



**FCC 47 CFR PART 15 SUBPART C  
INDUSTRY (ISED) CANADA RSS-247 ISSUE 1**

**BLUETOOTH LOW ENERGY  
CERTIFICATION TEST REPORT**

**FOR**

**WIRELESS CAPABLE SECURITY CAMERA**

**HVIN: r1**

**PMN: AXIS M3045-WV**

**FCC ID: PNB-AXISM3045-WV**

**IC: 3919A-M3045WV**

**REPORT NUMBER: 11197251-E4**

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NVLAP Lab code: 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2016-07-18	Initial Issue	Brian Kiewra
2	2016-07-21	Added model numbers and EUT descriptive detail. Added Line Conducted Emissions setup diagram and revised serial number.	Brian Kiewra
3	2016-08-11	Removed model variants, added HVIN and PMN. Made editorial changes to references throughout.	Brian Kiewra
4	2016-09-08	Lowered BLE power data.	Brian Kiewra
5	2016-09-19	Added clarifying information regarding lowered BLE power data in V4. Included information on samples used for retesting in Section 5.6.	Jeff Moser
6	2016-09-21	Added clarifying information on power setting information and samples used.	Jeff Moser

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Axis Communications AB  
Emdalavagen 14  
Lund, Sweden, SE-223 69

**EUT DESCRIPTION:** Wireless Capable Security Camera

**HVIN:** r1  
**PMN:** AXIS M3045-WV

**SERIAL NUMBER:** 00408C186CE0, 00408C186D46 (power only)

**DATE TESTED:** 2016-06-15 to 2016-06-29, 2016-08-24

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY (ISED) CANADA RSS-247 Issue 1	Pass
INDUSTRY (ISED) 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, any agency of the Federal Government, or any agency of any government.

Approved & Released  
For UL LLC By:

Prepared By:



Jeffrey Moser  
EMC Program Manager  
UL – Consumer Technology Division



Brian Kiewra  
EMC 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 1.

## 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 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

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:

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

## 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Total RF power, conducted	± 0.45 dB
RF power density, conducted	± 1.5 dB
Spurious emissions, conducted	± 2.94 dB
All emissions, radiated up to 40 GHz	± 5.36 dB
Temperature	± 0.07°C
Humidity	± 2.26% RH
DC and low frequency voltages	± 1.27%
Conducted Emissions (0.150-30MHz)	± 2.37dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a network surveillance camera that contains an 802.11 a/b/g/n and Bluetooth transceivers, manufactured by AXIS Communications AB, Lund, SWEDEN.

The EUT is provided with an Axis PS-U05 rev. 1 power supply.

### 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	5.19	3.30

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal inverted-f type antenna.

Peak antenna gain is +0.6 dBi for 2.5 GHz and +4.4 dBi for 5 GHz.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 6.15\_beta54.

Special test firmware used for EMC was 15+snapshot\_20160511 (this firmware allows for simultaneously operation for Bluetooth and WLAN in order to reduce test set-ups).



## **5.5. WORST-CASE CONFIGURATION AND MODE**

Radiated emission and power line conducted emission 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 X-Axis orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X-Axis orientation.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	T440	RTP1014PC015NUR	NA

### I/O CABLES

I/O Cable List					
Cable No	Port	# of Identical ports	Connector Type	Cable Length (m)	Remarks
1	Antenna Port	1	EUT	<1m	NA
2	Ethernet	1	RJ45	>1m	CAT5E
3	AC Mains	1	AC	>1m	NA
4	HDMI	1	HDMI	>1m	NA

### TEST SETUP

Test software exercised the radio card.

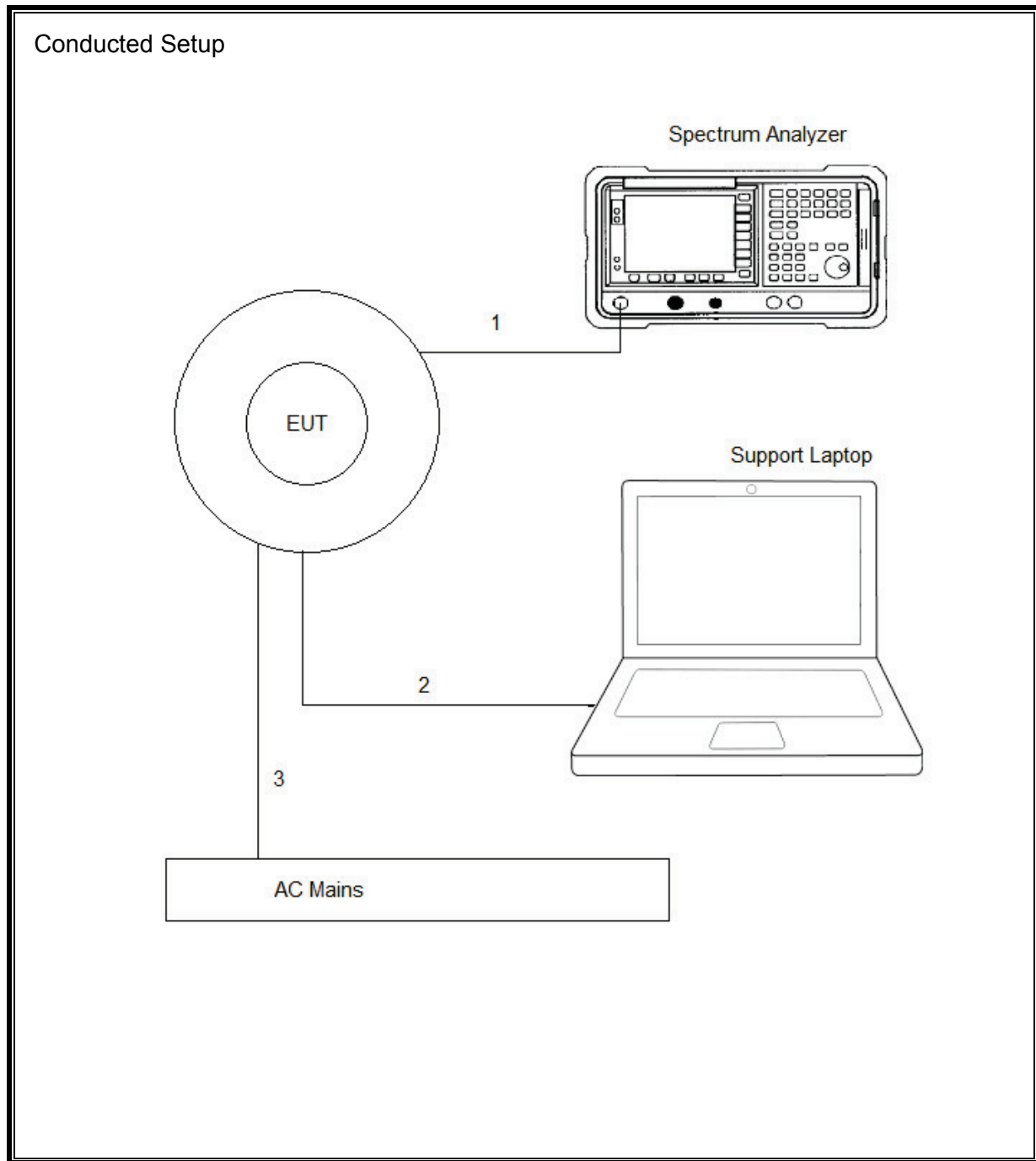
### SAMPLES USED

00408C186CE0, 00408C186D46 (conducted power only)

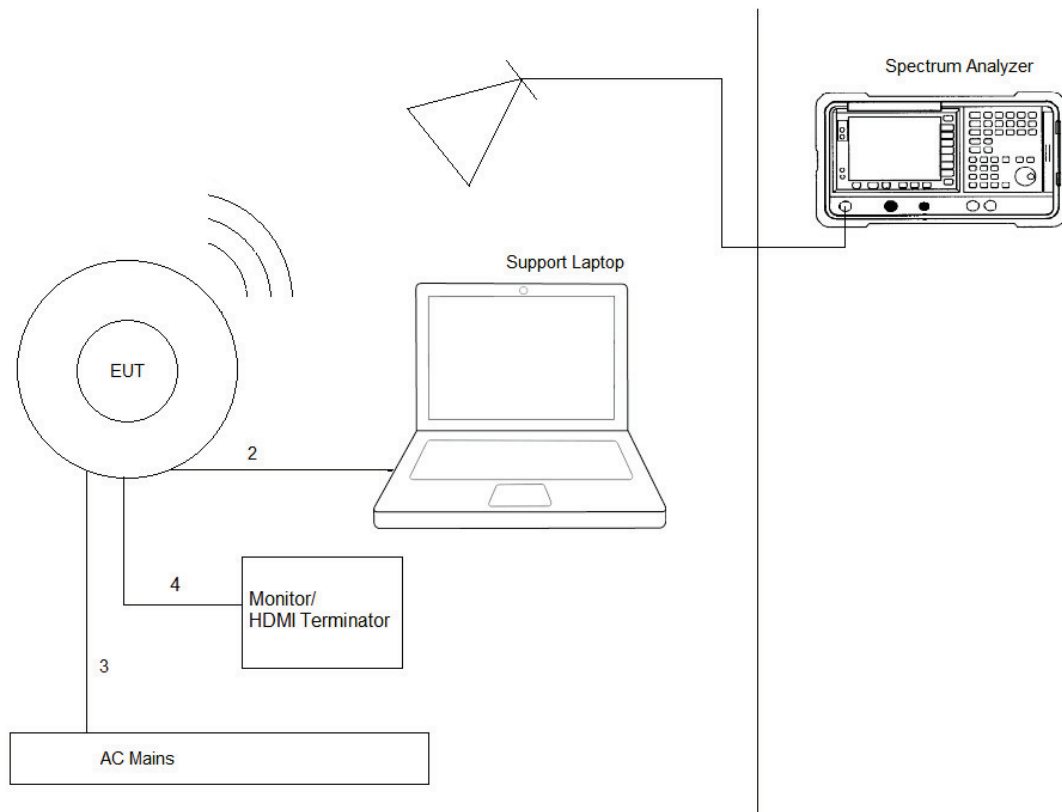
Note – Re-testing was required of the transmitter output power with reduced EUT power settings. All other tests were performed at the higher power settings (considered worst case).

