



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS 210**

CERTIFICATION TEST REPORT

FOR

WIRELESS SENSOR

MODEL NUMBER: SS-319

**FCC ID: XQC-SS319
IC: 9863B-SS319**

REPORT NUMBER: 14U19726 REVISION D

ISSUE DATE: MARCH 19, 2015

Prepared for
**ECOLINK INTELLIGENT TECHNOLOGY, INC.
2055 CORTE DEL NOGAL
CARLSBAD
CA, 92011, U.S.A**

Prepared by
**UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2/24/15	Initial Issue	P. ZHANG
A	3/13/15	Update page 8&9	P. ZHANG
B	3/16/15	Updated DCCF	P. ZHANG
C	3/17/15	Updated DCCF test plot with only one pulse width	P. ZHANG
D	3/19/15	Updated page 20; section 5.4; page 21; page 22	P. ZHANG

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. SAMPLE CALCULATION	5
4.3. MEASUREMENT UNCERTAINTY	6
5. EQUIPMENT UNDER TEST	7
5.1. DESCRIPTION OF EUT	7
5.2. DESCRIPTION OF AVAILABLE ANTENNAS	7
5.3. SOFTWARE AND FIRMWARE	7
5.4. WORST-CASE CONFIGURATION AND MODE	7
5.5. MODIFICATIONS	7
5.1. DESCRIPTION OF TEST SETUP	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. ANTENNA PORT TEST RESULTS	11
7.1. 20 dB AND 99% BW	11
7.2. DUTY CYCLE	15
7.3. TRANSMISSION TIME	19
8. RADIATED EMISSION TEST RESULTS	20
8.1. TX RADIATED SPURIOUS EMISSION	20
9. AC POWER LINE CONDUCTED EMISSIONS	28
10. SETUP PHOTOS	31

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ECOLINK INTELLIGENT TECHNOLOGY, INC.
2055 CORTE DEL NOGAL
CARLSBAD, CA, 92011, U.S.A

EUT DESCRIPTION: WIRELESS SENSOR

MODEL: SS-319

SERIAL NUMBER: 2056552

DATE TESTED: FEB 17 - MAR 13, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 1	Pass
INDUSTRY CANADA RSS-GEN Issue 4	Pass

UL Verification Services Inc 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 UL Verification Services Inc. 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 UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc 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
UL Verification Services Inc By:

Tested By:



PENG ZHANG
PROJECT LEAD
UL Verification Services Inc.



R.ALEGRE
LAB ENGINEER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

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:

$$\begin{aligned}\text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m}\end{aligned}$$

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 18000 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 Sensor.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal, wire, monopole antenna, with a maximum gain of -5 dBi.

5.3. SOFTWARE AND FIRMWARE

The typical factory firmware installed in the EUT during testing was ESW1063-01-014.HEX.

The firmware installed in the EUT to allow continuous transmit during testing was ESW1063-01-FCC_TX.HEX.

5.4. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in each of its three orthogonal axes. All radiated testing was performed in the worse-case axis, which was found to be the "Z-axis". See photos for details.

Both AC line powered and Battery powered configuration was investigated during exploratory and determine AC line powered is the worst case.

5.5. MODIFICATIONS

No modifications were made during testing.

5.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

NONE

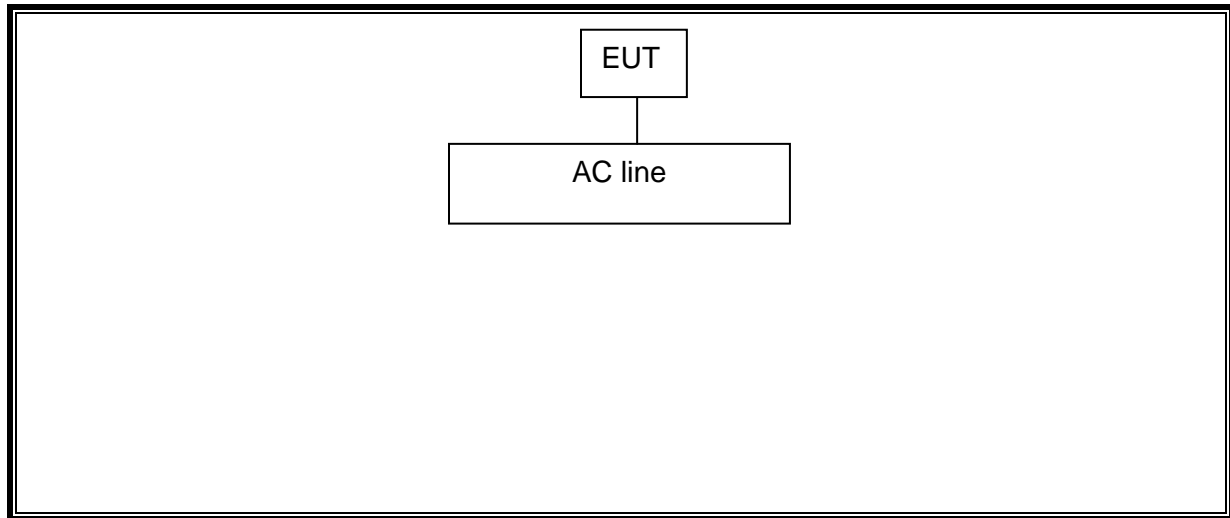
I/O CABLES

NONE

TEST SETUP

The EUT is an AC powered device, which operated on a button push.

