Testing Tomorrow's Technology

Application and Report for

Title 47 US Code, Part 2, Subpart J, Equipment Authorization Procedures, Section 2.907, Certification
Along With
Part 15, Subpart C for Intentional Radiators, Section 15.245 Operating within the Band 10500 MHz to 10550 MHz.

And

Title 47 US Code, Part 2, Subpart J, Equipment Authorization Procedures, Section 2.902, Verification
Along With
Part 15, Subpart B for Unintentional Radiators, Sections 15.107 for Conducted Emissions and 15.109 for Radiated Emissions

For the

Precision Plus Doppler Radar
Models MS270D, MS270DW, MS275D, MS275DW, MS275RD, MS275RDW, MS278D, MS278DW, MS280D, MS280DW

FCC ID: NCG-MS270D

Manufactured by

Cooper Lighting, L.L.C.

UST Project: 08-0195
Issue Date: October 27, 2008

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

FCC ID: NCG-MS270D

I certify that I am authorized to sign for the test facility and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: _____

Name: **Stephen A. Sawyer**

Title: **Chief Compliance Engineer**

Date: **October 27, 2008**

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: Cooper Lighting, L.L.C.

MODEL: Precision Plus Doppler Radar MS270D, MS270DW, MS275D, MS275DW, MS275RD, MS275RDW, MS278D, MS278DW, MS280D, MS280DW

FCC ID: NCG-MS270D
DATE: October 27, 2008

This report concerns (check one): Original grant_X
Class II change_____

Equipment type:
Intentional Radiator Operating within the bands 10500 to 10550 MHz

Deferred grant requested per 47 CFR 0.457(d) (1) (ii)? yes_____ No_X

If yes, defer until:_____
date

__N.A.__ agrees to notify the Commission by__N.A.__
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

SUMMARY OF TEST REQUIREMENTS

FCC Requirement	Title	Disposition
Verification		
15.107	Unintentional Radiator, Power Line Conducted Emissions	Pass
15.109	Unintentional Radiator, Radiated Emissions	Pass
Certification		
15.207	Intentional Radiator, Power Line Conducted Emissions	Pass
15.209	Intentional Radiator, Radiated Emissions	Pass
15.245(b)	Fundamental Field Strength	Pass

N/A = Not applicable for this unit.

Table Of Contents

Table Of Contents (Cont'd)

List of Figures

.

List of Tables

1 General Information

1.1 Purpose of Report

This report is prepared as a means of passing necessary test data to the reviewing authorities for the purpose of judging the acceptability of this product for distribution in the controlled market place.

1.2 Product Description

The Equipment under Test (EUT) is the Precision Plus Doppler Radar, Models MS270D, MS270DW, MS275D, MS275DW, MS275RD, MS275RDW, MS278D, MS278DW, MS280D, MS280DW. The EUT is a Motion Detector Security Floodlight. The EUT contains an intentional radiator and digital control circuitry.

1.3 Related Submittal(s)/Grant(s)

The EUT is subject to the following authorizations:

a) Certification as a transmitter (FCC ID: NCG-MS270D) and
b) Verification as a digital device and receiver.

The information contained in this report is presented for both the Certification & Verification authorization(s) for the EUT.

2 Tests and Measurements

2.1 Configuration of Tested System

The Test Sample was setup and tested per ANSI C63.4, *Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Frequency Range of 9 kHz to 40 GHz (2003).* Conducted and radiated emissions data below 1 GHz were taken with the EMC test receivers' (or spectrum analyzers') resolution bandwidth (RBW) adjusted to 9 kHz and 120 kHz, respectively. Above 1 GHz, RBW was set to 1MHz. Video bandwidth was auto coupled. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. A Block diagram of the tested system is shown in Figure 3. Test configuration photographs for spurious and fundamental emissions are shown in Figures 6 - 9.

2.2 EUT Characterization

The sample used for testing was received by US Tech on September 22, 2008 in good operating condition.

2.3 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. This site has been fully described and registered with the FCC under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1. Radiated Emissions testing from 26 to 53 GHz was subcontracted by US Tech to University of Michigan in Ann Arbor, Michigan. This portion of the testing was completed on September 30, 2008 and University of Michigan has agreed to allow US Tech to use the data in our test report.

2.4 Test Equipment

Table 1 describes test equipment used to evaluate this product.

2.5 Modifications to EUT

The following modification was made by US Tech to bring the EUT into compliance with FCC Part 15, Subpart B, Class B Limits for the receiver and digital portion of the EUT and the Subpart C, Transmitter requirements.

1. Applied a Torroidial Ferrite Bead (Fair-Rite P/N: 2631480102) to the Hot Phase and Neutral Power Lines in a single pass through configuration. See Figure 1 Below.