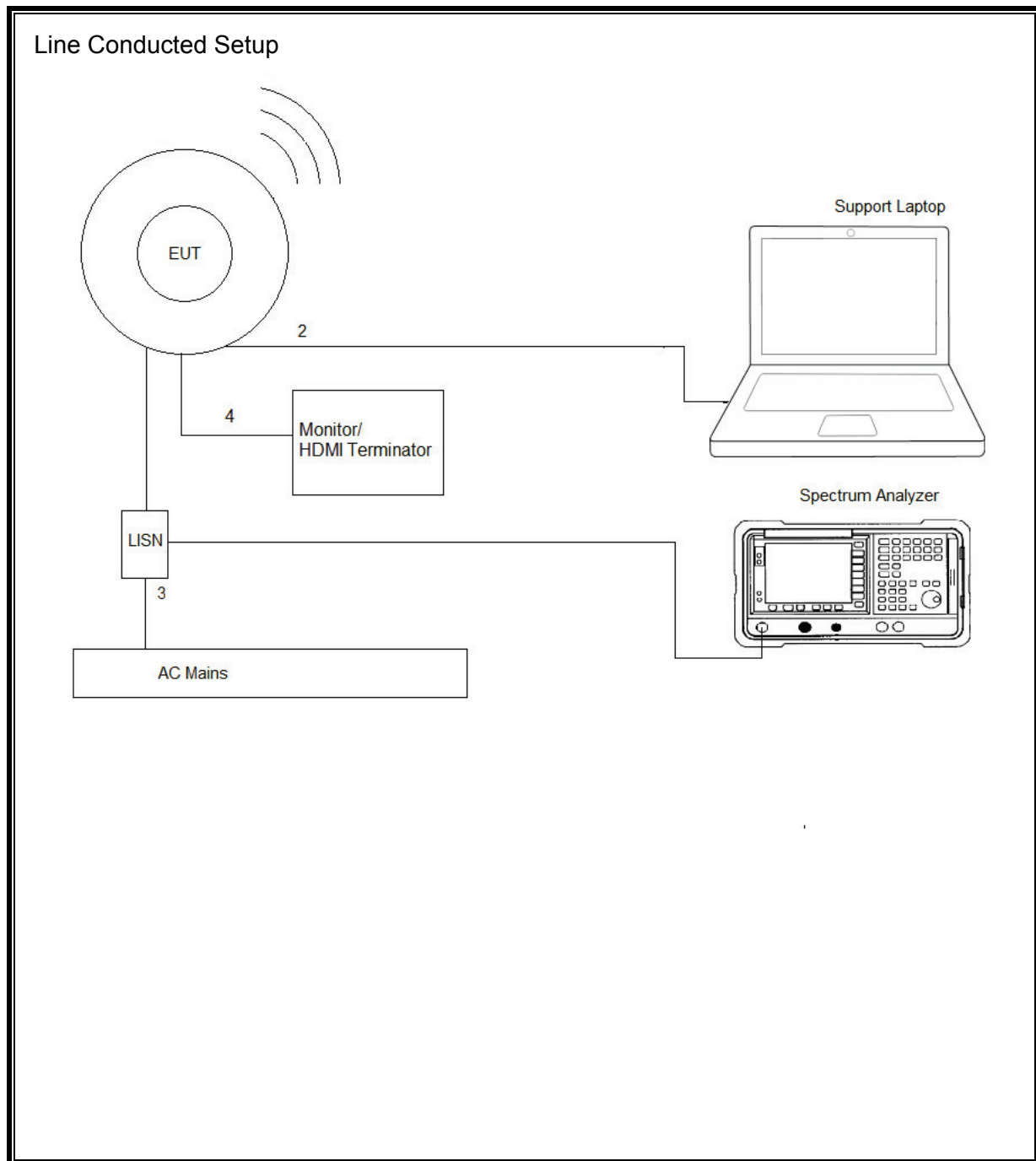
Test	Power Level	Comment
6 dB/99% OBW	Maximum allowed	This was the default setting provided.
Output Power	Reduced	Reduced power setting.
Power Spectral Density	Maximum allowed	This was the default setting provided.
Conducted Emissions	Maximum allowed	This was the default setting provided.
Radiated Emissions	Maximum allowed	This was the default setting provided.
Line Conducted Emissions	Maximum allowed	This was the default setting provided.

**SETUP DIAGRAM FOR TESTS**



### Radiated Setup





## 6. TEST AND MEASUREMENT EQUIPMENT

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

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	<b>0.009-30MHz</b>	<b>(Loop Ant.)</b>			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2015-12-08	2016-12-31
	<b>30-1000 MHz</b>				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2016-06-07	2017-06-30
	<b>1-18 GHz</b>				
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2016-03-07	2017-03-31
	<b>18-40 GHz</b>				
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2015-08-27	2016-08-31
	<b>Gain-Loss Chains</b>				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2015-10-07	2016-10-31
S-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2015-06-09	2016-06-30
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2015-08-22	2016-08-31
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2016-02-29	2017-02-28
	<b>Receiver &amp; Software</b>				
SA0025	Spectrum Analyzer	Agilent	N9030A	2016-03-17	2017-03-31
SA0026 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2016-02-24	2017-02-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	<b>Additional Equipment used</b>				
HI0050	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2015-07-01	2016-07-31

Note – All testing in this chamber was performed before 2016-06-30.

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
<b>Conducted Room 1</b>					
72822 (SA0019)	Spectrum Analyzer	Agilent Technologies	E4446A	2015-09-02	2016-09-30
PWM004	RF Power Meter	Keysight Technologies	N1911A	2015-06-08, 2016-06-22	2016-06-30, 2017-06-22
PWS004	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05, 2016-06-22	2016-06-30, 2017-06-22
HI0079	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-01	2016-07-31
HI0078	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2016-06-13	2017-06-13
MM0167	True RMS Multimeter	Agilent	U1232A	2015-08-17	2016-08-31
<b>Conducted Room 2</b>					
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2016-03-22	2017-03-31
PWM003	RF Power Meter	Keysight Technologies	N1911A	2015-06-08, 2016-06-21	2016-06-30, 2017-06-21
PWS003	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05, 2016-06-21	2016-06-30, 2017-06-21
HI0080	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-01	2016-07-31
HI0078	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2016-06-13	2017-06-13
MM0168	True RMS Multimeter	Agilent	U1232A	2015-08-17	2016-08-31
T1024	EMPower USB RF Power Sensor, 10MHz to 6GHz	ETS Lindgren	7002-006	2015-10-01	2016-10-01

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

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL077	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2016-06-15	2017-06-30
HI0079	Temp/Humid/Pressure Meter	Springfield Precision	PreciseTemp	2015-07-01	2016-07-31
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2015-08-24	2016-08-31
LISN008	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	2015-09-03	2016-09-30
MM0167	Multi-meter	Agilent	U1232A	2015-08-17	2016-08-31
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2015-08-26	2016-08-31
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2016-06-09	2017-06-30
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2016-06-04	2017-06-30



## 7. MEASUREMENT METHODS

Duty Cycle: KDB 558074 D01 v03r05 Section 6.0

6 dB BW: KDB 558074 D01 v03r05, Section 8.1.

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

Output Power: KDB 558074 D01 v03r05, Section 9.1.2

Power Spectral Density: KDB 558074 D01 v03r05, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r05, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r05, Section 12.1.

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

Line Conducted Emissions: ANSI C63.10:2013 Sections 6.2

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

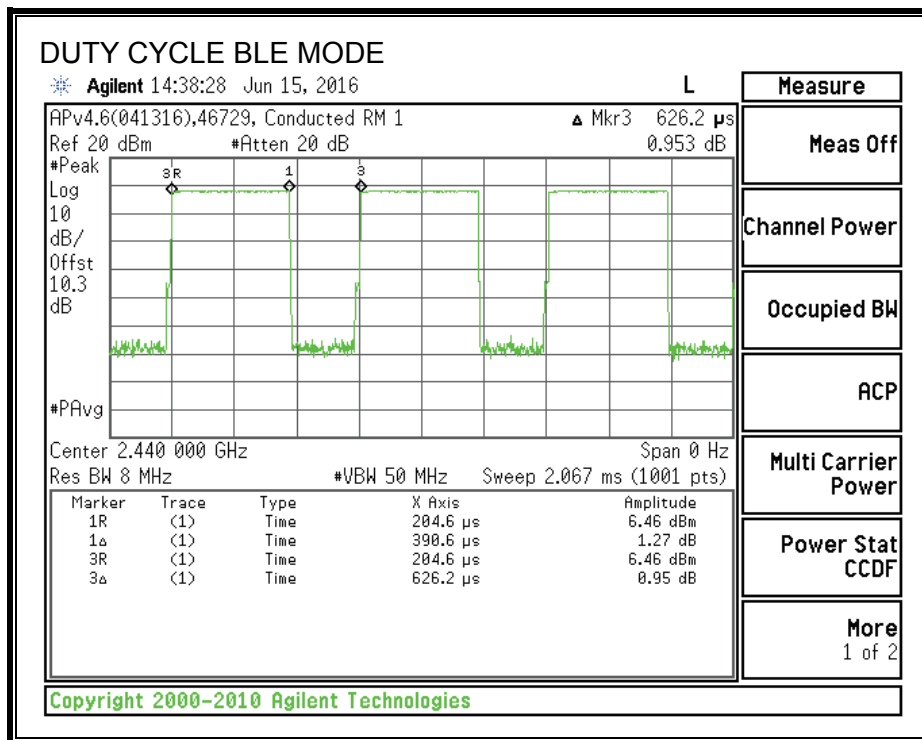
#### ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	0.391	0.626	0.624	62.38%	2.05	2.560

Test Performed: Ron Reichard/Jeff Cabrera  
Test Date: 2016-06-15

Note – This test was performed at the maximum allowed power setting.

## DUTY CYCLE PLOTS



## 8.2. 6 dB BANDWIDTH

### LIMITS

FCC §15.247 (a) (2)

IC RSS-247 5.2 (1)

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

### RESULTS

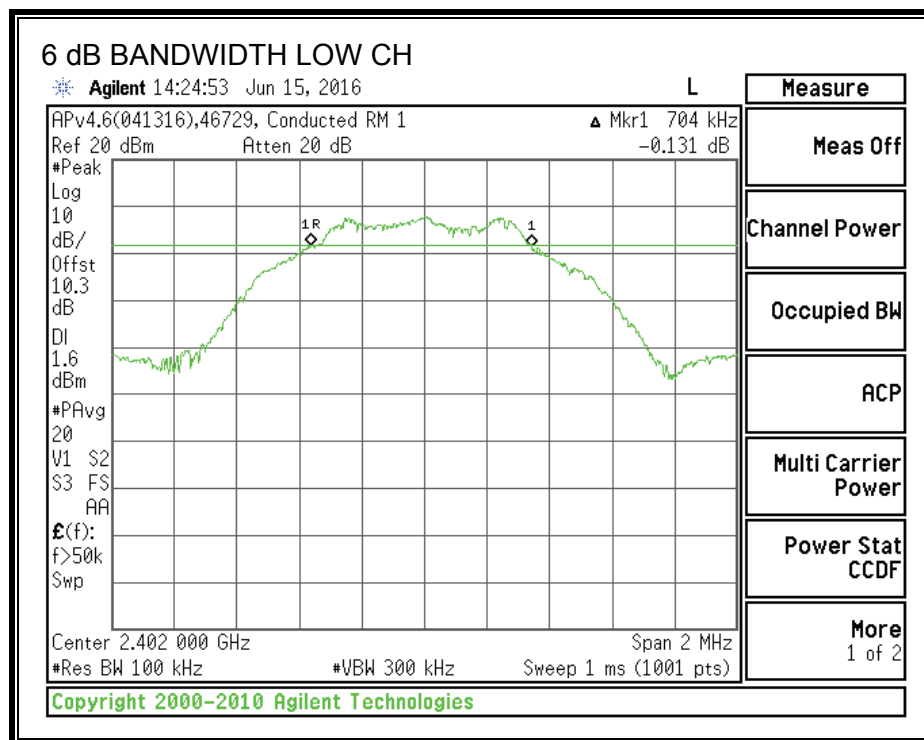
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.7040	0.5
Middle	2440	0.7140	0.5
High	2480	0.7240	0.5

