Excellence in Compliance Testing

Certification Test Report

FCC ID: NCG-MS180D

FCC Rule Part: 15.245

ACS Report Number: 11-0249.W03.11.A

Manufacturer: Cooper Lighting, LLC

Test Begin Date: July 5, 2011
Test End Date: July 10, 2011

Report Issue Date: July 12, 2011

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Reviewed by:

Kirby Munroe
Director, Wireless Certifications
ACS, Inc.

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This report contains 17 pages

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210.

1.2 General

The EUT is a motion detecting head that is to be installed in conjunction with an outdoor light. It utilizes infrared, photometric and Doppler detecting devices to automatically turn on and off a light fixture.

Technical Information:
Band of Operation: 10,500MHz – 10,550MHz
Number of Channels: 1
Modulation Format: Pulsed CW
Antenna Type: Integral PCB
Operating Voltage: 120VAC / 60Hz

Model Variants:

Model #	Floodlight Description	Max. Total Wattage	Color
MS-180D	N/A - Sensor only	300	Bronze
MS-180DW	N/A - Sensor only	300	White
MS-185D	Twin PAR lamp holders	300	Bronze
MS-185DW	Twin PAR lamp holders	300	White
MS-187D	(2) Halogen Heads, Round	200	Bronze
MS-187DW	(2) Halogen Heads, Round	200	White

Manufacturer Information:
Cooper Lighting, LLC
1121 Highway 74 South
Peachtree City, GA 30269

Test Sample Serial Number(s): ACS#1

Test Sample Condition: The test samples were provided in good working order with no visible defects.

1.3 Test Methodology and Considerations

For radiated emissions, including band-edge measurements, the EUT was evaluated in an orientation representative of typical use. The EUT was loaded by using a standard incandescent light fixture and bulb.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following addresses:

Radiated emissions to 40GHz / Conducted Emissions:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

Radiated emissions above 40GHz (Not Covered under the ACS scope of accreditation):

Timco Engineering Inc.
849 N.W. State Road 45
P.O. Box 370
Newberry, Florida 32669
Phone: (352) 472-5500
Fax: (352) 472-2030
FCC Test Firm Registration Number: 95517

2.2 Laboratory Accreditations/Recognitions/Certifications (ACS)

ACS is accredited to ISO/IEC 17025 by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 200612-0. Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment.

FCC Test Firm Registration Number: 511277
Industry Canada Lab Code: IC 4175A-1
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

