FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7

CERTIFICATION TEST REPORT

FOR

WIRELESS LIGHT SENSOR

MODEL NUMBER: WLS

FCC ID: XQC-WLS100

REPORT NUMBER: 09U12846-1, Revision B

ISSUE DATE: MARCH 30, 2010

Prepared for
ECOLINK INTELLIGENT TECHNOLOGY
5817 DRYDEN PLACE. SUITE D
CARLSBAD, CA 92008, U.S.A.

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/03/09	Initial Issue	T. Chan
A	03/19/10	Revised Sections 5.1 “Description Of EUT” and 7.3 “Transmission Time”	T. Chan
B	03/30/10	Re-inserted Transmission Time Plot and Updated limits to 15.231(b)	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ECOLINK INTELLIGENT TECHNOLOGY
5817 DRYDEN PLACE. SUITE D
CARLSBAD, CA 92008

EUT DESCRIPTION: WIRELESS LIGHT SENSOR

MODEL: WLS

SERIAL NUMBER: 02119

DATE TESTED: OCTOBER 9 and NOVEMBER 03 - 04, 2009

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 7, Annex 1	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

THU CHAN
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

TOM CHEN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wireless lighting control sensor.

Equipment Type	433.92 MHz Transmitter
Fundamental Frequency	433.92 MHz
Power Source	3V Type CR123A Battery
Transmitting Time	Periodic > 5 seconds
Manufacturer	Ecolink Intelligent Technology

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal loop antenna, with a maximum gain of -15 dBi.

5.3. SOFTWARE AND FIRMWARE

The EUT is modified to transmit continuously.

5.4. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined by X flat surface and Y upward position. The highest measured output power was at X-Axis.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

None

I/O CABLES

None, the EUT is battery operated.

TEST SETUP

The EUT is stand-alone unit

SETUP DIAGRAM FOR TESTS

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	02/04/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	01/14/10
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	12/16/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	04/20/10
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/10

7. ANTENNA PORT TEST RESULTS

7.1. 20 dB AND 99% BW

LIMITS

FCC §15.231 (c)
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

IC A1.1.3
For the purpose of Section A1.1, the 99% Bandwidth shall be no wider than 0.25% of the center frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

TEST PROCEDURE

ANSI C63.4

The transmitter output is connected to the spectrum analyzer.

20dB Bandwidth: The RBW is set to 100 KHz. The VBW is set to 300 KHz. The sweep time is coupled. Bandwidth is determined at the points 20 dB down from the modulated carrier.

