



TEST REPORT

Report Number.: 13092603-E2V3

Applicant : VAST PRODUCTION SERVICES
307 ROBBINS DRIVE
TROY, MI 48083, U.S.A

FCC ID : 2AJFG561129

ISED : 21819-561129

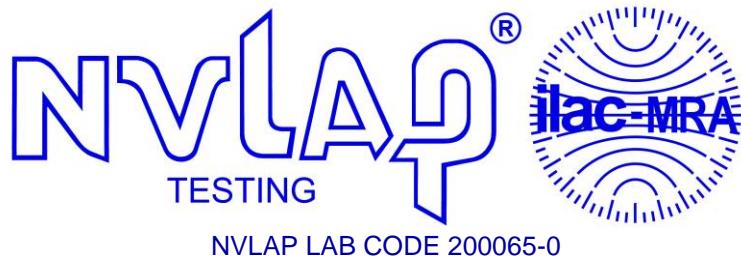
Model Number: 84735895

EUT Description : URBAN ACTIVE VEHICLE 2.1 433.92MHz

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS 210 Issue 10
INDUSTRY CANADA RSS-GEN Issue 5

Date of Issue:
July 14, 2020

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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	6/12/2020	Initial Issue	Steven Tran
V2	7/13/2020	Updated Section 5.3, 7.2 and Added 7.3 Transmission Time & addressed reviewer's comments	Vien Tran
V3	7/14/2020	Updated Section 7.2 Test Procedure and corrected fundamental frequency to 433.92MHz per reviewer's comments	Vien Tran

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Vast Production Services
307 Robbins Drive
Troy, MI 48083, U.S.A.

EUT DESCRIPTION : URBAN ACTIVE VEHICLE 2.1 433.92MHz

MODEL: 84735895

SERIAL NUMBER: hh089087 (Radiated)

DATE TESTED: April 17, 2020 to July 09, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Complies
INDUSTRY CANADA RSS-210 Issue 10, Annex A	Complies
INDUSTRY CANADA RSS-GEN Issue 5	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

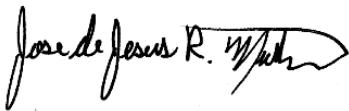
This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This 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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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 5, and RSS-210 Issue 10.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, 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	47658 Kato Rd
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input type="checkbox"/> Chamber I
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input type="checkbox"/> Chamber J
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F	<input checked="" type="checkbox"/> Chamber K
	<input type="checkbox"/> Chamber G	<input type="checkbox"/> Chamber L
	<input type="checkbox"/> Chamber H	<input type="checkbox"/> Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dB_{uV/m}) = Measured Voltage (dB_{uV}) + Antenna Factor (dB/m) + Cable

Loss (dB) – Preamp Gain (dB)

36.5 dB_{uV} + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dB_{uV/m}

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an URBAN ACTIVE VEHICLE 2.1 433.92MHz.

5.2. MAXIMUM FUNDAMENTAL FIELD STRENGTH

The transmitter has peak fundamental field strengths as follows:

Frequency Range (MHz)	Mode	Field Strength Peak (dBuV/m)	Field Strength Average (dBuV/m)
433.92	Normal	84.06	68.54

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes:

561108, 433.92MHz uses a trace antenna

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.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
CAN/LIN Interface	Vector	VN1630	N/A	N/A
Laptop	Dell	E6410	825633381124	N/A
Phone	ZTE	N9137	320576481360	N/A
DC Power Supply	Ametek	XT 15-4	1319A02779	DoC

I/O CABLES

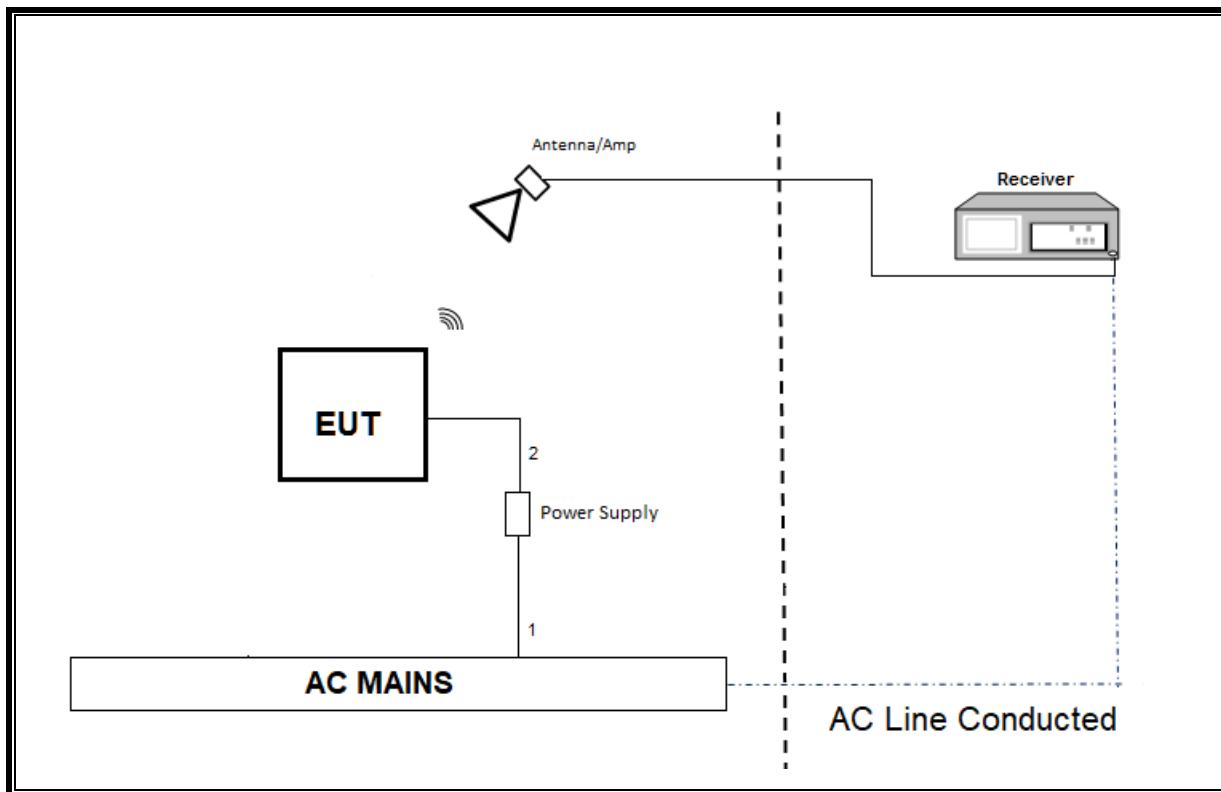
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-Shielded	1	to DC Power Supply
2	DC Power Supply	1	Banana Plug	Shielded	3	to EUT
3	USB	1	A to B	Shielded	3	Laptop to CAN
4	Serial	1	DB-9/Banana Plug	Shielded	3	CAN to Power Supply/EUT