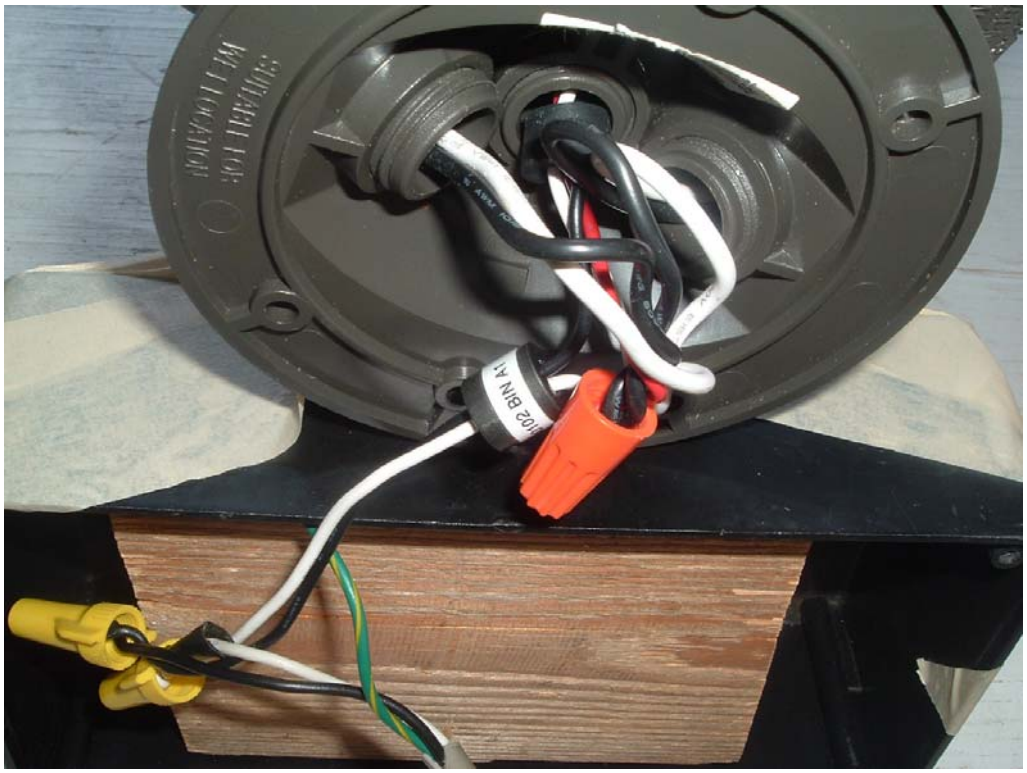


Figure 1. Modifications to EUT, Single Pass-through Configuration.

2.6 Measurement Standards (CFR 15.31)

Intentional and unintentional radiators are to use the methods of ANSI C63.4 – 2003. Measurements were made on an Open Area Test Site (OATS) wherever possible.

Section CFR15.31(m) was followed to determine how many channels the EUT was required to be tested on.

2.7 Frequency Range of Radiated Measurements (CFR 15.33)

2.7.1 Intentional Radiators

The spectrum was investigated from the lowest RF signal generated without going below 9 kHz to the 10th harmonic of the highest fundamental transmitter frequency.

2.7.2 Unintentional Radiators

The spectrum was investigated from the lowest RF signal generated without going below the lowest frequency for which an emissions limit is specified (30 MHz) to the 5th harmonic of the highest fundamental frequency of the digital device (5 GHz maximum).

2.8 Measurement Detector Function and Bandwidth (CFR 15.35)

On any frequency below 1000 MHz, the limits shown are based upon measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths. On frequencies above 1000 MHz, the radiation limits are based upon the use of measuring instrumentation employing an average detector function with corresponding bandwidth.

When average detector measurements are specified for use, including emission measurements below 1000 MHz, there is also a corresponding limit for Peak detector measurements having a limit of 20 dB above the corresponding average limit unless a different peak emission limit is specified. Measurements above 1000 MHz utilize a minimum resolution bandwidth of 1 MHz.

2.8 Measurement Detector Function and Bandwidth (Cont'd)

When radiated emissions limits are expressed in terms of the average value of the emission and pulsed operation is employed, the measurement field strength is determined by averaging over one complete pulse train (Duty Cycle) including blanking intervals for pulse trains up to 0.1 second in duration. The exact method of calculating the average field strength is included in paragraph 2.10 of this report.

2.9 Antenna Requirement (CFR 15.203)

The intentional radiator is designed to assure that no antenna other than that furnished by the manufacturer is used with the device. The use of a permanently attached antenna is considered sufficient to comply with this requirement. Below is a table of the permanently attached antenna used with this system and its characteristics. If, in the future, additional antennas are contemplated for use, they must be formally evaluated and approved for suitability to these requirements.

Table 1 – EUT Antennae

Manufacturer	Model Number	Antenna Type	Frequency Range	Peak Gain dB_i	Impedance Ohms
Microwave Solutions	N/A	Integral Patch	N/A	8 dBi	50

2.10 Duty Cycle Correction Factor

Because the EUT is not transmitting continuously, a duty cycle factor can be derived from measured peak data and applied for converting peak value data to average value data and comparing it to the average limits.

