



**FCC PART 15 SUBPART C (15.231)  
ISED RSS-210 ISSUE 9: 2016  
ISED RSS-GEN ISSUE 4: 2014**

**CERTIFICATION TEST REPORT**

**FOR**

**CARBON MONOXIDE ALARM**

**MODEL NUMBER\*:**

**EiA207WOET**

**EiA207iWOET**

**EiA207DWOET**

**EiA207iDWOET**

**FCC ID: 2AHZG-EIA207W433**

**IC: 21362-EIA207W433**

**REPORT NUMBER: 11417916-E1V3**

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\* Model differences are explained in the body of the report.



Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	02/28/18	Initial Issue	--
V2	03/02/18	Revised Transmission Time section	Frank Ibrahim
V3	03/20/18	Updated Above 1G Radiated Emissions Test Result	Vien Tran

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** oneEvent Technologies, Inc.  
**EUT DESCRIPTION:** CARBON MONOXIDE ALARM  
**MODEL:** EiA207IDWOET  
**SERIAL NUMBER:** 2  
**DATE TESTED:** JULY 27, 2017 to February 02, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C (15.231)	Complies
ISED RSS-210 Issue 9	Complies
ISED RSS-GEN Issue 4	Complies

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 the U.S. government.

Approved & Released For  
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Prepared By:



JASON QIAN  
TEST 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 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 checked="" type="checkbox"/> Chamber A(ISED: 2324B-1)	<input type="checkbox"/> Chamber D(ISED: 22541-1)
<input checked="" type="checkbox"/> Chamber B(ISED: 2324B-2)	<input type="checkbox"/> Chamber E(ISED: 22541-2)
<input type="checkbox"/> Chamber C(ISED: 2324B-3)	<input type="checkbox"/> Chamber F(ISED: 22541-3)
	<input type="checkbox"/> Chamber G(ISED: 22541-4)
	<input type="checkbox"/> Chamber H(ISED: 22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

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
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 low power wireless for CO and temperature detector which is intended to operate on a single fixed frequency of 433.920 MHz. This device operates from two 1.5 volt, type AAA battery.

### 5.2. MODEL DIFFERENCES

The RF PCB model number is OET-TX433-CO which has listed firmware and PCB revision in the report. The OET-TX433-CO is placed into the EiA207iDWOET which has all visual and audio functions enabled. This is the unit that was tested. EiA207iDWOET model is a supper set meaning functions are removed to produce lower CO models EiA207WOET, EiA207iWOET, and EiA207DWOET. Since the antenna is part of the OET-TX433-CO PCB it cannot be changed, so changing visual and audio functions in the CO models will not add gain to antenna. Also since firmware cannot be changed in OET-TX433-CO by any of the CO models the transmission characteristics you tested will not change. With no change to antenna gain or transmission characteristics there is no difference in RF between CO models.

### 5.3. MAXIMUM FILED STRENGTH

The transmitter has the maximum peak and average radiated electric field strengths as follows:

Fundamental Frequency (MHz)	Mode	Field Strength Peak (dBuV/m)	Field Strength Average (dBuV/m)
433.92	Normal	100.21	79.80

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna, with a maximum gain of -3 dBi.

### 5.5. SOFTWARE AND FIRMWARE

The typical factory firmware installed in the EUT during testing was 100032\_FW\_EI\_433\_CO\_TRANSMITTER\_0.18.Hex

The firmware installed in the EUT to allow continuous transmit during testing was OET-CO CW.Hex

## **5.6. 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.

The EUT operates at a single channel of 433.92 MHz.



## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

NONE

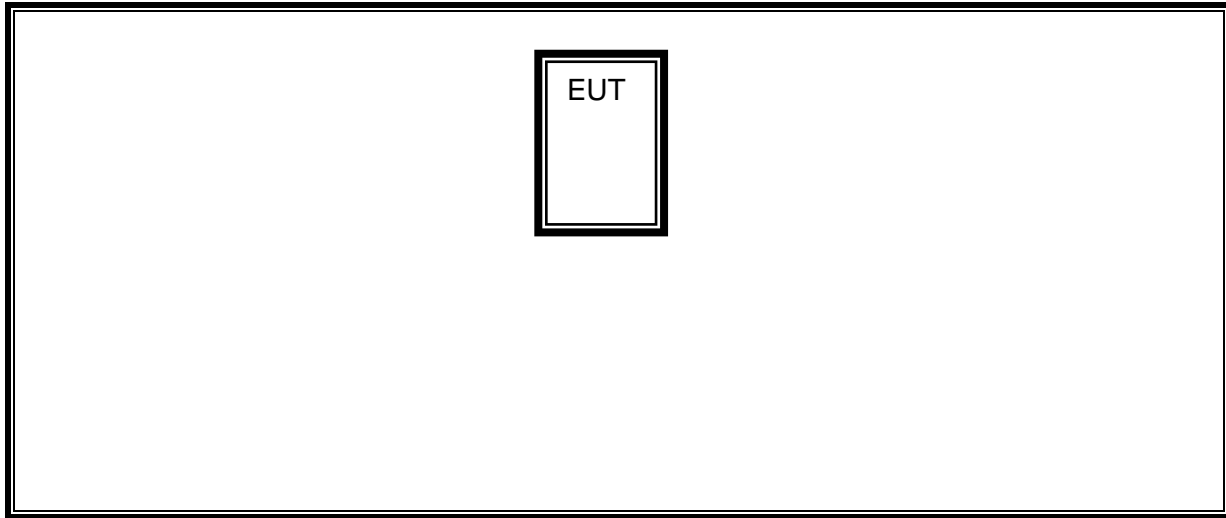
### I/O CABLES

NONE

### TEST SETUP

The EUT was tested as a standalone device.

### 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	907	02/07/2017	02/07/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	908	04/28/2017	04/28/2018
PSA Series Spectrum Analyzer, 3Hz - 26.5GHz	Agilent	E4446A	99	06/22/2017	06/22/2018
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	493	06/23/2017	06/23/2018
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	15	08/14/2017	08/14/2018
Antenna, Horn 1-18GHz	ETS Lindgren	3117	863	06/09/2017	06/09/2018
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	130	10/16/2017	10/16/2018
Loop Antenna	ETS-LINDGREN	6502	1683	02/17/2017	02/17/2018

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Ver 9.5, Dec 01, 2016

NOTE: Testing was completed before equipment calibration expiration date.

## 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.

RSS-210 A.1.3

The 99% bandwidth of monetarily operated devices shall be less or equal to 0.25% of the center frequency for devices operating between 70MHz and 900MHz. For devices operating above 900MHz, the 99% bandwidth shall be less or equal to 0.5% of the center frequency.

#### TEST PROCEDURE

ANSI C63.10: 2013

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.