Test Performed: Ron Reichard/Jeff Cabrera

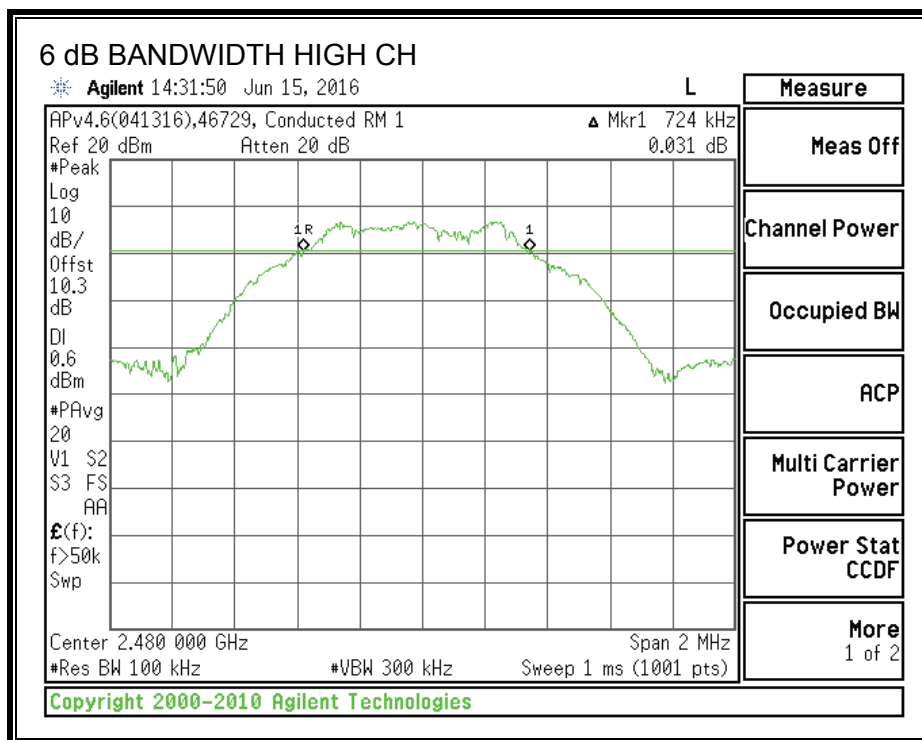
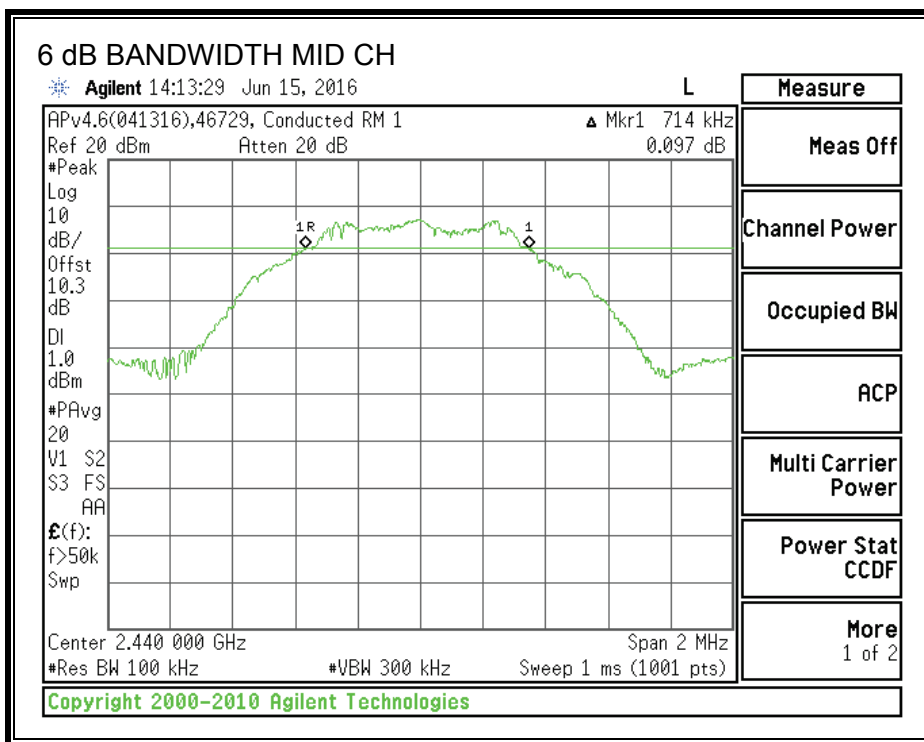
Test Date: 2016-06-15

Note – This test was performed at the maximum allowed power setting.

### 6 dB BANDWIDTH







### 8.3. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only. Testing per RSS-Gen Clause 6.6.

#### 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.

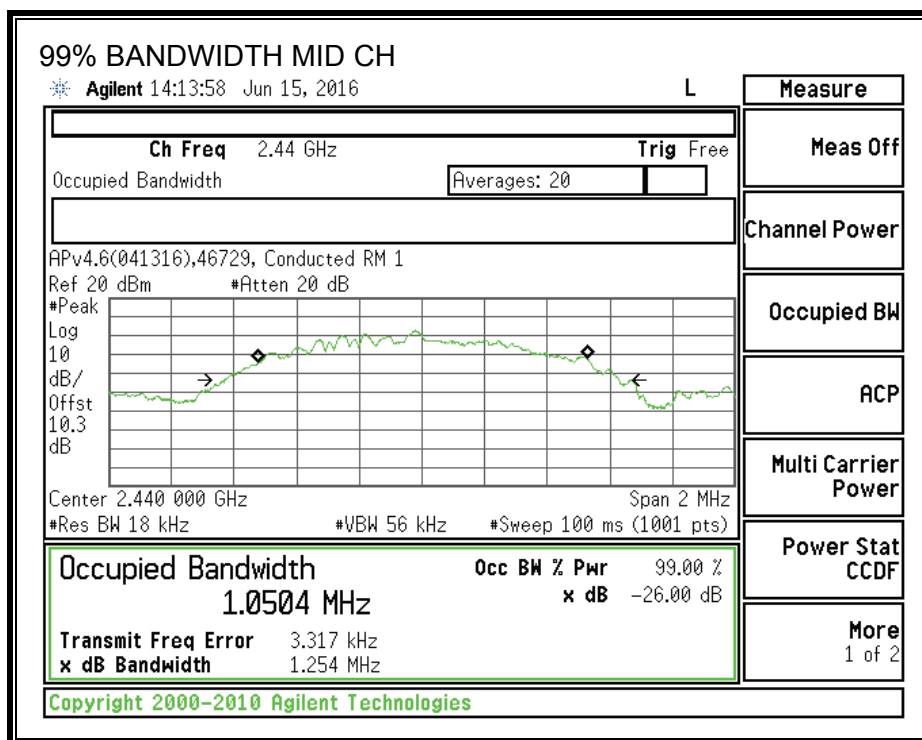
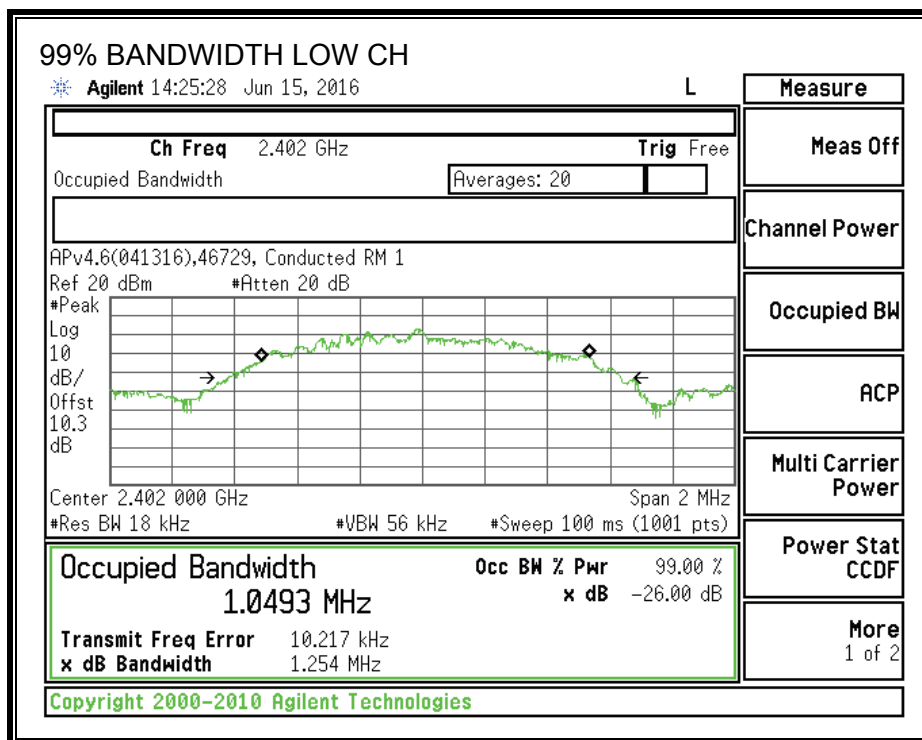
#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0493
Middle	2440	1.0504
High	2480	1.0494

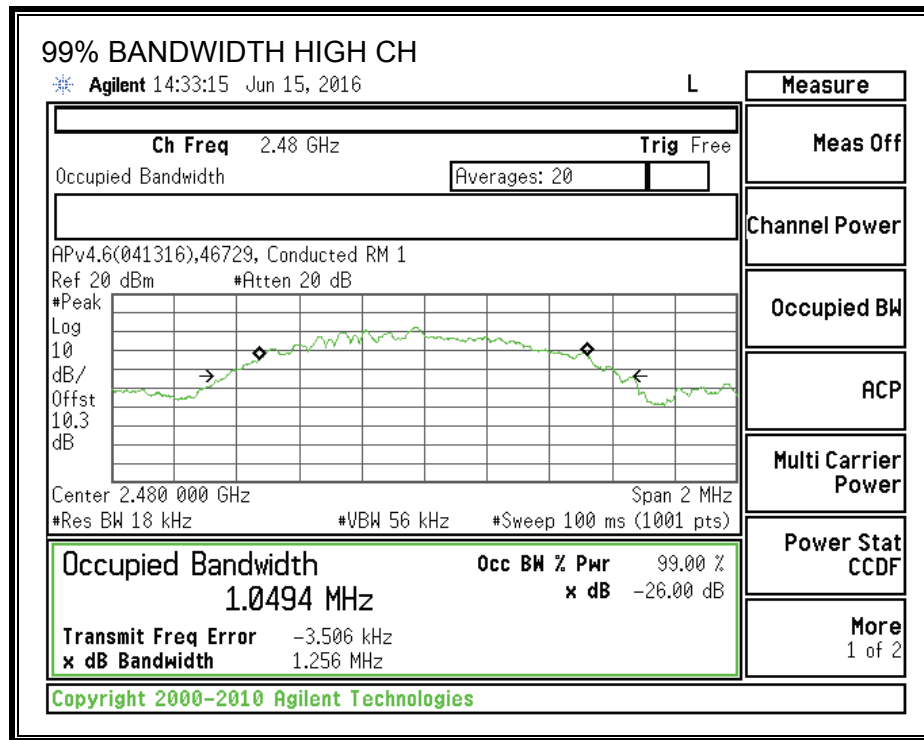
Test Performed: Ron Reichard/Jeff Cabrera  
Test Date: 2016-06-15

Note – This test was performed at the maximum allowed power setting.

# **99% BANDWIDTH**







## 8.4. OUTPUT POWER

### LIMITS

FCC §15.247 (b) (3)

IC RSS-247 5.4 (4)

FCC - For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS - For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

### RESULTS

The cable assembly insertion loss of 11.413 dB (including 10 dB pad and 1.413 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.190	30	-24.810
Middle	2440	4.910	30	-25.090
High	2480	5.090	30	-24.910

Test Performed: Niklas Haydon/Jeff Cabrera  
Test Date: 2016-08-24

Note – This test was performed at a reduced power setting.

## 8.5. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### RESULTS

The cable assembly insertion loss of 11.413 dB (including 10 dB pad and 1.413 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	4.93
Middle	2440	4.64
High	2480	4.8

Test Performed: Niklas Haydon/Jeff Cabrera  
Test Date: 2016-08-24

Note – This test was performed at a reduced power setting.

## 8.6. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

IC RSS-247 5.2 (2)

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.