From Figures 2 and 3 below:

In a 100 m Sec period, there are 65 pulses at 0.0756 mSec each. Therefore, the Duty Cycle correction factor is:

65 x 0.0756 mS = 5.55 mS/100 mS = 5.55 % or 20 log (0.0555)

= -26.17 dB

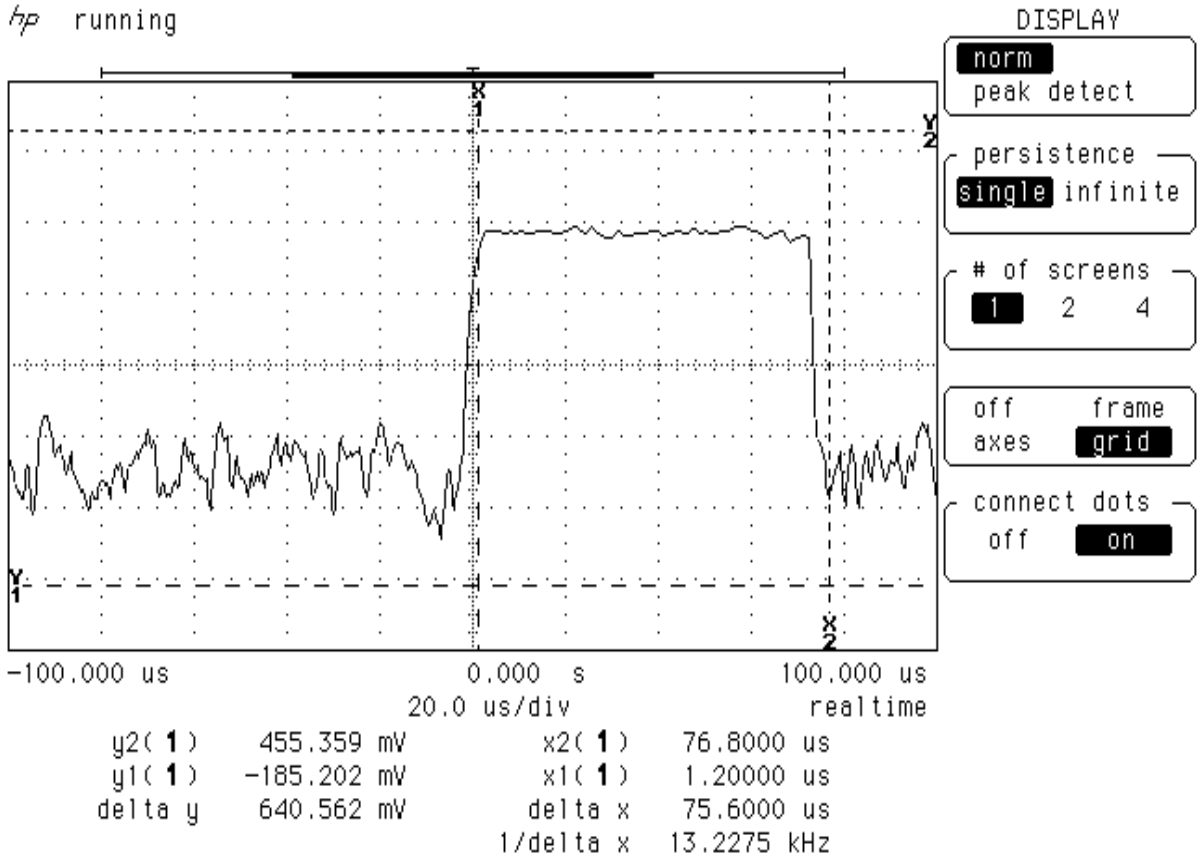


Figure 2 - Pulse Width

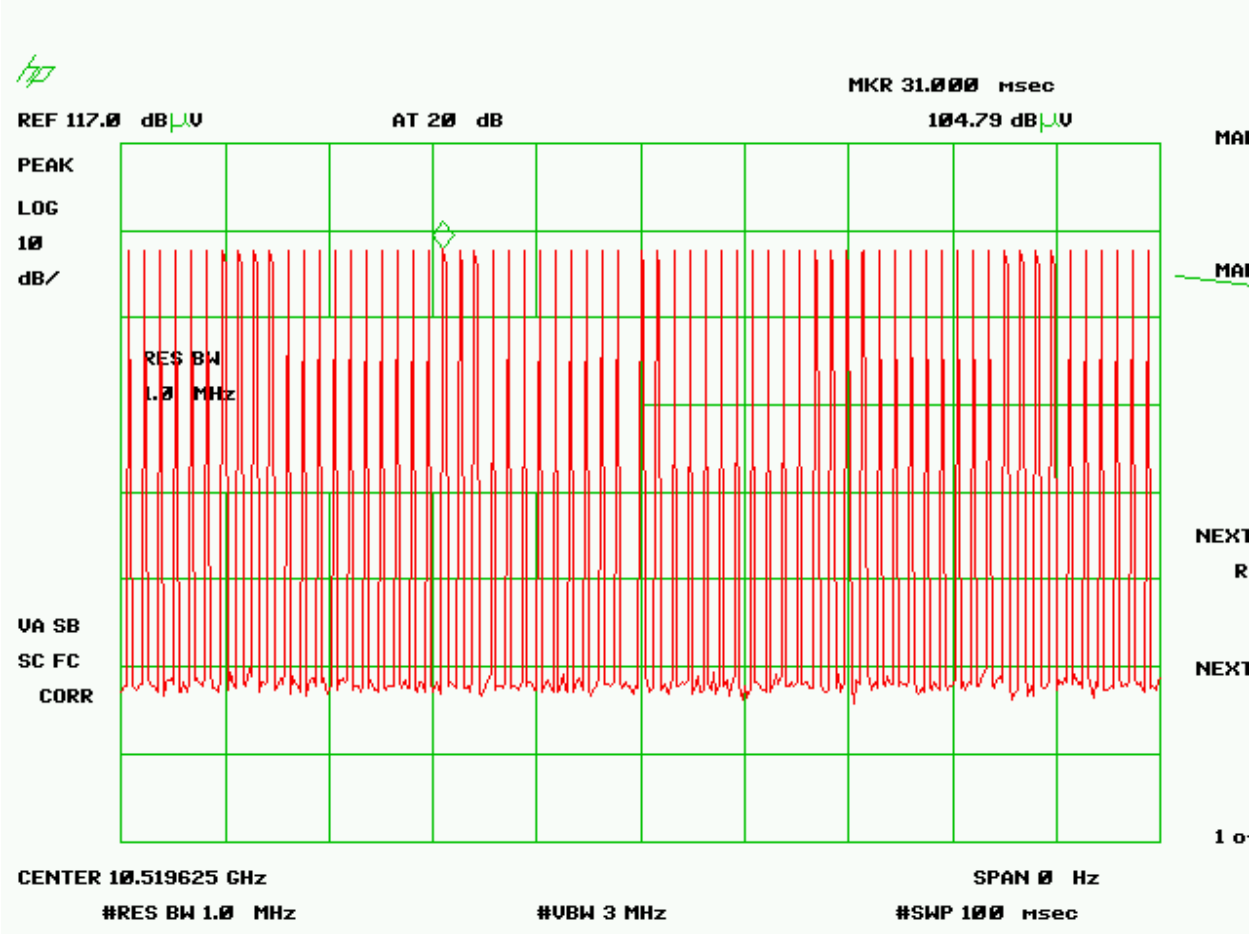


Figure 3 - Pulses in a 100 mSec period

2.11 Emission Bandwidth

The emission bandwidth is considered to be the 0.5 percent points (20 dB down points) of the pulse. Therefore the emission bandwidth is 1.40 MHz per the figure below.