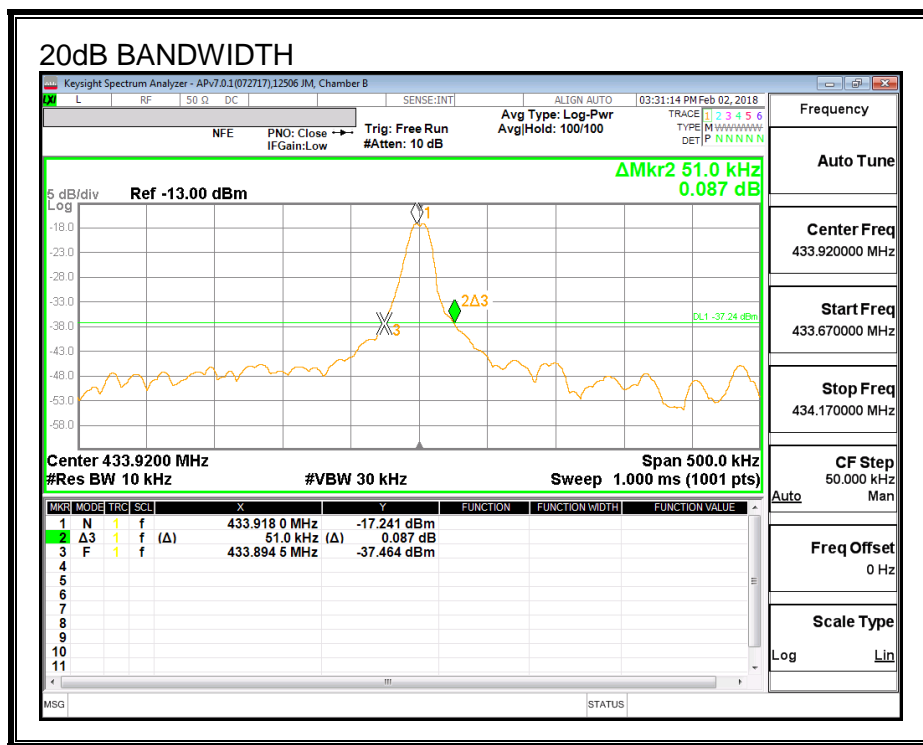
**RESULTS**

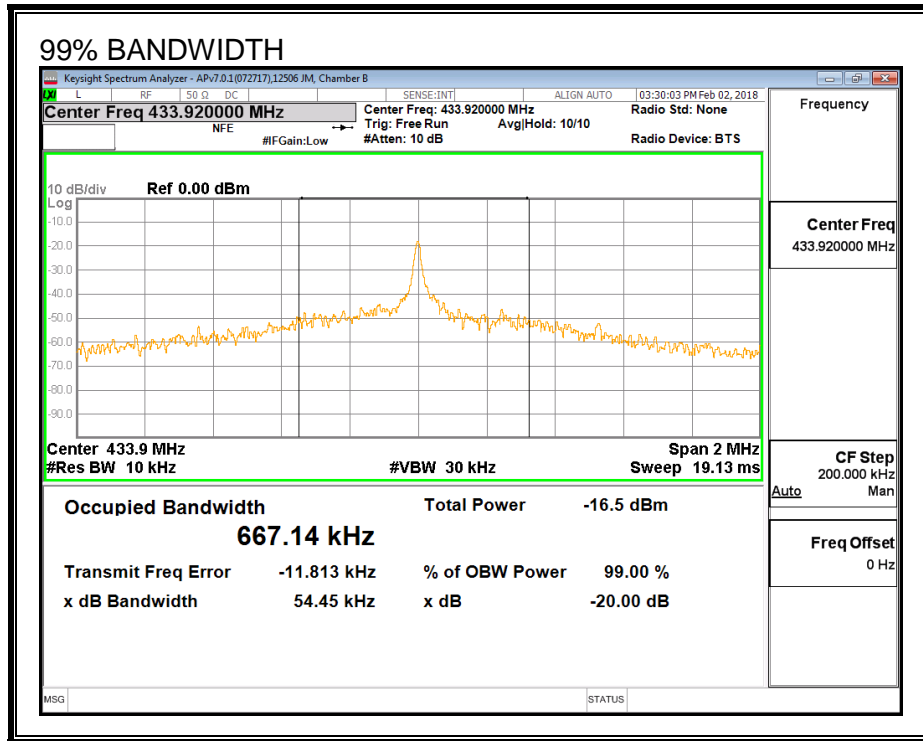
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	51	1084.8	-1033.8

