FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS 210

CERTIFICATION TEST REPORT

FOR

WIRELESS SHOCK SENSOR + CONTACT SENSOR

MODEL NUMBER: WST-301, TX-E301

FCC ID: XQC-WST301
IC: 9863B-WST301

REPORT NUMBER: 11625260-E1V4

ISSUE DATE: 3/9/17

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

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2/28/17	Initial Issue	C. Vergonio
V2	03/06/17	Added Section 7.3 & 7.4. Updated Section 5.1 & 5.2.	C. Vergonio
V3	03/08/17	Added Section 5.2 Model Difference. Updated Section 5.5 worse case mode. Updated Section 5.7, added I/O cables table. Removed QPK limit and only state dBuV/m limit in page 26. Updated the statement in Below 30MHz data in page 30.	C. Vergonio
V4	03/09/17	Removed QPK limit from tabular data in Page 27.	C. Vergonio

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: WIRELESS SHOCK SENSOR + CONTACT SENSOR

MODEL: WST-301, TX-E301

SERIAL NUMBER: 0A0865F & 0A0825F

DATE TESTED: FEBRUARY 16 – MARCH 8, 2017

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 9, Annex A	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
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UL Verification Services Inc.

Prepared By:

JONATHAN HSU
LAB ENGINEER
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 9.

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
☐ Chamber A (IC:2324B-1)	☐ Chamber D (IC:2324B-4)
☐ Chamber B (IC:2324B-2)	☐ Chamber E (IC:2324B-5)
☒ Chamber C (IC:2324B-3)	☐ Chamber F (IC:2324B-6)
	☐ Chamber G (IC:2324B-7)
	☐ Chamber H (IC:2324B-8)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

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:

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
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 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 Shock Sensor + Contact Sensor. The WST-301 is a battery-powered wireless sensor for detecting a physical shock and /or the open/closed status of a door or window in a home security or application. The device operates at a single fixed frequency of 319.5MHz, and is powered by a single CR123A lithium battery which provides a nominal operating voltage of 3 volts DC. The device is manually operated; please refer to User Manual for more detailed information.

5.2. MODEL DIFFERENCE

Models WST-301 & TX-E301 are electrically identical and the model is for marketing purpose only.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a wire antenna, with a maximum gain of -15dBi which is soldered directly to the circuit board. The antenna is not replaceable by the user.

5.4. SOFTWARE AND FIRMWARE

The typical factory firmware installed in the EUT during testing was ESW1021-03-B01.hex,

The firmware installed in the EUT to allow continuous transmit during testing was ESW1021-TEST.hex.

5.5. 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 “X-axis”. See photos for details.

EUT Fundamental was investigated for each mode and wire connected to CON1 was the worst case configuration.

5.6. MODIFICATIONS

No modifications were made during testing.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

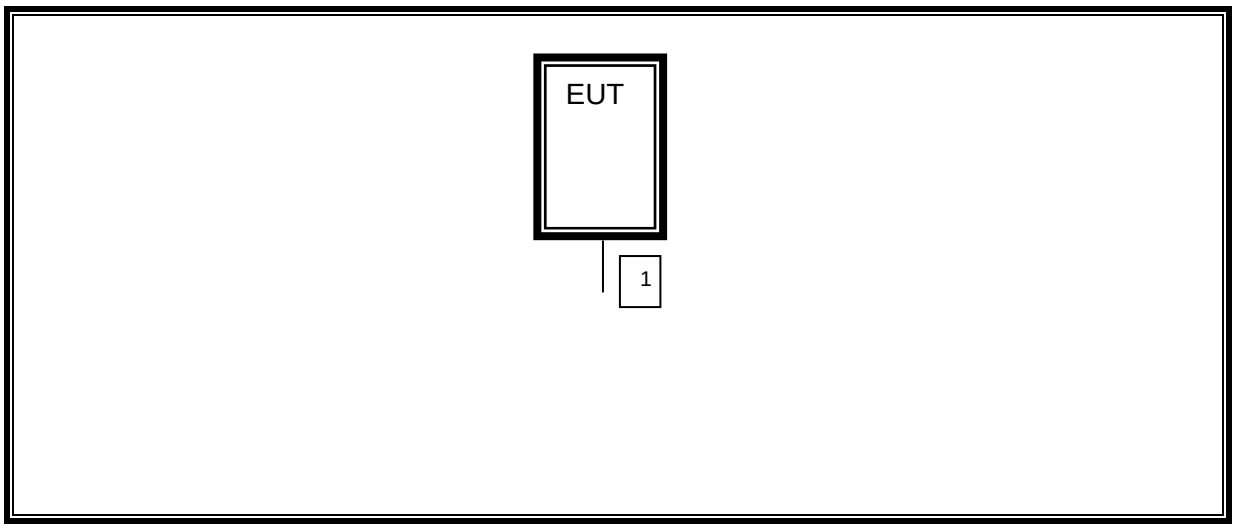
NONE

I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (cm)	Remarks
1	CON1	1	Wire	Unshielded	20	Transmission is initiated when an external contact connected to CON1 opens or closes.

TEST SETUP

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**	**T Number**	**Cal Date**	**Cal Due**
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	908	4/13/2016	4/13/2017
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	1165	8/1/2016	8/1/2017
Amplifier, 1 to 8 GHz	Miteq	AMF-4D-01000800-30-29P	1170	4/28/2016	4/28/2017
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310	300	11/10/2016	11/10/2017
Antenna, Horn 1-18GHz	ETS Lindgren	3117	711	1/30/2017	1/30/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB1	130	9/23/2016	9/23/2017
Loop Antenna	ETS Lindgren	6502	757	12/22/16	12/22/17

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
Antenna Port Software	UL	UL RF	Ver 5.1.1, July 15, 2016

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 C63.10

The transmitter output is connected to the spectrum analyzer.