TEST SETUP

The EUT is programmed for continuous TX mode for Radiated and Bandwidth measurements. For the Transmission Time test, the EUT is programmed for manual TX operation. The EUT was programmed through the USB port. The USB port was left unpopulated during testing since it is only used for factory programming and the USB port will remain inaccessible by the user after it is installed into the vehicle.

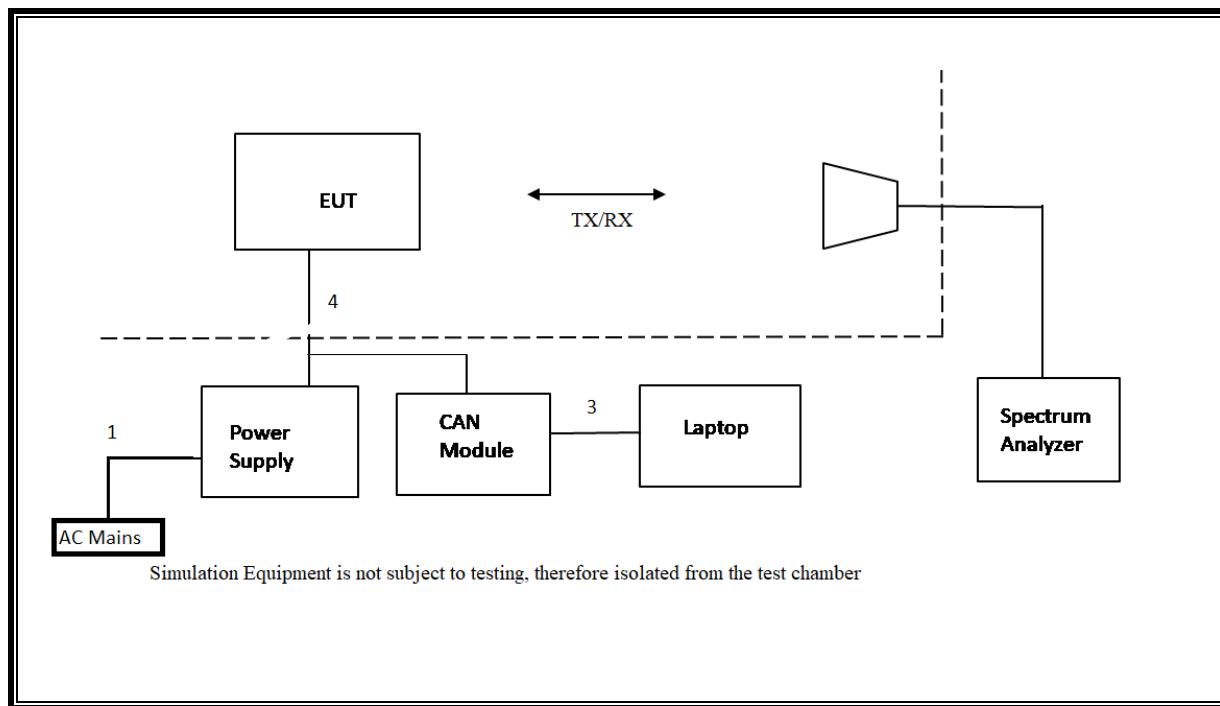
SETUP DIAGRAM FOR TESTS

Continuous TX Mode: For Radiated & Conducted Emissions tests.



SETUP DIAGRAM FOR TESTS

Manual TX mode: For Transmission Time test.



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0203383	02/18/2021
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0186650	01/23/2021
Antenna, Broad Band Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	PRE0181574	10/14/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1569	01/30/2021
Antenna	ETS-Lindgren	3117	EMC4294	06/14/2020
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	PRE0179466	05/31/2020
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	PRE0179468	05/31/2020
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight Technologies Inc	E4446A	T146	01/29/2021
UL AUTOMATION SOFTWARE				
Radiated Software (Above 1GHz)	UL	UL EMC	Ver 9.5, April 15, 2020	
Radiated Software (Below 30MHz)	UL	UL EMC	Ver 9.5, April 21, 2020	
Radiated Software (30MHz-1000MHz)	UL	UL EMC	Ver 9.5, April 30, 2020	

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

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 5% 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

