



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 2**

**BLUETOOTH LOW ENERGY
CERTIFICATION TEST REPORT**

FOR

BLE ENABLED PERSONAL NOTIFICATION DEVICE

MODEL NUMBER: ULTRA07

**FCC ID: 2AMX6-ULTRA07
IC: 22995-ULTRA07**

REPORT NUMBER: R11879698-E1

ISSUE DATE: 2018-02-07

**Prepared for
HANSEN FASHION TECHNOLOGY A/S
RYGAARDS ALLE 114
HELLERUP 2900, DENMARK**

**Prepared by
UL LLC
12 LABORATORY DR.
RESEARCH TRIANGLE PARK, NC 27709 USA
TEL: (919) 549-1400**



NVLAP LAB CODE 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2018-02-07	Initial Issue	Brian T. Kiewra
2	2018-03-27	Corrected model name	Lariah Ijames

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	6
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	6
4.2. <i>SAMPLE CALCULATION</i>	6
4.3. <i>MEASUREMENT UNCERTAINTY</i>	6
5. EQUIPMENT UNDER TEST	7
5.1. <i>DESCRIPTION OF EUT</i>	7
5.2. <i>MAXIMUM OUTPUT POWER</i>	7
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	7
5.4. <i>SOFTWARE AND FIRMWARE</i>	7
5.5. <i>WORST-CASE CONFIGURATION AND MODE</i>	7
5.6. <i>DESCRIPTION OF TEST SETUP</i>	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. MEASUREMENT METHODS	12
8. ANTENNA PORT TEST RESULTS	13
8.1. <i>ON TIME, DUTY CYCLE AND MEASUREMENT METHODS</i>	13
8.2. <i>6 dB BANDWIDTH</i>	14
8.3. <i>99% BANDWIDTH</i>	16
8.4. <i>OUTPUT POWER</i>	18
8.5. <i>AVERAGE POWER</i>	19
8.6. <i>POWER SPECTRAL DENSITY</i>	20
8.7. <i>CONDUCTED SPURIOUS EMISSIONS</i>	22
9. RADIATED TEST RESULTS	26
9.1. <i>LIMITS AND PROCEDURE</i>	26
9.2. <i>TX ABOVE 1 GHz FOR BLE MODE IN THE 2.4 GHz BAND</i>	27
9.3. <i>WORST-CASE CONFIGURATIONS</i>	34
10. SETUP PHOTOS	37
END OF REPORT	41

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Hansen Fashion Technology A/S
Rygaards Alle 114
Hellerup 2900, Denmark

EUT DESCRIPTION: BLE Enabled personal notification device

MODEL: ULTRA07

SERIAL NUMBER: Non-Serialized

DATE TESTED: 2017-11-14 to 2017-12-15

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 2	Pass
INDUSTRY CANADA RSS-GEN Issue 4	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:



Jeffrey Moser
Operations Leader
UL – Consumer Technology Division

Prepared By:



Brian Kiewra
Project Engineer
UL – Consumer Technology Division

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, RSS-GEN Issue 4, RSS-247 Issue 2, KDB 558074 D01 v04.

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, USA.

12 Laboratory Dr., RTP, NC 27709
<input type="checkbox"/> Chamber A
<input type="checkbox"/> Chamber C

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560
<input type="checkbox"/> Chamber NORTH
<input checked="" type="checkbox"/> Chamber SOUTH

The onsite chambers are covered under ISED Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY	Required by standard
Occupied Channel Bandwidth	2.00%	±5 %
RF output power, conducted	1.3 dB	±1,5 dB
Power Spectral Density, conducted	2.47 dB	±3 dB
Unwanted Emissions, conducted	2.94 dB	±3 dB
All emissions, radiated	5.36 dB	±6 dB
Temperature	2.26 °C	±3 °C
Supply voltages	2.40%	±3 %
Time	3.39%	±5 %

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a BLE Enabled Personal Notification Device

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	-1.06	0.78

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna with a maximum gain of +5.3dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was v2.26.0

The test utility software used during testing was J-Link RTT Viewer v6.16a.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions (1-18GHz) were performed with the EUT set to transmit at low, mid, and high channels. Radiated emissions (9kHz - 1000MHz, and 18-26GHz) were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

BLE radio does not transmit when connected to USB (in charging mode).

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	T450s	PC-0A2UQS	NA
J-Link	Segger	J-LINK 9.3	269300803	NA

I/O CABLES

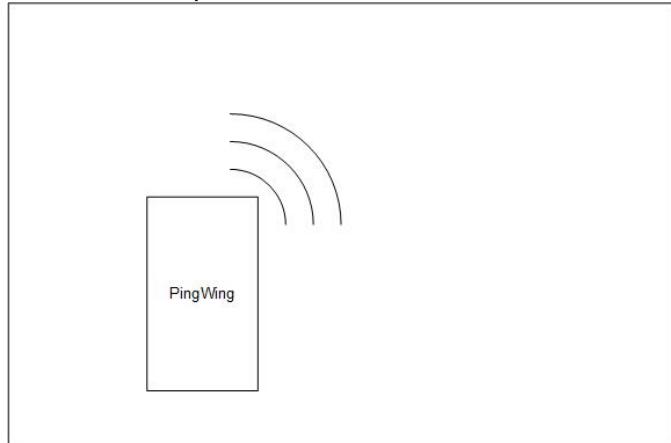
I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	6 Pin	1	6 Pin	Ribbon	<3m	Conducted testing only
2	USB	1	USB	USB	<3m	Conducted testing only

TEST SETUP

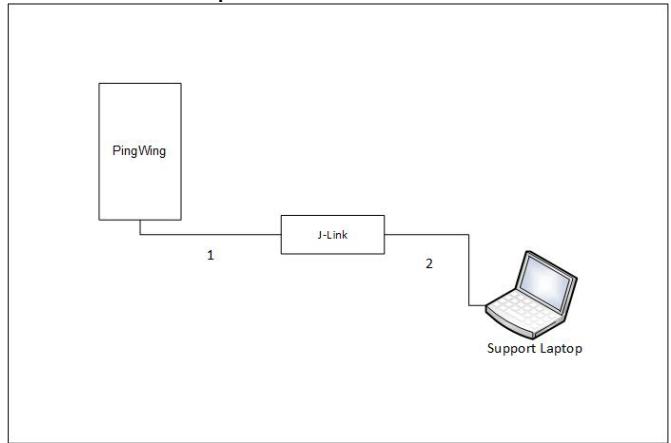
The EUT is installed as a standalone device. Test utility software exercised the radio.

SETUP DIAGRAM FOR TESTS

Radiated Setup



Conducted Setup



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 - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz (Loop Ant.)					
AT0059	Active Loop Antenna	EMCO	6502	2017-6-05	2018-6-30
30-1000 MHz					
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2017-06-15	2018-06-15
1-18 GHz					
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2017-04-05	2018-04-05
18-40 GHz					
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2017-10-10	2018-10-10
Gain-Loss Chains					
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2017-09-15	2018-09-15
S-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2017-06-11	2018-06-11
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2017-08-18	2018-08-18
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2017-03-03	2018-03-03
Receiver & Software					
SA0025	Spectrum Analyzer	Agilent	N9030A	2017-04-10	2018-04-10
SA0026 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2017-02-17	2018-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
Additional Equipment used					
s/n 161024887	Environmental Meter	Fisher Scientific	15-077-963	2016-12-23	2018-12-23

Test Equipment Used - Wireless Antenna Port Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Conducted Room 2					
T177	Spectrum Analyzer	Agilent Technologies	E4446A	2017-03-30	2018-03-30
PWM001	RF Power Meter	Keysight Technologies	N1911A	2017-07-17	2018-07-17
PWS006	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2017-07-17	2018-07-17
HI0081	Environmental Meter	Fisher Scientific	15-077-963	2016-12-21	2018-12-21
MM0168	True RMS Multimeter	Agilent	U1232A	2017-10-25	2018-10-30

7. MEASUREMENT METHODS

Duty Cycle: KDB 558074 D01 v04 Section 6.0

6 dB BW: KDB 558074 D01 v04 Section 8.1

99% Occupied Bandwidth: ANSI C63.10-2013, Section 6.9.3

Output Power: KDB 558074 D01 v04 Section 9.1.3

Power Spectral Density: KDB 558074 D01 v04 Section 10.2

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v04 Section 11.0

Out-of-band emissions in restricted bands: KDB 558074 D01 v04 Section 12.1

General Radiated Emissions: ANSI C63.10:2013 Sections 6.3 – 6.6

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	2.123	2.216	0.958	95.80%	0.19	0.471

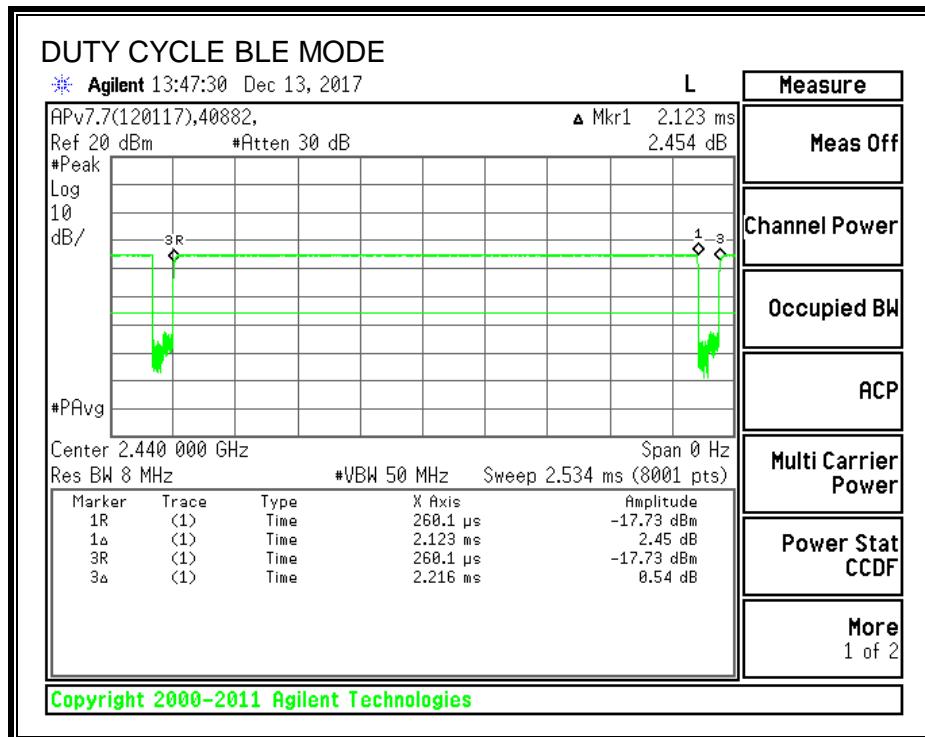
TEST INFORMATION

Test Date: 2017-12-13

Project No: 11879698

Tested By: Jeffrey Cabrera

DUTY CYCLE PLOTS



8.2.6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)
IC RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