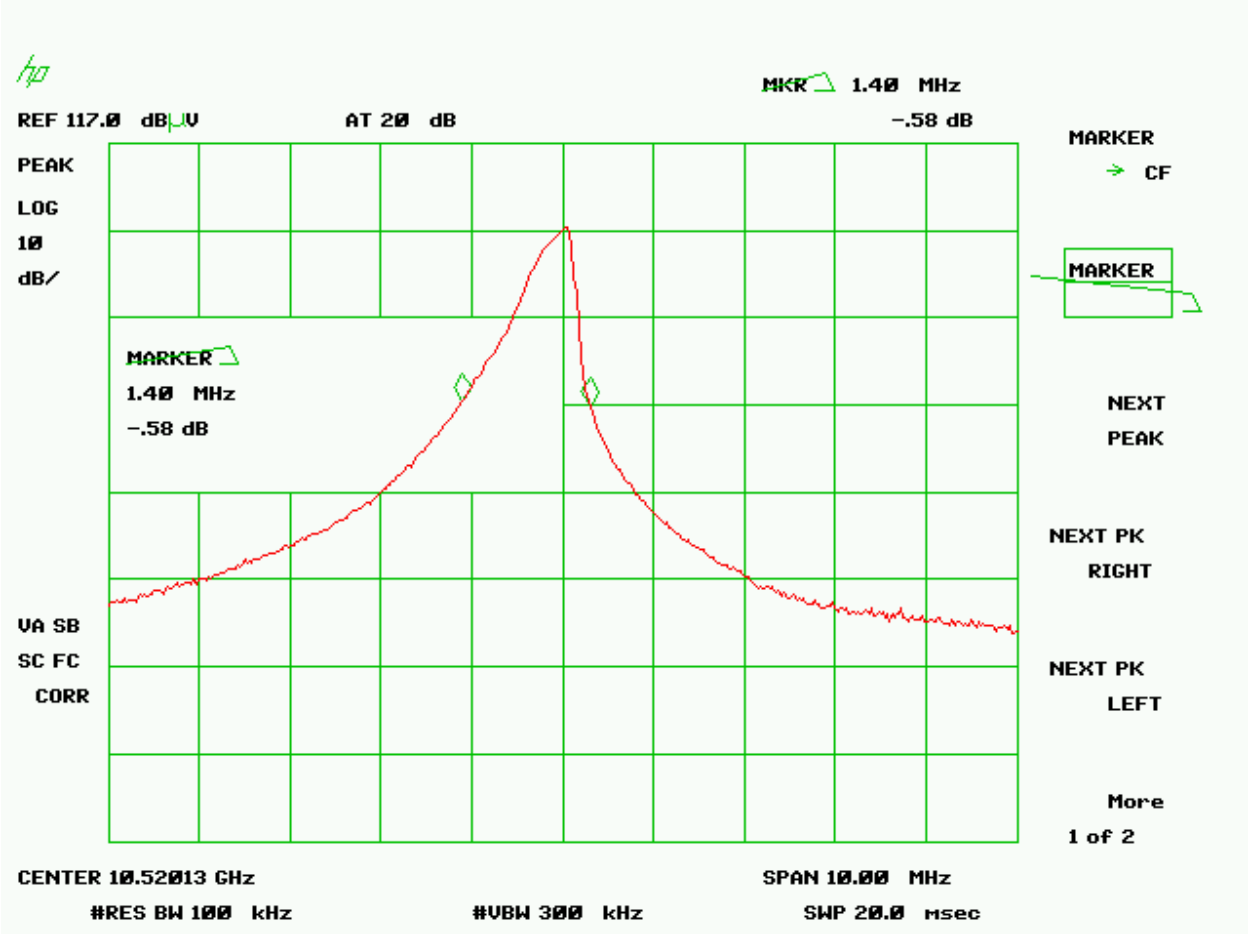


Figure 4 - Emission Bandwidth

2.12 Intentional Radiator, Power Line Conducted Emissions (CFR 15.207)

The unit was set-up and measured for power line conducted emissions. The measurement setup and test procedures were in accordance with ANSI C63.4, paragraph 7. The unit was connected to its power line adapter for measurement. By design, the EUT operating state is such that it is restricted to the battery charge mode only when connected to the power line adapter. It does not transmit (or receive) while connected to AC power. The worst-case results are given in tables 2 and 3 below.

2.13 Intentional Radiator, Radiated Emissions (CFR 15.245(b))

The EUT frequency pulsing was stopped and it was placed into a continuous transmit mode of operation. A preliminary scan was performed on the EUT to find signal frequencies that were caused by the transmitter. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. Radiated measurements above 1 GHz were measured using a RBW = VBW = 1 MHz. Test data are found in Tables 7 through 9.

2.14 Unintentional Radiator, Power Line Conducted Emissions (CFR 15.107)

The unit was set-up and measured for power line conducted emissions. The measurement setup and test procedures were in accordance with ANSI C63.4, paragraph 7. The unit was connected to its power line adapter for measurement. By design, the EUT operating state is such that it is restricted to the battery charge mode only. It does not transmit (or receive) while connected to AC power.

Measurements were made for the unit over the 150 kHz to 30 MHz frequency range. The measurement receiver was connected to the RF (receiver) Port on the LISN and each power lead was individually measured. Test results for the unit are shown on Tables 2 and 3.

2.15 Unintentional Radiator, Radiated Emissions (CFR 15.109)

Radiated emissions within the band 30 MHz to 25 GHz were measured with a spectrum analyzer and a pre-amplifier by connecting the spectrum analyzer to a receiving antenna spaced at three (3) meters from the EUT. The spectrum analyzer was set for a 50 Ω input impedance with the VBW set to ≥ the RBW bandwidth. The receiving antenna was raised and lowered from one to 