



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

VAPORIZER

MODEL NUMBER: 4680

FCC ID: 2AG9A116010

REPORT NUMBER: R11638993-E1

ISSUE DATE: 2018-01-24

Prepared for
THE PROCTOR & GAMBLE COMPANY
5299 SPRING GROVE AVE
CINCINNATI, OH 45217, USA

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NVLAP LAB CODE 200246-0

Revision History

<u>Ver.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
1	2017-09-20	Initial Issue	Brian T. Kiewra
2	2018-01-24	Corrected FCC ID	Brian T. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: The Proctor & Gamble Company
5299 Spring Grove Ave.
Cincinnati, OH 45217, USA

EUT DESCRIPTION: Vaporizer

MODEL: 4680

SERIAL NUMBER: ENT00333377L2, ENT00333387GA, and ENT0033337K37

DATE TESTED: 2017-09-07 to 2017-09-09

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

UL LLC 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 LLC 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.

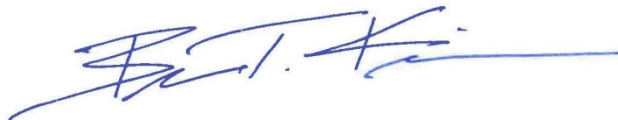
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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, or any agency of the U.S. Government.

Approved & Released
For UL LLC By:



Bartlomiej Mucha
Staff Engineer
UL – Consumer Technology Division

Prepared By:



Brian T. Kiewra
EMC Engineer
UL – Consumer Technology Division

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr, Suite B, Morrisville, NC 27560.

12 Laboratory Dr., RTP, NC 27709
☐ Chamber A
☐ Chamber C

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560
☒ Chamber NORTH
☐ Chamber SOUTH

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
RF output power, conducted	±0.45 dB
Power Spectral Density, conducted	±1.50 dB
Unwanted Emissions, conducted	±2.94 dB
All emissions, radiated	±5.36 dB
Conducted Emissions (0.150 – 30MHz)	±3.65 dB
Temperature	±0.07 °C
Humidity	±2.26 %
DC and Low Frequency Voltages	±1.27 %

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a BLE transceiver.

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak and average E-field as follows:

Frequency Range (MHz)	Mode	Output Peak E-field Strength (dBuV/m)	Output Average E-field Strength (dBuV/m)
2402 - 2480	BLE	93.08	92.06

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an inverted-F antenna, with a maximum gain of 1.1 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Enterprise_FCC_-4_9dBm_24XYMHz.hex.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output E-field.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	Proctor & Gamble	4660	ENT0033337P68	N/A
Power Supply	Braun	5210	N/A	N/A

I/O CABLES

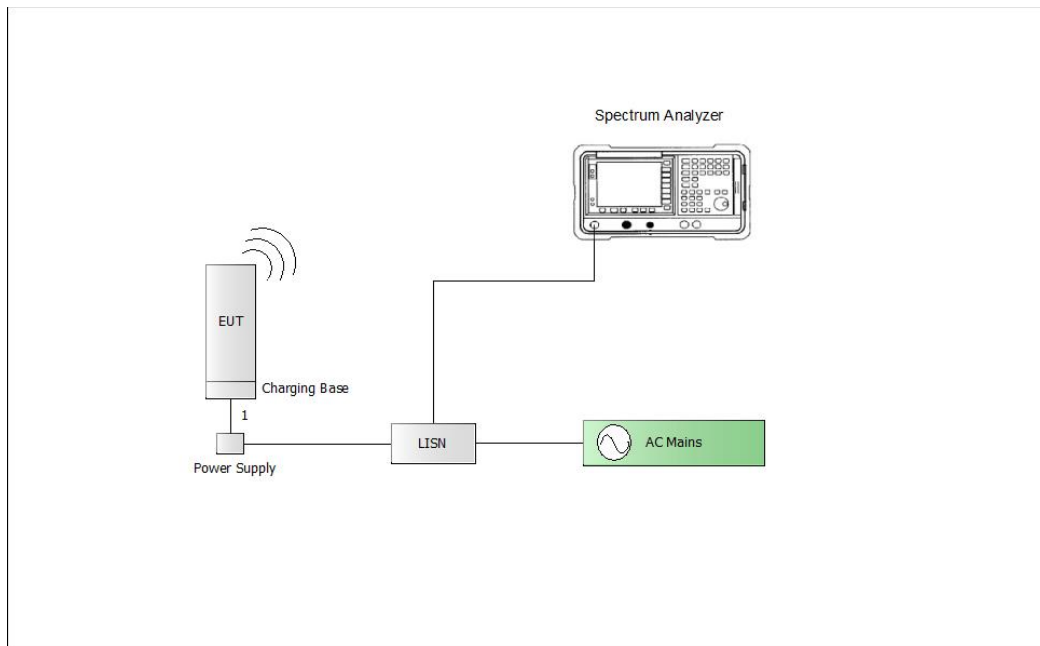
I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	DC	DC Mains	<3m	None

TEST SETUP

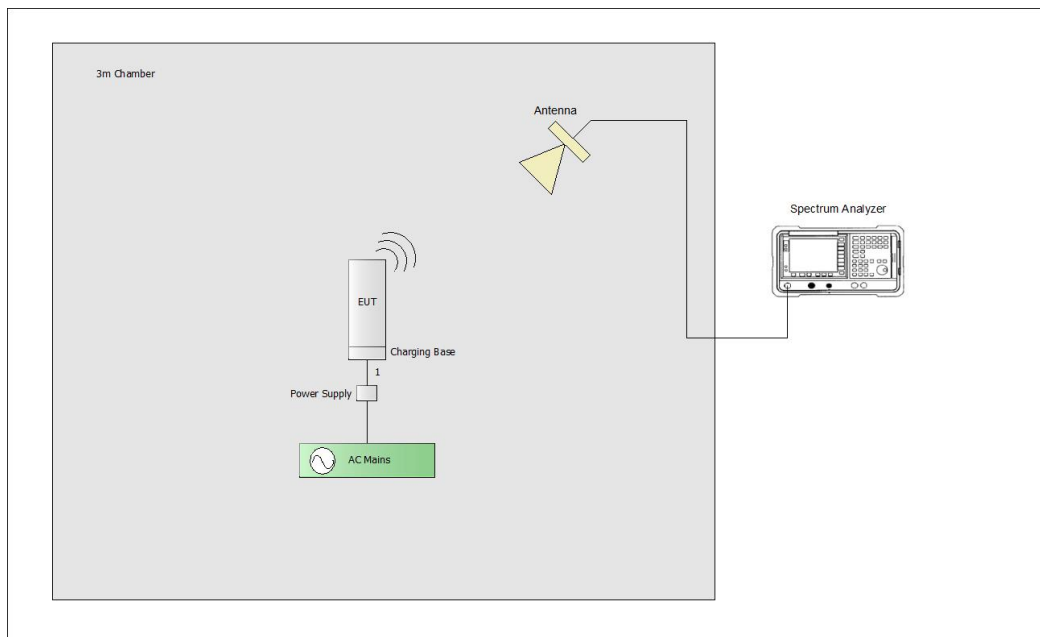
The EUT is installed as a standalone unit.

SETUP DIAGRAM FOR TESTS

Line Conducted



Radiated



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2016-12-28	2017-12-31
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2017-06-15	2018-06-15
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2017-04-05	2018-04-05
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2016-09-06	2017-09-30
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2016-10-04	2017-10-04
N-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2017-06-11	2018-06-11
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2017-08-18	2018-08-18
N-SAC04	Gain-loss string: 18-40GHz	Various	Various	2017-03-03	2018-03-03
SA0027	Spectrum Analyzer	Agilent	N9030A	2017-03-16	2018-03-16
SA0026 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2017-02-17	2018-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
s/n 161024690	Environmental Meter	Fisher Scientific	15-077-963	2016-12-21	2018-12-21

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL076	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2017-06-12	2018-06-12
s/n 160938893	Environmental Meter	Fisher Scientific	14-650-118	2016-11-02	2018-11-02
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2017-08-22	2018-08-22
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2017-08-23	2018-08-23
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2017-06-12	2018-06-12
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Miscellaneous				
MM0168	Multi-meter	Agilent	U1232A	2016-10-07	2017-10-31
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2017-07-03	2018-07-03