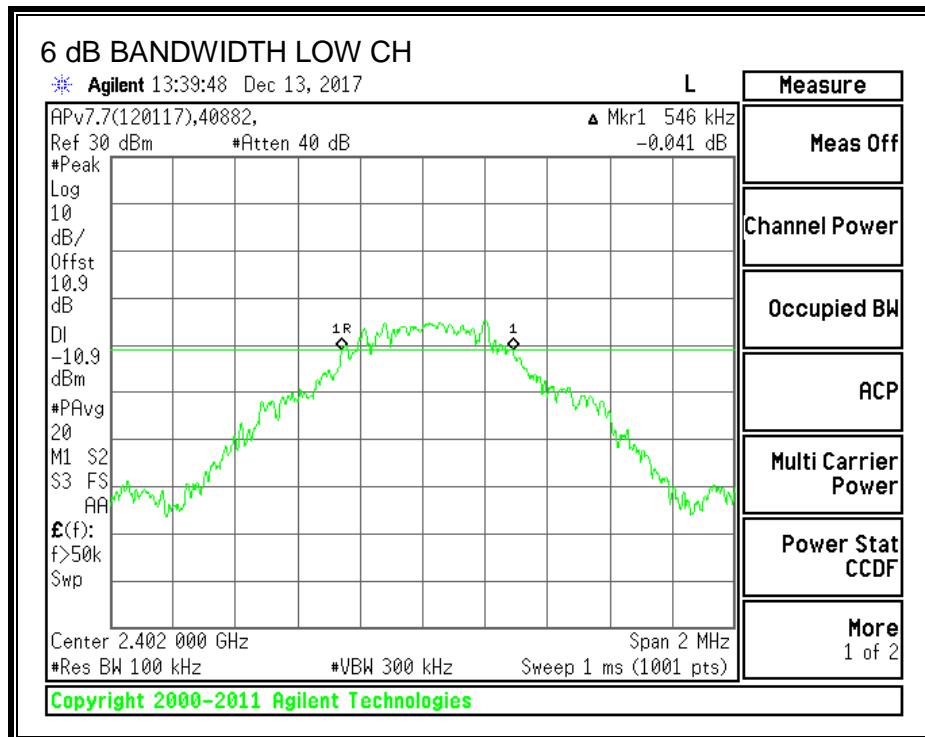
RESULTS

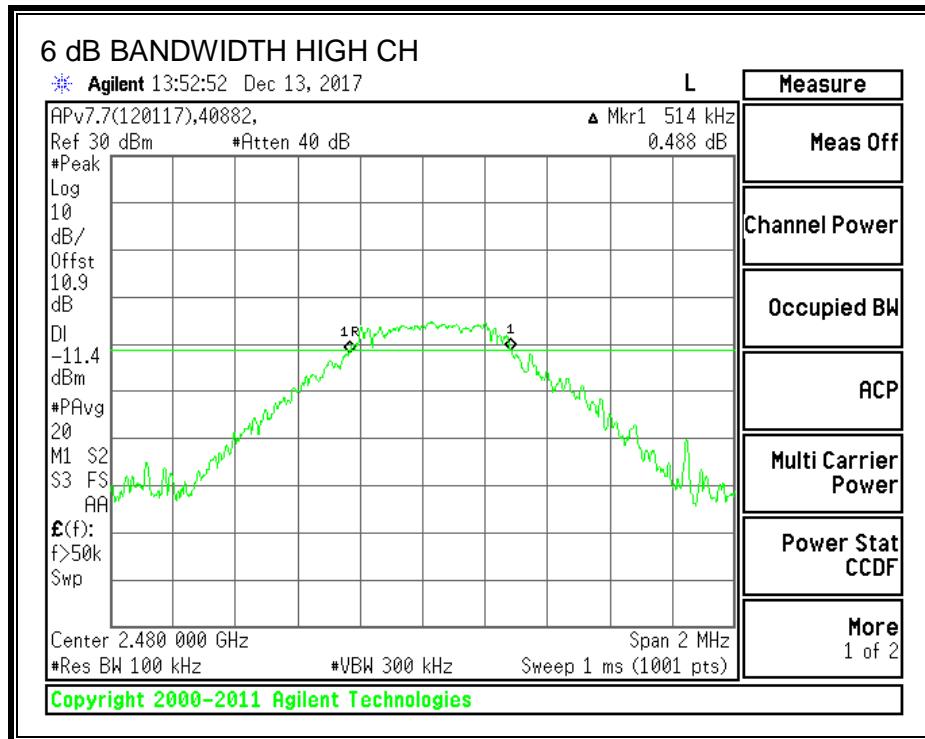
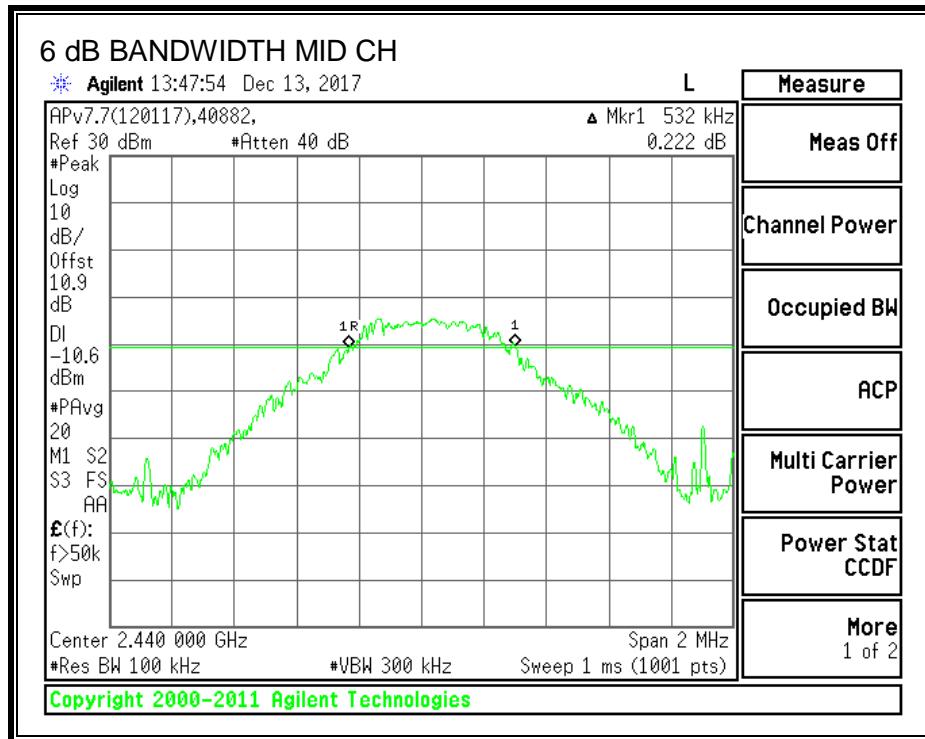
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.5460	0.5
Middle	2440	0.5320	0.5
High	2480	0.5140	0.5

TEST INFORMATION

Test Date: 2017-12-13
Project No: 11879698
Tested By: Jeffrey Cabrera

6 dB BANDWIDTH PLOTS





8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.
Tested per RSS-Gen Clause 6.6 and ANSI C63.10 6.9.3.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 5% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

