



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

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-E1

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**Prepared for
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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

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Network Surveillance Camera

HVIN: r1
PMN: AXIS M3045-WV

SERIAL NUMBER: 00408C186CE0

DATE TESTED: 2016-04-26 to 2016-06-28

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
Industry Canada (ISED CANADA) RSS-247 Issue 1	Pass
Industry Canada (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
WiSE 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	
☐	Chamber A
☒	Chamber C

2800 Suite B Perimeter Park Dr., Morrisville, NC 27560	
☐	Chamber NORTH
☐	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	$\pm 0.45 \text{ dB}$
RF power density, conducted	$\pm 1.5 \text{ dB}$
Spurious emissions, conducted	$\pm 2.94 \text{ dB}$
All emissions, radiated up to 40 GHz	$\pm 5.36 \text{ dB}$
Temperature	$\pm 0.07^\circ\text{C}$
Humidity	$\pm 2.26\% \text{ RH}$
DC and low frequency voltages	$\pm 1.27\%$
Conducted Emissions (0.150-30MHz)	$\pm 2.37\text{dB}$

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 conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	16.53	44.98
2412 - 2462	802.11g	12.97	19.82
2412 - 2462	802.11n HT20	11.98	15.78

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.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 5.5 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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

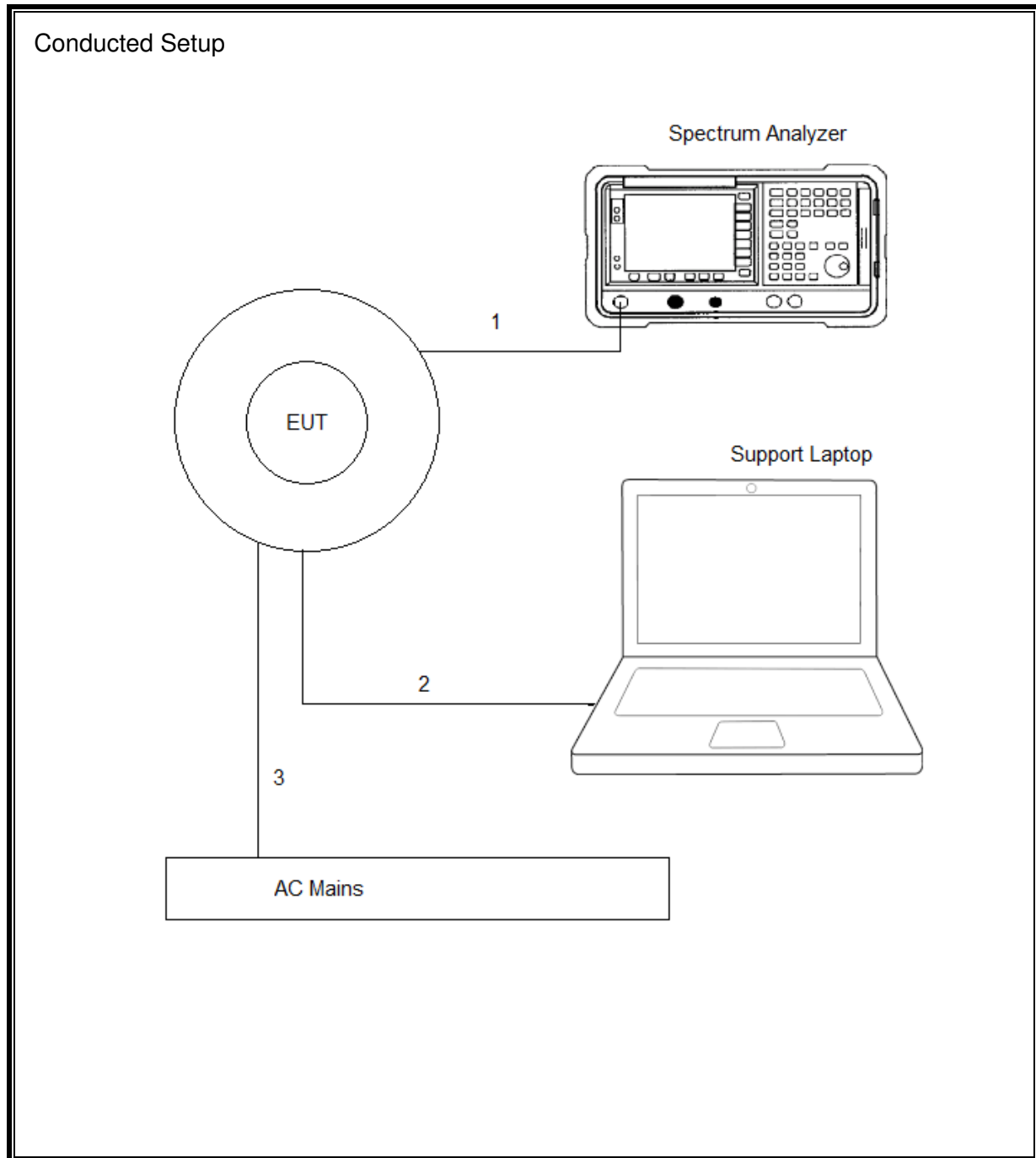
I/O CABLES

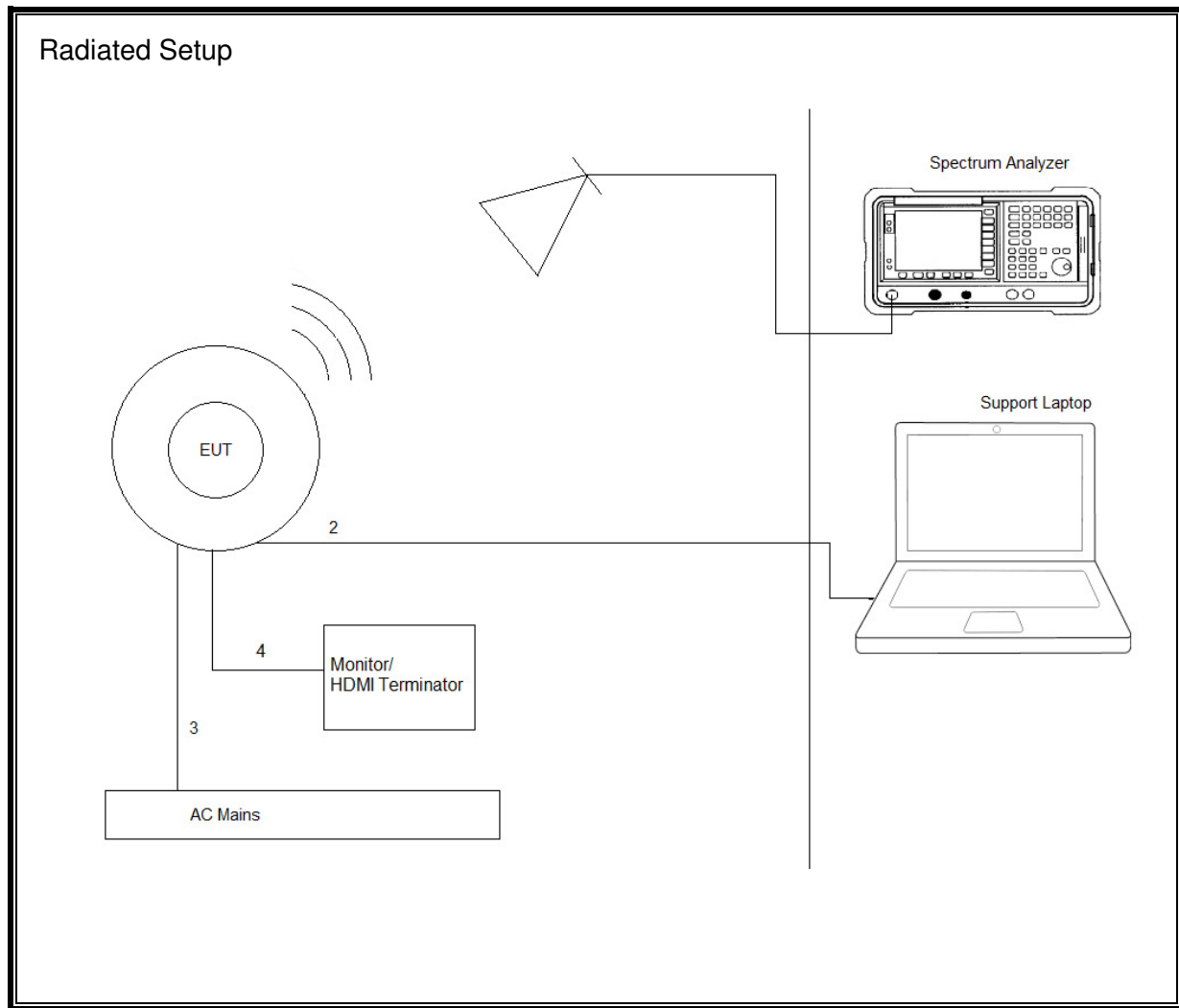
I/O Cable List					
Cable No	Port	# of Identical ports	Connector Type	Cable Length (m)	Remarks
1	Antenna Port	1	EUT	<1m	NA
2	Ethernet	1	RJ45	>1m	CAT5E
3	AC Mains	1	AC	>1m	NA
4	HDMI	1	HDMI	>1m	NA

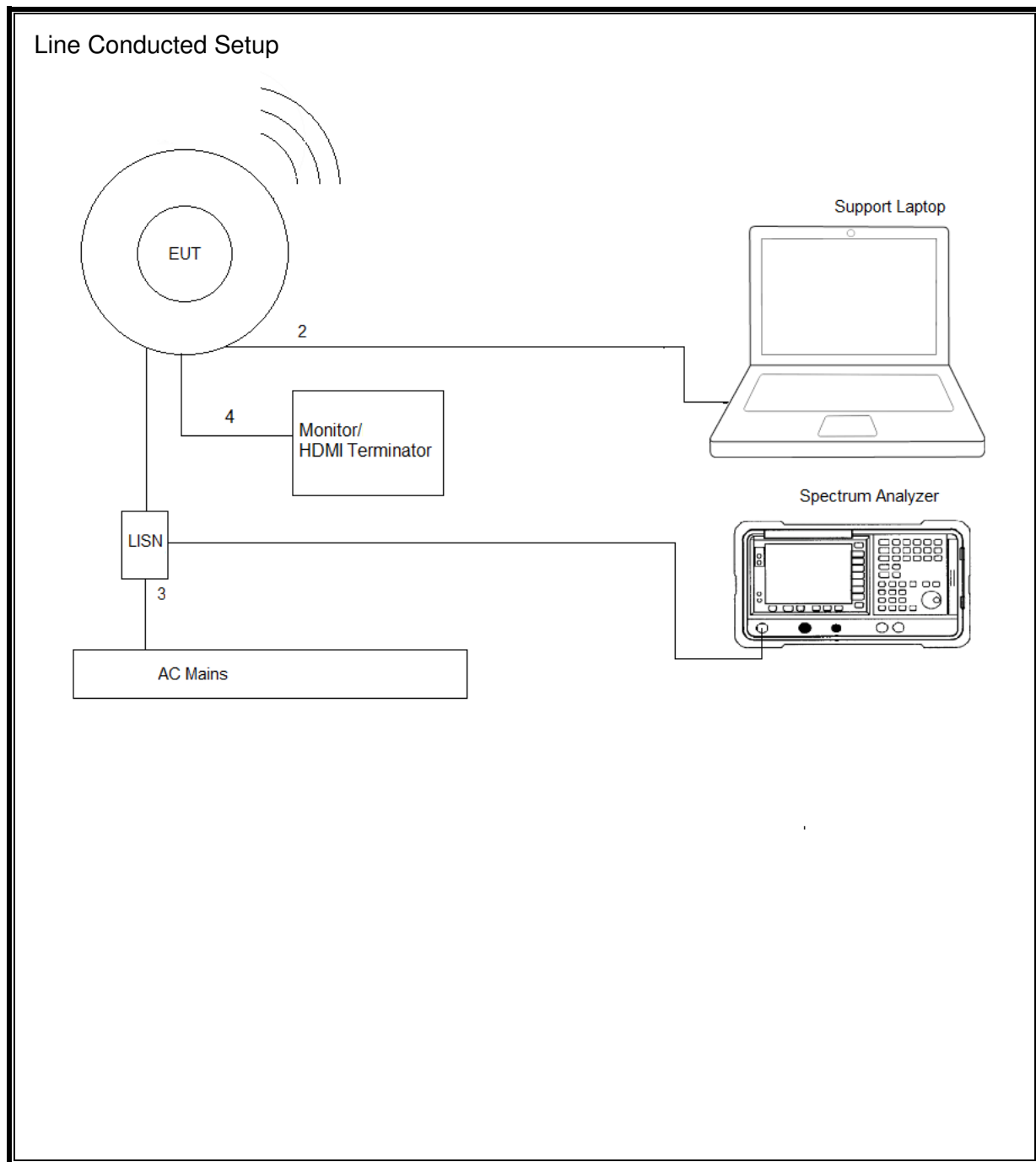
TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS







6. TEST AND MEASUREMENT EQUIPMENT

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

Radiated Emissions – Chamber C

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	30-1000 MHz Range				
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2015-06-10	2016-06-30
	1-18 GHz				
AT0062	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2015-08-25	2016-08-31
	18-40GHz				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2015-08-27	2016-08-31
	Gain-Loss Chains				
C-SAC01	Gain-loss string: 0.009-1000MHz	Various	Various	2016-01-18	2017-01-31
C-SAC02	Gain-loss string: 1-18GHz	Various	Various	2016-01-28	2017-01-31
C-SAC03	Gain-loss string: 18-40GHz	Various	Various	2015-09-27	2016-09-30
	Receiver & Software				
SA0016	Spectrum Analyzer	Agilent	PXA N903A	2015-08-26	2016-08-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
HI0082	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2016-04-26	2017-04-26
981217 (5A288)	9kHz – 30MHz Loop Antenna	EMCO	6507	2015-12-03	2016-12-31

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Conducted Room 1					
72822 (SA0019)	Spectrum Analyzer	Agilent Technologies	E4446A	2015-09-02	2016-09-30
PWM004	RF Power Meter	Keysight Technologies	N1911A	2015-06-08	2016-06-30
PWS004	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05	2016-06-30
HI0079	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-01	2016-07-31
MM0167	True RMS Multimeter	Agilent	U1232A	2015-08-17	2016-08-31
Conducted Room 2					
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2016-03-22	2017-03-31
PWM003	RF Power Meter	Keysight Technologies	N1911A	2015-06-08	2016-06-30
PWS003	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2015-06-05	2016-06-30
HI0080	Temp/Humid/Pressure Meter	Springfield	PreciseTemp	2015-07-01	2016-07-31
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
	Miscellaneous (if needed)				
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 9.2.3.1.

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 AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

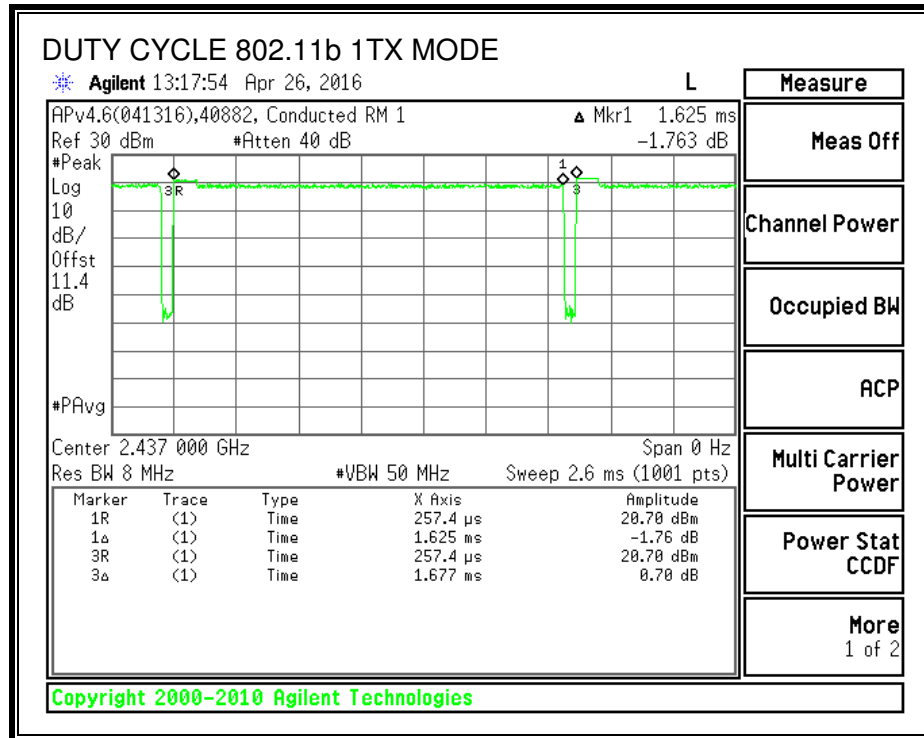
ON TIME AND DUTY CYCLE RESULTS

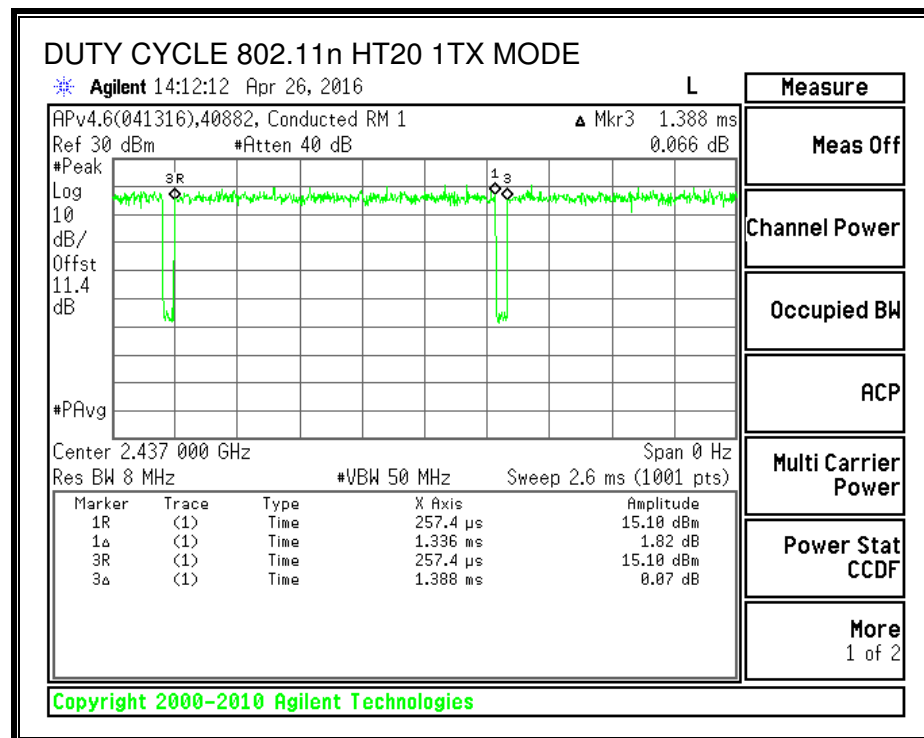
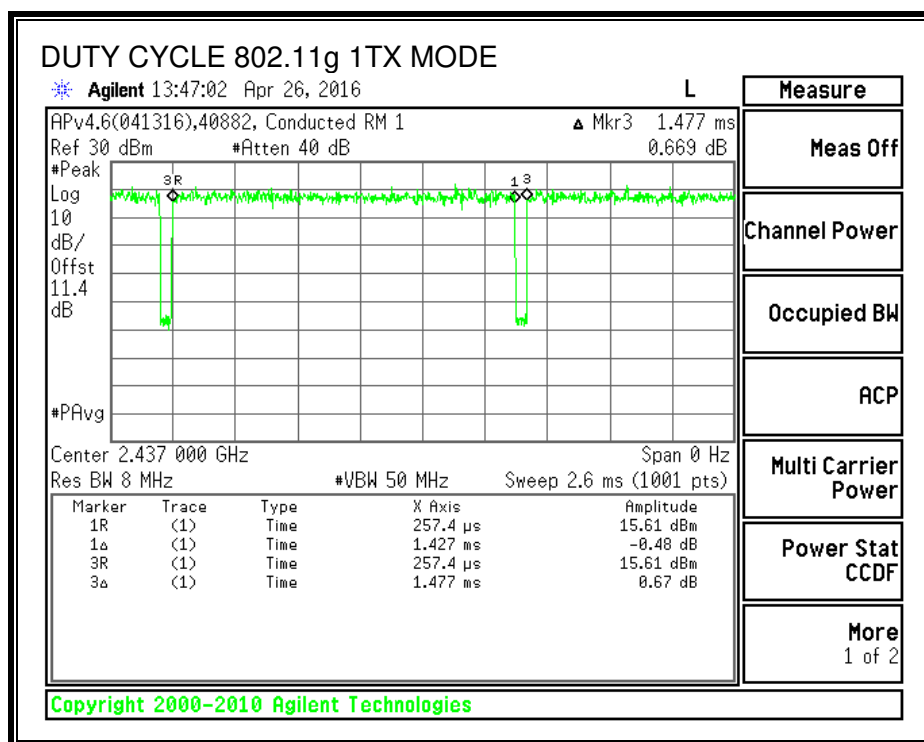
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b 1TX	1.625	1.677	0.969	96.90%	0.14	0.615
802.11g 1TX	1.427	1.477	0.966	96.61%	0.15	0.701
802.11n HT20 1TX	1.336	1.388	0.963	96.25%	0.17	0.749

Test Performed: Jeff Cabrera
Test Date: 2016-04-26

DUTY CYCLE PLOTS

2.4 GHz BAND





8.2. 802.11b MODE IN THE 2.4 GHz BAND

8.2.1. 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.