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
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/16
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/15
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/16
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/15
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15
CBT Bluetooth Tester	R & S	CBT	None	07/12/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/16
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR
ESA-E Spectrum Analyzer, 9kHz-26.5 GHz	Agilent / HP	E4407B	C01098	04/04/15
Antenna, Loop, 30 MHz	EMCO	6502	C00593	02/20/15

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

No non-compliance noted:

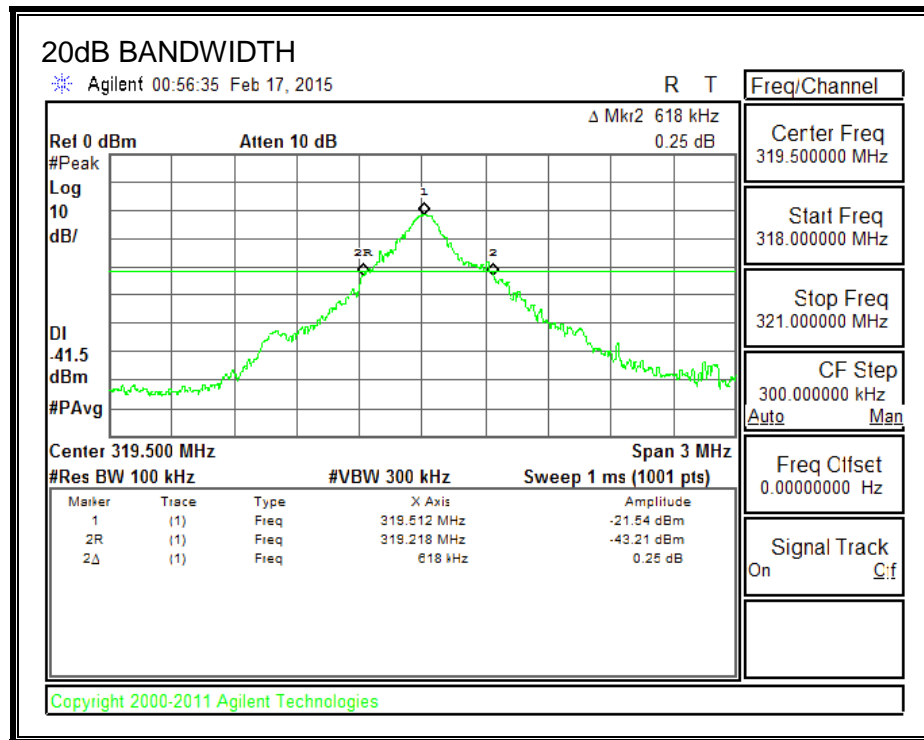
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
319.5	618	798.75	-180.75

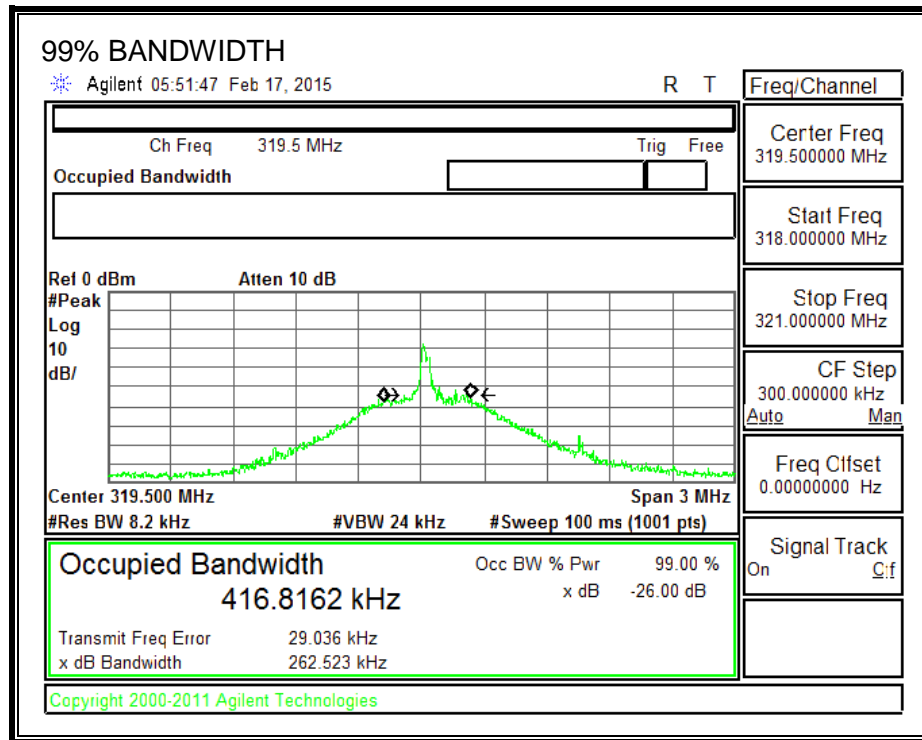
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
319.5	416.8	798.75	-381.95