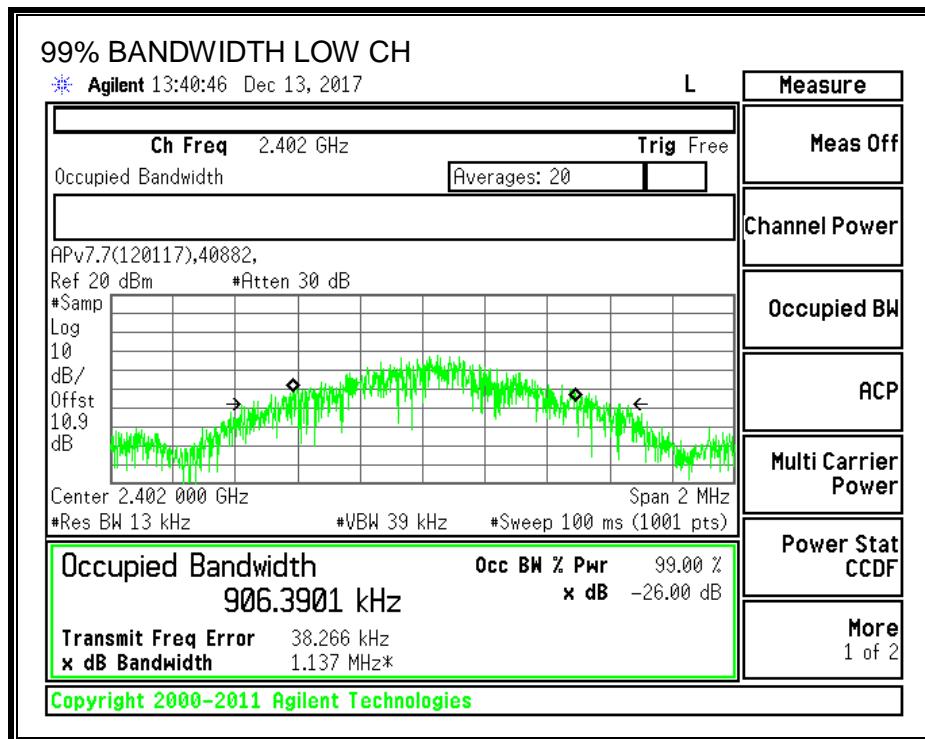
RESULTS

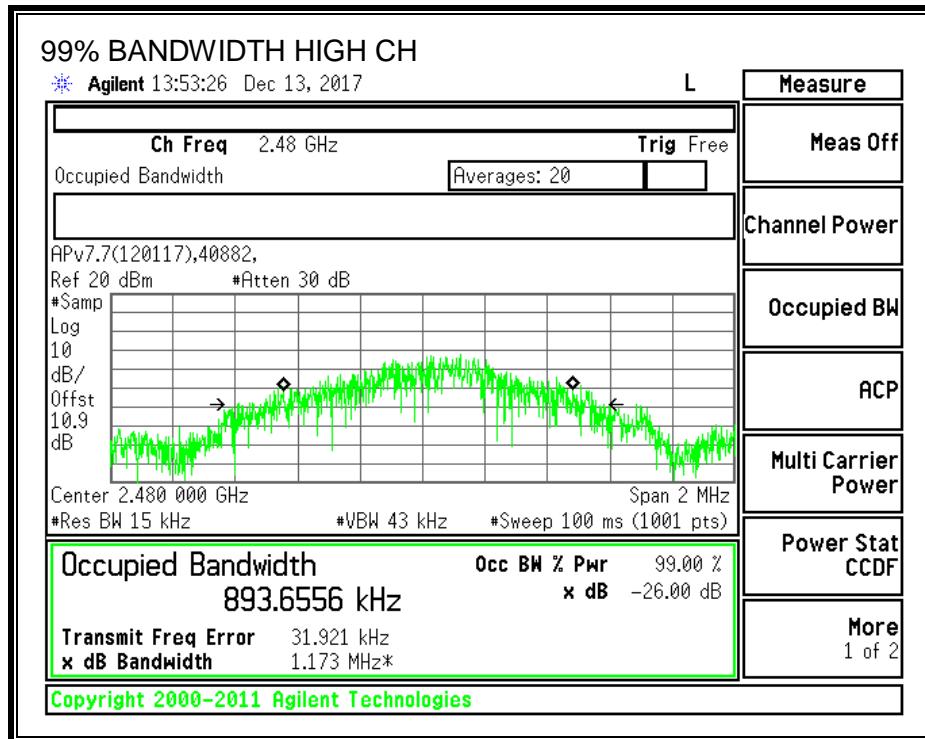
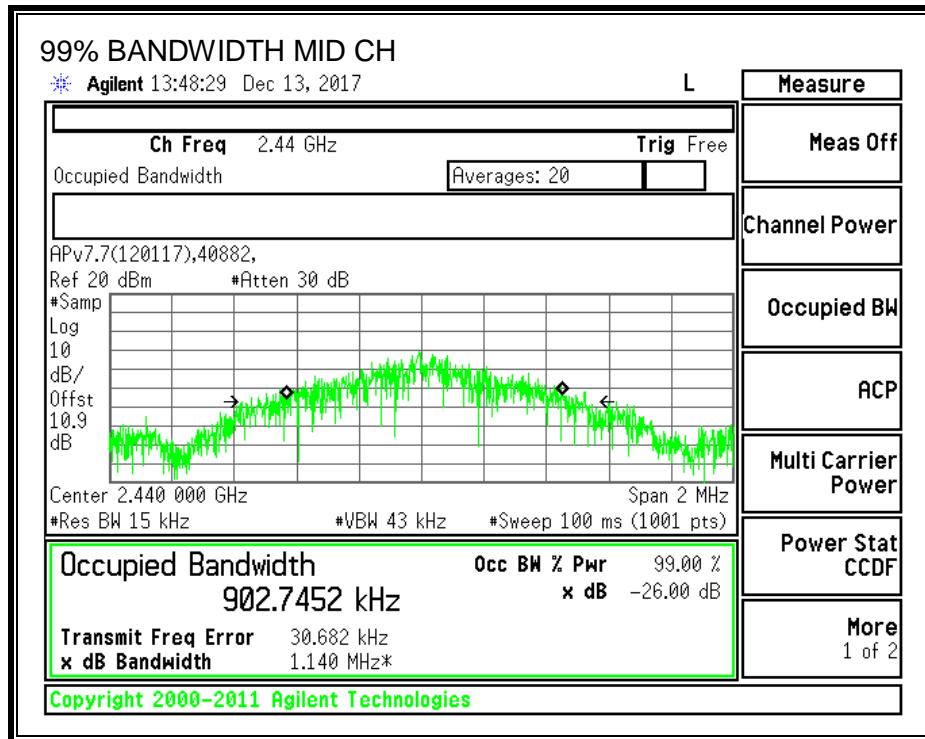
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	0.9064
Middle	2440	0.9027
High	2480	0.8937

TEST INFORMATION

Test Date: 2017-12-13
Project No: 11879698
Tested By: Jeffrey Cabrera

99% BANDWIDTH PLOTS





8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-1.06	30	-31.06
Middle	2440	-1.14	30	-31.14
High	2480	-1.17	30	-31.17

TEST INFORMATION

Test Date: 2017-12-13

Project No: 11879698

Tested By: Jeffrey Cabrera

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

The cable assembly insertion loss of 10.87 dB (including 10 dB pad and 0.87 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Note: This was a gated average power measurement.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	-1.29
Middle	2440	-1.33
High	2480	-1.36

TEST INFORMATION

Test Date: 2017-12-13
Project No: 11879698
Tested By: Jeffrey Cabrera

8.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)
IC RSS-247 5.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

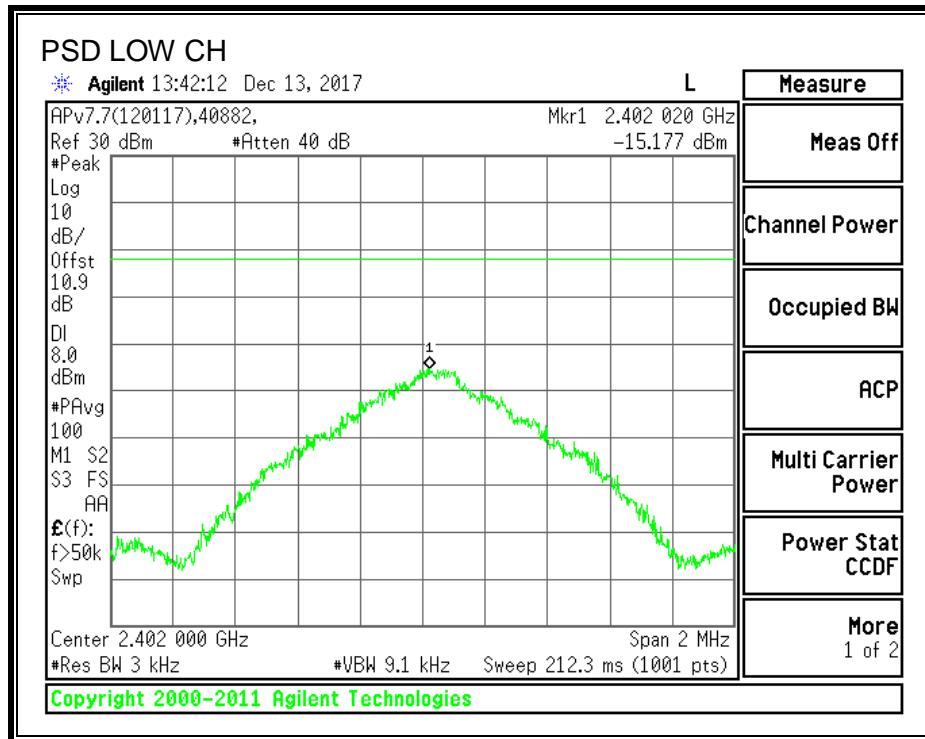
RESULTS

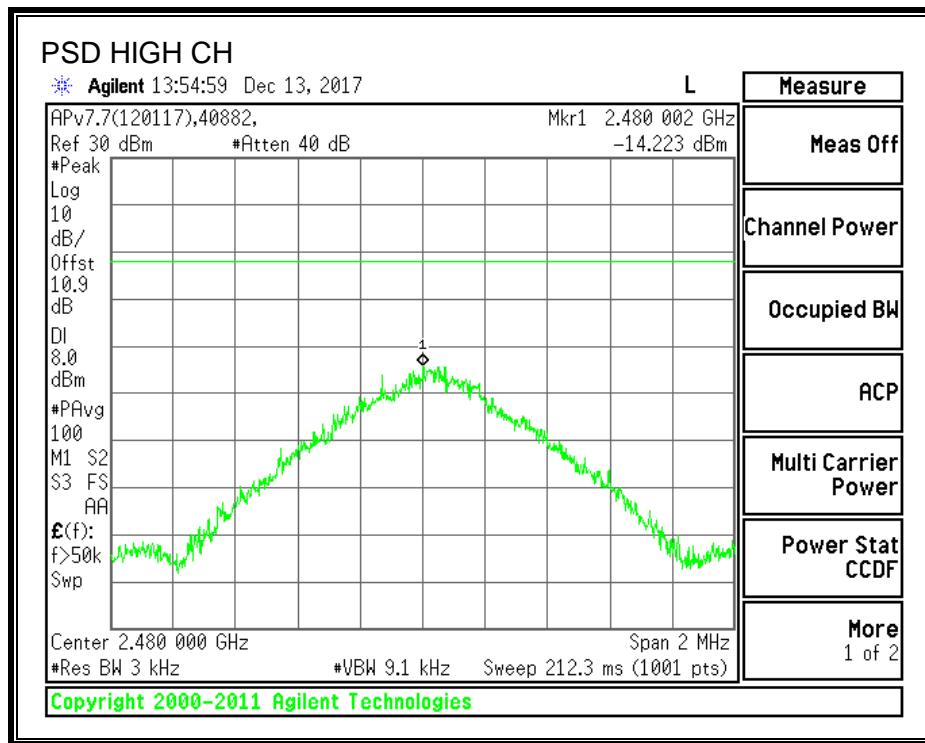
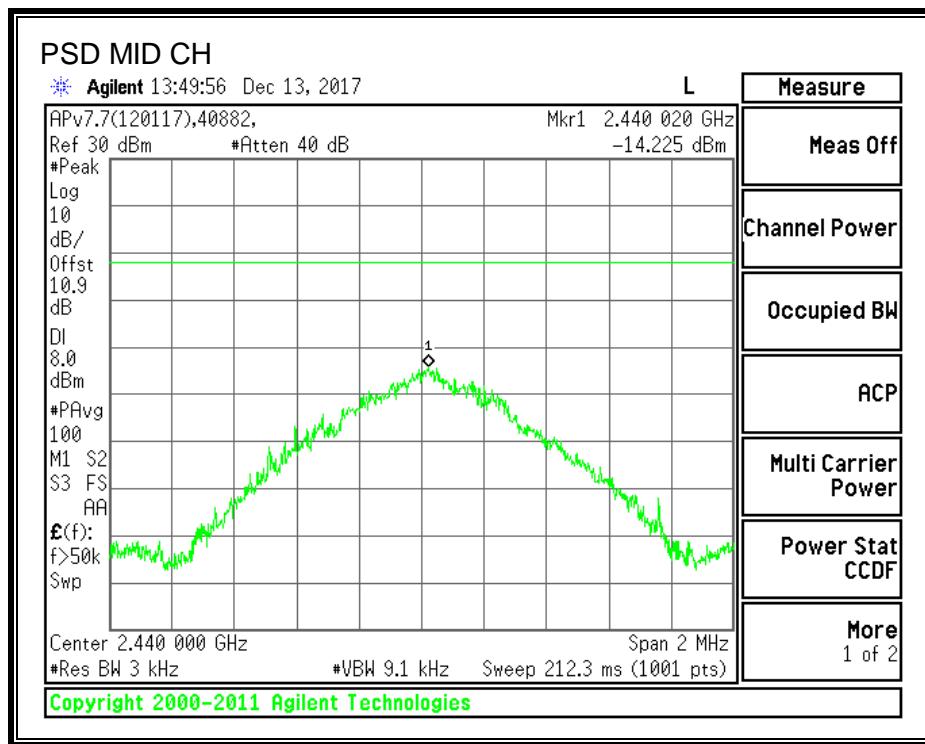
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-15.18	8	-23.18
Middle	2440	-14.23	8	-22.23
High	2480	-14.22	8	-22.22