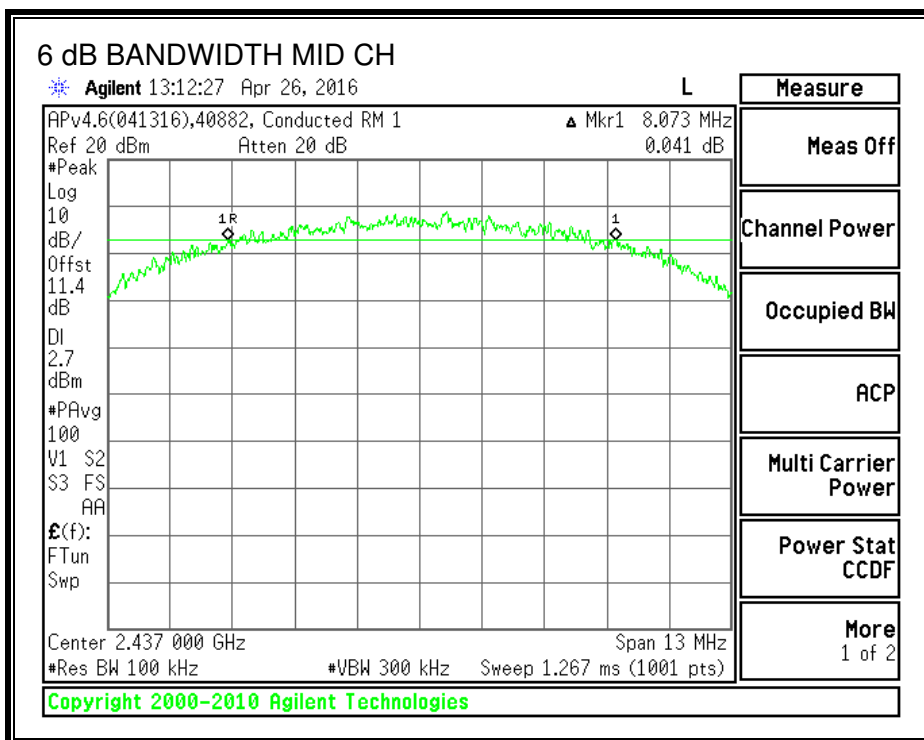
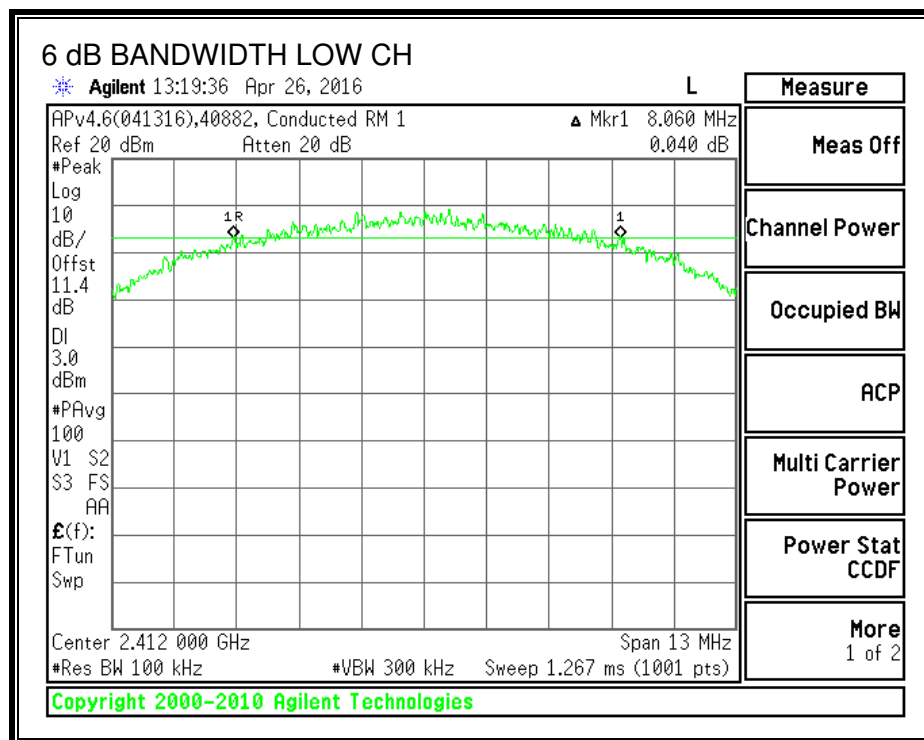
RESULTS

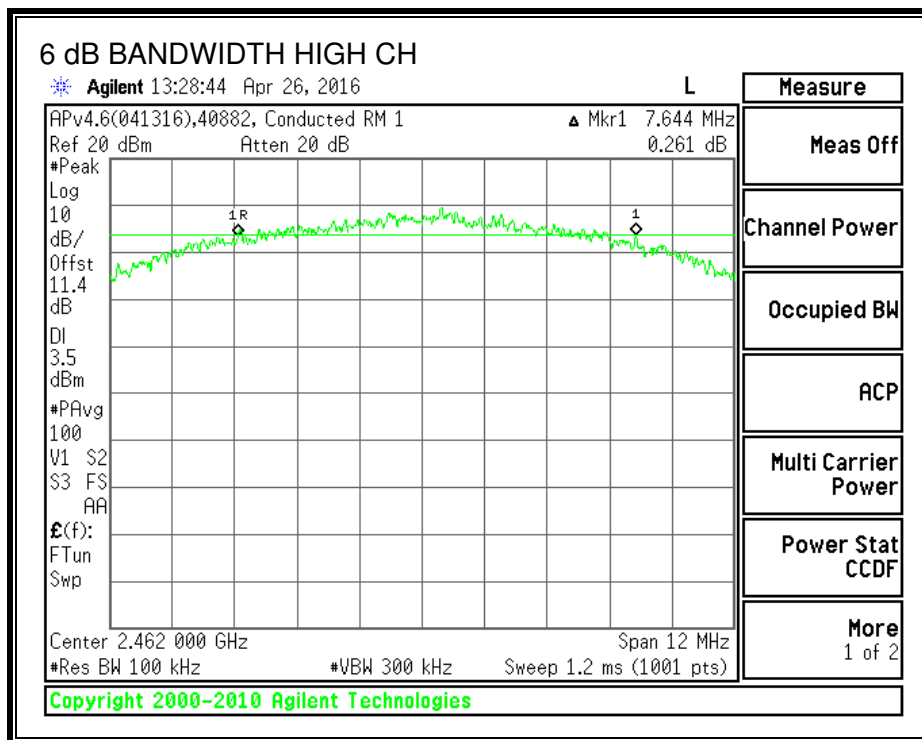
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.060	0.5
Mid	2437	8.073	0.5
High	2462	7.644	0.5

Test Performed: Jeff Cabrera

Test Date: 2016-04-26

6 dB BANDWIDTH





8.2.2. 99% BANDWIDTH

LIMITS

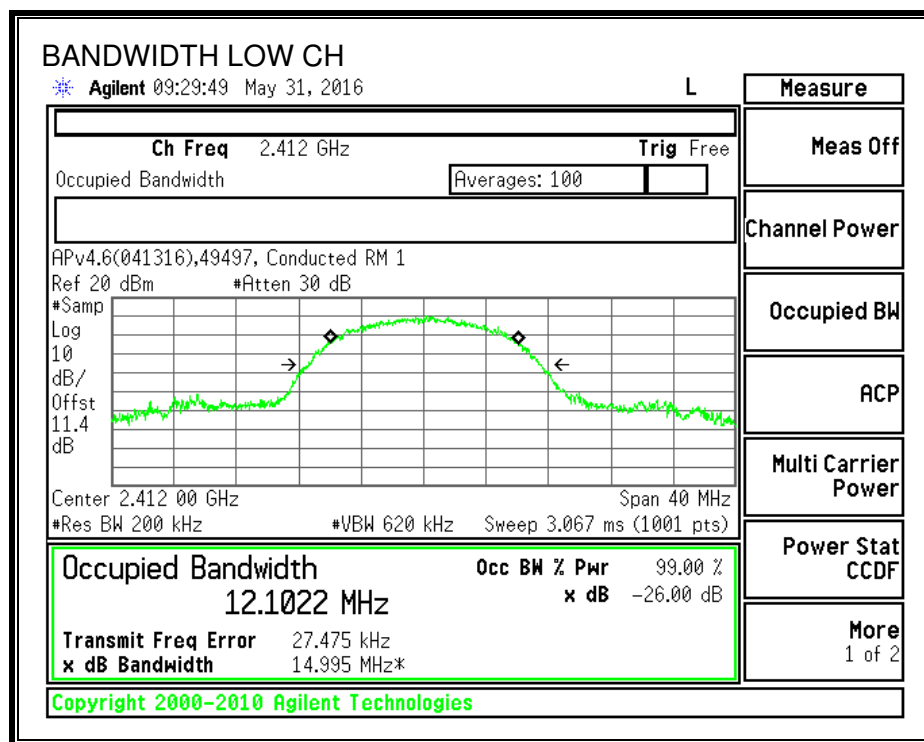
None; for reporting purposes only. Testing per RSS-Gen Clause 6.6.

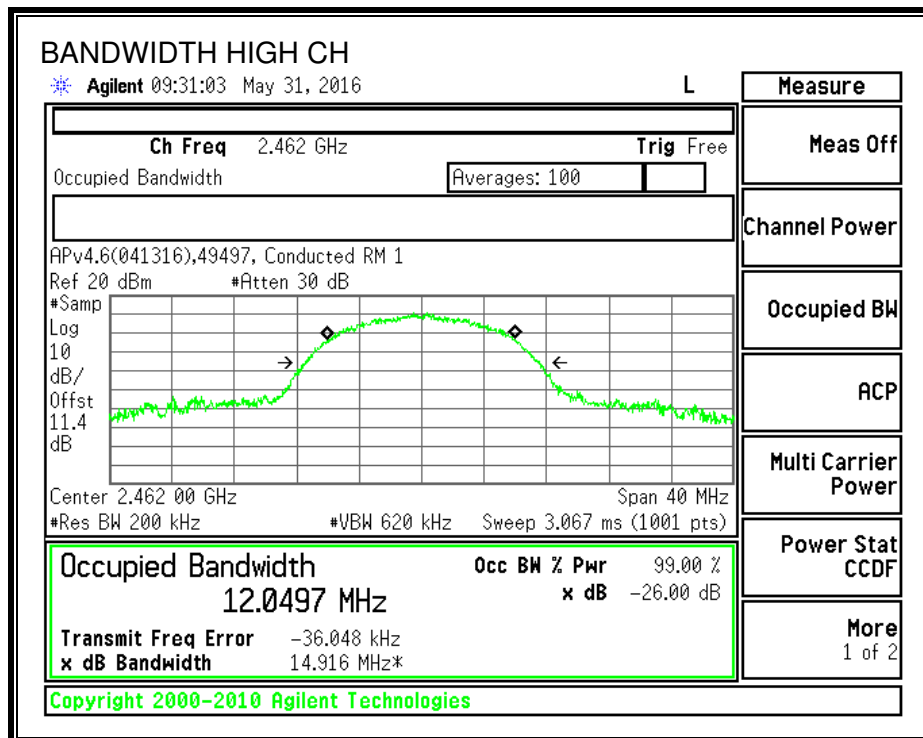
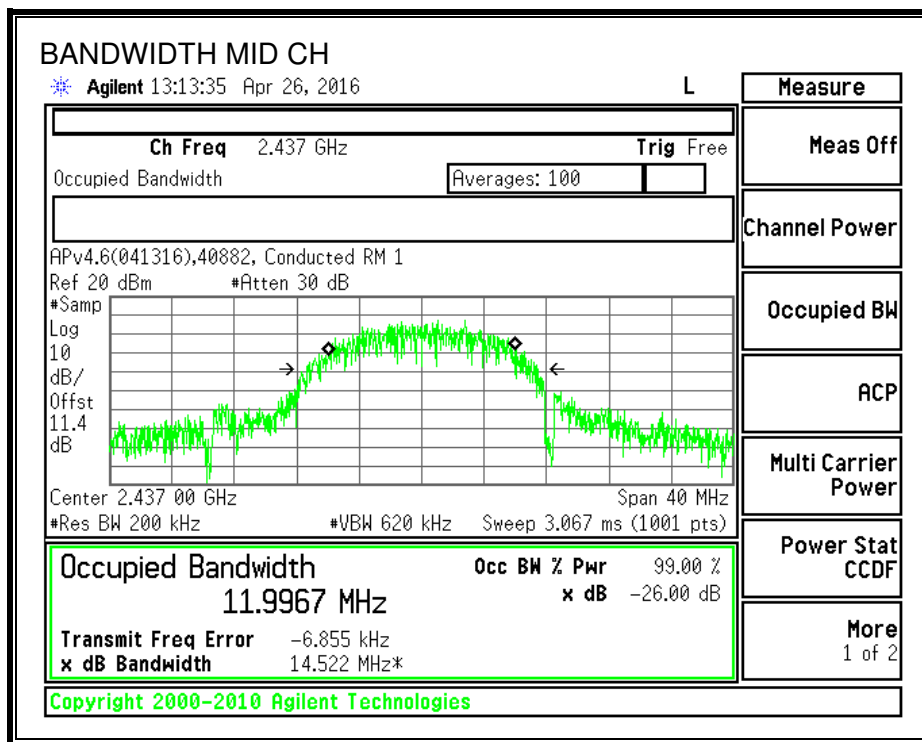
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.1022
Mid	2437	11.9967
High	2462	12.0497

Test Performed: Jeff Cabrera/Mark Learner
Test Date: 2016-04-26, 2016-05-31

99% BANDWIDTH





8.2.3. 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.60	30.00	30	36	30.00
Mid	2437	0.60	30.00	30	36	30.00
High	2462	0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.14	Included in Calculations of Corr'd Power
--------------------	------	--

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	16.25	16.39	30.00	-13.61
Mid	2437	16.39	16.53	30.00	-13.47
High	2462	16.32	16.46	30.00	-13.54

Test Performed: Jeff Cabrera
Test Date: 2016-04-26

8.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-247 5.2 (2)

RESULTS

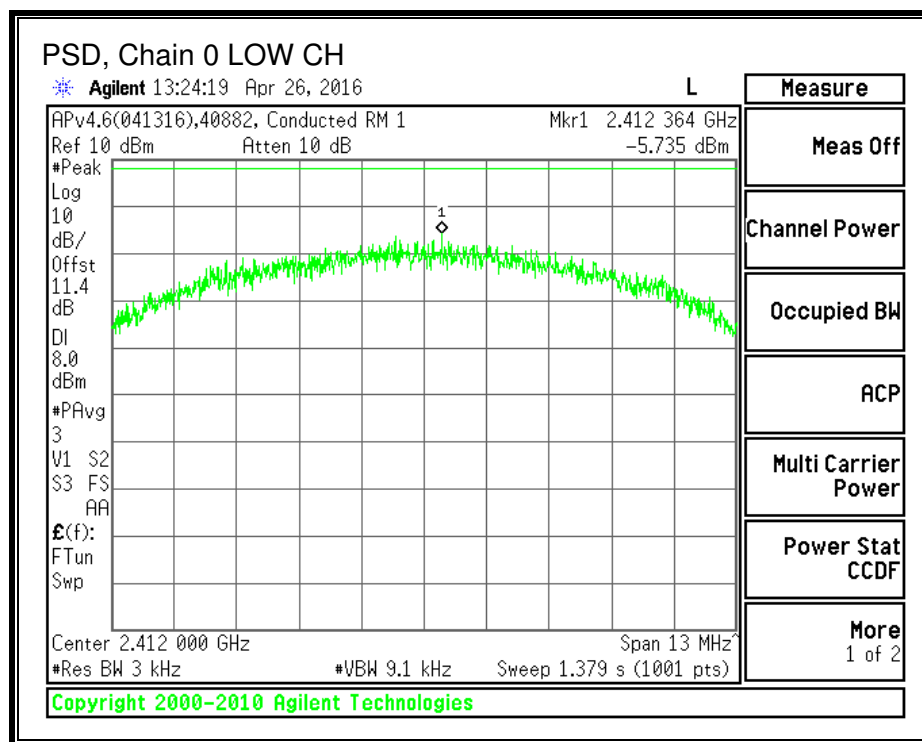
Duty Cycle CF (dB)	0.14	Included in Calculations of Corr'd PSD
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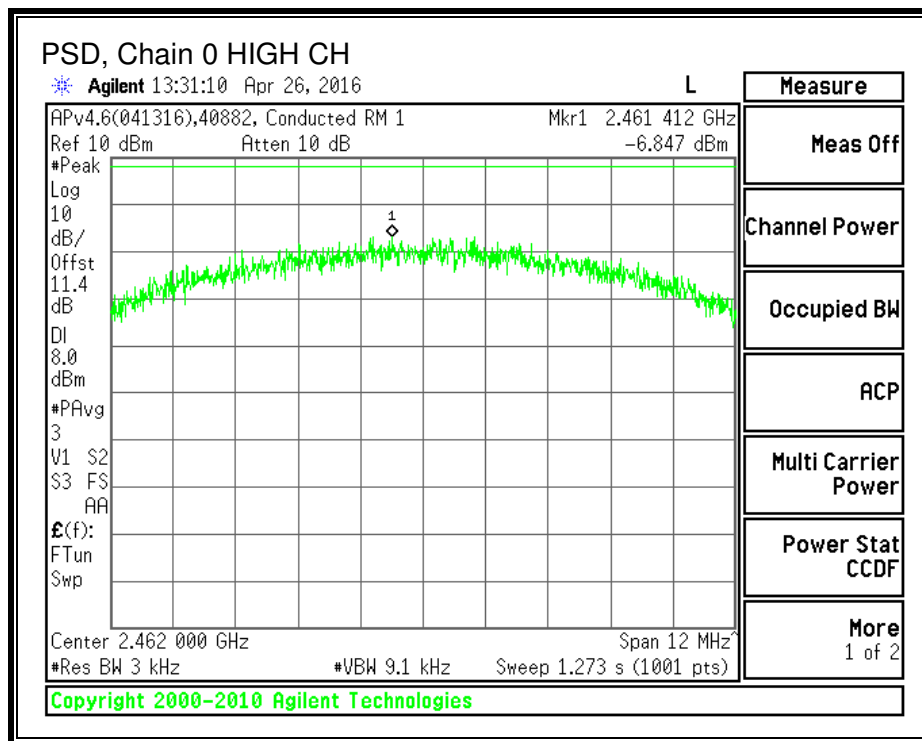
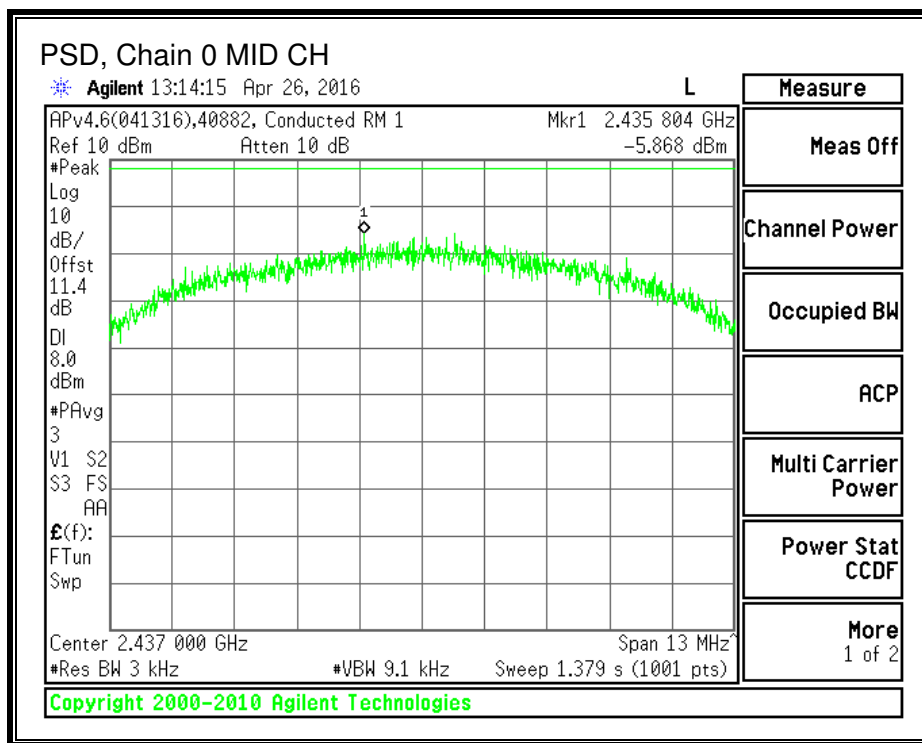
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.74	-5.60	8.0	-13.6
Mid	2437	-5.87	-5.73	8.0	-13.7
High	2462	-6.85	-6.71	8.0	-14.7