20dB BANDWIDTH



99% BANDWIDTH



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

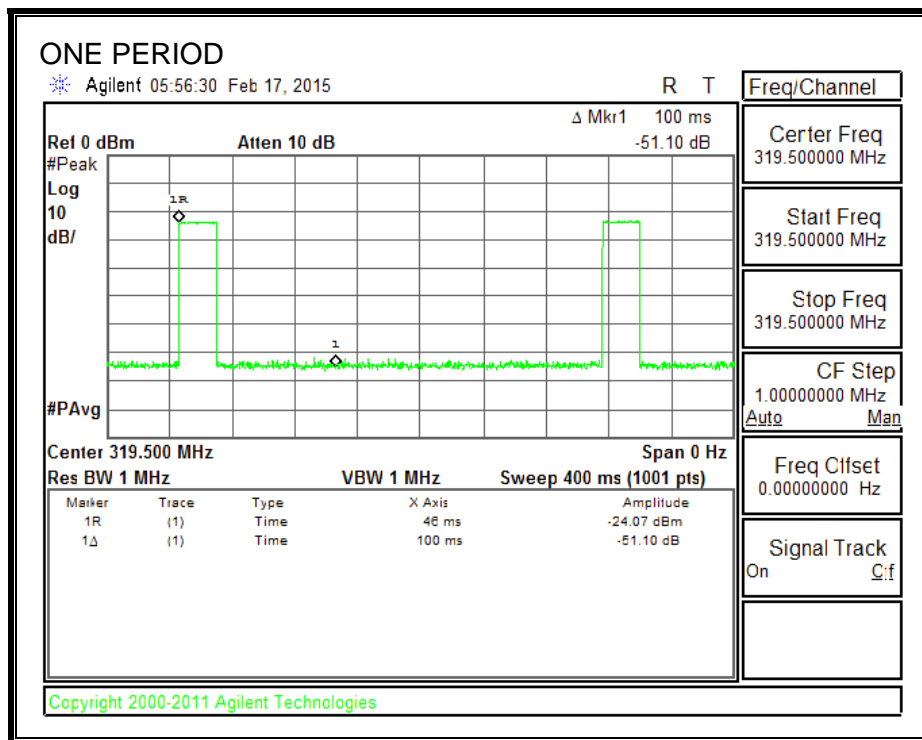
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

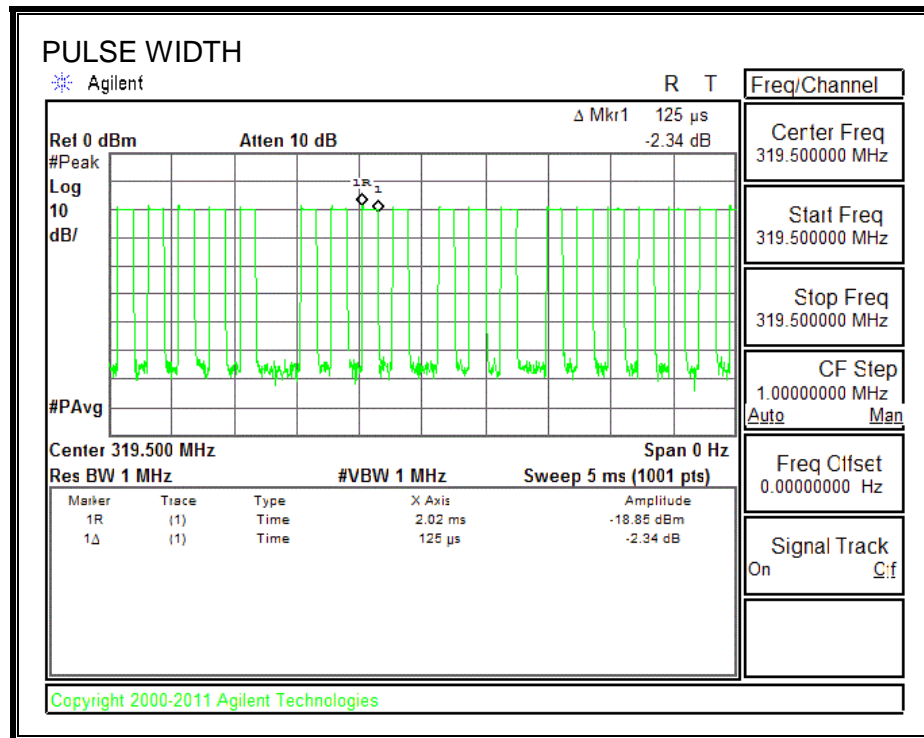
No non-compliance noted:

One Period (ms)	Pulse Width (ms)	# of Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	0.125	79	0.099	-20.11