TEST INFORMATION

Test Date: 2017-12-13
Project No: 11879698
Tested By: Jeffrey Cabrera

POWER SPECTRAL DENSITY PLOTS





8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

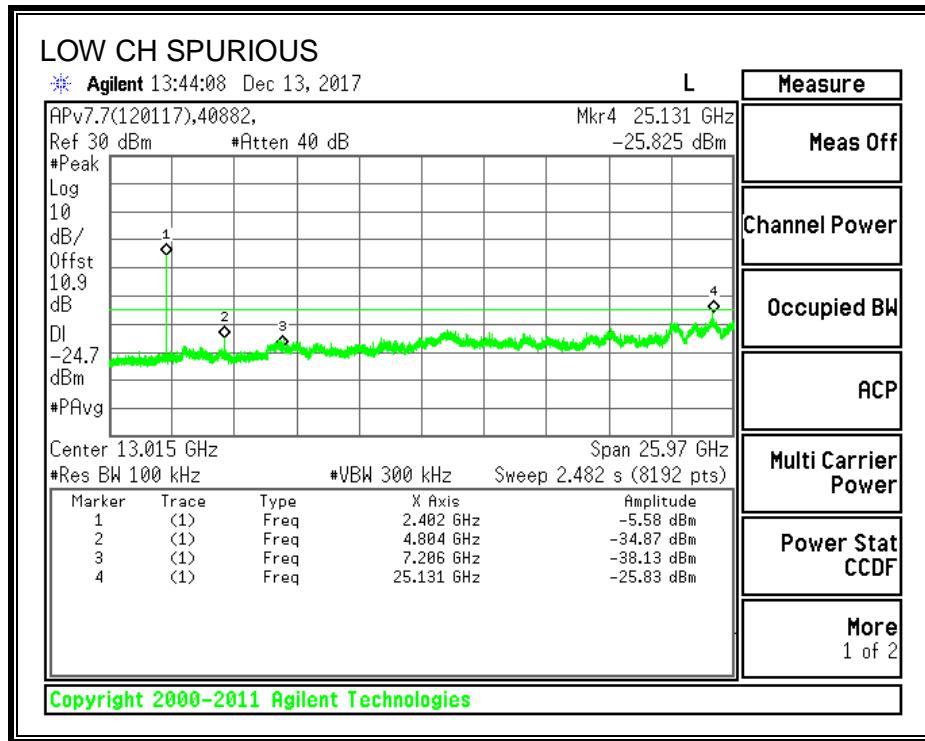
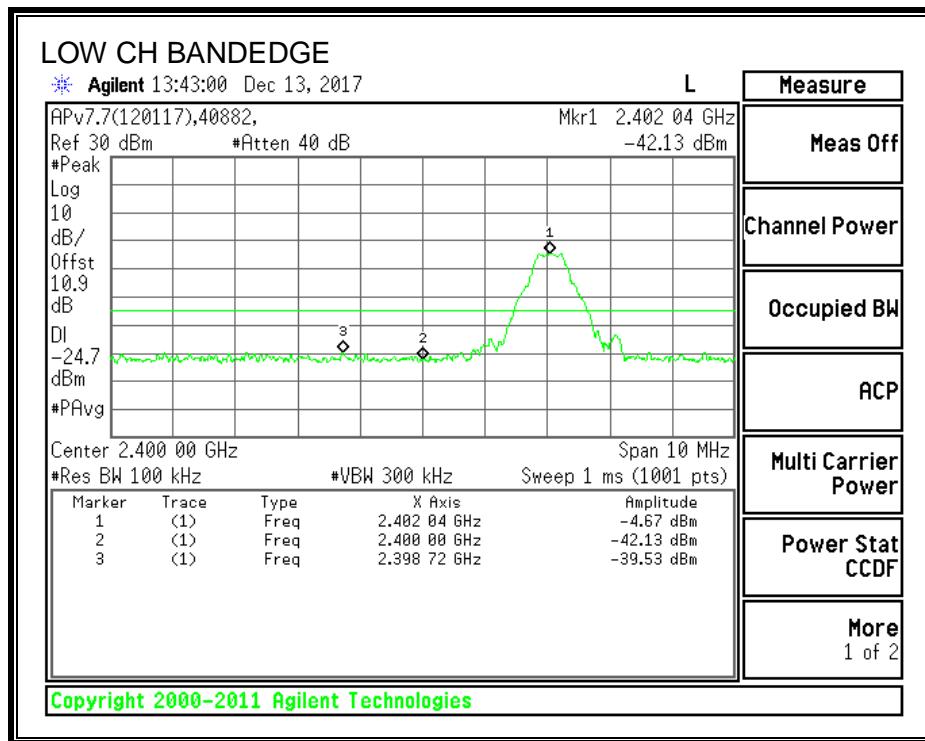
TEST INFORMATION

Test Date: 2017-12-13

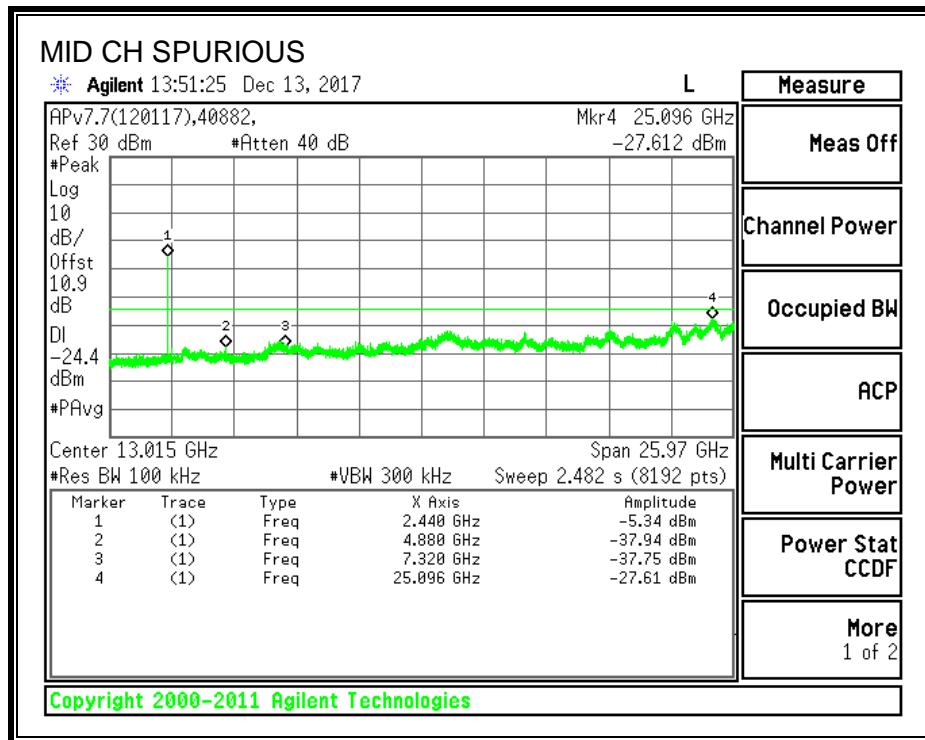
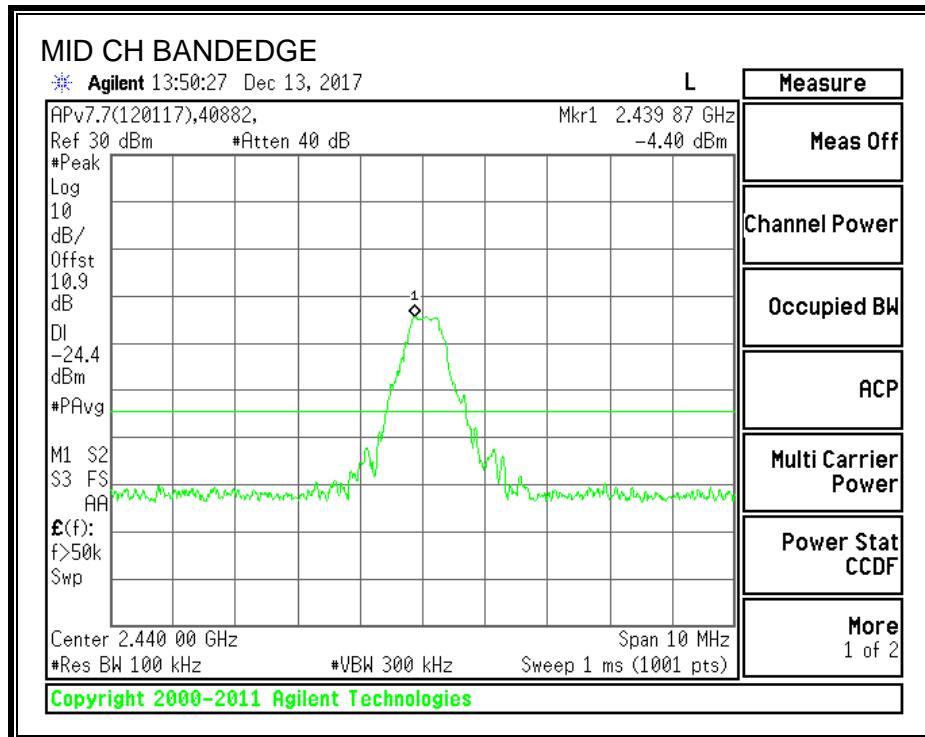
Project No: 11879698