4 meters in order to maximize the signals being received from the EUT. Similarly, the turntable was rotated through 360 degrees in the same maximizing effort. Also the EUT was scanned for a maximum when placed in each of the three mutually exclusive orthogonal planes. The results of the measurements are given in Table 6 and Figures 3 through 6 and 9.

Table 2 - MS275RD and MS275RDW Doppler radar Power Line (Hot Line) Average Conducted Emissions Data, Class B.

Average Power Line Conducted Emissions							
Test By: KM	**Test:** FCC Power Line Conducted Emissions 150 KHz – 30 MHz , Hot Phase			**Client:** Cooper Lighting, L.L.C.			
	Project: 08-0195	Sect. 15.107 Class: B		**Model:** MS275RD and MS275RDW Doppler			
Frequency (MHz)	**Test Data (dBuV)**	**IL+CL -PA (dB)**	**Results (dBuV)**	**AVG Limits (dBuV)**	**Supply /Neutral**	**Margin (dB)**	**PK / QP**
0.1590	42.50	-0.33	42.17	55.5	Supply	13.4	**PK**
0.5040	32.60	-0.06	32.54	46.0	Supply	13.5	**PK**
1.0800	26.40	0.07	26.47	46.0	Supply	19.5	**PK**
8.1900	27.00	0.29	27.29	50.0	Supply	22.7	**PK**
16.4000	23.80	0.50	24.30	50.0	Supply	25.7	**PK**
24.6200	29.40	0.27	29.67	50.0	Supply	20.3	**PK**

Tested from 150 kHz to 30 MHz.
SAMPLE CALCULATIONS: at 0.1590 MHz, 42.50 dBuV + (- 0.33) = 42.17 dBuV

Test Date: **September 30, 2008**
UST Project: **08-0195**
Customer: **Cooper Lighting, L.L.C.**
Model: **MS275RD and MS275RDW Doppler**

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

Table 3. Average Power Line (Neutral) Conducted Emissions Data, Class B

Average Power Line Conducted Emissions							
Test By: KM	**Test:** FCC Conducted Emissions 150 KHz – 30 MHz, Neutral			**Client:** Cooper Lighting, L.L.C.			
	Project: 08-0195	Sect. 15.107 Class: B		**Model:** MS275RD and MS275RDW Doppler			
Frequency (MHz)	**Test Data (dBuV)**	**IL+CL -AMP (dB)**	**Corrected Results (dBuV)**	**Avg Limits (dBuV)**	**Applied**	**Margin (dB)**	**PK / QP/ Avg DET**
0.1640	27.50	-0.33	27.17	55.3	Neutral	28.1	**PK**
0.6840	20.80	-0.09	20.71	46.0	Neutral	25.3	**PK**
2.9100	19.50	0.13	19.63	46.0	Neutral	26.4	**PK**
8.1800	27.80	0.20	28.00	50.0	Neutral	22.0	**PK**
16.3800	29.70	0.40	30.10	50.0	Neutral	19.9	**PK**
24.9100	27.20	0.17	27.37	50.0	Neutral	22.6	**PK**