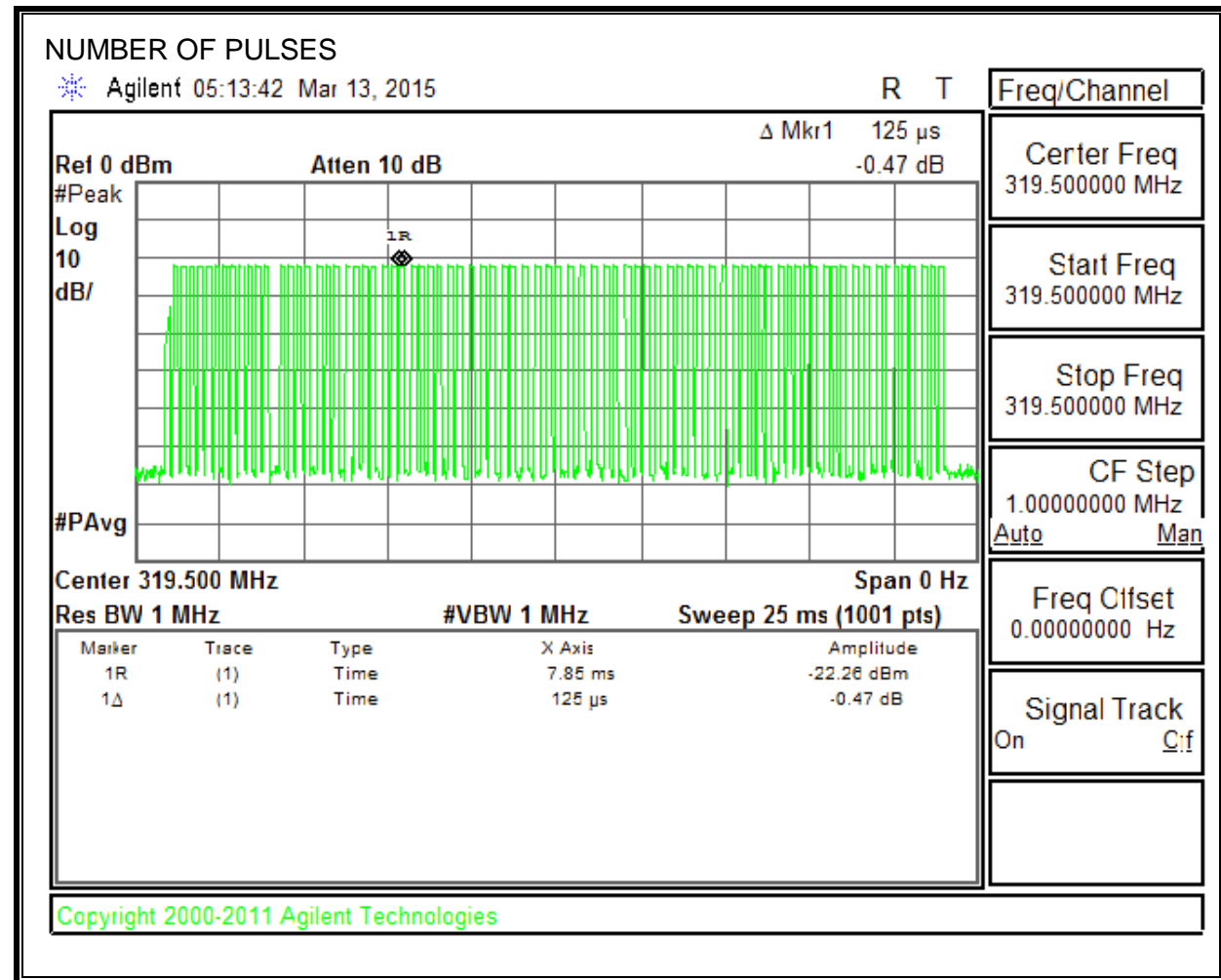
ONE PERIOD



PULSE WIDTH



NUMBER PULSES



7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1.1 (b)

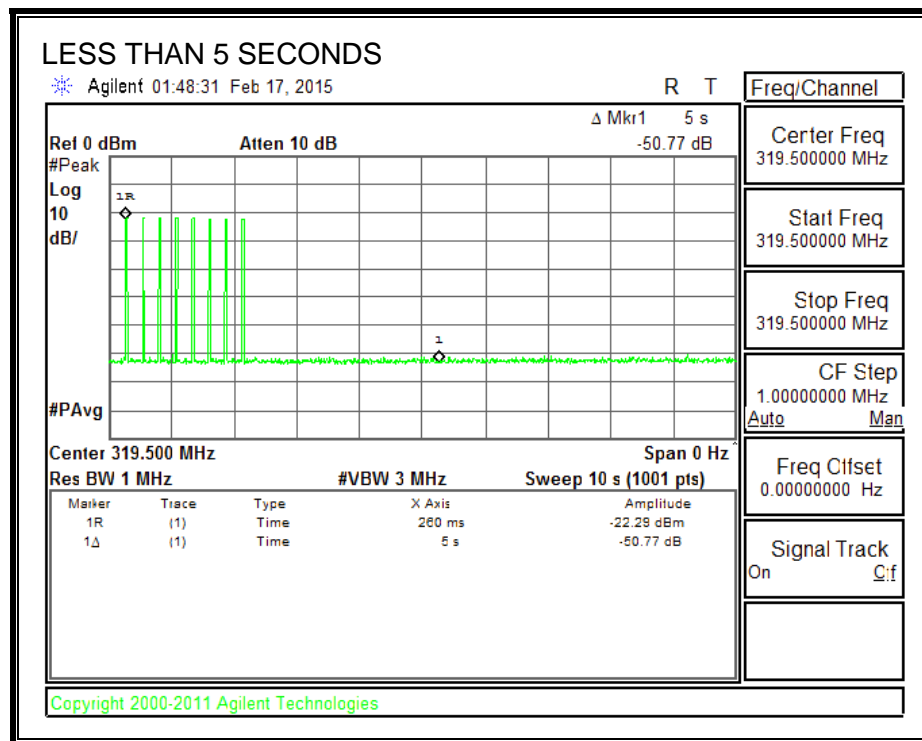
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

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. The sweep time is set to 10 seconds and the span is set to 0 Hz.

RESULTS

No non-compliance noted:



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)
Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹Linear 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:

quency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
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.