PS Test Performed: Jeff Cabrera
Test Date: 2016-04-26

PSD, Chain 0





8.2.5. OUT-OF-BAND 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.

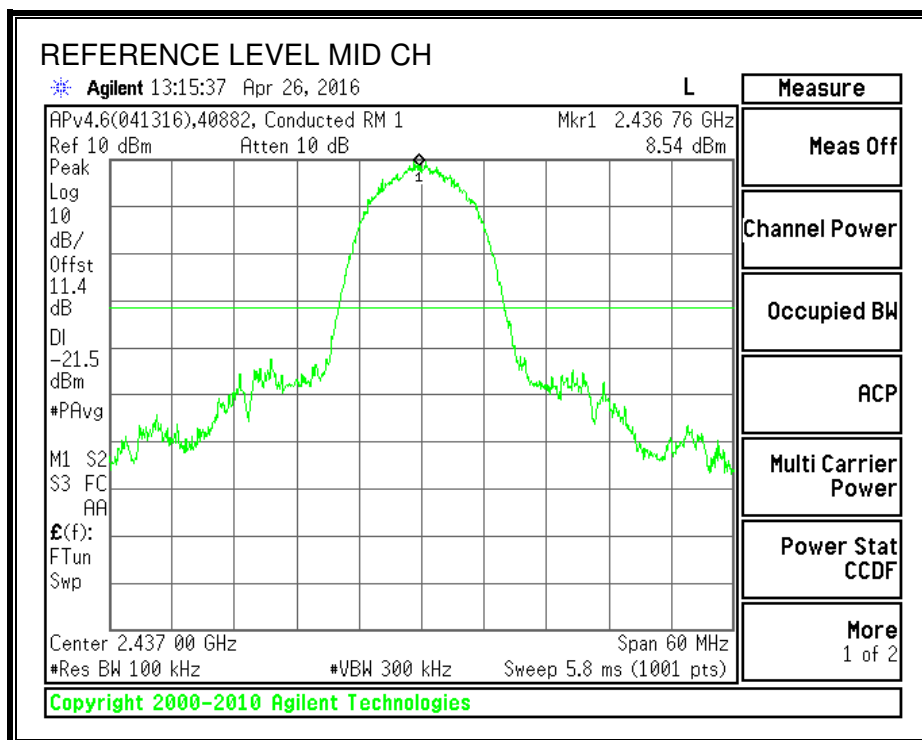
RSS - In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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

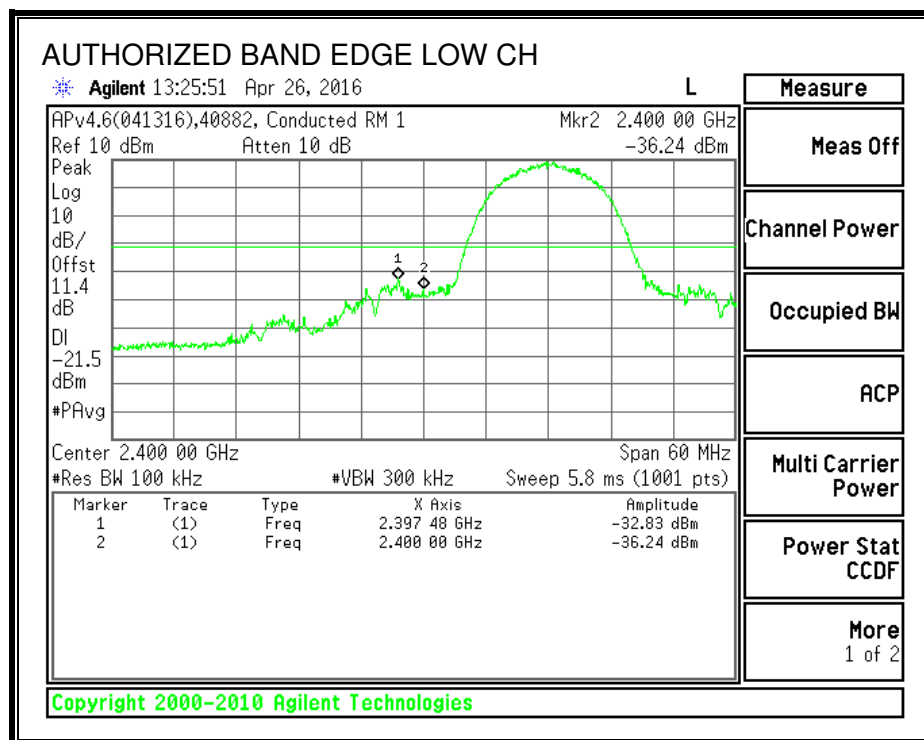
Test Performed: Jeff Cabrera

Test Date: 2016-04-26

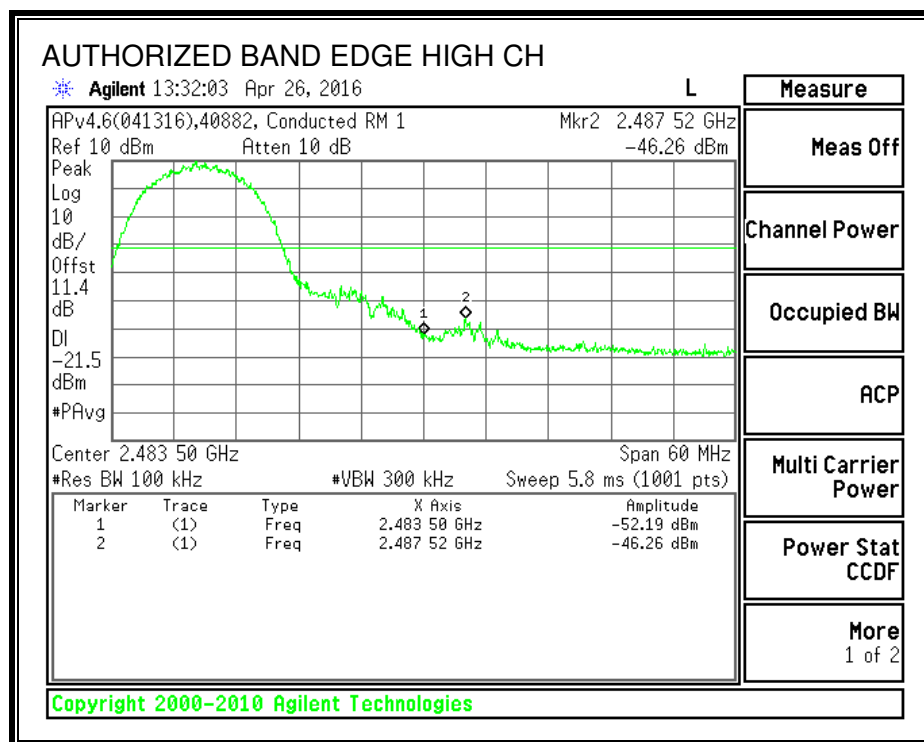
IN-BAND REFERENCE LEVEL



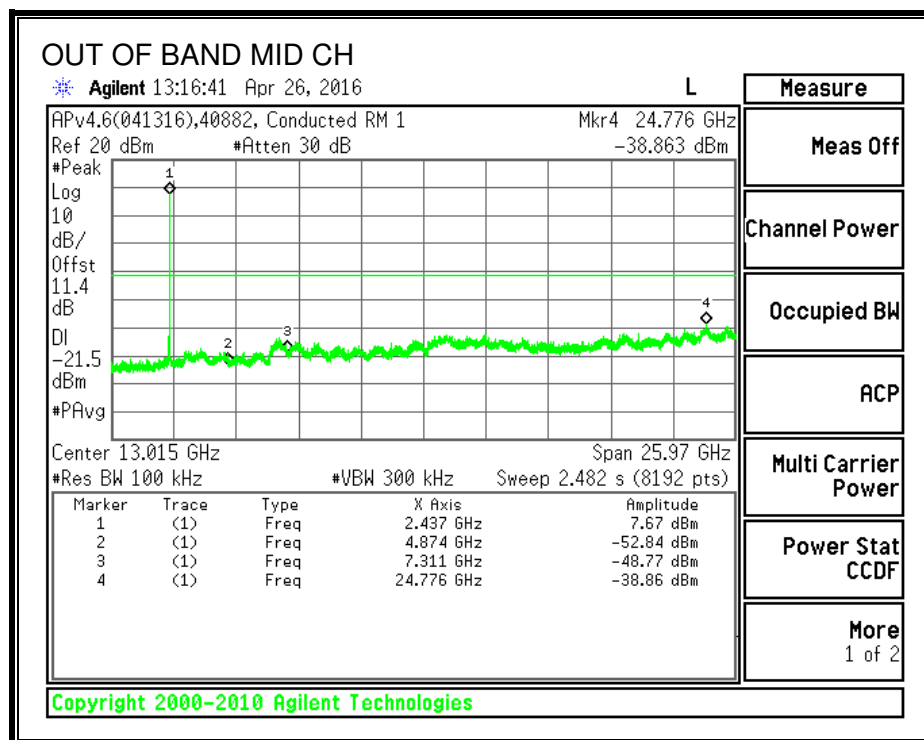
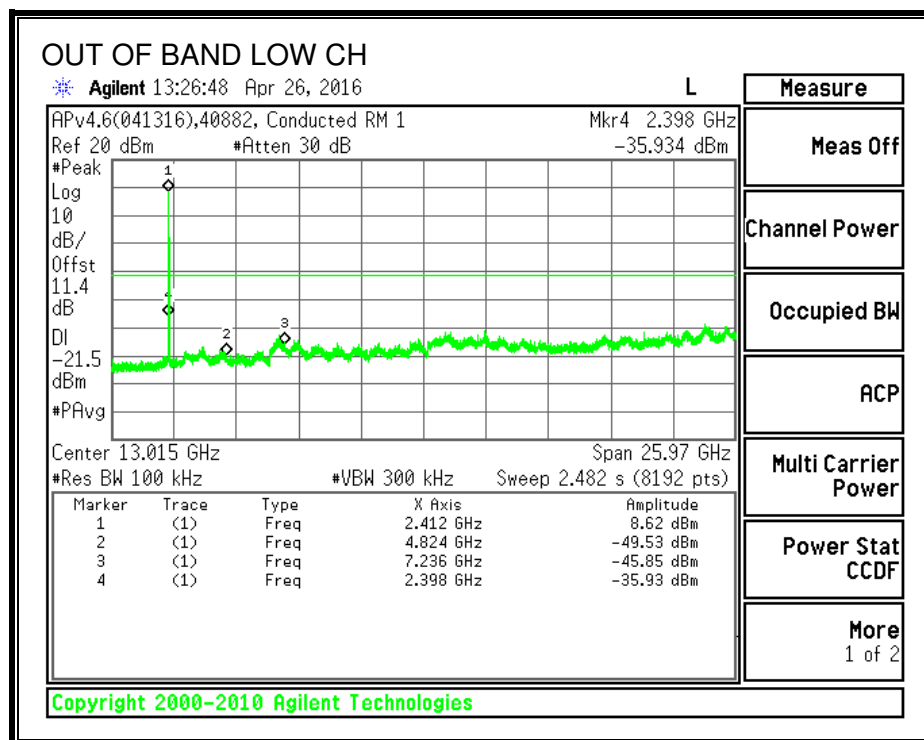
LOW CHANNEL BANDEDGE

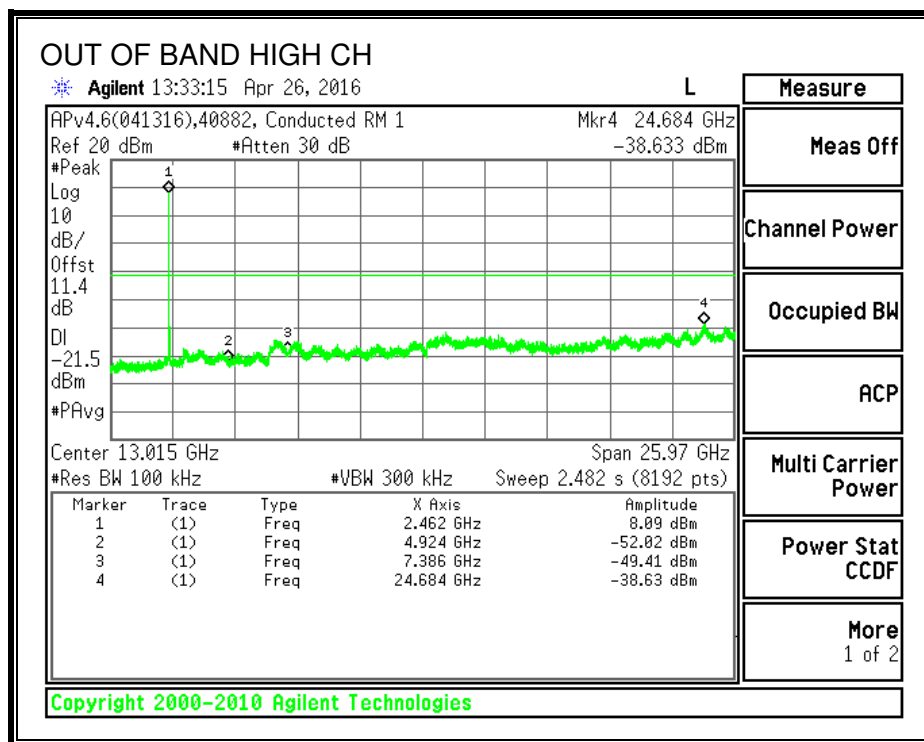


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS





8.3. 802.11g MODE IN THE 2.4 GHz BAND

8.3.1. 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.

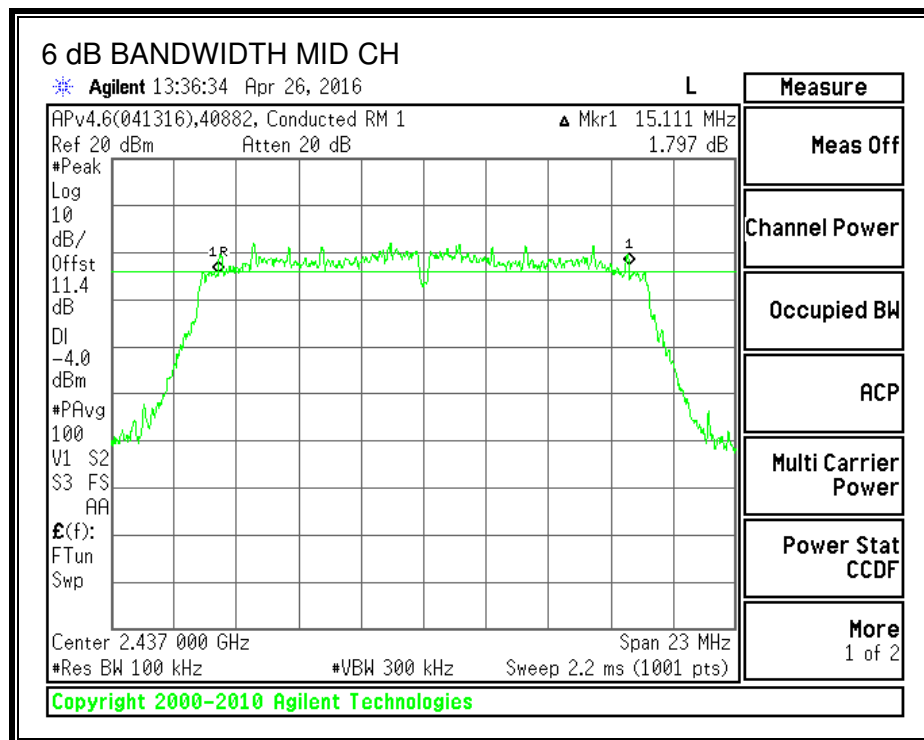
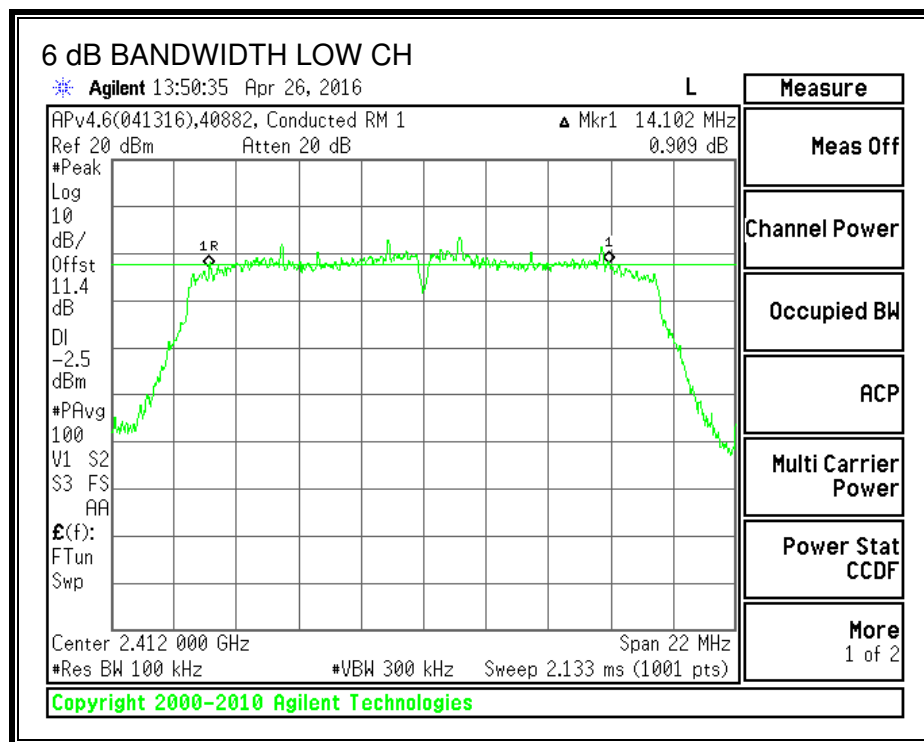
RESULTS

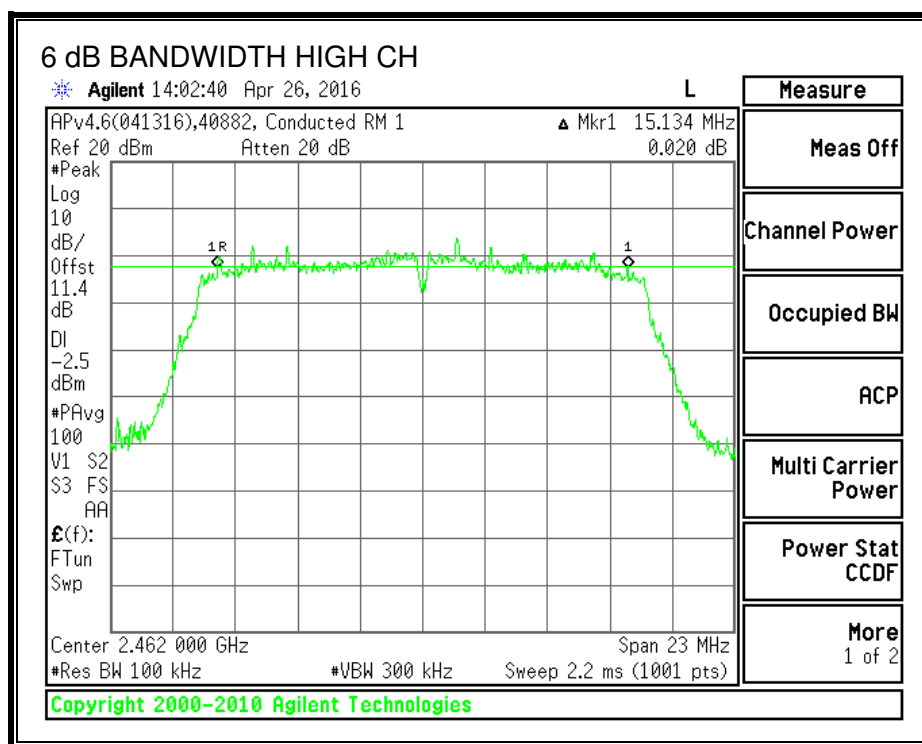
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	14.102	0.5
Mid	2437	15.111	0.5
High	2462	15.134	0.5

Test Performed: Jeff Cabrera

Test Date: 2016-04-26

6 dB BANDWIDTH





8.3.2. 99% BANDWIDTH

LIMITS

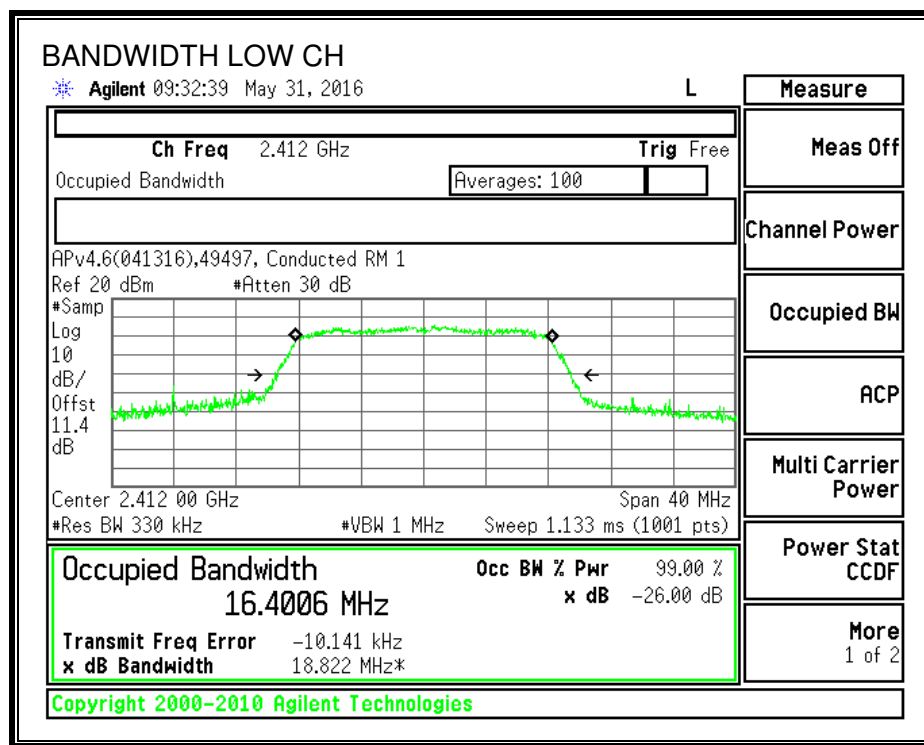
None; for reporting purposes only. Testing per RSS-Gen Clause 6.6.