Tested from 150 kHz to 30 MHz.
SAMPLE CALCULATIONS: at 0.1640 MHz, 27.50 dBuV + (-0.33) dB = 27.17 dBuV

Test Date: **September 30, 2008**
UST Project: **08-0195**
Customer: **Cooper Lighting, L.L.C.**
Model: **MS275RD and MS275RDW Doppler**

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

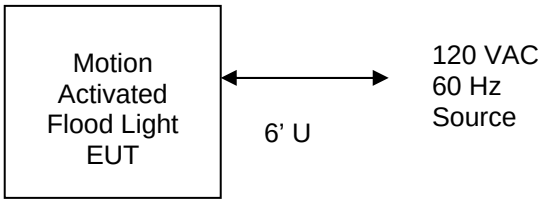


Figure 5 - Test Configuration

Table 4 - EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Cooper Lighting, L.L.C.	MS275RD MS275RDW Doppler	None	NCG-MS270D	6' U Power Cord

U = Unshielded; P = Power Leads

Table 5a - US Tech Test Instruments.

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	9/9/08
RF PREAMP	8447D	HEWLETT-PACKARD	2944A06291	9/12/08
BICONICAL ANTENNA	3110B	EMCO	9307-1431	11/15/07
LOG PERIODIC	3146	EMCO	9110-3236	11/21/07 2 Yr.
LISN (x 2) 9247-50-TS-50-N	9247	SOLAR ELE.	955824 & 955825	4/2/08
HORN ANTENNA	3115	EMCO	9107-3723	10/16/06 2 Yr.
HORN ANTENNA	3116	EMCO	9505-2255	1/21/08
MICROWAVE PREAMP	8449B	HEWLETT PACKARD	3008A00480	9/2/08
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise, and all calibrations are traceable to NIST/USA.

Table 5b - University of Michigan Test Instruments

The pertinent test equipment commonly used in our facility for measurements is listed in Table 2.1 below. The Used column identifies the specific equipment used in these tests. The quality system employed at the University of Michigan Radiation Laboratory Willow Run Test Range has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to national standards.

Table 2.1 Test Equipment.

Test Instrument	Used	Manufacturer/Model	Q Number
Spectrum Analyzer (9kHz-26GHz)	X	Hewlett-Packard 8563E, SN: 3310A01174	HP8563E1
Harmonic Mixer (26-40 GHz)	X	Hewlett-Packard 11970A, SN: 3003A08327	HP11970A1
Harmonic Mixer (40-60 GHz)	X	Hewlett-Packard 11970U, SN: 2332A00500	HP11970U1
Ka-band horn (26.5-40 GHz)	X	FXR, Inc., U638A	KABAND1
U-band horn (40-60 GHz)	X	Custom Microwave, HO19	UBAND1

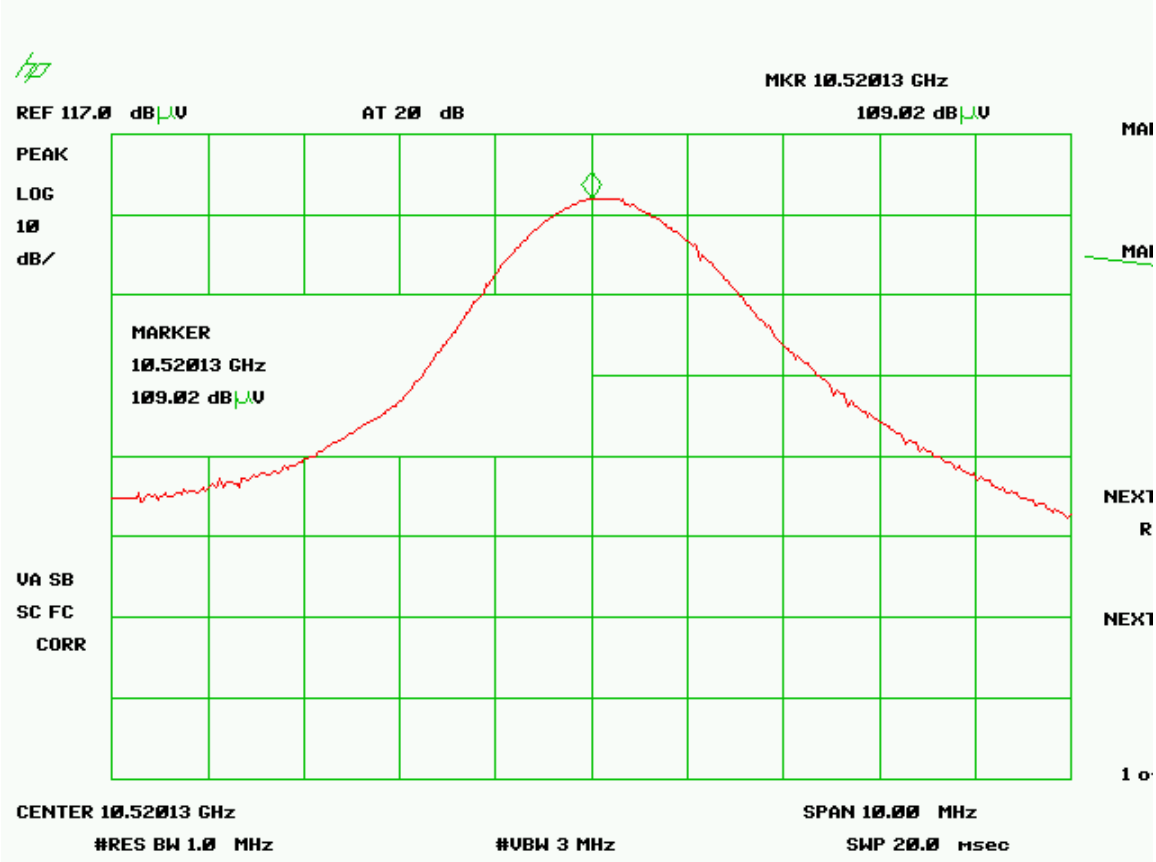
Table 6 - Unintentional Radiator, Peak Spurious and Harmonics, (CFR15.109 (a))