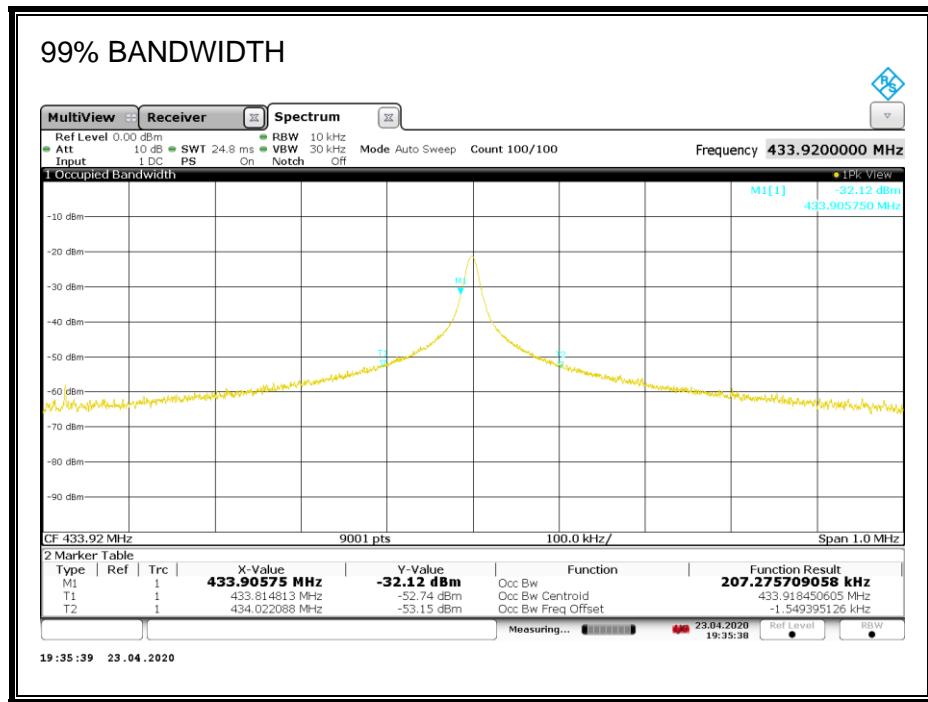
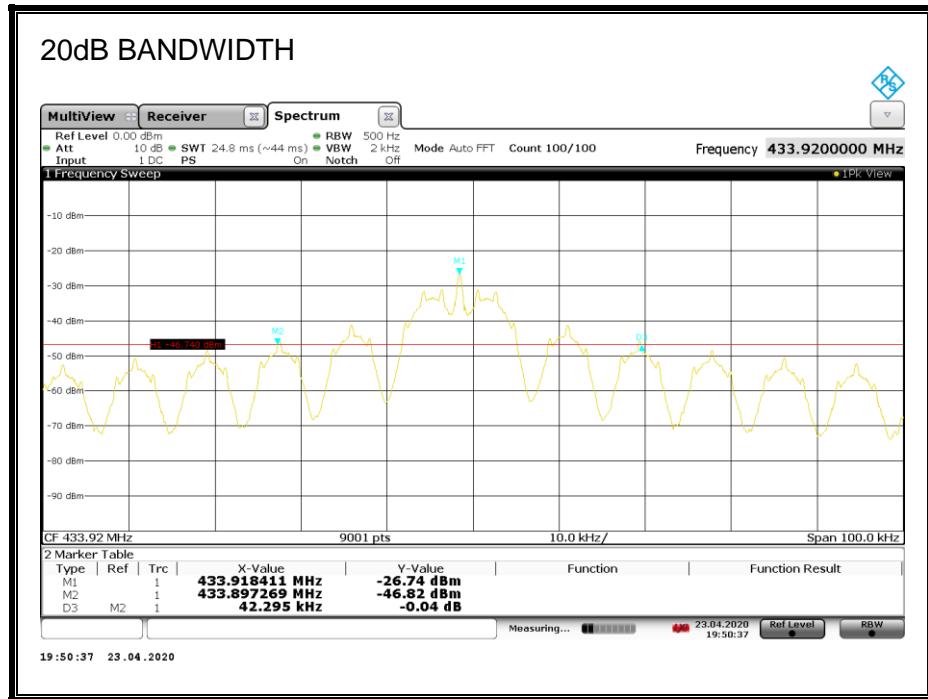
No non-compliance noted:

20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	42.295	1084.8	-1042.505

99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.92	207.28	1084.8	-877.52



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 \geq OBW if possible; otherwise, set RBW to the largest available value and the VBW \geq RBW.

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

1. Duty Cycle = (Number of short pulses * ON time a single short pulse) + (Number of long pulses * ON time a single long pulse) / Pulse train length (or 100ms).
2. Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle)