7. TEST RESULTS

7.1.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

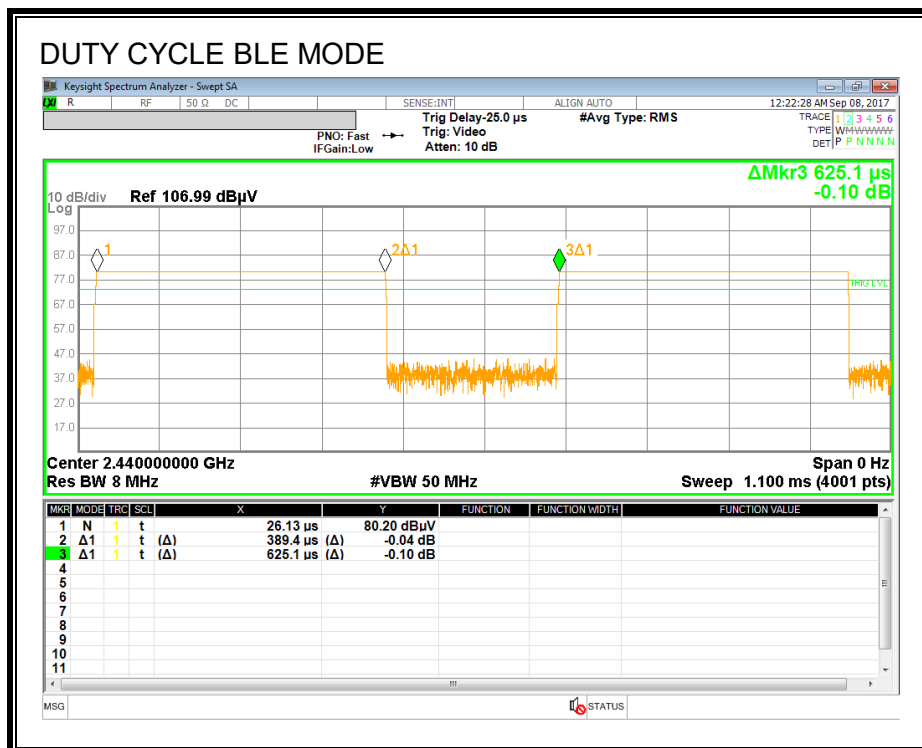
ANSI C63.10-2013, section 11.6, paragraph b. (Zero-span spectrum analyzer method.)

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time T (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	1/T Minimum VBW (kHz)
BLE	0.389	0.625	0.623	62.29%	2.568

The $VBW \geq 1/T$ method was used for average field-strength measurements of the fundamental frequency and its harmonics.

DUTY CYCLE PLOT **BLE**



7.1.2. 99% and 20dB BANDWIDTH LIMITS

None; for reporting purposes only.

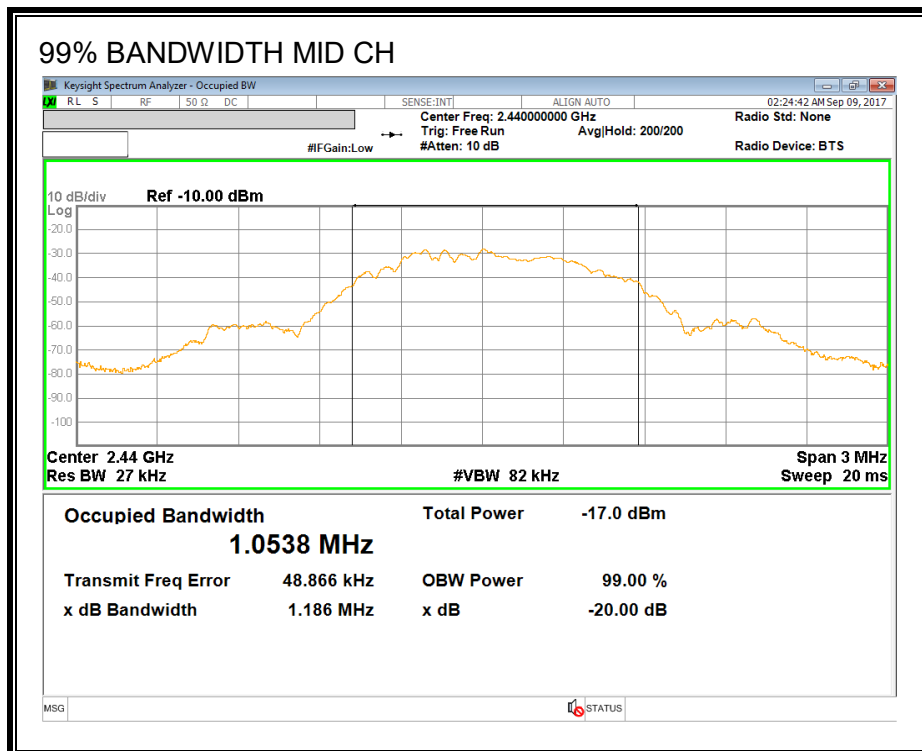
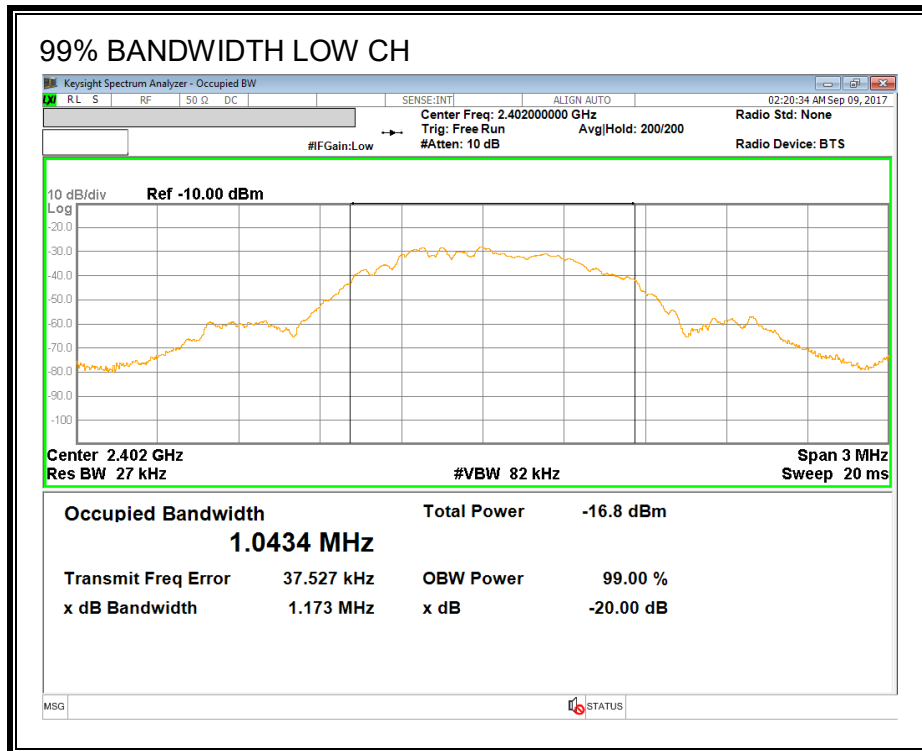
TEST PROCEDURE

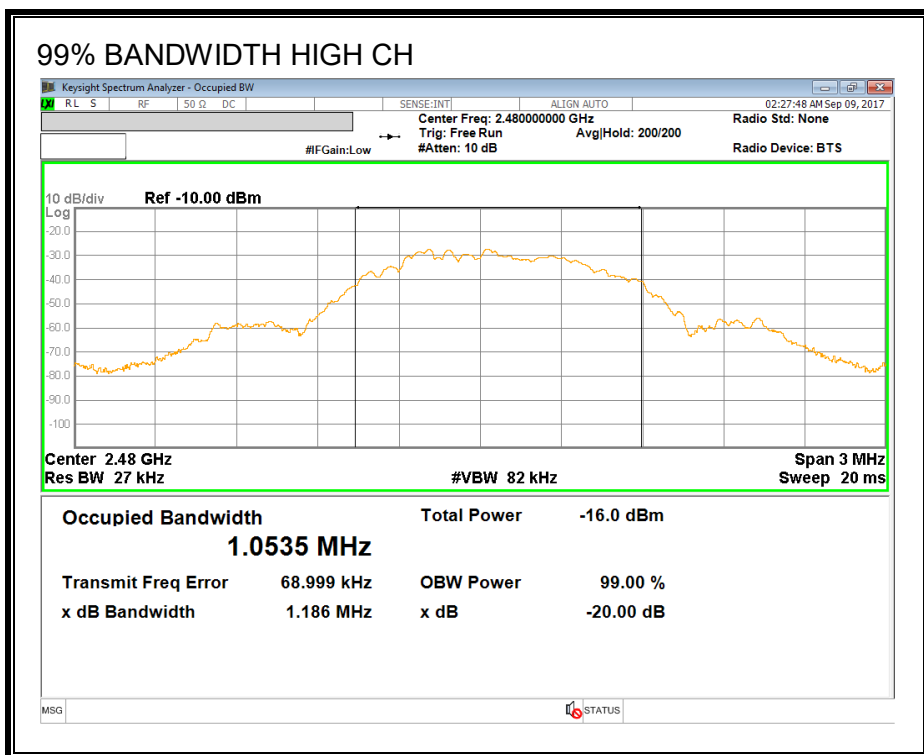
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