99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	667.14	1084.8	-417.66





## 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.

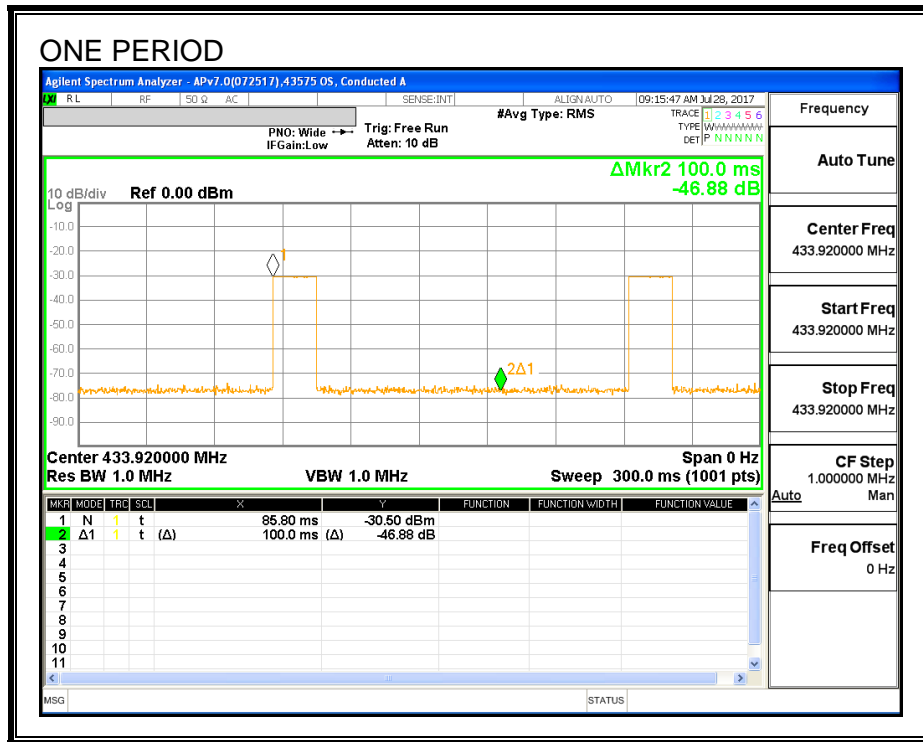
### CALCULATION

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

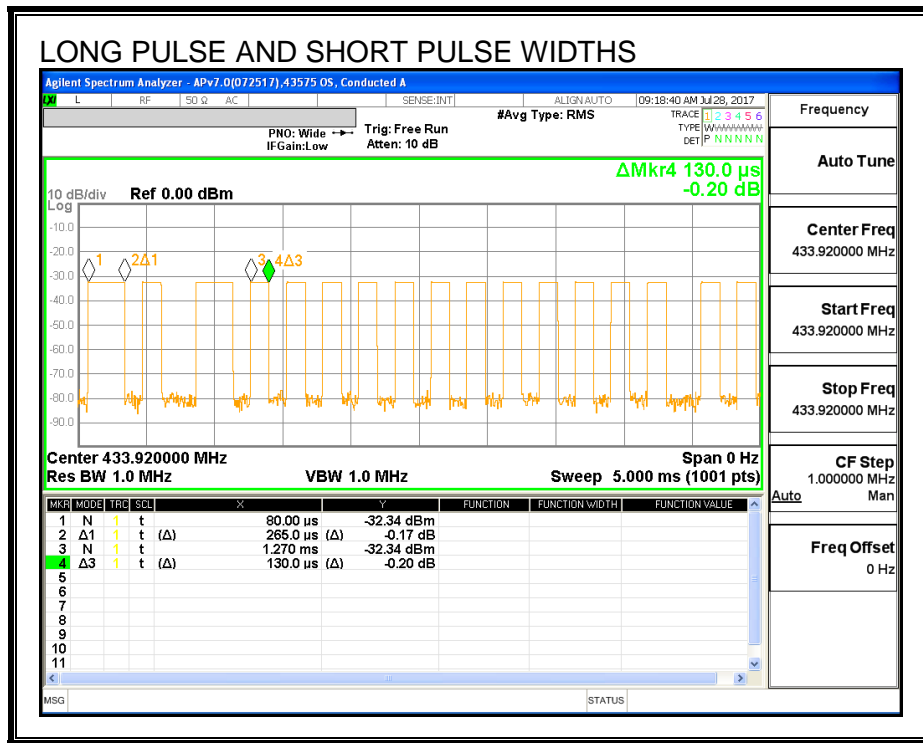
**RESULTS**

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Pulse Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	0.265	9	0.130	55	0.095	-20.41

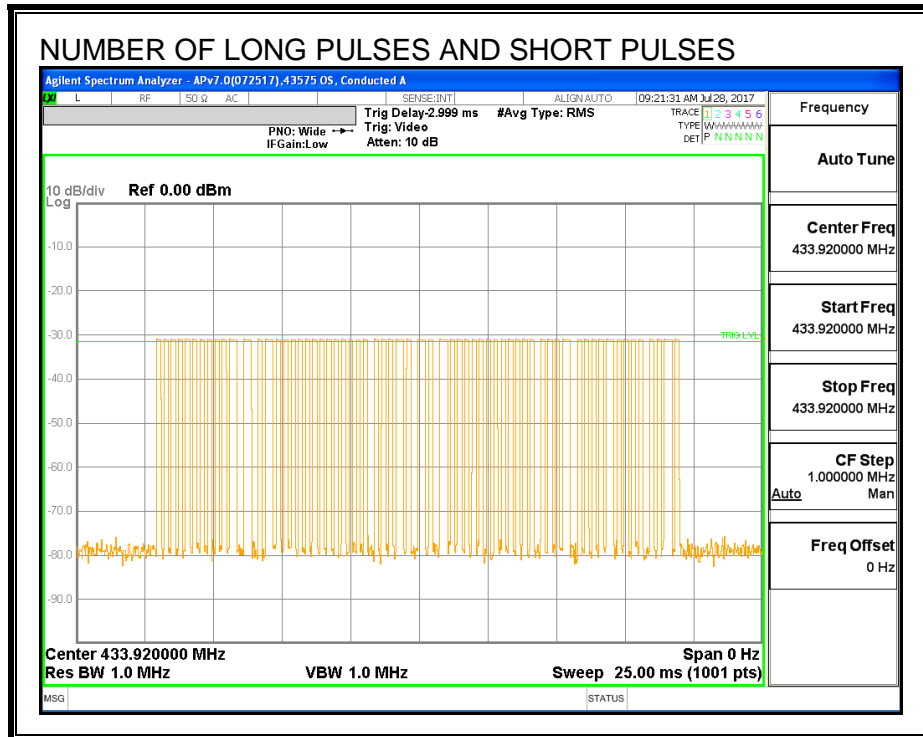
**ONE PERIOD**



**PULSE WIDTHS**



**NUMBER OF PULSES**





### 7.3. TRANSMISSION TIME

#### LIMITS

FCC §15.231 (a) (2)

RSS-210 A.1.1 (b)