RESULTS

Tester: 20756 CW

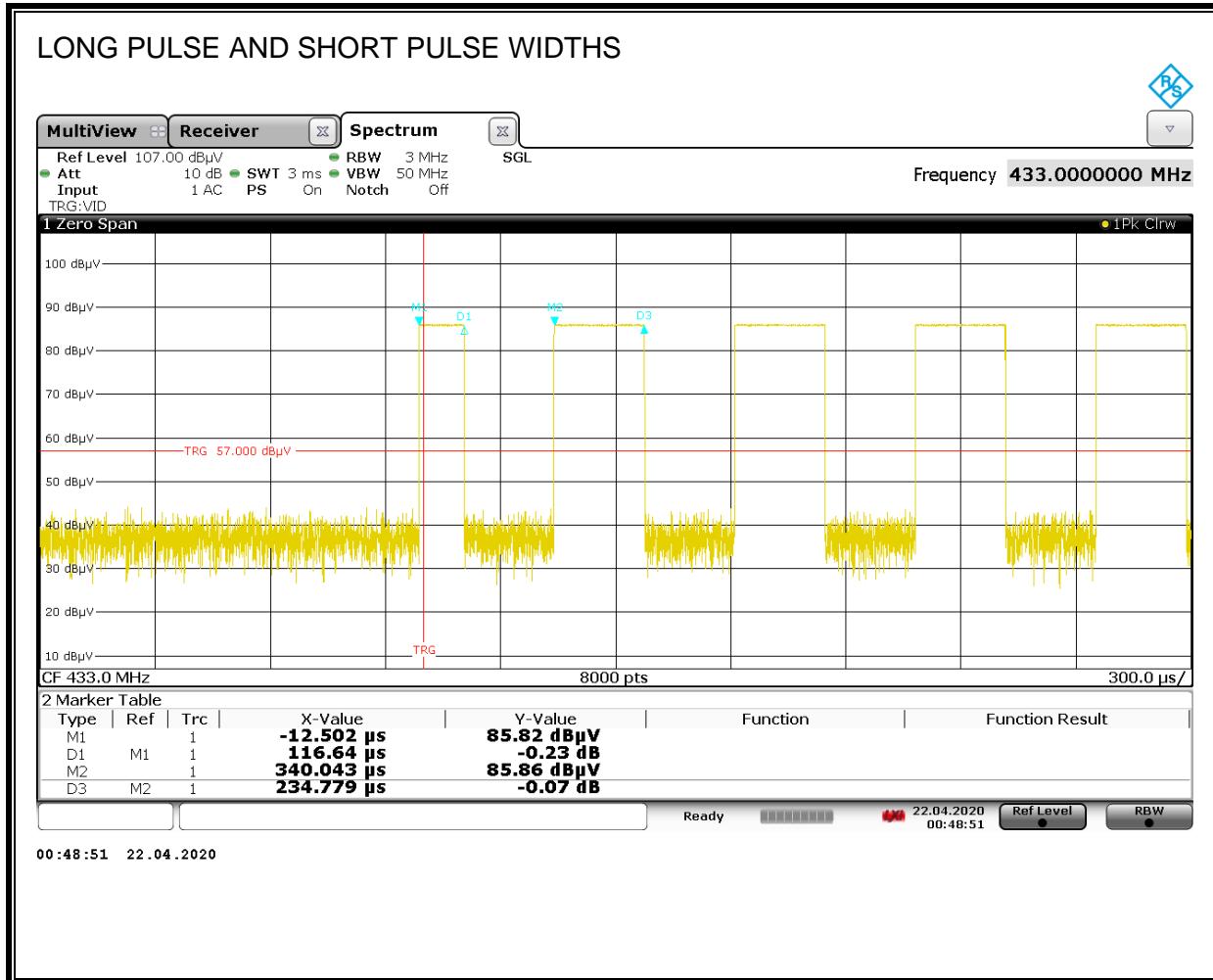
No non-compliance noted:

One Period	Short Pulse Width (ms)	Number of Short Pulse	Long Pulse Width (ms)	Number of Long Pulse	Duty Cycle in a pulse train length (or 100ms)	20*Log Duty Cycle (dB)
100	0.11664	59	0.23478	42	0.167	-15.52

