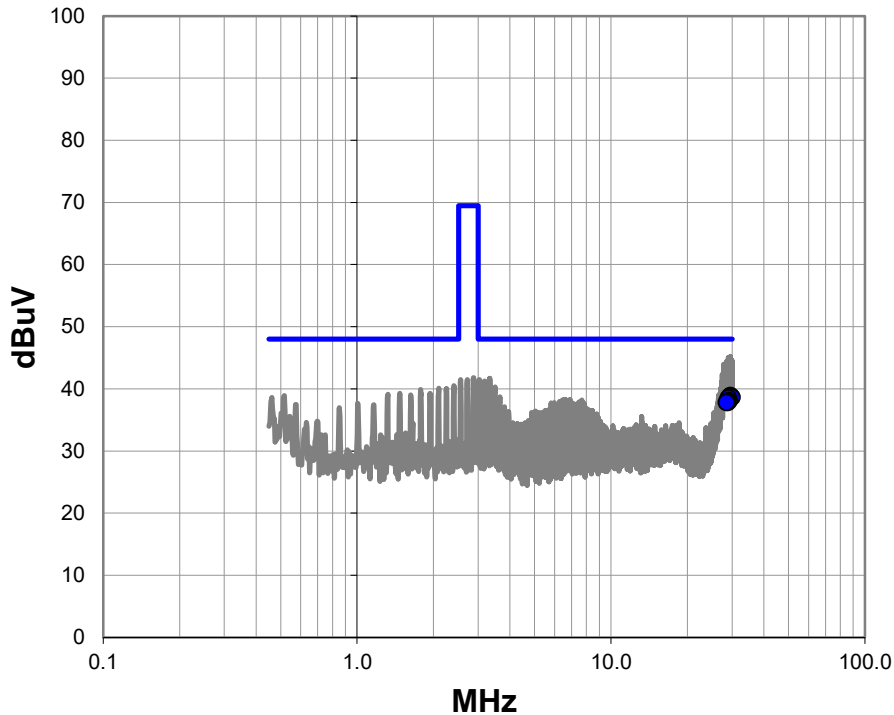
## EUT OPERATING MODES

Knob on 1000W Setting

## DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit





# CONDUCTED EMISSIONS

## RESULTS - Run #4

Peak Data – vs – Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
29.555	17.0	21.9	38.9	48.0	-9.1
29.733	16.8	21.9	38.7	48.0	-9.3
29.992	16.7	21.9	38.6	48.0	-9.4
29.083	16.7	21.8	38.5	48.0	-9.5
29.178	16.2	21.9	38.1	48.0	-9.9
28.860	16.2	21.8	38.0	48.0	-10.0
28.838	16.0	21.8	37.8	48.0	-10.2
28.543	16.0	21.8	37.8	48.0	-10.2

## CONCLUSION

Pass



Tested By