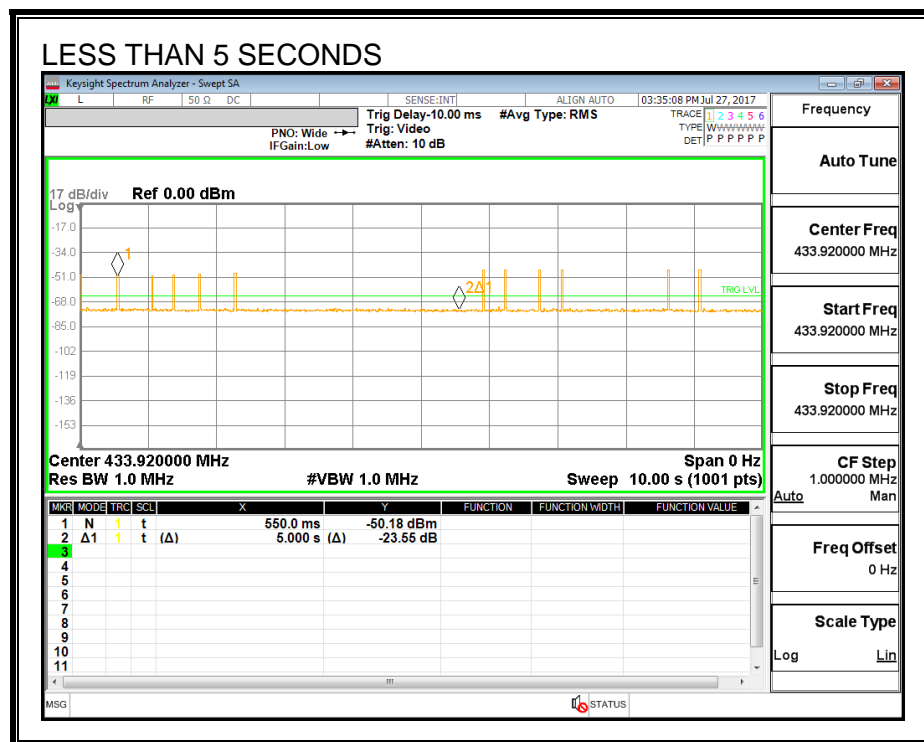
2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

#### 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 20 seconds and the span is set to 0 Hz.

#### RESULTS

**Note:** When the batteries are installed the device sends some power up signal, after which it sends the first supervisory message, which is initiated automatically by the EUT.



## 8. RADIATED EMISSION TEST RESULTS

### LIMITS

FCC §15.231 (b)  
 RSS-210 A.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	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375
174-260	3,750	375
260-470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250
Above 470	12,500	1,250

<sup>1</sup>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
<sup>1</sup> 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	( <sup>2</sup> )
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)
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.

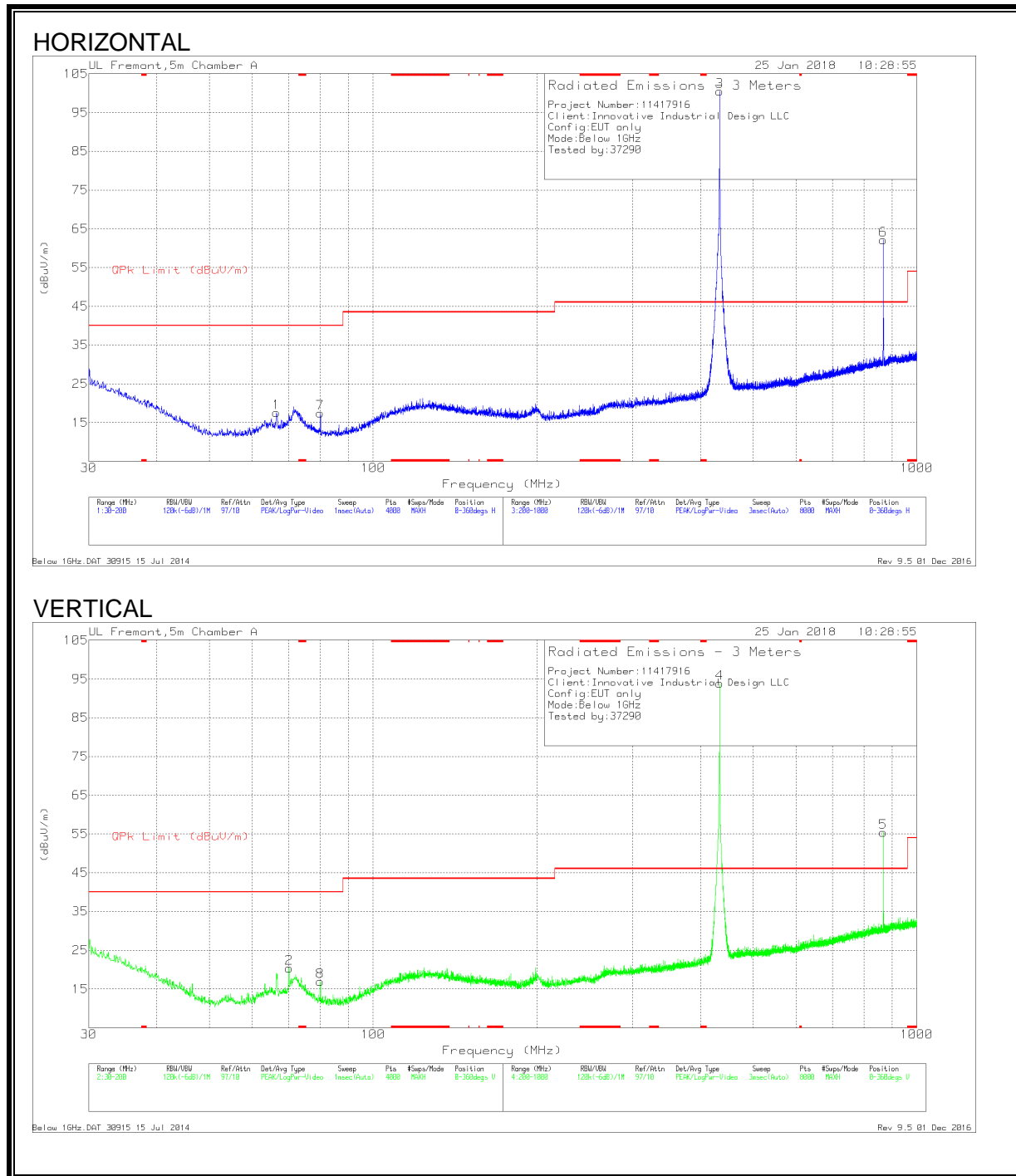
For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted.