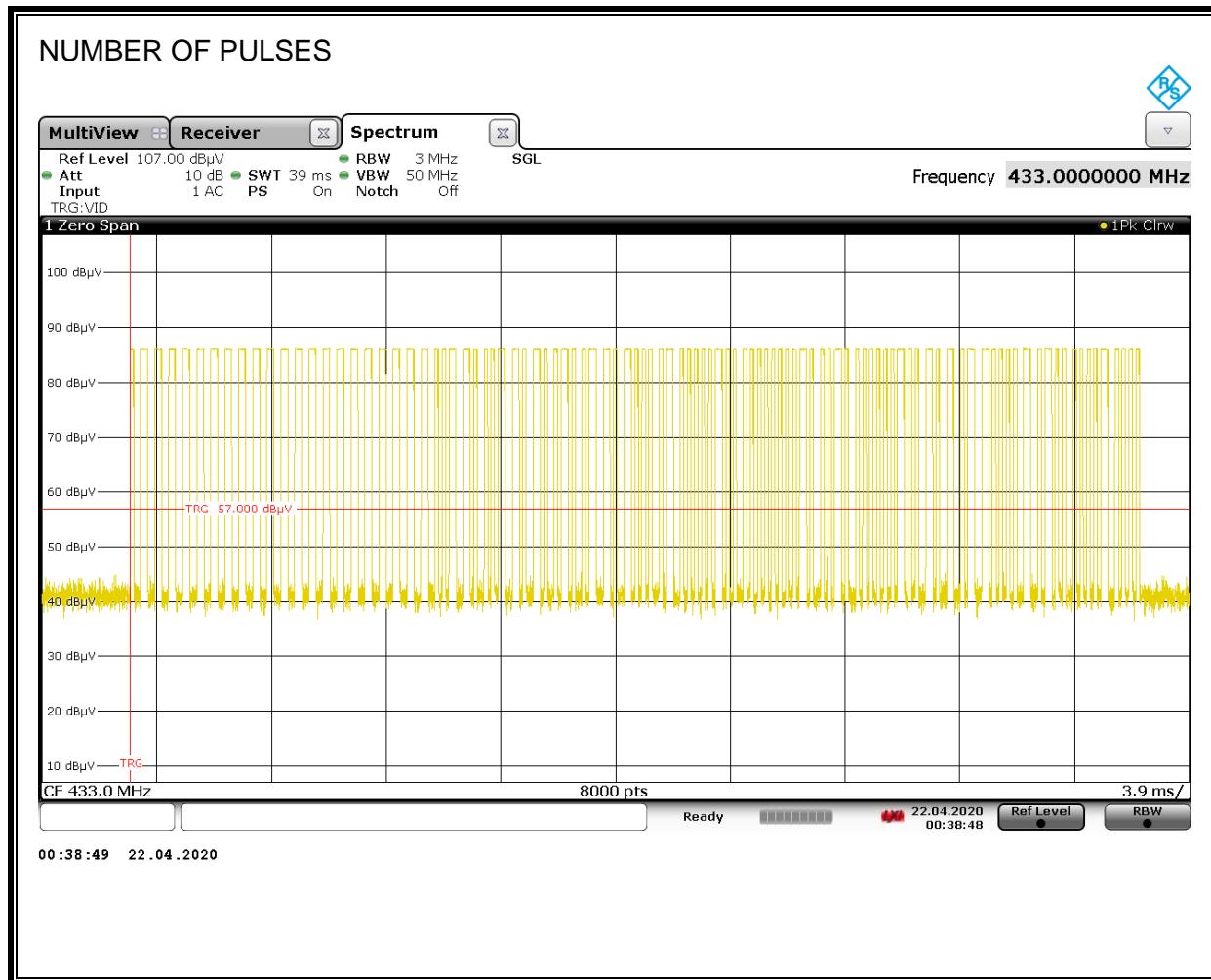
ONE PERIOD



PULSE WIDTHS



NUMBER OF PULSES



7.3 TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)
RSS-210 A.1.1 (b)

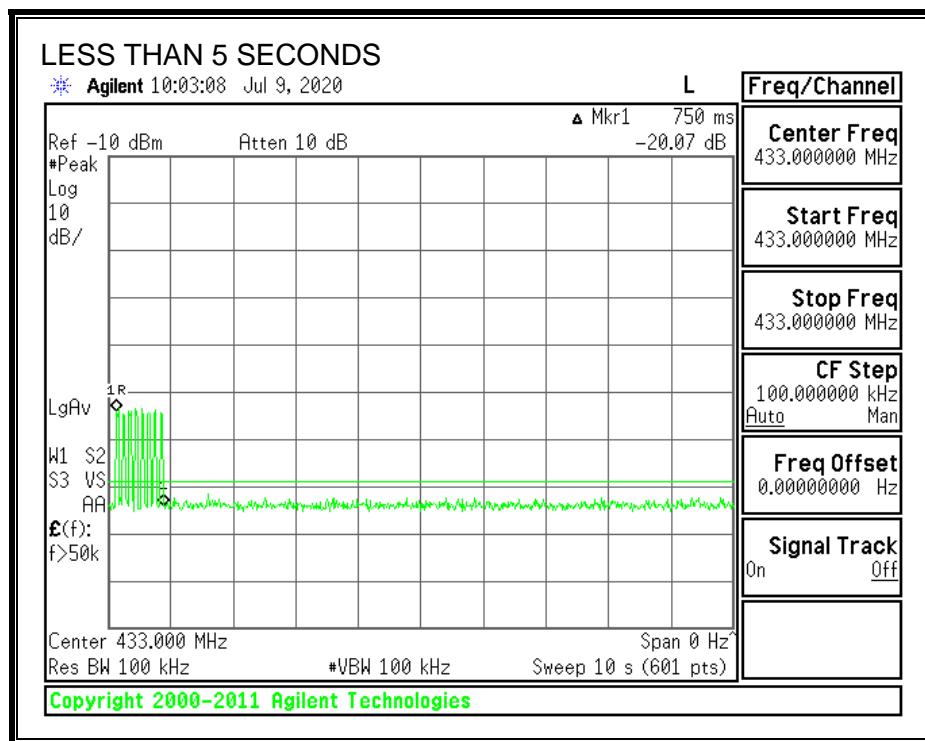
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

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

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	¹ 1,250 to 3,750	1125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	1375 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
10.495 - 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
6.2125 - 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)
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 measurement below 1GHz; 1.5 m above the ground plane for measurement 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.

2D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification

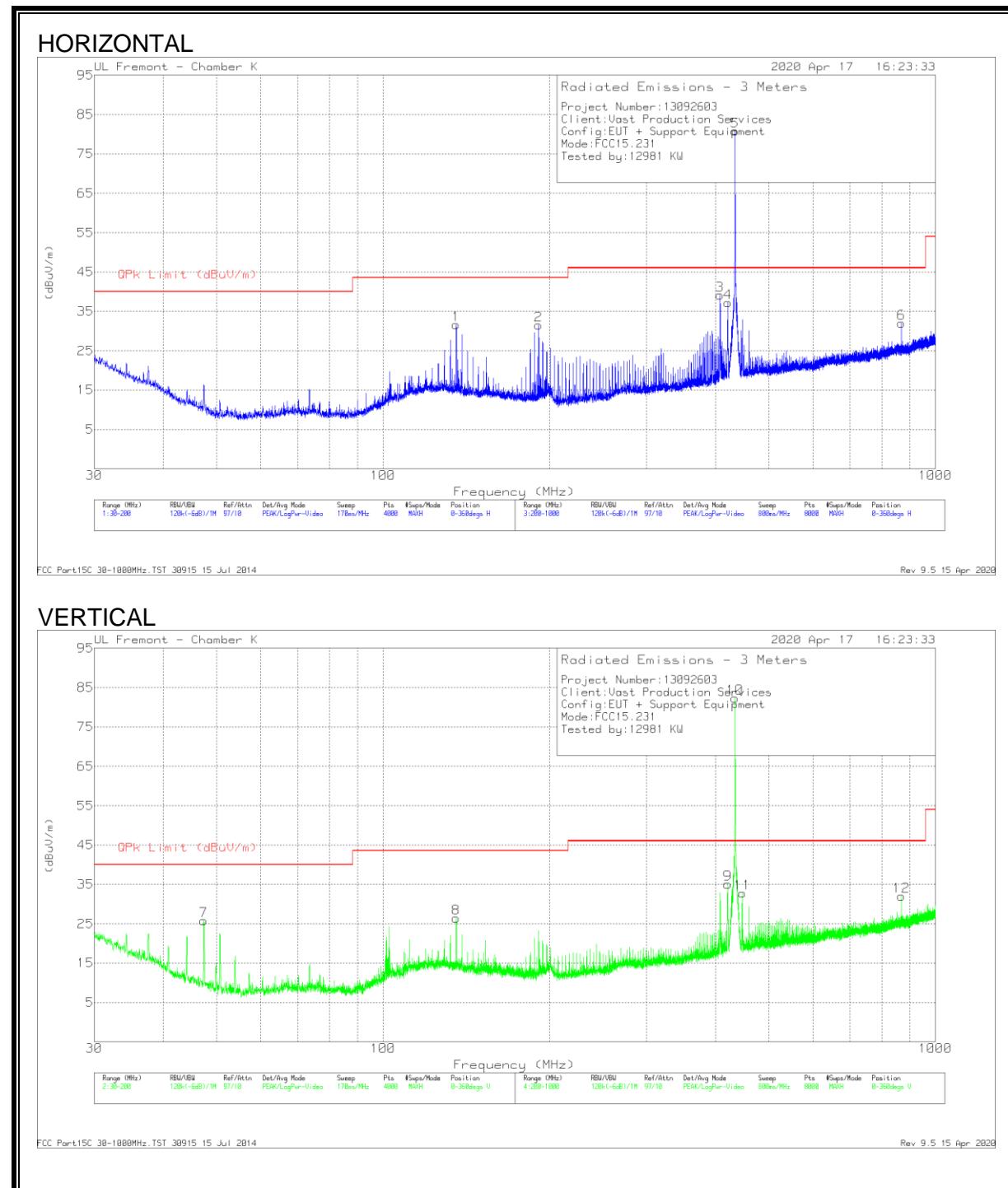
Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