Tested By: Jeffrey Cabrera

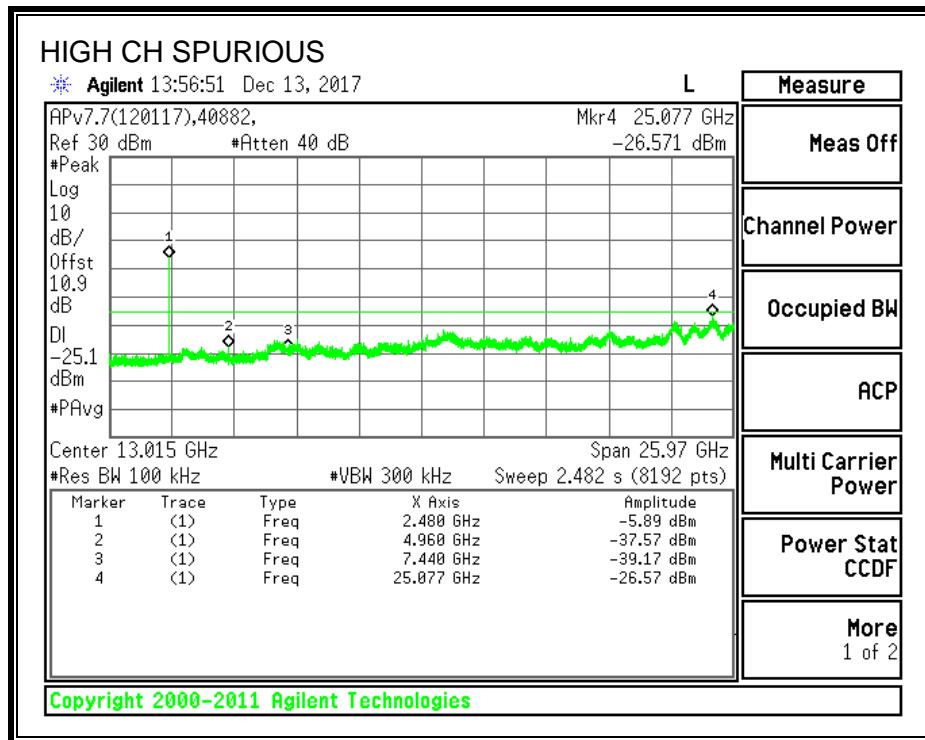
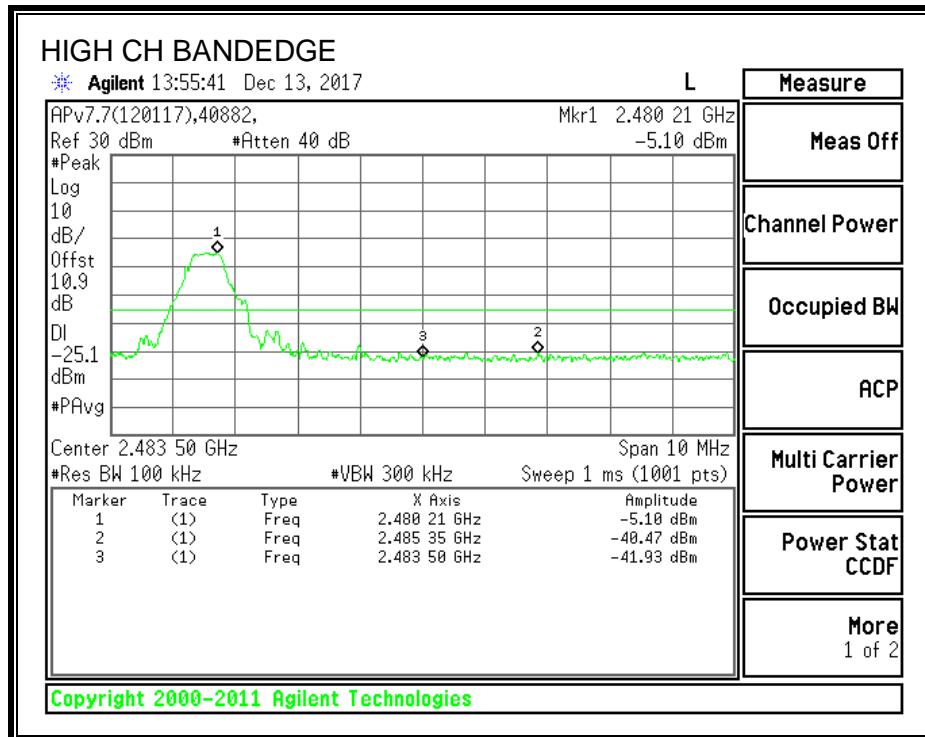
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209
IC RSS-GEN Clause 8.9 (Transmitter)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

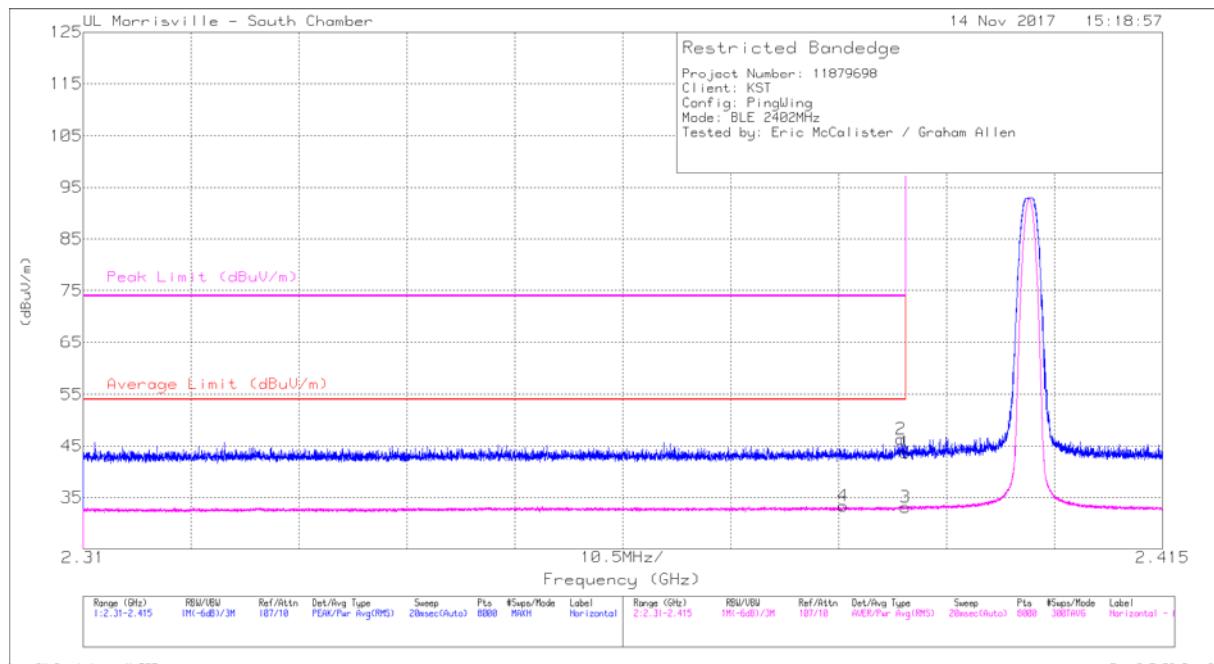
For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was RMS.

The spectrum from 1 to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. The spectrum from 9kHz to 1000MHz and 18 to 26GHz was investigated on the worst-case channel.

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.

9.2. TX ABOVE 1 GHz FOR BLE MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



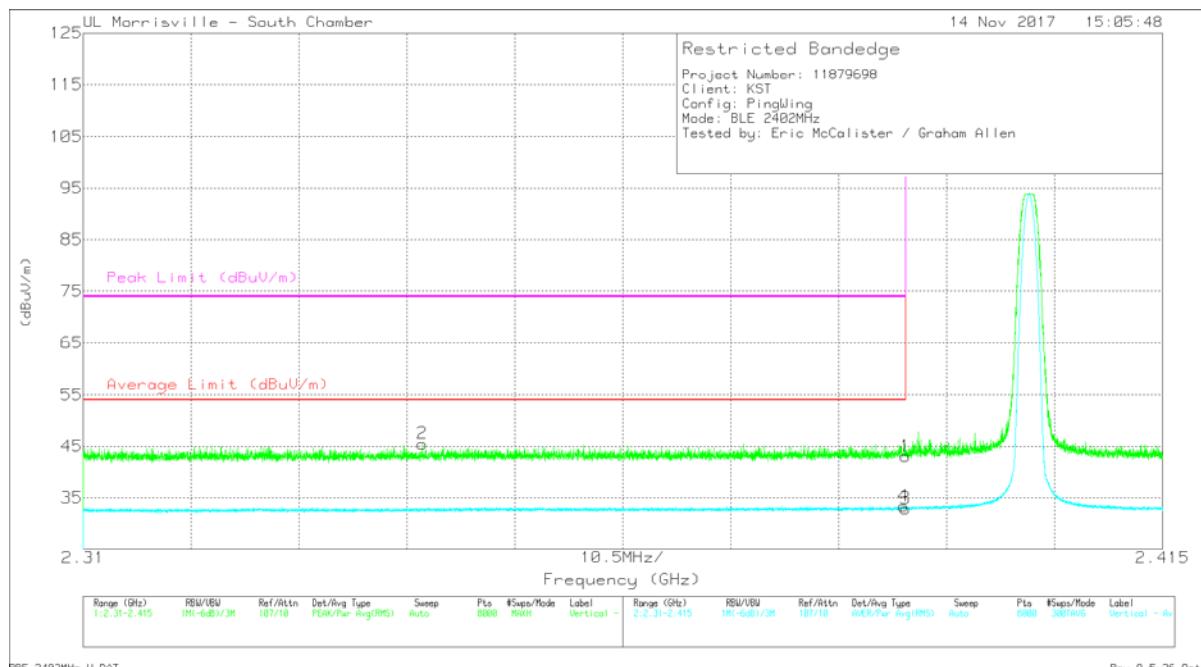
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.384	25.34	RMS	31.9	-23.9	.19	33.53	54	-20.47	-	-	15	143	H
1	* 2.39	35.72	Pk	31.9	-23.9	0	43.72	-	-	74	-30.28	15	143	H
2	* 2.39	38.26	Pk	31.9	-23.9	0	46.26	-	-	74	-27.74	15	143	H
3	* 2.39	25.1	RMS	31.9	-23.9	.19	33.29	54	-20.71	-	-	15	143	H