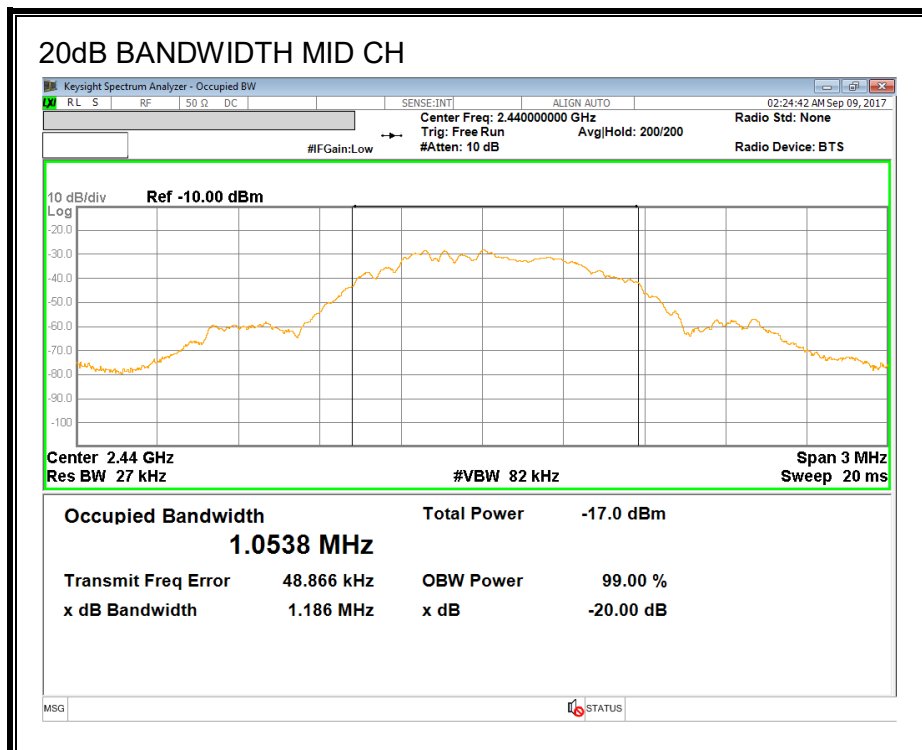
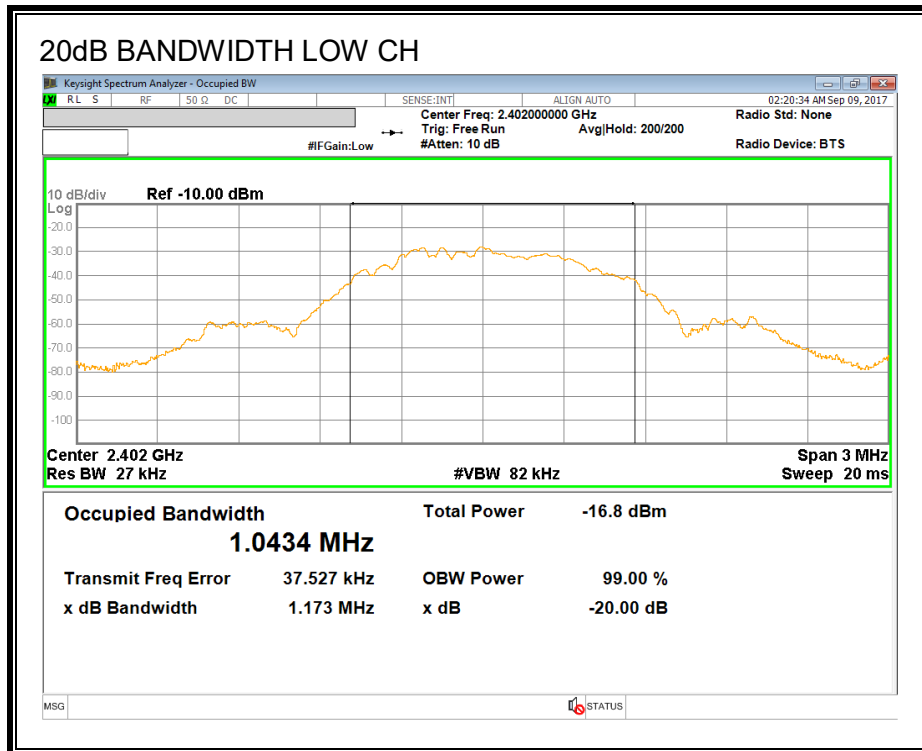
Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Low	2402	1.0434	1.173
Middle	2440	1.0538	1.186
High	2480	1.0535	1.186

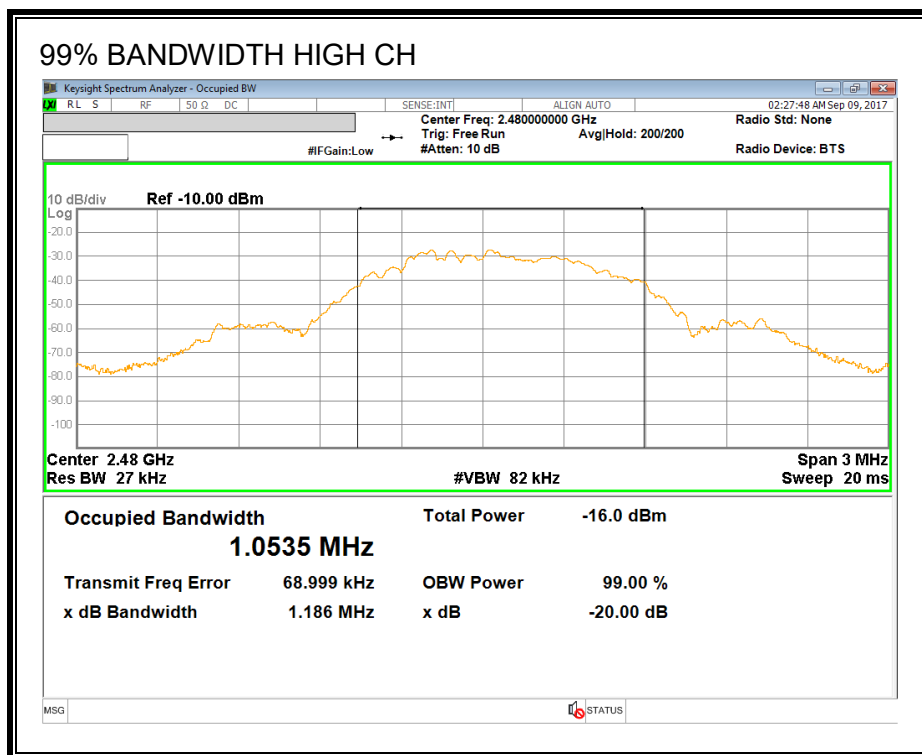
99% BANDWIDTH





20dB BANDWIDTH





Test Information

Tester: Mark Nolting

Date: 2017-09-09

7.2. RADIATED EMISSIONS LIMIT

IC RSS-210, B.10
FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

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., §§15.231 and 15.241.

RESULTS

7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

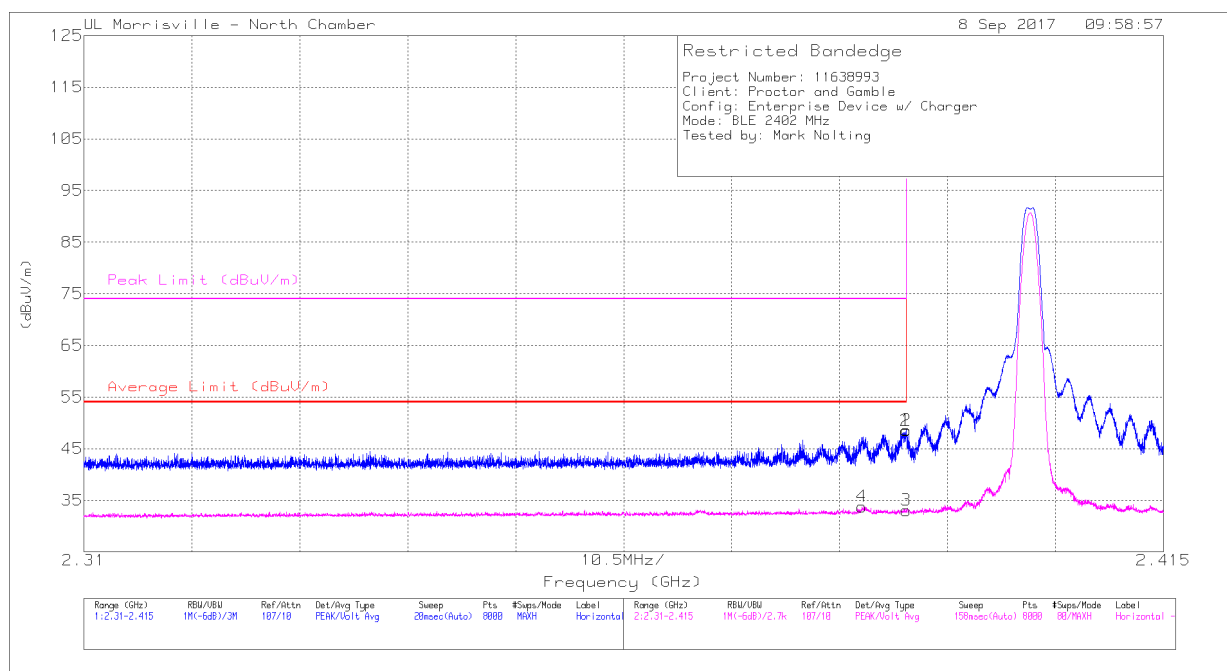
Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
Fc: Low Channel (2402MHz) Highest Emission												
2.402	83.4	PK	31.9	-23.9	91.4	-	-	114	-22.6	156	253	H
2.402	82.43	V1TV	31.9	-23.9	90.43	94	-3.57	-	-	156	253	H
Fc: Middle Channel (2440MHz) Highest Emission												
2.44	84.18	PK	32.1	-23.9	92.38	-	-	114	-21.62	205	355	V
2.44	83.11	V1TV	32.1	-23.9	91.31	94	-2.69	-	-	205	355	V
Fc: High Channel (2480MHz) Highest Emission -												
2.48	84.58	PK	32.3	-23.8	93.08	-	-	114	-20.92	214	383	V
2.48	83.56	V1TV	32.3	-23.8	92.06	94	-1.94	-	-	214	383	V