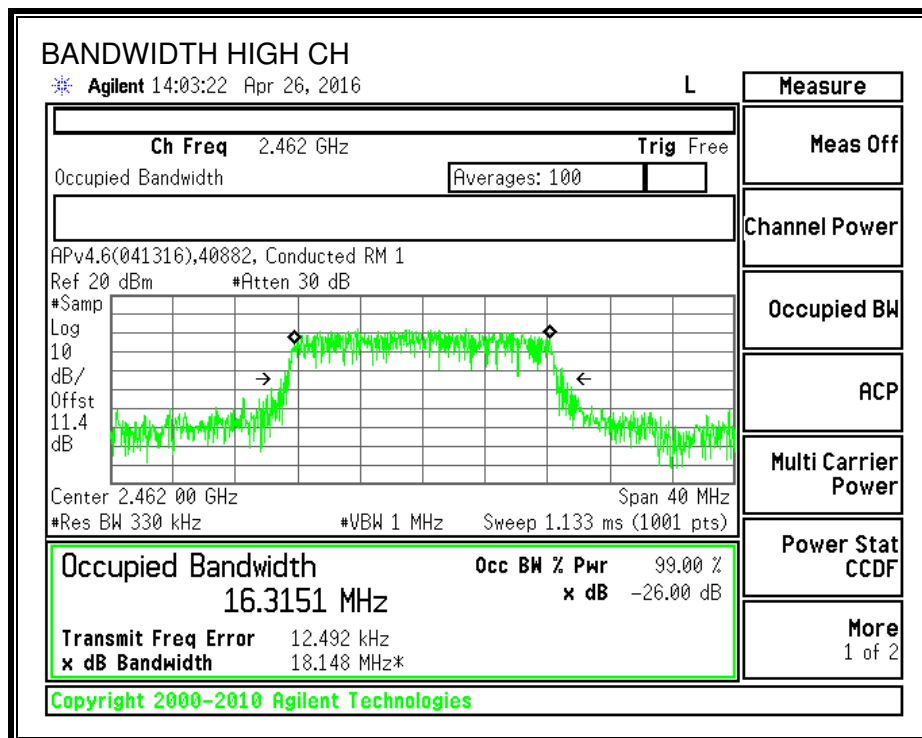
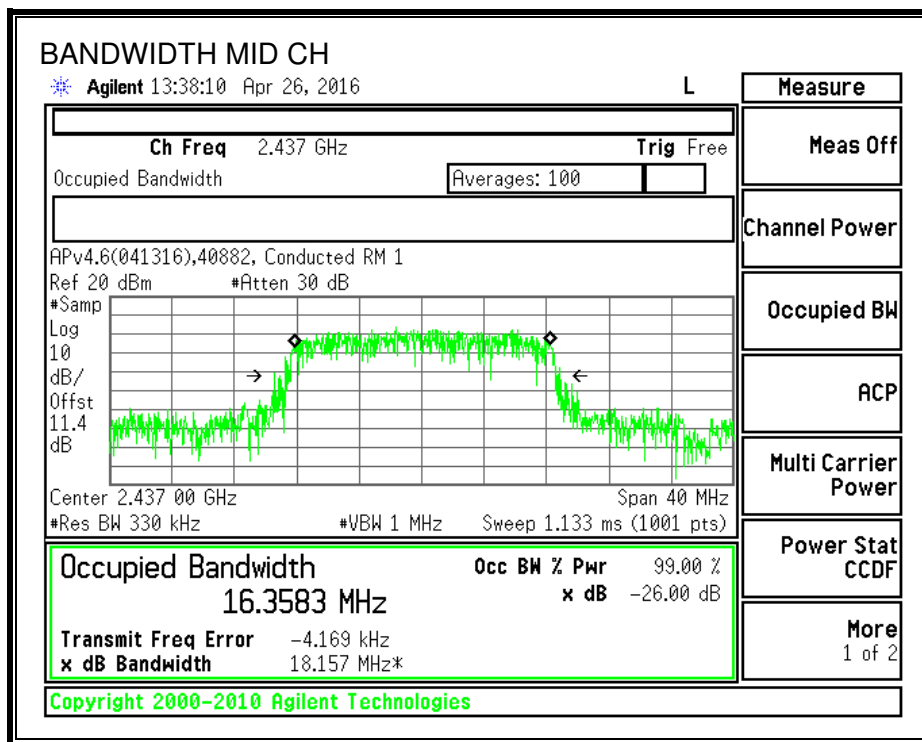
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.4006
Mid	2437	16.3583
High	2462	16.3151

Test Performed: Jeff Cabrera/Mark Learner
Test Date: 2016-04-26/2016-05-31

99% BANDWIDTH





8.3.3. 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 DTSSs 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

Test Performed: Jeff Cabrera

Test Date: 2016-04-26

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.60	30.00	30	36	30.00
Mid	2437	0.60	30.00	30	36	30.00
High	2462	0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.15	Included in Calculations of Corr'd Power
--------------------	------	--

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	12.70	12.85	30.00	-17.15
Mid	2437	12.82	12.97	30.00	-17.03
High	2462	12.76	12.91	30.00	-17.09

8.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-247 5.2 (2)

RESULTS

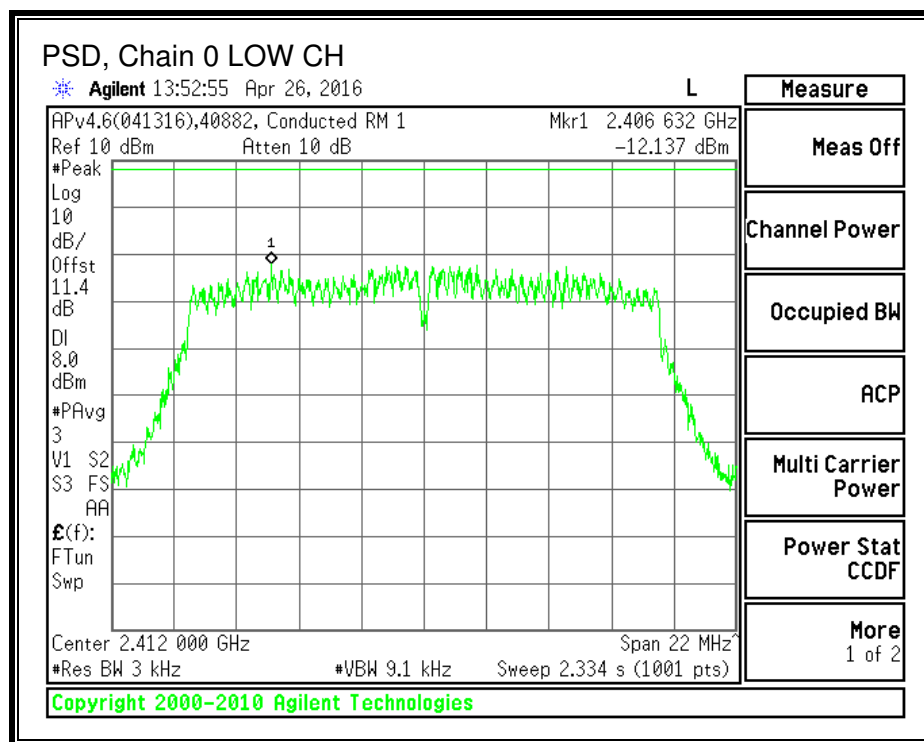
Duty Cycle CF (dB)	0.15	Included in Calculations of Corr'd PSD
--------------------	------	--

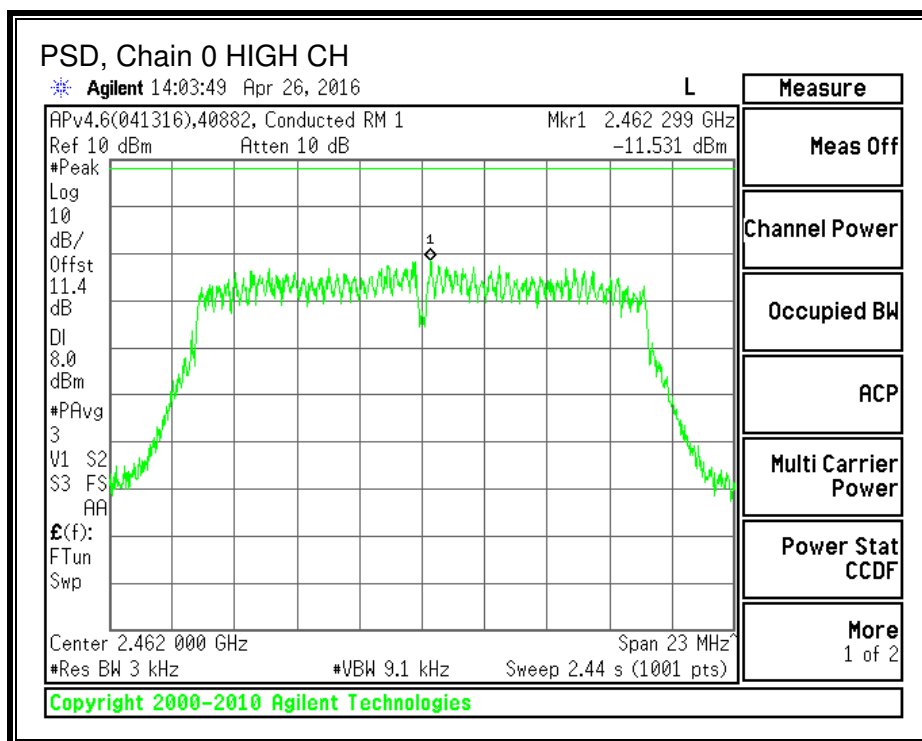
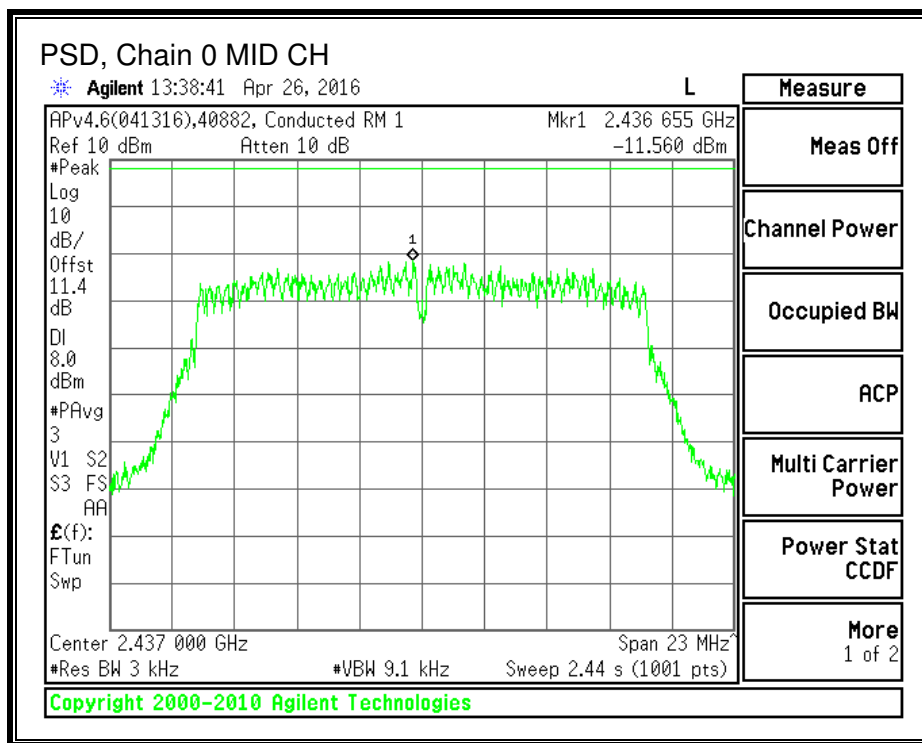
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.14	-11.99	8.0	-20.0
Mid	2437	-11.56	-11.41	8.0	-19.4
High	2462	-11.53	-11.38	8.0	-19.4

Test Performed: Jeff Cabrera
Test Date: 2016-04-26

PSD, Chain 0





8.3.5. OUT-OF-BAND 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.

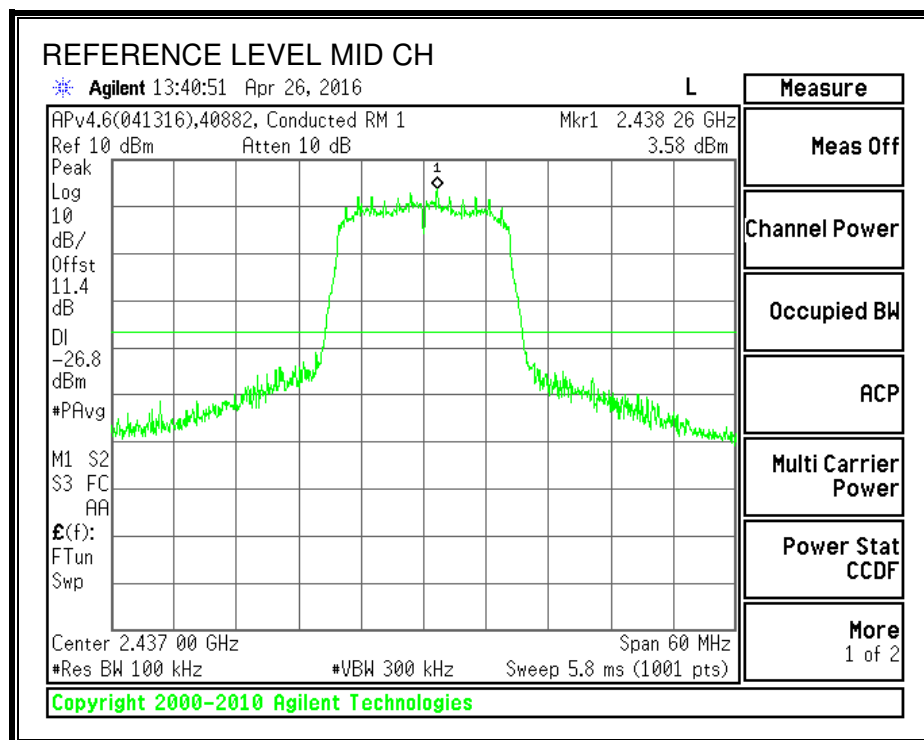
RSS - In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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