99% Bandwidth: The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

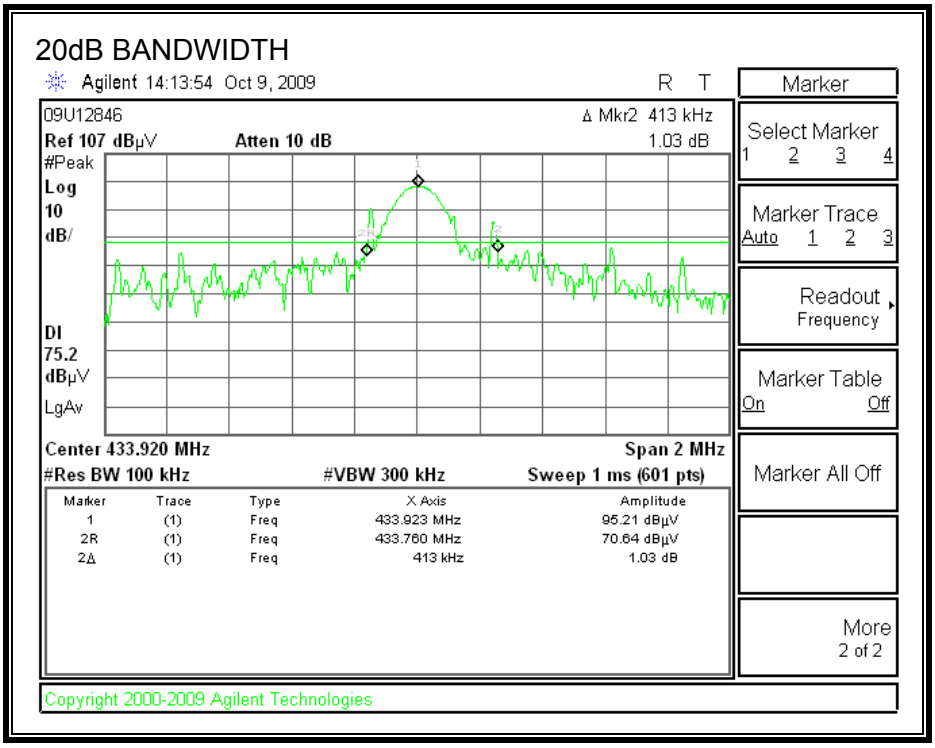
RESULTS

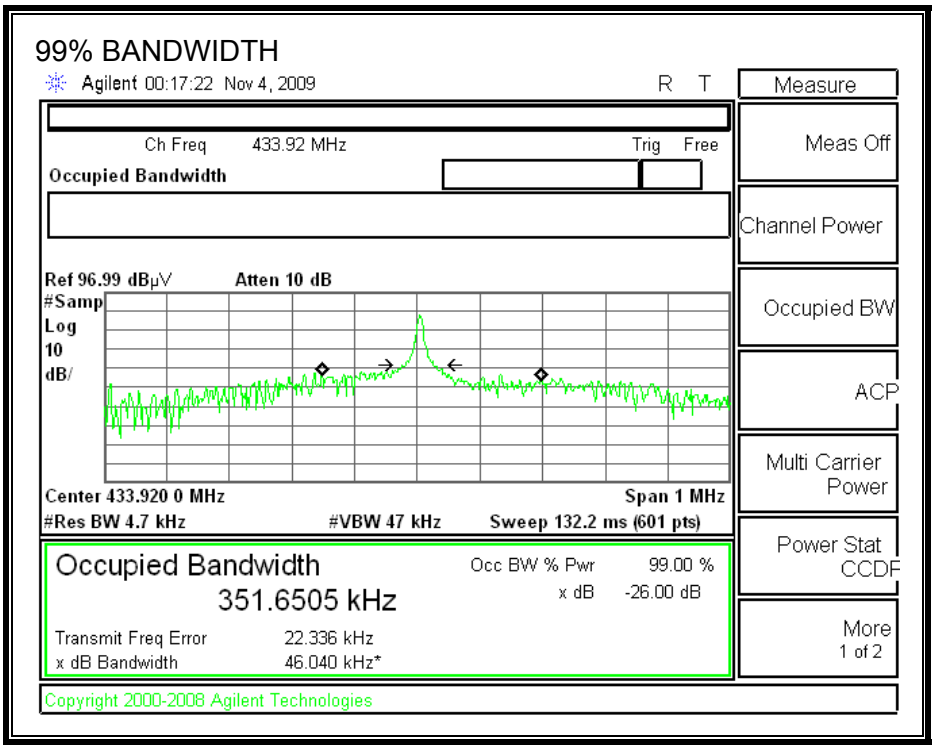
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	413	1084.8	-671.8