2.3 Radiated Emissions Test Site Description (ACS)

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

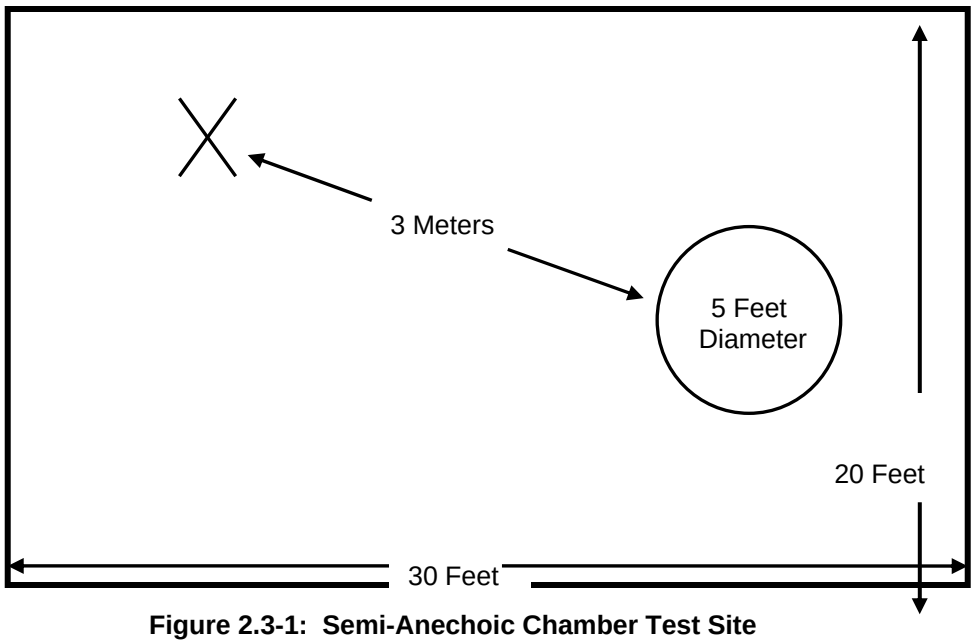


Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

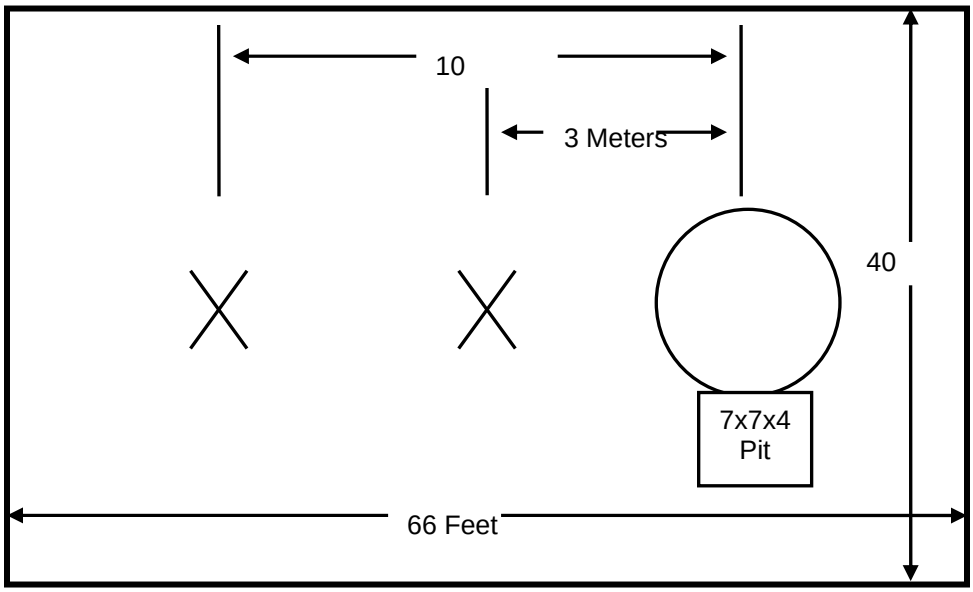


Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description (ACS)

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal group reference plane (GRP) bonded every 3" to an 8' X 8' vertical ground plane.

The site is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 4.1.3-1:

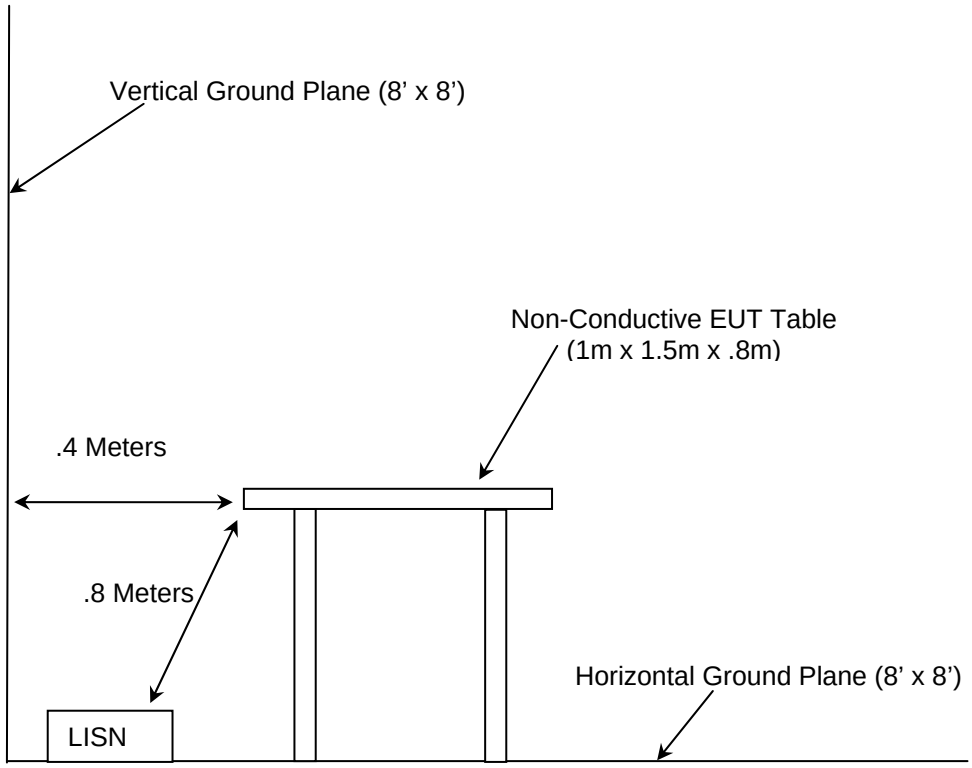


Figure 2.4-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2010
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2010
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8, Dec 2010
- Industry Canada Radio Standards Specification: RSS-Gen - General Requirements and Information for the Certification of Radiocommunication Equipment, Issue 3, Dec 2010.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

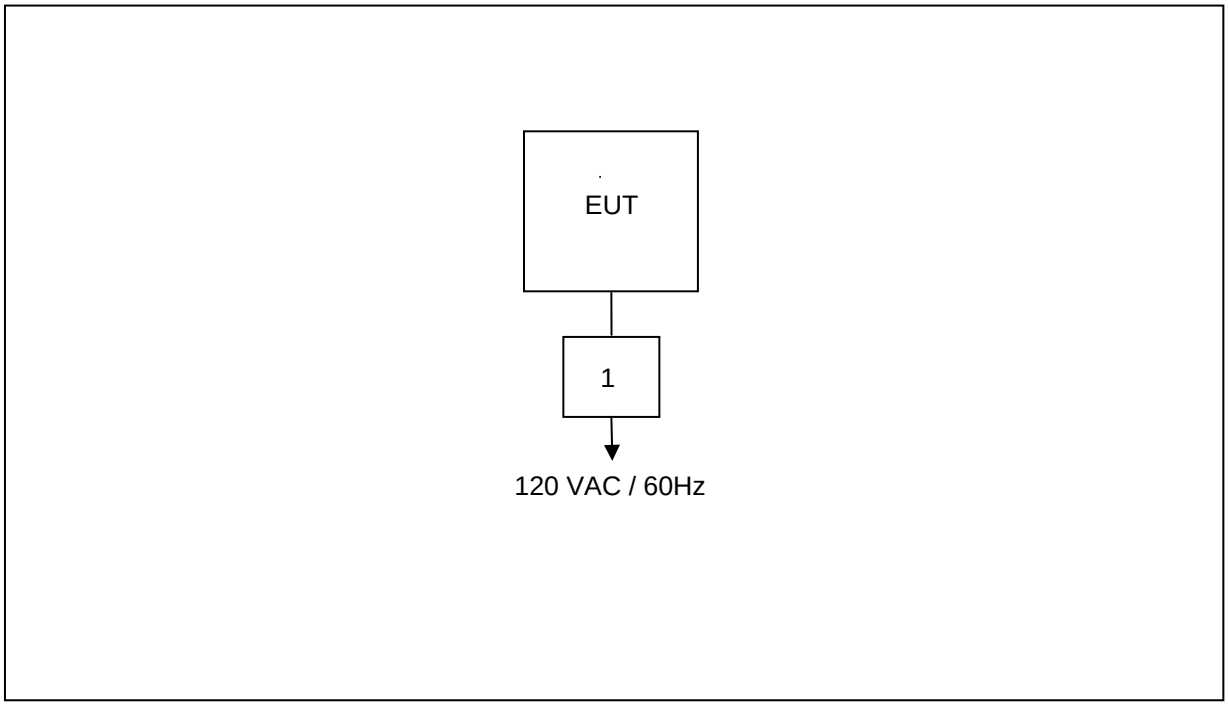
AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
1	Rohde & Schwarz	ESMI - Display	Spectrum Analyzers	833771/007	9/23/2010	9/23/2012
2	Rohde & Schwarz	ESMI-Receiver	Spectrum Analyzers	839587/003	9/23/2010	9/23/2012
3	Rohde & Schwarz	ESMI - Display	Spectrum Analyzers	839379/011	2/2/2009	2/2/2011
4	Rohde & Schwarz	ESMI - Receiver	Spectrum Analyzers	833827/003	2/2/2009	2/2/2011
25	Chase	CBL6111	Antennas	1043	9/13/2010	9/13/2012
30	Spectrum Technologies	DRH-0118	Antennas	970102	5/8/2009	5/8/2011
73	Agilent	8447D	Amplifiers	2727A05624	5/26/2010	5/26/2011
153	EMCO	3825/2	LISN	9411-2268	1/11/2009	1/11/2011
167	ACS	Chamber EMI Cable Set	Cable Set	167	1/25/2010	1/25/2011
168	Hewlett Packard	11947A	Attenuators	44829	2/4/2010	2/4/2011
283	Rohde & Schwarz	FSP40	Spectrum Analyzers	1000033	8/31/2010	8/31/2011
291	Florida RF Cables	SMRE-200W-12.0-SMRE	Cables	None	12/7/2010	12/7/2011
292	Florida RF Cables	SMR-290AW-480.0-SMR	Cables	None	12/7/2010	12/7/2011
324	ACS	Belden	Cables	8214	7/9/2010	7/9/2011
332	Rohde & Schwarz	TS-PR40	Amplifiers	100021	10/29/2010	10/29/2011
333	Rohde&Schwarz	3160-09	Antennas	49404	NCR	NCR
334	Rohde&Schwarz	3160-10	Antennas	45576	NCR	NCR
335	Suhner	SF-102A	Cables	882/2A	10/29/2010	10/29/2011
338	Hewlett Packard	8449B	Amplifiers	3008A01111	10/29/2010	10/29/2011
345	Suhner Sucoflex	102A	Cables	1077/2A	10/29/2010	10/29/2011
422	Florida RF	SMS-200AW-72.0-SMR	Cables	805	1/26/2010	1/26/2011
NA	HP	8566B Opt 462	Spectrum Analyzer	3138A07786 3144A20661	11/24/2009	11/24/2011
NA	ATM	19-443-6R	Antennas	Std Gain	NCR	NCR
NA	HP/Agilent	11970U	Mixer	2332A00238	7/29/2011	7/29/2013