PK: Maximum Peak

V1TV: $V_B = 1/T_{on}$, Linear Voltage Average where: T_{on} is packet duration

7.2.2. TRANSMITTER RESTRICTED BAND EDGES

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



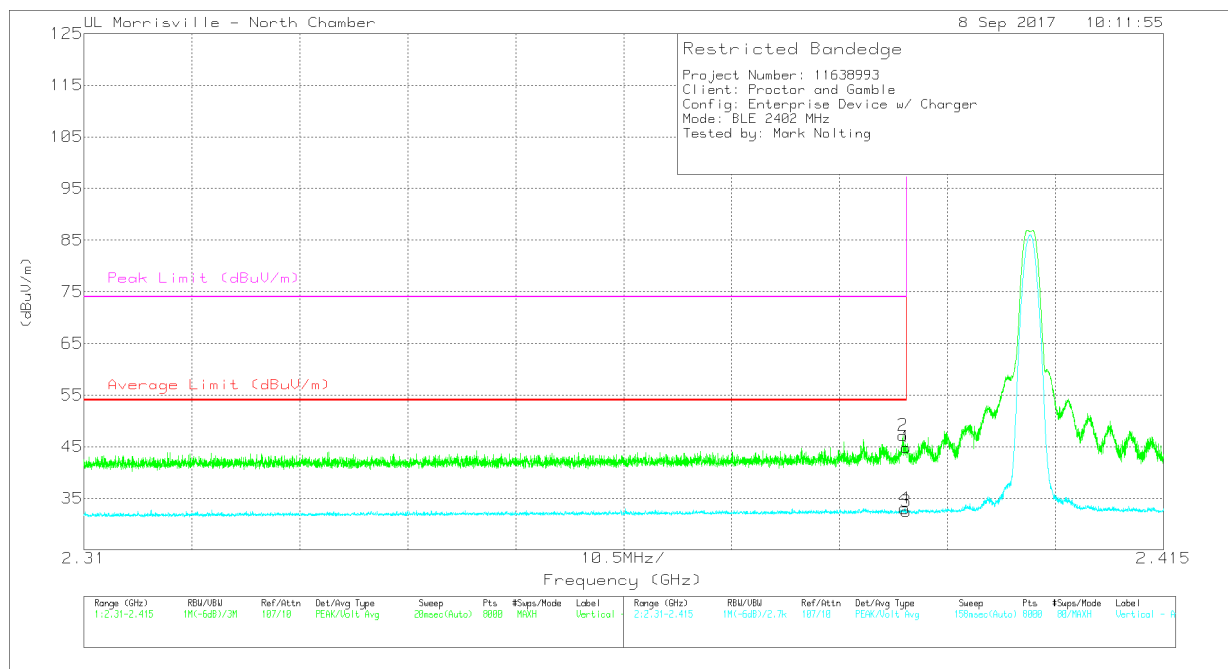
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.71	Pk	31.8	-23.9	48.61	-	-	74	-25.39	163	253	H
2	* 2.39	40.61	Pk	31.8	-23.9	48.51	-	-	74	-25.49	163	253	H
3	* 2.39	25.16	V1TV	31.8	-23.9	33.06	54	-20.94	-	-	163	253	H
4	* 2.386	25.88	V1TV	31.8	-23.9	33.78	54	-20.22	-	-	163	253	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



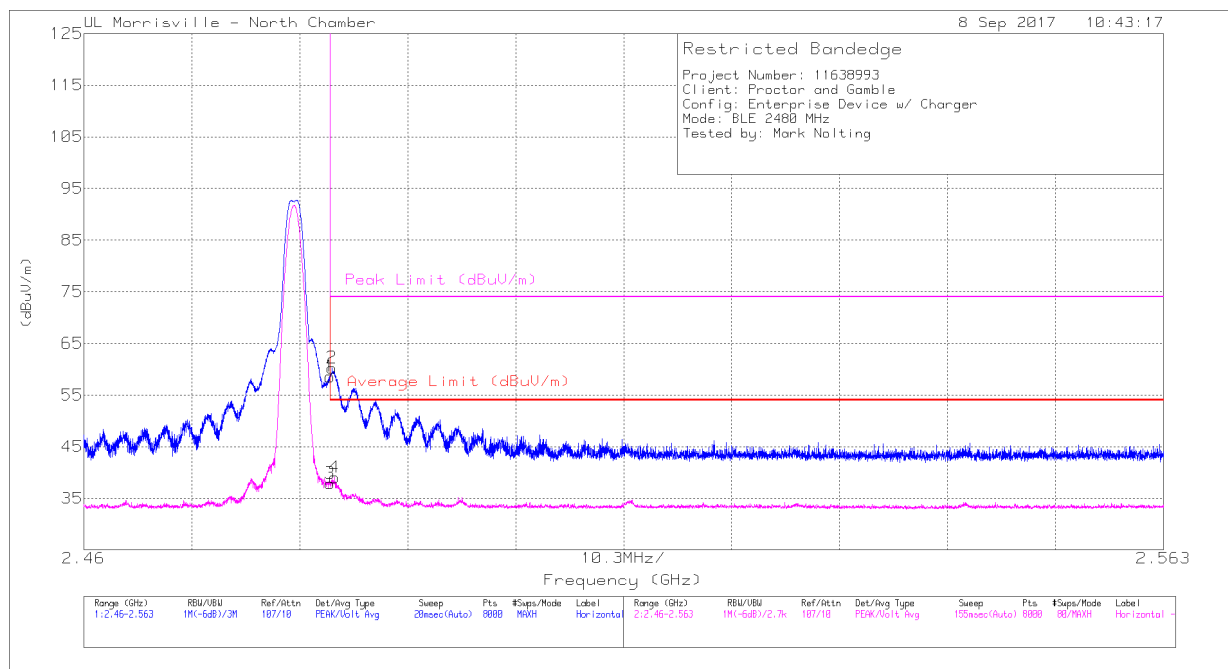
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	36.99	Pk	31.8	-23.9	44.89	-	-	74	-29.11	106	205	V
2	* 2.39	39.28	Pk	31.8	-23.9	47.18	-	-	74	-26.82	106	205	V
3	* 2.39	24.57	V1TV	31.8	-23.9	32.47	54	-21.53	-	-	106	205	V
4	* 2.39	25.16	V1TV	31.8	-23.9	33.06	54	-20.94	-	-	106	205	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



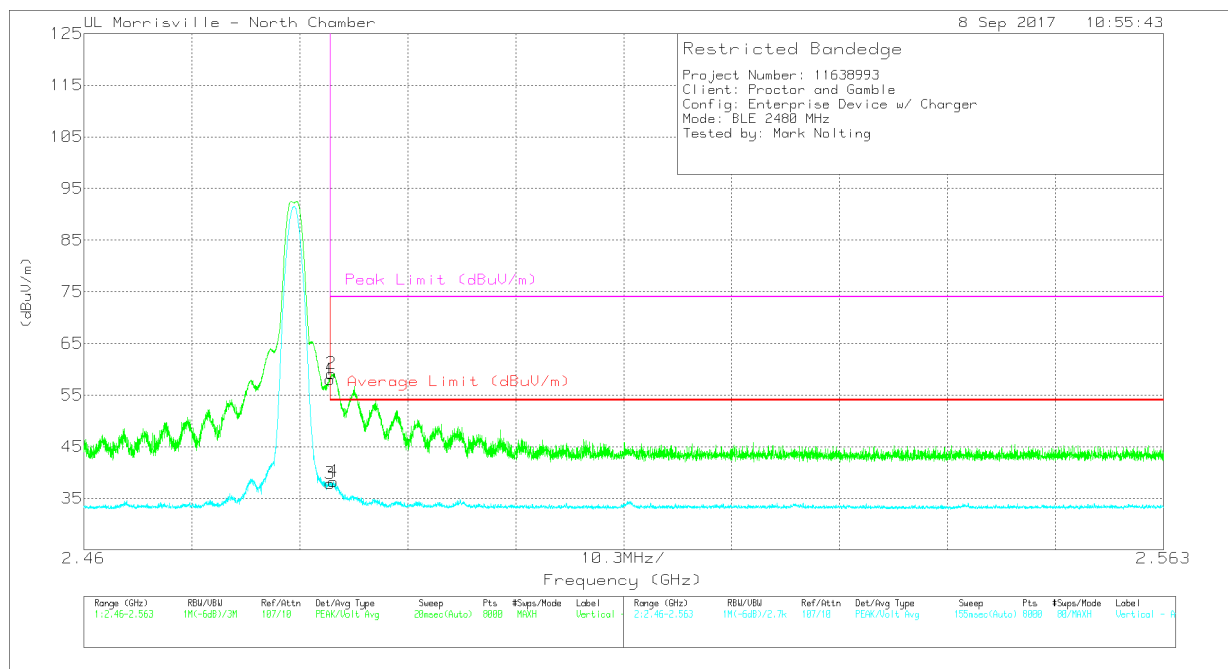
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	50.08	Pk	32.3	-23.8	58.58	-	-	74	-15.42	167	237	H
2	* 2.484	51.77	Pk	32.3	-23.8	60.27	-	-	74	-13.73	167	237	H
3	* 2.484	29.39	V1TV	32.3	-23.8	37.89	54	-16.11	-	-	167	237	H
4	* 2.484	30.54	V1TV	32.3	-23.8	39.04	54	-14.96	-	-	167	237	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	49.53	Pk	32.3	-23.8	58.03	-	-	74	-15.97	213	383	V
2	* 2.484	50.66	Pk	32.3	-23.8	59.16	-	-	74	-14.84	213	383	V
3	* 2.484	29.41	V1TV	32.3	-23.8	37.91	54	-16.09	-	-	213	383	V
4	* 2.484	29.78	V1TV	32.3	-23.8	38.28	54	-15.72	-	-	213	383	V