RESULTS

No non-compliance noted:

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 PRE0181574 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	135.7139	43.51	Pk	19.3	-30.7	32.11	43.52	-11.41	0-360	200	H
2	191.3108	45.32	Pk	17.3	-30.4	32.22	80.79	-48.57	0-360	200	H
	* 191.3108		Av	-	-	16.7	60.79	-44.09	-	-	-
7	47.3756	42.91	Pk	14.9	-31.4	26.41	80.79	-54.38	0-360	95	V
	* 47.3756		Av	-	-	10.89	60.79	-49.9	-	-	-
8	135.6351	38.1	Pk	19.3	-30.7	26.7	43.52	-16.82	0-360	95	V
5	433.9179	91.06	Pk	22.4	-29.4	84.06	100.79	-16.73	178	202	H
	* 433.9179		Av	-	-	68.54	80.79	-12.25	-	-	-
6	** 867.8398	37.36	Pk	27.7	-27.3	37.76	80.79	-43.03	143	95	H
	* 867.8398		Av	-	-	22.24	60.79	-38.55	-	-	-
4	420.8359	45.07	Pk	22.2	-29.5	37.77	80.79	-43.02	172	202	H
	* 420.8359		Av	-	-	22.25	60.79	-38.54	-	-	-
3	407.7529	44.35	Pk	21.8	-29.5	36.65	46.02	-9.37	115	202	H
10	433.9179	88.82	Pk	22.4	-29.4	81.82	100.79	-18.97	191	103	V
	* 433.9179		Av	-	-	66.3	80.79	-14.49	-	-	-
12	** 867.8389	36.97	Pk	27.7	-27.3	37.37	80.79	-43.42	72	133	V
	* 867.8389		Av	-	-	21.85	60.79	-38.94	-	-	-
11	446.9985	42.52	Pk	22.7	-29.3	35.92	80.79	-44.87	198	136	V
	* 446.9985		Av	-	-	20.4	60.79	-40.39	-	-	-
9	420.8318	43.46	Pk	22.2	-29.5	36.16	80.79	-44.63	155	124	V
	* 420.8318		Av	-	-	20.64	60.79	-40.15	-	-	-

Pk - Peak detector

Av – Average detector

* Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle).
 = Peak Reading (dBuV/m) - 15.52dB.

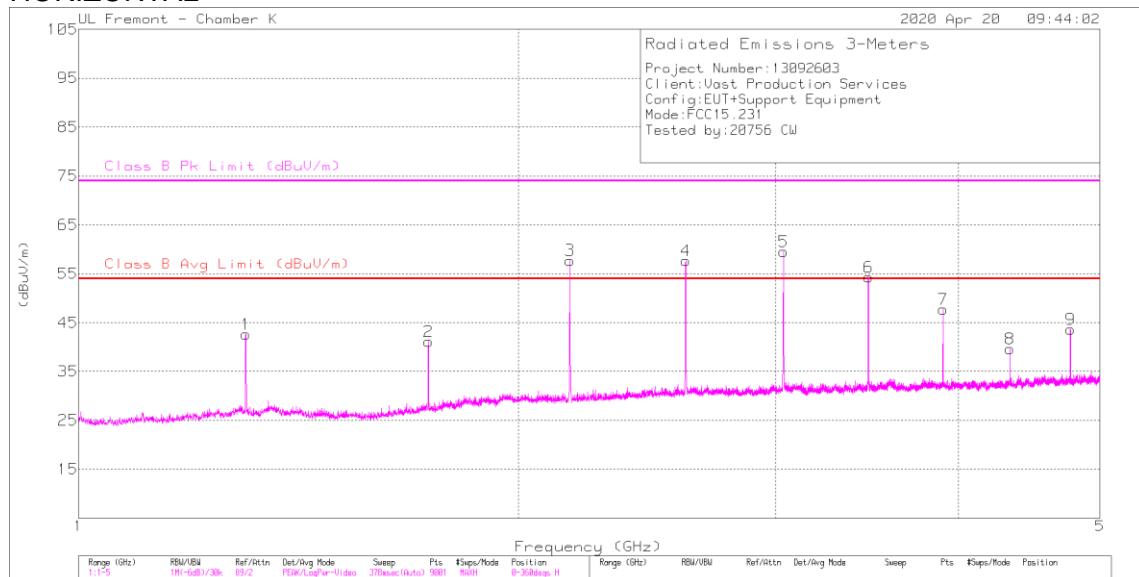
(Refer to section 7.2 Duty Cycle Calculation)