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	Light Fixture (Load)	N/A	N/A	N/A

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM



7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The antenna used for the EUT is an integral PCB antenna and therefore meets the requirements of Section 15.203.

7.2 Power Line Conducted Emissions – FCC: Section 15.207

7.2.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.2.2 Measurement Results

Results of the test are shown below in and Tables 7.2.2-1 to 7.2.2.2.

Table 7.2.2-1: Line 1 Conducted EMI Results

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.156	37.9	9.9	66	27.8	L1	FLO	QP
0.324	28.6	10	60	31	L1	FLO	QP
0.426	24.1	10	57	33.2	L1	FLO	QP
0.504	21	10	56	35	L1	FLO	QP
0.534	20.4	10	56	35.6	L1	FLO	QP
0.57	19.1	10	56	36.9	L1	FLO	QP
0.738	14.5	10.1	56	41.5	L1	FLO	QP
0.792	13.2	10.1	56	42.8	L1	FLO	QP
0.906	11.2	10	56	44.8	L1	FLO	QP
28.056	9.3	9.3	60	50.7	L1	FLO	QP
0.228	11.1	9.9	53	41.4	L1	FLO	AVG
0.318	9.5	10	50	40.2	L1	FLO	AVG
0.426	8.7	10	47	38.6	L1	FLO	AVG
0.498	8.2	10	46	37.8	L1	FLO	AVG
0.582	8	10	46	38	L1	FLO	AVG
0.624	7.9	10	46	38.1	L1	FLO	AVG
0.672	7.8	10	46	38.2	L1	FLO	AVG
0.792	7.6	10.1	46	38.4	L1	FLO	AVG
0.936	7.4	10	46	38.6	L1	FLO	AVG
28.032	6.6	9.3	50	43.4	L1	FLO	AVG