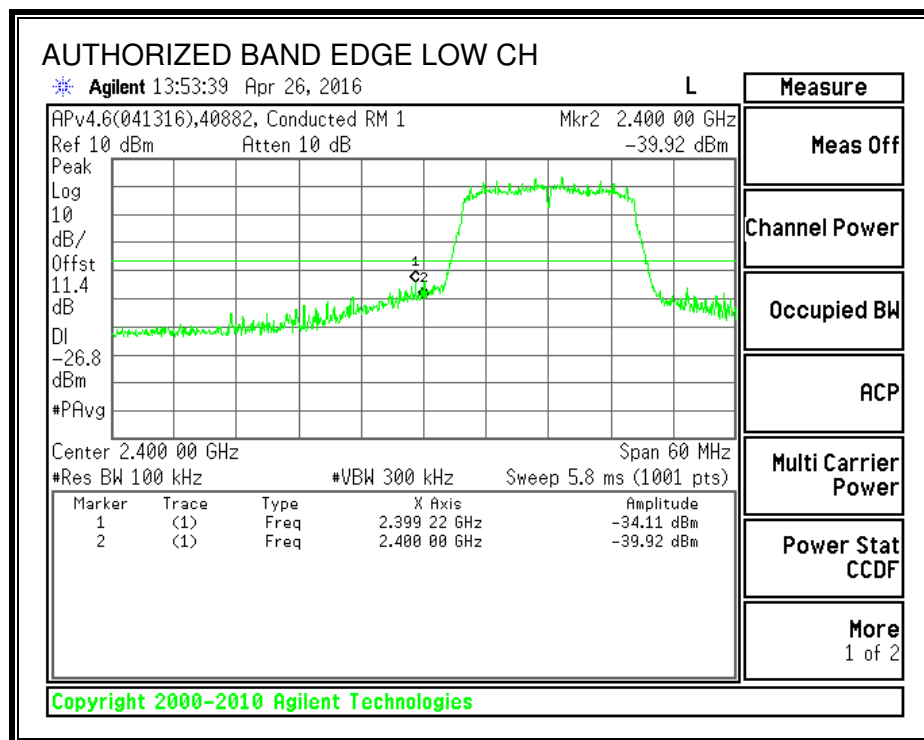
Test Performed: Jeff Cabrera

Test Date: 2016-04-26

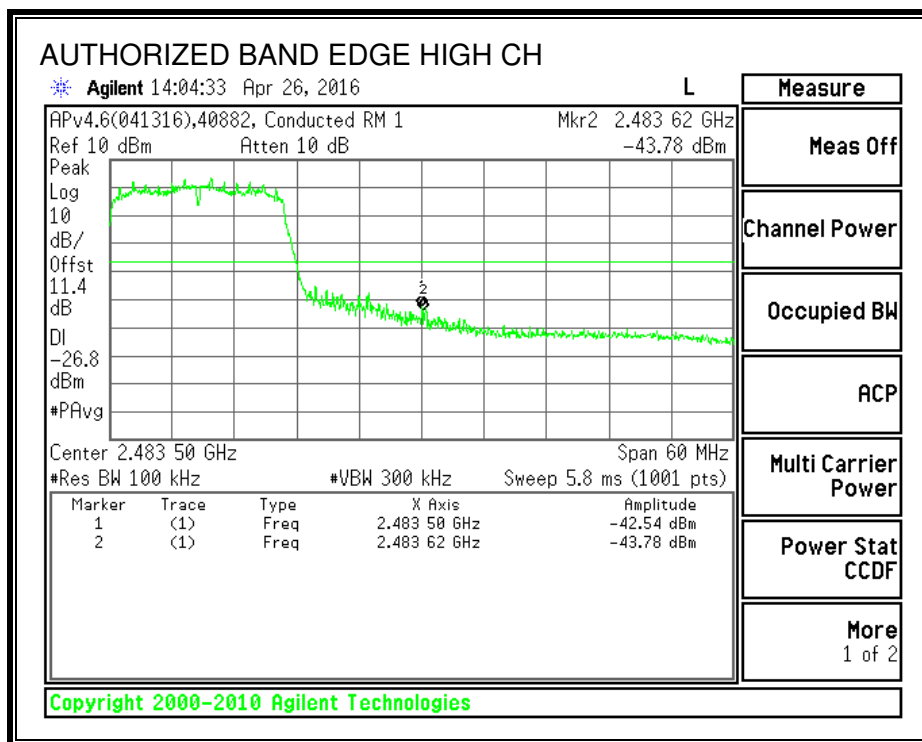
IN-BAND REFERENCE LEVEL



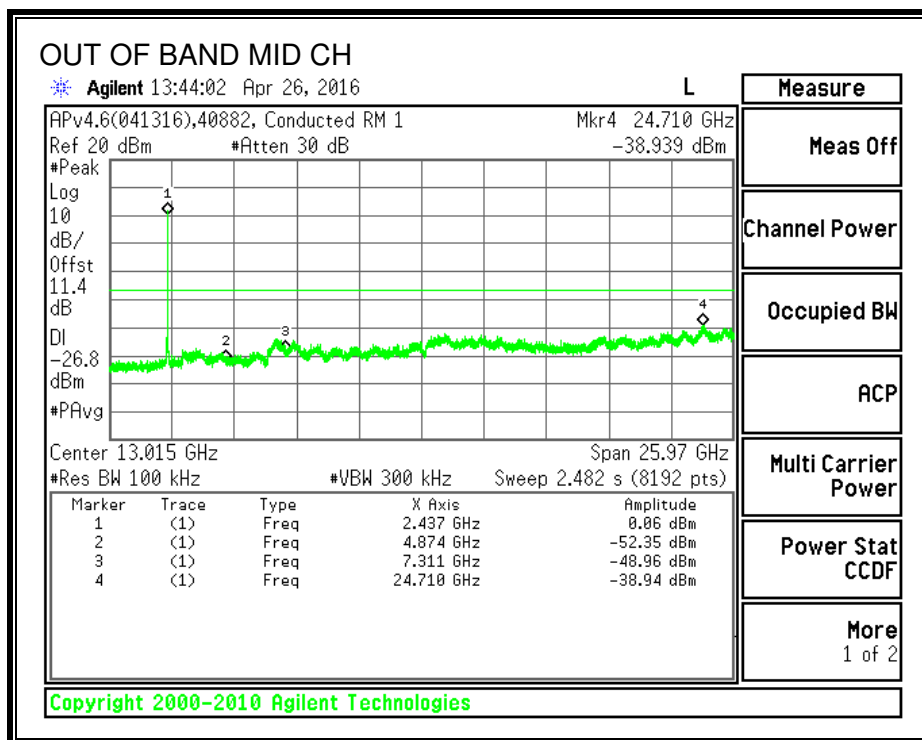
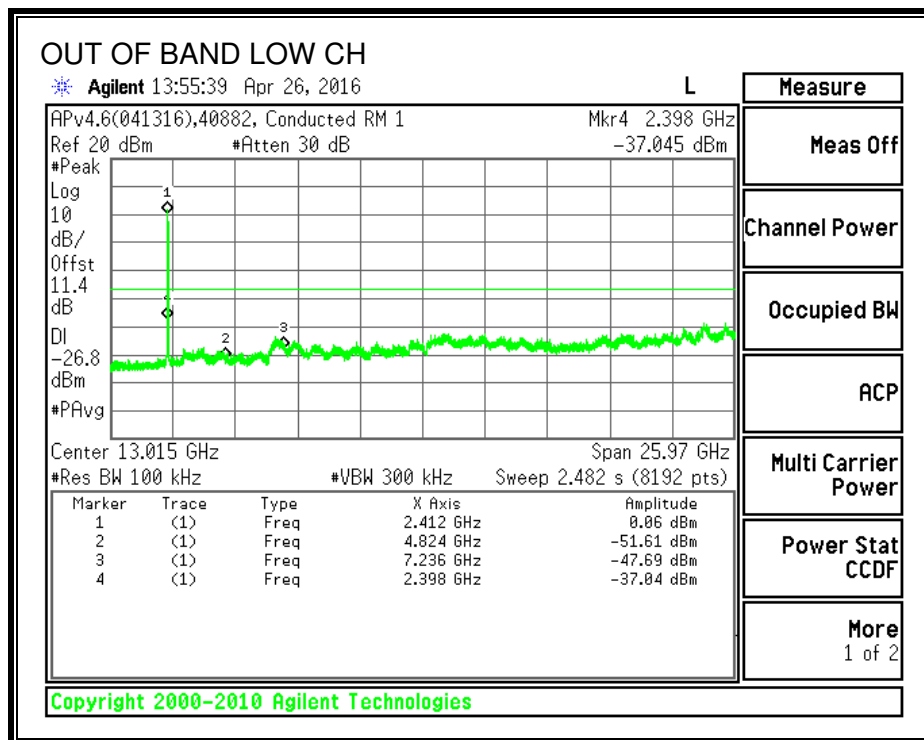
LOW CHANNEL BANDEDGE

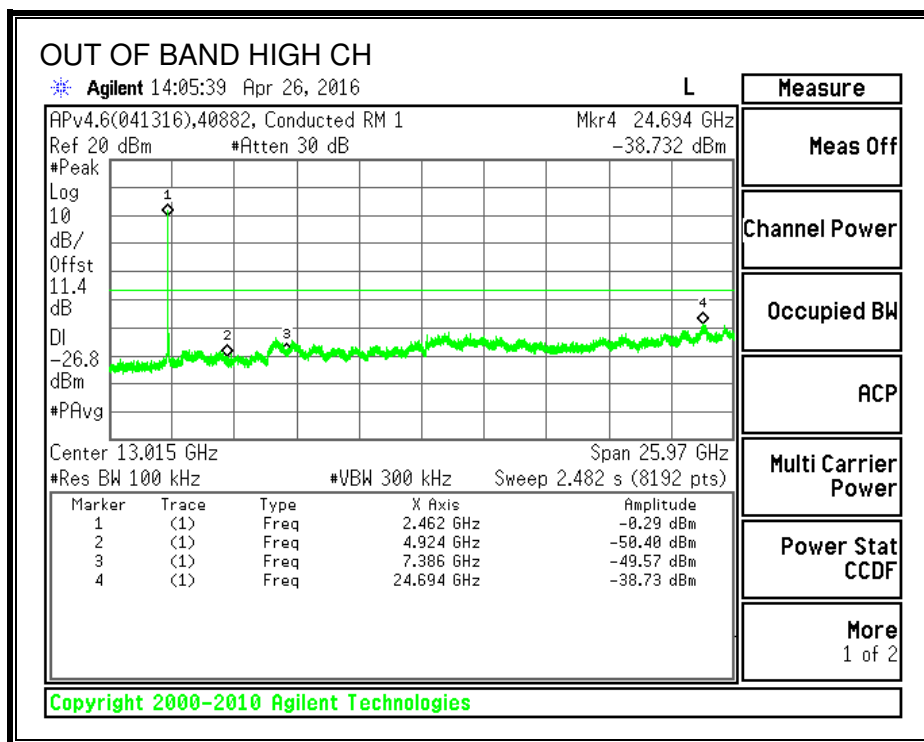


HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS





8.4. 802.11n HT20 MODE IN THE 2.4 GHz BAND

8.4.1. 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.

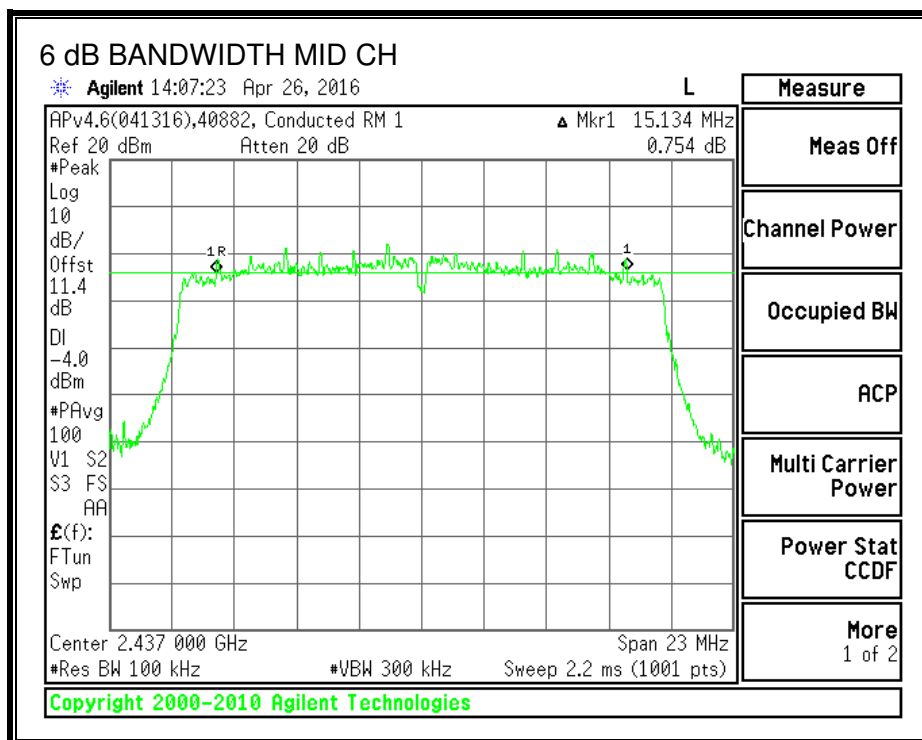
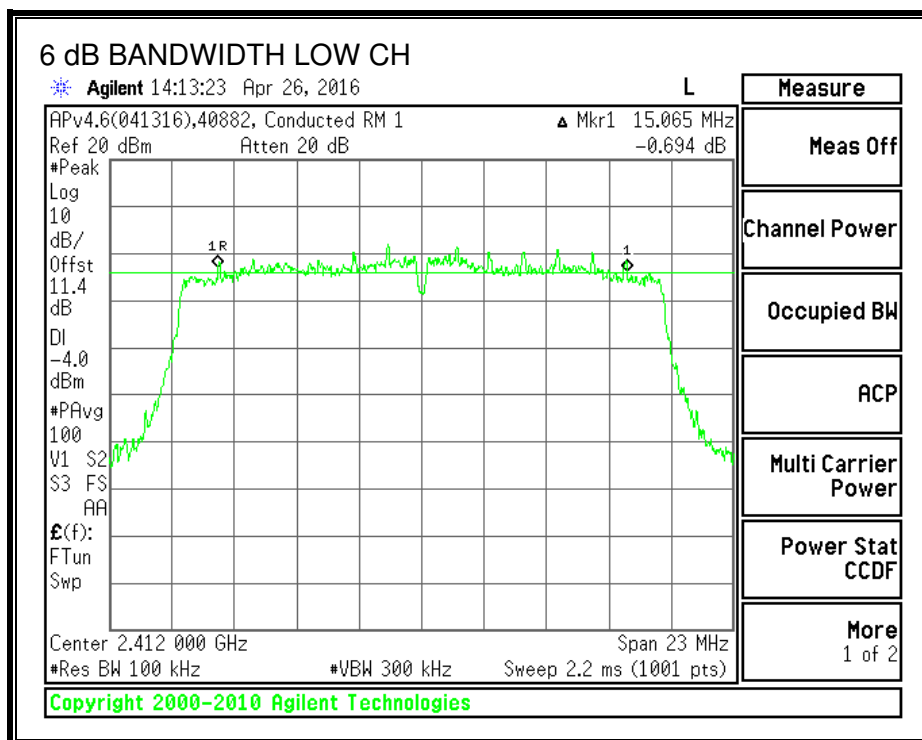
RESULTS

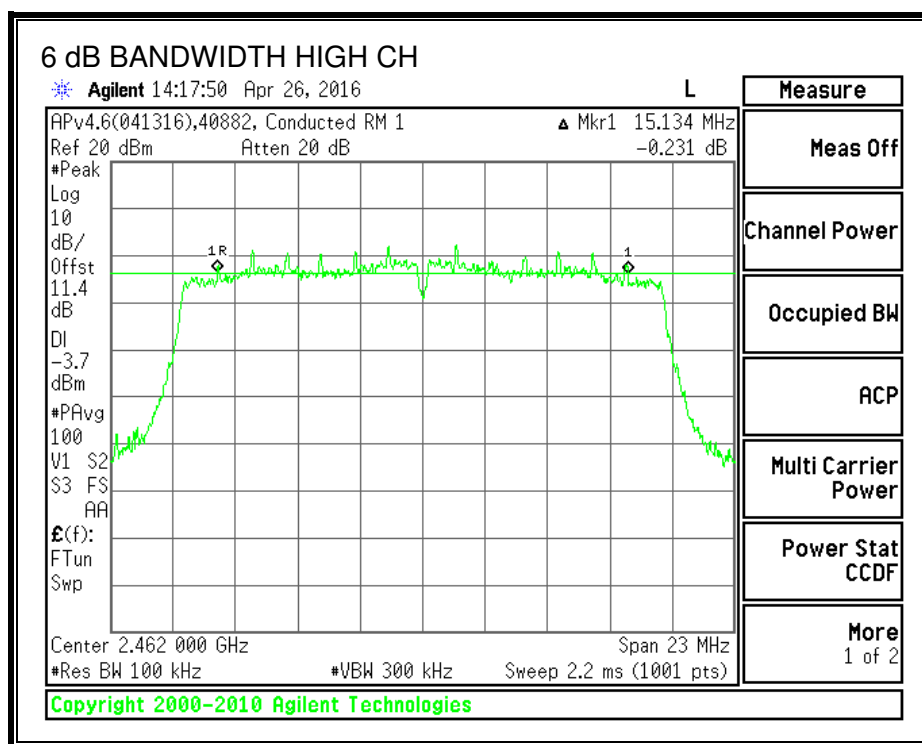
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.064	0.5
Mid	2437	15.134	0.5
High	2462	15.134	0.5

Test Performed: Jeff Cabrera

Test Date: 2016-04-26

6 dB BANDWIDTH





8.4.2. 99% BANDWIDTH

LIMITS

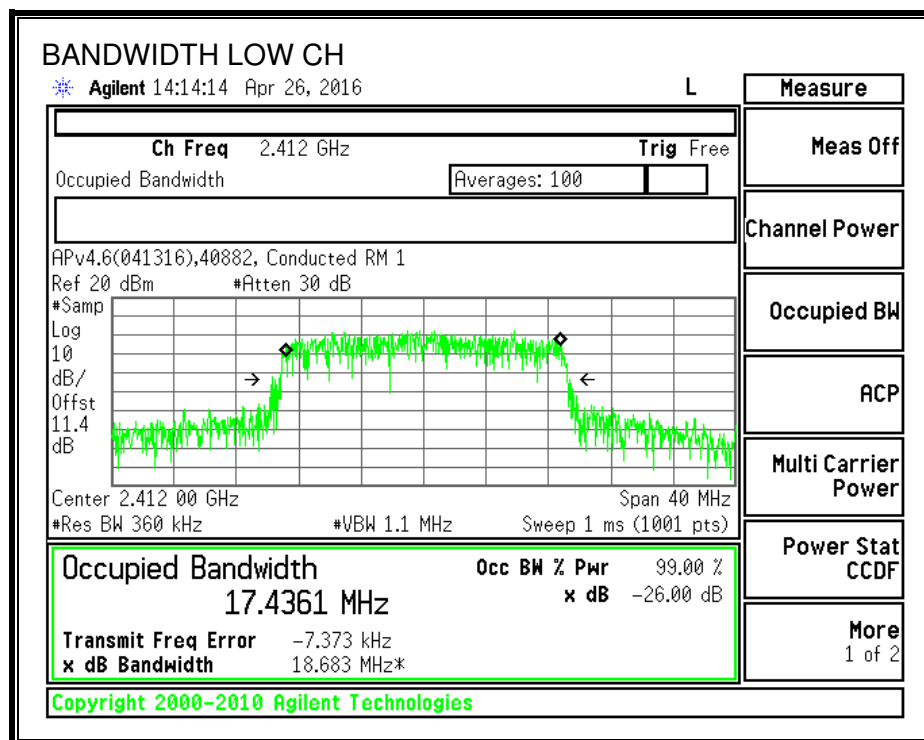
None; for reporting purposes only. Testing per RSS-Gen Clause 6.6.

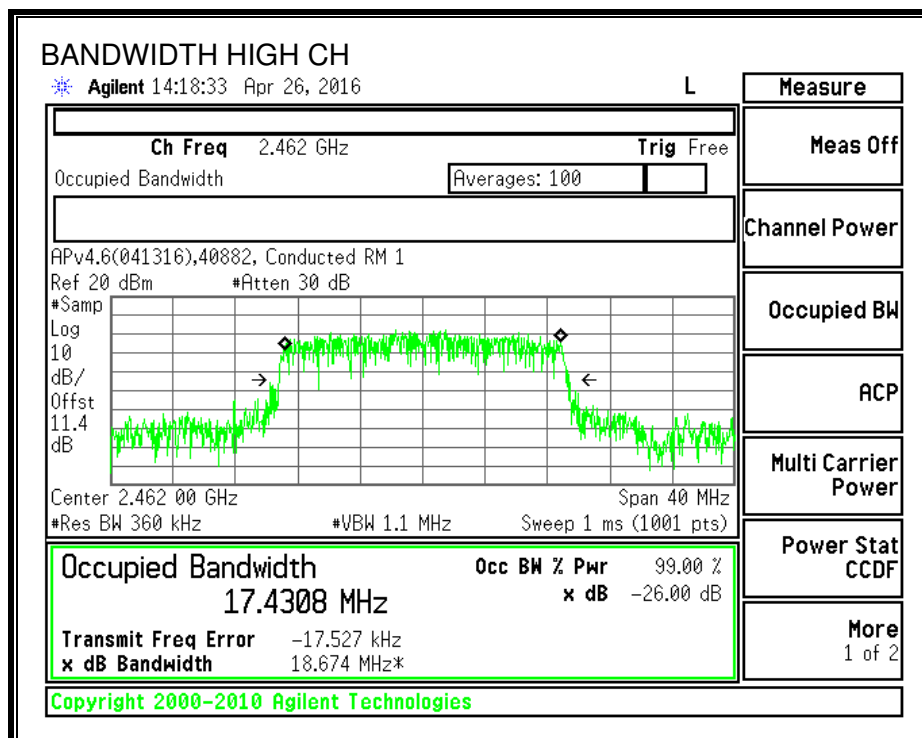
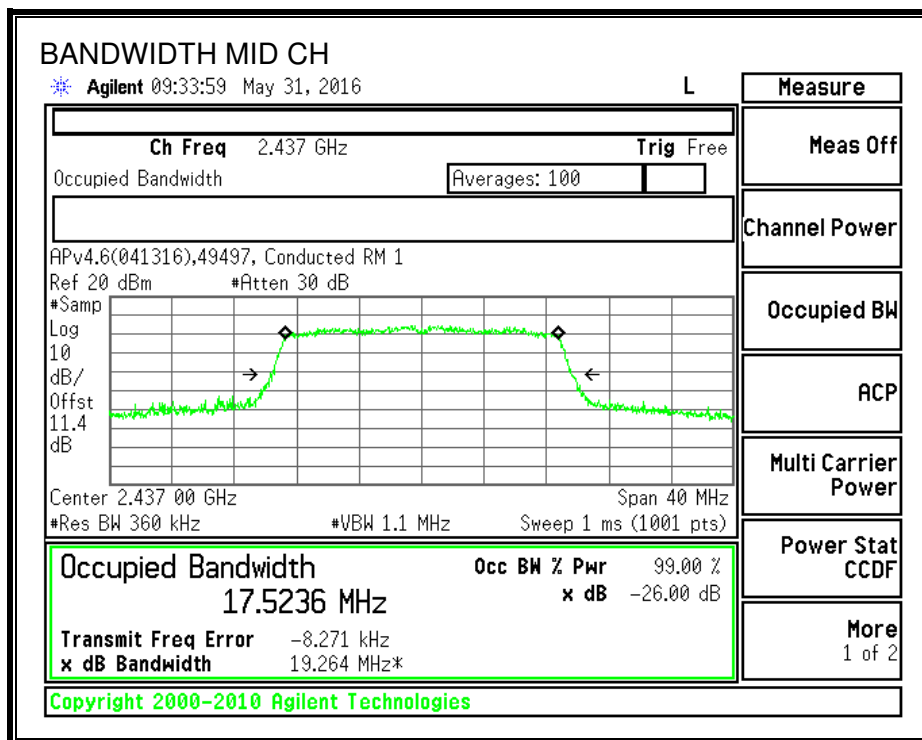
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.4361
Mid	2437	17.5236
High	2462	17.4308

Test Performed: Jeff Cabrera/Mark Learner
Test Date: 2016-04-26/2016-05-31

99% BANDWIDTH





8.4.3. 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 DTSSs 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

Test Performed: Jeff Cabrera

Test Date: 2016-04-26

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	0.60	30.00	30	36	30.00
Mid	2437	0.60	30.00	30	36	30.00
High	2462	0.60	30.00	30	36	30.00

Duty Cycle CF (dB)	0.17	Included in Calculations of Corr'd Power
--------------------	------	--

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	11.75	11.92	30.00	-18.08
Mid	2437	11.81	11.98	30.00	-18.02
High	2462	11.62	11.79	30.00	-18.21

8.4.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-247 5.2 (2)