99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	351.7	1084.8	-733.2





7.2. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

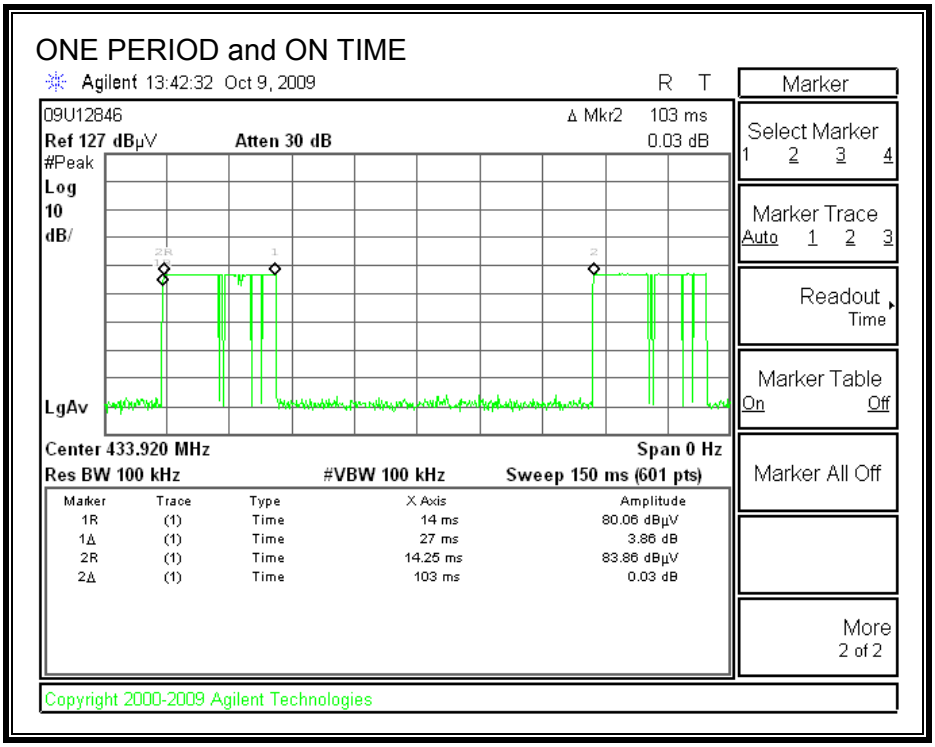
CALCULATION

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

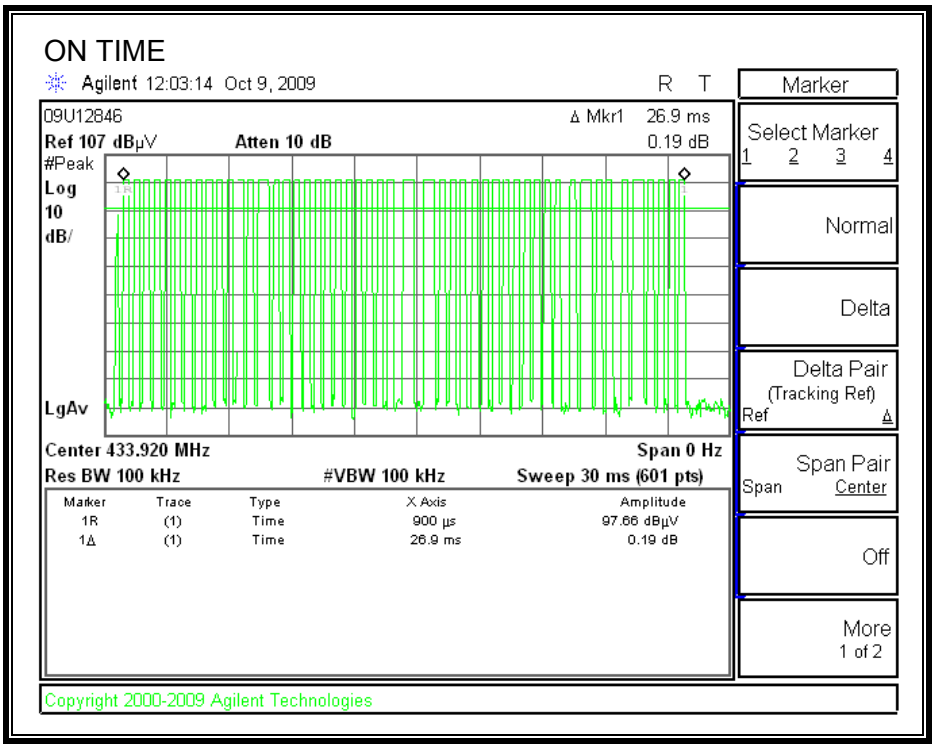
RESULTS

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
103	0.492	7	0.25	44	0.144	-16.81