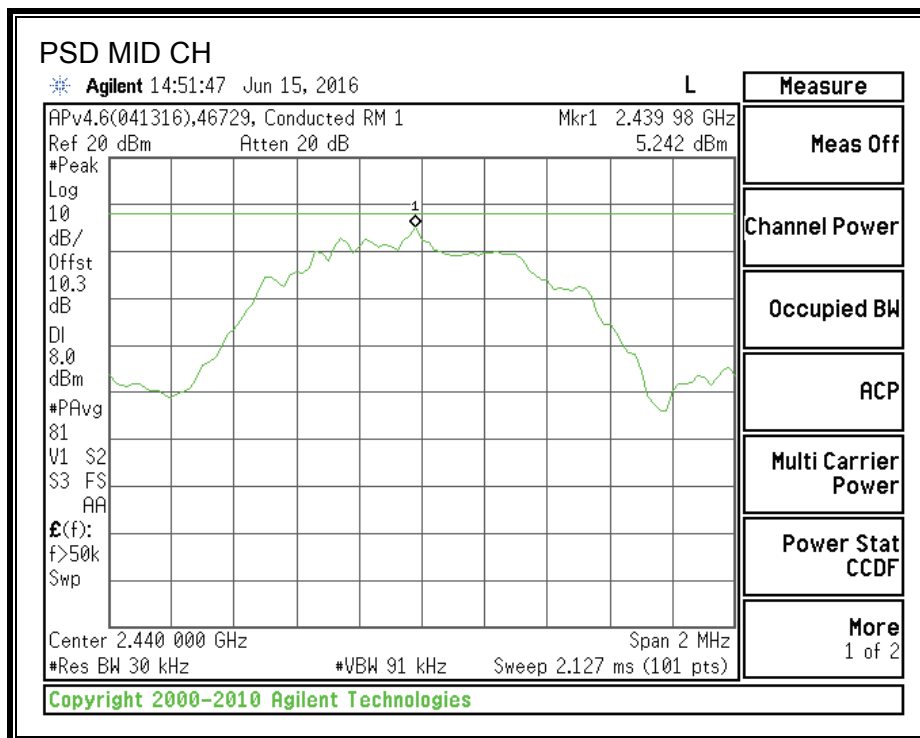
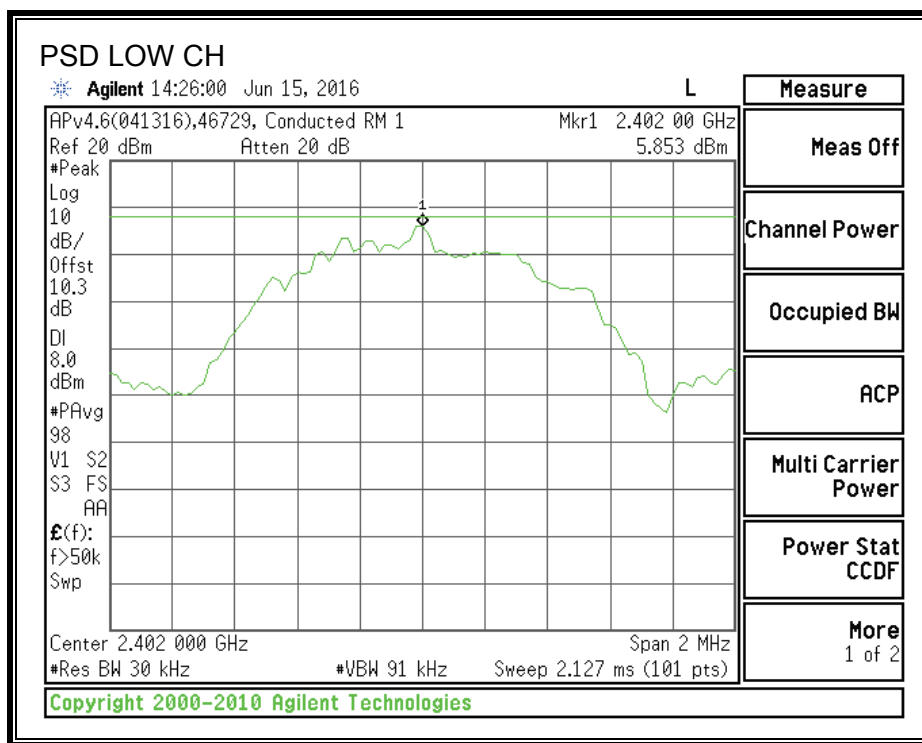
### RESULTS

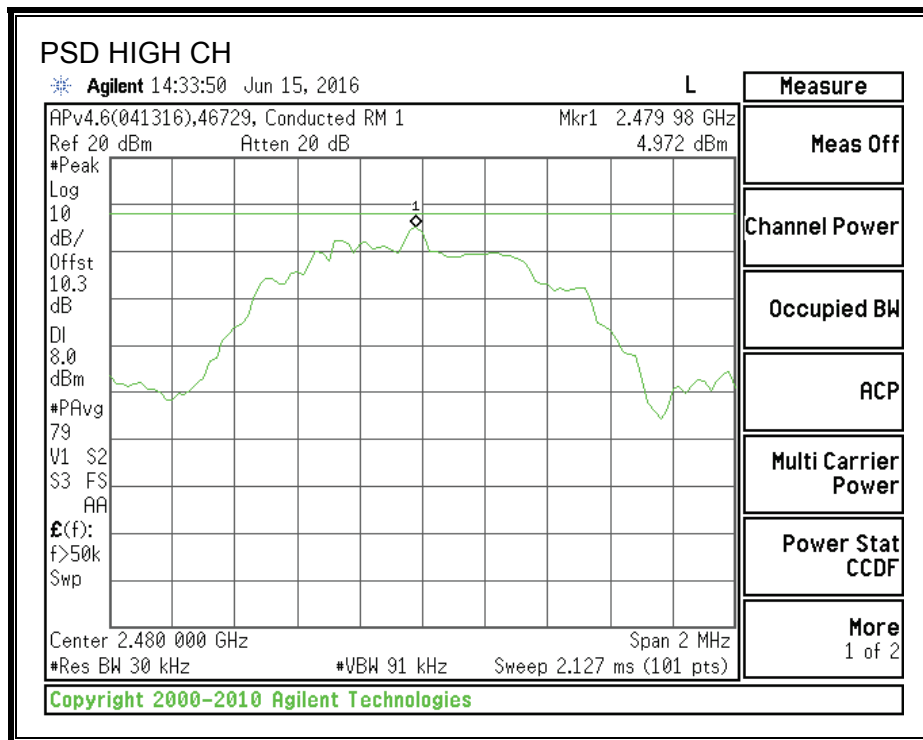
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.85	8	-2.15
Middle	2440	5.24	8	-2.76
High	2480	4.97	8	-3.03

Test Performed: Ron Reichard/Jeff Cabrera  
Test Date: 2016-06-15

Note – This test was performed at the maximum allowed power setting.

**POWER SPECTRAL DENSITY**





## **8.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-247 5.5

FCC - In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

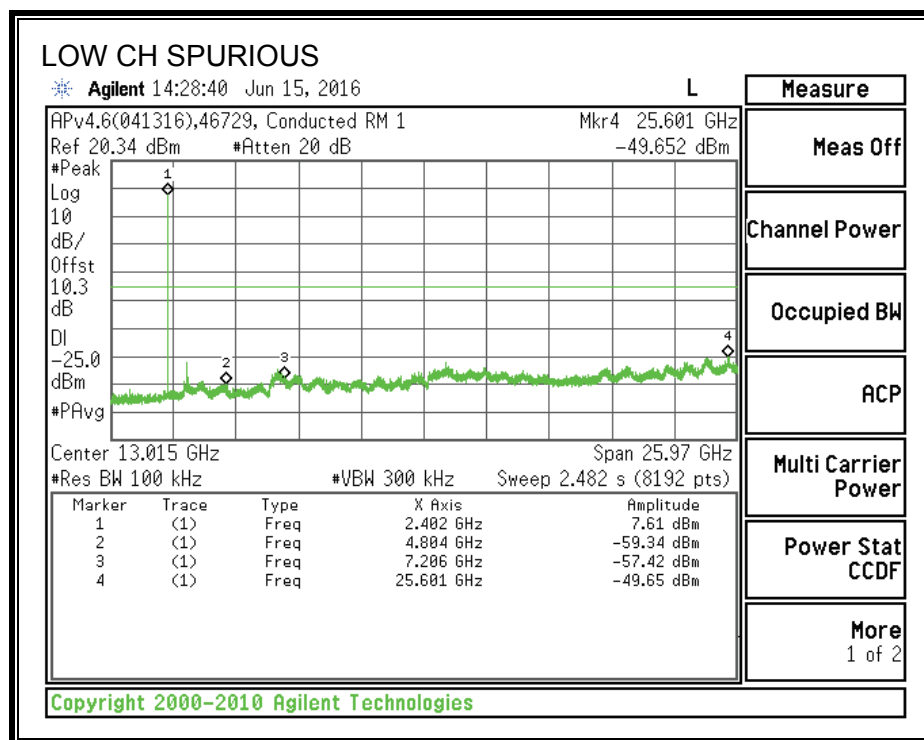
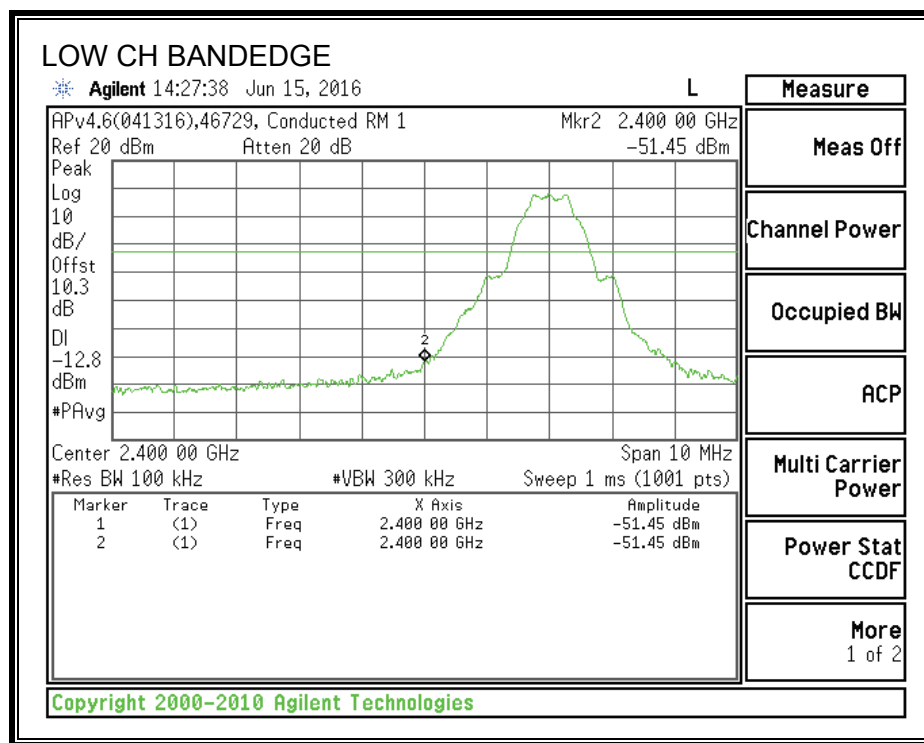
RSS - In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### **RESULTS**

Test Performed: Ron Reichard/Jeff Cabrera  
Test Date: 2016-06-15

Note – This test was performed at the maximum allowed power setting.