RESULTS

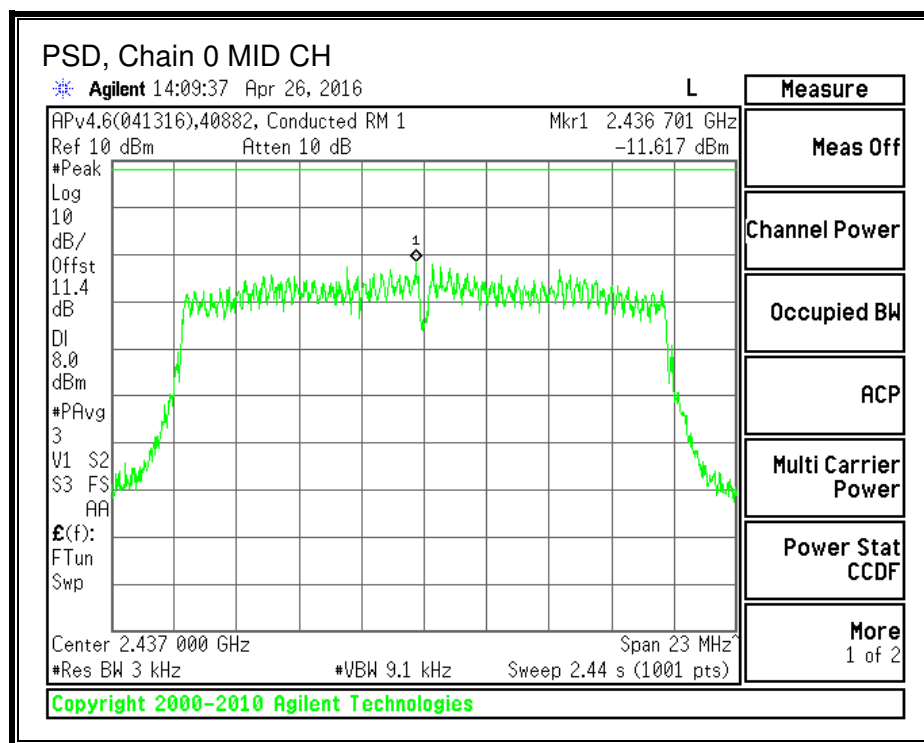
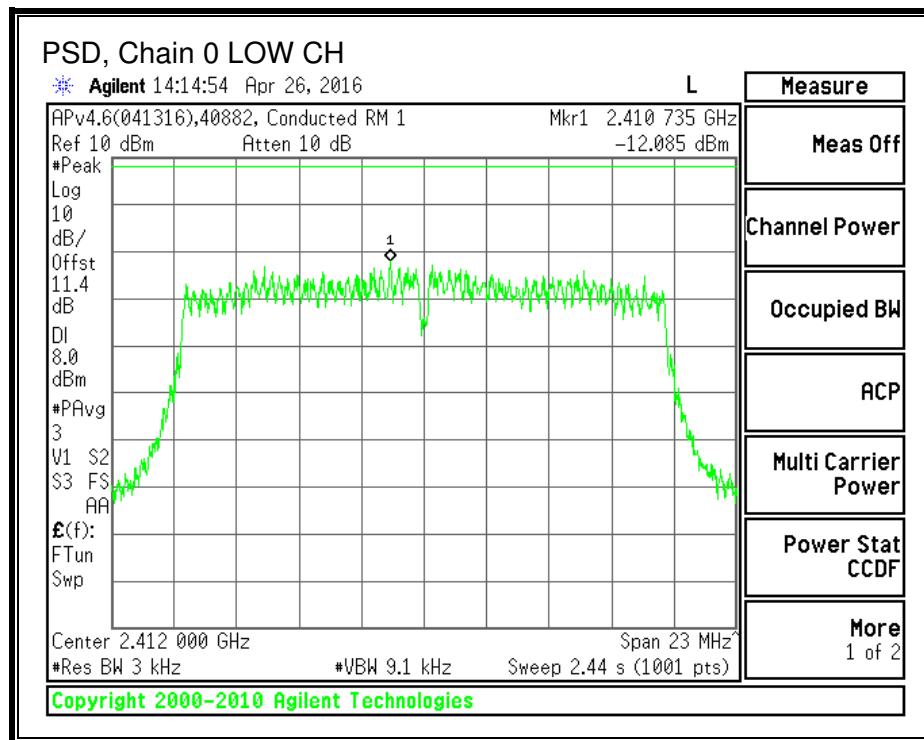
Duty Cycle CF (dB)	0.17	Included in Calculations of Corr'd PSD
--------------------	------	--

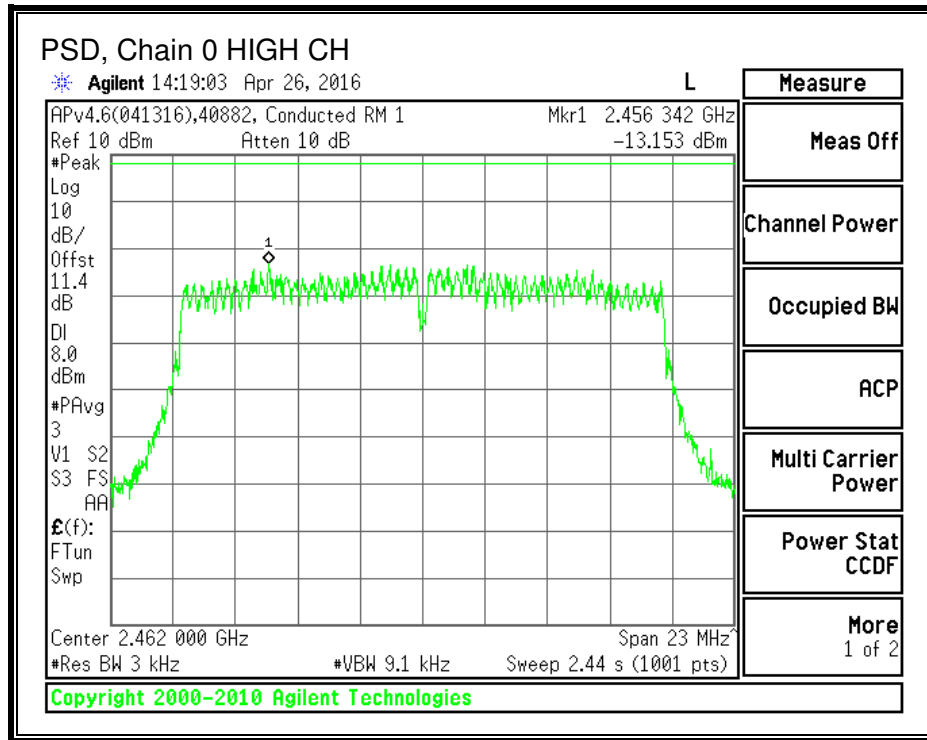
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.09	-11.92	8.0	-19.9
Mid	2437	-11.62	-11.45	8.0	-19.4
High	2462	-13.15	-12.98	8.0	-21.0

Test Performed: Jeff Cabrera
Test Date: 2016-04-26

PSD, Chain 0





8.4.5. OUT-OF-BAND 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.

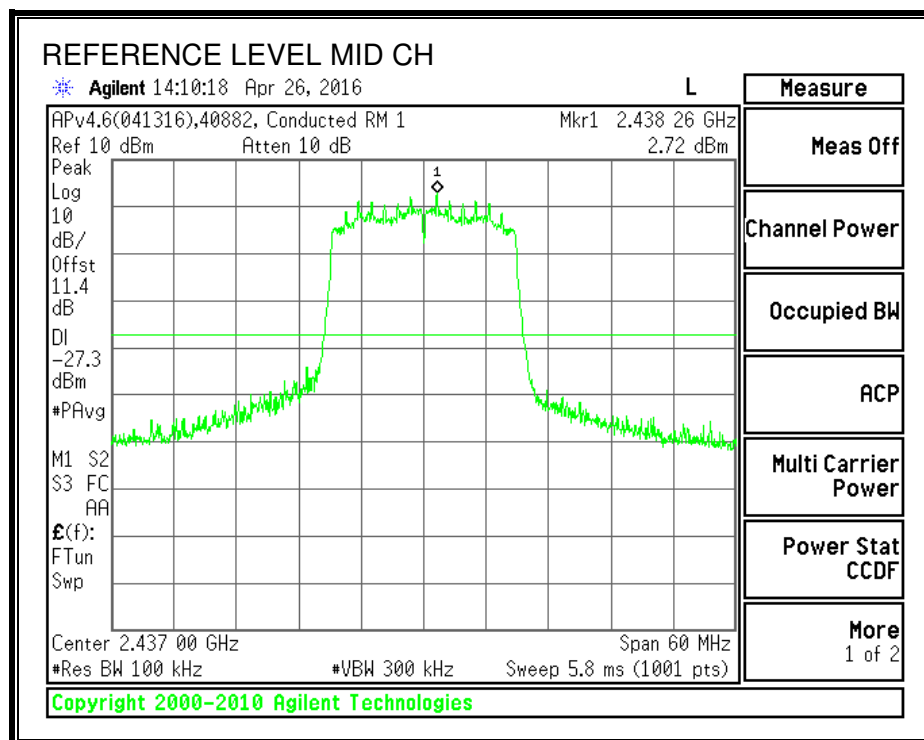
RSS - In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either 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

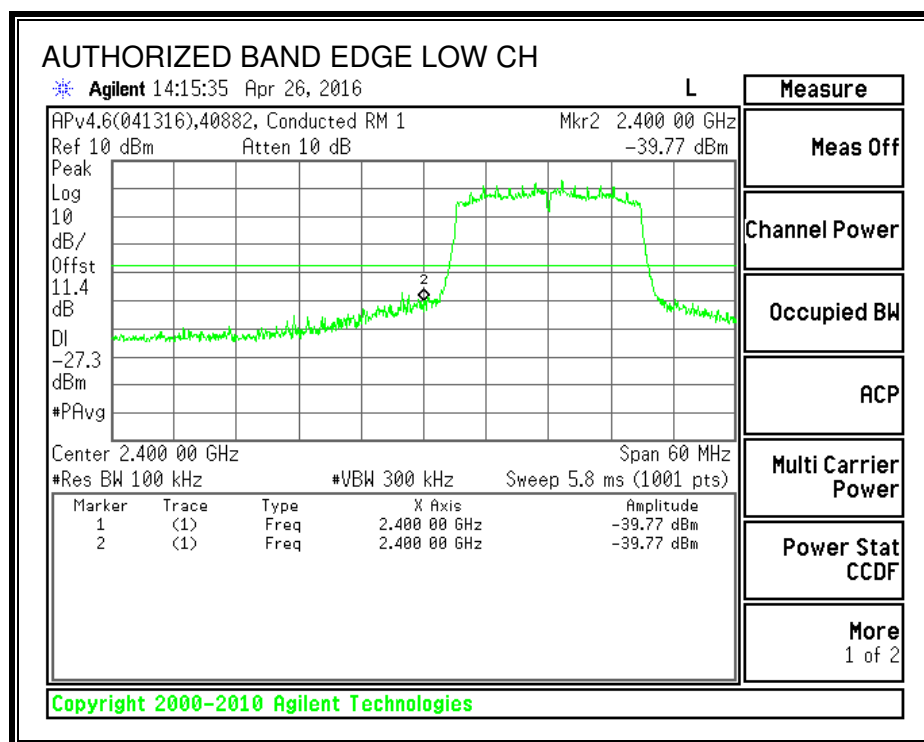
Test Performed: Jeff Cabrera

Test Date: 2016-04-26

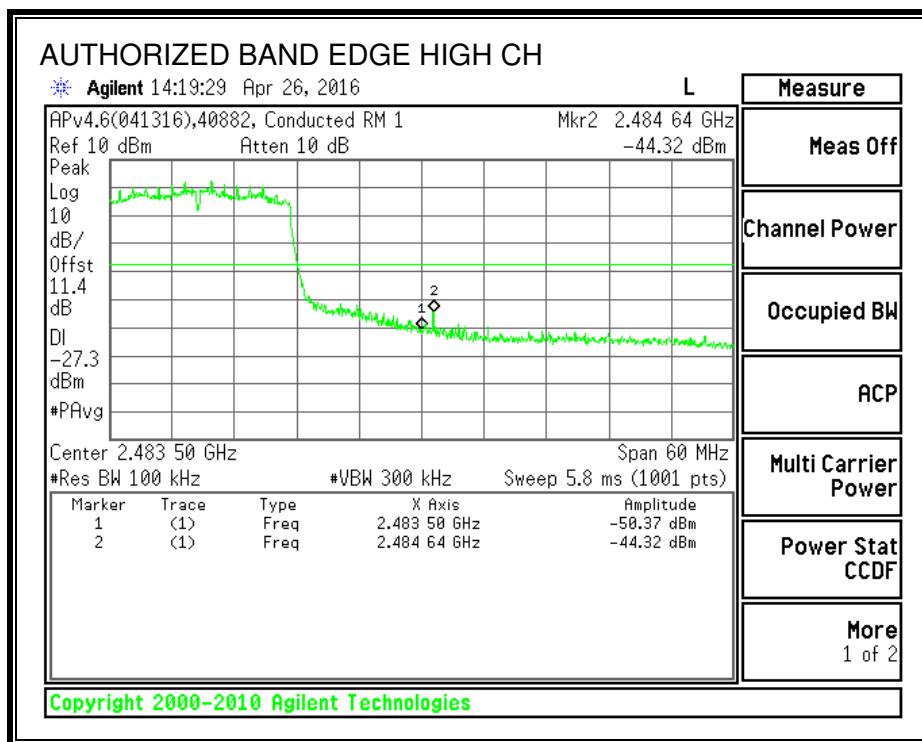
IN-BAND REFERENCE LEVEL



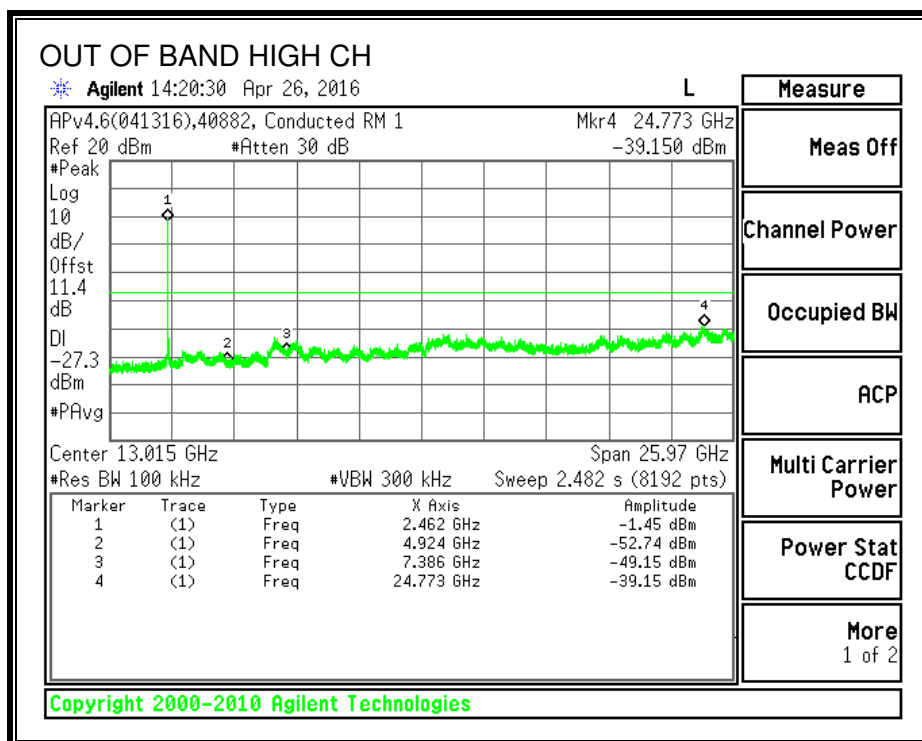
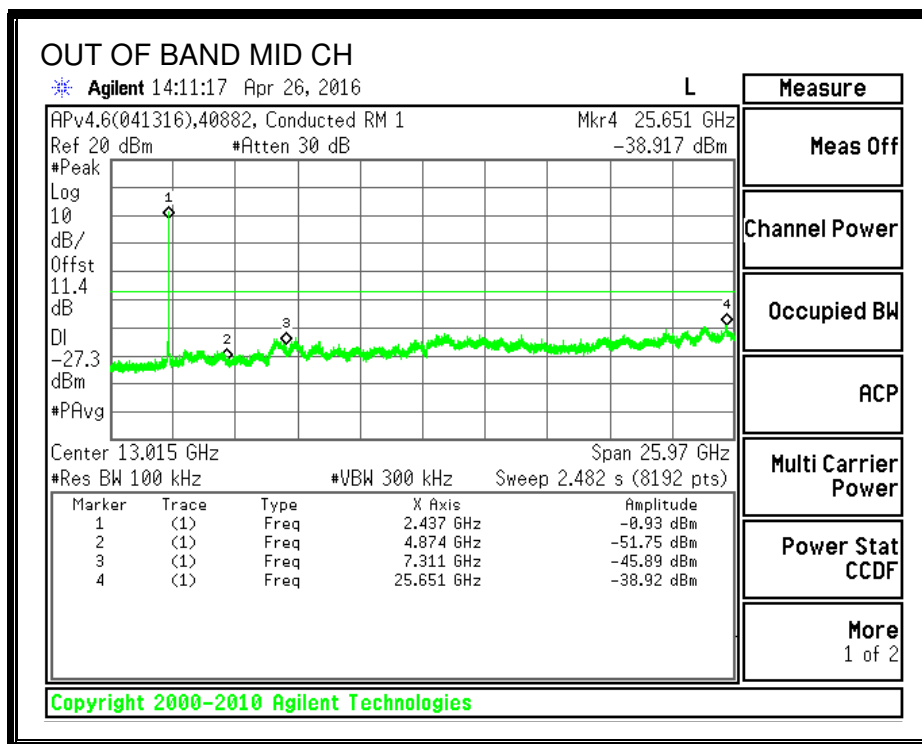
LOW CHANNEL BANDEDGE



HIGH CHANNEL BANDEDGE



OUT-OF-BAND EMISSIONS



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.

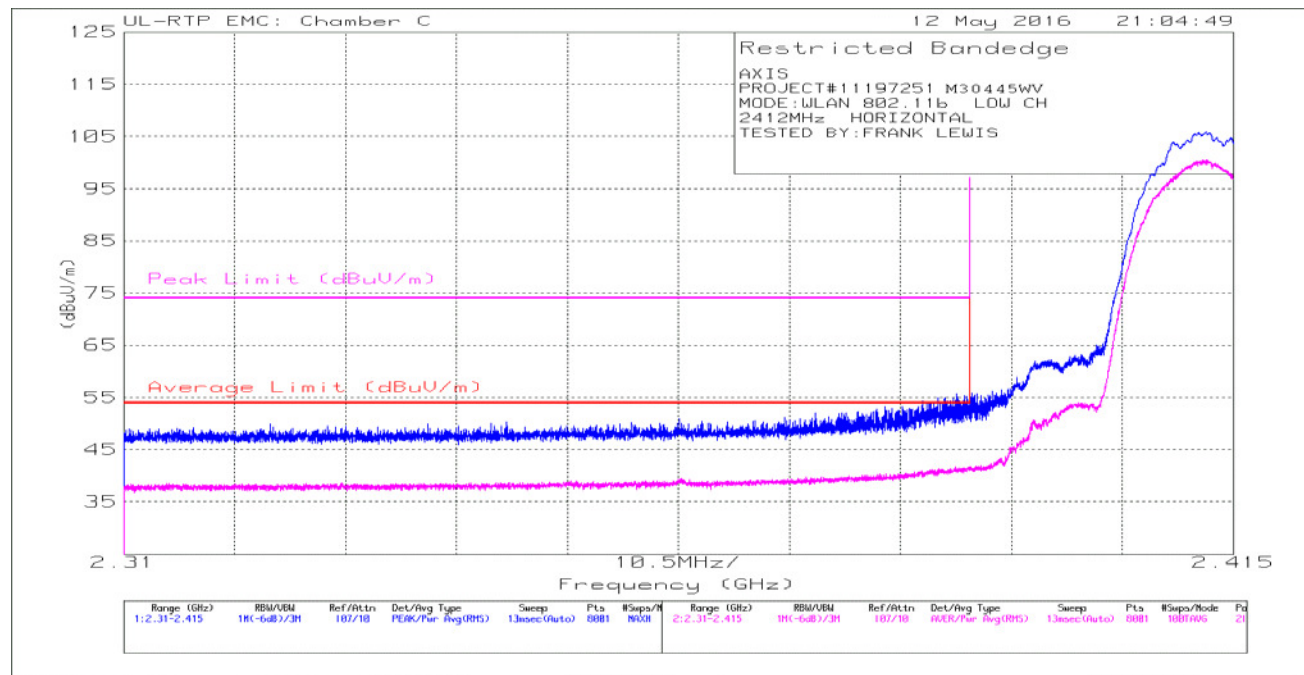
For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. For this evaluation, RMS Power 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.