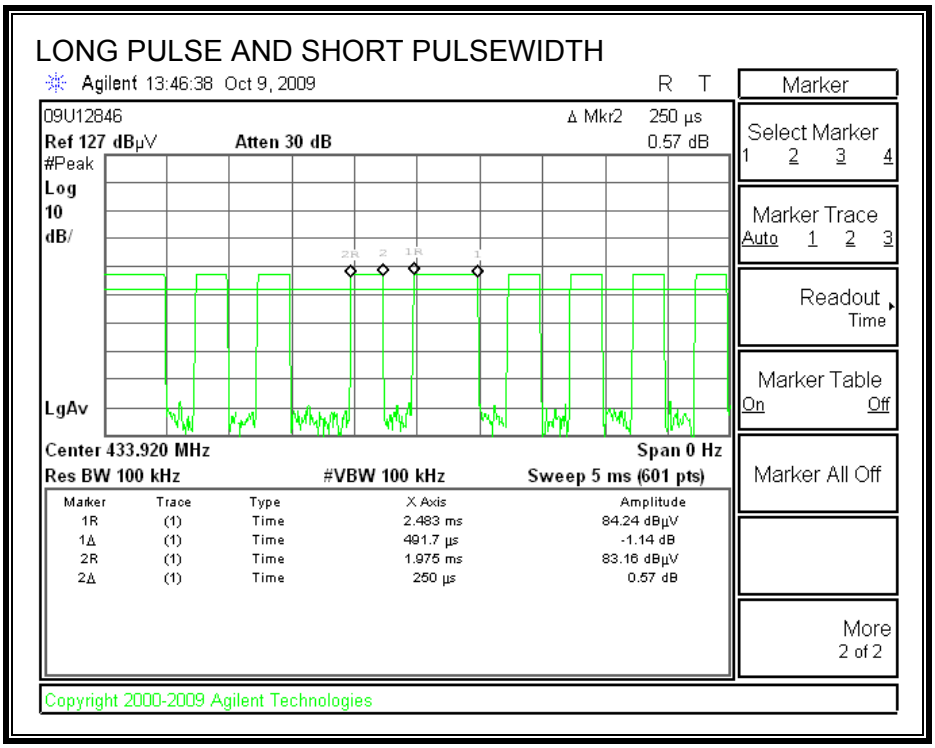
ONE PERIOD and ON TIME



ON TIME



LONG PULSE AND SHORT PULSE WIDTH



7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

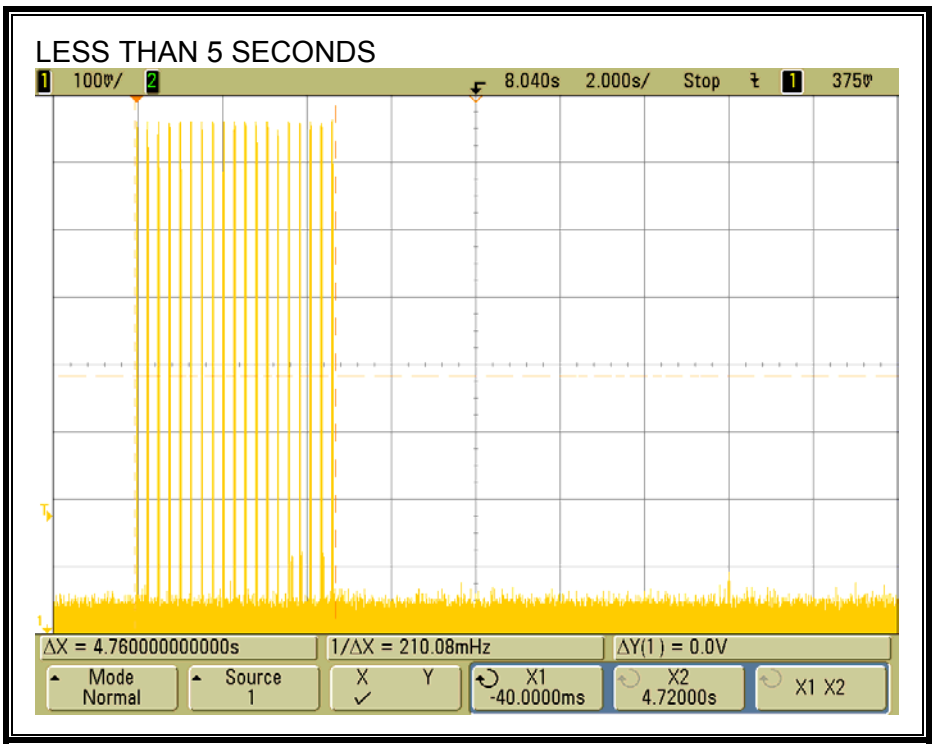
IC A1.1.1 (b)

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz.

RESULTS



8. RADIATED EMISSION TEST RESULTS

8.1. TX RADIATED SPURIOUS EMISSION

LIMITS

FCC §15.231 (b)
IC A1.1.2
In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,7501	125 to 3751
174 - 260	3,750	375
260 - 470	3,750 to 12,5001	375 to 1,2501
Above 470	12,500	1,250

1 Linear interpolation

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 – 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 88	100 **	3
88 216	150 **	3
216 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 72 MHz, 76 88 MHz, 174 216 MHz or 470 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP
47173 BENICIA STREET, FREMONT, CA 94538
PHONE: (510) 771-1000 FAX: (501) 661-0888

Project #:	09U12846
Report #:	09U12846-1
Date& Time:	11/3/2009
Test Engr:	Tom Chen
Company:	SECURE WIRELESS, INC.
EUT Description:	Wireless Light Sensor
Test Configuration :	EUT Batteries Operated .
Type of Test:	FCC 15.231(b)
Mode of Operation:	Continuous Transmit