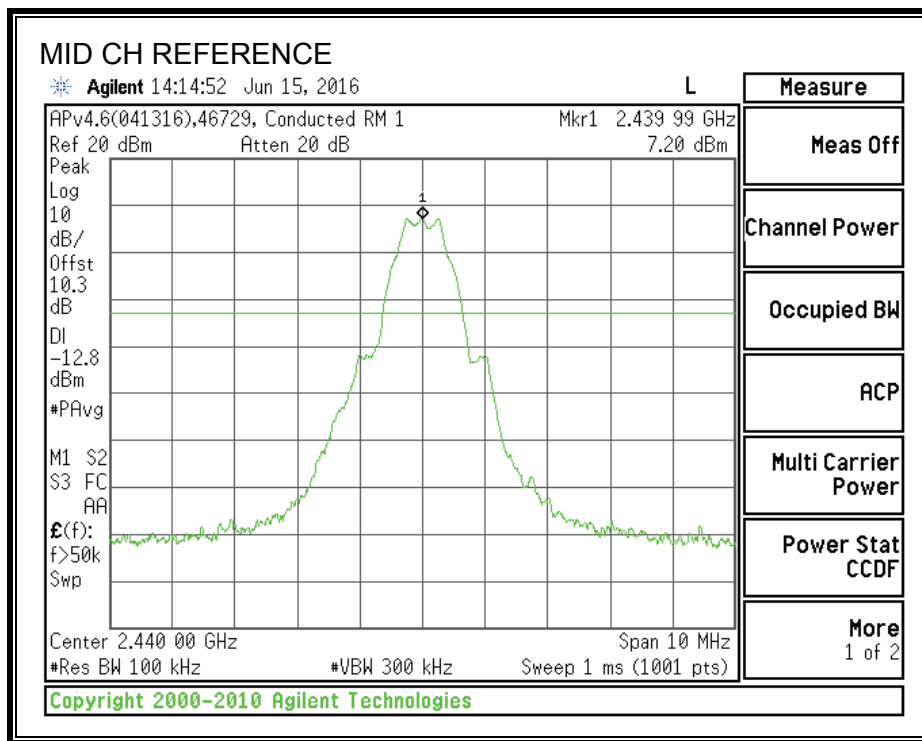
# **SPURIOUS EMISSIONS, LOW CHANNEL**

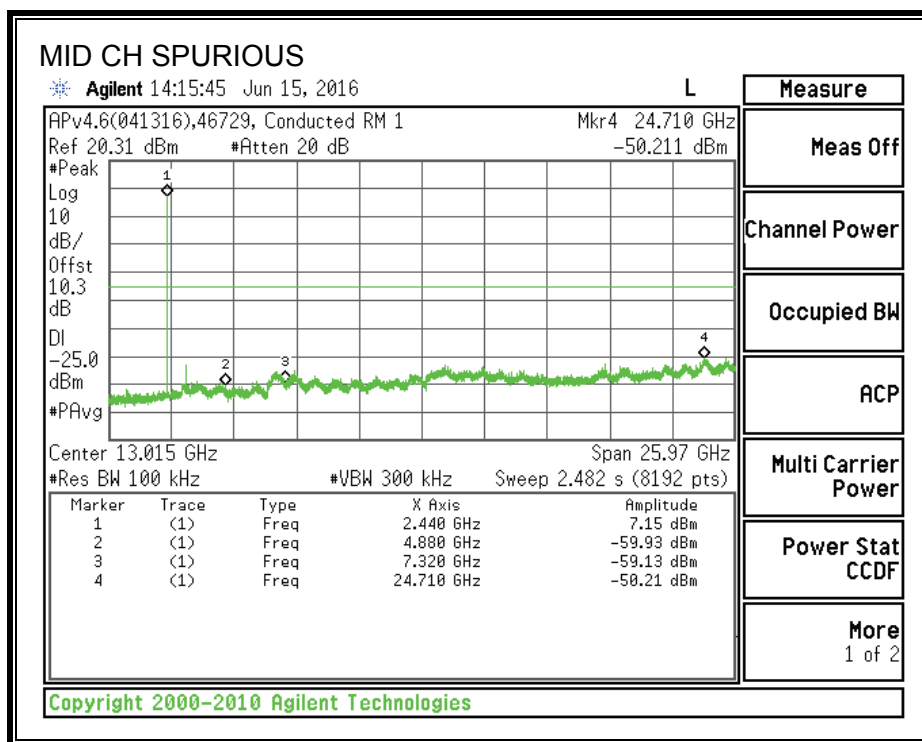


Note – Limit line should be -12.8 dBm for the Low Channel Spurious plot.



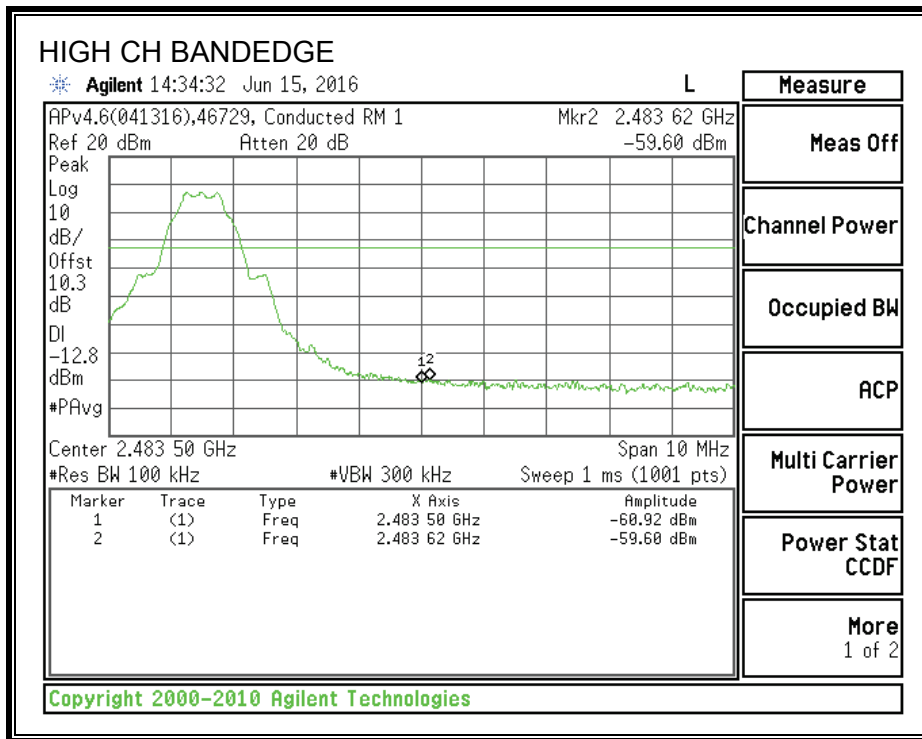
**SPURIOUS EMISSIONS, MID CHANNEL**

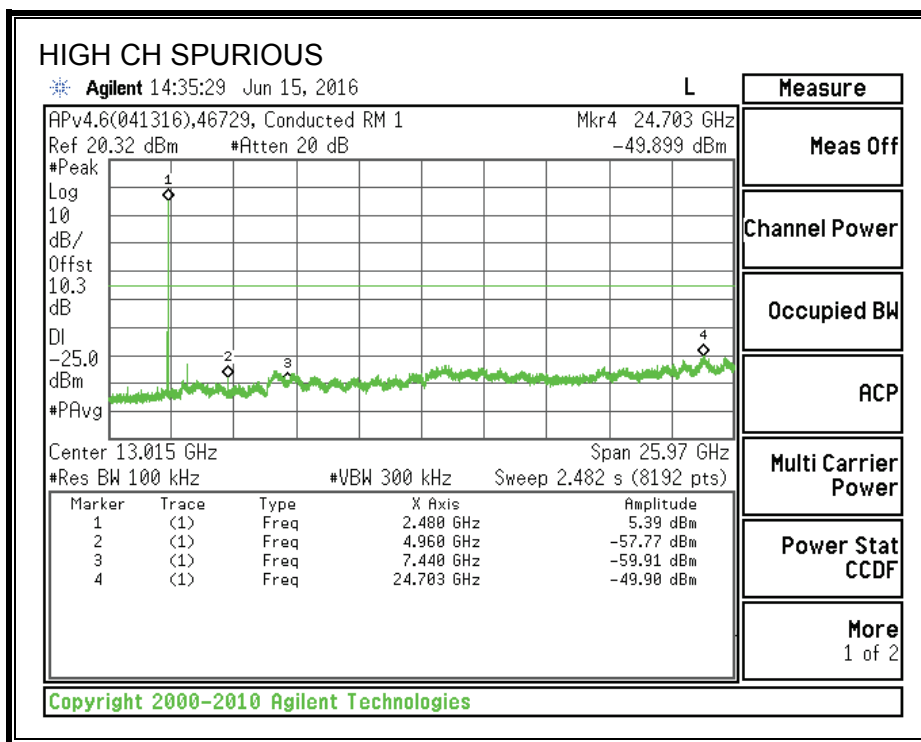




Note – Limit line should be -12.8 dBm for the Mid Channel Spurious plot.

**SPURIOUS EMISSIONS, HIGH CHANNEL**





Note – Limit line should be -12.8 dBm for the High Channel Spurious plot.

## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205, §15.209, §15.247 (d)

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
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. For this evaluation, RMS Power Averaging was used and the resolution/video bandwidth settings were 1MHz/3MHz.

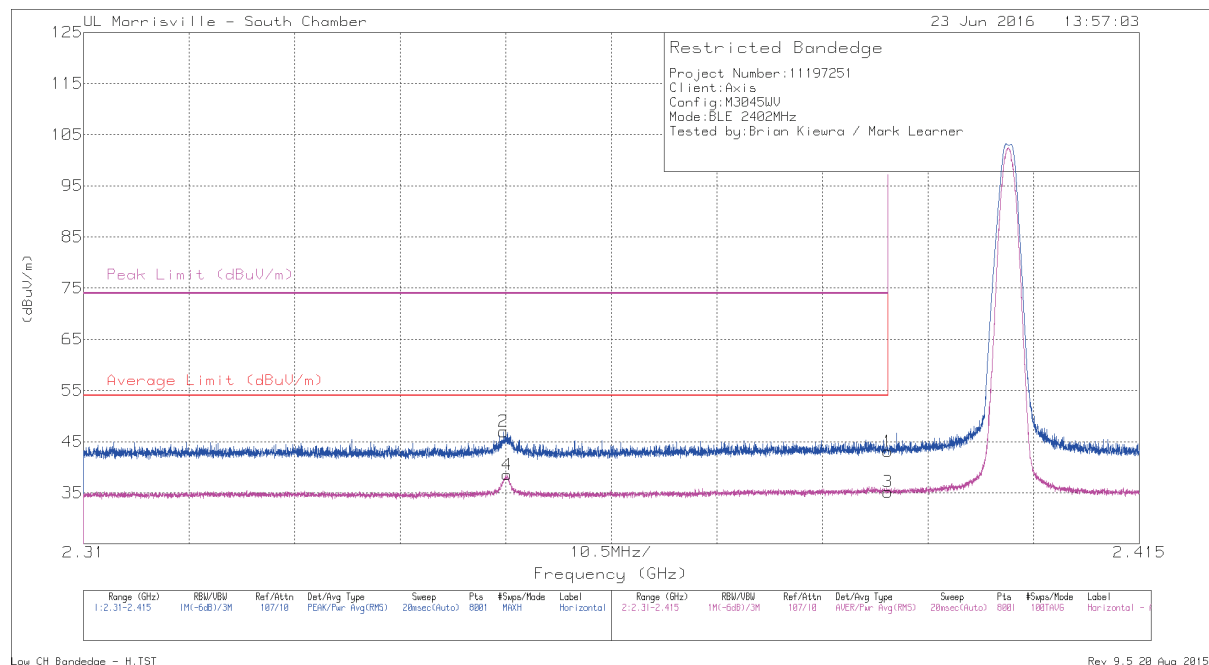
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

Note – This test was performed at the maximum allowed power setting.