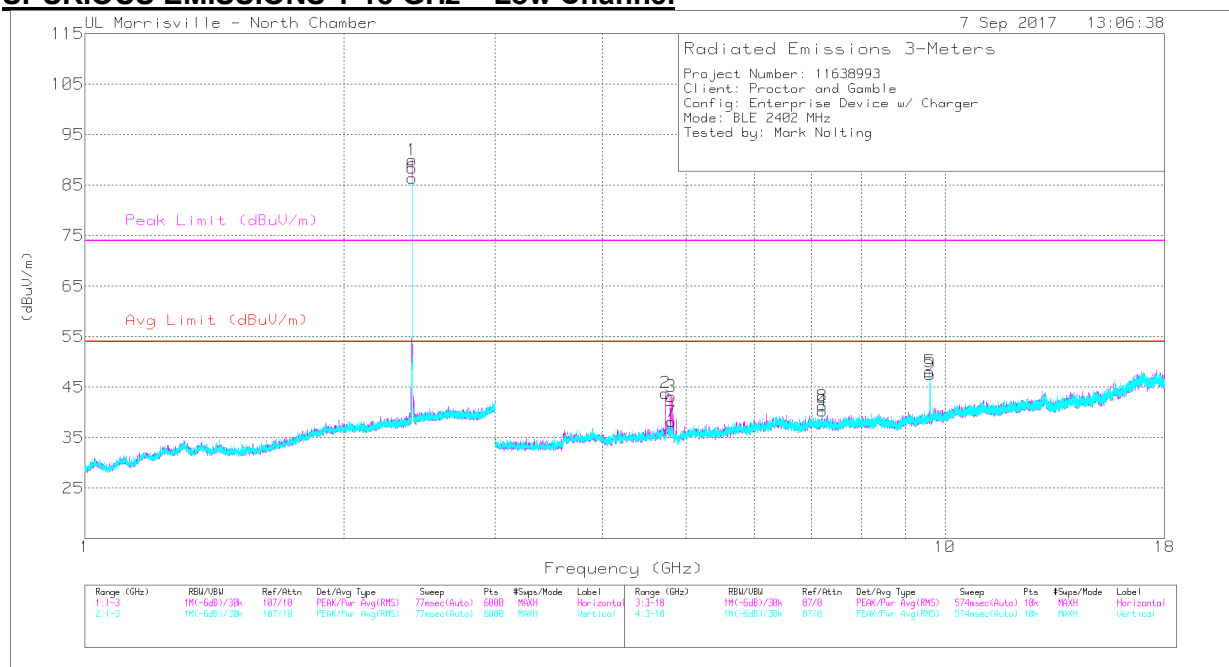
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

7.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

SPURIOUS EMISSIONS 1-18 GHz – Low Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.402	83.4	PK	31.9	-23.9	91.4	-	-	114	-22.6	156	253	H
	2.402	82.43	V1TV	31.9	-23.9	90.43	94	-3.57	-	-	156	253	H
2	* 4.732	46.54	PK	34.1	-31.7	48.94	-	-	74	-25.06	151	150	H
	* 4.731	28.09	Av	34.1	-31.7	30.49	54	-23.51	-	-	151	150	H
3	* 4.805	46.21	PK	34.1	-31.1	49.21	-	-	74	-24.79	163	110	H
	* 4.804	38.68	V1TV	34.1	-31.1	41.68	54	-12.32	-	-	163	110	H
4	7.206	42.33	PK	35.6	-29.4	48.53	-	-	74	-25.47	98	157	H
	7.205	32.48	V1TV	35.6	-29.4	38.68	54	-15.32	-	-	98	157	H
5	9.607	44.5	PK	36.8	-27.8	53.5	-	-	74	-20.5	289	100	H
	9.607	36.86	V1TV	36.8	-27.8	45.86	54	-8.14	-	-	289	100	H
6	2.402	79.12	PK	31.9	-23.9	87.12	-	-	114	-26.88	104	204	V
	2.402	78.13	V1TV	31.9	-23.9	86.13	94	-7.87	-	-	104	204	V
7	* 4.805	42.43	PK	34.1	-31.1	45.43	-	-	74	-28.57	235	104	V
	* 4.804	31.92	V1TV	34.1	-31.1	34.92	54	-19.08	-	-	235	104	V
8	7.205	42.72	PK	35.6	-29.4	48.92	-	-	74	-25.08	119	140	V
	7.205	32.79	V1TV	35.6	-29.4	38.99	54	-15.01	-	-	119	140	V
9	9.607	43.44	PK	36.8	-27.8	52.44	-	-	74	-21.56	211	100	V
	9.607	35.42	V1TV	36.8	-27.8	44.42	54	-9.58	-	-	211	100	V

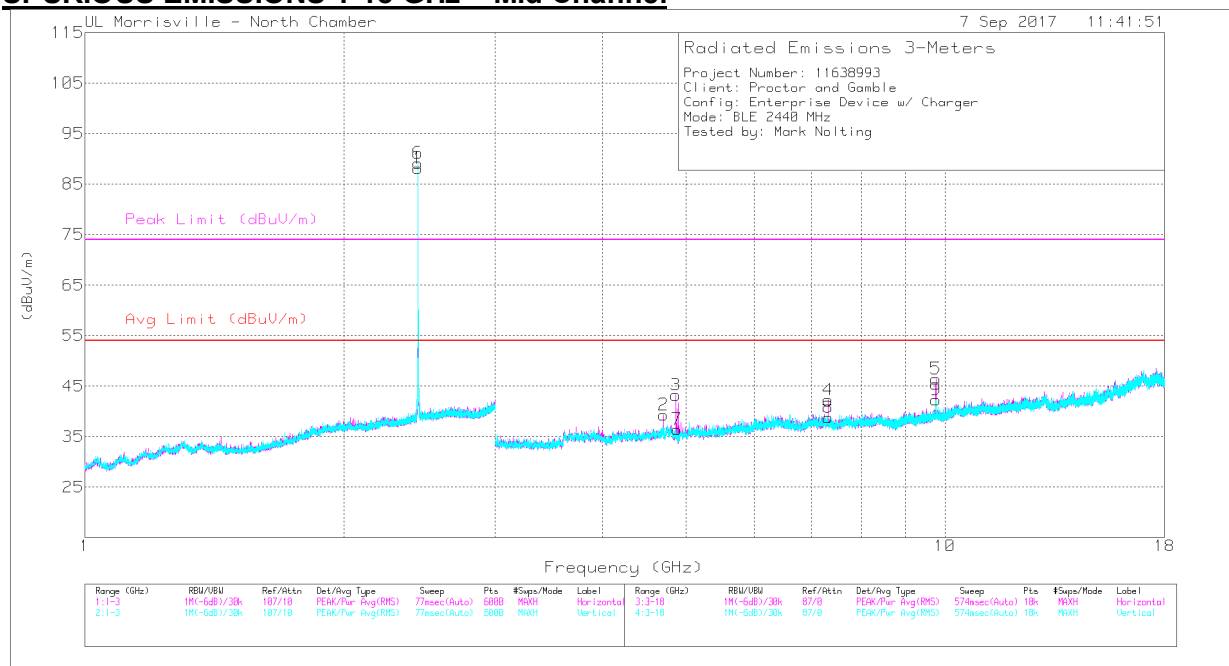
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK: Maximum Peak