20dB Bandwidth: The RBW is set to 1% to 5% of OBW. The VBW is set to 3 times the RBW. 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

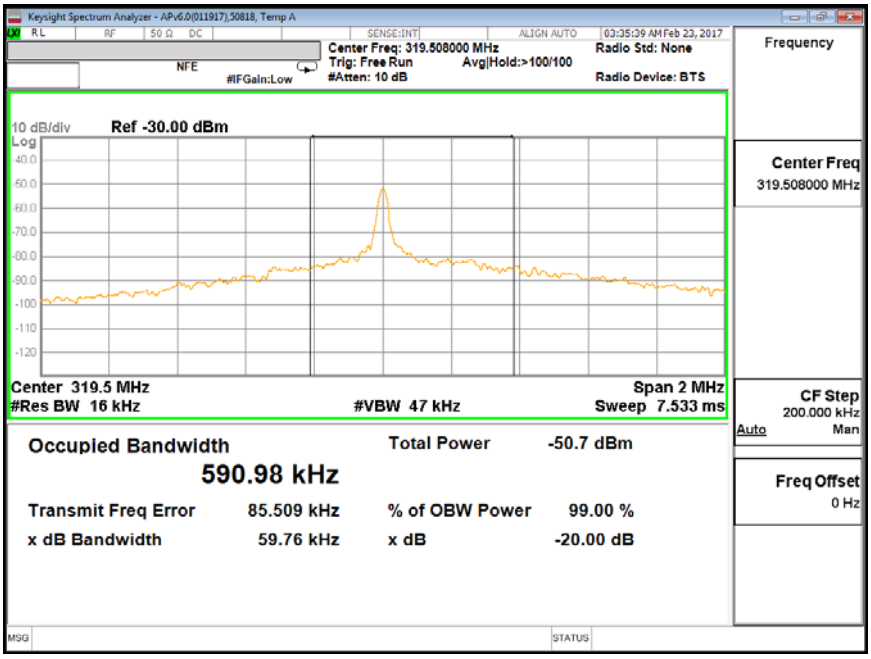
Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
319.5	59.76	798.75	-738.99

99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
319.5	590.98	798.75	-207.77

20dB & 99% BANDWIDTH

20dB & 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 1MHz and the VBW is set to 1MHz. 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

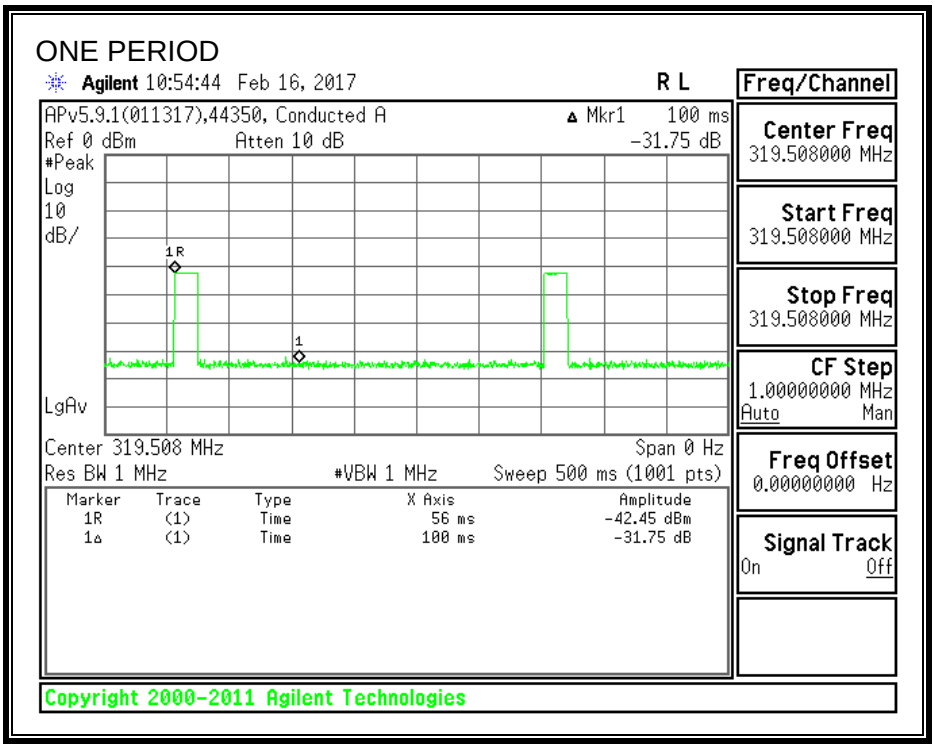
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

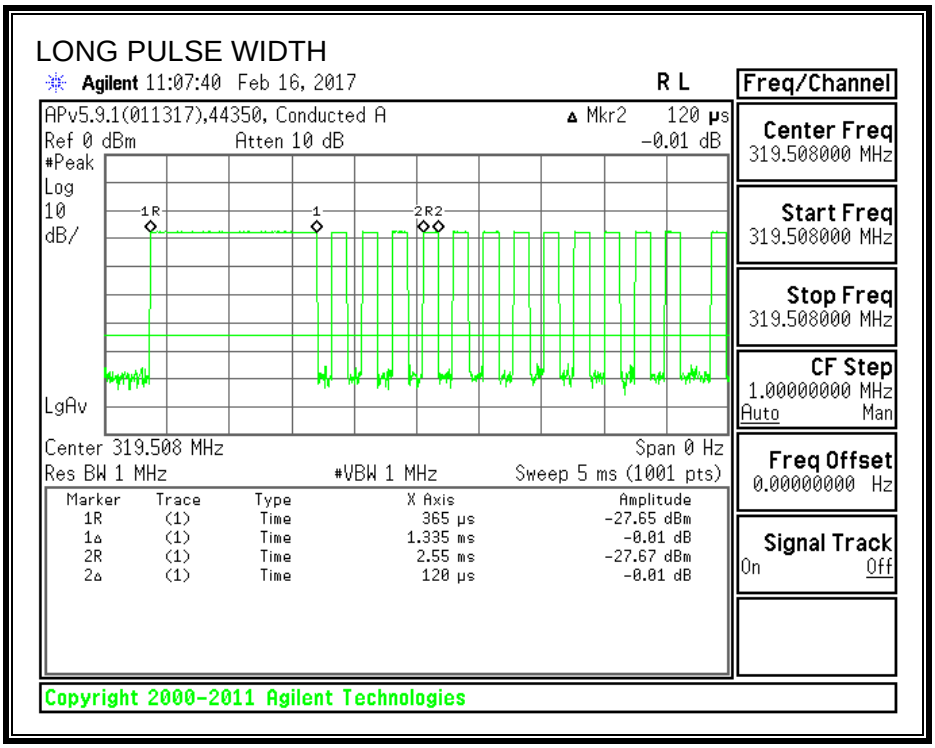
No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Medium Pulse Width (ms)	# of Medium Pulses	Short Pulse Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	1.335	1	0.483	1	0.120	58	0.088	-21.13