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

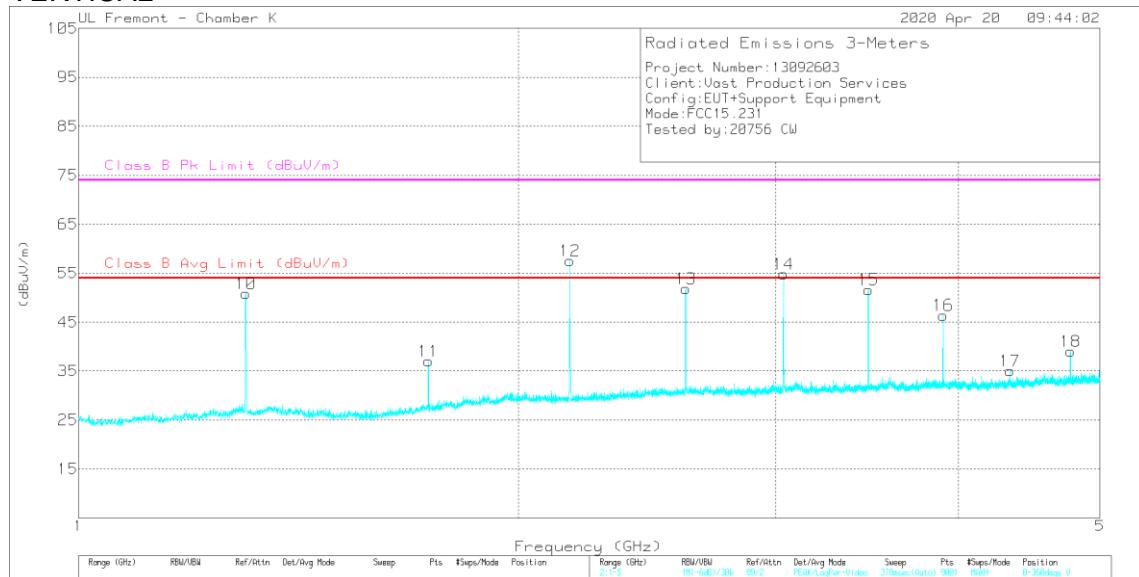
HORIZONTAL



FCC Part 15 Subpart B Class B 1-5GHz, TST 30915 16 Jun 2015

Rev 9.5 15 Apr 2020

VERTICAL



FCC Part 15 Subpart B Class B 1-5GHz, TST 30915 16 Jun 2015

Rev 9.5 15 Apr 2020

Marker	Frequency (GHz)	Meter Readin g (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	FCC Avg Limit (dBuV/m)	Margin (dB)	FCC Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.30175	51.99	Pk	29	-34.7	46.29	-	-	74	-27.71	37	96	H
			Av			30.77	54	-23.23	-	-			
2	** 1.73573	49.53	Pk	29.6	-34.7	44.43	-	-	80.79	-36.36	334	141	H
			Av			28.91	60.79	-31.88	-	-			
3	** 2.16956	61.58	Pk	31.2	-34.5	58.28	-	-	80.79	-22.51	350	153	H
			Av			42.76	60.79	-18.03	-	-			
4	** 2.60353	59.87	Pk	32.6	-34.2	58.27	-	-	80.79	-22.52	349	191	H
			Av			42.75	60.79	-18.04	-	-			
5	** 3.03754	61.65	Pk	32.9	-33.3	61.25	-	-	80.79	-19.54	330	165	H
			Av			45.73	60.79	-15.06	-	-			
6	** 3.47123	56.58	Pk	33.1	-32.2	57.48	-	-	80.79	-23.31	349	293	H
			Av			41.96	60.79	-18.83	-	-			
7	** 3.90541	47.24	Pk	33.3	-30.8	49.74	-	-	74	-24.26	335	230	H
			Av			34.22	54	-19.78	-	-			
8	** 4.33931	43.66	Pk	33.5	-30.6	46.56	-	-	74	-27.44	325	312	H
			Av			31.04	54	-22.96	-	-			
9	** 4.77303	44.76	Pk	34.1	-30	48.86	-	-	74	-25.14	325	276	H
			Av			33.34	54	-20.66	-	-			
10	** 1.3017	57.65	Pk	29	-34.7	51.95	-	-	74	-22.05	317	238	V
			Av			36.43	54	-17.57	-	-			
11	** 1.73562	46.22	Pk	29.6	-34.7	41.12	-	-	80.79	-39.67	40	160	V
			Av			25.6	60.79	-35.19	-	-			
12	** 2.1696	64.6	Pk	31.2	-34.5	61.3	-	-	80.79	-19.49	38	107	V
			Av			45.78	60.79	-15.01	-	-			
13	** 2.6035	58.28	Pk	32.6	-34.2	56.68	-	-	80.79	-24.11	155	320	V
			Av			41.16	60.79	-19.63	-	-			
14	** 3.03748	57.67	Pk	32.9	-33.3	57.27	-	-	80.79	-23.52	158	242	V
			Av			41.75	60.79	-19.04	-	-			
15	** 3.47141	52.59	Pk	33.1	-32.2	53.49	-	-	80.79	-27.3	209	98	V
			Av			37.97	60.69	-22.72	-	-			
16	** 3.90529	46.53	Pk	33.3	-30.8	49.03	-	-	74	-24.97	199	243	V
			Av			33.51	54	-20.49	-	-			
17	** 4.33889	41.79	Pk	33.5	-30.6	44.69	-	-	74	-29.31	79	120	V
			Av			29.17	54	-24.83	-	-			
18	** 4.77303	43	Pk	34.1	-30	47.1	-	-	74	-26.9	1	96	V
			Av			31.58	54	-22.42	-	-			

Pk - Peak detector

Av – Average detector

* Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle).
 = Peak Reading (dBuV/m) - 15.52dB.