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

Av - Average detection

SPURIOUS EMISSIONS 1-18 GHz – Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.44	81.28	PK	32.1	-23.9	89.48	-	-	114	-24.52	155	245	H
	2.44	80.25	V1TV	32.1	-23.9	88.45	94	-5.55	-	-	155	245	H
2	* 4.71	45.72	PK	34.1	-31.8	48.02	-	-	74	-25.98	163	160	H
	* 4.71	28.32	Av	34.1	-31.8	30.62	54	-23.38	-	-	163	160	H
3	* 4.879	44.89	PK	34	-31	47.89	-	-	74	-26.11	160	100	H
	* 4.88	35.48	V1TV	34	-31	38.48	54	-15.52	-	-	160	100	H
4	* 7.321	41.32	PK	35.6	-28.6	48.32	-	-	74	-25.68	131	100	H
	* 7.319	32.06	V1TV	35.6	-28.6	39.06	54	-14.94	-	-	131	100	H
5	9.759	41.74	PK	36.8	-27	51.54	-	-	74	-22.46	290	115	H
	9.759	33.05	V1TV	36.8	-27	42.85	54	-11.15	-	-	290	115	H
6	2.44	84.18	PK	32.1	-23.9	92.38	-	-	114	-21.62	205	355	V
	2.44	83.11	V1TV	32.1	-23.9	91.31	94	-2.69	-	-	205	355	V
7	* 4.879	41.22	PK	34	-31	44.22	-	-	74	-29.78	249	203	V
	* 4.88	31.06	V1TV	34	-31	34.06	54	-19.94	-	-	249	203	V
8	* 7.319	40.15	PK	35.6	-28.6	47.15	-	-	74	-26.85	120	178	V
	* 7.319	29.76	V1TV	35.6	-28.6	36.76	54	-17.24	-	-	120	178	V
9	9.759	34.1	V1TV	36.8	-27	43.9	54	-10.1	-	-	229	256	V
	9.761	42.25	PK	36.8	-27	52.05	-	-	74	-21.95	229	256	V

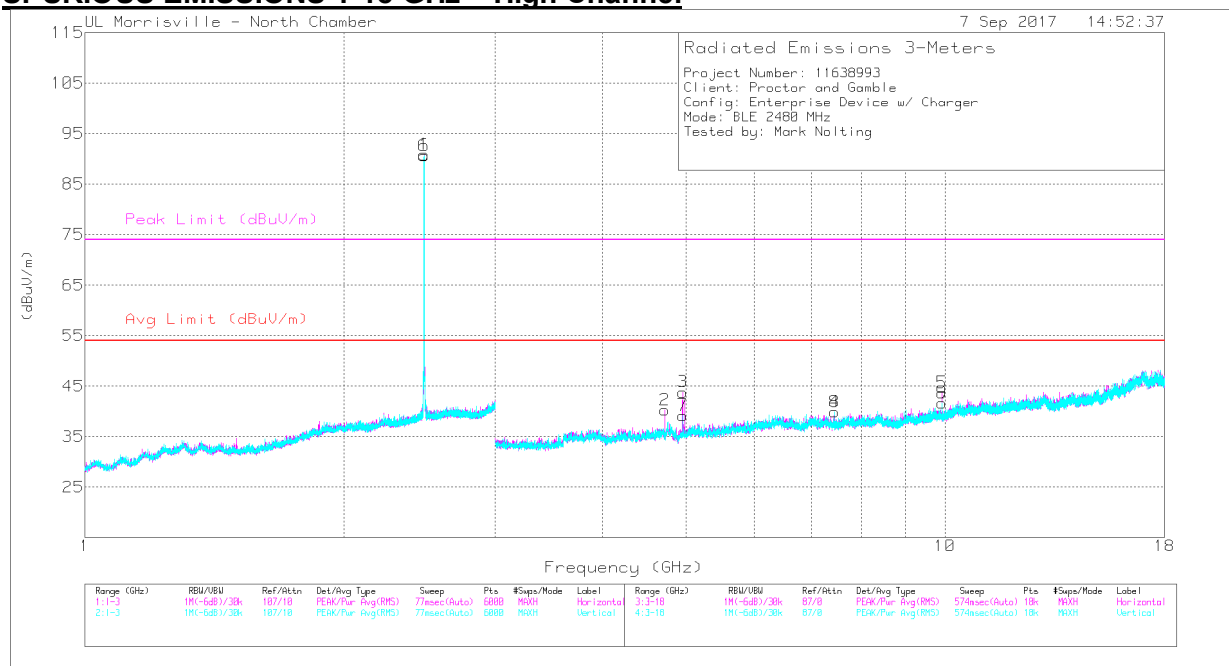
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK: Maximum Peak

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

Av - Average detection

SPURIOUS EMISSIONS 1-18 GHz – High Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48	84.54	PK	32.3	-23.8	93.04	-	-	114	-20.96	166	237	H
	2.48	83.51	V1TV	32.3	-23.8	92.01	94	-1.99	-	-	166	237	H
2	* 4.725	45.68	PK	34.1	-31.7	48.08	-	-	74	-25.92	169	157	H
	* 4.725	28.05	Av	34.1	-31.7	30.45	54	-23.55	-	-	169	157	H
3	* 4.96	46.36	PK	34.1	-31.8	48.66	-	-	74	-25.34	157	100	H
	* 4.96	38.83	V1TV	34.1	-31.8	41.13	54	-12.87	-	-	157	100	H
4	* 7.441	40.55	PK	35.6	-28.6	47.55	-	-	74	-26.45	284	100	H
	* 7.439	29.98	V1TV	35.6	-28.5	37.08	54	-16.92	-	-	284	100	H
5	9.919	40.95	PK	37	-27.5	50.45	-	-	74	-23.55	220	100	H
	9.919	32.21	V1TV	37	-27.5	41.71	54	-12.29	-	-	220	100	H
6	2.48	84.58	PK	32.3	-23.8	93.08	-	-	114	-20.92	214	383	V
	2.48	83.56	V1TV	32.3	-23.8	92.06	94	-1.94	-	-	214	383	V
7	* 4.96	43.61	PK	34.1	-31.8	45.91	-	-	74	-28.09	107	174	V
	* 4.96	34.09	V1TV	34.1	-31.8	36.39	54	-17.61	-	-	107	174	V
8	* 7.441	41.03	PK	35.6	-28.6	48.03	-	-	74	-25.97	152	194	V
	* 7.44	31.35	V1TV	35.6	-28.5	38.45	54	-15.55	-	-	152	194	V
9	9.921	41.07	PK	37	-27.5	50.57	-	-	74	-23.43	244	248	V
	9.919	32.97	V1TV	37	-27.5	42.47	54	-11.53	-	-	244	248	V

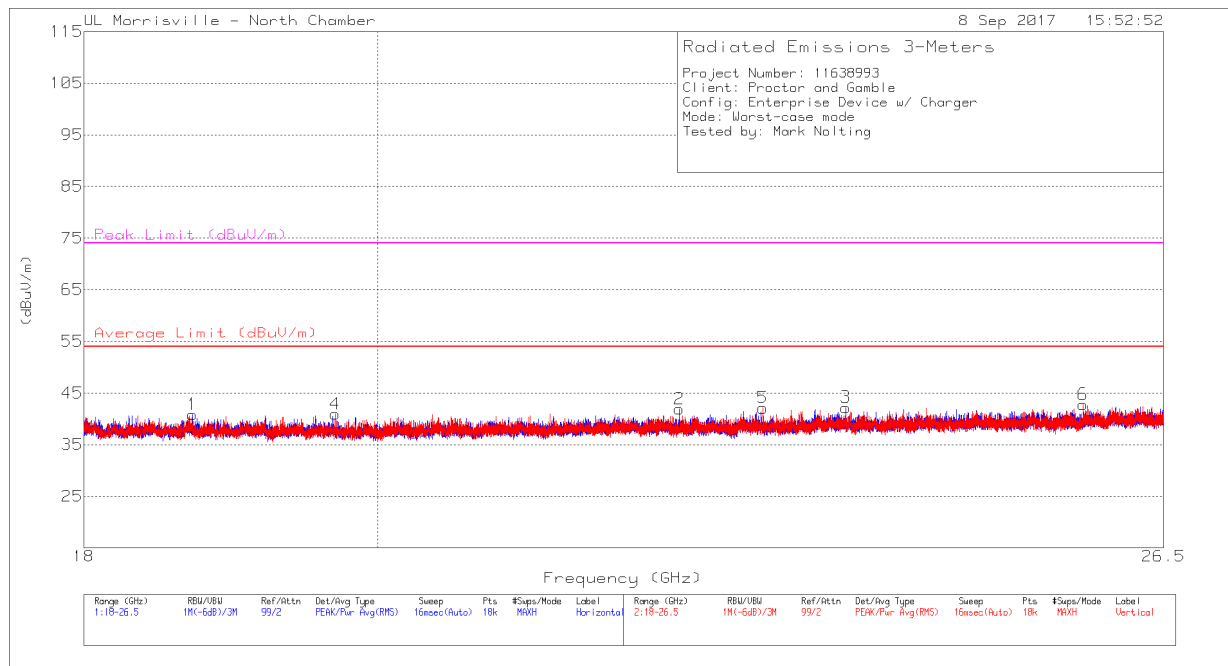
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK: Maximum Peak