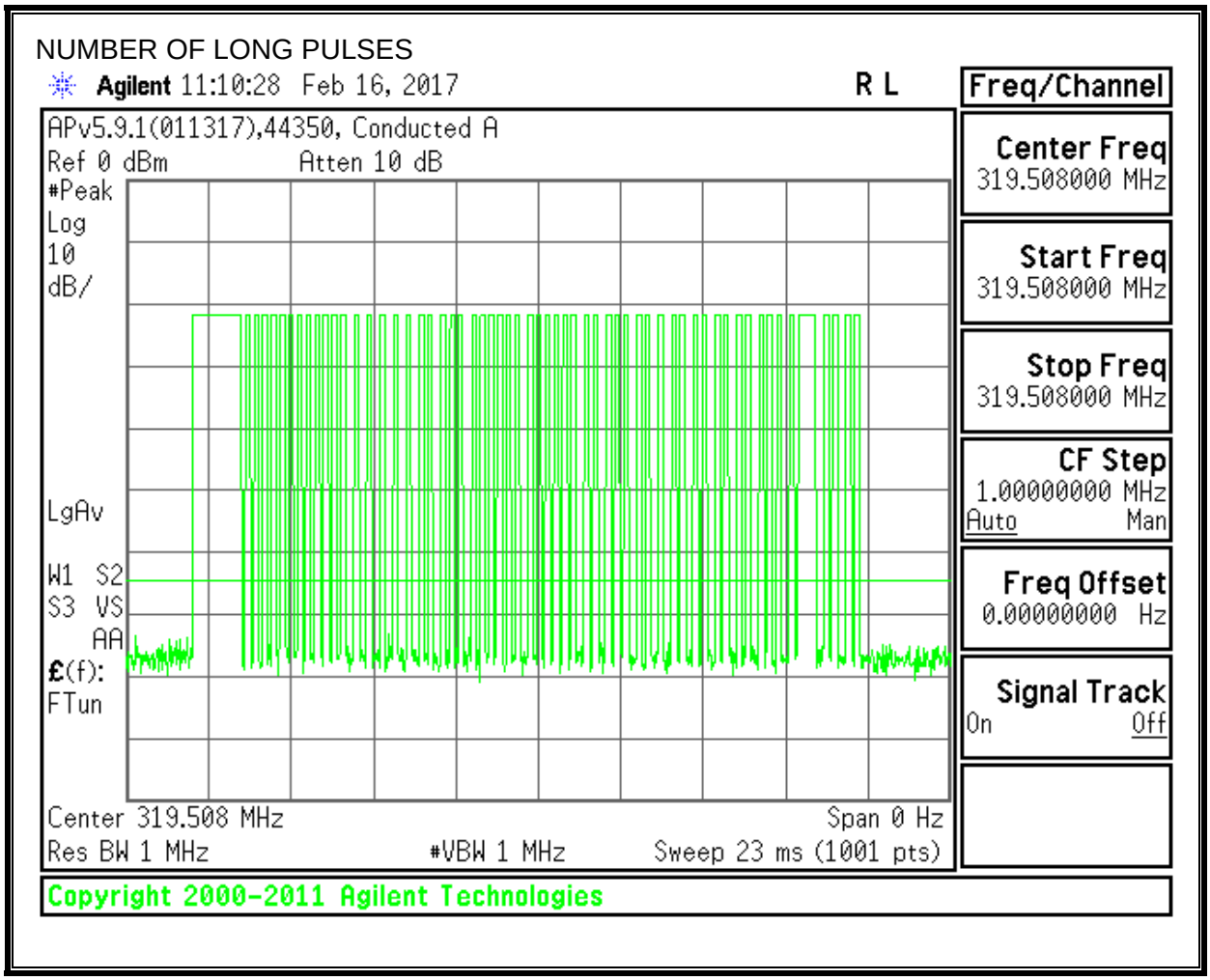
ONE PERIOD



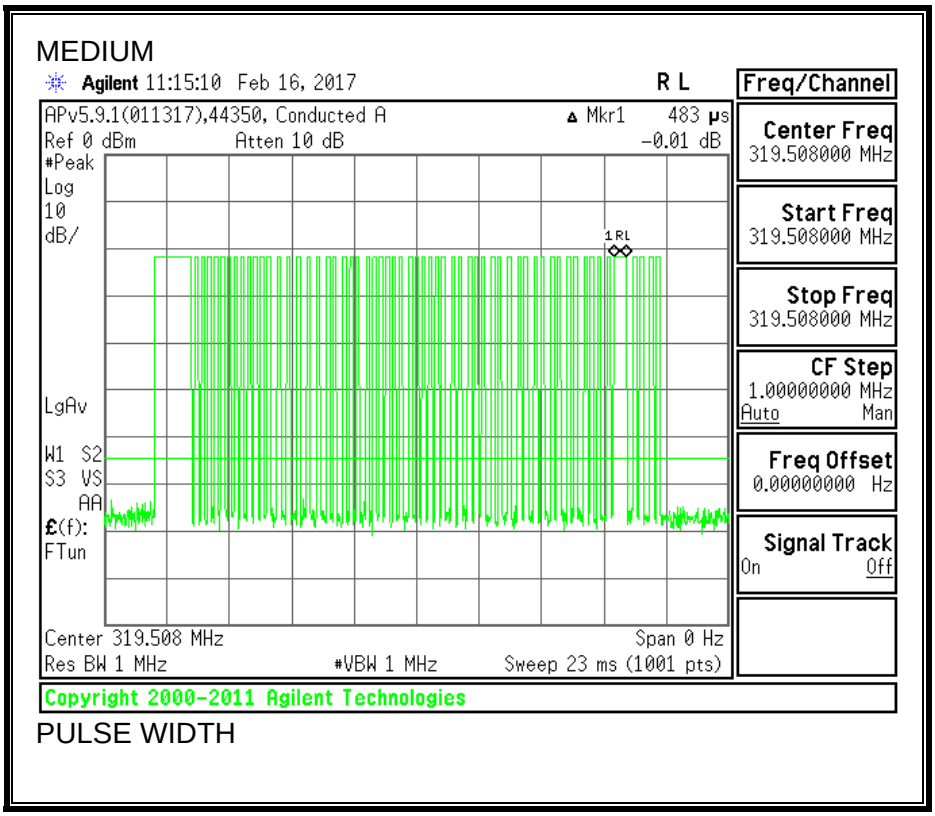
LONG PULSE WIDTH



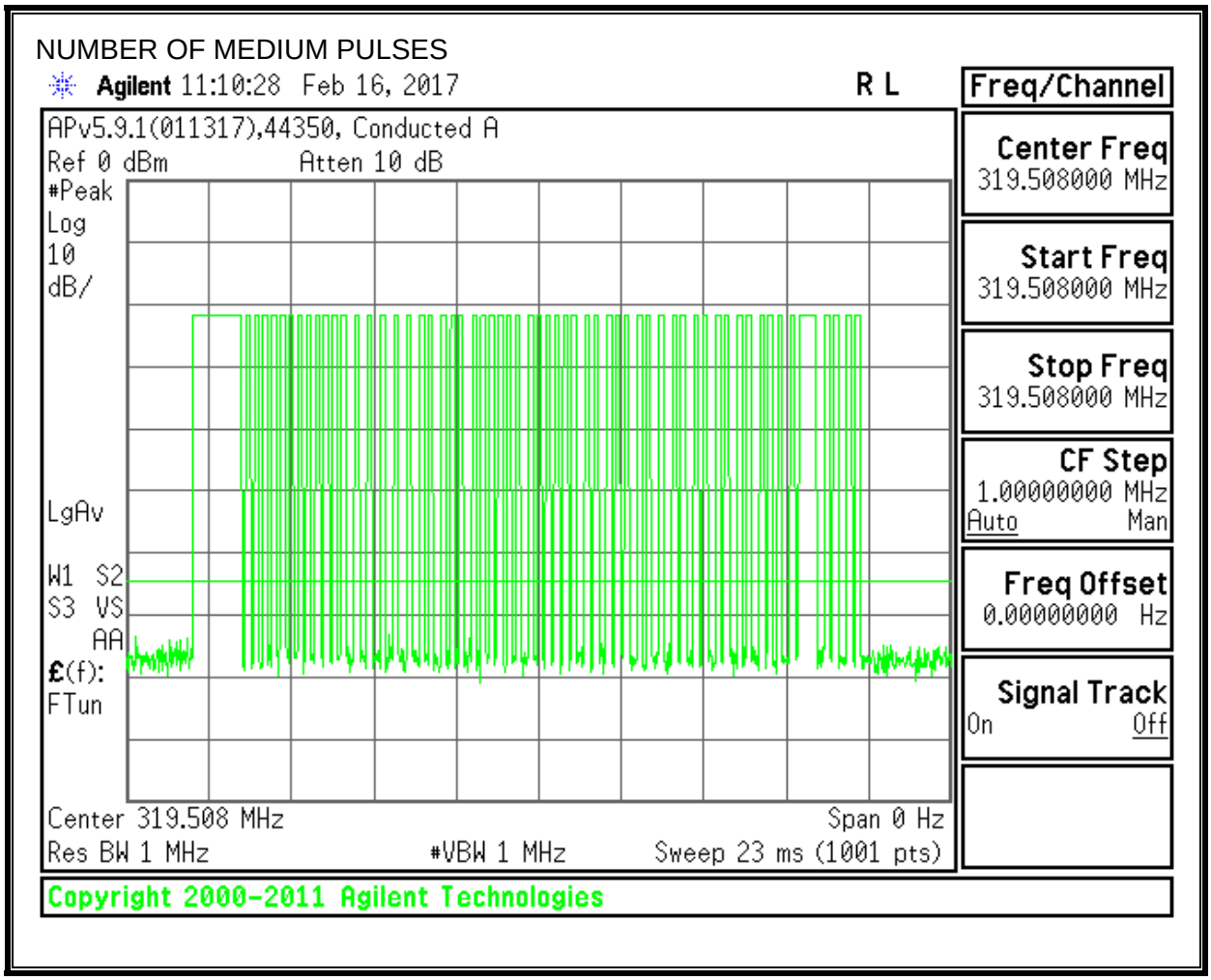
NUMBER OF LONG PULSES



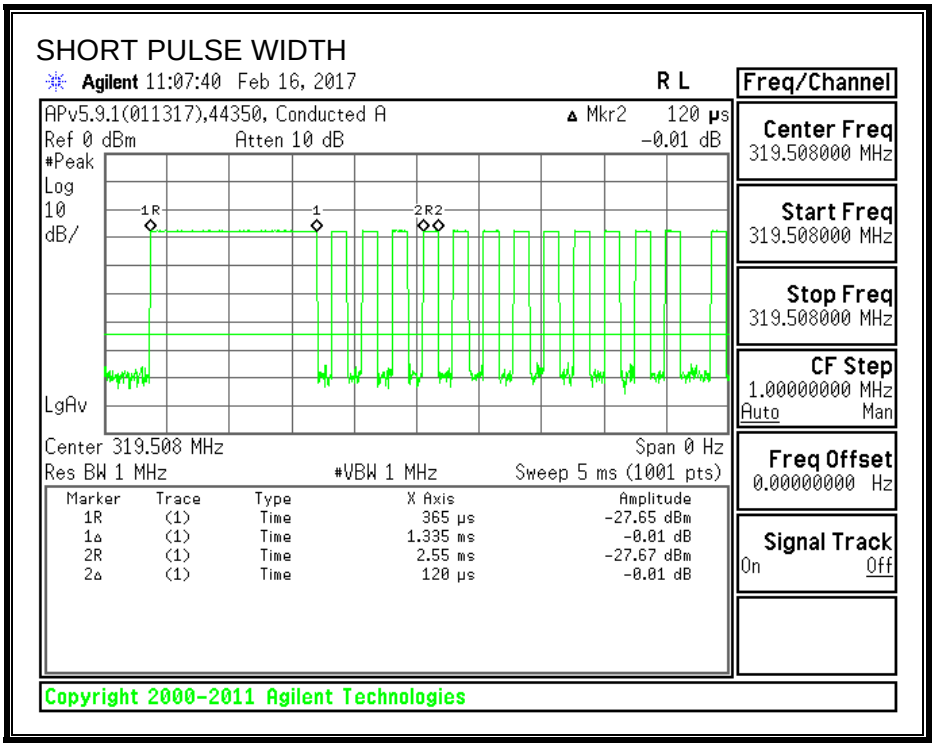
MEDIUM PULSE WIDTH



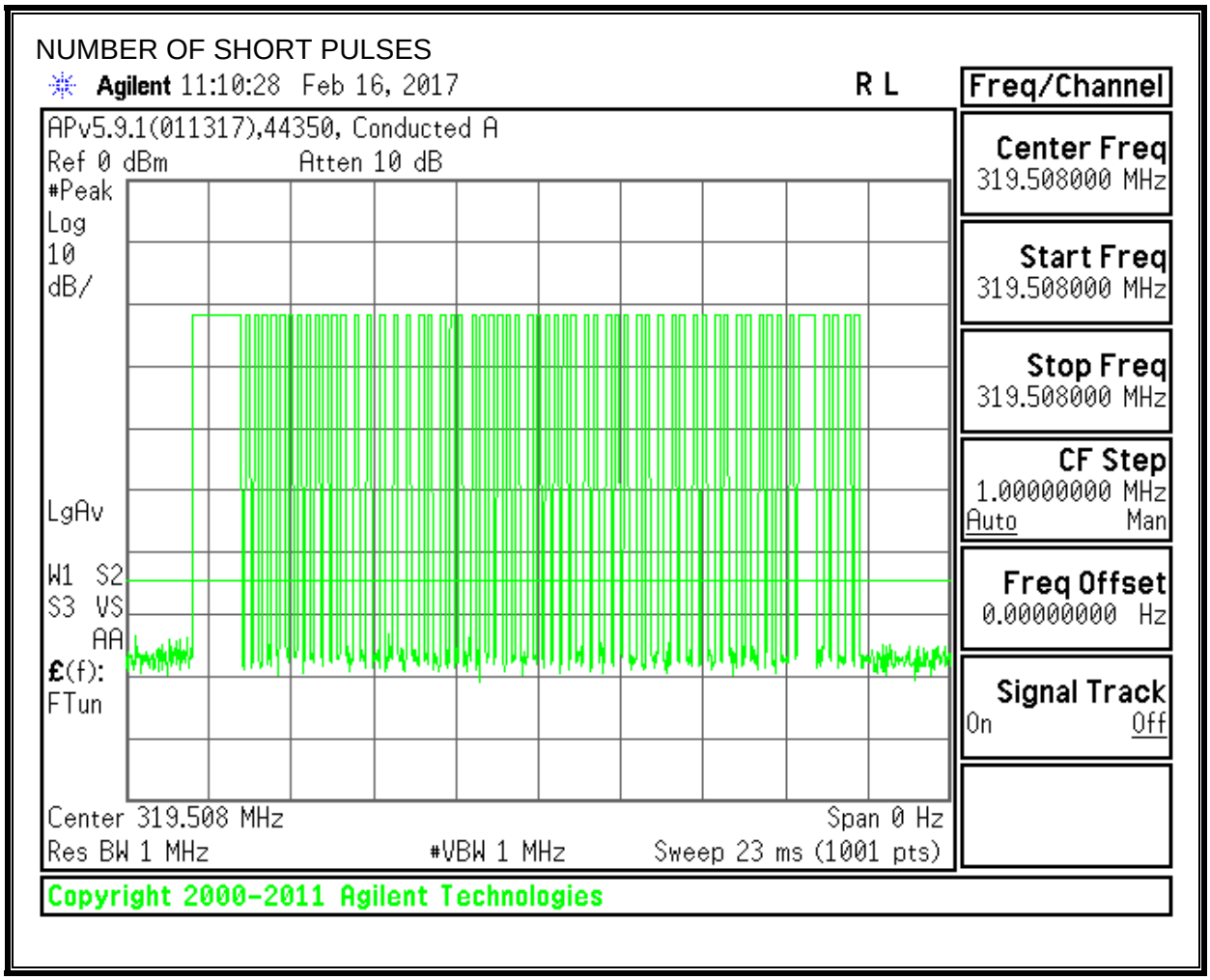
NUMBER OF MEDIUM PULSES



SHORT PULSE WIDTH



NUMBER OF SHORT PULSES



7.3. SUPERVISION TRANSMISSIONS

LIMITS

FCC §15.35 (a) (3)

Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

Results

1. According to manufacturer technical description, the device transmits brief supervisory signal at approximately 70 minutes intervals.

2. One pulse stream is 1.335ms*1 + 0.483ms* 1 + 0.12ms*58 = 8.8ms. Base on section 7.4 test plot, one transition contain 16 pulse streams which is 8.8ms * 16 = 140.8ms

7.4. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1.1 (b)

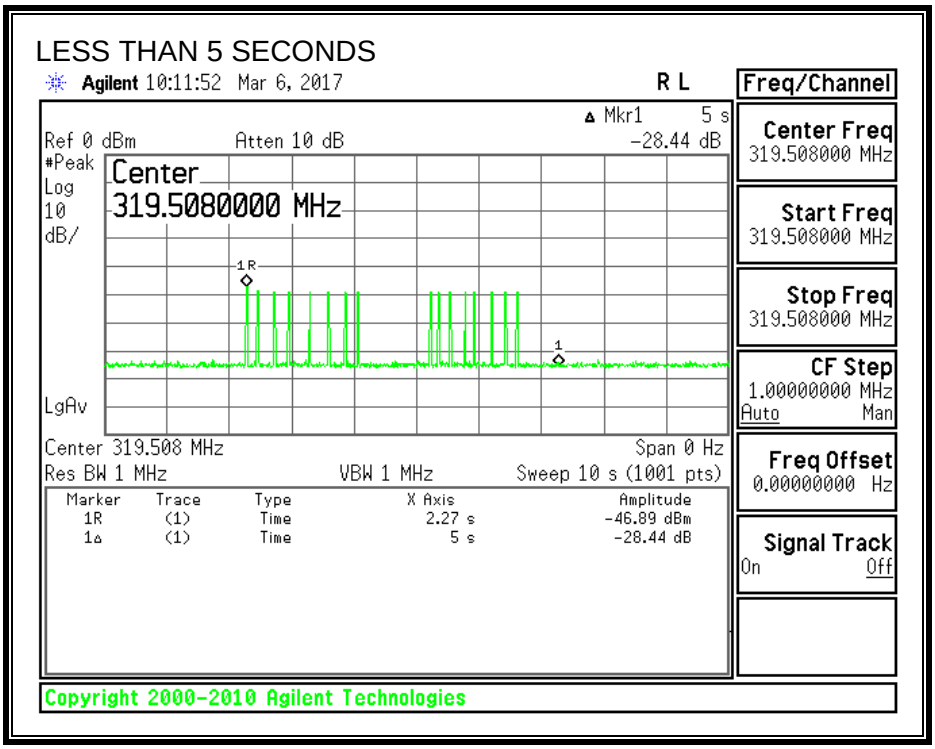
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1MHz and the VBW is set to 1MHz. 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 (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

[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:

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 for below 1GHz and 150 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. 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.