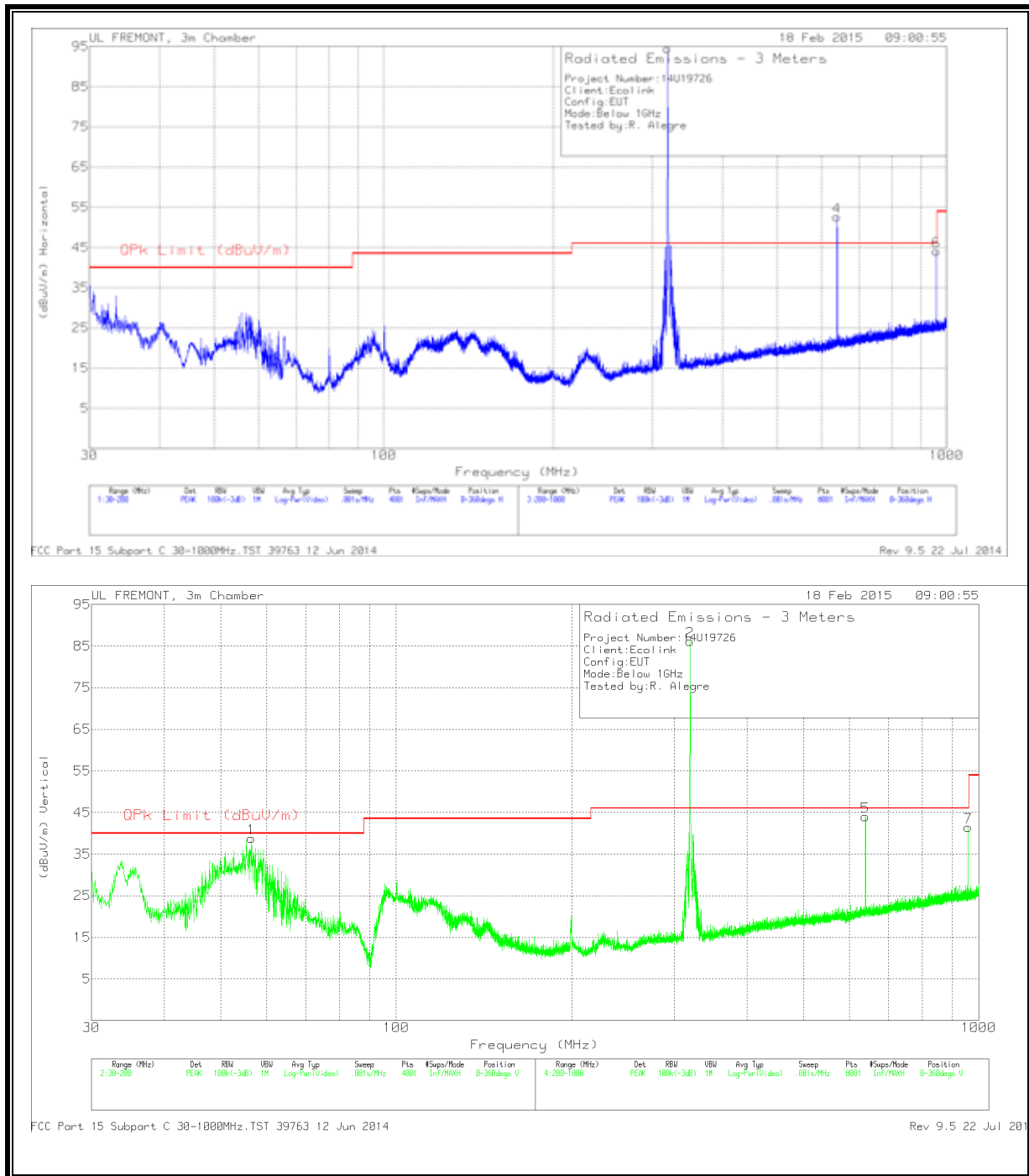
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and apply DCCF for average measurements.

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

No non-compliance noted:

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



Radiated Emissions

Trace Markers

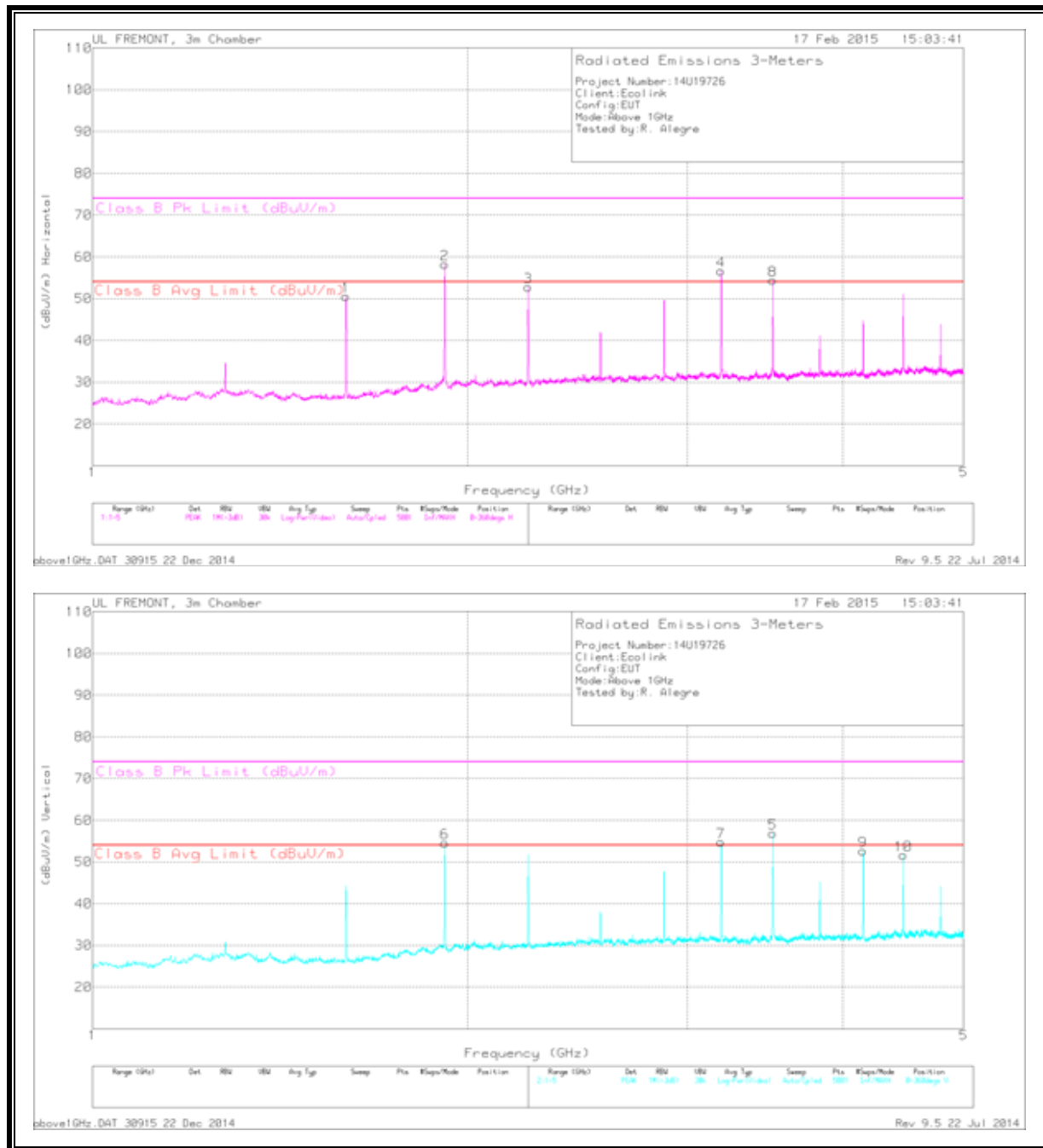
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	56.4775	59.31	PK	6.8	-27.3	38.81	40	-1.19	0-360	100	V
3	319.5	105.79	PK	13.9	-25.2	94.49			0-360	100	H
2	319.5	97.43	PK	13.9	-25.2	86.13			0-360	200	V
4	639	58.52	PK	19.7	-25.6	52.62			0-360	100	H
5	639	49.93	PK	19.7	-25.6	44.03	46.02	-1.99	0-360	100	V
6	958.5	45.06	PK	22.7	-23.6	44.16	46.02	-1.86	0-360	100	H
7	958.5	42.4	PK	22.7	-23.6	41.5	46.02	-4.52	0-360	100	V