V1TV: VB=1/Ton, Linear Voltage Average where: Ton is packet duration

Av - Average detection

SPURIOUS EMISSIONS 18-26 GHz – Worse-Case Channel



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0076 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 18.716	49.03	Pk	32.7	-40.9	40.83	54	-13.17	74	-33.17	0-360	299	H
2	* 22.28	49.29	Pk	33.5	-40.9	41.89	54	-12.11	74	-32.11	0-360	102	H
3	* 23.648	48.91	Pk	33.9	-40.6	42.21	54	-11.79	74	-31.79	0-360	152	H
4	* 19.697	49.45	Pk	32.8	-41.3	40.95	54	-13.05	74	-33.05	0-360	249	V
5	* 22.956	49.31	Pk	33.7	-40.9	42.11	54	-11.89	74	-31.89	0-360	249	V
6	25.75	47.69	Pk	34.5	-39.4	42.79	54	-11.21	74	-31.21	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

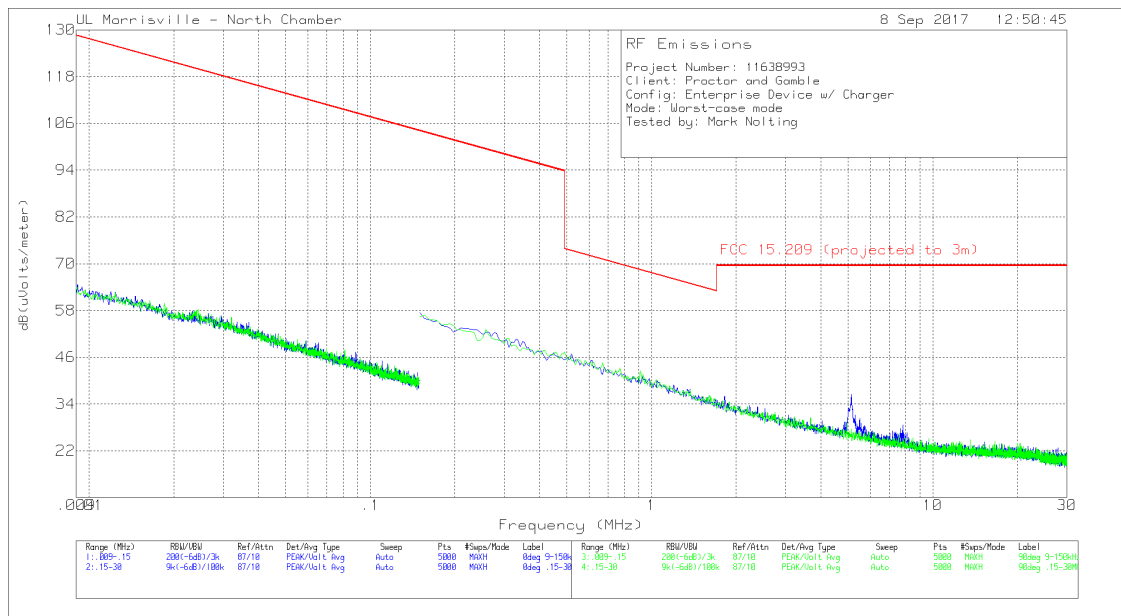
Pk - Peak detector

7.2.4. WORST-CASE BELOW 1 GHz **SPURIOUS EMISSIONS 0.009 to 30 MHz**

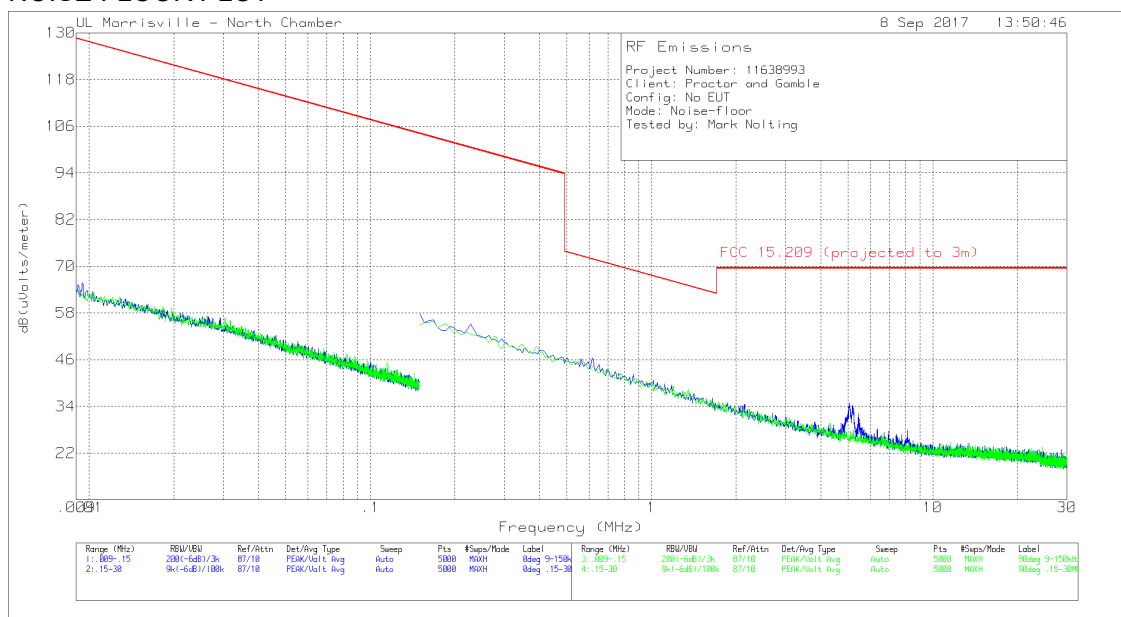
Note: All measurements were made at a test distance of 3 m. The limits in the plots and tabular data are the FCC/IC limits extrapolated from the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to the measurement distance to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 \cdot \log(\text{specification distance} / \text{test distance})$ per FCC 15.31 (f) (2).

Although these tests were performed at a test site other than an open area test site, adequate comparison measurements were confirmed against an open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

EUT PLOT

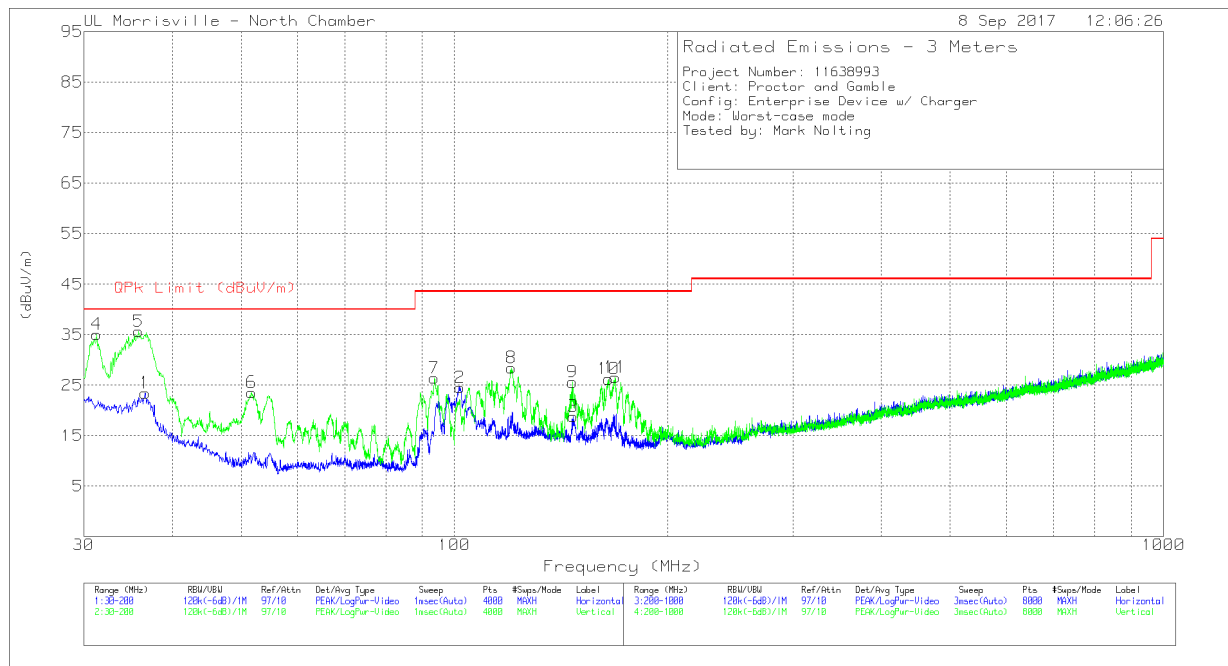


NOISE-FLOOR PLOT



The above plots demonstrate there were no EUT-related emissions of interest relative to the FCC 15.209 limit below 30MHz.