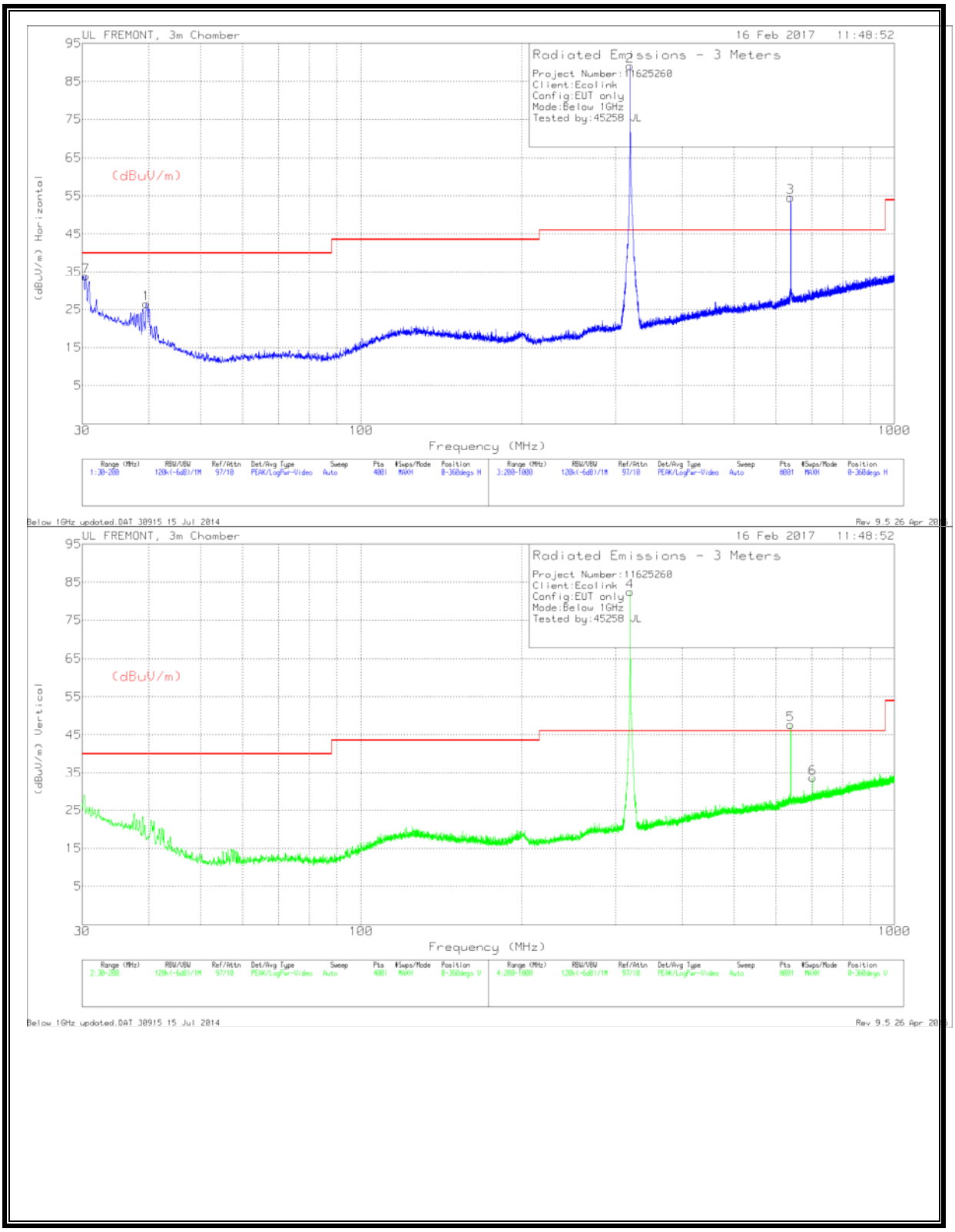
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Please refer to test report section 7.2 for duty cycle factor information. Note: The pre-scan measurements above 1GHz the VBW is set to 30 kHz.

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)



BELOW 1GHZ RADIATED EMISSIONS

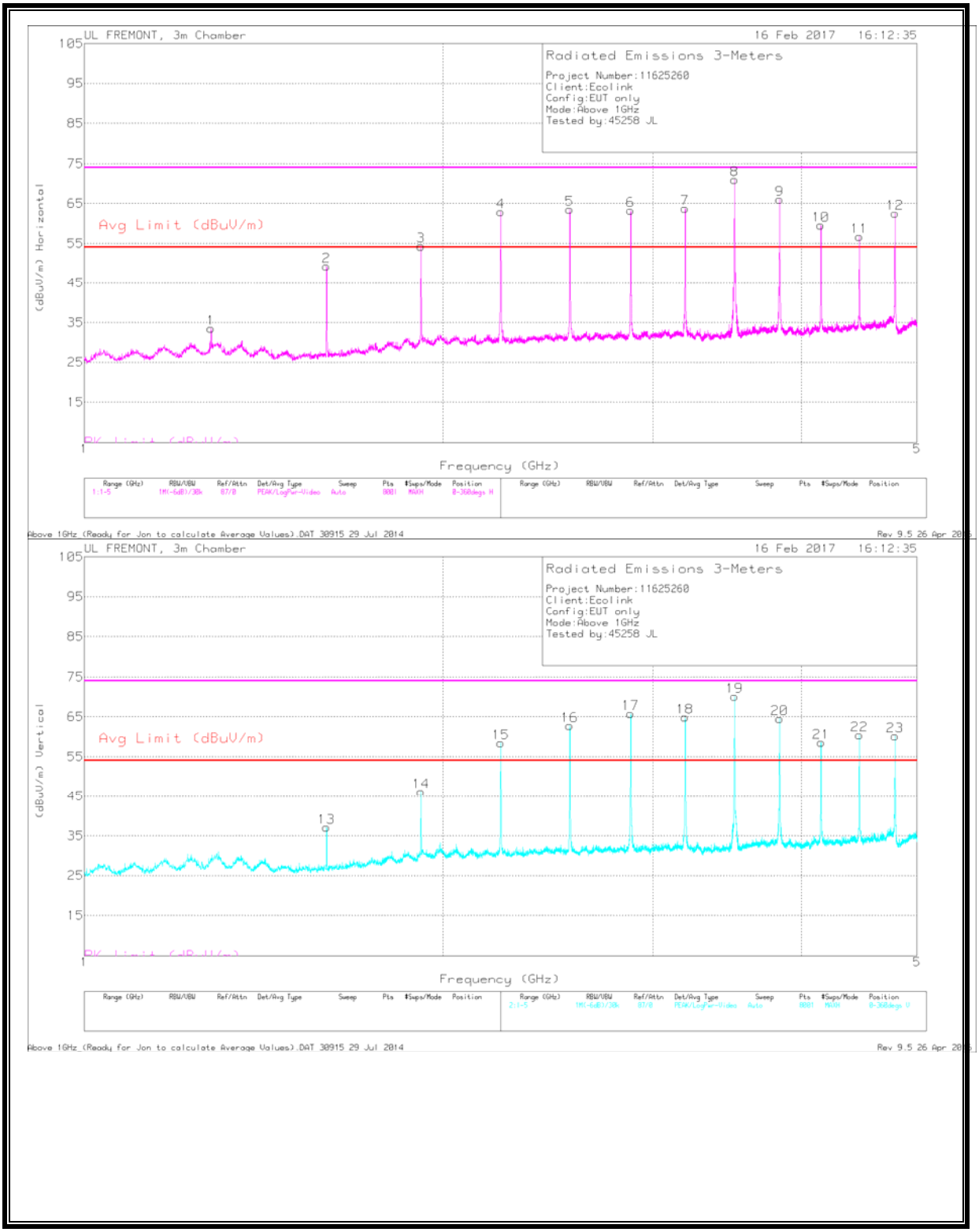
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7	30.4675	36.03	Pk	25	-27.2	33.83	40	-6.17	0-360	100	H
1	39.5625	35.31	Pk	18.3	-27.1	26.51	40	-13.49	0-360	100	H
2	319.5	95.33	Pk	17.9	-24.2	89.03	-	-	0-360	100	H
4	319.5	88.71	Pk	17.9	-24.2	82.41	-	-	0-360	200	V
3	639	55.01	Pk	23.7	-24.1	54.61	-	-	0-360	100	H
5	639	48.13	Pk	23.7	-24.1	47.73	-	-	0-360	300	V
6	703.1	32.94	Pk	24.2	-23.6	33.54	46.02	-12.48	0-360	200	V