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

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



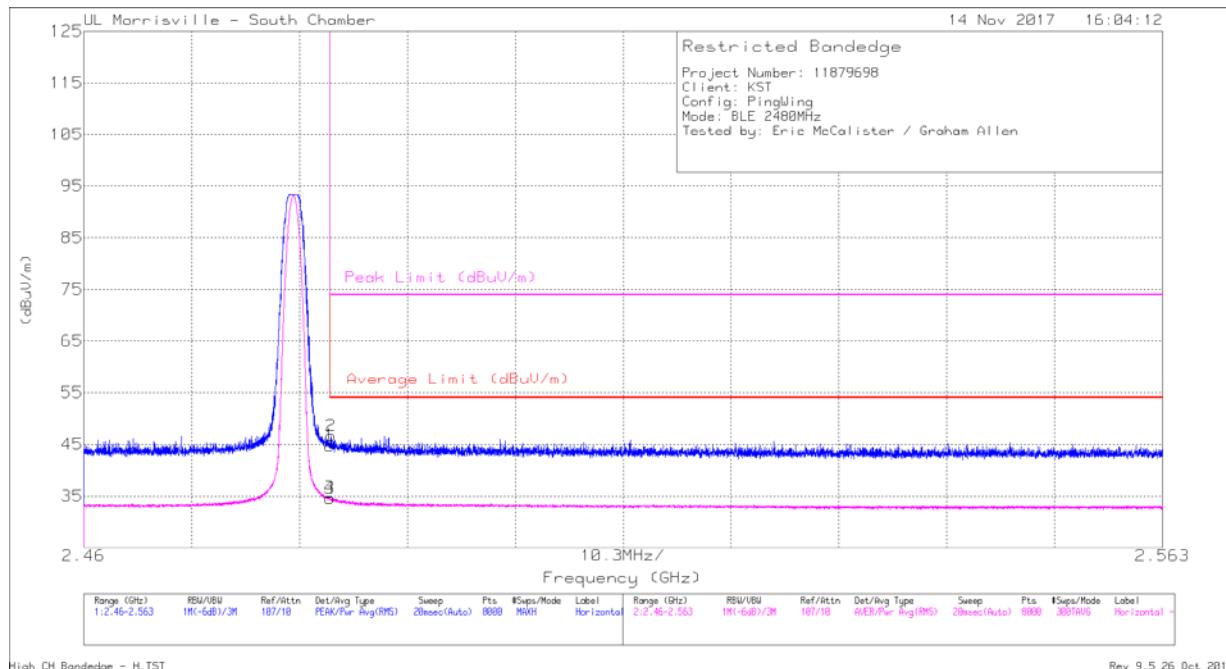
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.05	Pk	31.9	-23.9	0	43.05	-	-	74	-30.95	207	114	V
2	* 2.343	37.49	Pk	31.7	-23.7	0	45.49	-	-	74	-28.51	207	114	V
3	* 2.39	24.94	RMS	31.9	-23.9	.19	33.13	54	-20.87	-	-	207	114	V
4	* 2.39	25.38	RMS	31.9	-23.9	.19	33.57	54	-20.43	-	-	207	114	V

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

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



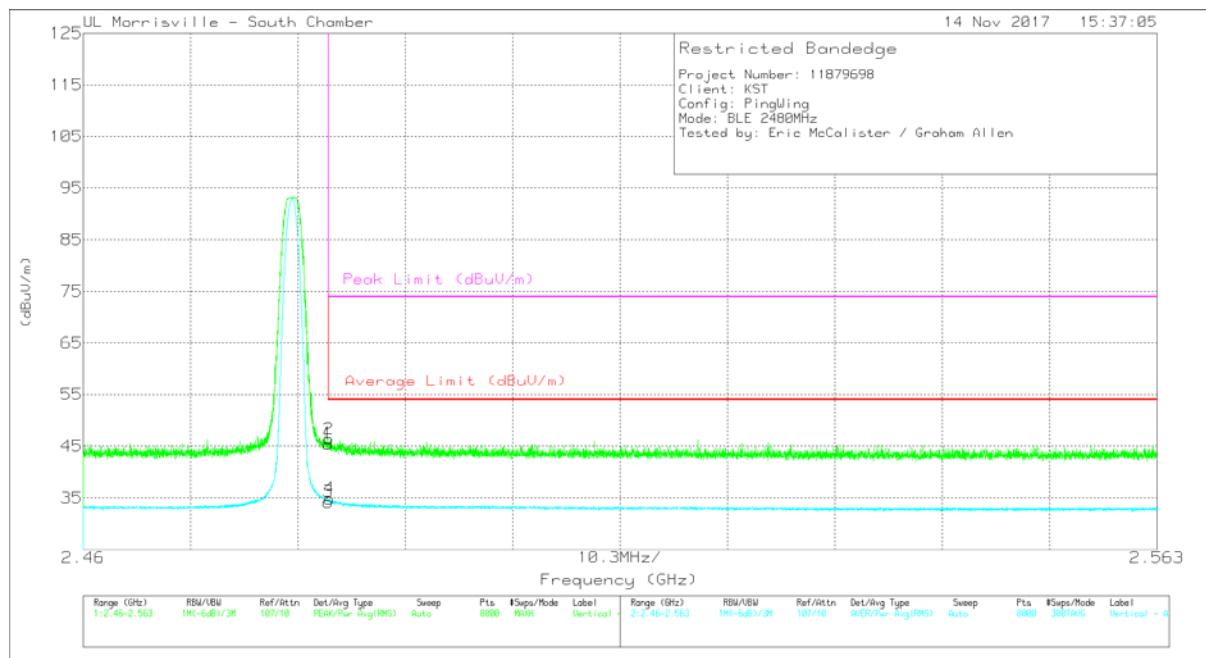
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	36.72	Pk	32.4	-24.4	0	44.72	-	-	74	-29.28	198	214	H
2	* 2.484	38.67	Pk	32.4	-24.4	0	46.67	-	-	74	-27.33	198	214	H
3	* 2.484	26.6	RMS	32.4	-24.4	.19	34.79	54	-19.21	-	-	198	214	H
4	* 2.484	26.64	RMS	32.4	-24.4	.19	34.83	54	-19.17	-	-	198	214	H

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

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



RBE_2400MHz_U.DAT

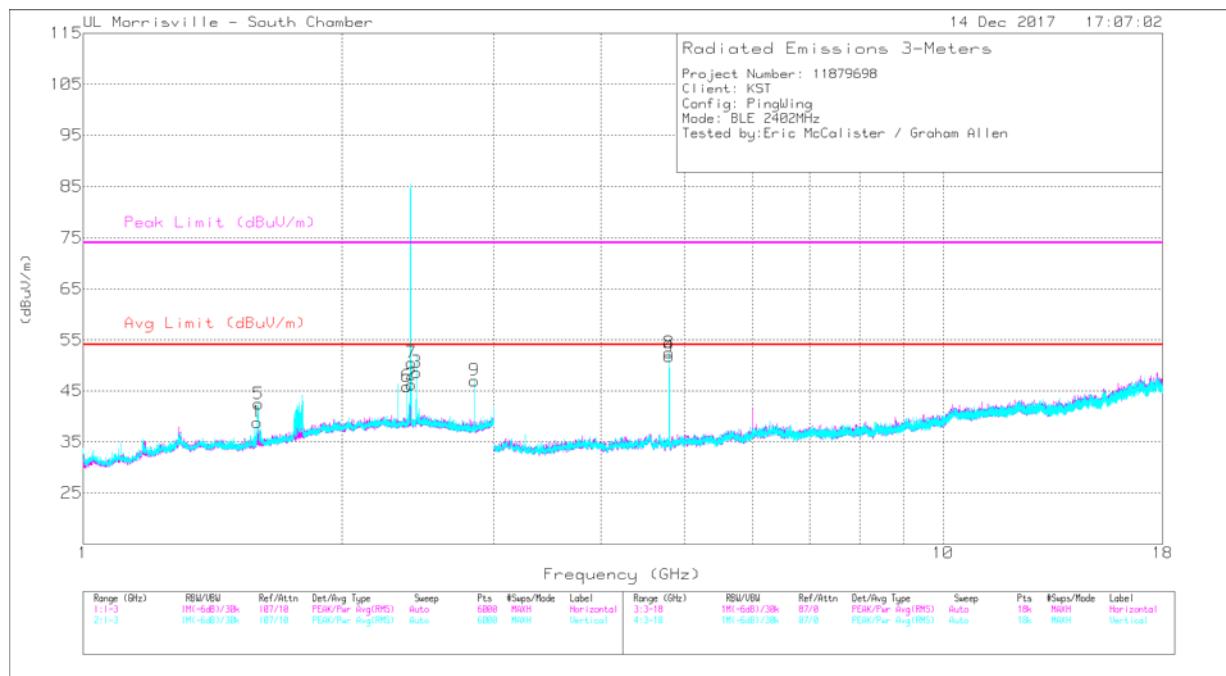
Marker	Frequency (GHz)	Meter Reading (dBmV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBmV/m)	Average Limit (dBmV/m)	Margin (dB)	Peak Limit (dBmV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.45	Pk	32.4	-24.4	0	45.45	-	-	74	-28.55	126	162	V
2	* 2.484	38.37	Pk	32.4	-24.4	0	46.37	-	-	74	-27.63	126	162	V
3	* 2.484	26.25	RMS	32.4	-24.4	.19	34.44	54	-19.56	-	-	126	162	V
4	* 2.484	26.86	RMS	32.4	-24.4	.19	35.05	54	-18.95	-	-	126	162	V