SPURIOUS EMISSIONS 30 TO 1000 MHz



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	36.6317	34.05	Pk	21.1	-31.7	23.45	40	-16.55	0-360	199	H
2	101.7586	40.44	Pk	15	-30.9	24.54	43.52	-18.98	0-360	298	H
3	146.9265	32.3	Pk	17	-30.5	18.8	43.52	-24.72	0-360	298	H
4	31.2701	34.95	Qp	25.3	-31.7	28.55	40	-11.45	42	100	V
5	35.8575	37.54	Qp	21.7	-31.7	27.54	40	-12.46	348	101	V
6	51.7231	42.75	Pk	12.3	-31.5	23.55	40	-16.45	0-360	102	V
7	93.6815	44.99	Pk	12.4	-31	26.39	43.52	-17.13	0-360	102	V
8	* 120.2509	41.12	Pk	18.1	-30.8	28.42	43.52	-15.1	0-360	102	V
9	146.7777	39.21	Pk	17	-30.6	25.61	43.52	-17.91	0-360	102	V
10	* 164.8449	40.02	Pk	16.6	-30.4	26.22	43.52	-17.3	0-360	102	V
11	* 168.5433	40.44	Pk	16.4	-30.3	26.54	43.52	-16.98	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

8. AC POWER LINE CONDUCTED EMISSIONS LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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.

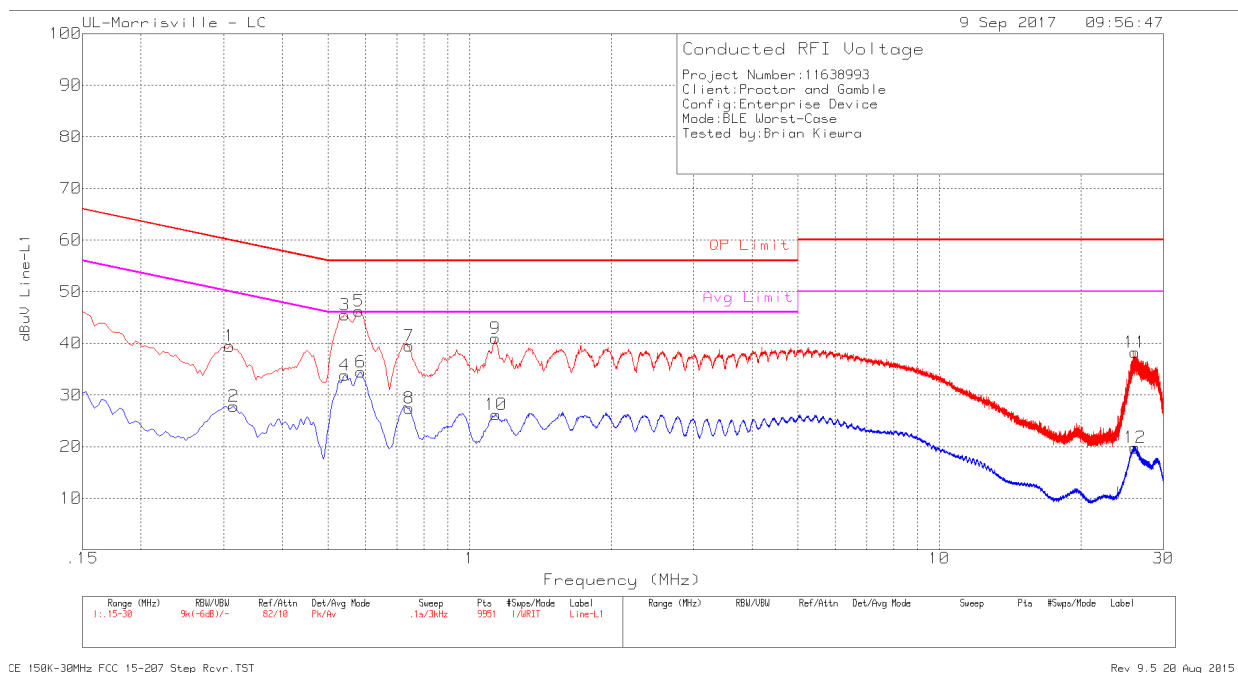
TEST PROCEDURE

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 C63.10.

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 lines 1 and 2.

LINE 1 RESULTS

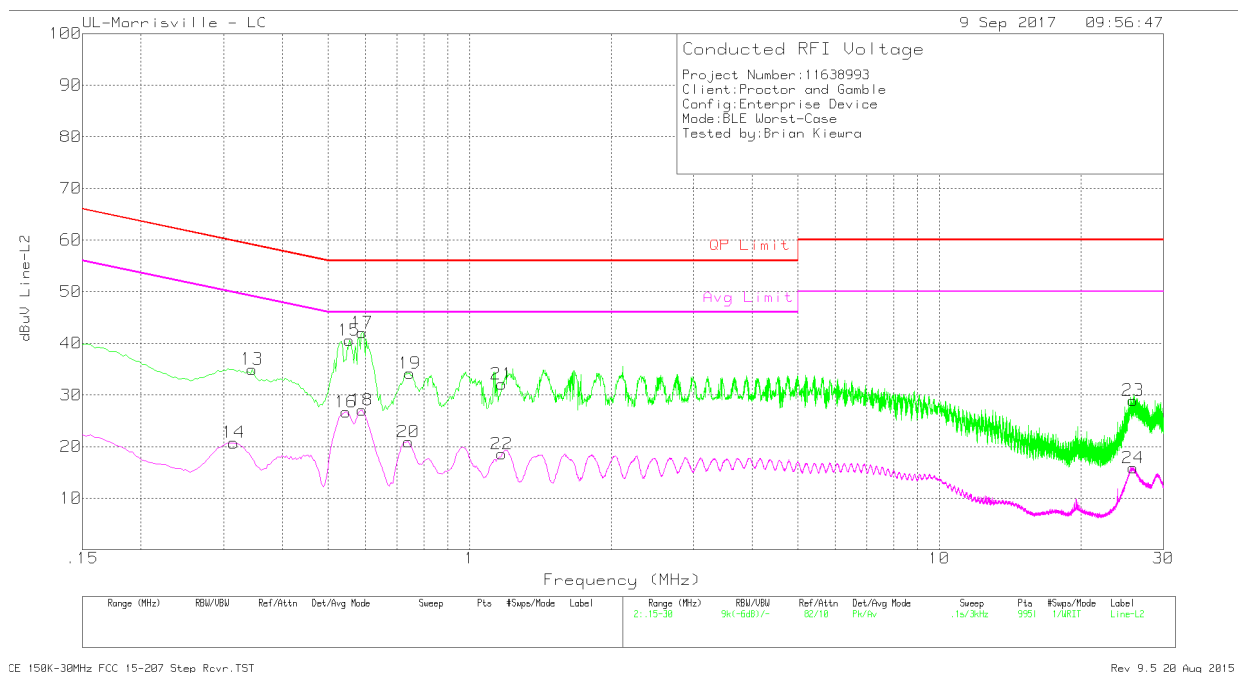


Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
1	.309	29.43	Pk	.1	9.9	39.43	60	-20.57	-	-
2	.315	17.82	Av	.1	9.9	27.82	-	-	49.84	-22.02
3	.543	35.62	Pk	0	9.9	45.52	56	-10.48	-	-
4	.543	23.92	Av	0	9.9	33.82	-	-	46	-12.18
5	.582	36.34	Pk	0	9.9	46.24	56	-9.76	-	-
6	.588	24.53	Av	0	9.9	34.43	-	-	46	-11.57
7	.744	29.54	Pk	0	9.9	39.44	56	-16.56	-	-
8	.744	17.53	Av	0	9.9	27.43	-	-	46	-18.57
9	1.134	31.05	Pk	0	9.9	40.95	56	-15.05	-	-
10	1.14	16.29	Av	0	9.9	26.19	-	-	46	-19.81
11	26.115	27.61	Pk	.3	10.3	38.21	60	-21.79	-	-
12	26.094	9.17	Av	.3	10.3	19.77	-	-	50	-30.23

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
13	.345	24.98	Pk	.1	9.9	34.98	59.08	-24.1	-	-
14	.315	10.74	Av	.1	9.9	20.74	-	-	49.84	-29.1
15	.555	30.67	Pk	0	9.9	40.57	56	-15.43	-	-
16	.546	16.82	Av	0	9.9	26.72	-	-	46	-19.28
17	.591	32.15	Pk	0	9.9	42.05	56	-13.95	-	-
18	.591	17.13	Av	0	9.9	27.03	-	-	46	-18.97
19	.747	24.22	Pk	0	10	34.22	56	-21.78	-	-
20	.741	10.99	Av	0	9.9	20.89	-	-	46	-25.11
21	1.173	22.17	Pk	0	9.9	32.07	56	-23.93	-	-
22	1.173	8.66	Av	0	9.9	18.56	-	-	46	-27.44
23	25.86	18.44	Pk	.2	10.3	28.94	60	-31.06	-	-
24	25.842	5.34	Av	.2	10.3	15.84	-	-	50	-34.16

Pk - Peak detector

Av - Average detection