Table 7.2.2-2: Line 2 Conducted EMI Results

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.156	39.8	9.9	66	25.8	L2	FLO	QP
0.33	31.7	10	60	27.7	L2	FLO	QP
0.39	29.5	10.1	58	28.6	L2	FLO	QP
0.498	25.8	10	56	30.3	L2	FLO	QP
0.558	24	10	56	32	L2	FLO	QP
0.654	21.1	10	56	34.9	L2	FLO	QP
0.9	15.4	10	56	40.6	L2	FLO	QP
1.068	12.1	10	56	43.9	L2	FLO	QP
1.446	10.3	10	56	45.7	L2	FLO	QP
4.476	9.4	10	56	46.6	L2	FLO	QP
0.198	14	9.9	54	39.7	L2	FLO	AVG
0.312	10.4	10	50	39.5	L2	FLO	AVG
0.384	9.7	10.1	48	38.5	L2	FLO	AVG
0.51	8.7	10	46	37.3	L2	FLO	AVG
0.516	8.7	10	46	37.3	L2	FLO	AVG
0.696	8	10.1	46	38	L2	FLO	AVG
0.924	7.6	10	46	38.4	L2	FLO	AVG
1.122	7.3	10	46	38.7	L2	FLO	AVG
1.404	7.2	10	46	38.8	L2	FLO	AVG
4.518	6.9	10	46	39.1	L2	FLO	AVG

7.3 20dB / 99% Bandwidth – FCC: Section 15.215

7.3.1 Measurement Procedure

The 20dB bandwidth was measured at an amplitude level reduced from the reference level by 20dB. The reference level was set on the spectrum analyzer equal to the highest amplitude signal observed from the device at either the fundamental frequency or the first-order modulation product in all typical modes of operation. The span of the spectrum analyzer display was set between two times and five times the occupied bandwidth (OBW) of the emission. The RBW of the spectrum analyzer was set to approximately 1 % to 5 % of the OBW. The 20dB bandwidth was measured between the lower and upper points on the emission which correspond to 20dB below the reference level previously established.

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission and side bands. The RBW was to ~ 1% of the span. The trace was set to max hold with a sample detector. The occupied bandwidth measurement function of the analyzer was used for the 99% bandwidth.

7.3.2 Measurement Results

Results are shown below in table 7.3.2-1 and figure 7.3.2-1 to 7.3.2-6:

Table 7.3.2-1: 20dB / 99% Bandwidth

Frequency [GHz]	20dB Bandwidth [kHz]	99% Bandwidth [kHz]
10.535	241.0	304.0

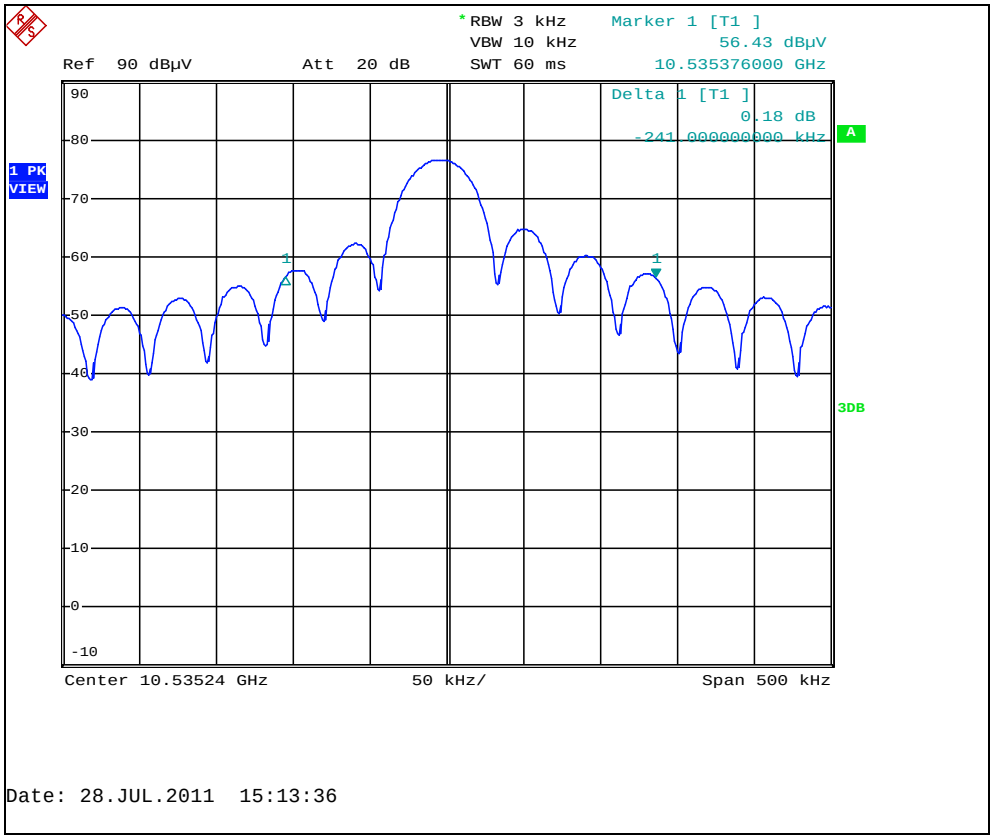


Figure 7.3.2-1: 20dB Bandwidth Plot

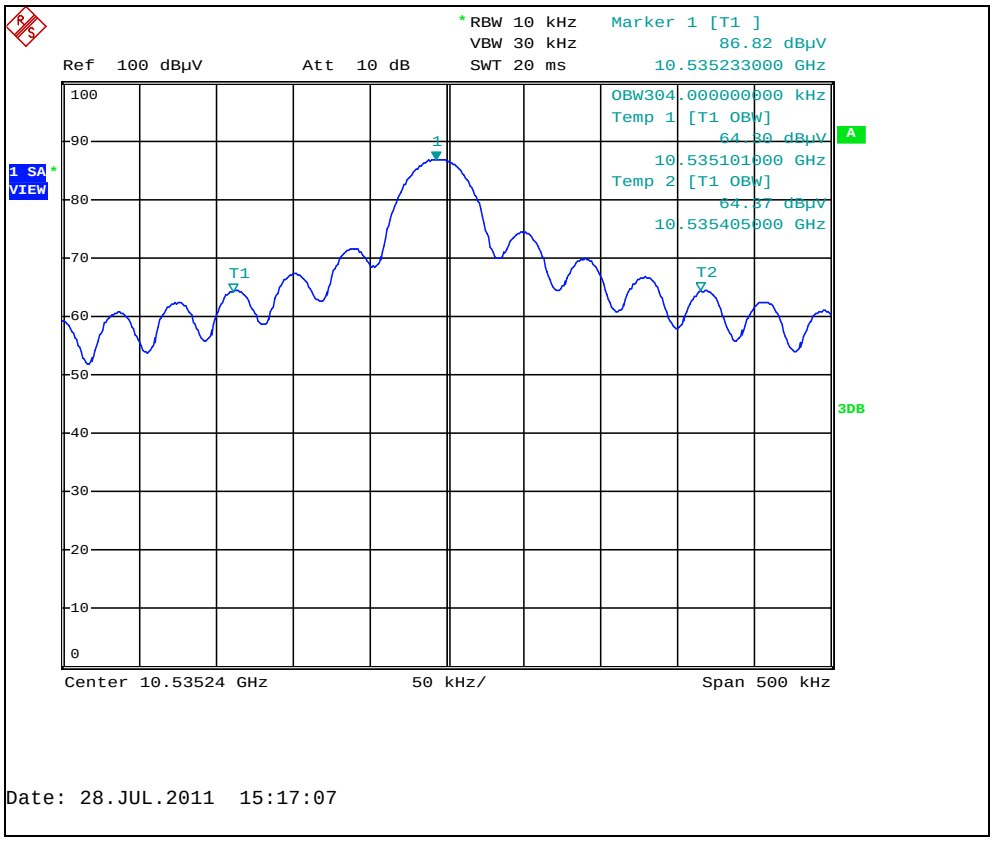


Figure 7.3.2-2: 99% Occupied Bandwidth Plot

7.4 Fundamental Field Strength – FCC: Section 15.245(b)

7.4.1 Measurement Procedure

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For fundamentals below 1GHz, quasi-peak measurements were made using a resolution bandwidth (RBW) of 120 kHz and a video bandwidth (VBW) of 300 kHz. For fundamentals above 1GHz, peak and average measurements were made using a resolution bandwidth (RBW) of 1 MHz and a video bandwidth (VBW) of 3 MHz.

The average emissions were further corrected by applying the duty cycle correction of the EUT for comparison to the average limit. See section 7.5.2 for determination of the duty cycle.

7.4.2 Measurement Results

Results are shown below in Table 7.4.2-1.