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

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS 1-18GHz

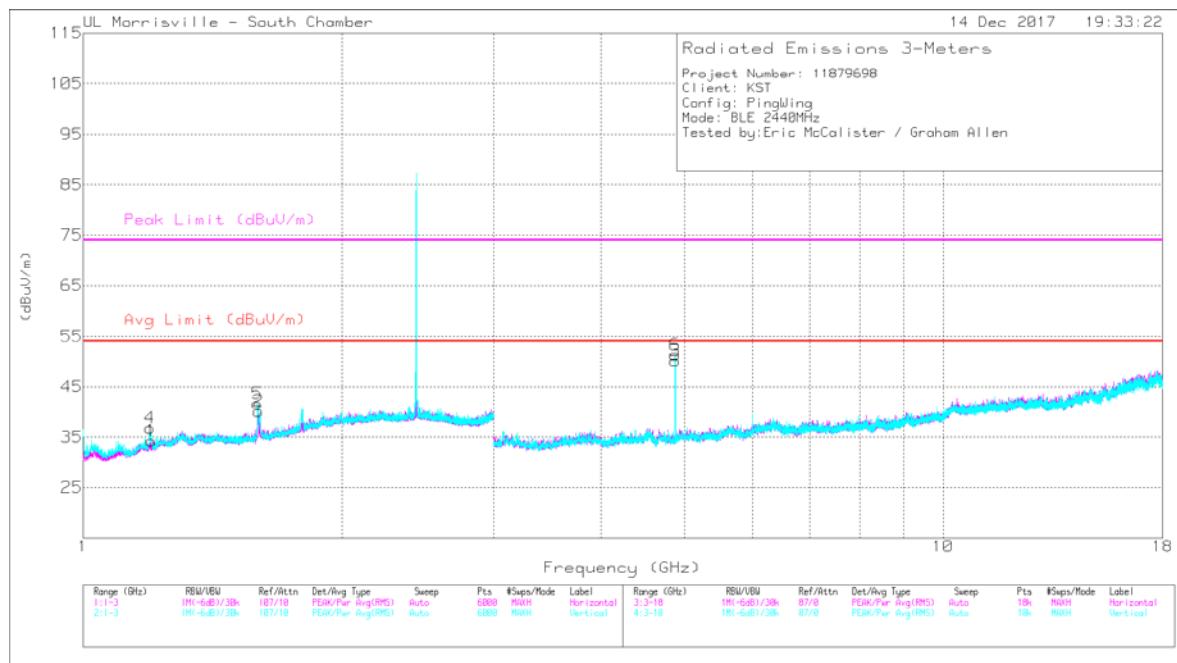


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.594	40.56	PK2	28.2	-22.2	0	46.56	-	-	74	-27.44	196	318	H
	* 1.595	24.85	MAV1	28.2	-22.2	.19	31.04	54	-22.96	-	-	196	318	H
5	* 1.599	42.17	PK2	28.3	-22.2	0	48.27	-	-	74	-25.73	231	236	V
	* 1.599	24.39	MAV1	28.3	-22.2	.19	30.68	54	-23.32	-	-	231	236	V
6	* 2.379	44.92	PK2	31.9	-23.9	0	52.92	-	-	74	-21.08	15	123	V
	* 2.379	26.24	MAV1	31.9	-23.9	.19	34.43	54	-19.57	-	-	15	123	V
9	* 2.849	37.72	PK2	32.3	-25.8	0	44.22	-	-	74	-29.78	70	259	V
	* 2.849	25.72	MAV1	32.3	-25.8	.19	32.41	54	-21.59	-	-	70	259	V
4	* 4.804	50.93	PK2	34	-30.9	0	54.03	-	-	74	-19.97	196	186	H
	* 4.804	47.77	MAV1	34	-30.9	.19	51.06	54	-2.94	-	-	196	186	H
8	* 4.804	51.67	PK2	34	-30.9	0	54.77	-	-	74	-19.23	140	104	V
	* 4.804	48.38	MAV1	34	-30.9	.19	51.67	54	-2.33	-	-	140	104	V
2	2.409	47.36	PK2	32	-24.1	0	55.26	-	-	-	-	104	265	H
	2.409	29.57	MAV1	32	-24.1	.19	37.66	-	-	-	-	104	265	H
7	2.409	47.43	PK2	32	-24.1	0	55.33	-	-	-	-	130	185	V
	2.409	29.51	MAV1	32	-24.1	.19	37.6	-	-	-	-	130	185	V
3	2.44	46.68	PK2	32.2	-24.2	0	54.68	-	-	-	-	334	111	H
	2.44	29.2	MAV1	32.2	-24.2	.19	37.39	-	-	-	-	334	111	H

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

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

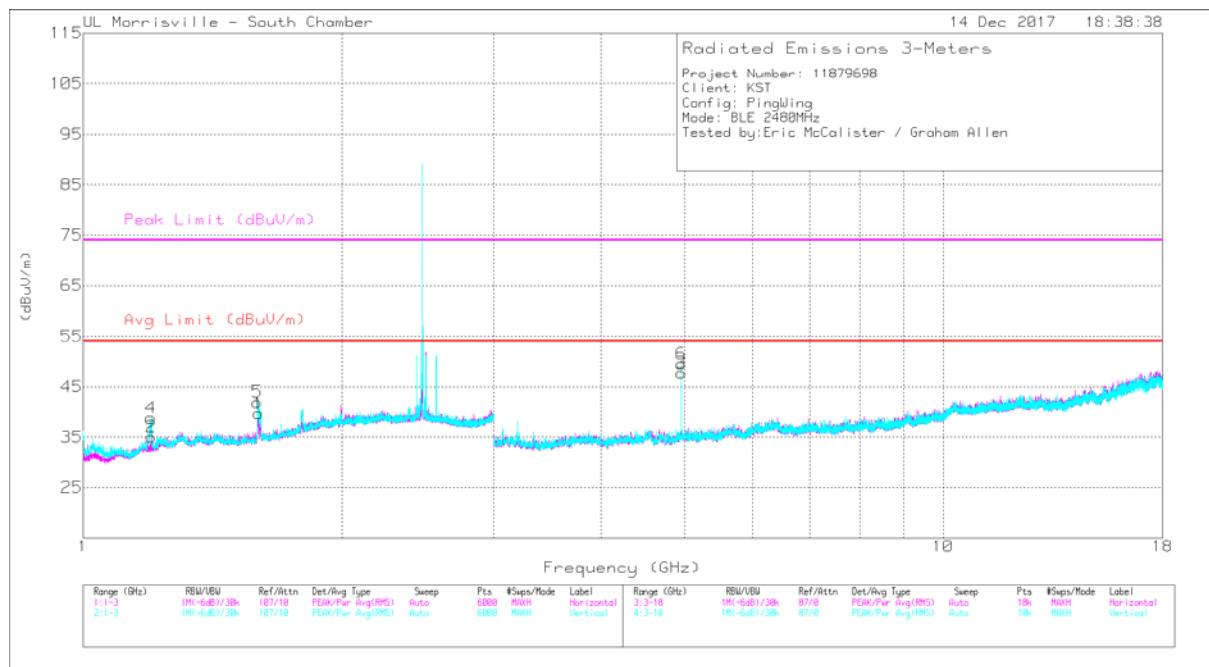


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.198	38.99	PK2	28.2	-23.7	0	43.49	-	-	74	-30.51	326	261	H
	* 1.197	24.22	MAv1	28.2	-23.7	.19	28.91	54	-25.09	-	-	326	261	H
2	* 1.598	41.13	PK2	28.3	-22.2	0	47.23	-	-	74	-26.77	356	194	H
	* 1.598	25.16	MAv1	28.3	-22.2	.19	31.45	54	-22.55	-	-	356	194	H
4	* 1.198	42.5	PK2	28.2	-23.7	0	47	-	-	74	-27	4	202	V
	* 1.196	25.41	MAv1	28.2	-23.7	.19	30.1	54	-23.9	-	-	4	202	V
5	* 1.593	43.34	PK2	28.2	-22.2	0	49.34	-	-	74	-24.66	49	175	V
	* 1.593	26.41	MAv1	28.2	-22.2	.19	32.6	54	-21.4	-	-	49	175	V
3	* 4.88	49.69	PK2	34	-30.8	0	52.89	-	-	74	-21.11	224	279	H
	* 4.88	46.12	MAv1	34	-30.8	.19	49.51	54	-4.49	-	-	224	279	H
6	* 4.88	50.08	PK2	34	-30.8	0	53.28	-	-	74	-20.72	170	155	V
	* 4.88	46.47	MAv1	34	-30.8	.19	49.86	54	-4.14	-	-	170	155	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.598	40.61	PK2	28.3	-22.2	0	46.71	-	-	74	-27.29	355	191	H
	* 1.6	25.34	MAV1	28.3	-22.2	.19	31.63	54	-22.37	-	-	355	191	H
2	* 1.197	36.56	PK2	28.2	-23.7	0	41.06	-	-	74	-32.94	327	338	H
	* 1.198	23.87	MAV1	28.2	-23.7	.19	28.56	54	-25.44	-	-	327	338	H
4	* 1.197	39.71	PK2	28.2	-23.7	0	44.21	-	-	74	-29.79	24	205	V
	* 1.196	24.29	MAV1	28.2	-23.8	.19	28.88	54	-25.12	-	-	24	205	V
5	* 1.595	43.51	PK2	28.2	-22.2	0	49.51	-	-	74	-24.49	221	120	V
	* 1.595	24.75	MAV1	28.2	-22.2	.19	30.94	54	-23.06	-	-	221	120	V
3	* 4.96	48.43	PK2	34	-31.1	0	51.33	-	-	74	-22.67	203	213	H
	* 4.96	44.28	MAV1	34	-31.1	.19	47.37	54	-6.63	-	-	203	213	H
6	* 4.96	49.12	PK2	34	-31.1	0	52.02	-	-	74	-21.98	150	175	V
	* 4.96	45.2	MAV1	34	-31.1	.19	48.29	54	-5.71	-	-	150	175	V