Radiated Spurious and Harmonic Emissions							
Test By: DA	**Test:** Spurious and Harmonics- 30 MHz to 25 GHz CFR 15.109 (a)			**Client:** Cooper Lighting, L.L.C.			
	Project: 08-0195	**Class: B**		**Model:** MS275RD and MS275RDW Doppler			
Frequency (MHz)	**Test Data (dBuV)**	**AF+CL-PA (dB/m)**	**Corrected Results (dBuV/m)**	**Class B Limits (dBuV/m)**	**Distance / Polarity (Meters)**	**Margin (dB)**	**Det PK / QP**
32.6500	17.30	13.59	30.89	40.0	3m./VERT	9.1	**QP**
114.3300	22.83	13.58	36.41	43.5	3m./VERT	7.1	**QP**
122.7000	25.70	13.90	39.60	43.5	3m./VERT	3.9	**QP**
122.8000	24.70	13.70	38.40	43.5	3m./HORZ	5.1	**QP**
212.7000	16.24	14.05	30.29	43.5	3m./VERT	13.2	**QP**
No other emissions detected within 20 dB of the Part 15.109 limits							

Tested from 30 MHz to 25 GHz.
SAMPLE CALCULATION:
RESULTS: At 32.65 MHz, = 17.30 dBuV + 13.59 dB/m = 30.89 dBuV/m @ 3m

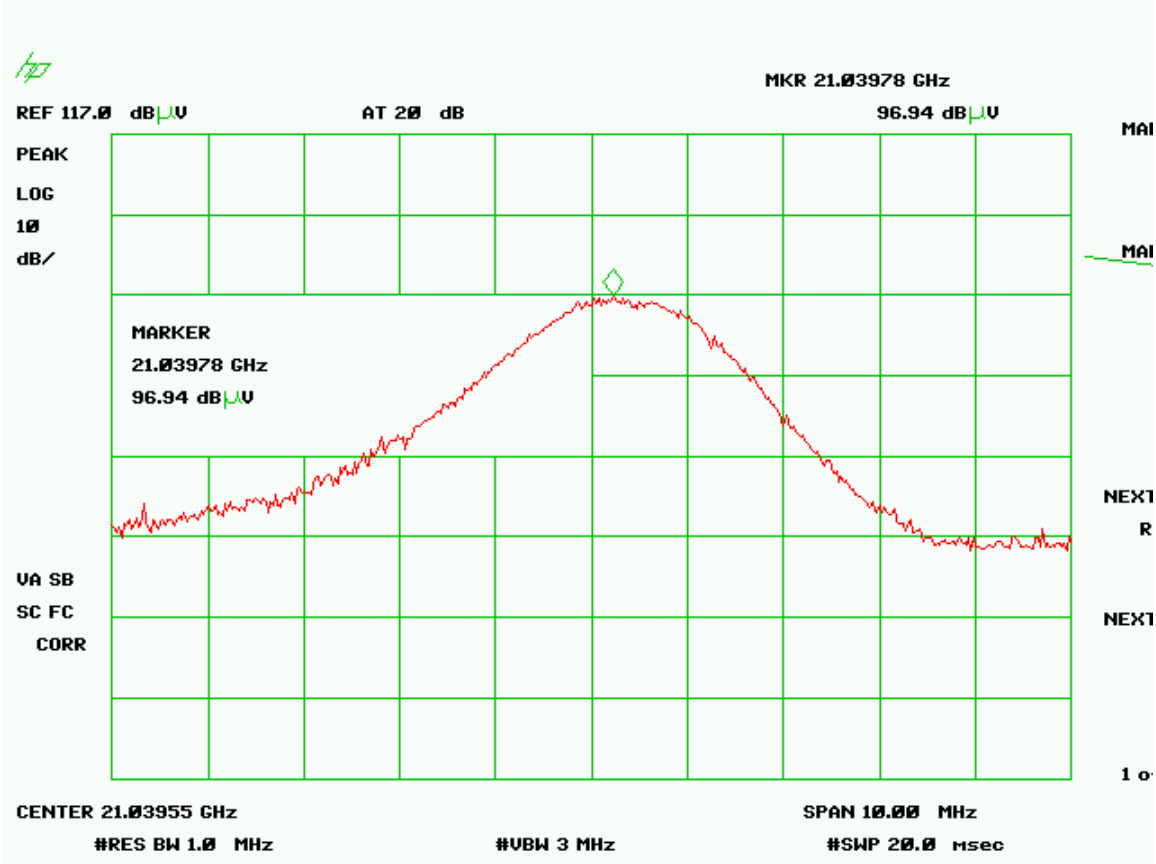
Test Date: September 30, 2008

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**



Note: does not include distance factor for 1m to 3m.