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
319.51	97.99	PK	13.9	-25.2	86.69	95.89	-9.2	312	176	V
319.51		Av			66.58	75.89	-9.31	312	176	V
319.534	105.66	PK	13.9	-25.2	94.36	95.89	-1.53	165	115	H
319.534		Av			74.25	75.89	-1.64	165	115	H
639.0177	55.78	PK	19.7	-25.6	49.88	75.89	-26.01	232	138	V
639.0177		Av			29.77	55.89	-26.12	232	138	V
639.02	58.82	PK	19.7	-25.6	52.92	75.89	-22.97	151	103	H
639.052		Av			32.81	55.89	-23.08	151	103	H
958.5293	46.73	PK	22.7	-23.6	45.83	75.89	-30.06	165	115	H
958.5293		Av			25.72	55.89	-30.17	165	115	H
958.5325	43.35	PK	22.7	-23.6	42.45	75.89	-33.44	122	104	V
958.5325		Av			22.34	55.89	-33.55	122	104	V

Note: average reading = peak reading + DCCF

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



Pre-scan

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B Avg Limit (dBuV/m)	Margin (dB)	Class B Pk Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.598	55.91	PK	28	-33.3	50.61	-	-	74	-23.39	0-360	200	H
2	1.917	60.14	PK	31.2	-33.1	58.24	-	-	74	-15.76	0-360	200	H
6	1.917	56.5	PK	31.2	-33.1	54.6	54	.6	74	-19.4	0-360	100	V
3	2.237	54.24	PK	31.5	-32.9	52.84	-	-	74	-21.16	0-360	200	H
4	3.195	56.26	PK	32.6	-32.2	56.66	-	-	74	-17.34	0-360	100	H
7	3.195	54.44	PK	32.6	-32.2	54.84	54	.84	74	-19.16	0-360	100	V
8	3.514	53.72	PK	32.8	-32.1	54.42	-	-	74	-19.58	0-360	200	H
5	3.514	56.18	PK	32.8	-32.1	56.88	54	2.88	74	-17.12	0-360	200	V
9	4.154	51.27	PK	33.3	-31.9	52.67	54	-1.33	74	-21.33	0-360	200	V
10	4.473	49.63	PK	33.7	-31.7	51.63	54	-2.37	74	-22.37	0-360	100	V

Note: Above plots is from pre-scan, for final measurement please refer to data table.

Final-scan

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl (dB)	Corrected Avg Reading (dBuV/m)	Class B Avg Limit (dBuV/m)	Av(CIS PR)Margin (dB)	Corrected PK Reading (dBuV/m)	Class B Pk Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.598	57.78	PK	28	-33.3	32.37	54	-21.63	52.48	74	-21.52	60	276	H
1.917	63.38	PK	31.2	-33.1	41.37	54	-12.63	61.48	74	-12.52	74	210	H
1.917	61.24	PK	31.2	-33.1	39.23	54	-14.77	59.34	74	-14.66	180	158	V
2.237	56.19	PK	31.5	-32.9	34.68	54	-19.32	54.79	74	-19.21	322	167	H
3.195	57.83	PK	32.6	-32.2	38.12	54	-15.88	58.23	74	-15.77	231	100	V
3.196	57.67	PK	32.6	-32.2	37.96	54	-16.04	58.07	74	-15.93	174	198	H
3.514	57.75	PK	32.8	-32.1	38.34	54	-15.66	58.45	74	-15.55	107	344	H
3.515	59.98	PK	32.8	-32.1	40.57	54	-13.43	60.68	74	-13.32	248	254	V
4.154	55.46	PK	33.3	-31.9	36.75	54	-17.25	56.86	74	-17.14	128	323	V
4.473	54.54	PK	33.7	-31.7	36.43	54	-17.57	56.54	74	-17.46	159	150	V

PK - Peak detector

Note: Average reading = Peak reading + DCCF (-20.11dB)

* 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

BELOW 30MHz

FCC Part 15, Subpart B & C 3 Meter Distance Measurement At Open Field

Company: Ecolink
Project #: 14U19726
EUT configuration #: EUT ONLY Cont. TX.
Mode of operation: 9KHz-30MHz
Tester: R. Alegre
Date: 2/17/15

Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF dB/m	Distance (m)	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes
Loop Antenna Face On:													
0.03	62.82		57.59	12.97	3	-80.00	-4.21	-9.44	58.06	38.06	-62.3	-47.5	
0.05	59.28		57.3	11.3	3	-80.00	-9.42	-11.40	53.62	33.62	-63.0	-45.0	
0.22	60.76		52.56	10.8	3	-80.00	-8.44	-16.64	40.76	20.76	-49.2	-37.4	
1.05	55.64	48.64		10.71	3	-40.00	19.35		27.18		-7.8		
7.21	59.45	52.33		10.86	3	-40.00	23.19		29.54		-6.4		
15.45	60.18	53.33		10.56	3	-40.00	23.89		29.54		-5.7		
Loop Antenna Face Off:													
0.03	61.45		59.42	12.97	3	-80.00	-5.58	-7.61	58.06	38.06	-63.6	-45.7	
0.05	57.8		55.32	11.3	3	-80.00	-10.90	-13.38	53.62	33.62	-64.5	-47.0	
0.22	59.21		57.62	10.8	3	-80.00	-9.99	-11.58	40.76	20.76	-50.7	-32.3	
1.05	53.25	44.2		10.71	3	-40.00	14.91		27.18		-12.3		
7.21	57.8	51.38		10.86	3	-40.00	22.24		29.54		-7.3		
15.45	58.03	52.09		10.56	3	-40.00	22.65		29.54		-6.9		

* No more emissions were found up to 30MHz

Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 10000Mhz. Radiated emission limits in these three bands are based on measurements employing an average detector.

P.K. = Peak
Q.P. = Quasi Peak Readings
A.F. = Antenna factor

Below 150kHz => RBW=VBW=200 or 300Hz
Above 150kHz =>RBW=VBW=9 or 10kHz (Average => VBW=10Hz)

Rev. 060314

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [*]	56 to 46 [*]
0.5-5	56	46
5-30	60	50

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

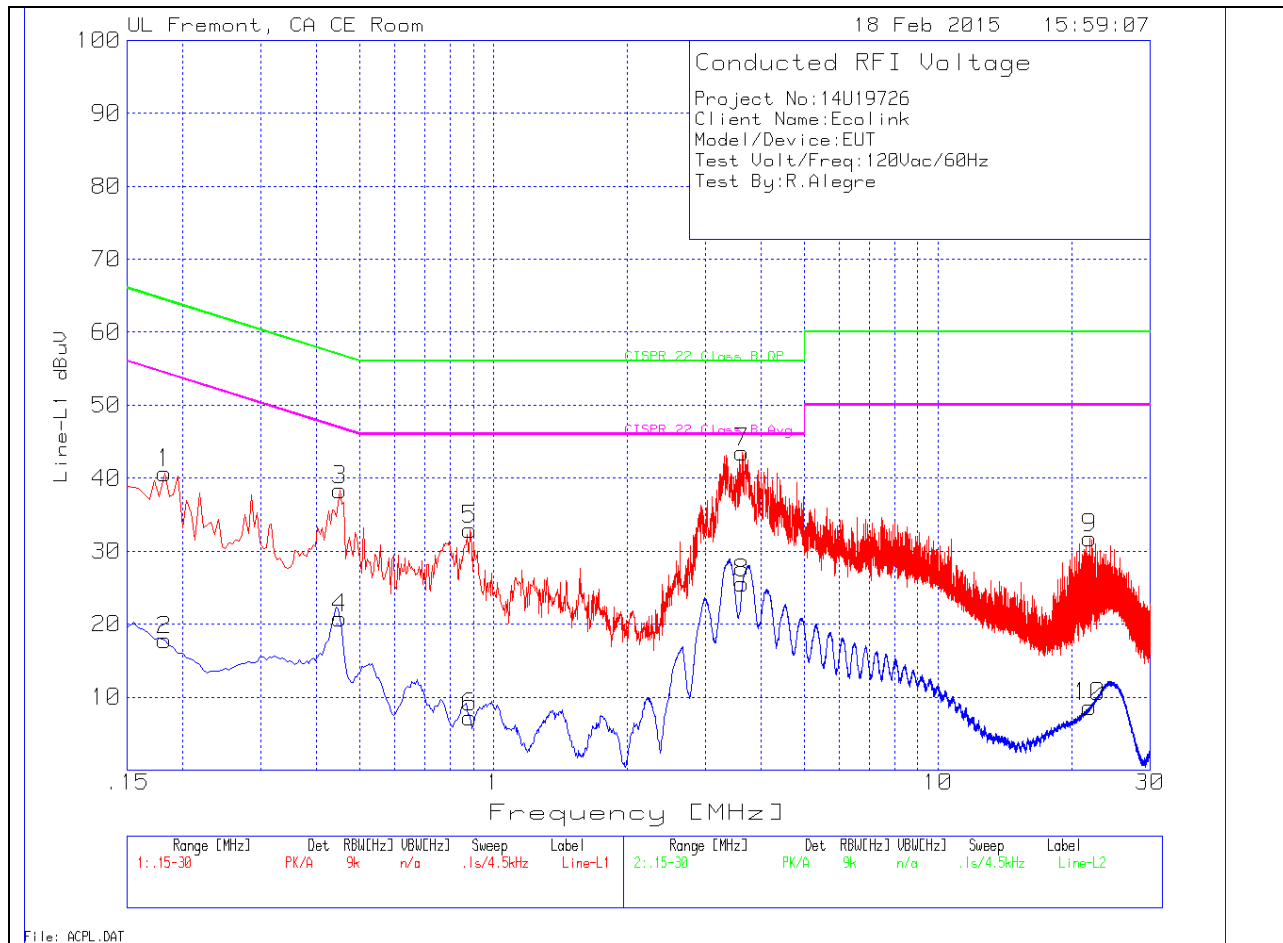
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT

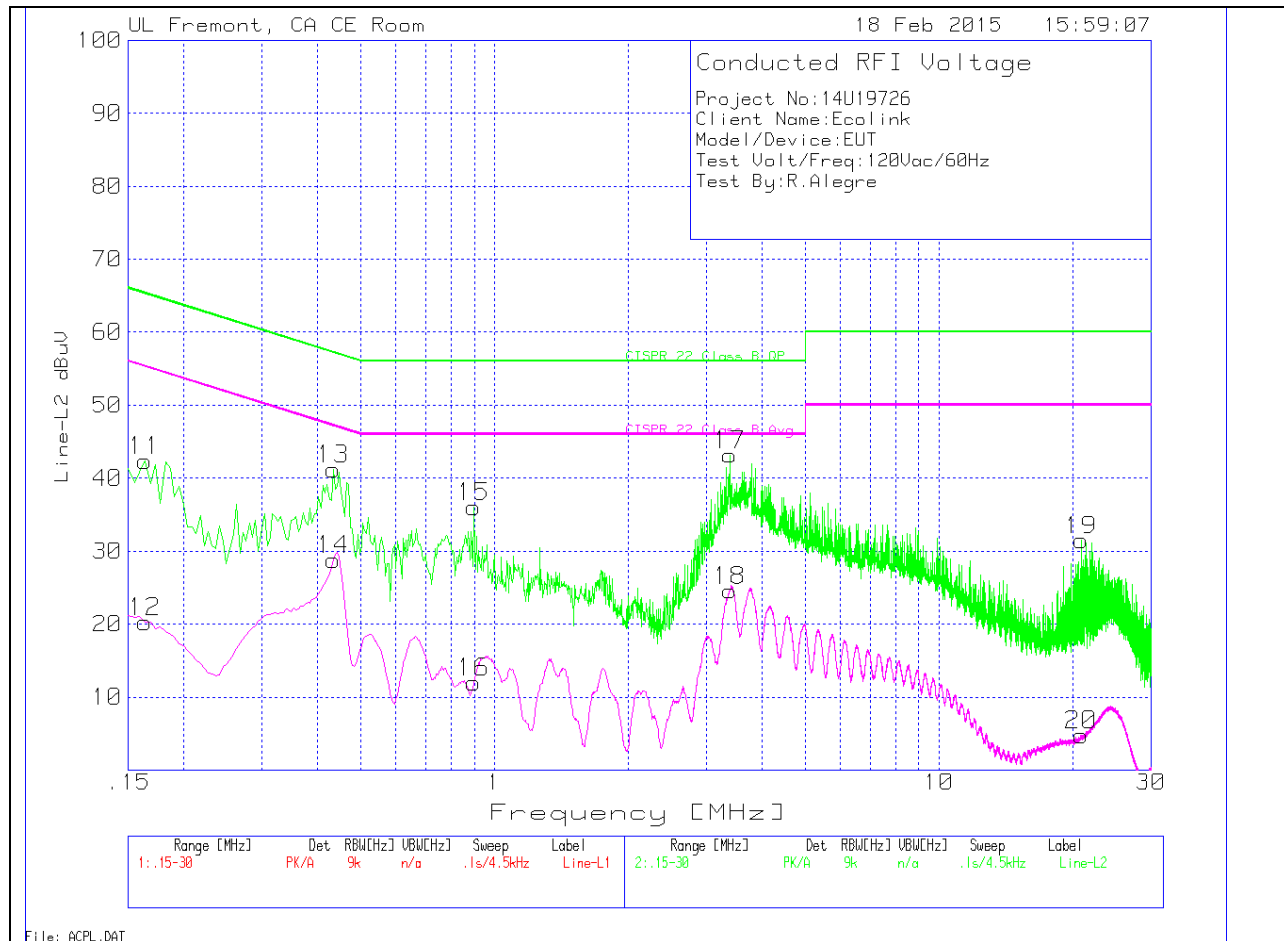


Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.1815	39.56	PK	1.1	0	40.66	64.4	-23.74	-	-
2	.1815	16.67	Av	1.1	0	17.77	-	-	54.4	-36.63
3	.4515	37.92	PK	.4	0	38.32	56.8	-18.48	-	-
4	.4515	20.44	Av	.4	0	20.84	-	-	46.8	-25.96
5	.8835	32.62	PK	.3	0	32.92	56	-23.08	-	-
6	.8835	6.94	Av	.3	0	7.24	-	-	46	-38.76
7	3.6285	43.24	PK	.2	.1	43.54	56	-12.46	-	-
8	3.6285	25.28	Av	.2	.1	25.58	-	-	46	-20.42
9	21.984	31.25	PK	.3	.2	31.75	60	-28.25	-	-
10	21.984	8.19	Av	.3	.2	8.69	-	-	50	-41.31

LINE 2 PLOT



Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
11	.1635	41.03	PK	1.3	0	42.33	65.3	-22.97	-	-
12	.1635	19.01	Av	1.3	0	20.31	-	-	55.3	-34.99
13	.4335	40.85	PK	.4	0	41.25	57.2	-15.95	-	-
14	.4335	28.4	Av	.4	0	28.8	-	-	47.2	-18.4
15	.897	35.75	PK	.3	0	36.05	56	-19.95	-	-
16	.897	11.69	Av	.3	0	11.99	-	-	46	-34.01
17	3.381	42.9	PK	.2	.1	43.2	56	-12.8	-	-
18	3.381	24.3	Av	.2	.1	24.6	-	-	46	-21.4
19	20.8815	30.96	PK	.3	.2	31.46	60	-28.54	-	-
20	20.8815	4.28	Av	.3	.2	4.78	-	-	50	-45.22

PK - Peak detector
Av - average detection