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

PK2 - KDB558074 Method: Maximum Peak

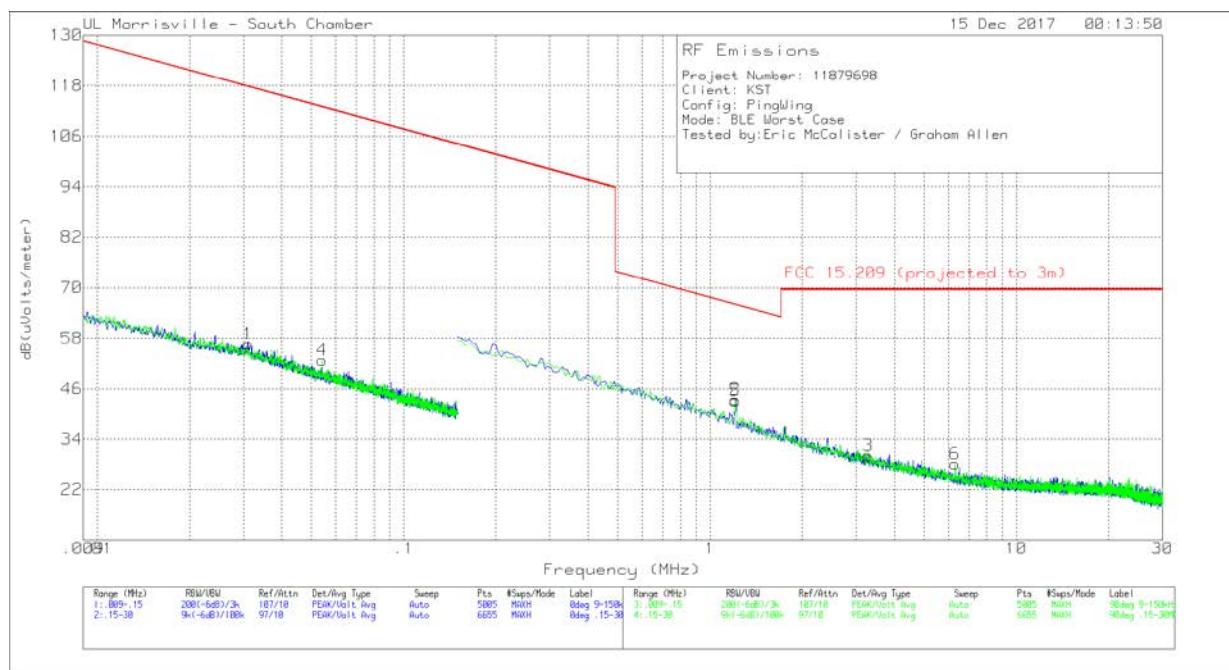
MAV1 - KDB558074 Option 1 Maximum RMS Average

9.3. WORST-CASE CONFIGURATIONS

SPURIOUS EMISSIONS 0.009 - 30 MHz (WORST-CASE CONFIGURATION)

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 $40 \times \log$ (specification distance / test distance).

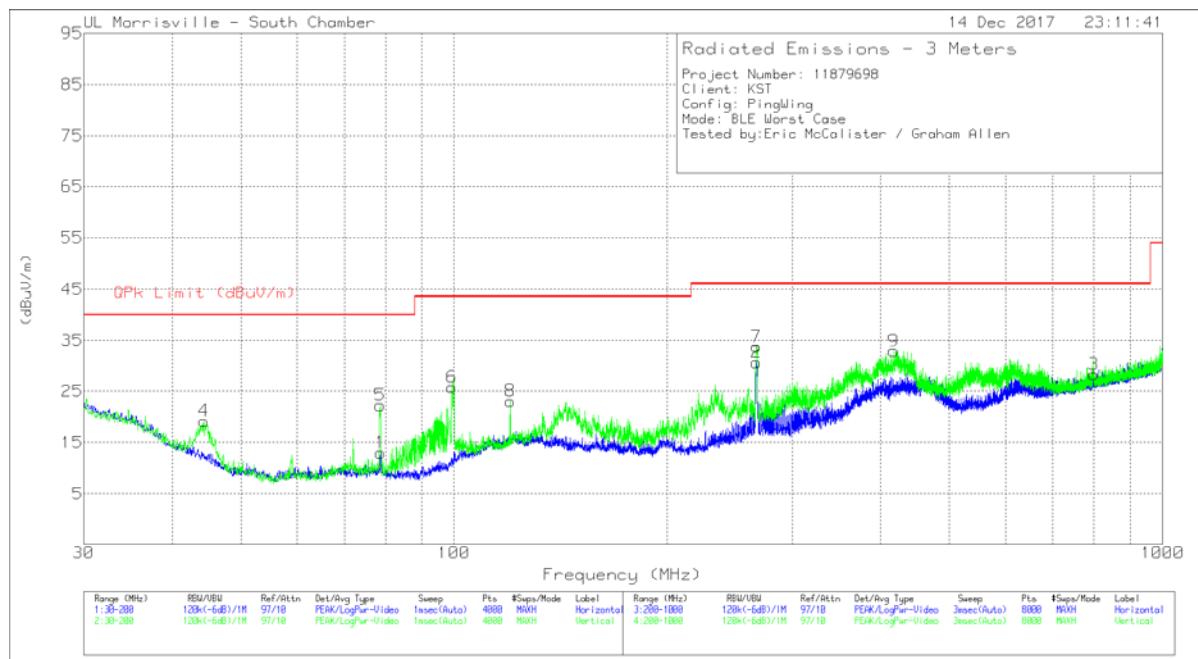
Although these tests were performed at a test site other than an open area test site, adequate comparison measurements were confirmed against an open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made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



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Cbl (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 QP (projected to 3m)	QP Margin (dB)	FCC 15.209 AV (projected to 3m)	AV Margin (dB)	FCC 15.209 PK (projected to 3m)	PK Margin (dB)	Azimuth (Degs)
1	.03112	42.92	Pk	13.6	.1	56.62	-	-	117.74	-61.12	137.74	-81.12	0-360
4	.05419	41.19	Pk	11.4	.1	52.69	-	-	112.93	-60.24	132.93	-80.24	0-360
2	1.2087	32.63	Pk	10.6	.2	43.43	65.96	-22.53	-	-	-	-	0-360
5	1.2087	32.37	Pk	10.6	.2	43.17	65.96	-22.79	-	-	-	-	0-360
3	3.2902	19.22	Pk	10.6	.3	30.12	69.54	-39.42	-	-	-	-	0-360
6	6.31376	17.01	Pk	10.7	.4	28.11	69.54	-41.43	-	-	-	-	0-360

Pk - Peak detector

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

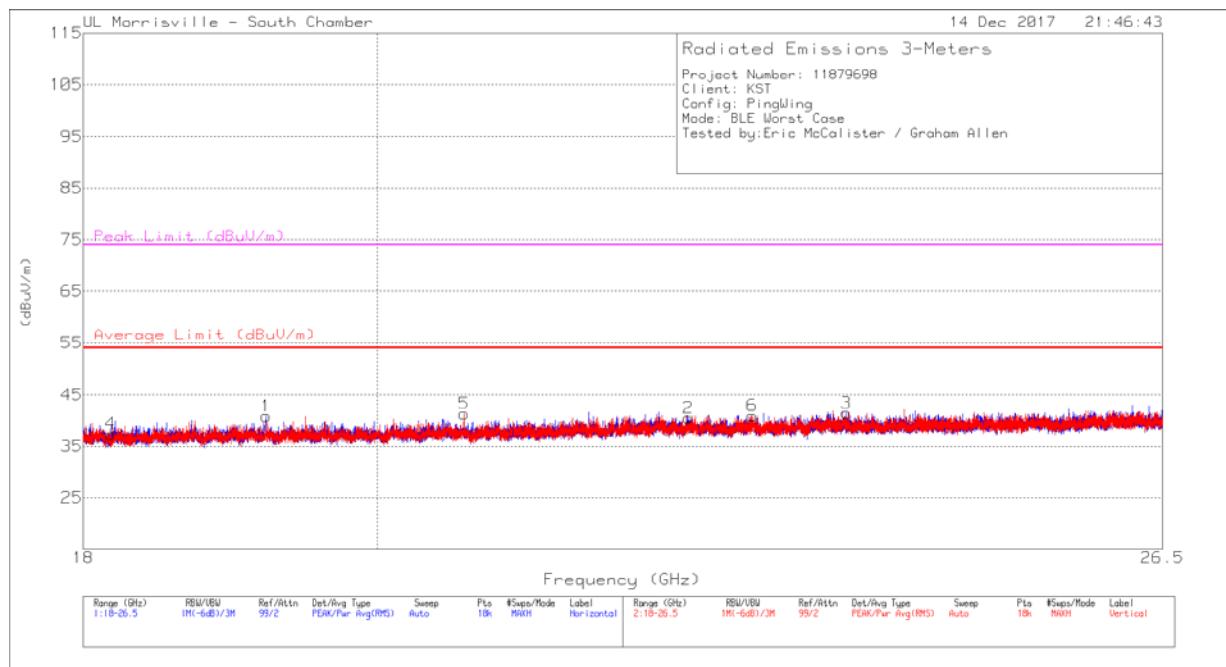


Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8	* 119.9958	35.75	Pk	18.1	-30.8	23.05	43.52	-20.47	0-360	101	V
2	* 267.3087	42.8	Pk	17.6	-29.8	30.6	46.02	-15.42	0-360	298	H
7	* 267.0087	45.96	Pk	17.6	-29.8	33.76	46.02	-12.26	0-360	199	V
4	44.3262	35.38	Pk	15.4	-31.6	19.18	40	-20.82	0-360	101	V
5	78.6751	41.34	Pk	12.1	-31.2	22.24	40	-17.76	0-360	101	V
1	78.7176	32.09	Pk	12.1	-31.2	12.99	40	-27.01	0-360	399	H
6	99.2929	42.56	Pk	14.2	-31	25.76	43.52	-17.76	0-360	101	V
9	417.3282	40.86	Pk	20.9	-28.9	32.86	46.02	-13.16	0-360	102	V
3	799.1779	30.26	Pk	25.8	-27.8	28.26	46.02	-17.76	0-360	199	H

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

Pk - Peak detector

SPURIOUS EMISSIONS 18-26GHz (WORST-CASE CONFIGURATION)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (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	* 19.219	48.19	Pk	32.7	-40.1	40.79	54	-13.21	74	-33.21	0-360	149	H
2	* 22.356	45.88	Pk	33.8	-39.2	40.48	54	-13.52	74	-33.52	0-360	199	H
3	* 23.66	46.41	Pk	33.9	-38.9	41.41	54	-12.59	74	-32.59	0-360	102	H
4	* 18.179	45.62	Pk	32.3	-40.6	37.32	54	-16.68	74	-36.68	0-360	151	V
5	* 20.634	47.78	Pk	33.1	-39.6	41.28	54	-12.72	74	-32.72	0-360	299	V
6	* 22.876	46.2	Pk	33.7	-39	40.9	54	-13.1	74	-33.1	0-360	299	V

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