## 9.2. TRANSMITTER 1-18 GHz

### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



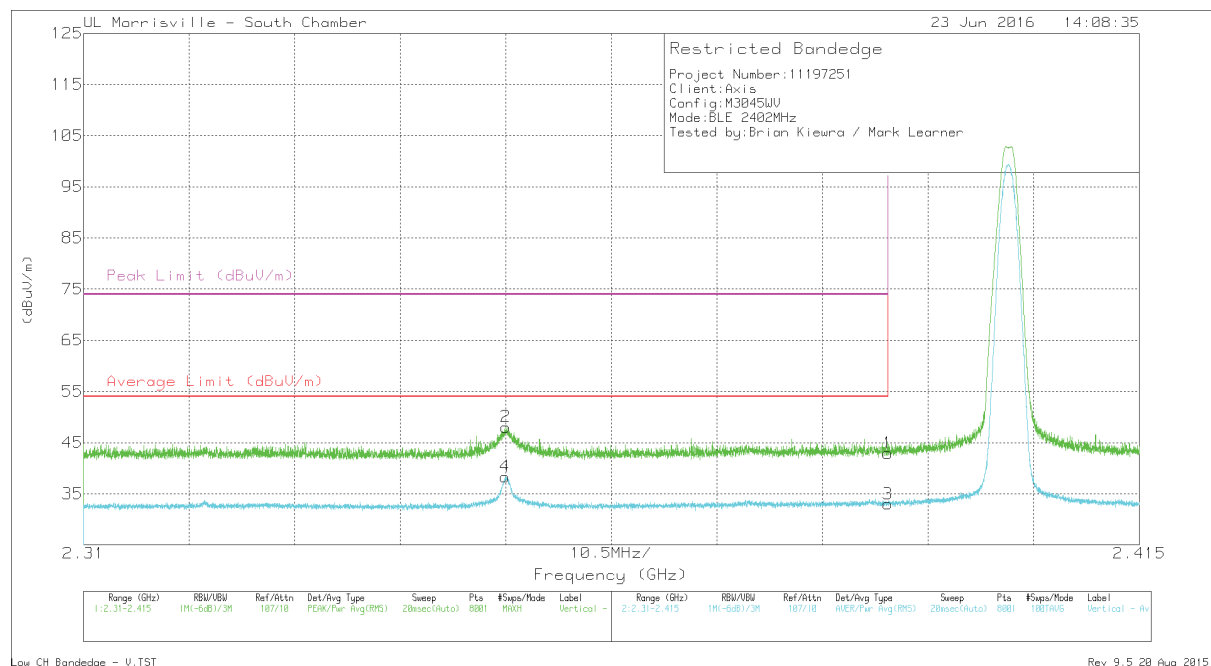
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.06	Pk	32.2	-24.2	0	43.06	-	-	74	-30.94	252	319	H
2	* 2.352	39.17	Pk	31.8	-24	0	46.97	-	-	74	-27.03	252	319	H
3	* 2.39	25.13	RMS	32.2	-24.2	2.05	35.18	54	-18.82	-	-	252	319	H
4	* 2.352	28.7	RMS	31.8	-24	2.05	38.55	54	-15.45	-	-	252	319	H

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

Pk - Peak detector

RMS - RMS detection

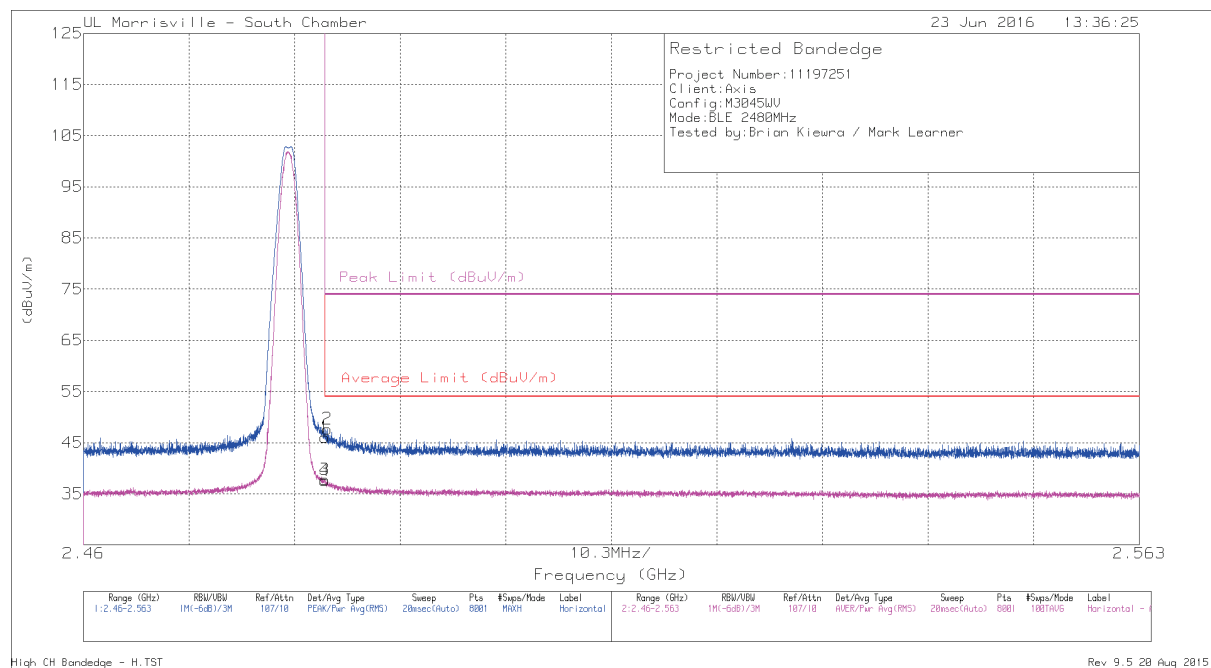
# **RESTRICTED BANDEGE (LOW CHANNEL, VERTICAL)**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fitr/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	34.92	Pk	32.2	-24.2	0	42.92	-	-	74	-31.08	133	266	V
2	* 2.352	40.27	Pk	31.8	-24	0	48.07	-	-	74	-25.93	133	266	V
3	* 2.39	25	RMS	32.2	-24.2	2.05	35.05	54	-21	-	-	133	266	V
4	* 2.352	30.56	RMS	31.8	-24	2.05	40.41	54	-15.64	-	-	133	266	V

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

# RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

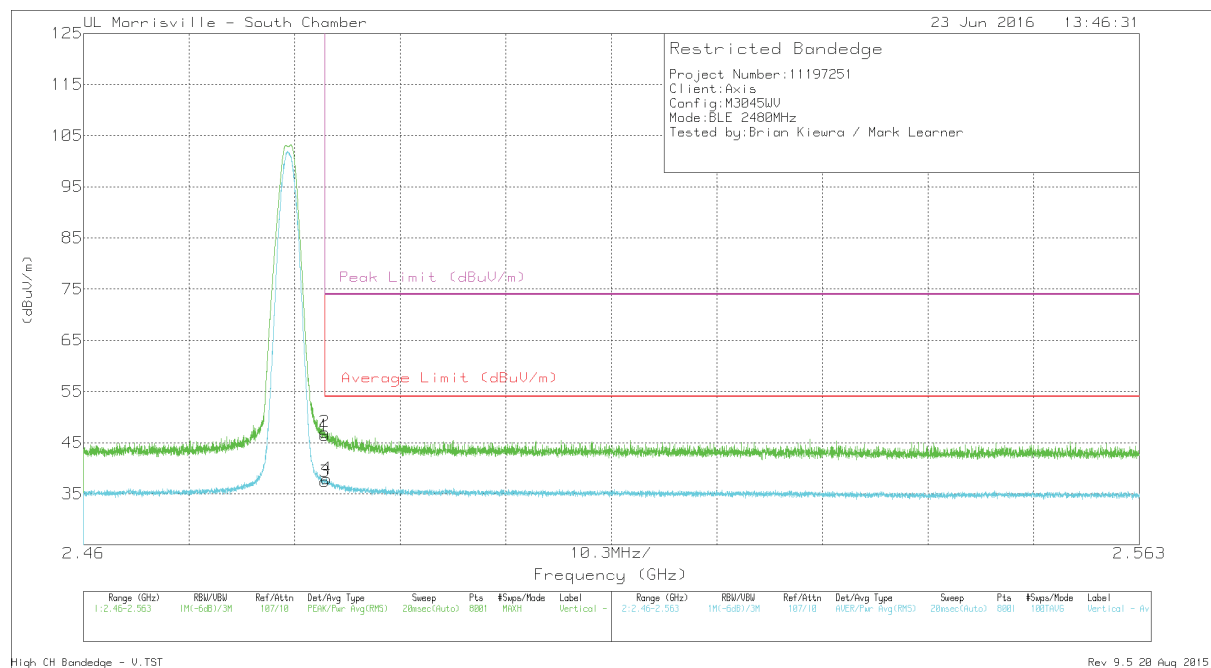


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	38.39	Pk	32.4	-24.7	0	46.09	-	-	74	-27.91	167	283	H
2	* 2.484	39.99	Pk	32.4	-24.7	0	47.69	-	-	74	-26.31	167	283	H
3	* 2.484	28.03	RMS	32.4	-24.7	2.05	37.78	54	-16.22	-	-	167	283	H
4	* 2.484	27.86	RMS	32.4	-24.7	2.05	37.61	54	-16.39	-	-	167	283	H

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



# **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



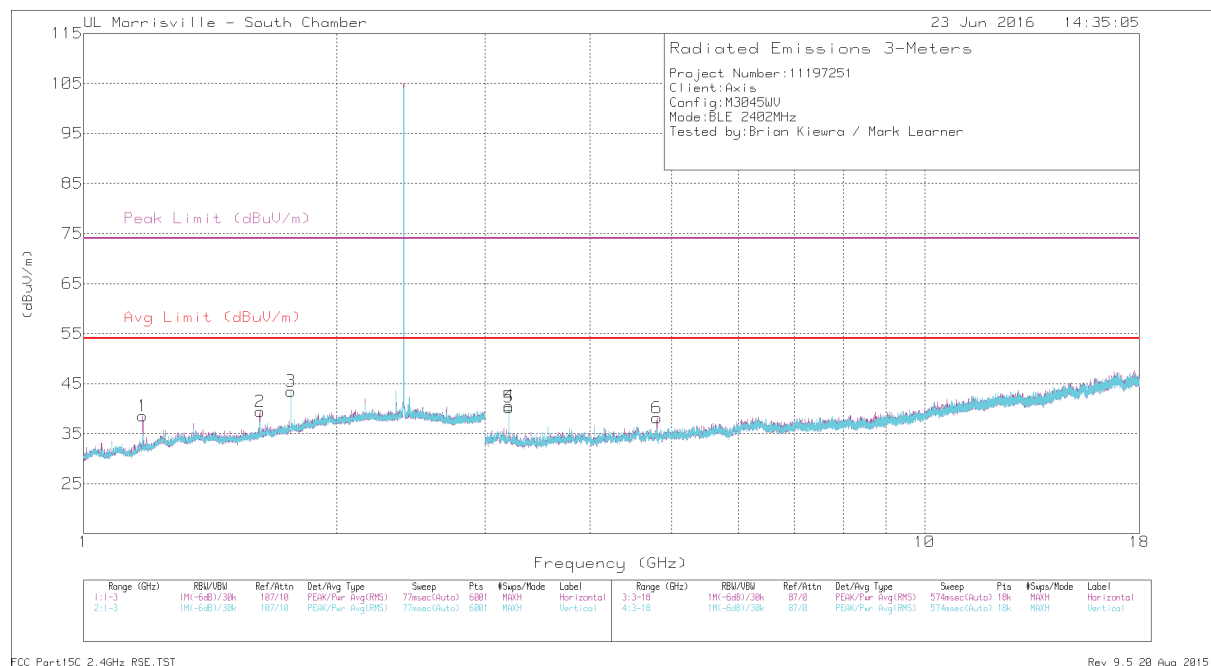
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	38.74	Pk	32.4	-24.7	0	46.44	-	-	74	-27.56	318	281	V
2	* 2.484	39.39	Pk	32.4	-24.7	0	47.09	-	-	74	-26.91	318	281	V
3	* 2.484	27.71	RMS	32.4	-24.7	2.05	37.46	54	-16.54	-	-	318	281	V
4	* 2.484	28.23	RMS	32.4	-24.7	2.05	37.98	54	-16.02	-	-	318	281	V