9.2. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

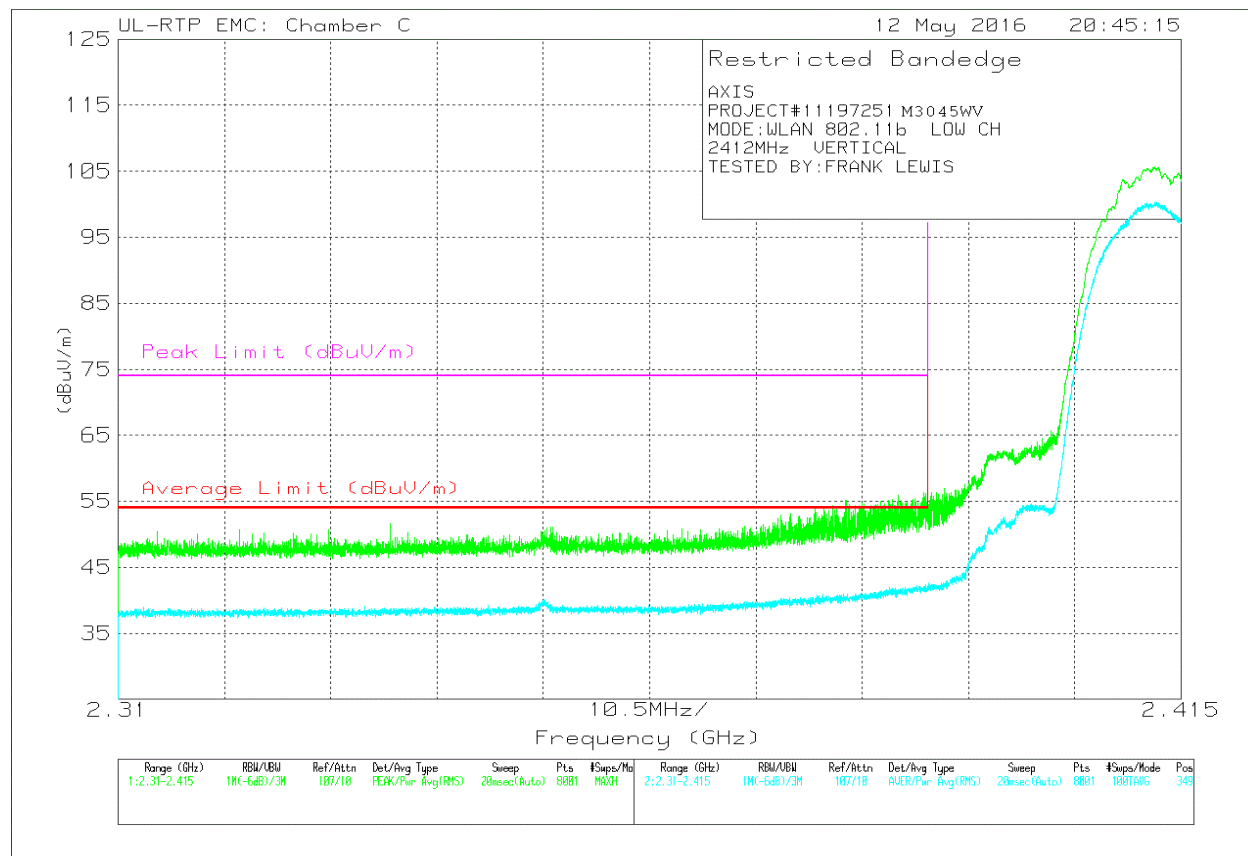


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	45.66	Pk	32	-26.8	0	50.86	-	-	74	-23.14	213	198	H
2	* 2.389	50.55	Pk	32	-26.8	0	55.75	-	-	74	-18.25	213	198	H
3	* 2.39	35.88	RMS	32	-26.8	.14	41.22	54	-12.78	-	-	213	198	H
4	* 2.389	36.45	RMS	32	-26.8	.14	41.79	54	-12.21	-	-	213	198	H

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

Pk - Peak detector

RMS - RMS detection



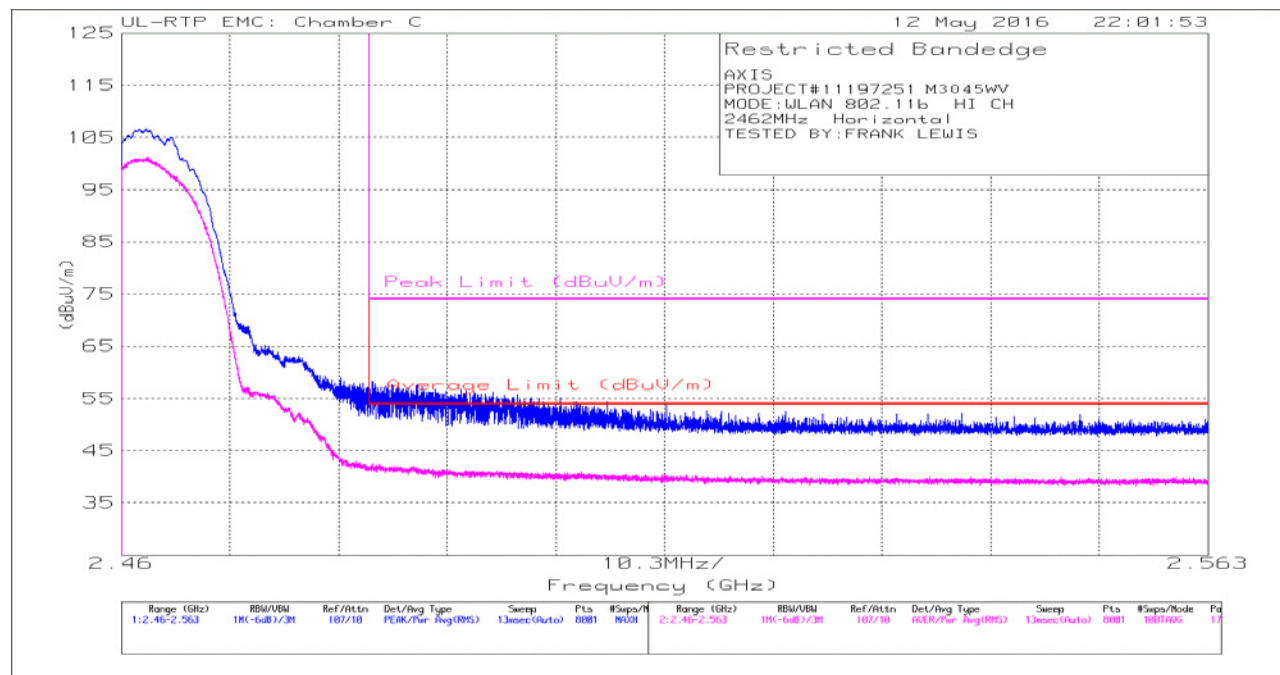
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Filtr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	46.44	Pk	32	-26.8	0	51.64	-	-	74	-22.36	349	121	V
2	* 2.39	51.17	Pk	32	-26.8	0	56.37	-	-	74	-17.63	349	121	V
3	* 2.39	36.46	RMS	32	-26.8	.14	41.8	54	-12.2	-	-	349	121	V
4	* 2.39	37.06	RMS	32	-26.8	.14	42.4	54	-11.6	-	-	349	121	V

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

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

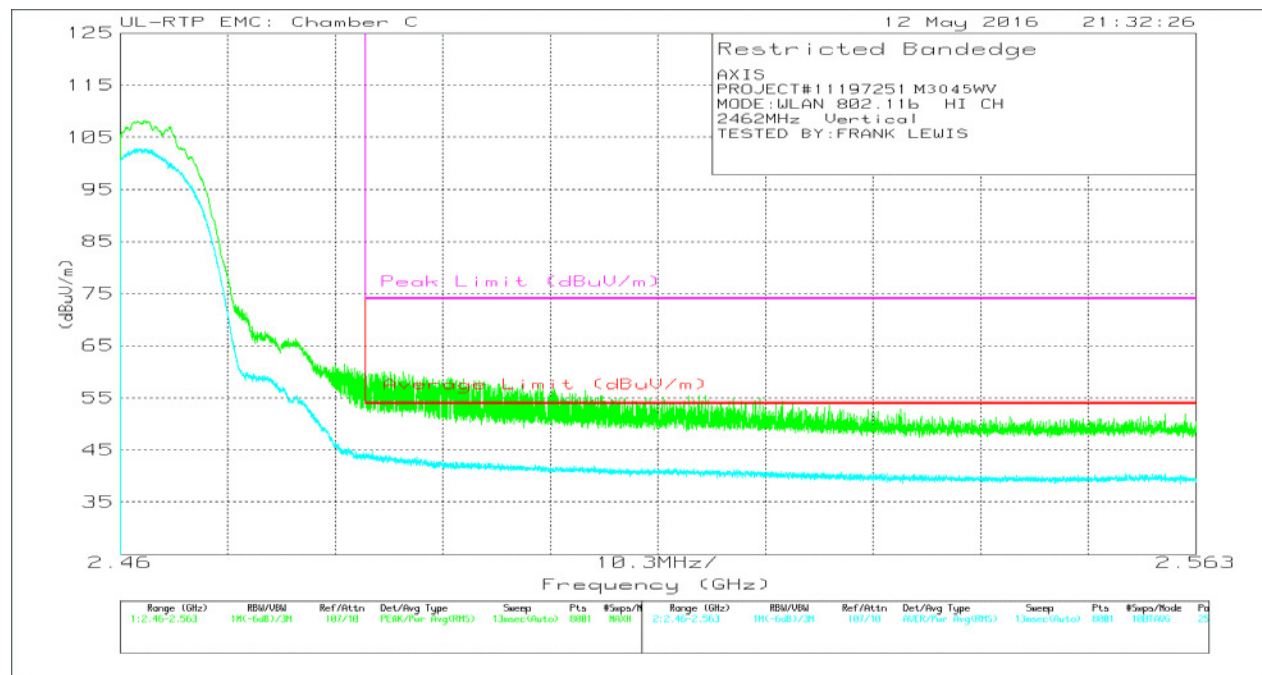


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Filtr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	50.26	Pk	32.6	-26.6	0	56.26	-	-	74	-17.74	177	130	H
2	* 2.484	52.35	Pk	32.6	-26.6	0	58.35	-	-	74	-15.65	177	130	H
3	* 2.484	35.75	RMS	32.6	-26.6	.14	41.89	54	-12.11	-	-	177	130	H
4	* 2.484	36.24	RMS	32.6	-26.6	.14	42.38	54	-11.62	-	-	177	130	H

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

Pk - Peak detector

RMS - RMS detection



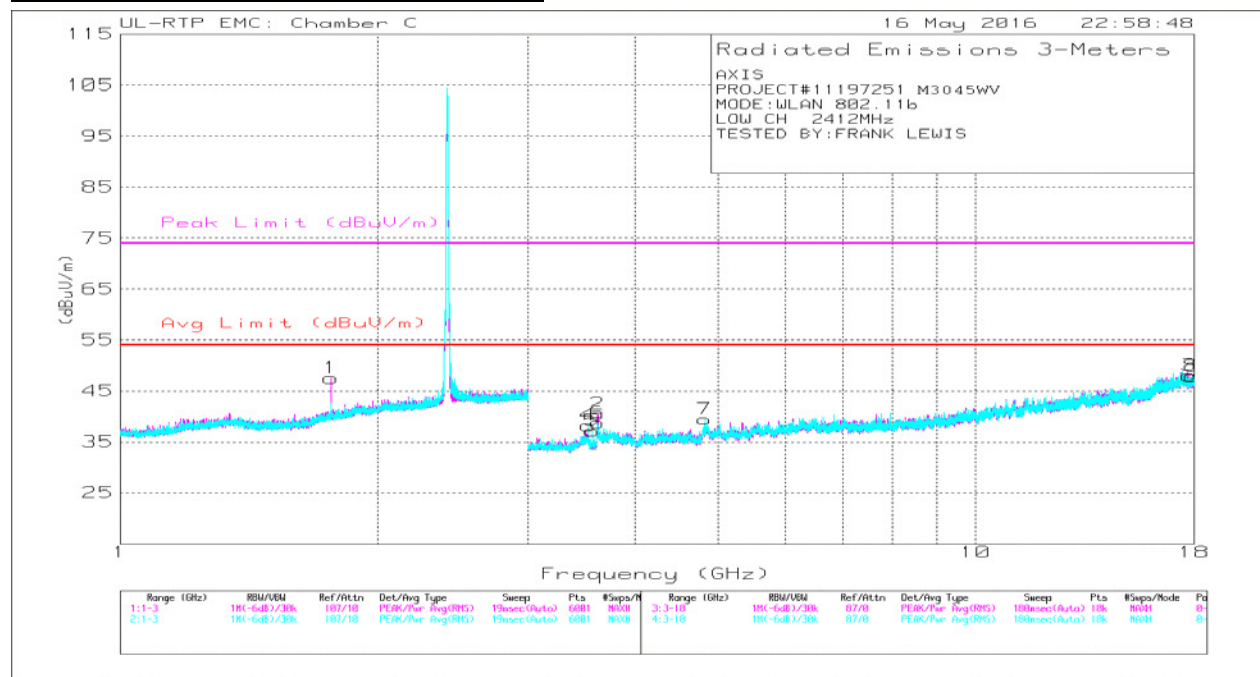
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	48.15	Pk	32.6	-26.6	0	54.15	-	-	74	-19.85	25	158	V
2	* 2.484	48.15	Pk	32.6	-26.6	0	54.15	-	-	74	-19.85	25	158	V
3	* 2.486	54.04	Pk	32.6	-26.6	0	60.04	-	-	74	-13.96	25	158	V
4	* 2.484	37.59	RMS	32.6	-26.6	.14	43.73	54	-10.27	-	-	25	158	V
5	* 2.484	38.62	RMS	32.6	-26.6	.14	44.76	54	-9.24	-	-	25	158	V

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

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS



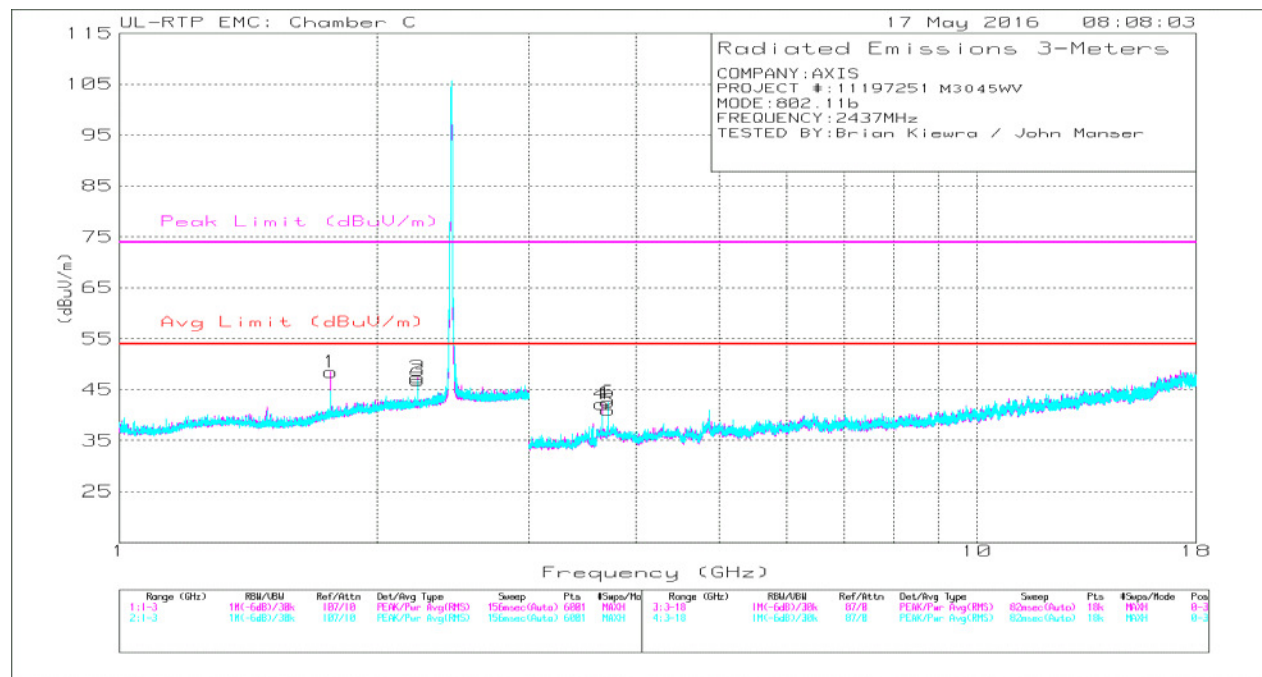
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/ Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 3.618	47.97	PK2	33.3	-34.3	0	46.97	-	-	74	-27.03	26	362	H
	* 3.618	41.36	MAV1	33.3	-34.3	.14	40.5	54	-13.5	-	-	26	362	H
3	* 17.763	33.77	PK2	41.4	-20.5	0	54.67	-	-	74	-19.33	226	109	H
	* 17.763	21.69	MAV1	41.4	-20.5	.14	42.73	54	-11.27	-	-	226	109	H
4	* 3.528	46.61	PK2	33.7	-34.7	0	45.61	-	-	74	-28.39	23	186	V
	* 3.528	35	MAV1	33.7	-34.7	.14	34.14	54	-19.86	-	-	23	186	V
5	* 3.564	47.61	PK2	33.2	-34.7	0	46.11	-	-	74	-27.89	31	349	V
	* 3.564	36.34	MAV1	33.2	-34.7	.14	34.98	54	-19.02	-	-	31	349	V
6	* 3.618	46.33	PK2	33.3	-34.3	0	45.33	-	-	74	-28.67	40	351	V
	* 3.618	38.14	MAV1	33.3	-34.3	.14	37.28	54	-16.72	-	-	40	351	V
7	* 4.824	44.54	PK2	34.2	-32.9	0	45.84	-	-	74	-28.16	274	272	V
	* 4.824	35.15	MAV1	34.2	-32.9	.14	36.59	54	-17.41	-	-	274	272	V
8	* 17.914	32.96	PK2	41.2	-19.9	0	54.26	-	-	74	-19.74	337	361	V
	* 17.915	21.58	MAV1	41.2	-19.9	.14	43.02	54	-10.98	-	-	337	361	V
1	1.764	45.91	Pk	29.9	-28.3	0	47.51	-	-	74	-26.49	0-360	100	H

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

Pk - Peak detector

PK2 - Maximum Peak

MAV1 - Maximum RMS Average



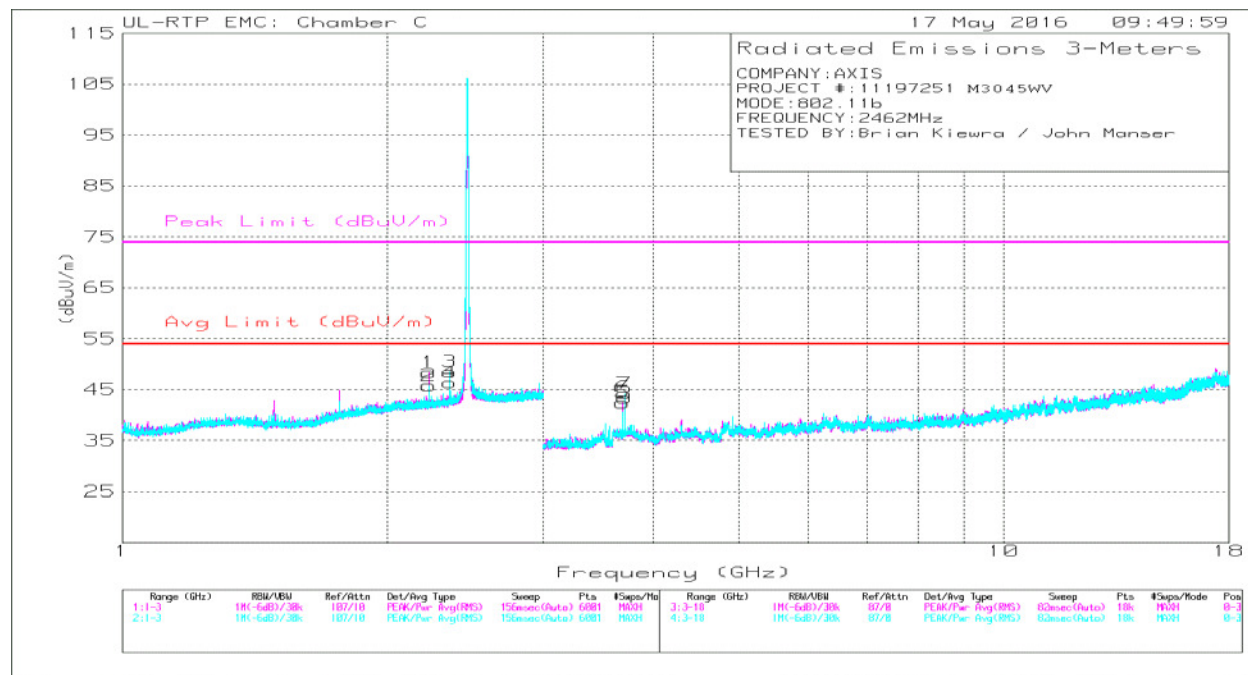
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/ Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.228	49.38	PK2	31.8	-27.3	0	53.88	-	-	74	-20.12	297	352	H
	* 2.227	39.79	MAv1	31.8	-27.3	.14	44.43	54	-9.57	-	-	297	352	H
3	* 2.227	48.74	PK2	31.8	-27.3	0	53.24	-	-	74	-20.76	160	107	V
	* 2.227	38.29	MAv1	31.8	-27.3	.14	42.93	54	-11.07	-	-	160	107	V
4	* 3.654	43.45	PK2	33.3	-34.5	0	42.25	-	-	74	-31.75	160	200	H
	* 3.655	33.21	MAv1	33.3	-34.6	.14	32.05	54	-21.95	-	-	160	200	H
5	* 3.712	51.53	PK2	33.4	-34.7	0	50.23	-	-	74	-23.77	231	379	H
	* 3.712	41.89	MAv1	33.4	-34.7	.14	40.73	54	-13.27	-	-	231	379	H
6	* 3.711	49.36	PK2	33.4	-34.7	0	48.06	-	-	74	-25.94	134	131	V
	* 3.712	39.14	MAv1	33.4	-34.7	.14	37.98	54	-16.02	-	-	134	131	V
1	1.764	46.97	Pk	29.8	-28.3	0	48.47	-	-	74	-25.53	0-360	101	H