M% = ((t1+t2+t3+...)/T) = 14.4%

Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -16.83 (Max=-20dB)

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)
433.917MHz Fundamental frequency												
EUT At X Position												
433.92	63.02	46.19	14.00	1.62	0.00	78.64	61.81	100.83	80.83	-22.19	-19.02	3mV
433.92	73.65	56.82	14.00	1.62	0.00	89.27	72.44	100.83	80.83	-11.56	-8.39	3mH
EUT At Y Position												
433.92	57.90	41.07	14.00	1.62	0.00	73.52	56.69	100.83	80.83	-27.31	-24.14	3mH
433.92	72.33	55.50	14.00	1.62	0.00	87.95	71.12	100.83	80.83	-12.88	-9.71	3mV
EUT At Z Position												
433.92	70.96	54.13	14.00	1.62	0.00	86.58	69.75	100.83	80.83	-14.25	-11.08	3mH
433.92	68.02	51.19	14.00	1.62	0.00	83.64	66.81	100.83	80.83	-17.19	-14.02	3mV
Y-Position is the worst case												
867.80	46.24	29.41	18.90	2.40	28.50	39.04	22.21	80.83	60.83	-41.79	-38.62	3mV
867.80	44.55	27.72	18.90	2.40	28.50	37.35	20.52	80.83	60.83	-43.48	-40.31	3mH

Note: No other emissions were detected above system noise floor from 30 MHz to 1000 MHz.

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Secure Wireless
Project #: 09U12846
Date: 10/09/09
Test Engineer: Tom Chen
Configuration: EUT Battery Operated
Mode: Continuous Transmit

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
Average = Peak - Duty cycle

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.140	3.0	37.6	20.8	24.3	2.5	-39.3	0.0	0.0	25.2	8.3	74	54	-48.8	-45.7	H
1.438	3.0	36.7	19.9	25.3	2.9	-38.9	0.0	0.0	26.1	9.3	74	54	-47.9	-44.7	H
3.048	3.0	41.4	24.6	30.1	4.4	-37.3	0.0	0.0	38.6	21.8	74	54	-35.4	-32.2	H
1.140	3.0	38.7	21.9	24.3	2.5	-39.3	0.0	0.0	26.3	9.4	74	54	-47.7	-44.6	V
1.438	3.0	39.6	22.8	25.3	2.9	-38.9	0.0	0.0	28.9	12.1	74	54	-45.1	-41.9	V
3.048	3.0	41.8	25.0	30.1	4.4	-37.3	0.0	0.0	39.0	22.1	74	54	-35.0	-31.9	V
No other emissions above system noise floor															

Rev. 11.10.08

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

8.2. RX RADIATED SPURIOUS EMISSION

LIMITS

IC RSS-Gen Issue 2, section 7.2.3.2

All spurious emissions shall comply with the limits shown below:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dBµV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to receive in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 5th harmonic is investigated with the transmitter set to the middle channel.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

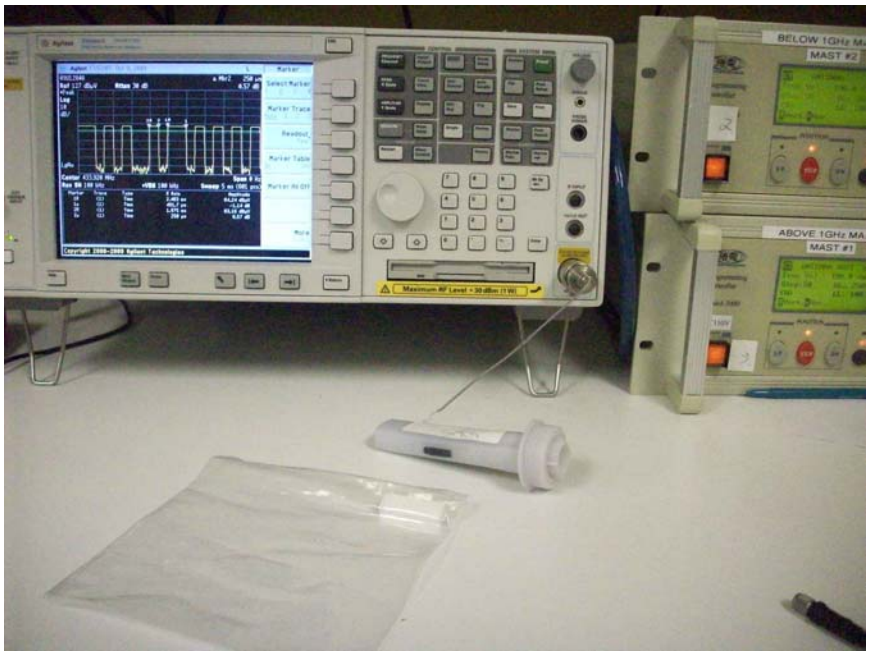
RESULTS

Not applicable, this EUT is transmitter only.