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

Pk - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS



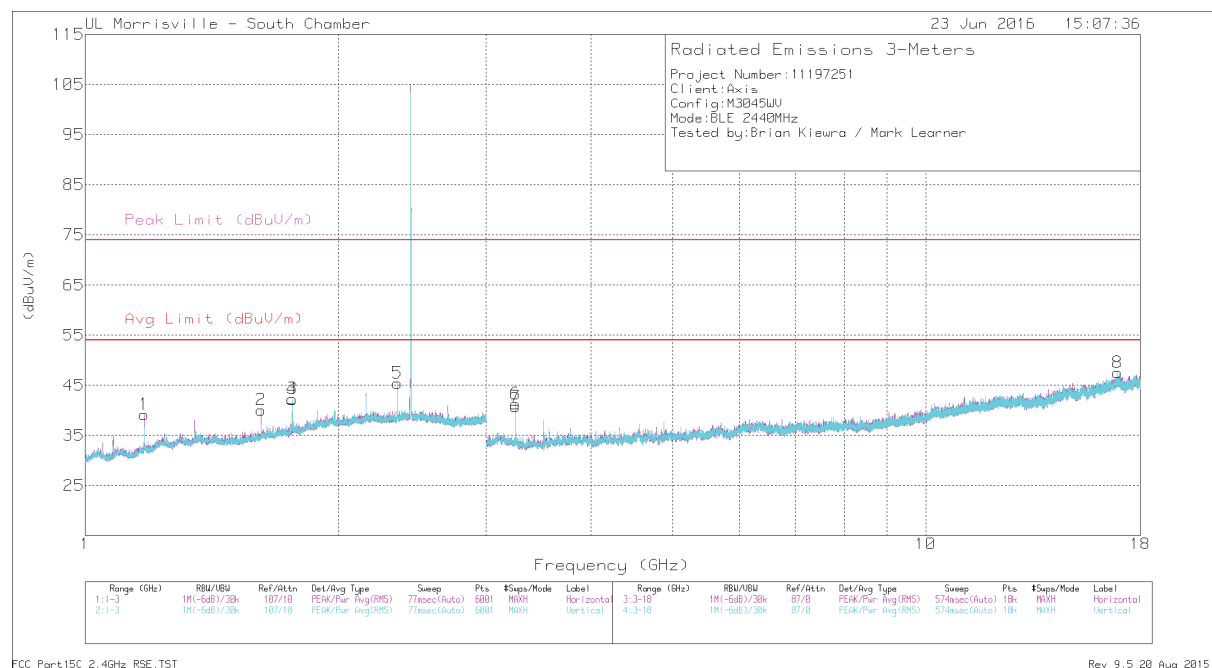
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	41.13	PK2	27.8	-24.1	0	44.83	-	-	74	-29.17	355	274	H
	* 1.176	31.6	MAv1	27.8	-24.1	2.05	37.35	54	-16.65	-	-	355	274	H
2	* 1.62	39.29	PK2	28.5	-22.5	0	45.29	-	-	74	-28.71	33	157	H
	* 1.62	33.15	MAv1	28.5	-22.5	2.05	41.2	54	-12.8	-	-	33	157	H
6	* 4.804	41.78	PK2	34	-31.7	0	44.08	-	-	74	-29.92	75	251	H
	* 4.804	31.71	MAv1	34	-31.7	2.05	36.06	54	-17.94	-	-	75	251	H
4	3.202	40.54	Pk	33.4	-33.4	0	40.54	-	-	-	-	0-360	199	H
3	1.764	36.4	Pk	29.6	-22.5	0	43.5	-	-	-	-	0-360	199	V
5	3.202	40.24	Pk	33.4	-33.4	0	40.24	-	-	-	-	0-360	199	V

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

Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average



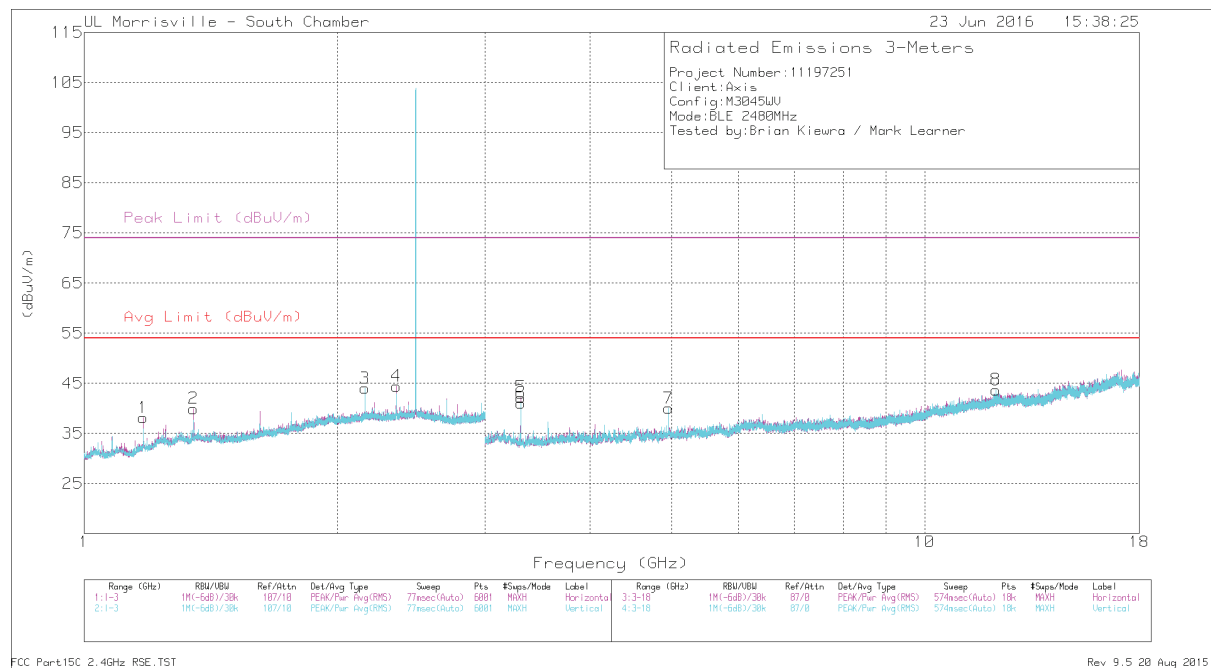
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.176	41.21	PK2	27.8	-24.1	0	44.91	-	-	74	-29.09	192	194	H
	* 1.176	32.93	MAv1	27.8	-24.1	2.05	38.68	54	-15.32	-	-	192	194	H
2	* 1.62	40.2	PK2	28.5	-22.5	0	46.2	-	-	74	-27.8	130	329	H
	* 1.62	34.61	MAv1	28.5	-22.5	2.05	42.66	54	-11.34	-	-	130	329	H
5	* 2.352	43.61	PK2	31.8	-24	0	51.41	-	-	74	-22.59	248	130	V
	* 2.352	35.12	MAv1	31.8	-24	2.05	44.97	54	-9.03	-	-	248	130	V
3	1.764	35.24	Pk	29.6	-22.5	0	42.34	-	-	-	-	0-360	199	H
6	3.253	41.8	Pk	33.2	-33.7	0	41.3	-	-	-	-	0-360	102	H
4	1.764	35.13	Pk	29.6	-22.5	0	42.23	-	-	-	-	0-360	102	V
7	3.253	41.27	Pk	33.2	-33.7	0	40.77	-	-	-	-	0-360	199	V
8	16.913	30.04	Pk	41.6	-24.1	0	47.54	-	-	-	-	0-360	101	V

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

Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0069 (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	* 1.176	39.37	PK2	27.8	-24.1	0	43.07	-	-	74	-30.93	162	187	H
	* 1.176	30.17	MAv1	27.8	-24.1	2.05	35.92	54	-18.08	-	-	162	187	H
2	* 1.35	37.58	PK2	28.8	-23.2	0	43.18	-	-	74	-30.82	157	166	H
	* 1.35	29.95	MAv1	28.8	-23.2	2.05	37.6	54	-16.4	-	-	157	166	H
4	* 2.352	40.71	PK2	31.8	-24	0	48.51	-	-	74	-25.49	286	202	H
	* 2.352	30.86	MAv1	31.8	-24	2.05	40.71	54	-13.29	-	-	286	202	H
7	* 4.96	42.09	PK2	34.1	-31.6	0	44.59	-	-	74	-29.41	344	129	V
	* 4.96	32.25	MAv1	34.1	-31.6	2.05	36.8	54	-17.2	-	-	344	129	V
8	* 12.154	34.53	PK2	39	-25	0	48.53	-	-	74	-25.47	326	348	V
	* 12.156	23.19	MAv1	39	-25.1	2.05	39.14	54	-14.86	-	-	326	348	V
5	3.307	43.01	Pk	32.7	-33.5	0	42.21	-	-	-	-	0-360	199	H
3	2.16	35.64	Pk	31.7	-23.3	0	44.04	-	-	-	-	0-360	102	V
6	3.307	41.88	Pk	32.7	-33.5	0	41.08	-	-	-	-	0-360	199	V

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

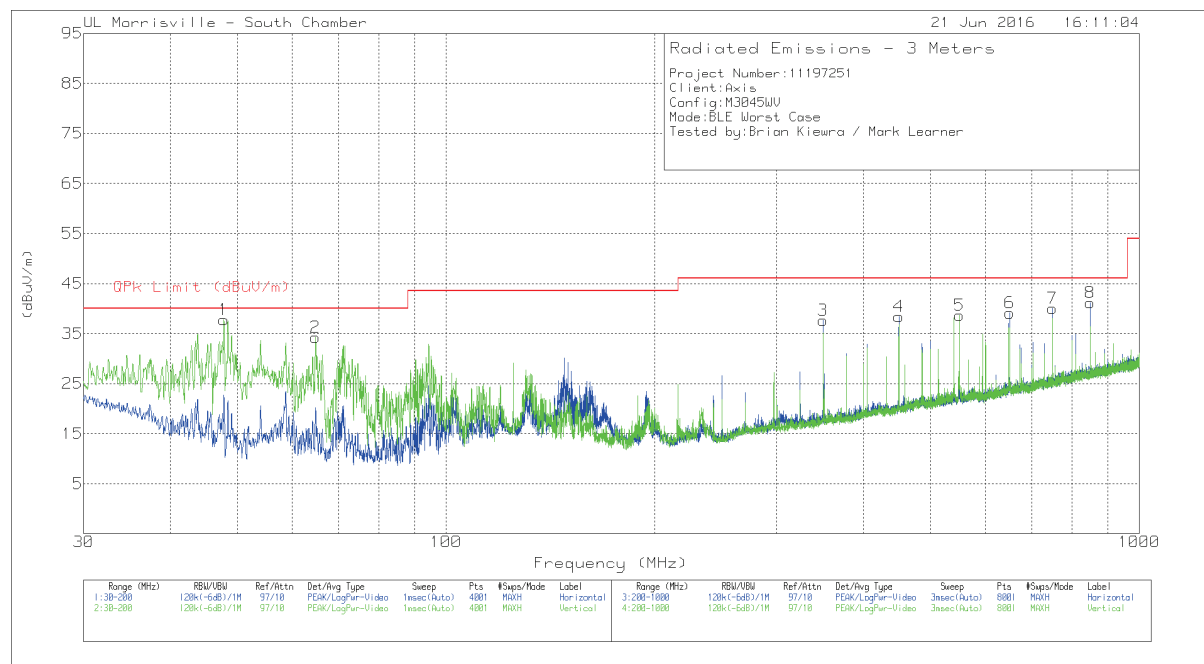
Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