FUNDAMENTAL AND HARMONICS SPURIOUS EMISSIONS

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T408 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
319.5058	90.77	Pk	17.9	-24.2	84.47	95.89	-11.42	56	147	V
		Av			63.34	75.89	-12.55			
319.5086	95.28	Pk	17.9	-24.2	88.98	95.89	-6.91	306	101	H
		Av			67.85	75.89	-8.04			
639.0106	50.8	Pk	23.7	-24.1	50.4	75.89	-25.49	198	126	V
		Av			29.27	55.89	-26.62			
639.0158	58.25	Pk	23.7	-24.1	57.85	75.89	-18.04	278	131	H
		Av			36.72	55.89	-19.17			

* Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is -21.13dB
(# of long pulses * long pulse width) + (# of ,medium pulses * medium pulse width) + (# of short pulses * short pulse width) / 100 or T
Refer to section 7.2 for duty cycle factor calculation (-21.13dB)
Note: Radiated peak result is based on 100% duty cycle sample; average reading = peak reading + DCCF
** Harmonics of fundamental 319.5MHz

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Avg Limit (dBuV/m)	Peak Margin (dB)	Avg Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
**1.278	41.46	Pk	29.7	-31.8	39.36	74	-	-34.64	-	0	319	H
		Av			18.23	-	54	-	-35.77	0	319	H
**1.597	51.71	Pk	28	-31.5	48.21	74	-	-25.79	-	116	367	V
		Av			27.08	-	54	-	-26.92	116	367	V
**1.598	55.8	Pk	28	-31.5	52.3	74	-	-21.7	-	228	135	H
		Av			31.17	-	54	-	-22.83	228	135	H
**1.917	56.85	Pk	31.4	-31	57.25	74	-	-16.75	-	225	398	H
		Av			36.12	-	54	-	-17.88	225	398	H
**1.917	55.11	Pk	31.4	-31	55.51	74	-	-18.49	-	113	395	V
		Av			34.38	-	54	-	-19.62	113	395	V
**2.236	61.84	Pk	31.7	-30.9	62.64	74	-	-11.36	-	45	388	V
		Av			41.51	-	54	-	-12.49	45	388	V
**2.237	64.39	Pk	31.7	-30.9	65.19	74	-	-8.81	-	163	374	H
		Av			44.06	-	54	-	-9.94	163	374	H
**2.556	63.24	Pk	32.4	-30.6	65.04	74	-	-8.96	-	337	318	H
		Av			43.91	-	54	-	-10.09	337	318	H
**2.556	61.87	Pk	32.4	-30.6	63.67	74	-	-10.33	-	186	102	V
		Av			42.54	-	54	-	-11.46	186	102	V
**2.876	62.92	Pk	32.7	-30.3	65.32	74	-	-8.68	-	16	345	H
		Av			44.19	-	54	-	-9.81	16	345	H
**2.876	65.54	Pk	32.7	-30.3	67.94	74	-	-6.06	-	236	347	V
		Av			46.81	-	54	-	-7.19	236	347	V
**3.195	65.96	Pk	33	-30.1	68.86	74	-	-5.14	-	273	309	H
		Av			47.73	-	54	-	-6.27	273	309	H
**3.195	65.69	Pk	33	-30.1	68.59	74	-	-5.41	-	265	103	V
		Av			47.46	-	54	-	-6.54	265	103	V
**3.514	69.38	Pk	32.8	-29.7	72.48	74	-	-1.52	-	286	112	V
		Av			51.35	-	54	-	-2.65	286	112	V
**3.514	70.49	Pk	32.8	-29.7	73.59	74	-	-.41	-	260	124	H
		Av			52.46	-	54	-	-1.54	260	124	H
**3.834	64.24	Pk	33	-29.5	67.74	74	-	-6.26	-	215	335	H
		Av			46.61	-	54	-	-7.39	215	335	H
**3.834	66.64	Pk	33	-29.5	70.14	74	-	-3.86	-	237	199	V
		Av			49.01	-	54	-	-4.99	237	199	V
**4.154	60.92	Pk	33.6	-29.3	65.22	74	-	-8.78	-	125	171	H
		Av			44.09	-	54	-	-9.91	125	171	H
**4.154	61.34	Pk	33.6	-29.3	65.64	74	-	-8.36	-	136	393	V
		Av			44.51	-	54	-	-9.49	136	393	V
**4.473	57.58	Pk	34.1	-29	62.68	74	-	-11.32	-	203	206	H
		Av			41.55	-	54	-	-12.45	203	206	H
**4.473	58.74	Pk	34.1	-29	63.84	74	-	-10.16	-	147	100	V
		Av			42.71	-	54	-	-11.29	147	100	V
**4.792	60.8	Pk	34.2	-28.5	66.5	74	-	-7.5	-	227	101	H
		Av			45.37	-	54	-	-8.63	227	101	H
**4.792	58.48	Pk	34.2	-28.5	64.18	74	-	-9.82	-	50	200	V
		Av			43.05	-	54	-	-10.95	50	200	V

* Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is -21.13dB

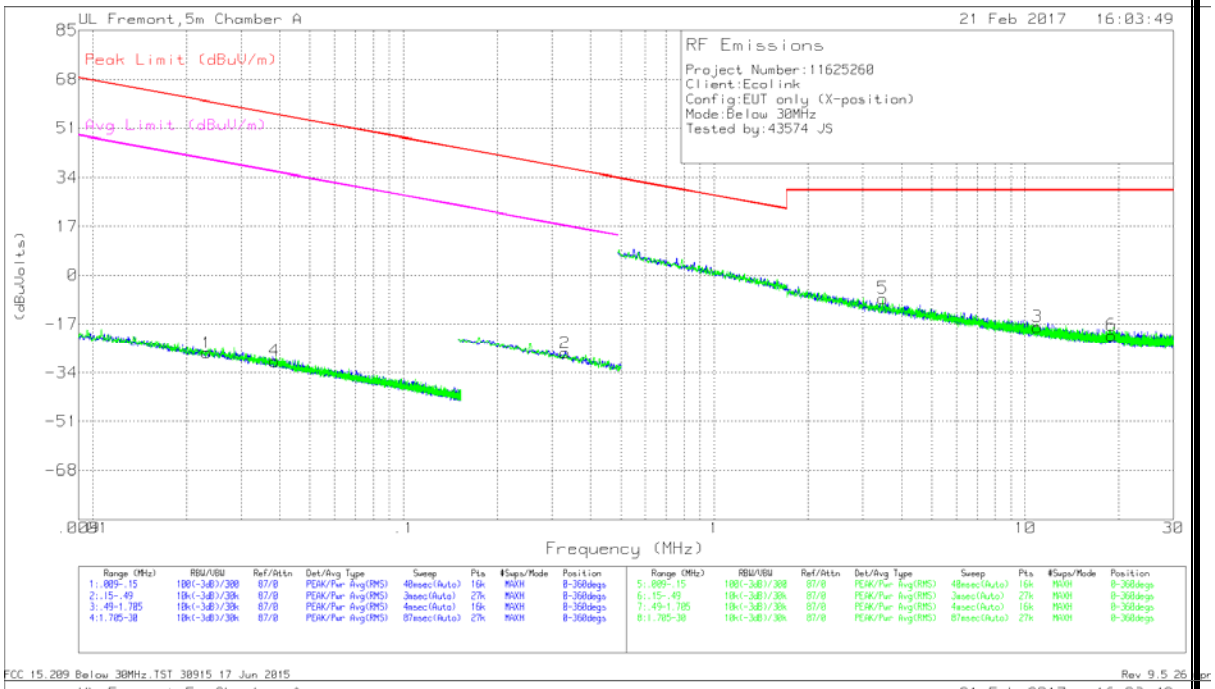
(# of long pulses * long pulse width) +(# of ,medium pulses * medium pulse width) + (# of short pulses * short pulse width) / 100 or T

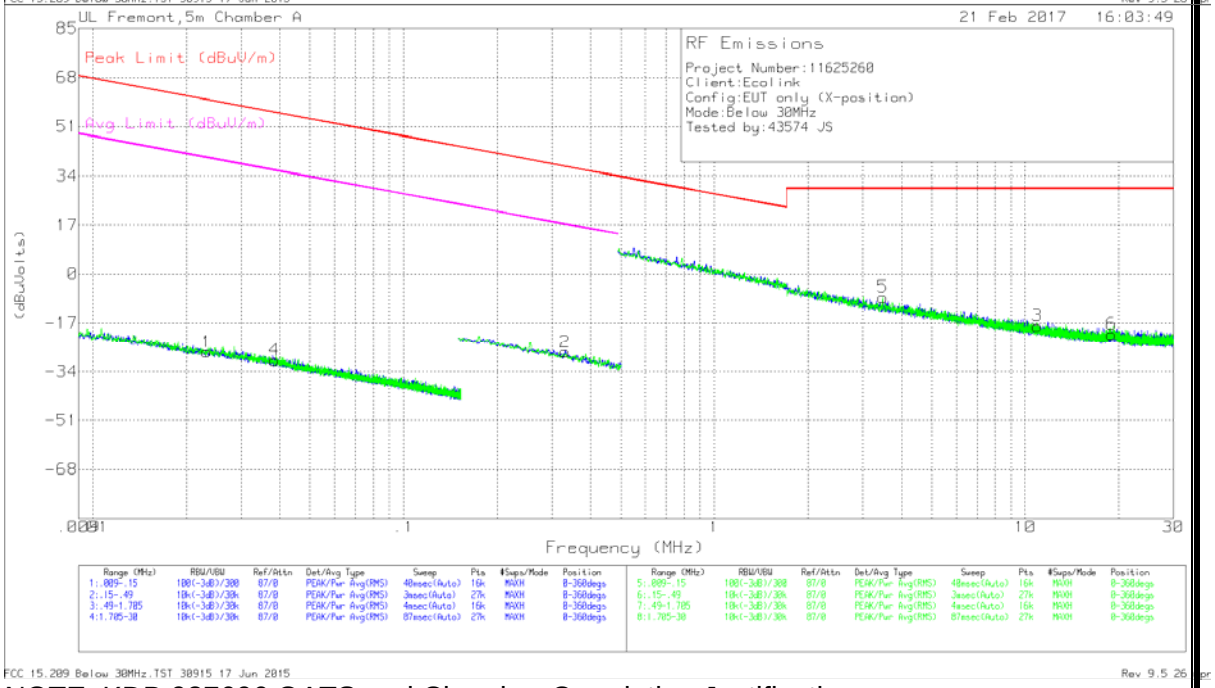
Refer to section 7.2 for duty cycle factor calculation(-21.13dB)

Note: Radiated peak result is based on 100% duty cycle sample; average reading = peak reading + DCCF

** Harmonics of fundamental 319.5MHz

BELOW 30MHz





NOTE: KDB 937606 OATS and Chamber Correlation Justification

- Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

BELOW 30MHz RADIATED EMISSIONS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.02331	39.17	Pk	13.5	.1	-80	-27.23	60.25	-87.48	40.25	-67.48	0-360
4	.03847	37.43	Pk	12.3	.1	-80	-30.17	55.9	-86.07	35.9	-66.07	0-360
2	.33082	42.05	Pk	10.7	.1	-80	-27.15	37.21	-64.36	17.21	-44.36	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
5	3.47926	20.85	Pk	10.8	.3	-40	-8.05	29.54	-37.59	-	-	0-360
3	10.9295	10.71	Pk	10.8	.5	-40	-17.99	29.54	-47.53	-	-	0-360
6	18.95456	8.29	Pk	10.2	.6	-40	-20.91	29.54	-50.45	-	-	0-360

Pk - Peak detector