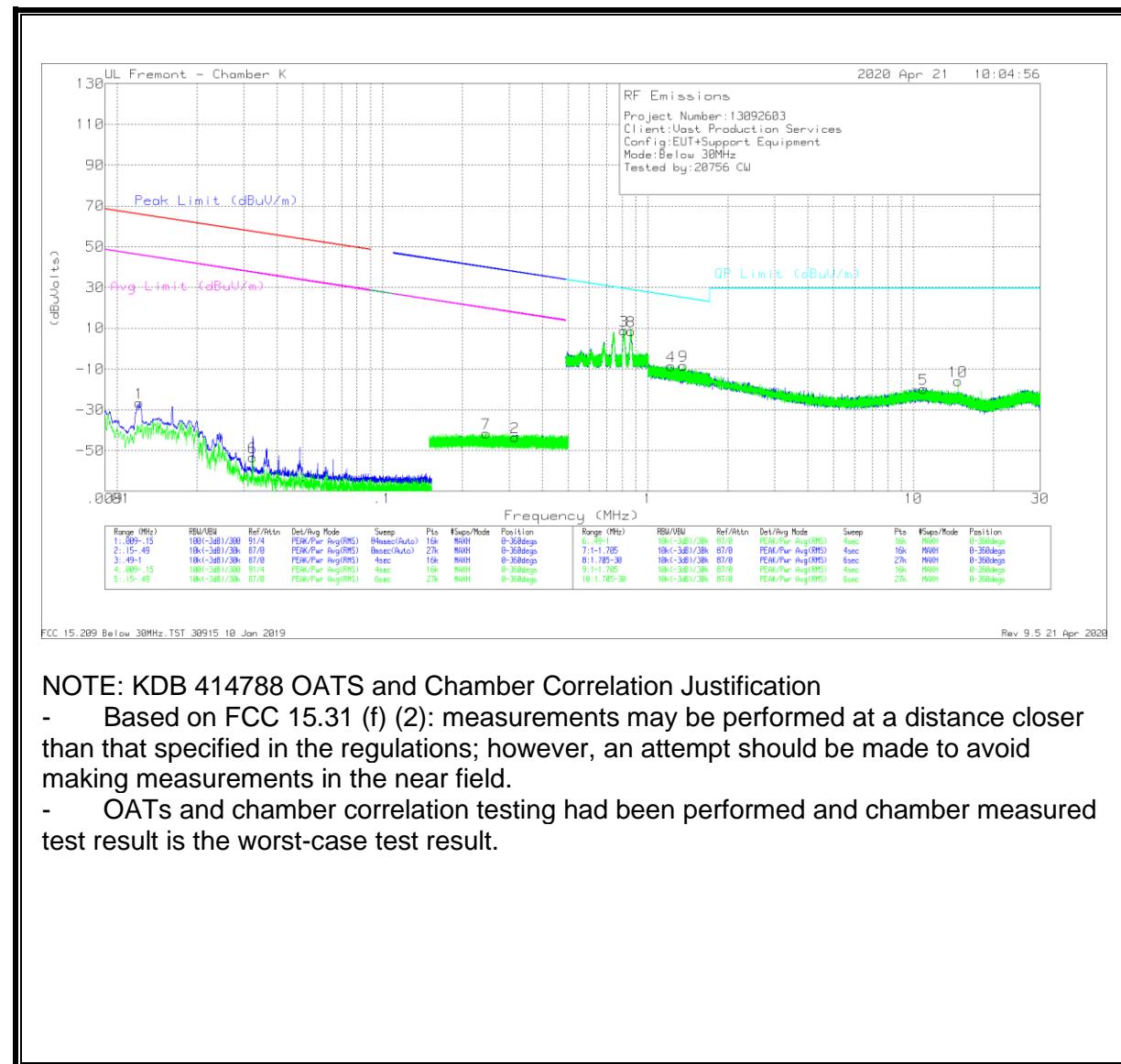
(Refer to section 7.2 Duty Cycle Calculation)

Note1: Radiated peak result is based on 100% duty cycle sample; average reading = peak reading + DCCF

NOTE 2: Marker 12 wasn't maximized because its BLE signal

** Harmonics of fundamental 433.92MHz

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 (ACF)	Cables w/ PRE0186650	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01216	25.32	Pk	59.9	-31.8	-80	-26.58	65.89	-92.47	45.89	-72.47	-	-	-	-	0-360
2	.3152	12.64	Pk	56.1	-32.1	-80	-43.36	-	-	-	-	37.64	-81	17.64	-61	0-360
6	.03249	1.36	Pk	57.5	-32.2	-80	-53.34	57.35	-110.69	37.35	-90.69	-	-	-	-	0-360
7	.24521	14.47	Pk	56.1	-32.1	-80	-41.53	-	-	-	-	39.82	-81.35	19.82	-61.35	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuVolts)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.81163	24.95	Pk	56.1	-32.1	-40	8.95	29.43	-20.48	0-360
8	.86366	24.67	Pk	56.1	-32.1	-40	8.67	28.89	-20.22	0-360
4	1.21982	17.87	Pk	45.7	-32.1	-40	-8.53	25.9	-34.43	0-360
5	10.89072	17.76	Pk	34.4	-31.8	-40	-19.64	29.5	-49.14	0-360
9	1.36102	18.8	Pk	44.9	-32.1	-40	-8.4	24.95	-33.35	0-360
10	14.71487	21.65	Pk	34.1	-31.7	-40	-15.95	29.5	-45.45	0-360

Pk - Peak detector