### 9.3. WORST-CASE BELOW 1 GHz

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



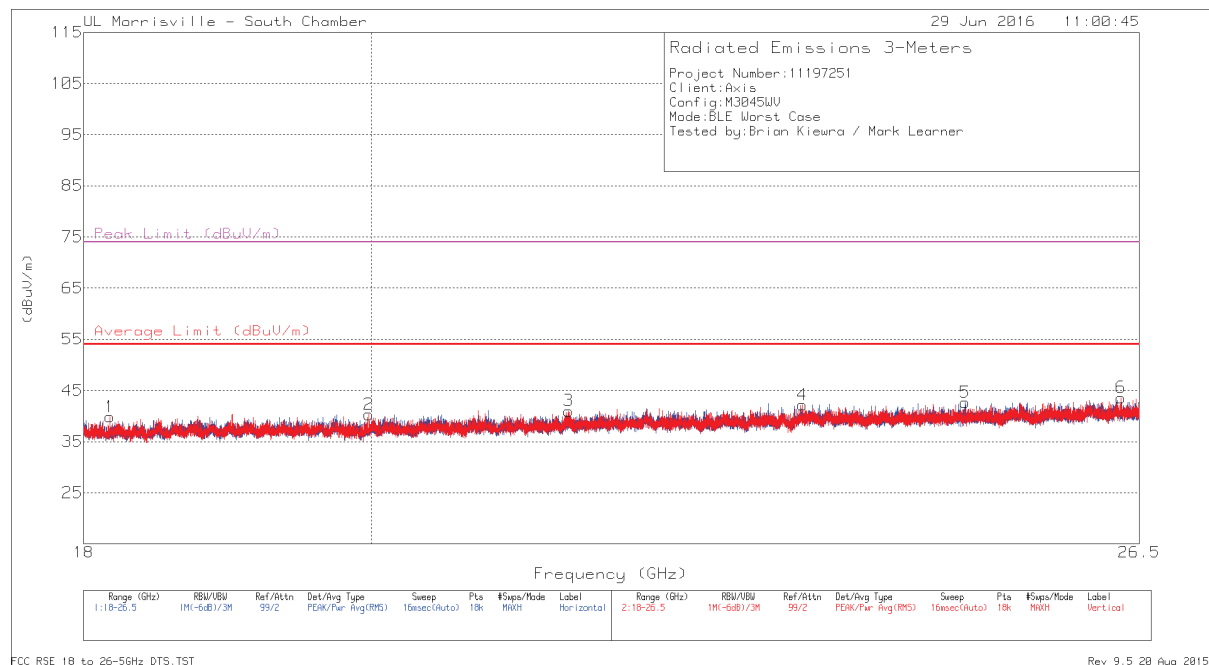
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	350	47.87	Pk	19.2	-29.4	37.67	46.02	-8.35	0-360	102	H
4	450	46.18	Pk	21.2	-29	38.38	46.02	-7.64	0-360	199	H
6	650	43.21	Pk	24.4	-28.5	39.11	46.02	-6.91	0-360	102	H
7	750	42.8	Pk	25.2	-28	40	46.02	-6.02	0-360	102	H
8	850.013	41.29	Qp	26.4	-27.4	40.29	46.02	-5.73	168	102	H
1	47.8075	54.34	Qp	13.4	-31.6	36.14	40	-3.86	137	102	V
2	64.771	53.52	Qp	12.2	-31.4	34.32	40	-5.68	310	102	V
5	550	44.52	Pk	22.8	-28.7	38.62	46.02	-7.4	0-360	102	V

Pk - Peak detector

Qp - Quasi-Peak detector

## 9.4. WORST-CASE 18-16GHz

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



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF AT0076 (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 18.174	47.79	PK2	32.6	-40.9	0	39.49	54	-14.51	74	-34.51	347	152	V
2	* 19.982	47.23	PK2	33.1	-40.5	0	39.83	54	-14.17	74	-34.17	338	299	V
3	21.501	47.42	Pk	33.6	-40	0	41.02	54	-12.98	74	-32.98	0-360	251	V
4	23.421	46.97	Pk	34.5	-39.3	0	42.17	54	-11.83	74	-31.83	0-360	202	V
5	24.86	46.46	Pk	34.6	-38.4	0	42.66	54	-11.34	74	-31.34	0-360	249	H
6	26.324	46	Pk	35	-37.4	0	43.6	54	-10.4	74	-30.4	0-360	202	V

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

Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

## 10. 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.

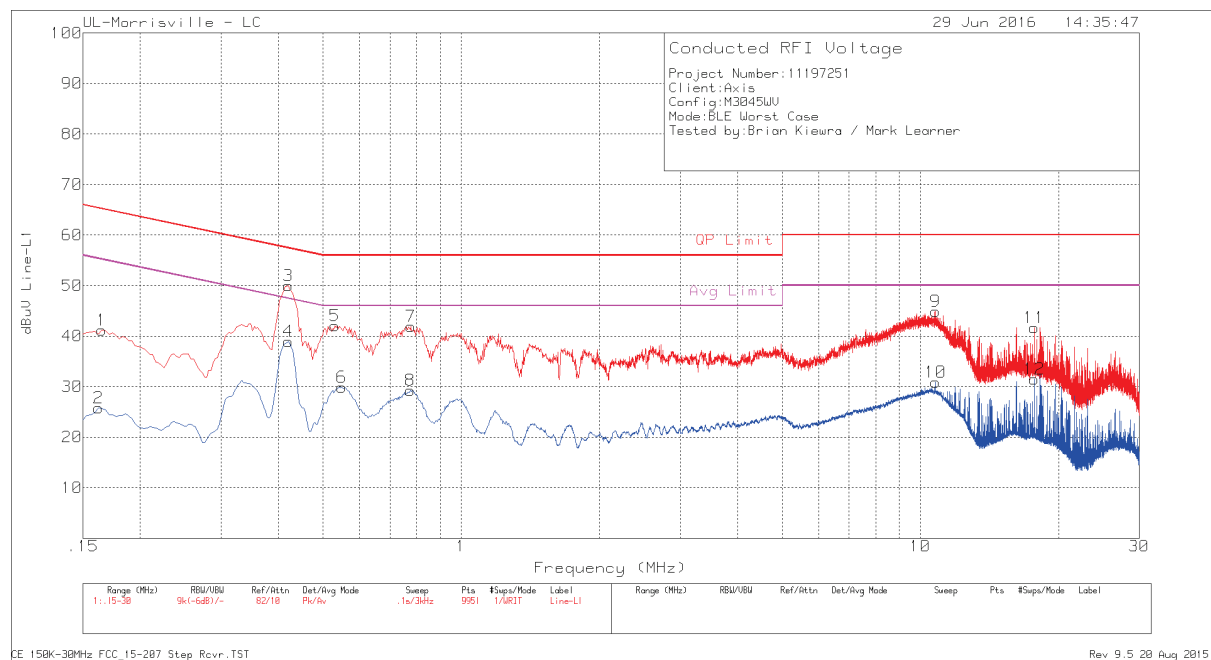
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

Note – This test was performed at the maximum allowed power setting.

## LINE 1 RESULTS



## Trace Markers

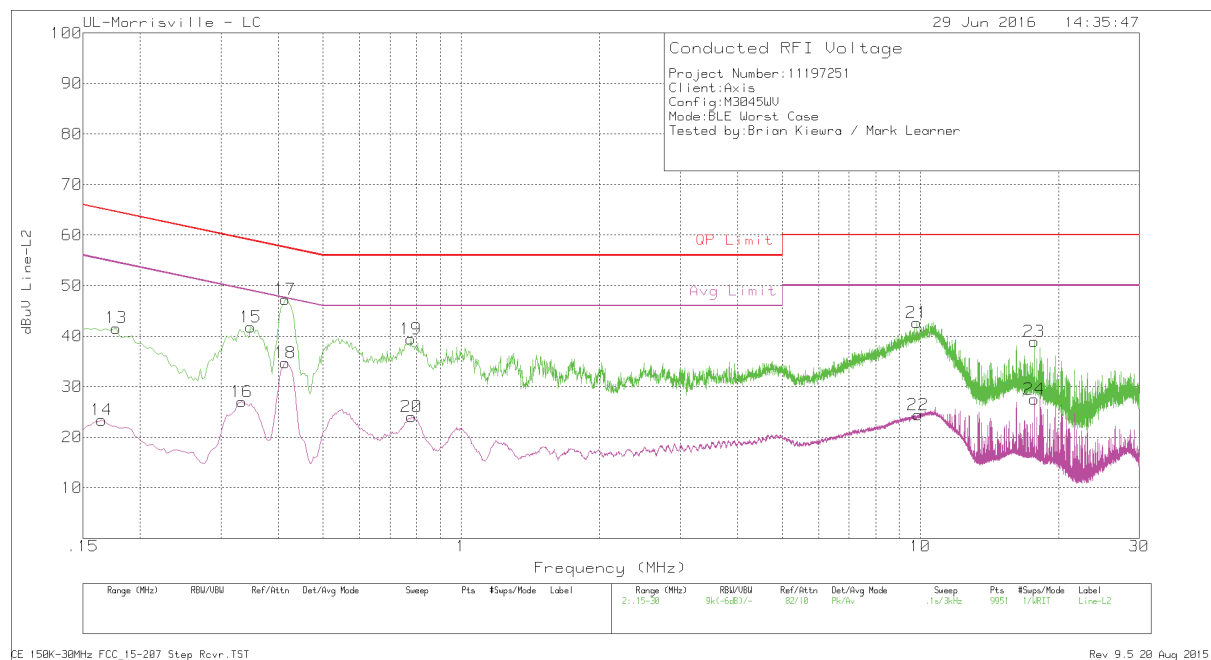
Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF [dB]	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
1	.165	31.01	Pk	.2	10	41.21	65.21	-24	-	-
2	.162	15.54	Av	.2	10	25.74	-	-	55.36	-29.62
3	.42	39.88	Pk	.1	10	49.98	57.45	-7.47	-	-
4	.42	28.83	Av	.1	10	38.93	-	-	47.45	-8.52
5	.531	31.98	Pk	.1	10	42.08	56	-13.92	-	-
6	.549	19.83	Av	.1	10	29.93	-	-	46	-16.07
7	.777	31.95	Pk	0	10	41.95	56	-14.05	-	-
8	.774	19.21	Av	0	10	29.21	-	-	46	-16.79
9	10.794	34.49	Pk	.1	10.3	44.89	60	-15.11	-	-
10	10.794	20.43	Av	.1	10.3	30.83	-	-	50	-19.17
11	17.694	31	Pk	.2	10.5	41.7	60	-18.3	-	-
12	17.694	20.78	Av	.2	10.5	31.48	-	-	50	-18.52

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	.177	31.42	Pk	.2	10	41.62	64.63	-23.01	-	-
14	.165	13.17	Av	.2	10	23.37	-	-	55.21	-31.84
15	.348	31.69	Pk	.1	10	41.79	59.01	-17.22	-	-
16	.333	16.97	Av	.1	10	27.07	-	-	49.38	-22.31
17	.414	37.21	Pk	.1	10	47.31	57.57	-10.26	-	-
18	.414	24.6	Av	.1	10	34.7	-	-	47.57	-12.87
19	.777	29.45	Pk	0	10	39.45	56	-16.55	-	-
20	.78	14.09	Av	0	10	24.09	-	-	46	-21.91
21	9.831	32.33	Pk	.1	10.3	42.73	60	-17.27	-	-
22	9.897	13.98	Av	.1	10.3	24.38	-	-	50	-25.62
23	17.694	28.25	Pk	.2	10.5	38.95	60	-21.05	-	-
24	17.694	16.84	Av	.2	10.5	27.54	-	-	50	-22.46

Pk - Peak detector

Av - Average detection