Table 7.4.2-1: Fundamental Field Strength

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
10535	99.77	99.77	H	10.89	110.66	84.32	148.0	128.0	37.3	43.6
10535	87.00	87.00	V	10.89	97.89	71.55	148.0	128.0	50.1	56.4

7.5 Radiated Spurious Emissions - FCC: Section 15.245(b)

7.5.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30MHz to 53GHz, 5 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000MHz, peak and average measurements were made with RBW and VBW of 1 MHz and 3 MHz respectively.

The average emissions were further corrected by applying the duty cycle correction of the EUT for comparison to the average limit. See section 7.5.2 for determination of the duty cycle.

All out of band emissions, including emissions at the band-edge, were evaluated.

Radiated emissions > 40GHz are not covered under the ACS scope of accreditation.

7.5.2 Duty Cycle Correction

For average radiated measurements, the measured level was reduced by a factor 26.34dB to account for the duty cycle of the EUT. The EUT transmits for 26.2uS with a period of 543.6uS. therefore the duty cycle is 4.82%. The duty cycle correction factor is determined using the formula: 20log (26.2 / 543.6) = -26.34dB.

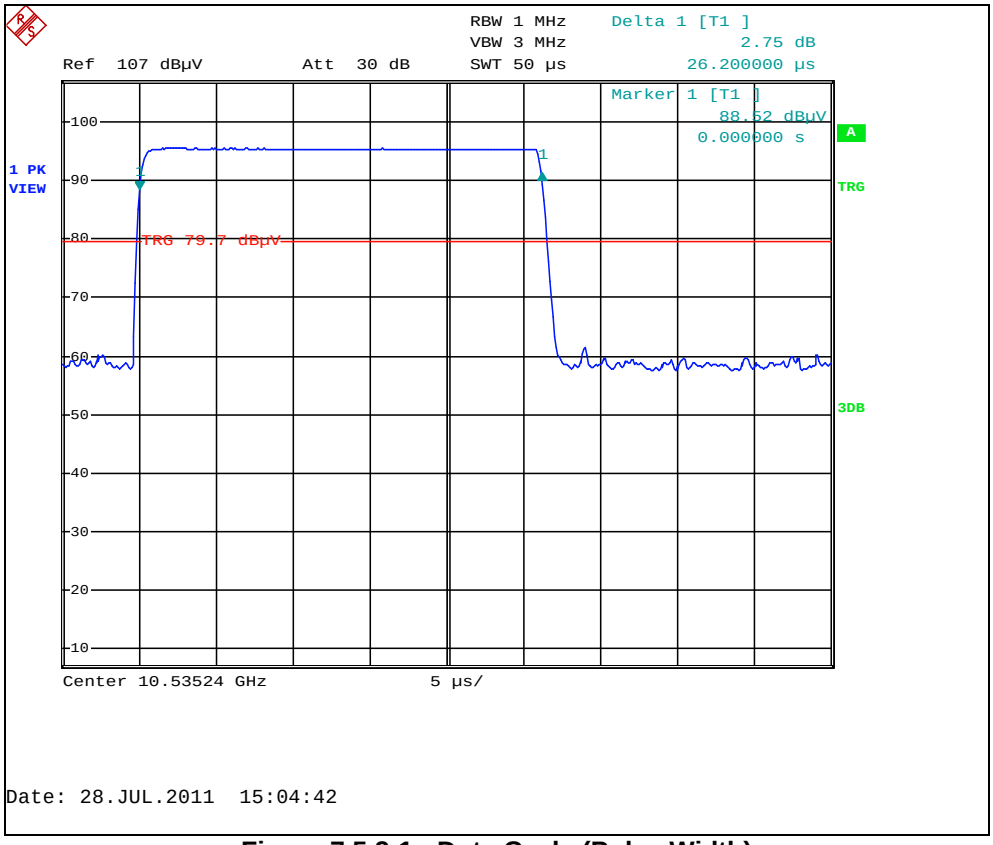


Figure 7.5.2-1: Duty Cycle (Pulse Width)