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**

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



**BELOW 1GHZ RADIATED EMISSIONS**

**FUNDAMENTAL FIELD STRENGTH AND HARMONICS SPURIOUS EMISSIONS**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	66.4319	32.31	Pk	12.1	-26.8	17.61	40	-22.39	0-360	100	H
2	70.0454	35	Pk	12.1	-26.7	20.4	40	-19.6	0-360	100	V
7	79.9929	32.53	Pk	11.5	-26.6	17.43	40	-22.57	0-360	100	H
8	79.9929	32.08	Pk	11.5	-26.6	16.98	40	-23.02	0-360	100	V
3	433.9304	105.02	Pk	20.6	-25.1	100.21	100.82	-0.61	108	239	H
			Av			79.8	80.82	-1.02	108	239	H
4	433.9304	98.42	Pk	20.6	-25.1	94.32	100.82	-6.5	212	230	V
			Av			73.91	80.82	-6.91	212	230	V
6	**867.7868	59.48	Pk	25.9	-23.2	60.16	80.82	-20.66	1	185	H
			Av			39.75	60.82	-21.07	1	185	H
5	**867.8868	52.71	Pk	25.9	-23.2	55.21	80.82	-25.61	274	193	V
			Av			34.8	60.82	-26.02	274	193	V

Pk - Peak detector

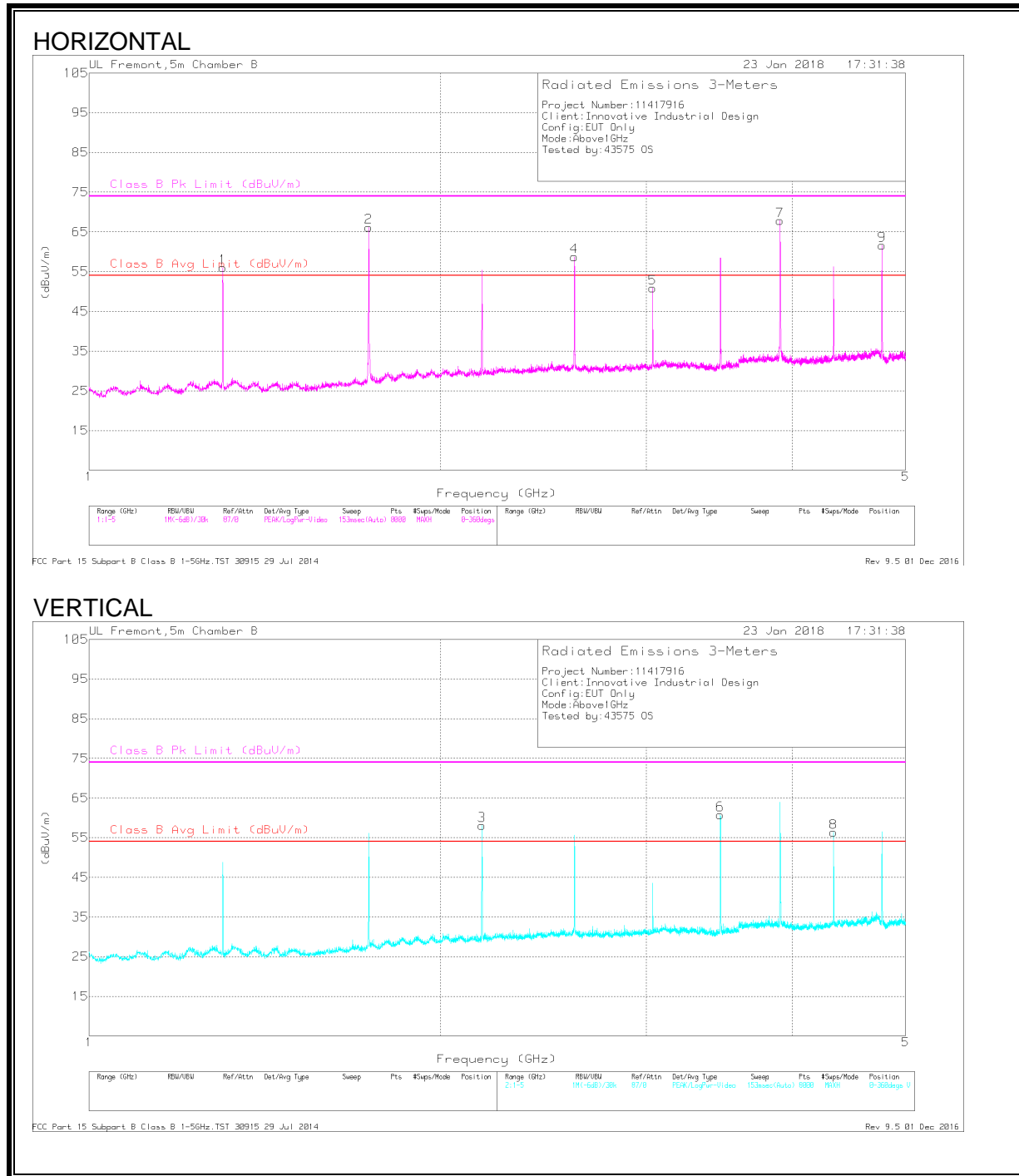
\* Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is 0.095 (# of long pulses \* long pulse width) + (# of short pulses \* short pulse width) / 100 or T.

Refer to section 7.2 for duty cycle factor calculation (-20.41dB).

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

\*\* Harmonics of fundamental 433.92MHz

**HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz**



**ABOVE 1GHZ RADIATED EMISSIONS**

**HARMONICS SPURIOUS EMISSIONS**

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B Avg Limit (dBuV/m)	Av(CISPR)Margin (dB)	Class B Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
***1.302	63.14	Pk	28.9	-34.5	57.54	-	-	74	-16.46	285	215	H
		Av			37.13	54	-16.87	-				
1.736	70.36	Pk	29.5	-33.8	66.06	-	-	80.83	-14.77	24	205	H
		Av			45.65	60.83	-15.18	-				
2.17	62.01	Pk	31.4	-33.2	60.21	-	-	80.83	-20.62	110	208	V
		Av			39.8	60.83	-21.03	-				
2.604	61.59	Pk	32.6	-32.7	61.49	-	-	80.83	-19.34	24	235	H
		Av			41.08	60.83	-19.75	-				
3.038	52.71	Pk	32.9	-32.4	53.21	-	-	80.83	-27.62	192	114	H
		Av			32.8	60.83	-28.03	-				
3.471	63.27	Pk	32.7	-32	63.97	-	-	80.83	-16.86	75	186	V
		Av			43.56	60.83	-17.27	-				
***3.905	67.86	Pk	33.5	-31.3	70.06	-	-	74	-3.94	240	104	H
		Av			49.65	54	-4.38	-				
***4.339	59.07	Pk	33.6	-31.6	61.07	-	-	74	-12.93	261	336	V
		Av			40.66	54	-13.34	-				
***4.774	61.71	Pk	34.3	-31.3	64.71	-	-	74	-9.29	341	355	H
		Av			44.3	54	-9.7	-				

Pk - Peak detector

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is 0.095 (# of long pulses \* long pulse width) + (# of short pulses \* short pulse width) / 100 or T duty cycle factor calculation is -20.41dB.