Figure 6 - Fundamental Signal



Note: Does not include distance extrapolation factor.

Figure 7 - Worst-Case Second Harmonic

Table 7 - Intentional Radiator, Peak Radiated Emissions (CFR 15.245).

Peak Radiated Emissions, Transmitter							
Test By: DA	**Test:** Radiated Emissions- 30 MHz to 27 GHz			**Client:** Cooper Lighting, L.L.C.			
	Project: 08-0195	**Requirement** FCC 15.245		**Model:** MS275RD and MS275RDW Doppler			
Frequency (MHz)	**Test Data (dBuV)**	**AF+CL-PA (dB)**	**Results (dBuV/m)**	**Peak Limits (dBuV/m)**	**Distance / Polarity (meters)**	**Margin (dB)**	**Detector PK / QP**
10525.0000	*99.5	12.53	112.03	148.0	1m./HORZ	36	**PK**
21050.0000	*63.54	20.90	84.44	108.0	1m./HORZ	23.6	**PK**

* Includes extrapolation factor of -9.5 dB for distance (1 m to 3 m).
Tested from 30 MHz to 27 GHz.
Above fundamental, Data corrected by 1.0 dB for loss due to high pass filter.

SAMPLE CALCULATION:
RESULTS at 10525.0 MHz, = 99.5 dBuV + 12.53 dB/m = 112.03 dBuV/m

UST Project: **08-0195**
Customer: **Cooper Lighting, L.L.C.**
Model: **MS275RD and MS275RDW Doppler**

Test Date: September 29, 2008

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

Table 8 - Intentional Radiator, Average Radiated Emissions (CFR 15.245).

Average Radiated Emissions, Transmitter							
Test By: DA	**Test:** Radiated Emissions- 30 MHz to 27 GHz			**Client:** Cooper Lighting, L.L.C.			
	Project: 08-0195	**Requirement:**15.245		**Model:** MS275RD and MS275RDW Doppler			
Frequency (MHz)	**Test Data (dBuV)**	**AF+CL-PA + DC (dB)**	**Results (dBuV/m)**	**Average Limits (dBuV/m)**	**Distance / Polarity (meters)**	**Margin (dB)**	**Detector PK / QP**
10525.0000	*99.5	12.53-26.17	85.86	128.0	1m./HORZ	42.14	**PK**
21050.0000	*54.0	20.9-26.17	48.73	88	1m./HORZ	39.27	**PK**

*includes -9.5 dB factor for distance (1m to 3m). DC = -26.17 dB.
Tested from 30 MHz to 27 GHz.

Above 10525 MHz, data corrected by +1.0 dB for loss of high pass filter.

SAMPLE CALCULATION:
RESULTS at 10525.0 MHz, = (109-9.55) dBuV + (12.53-26.17) dB/m = 85.86 dBuV/m

UST Project: **08-0195**
Customer: **Cooper Lighting, L.L.C.**
Model: **MS275RD and MS275RDW Doppler**

Test Date: September 29, 2008

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

Table 9 - Intentional Radiator Radiated Emissions 3rd through 5th Harmonics (CFR 15.245).

The 3rd through 5th harmonics test data was gathered by the University of Michigan. First and 2nd harmonics were measured by US Tech.

UST Project: 08-0195
Customer: Cooper Lighting, L.L.C.
Model: MS275RD and MS275RDW Doppler

Harmonics Radiated Emissions Motion Sensor

#	Freq. GHz	Ant. Used	Ant. D,cm	Meas. dist, m	Pr dBm	N/F m	Pr(3m) dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments (Notes)
1	10.52	X-horn											
2	21.05	K-horn											
3	31.57	Ka-horn	6.9	3.00	-50.8	1.00	-50.8	36.0	0.0	72.2	77.5	5.3	(1,2,3,4)
4	42.10	U-horn	4.6	1.00	-66.3	0.59	-75.8	39.1	0.0	50.3	77.5	27.2	(1,2,3,4)
5	52.62	U-horn	4.6	1.00	-64.3	0.74	-73.8	39.6	0.0	52.8	77.5	24.7	(1,2,3,4)
6													
7													
9													
10													
11													
12													
13													
14													
15													

NOTES:
(1) Mixer conversion loss is programmed in the spectrum analyzer and automatically adjusts the readings
(2) When extrapolating to 3 m, use Far Fld (20 dB/dec) behavior
(3) For Pk measurement RBW = 1 MHz, VBW> RBW
(4) Peak to Average ratio was measured to be >20.0 dB, 20 dB duty applied throughout

16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													

Meas. 09/30/2008; U of Mich.

Test Date: September 30, 2008