9. SETUP PHOTOS

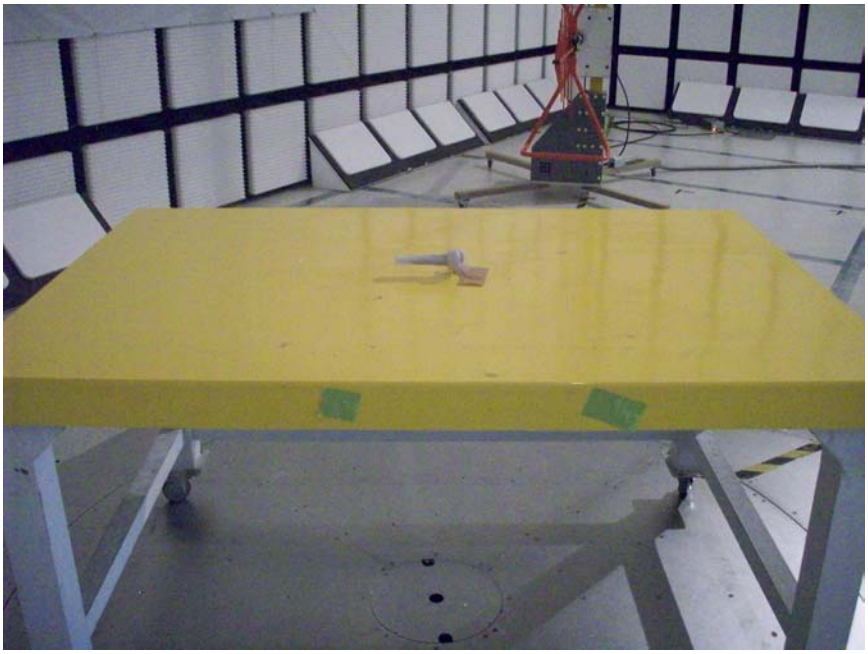
ANTENNA PORT

ANTENNA PORT



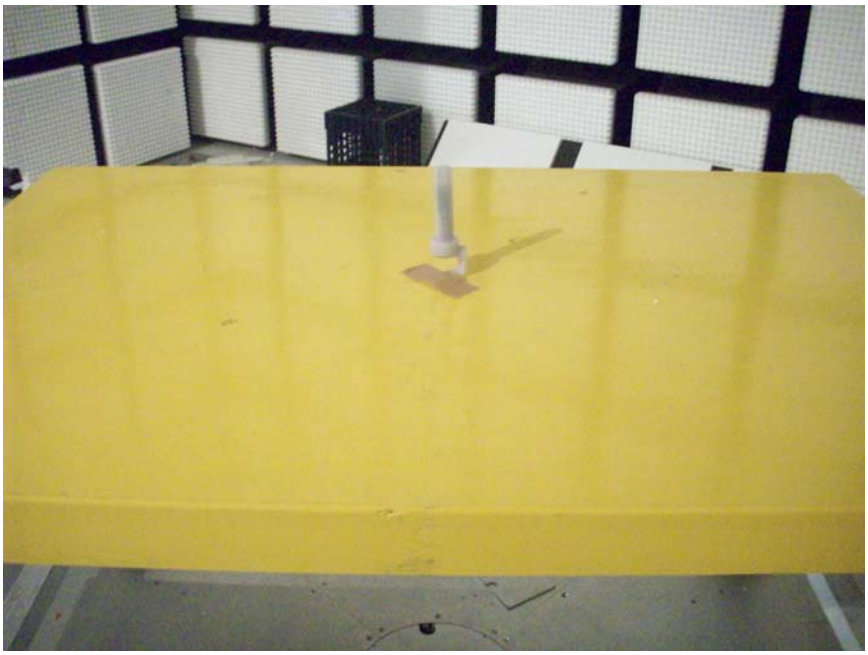
RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION



RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION



RADIATED EMISSION FOR PORTABLE CONFIGURATION – Z ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – Z ORIENTATION

END OF REPORT