Refer to section 7.2 for duty cycle factor calculation (-20.41dB)

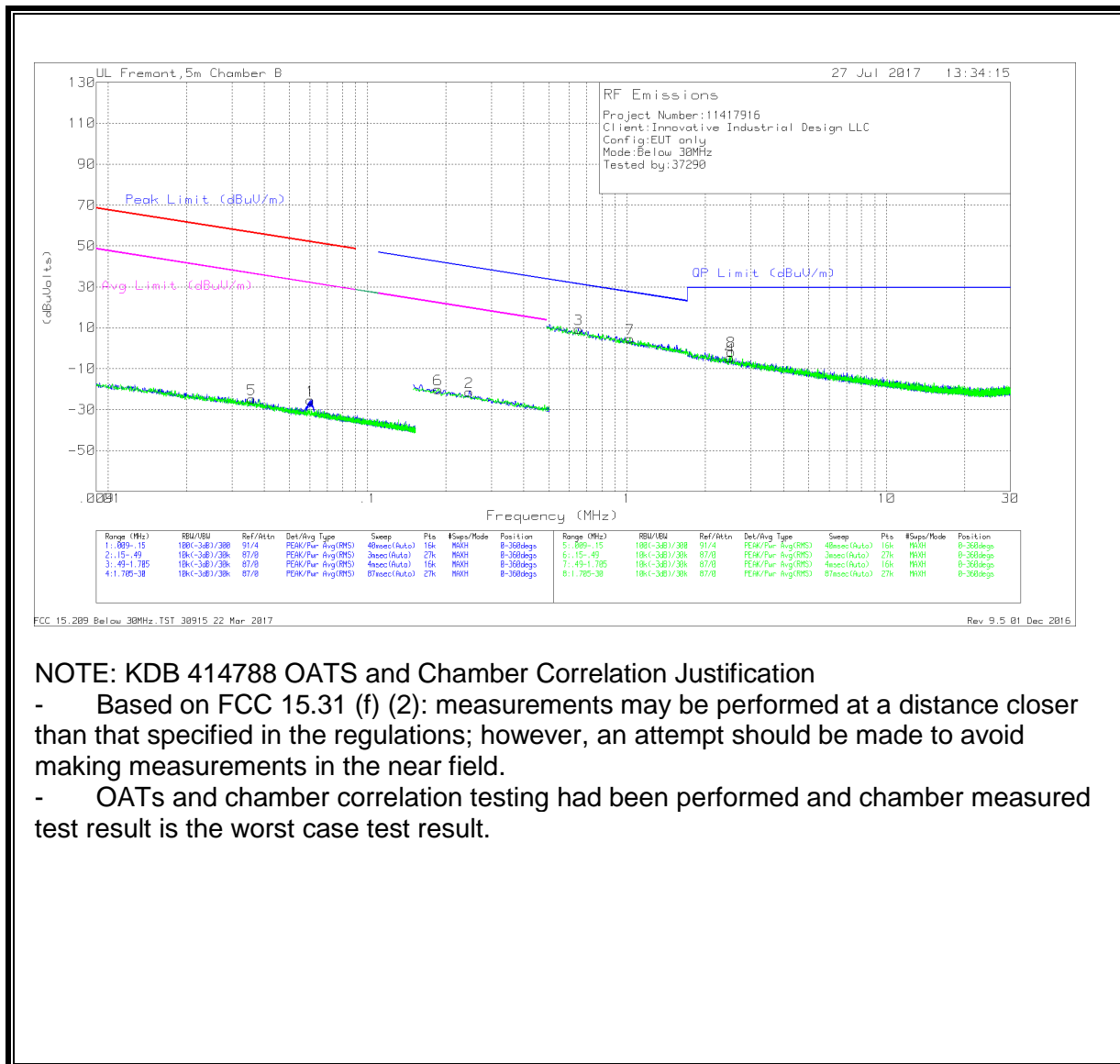
Note: Radiated peak result is based on 100% duty cycle sample; average reading = peak reading + DCCF.

\*\*\* Indicates frequency in CFR15.205/RSS-Gen 8.10 -Restricted Band

RBW = 1MHz, VBW = 3MHz for the final Peak and Average readings



**HARMONICS AND TX SPURIOUS EMISSIONS BELOW 30MHz**



**NOTE: KDB 414788 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)
5	.03573	40.43	Pk	13.2	1.4	-80	-24.97	56.52	-81.49	36.52	-61.49	0-360
1	.06028	41.11	Pk	12	1.4	-80	-25.49	51.98	-77.47	31.98	-57.47	0-360
6	.18669	46.87	Pk	11.6	1.5	-80	-20.03	42.2	-62.23	22.2	-42.23	0-360
2	.24634	45.57	Pk	11.6	1.5	-80	-21.33	39.78	-61.11	19.78	-41.11	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.64975	36.24	Pk	11.6	1.5	-40	9.34	31.36	-22.02	0-360
7	1.02869	31.45	Pk	11.6	1.5	-40	4.55	27.38	-22.83	0-360
4	2.49152	22.13	Pk	11.7	1.5	-40	-4.67	29.5	-34.17	0-360
8	2.52087	25.28	Pk	11.6	1.5	-40	-1.62	29.5	-31.12	0-360

Pk - Peak detector