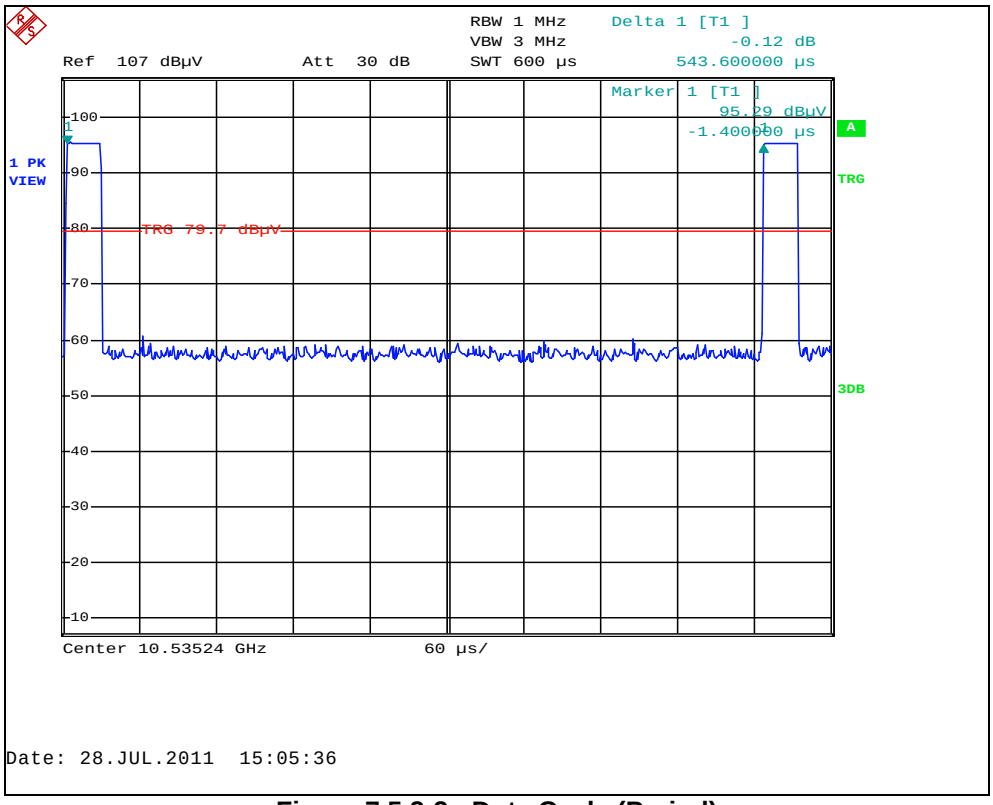


Figure 7.5.2-2: Duty Cycle (Period)

7.5.3 Measurement Results

Radiated spurious emissions found in the band of 30MHz to 53GHz are reported in the table 7.5.3-1 below.

Table 7.5.3-1: Radiated Spurious Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
10500	50.70	50.70	H	10.85	61.55	35.21	74.0	54.0	12.5	18.8
10500	41.13	41.13	V	10.85	51.98	25.64	74.0	54.0	22.0	28.4
10550	55.30	55.30	H	10.91	66.21	39.87	74.0	54.0	7.8	14.1
10550	44.69	44.69	V	10.91	55.60	29.26	74.0	54.0	18.4	24.7
21070	71.84	71.84	H	14.49	86.33	59.99	97.5	77.5	11.2	17.5
21070	71.80	71.80	V	14.49	86.29	59.95	97.5	77.5	11.2	17.6
31605	91.75	91.75	H	1.44	93.19	66.85	97.5	77.5	4.3	10.7
31605	89.49	89.49	V	1.44	90.93	64.59	97.5	77.5	6.6	12.9
42140	33.50	33.50	V	23.60	57.10	30.76	97.5	77.5	40.4	46.7
52675	37.10	37.10	V	25.50	62.60	36.26	97.5	77.5	34.9	41.2

7.5.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak

Corrected Level: 50.70 + 10.85 = 61.55dBuV/m
Margin: 74dBuV/m – 61.55dBuV/m = 12.5dB

Example Calculation: Average

Corrected Level: 50.70 + 10.85 - 26.34 = 35.21dBuV
Margin: 54dBuV – 35.21dBuV = 18.8dB

8 CONCLUSION

In the opinion of ACS, Inc. FCC ID: NCG-MS180D, manufactured by Cooper Lighting, LLC, meets the requirements of FCC Part 15 subpart C.

END REPORT