* - 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 (dB/m)	Amp/Cbl/Fitr/Pad	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	* 2.228	49.4	PK2	31.8	-27.3	0	53.9	-	-	74	-20.1	298	121	H
	* 2.227	40.19	MAv1	31.8	-27.3	.14	44.83	54	-9.17	-	-	298	121	H
4	* 2.352	47.19	PK2	32	-26.9	0	52.29	-	-	74	-21.71	173	148	H
	* 2.352	36.74	MAv1	32	-26.9	.14	41.98	54	-12.02	-	-	173	148	H
2	* 2.227	50.66	PK2	31.8	-27.3	0	55.16	-	-	74	-18.84	210	266	V
	* 2.227	41.43	MAv1	31.8	-27.3	.14	46.07	54	-7.93	-	-	210	266	V
3	* 2.352	48.4	PK2	32	-26.9	0	53.5	-	-	74	-20.5	196	315	V
	* 2.352	38.37	MAv1	32	-26.9	.14	43.61	54	-10.39	-	-	196	315	V
5	* 3.693	48.41	PK2	33.4	-34.8	0	47.01	-	-	74	-26.99	21	317	H
	* 3.693	42.44	MAv1	33.4	-34.8	.14	41.18	54	-12.82	-	-	21	317	H
6	* 3.711	51.54	PK2	33.4	-34.7	0	50.24	-	-	74	-23.76	237	245	H
	* 3.712	42.31	MAv1	33.4	-34.7	.14	41.15	54	-12.85	-	-	237	245	H
7	* 3.712	51.3	PK2	33.4	-34.7	0	50	-	-	74	-24	202	202	V
	* 3.712	41.73	MAv1	33.4	-34.7	.14	40.57	54	-13.43	-	-	202	202	V

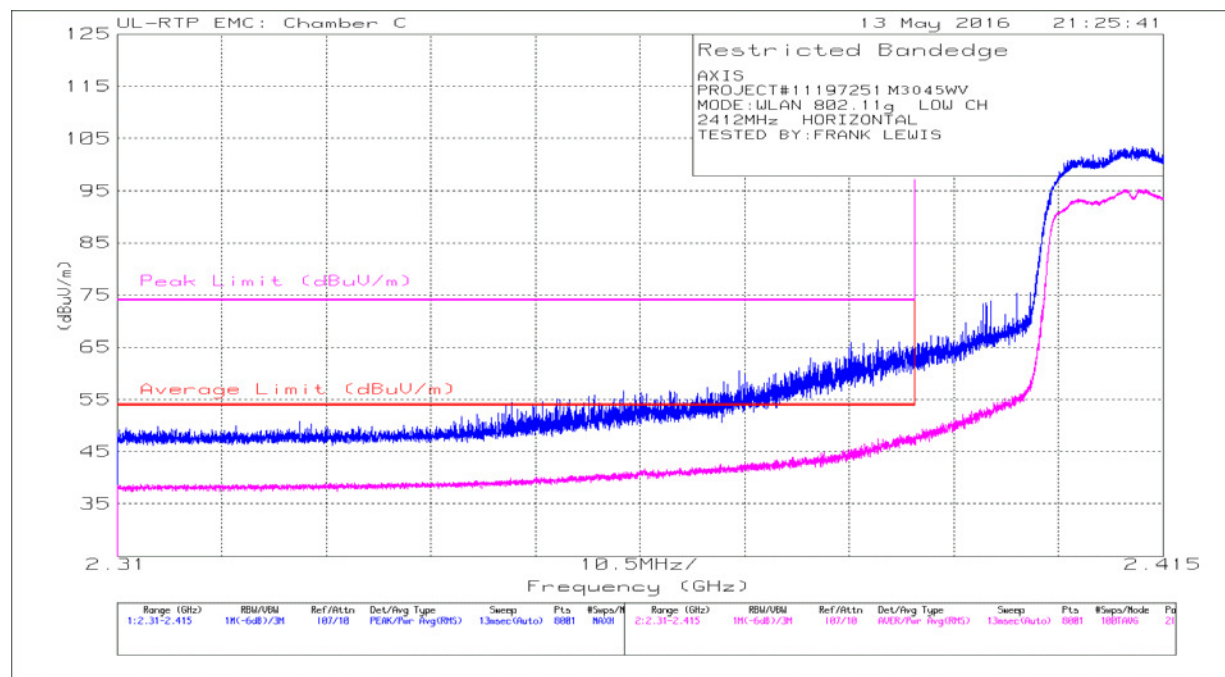
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

9.3. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

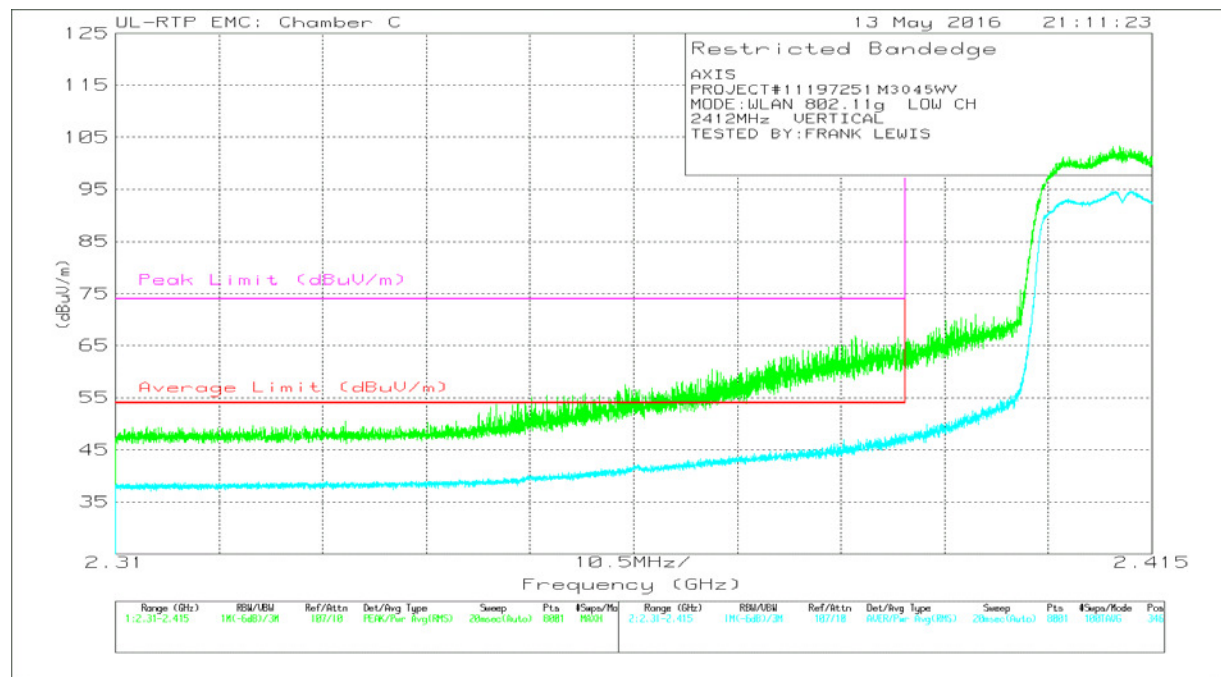


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Filtr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	56.32	Pk	32	-26.8	0	61.52	-	-	74	-12.48	215	198	H
2	* 2.386	61.16	Pk	32	-26.8	0	66.36	-	-	74	-7.64	215	198	H
3	* 2.39	41.92	RMS	32	-26.8	.15	47.27	54	-6.73	-	-	215	198	H
4	* 2.389	42.93	RMS	32	-26.8	.15	48.28	54	-5.72	-	-	215	198	H

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

Pk - Peak detector

RMS - RMS detection



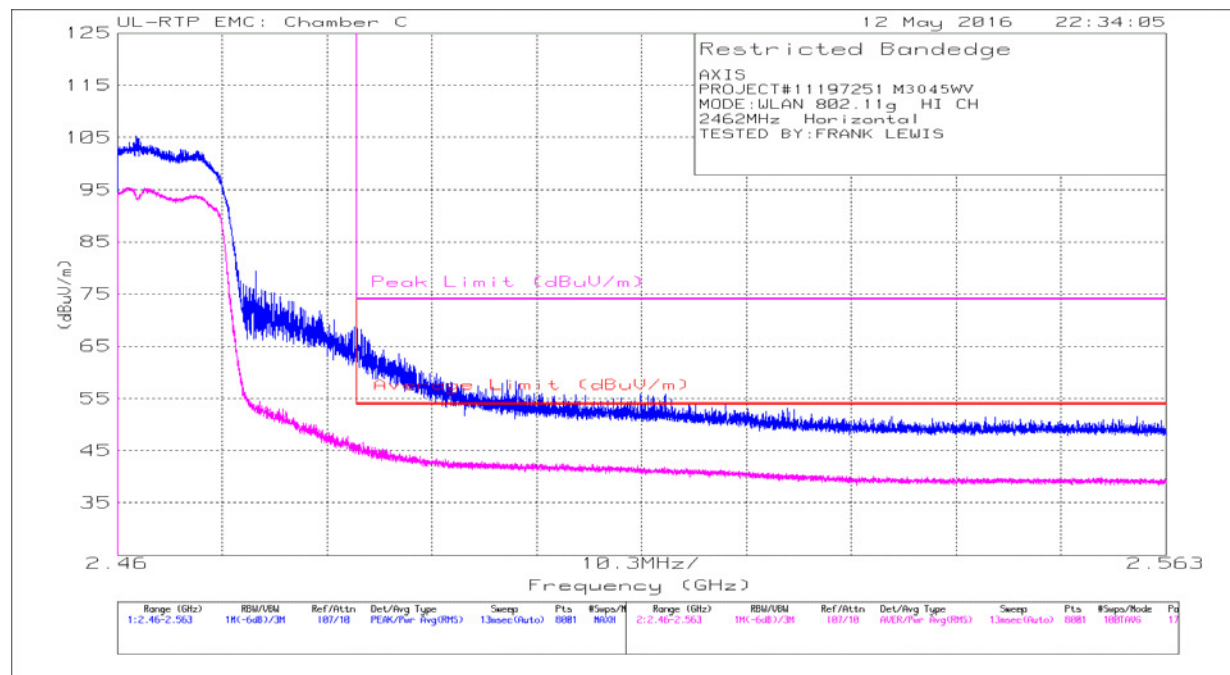
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Filtr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	56.28	Pk	32	-26.8	0	61.48	-	-	74	-12.52	346	119	V
2	* 2.385	61.61	Pk	32	-26.8	0	66.81	-	-	74	-7.19	346	119	V
3	* 2.39	42.53	RMS	32	-26.8	.15	47.88	54	-6.12	-	-	346	119	V
4	* 2.39	42.95	RMS	32	-26.8	.15	48.3	54	-5.7	-	-	346	119	V

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

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

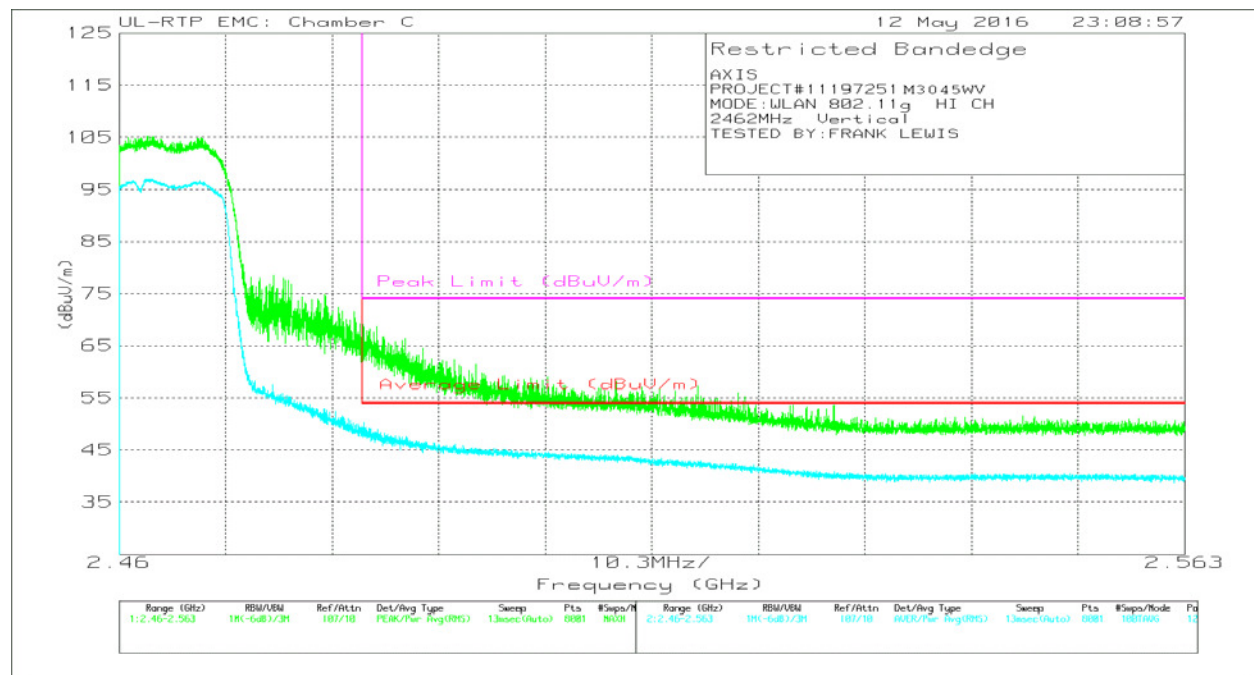


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Filtr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	56.11	Pk	32.6	-26.6	0	62.11	-	-	74	-11.89	177	140	H
2	* 2.484	62.42	Pk	32.6	-26.6	0	68.42	-	-	74	-5.58	177	140	H
3	* 2.484	39.82	RMS	32.6	-26.6	.15	45.97	54	-8.03	-	-	177	140	H
4	* 2.484	40.55	RMS	32.6	-26.6	.15	46.70	54	-7.30	-	-	177	140	H

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

Pk - Peak detector

RMS - RMS detection



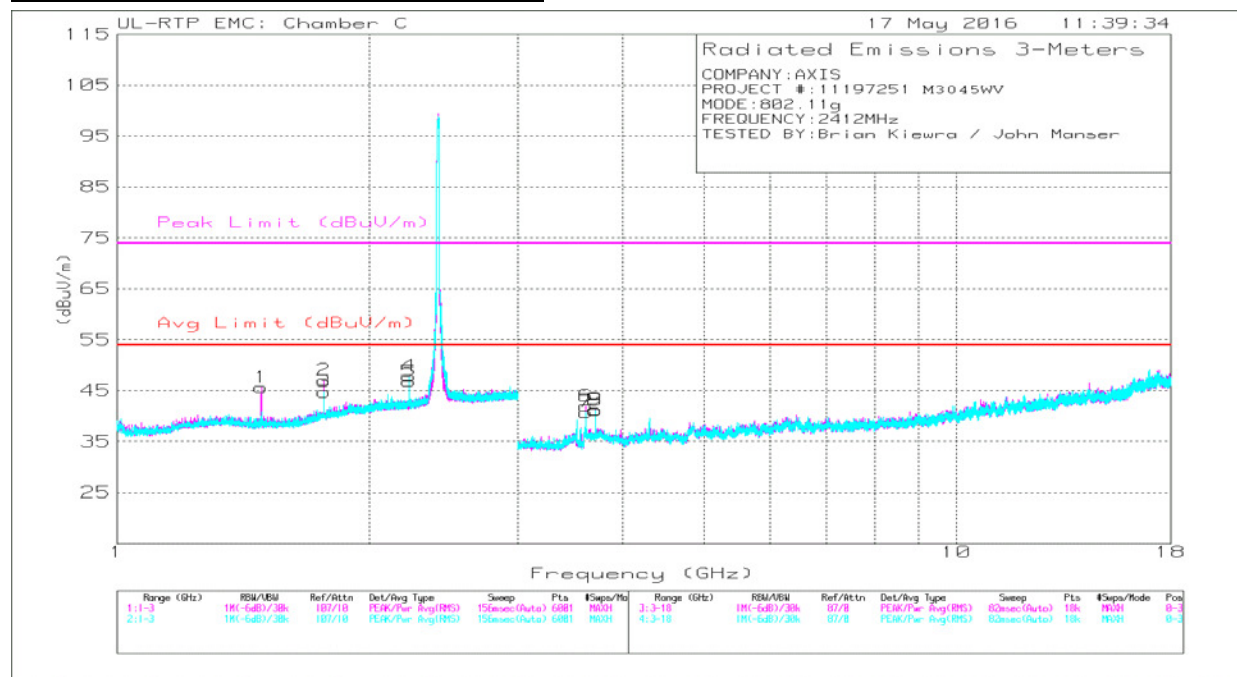
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Ftr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	56.59	Pk	32.6	-26.6	0	62.59	-	-	74	-11.41	12	138	V
2	* 2.484	63.09	Pk	32.6	-26.6	0	69.09	-	-	74	-4.91	12	138	V
3	* 2.484	42	RMS	32.6	-26.6	.15	48.15	54	-5.85	-	-	12	138	V
4	* 2.484	44.12	RMS	32.6	-26.6	.15	50.27	54	-3.73	-	-	12	138	V

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

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS



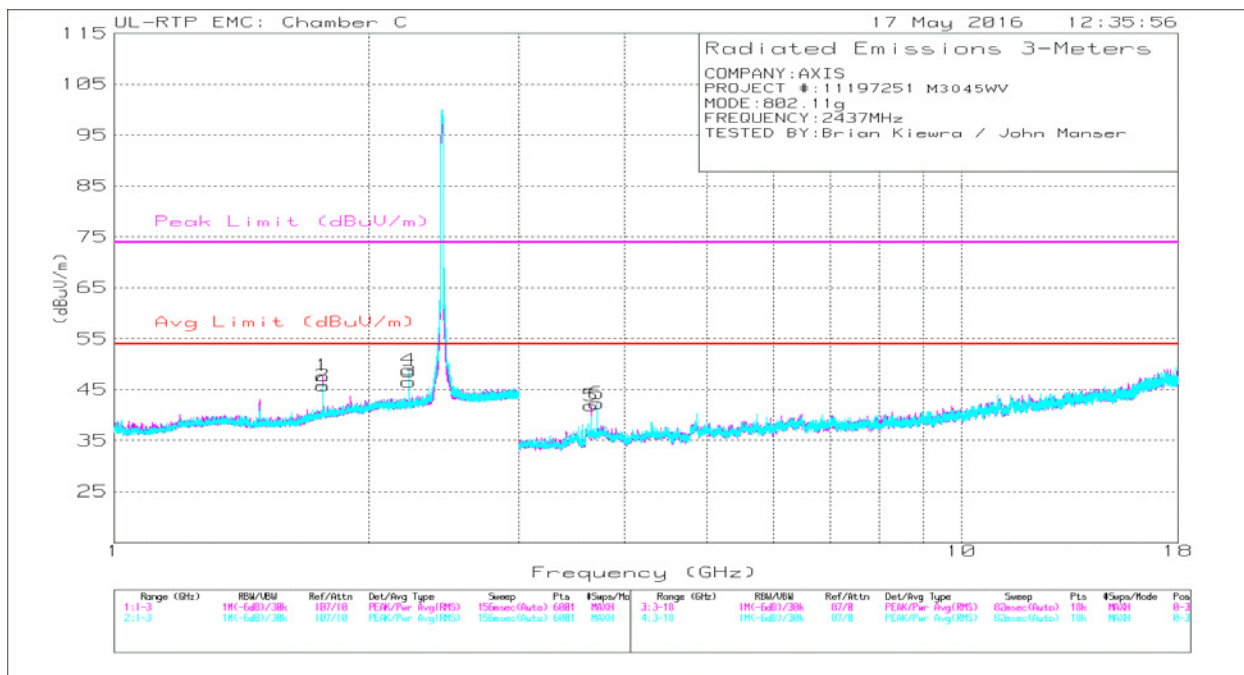
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.485	51.24	PK2	28.1	-28.9	0	50.44	-	-	74	-23.56	176	112	H
	* 1.485	42.44	MAV1	28.1	-28.9	.15	41.79	54	-12.21	-	-	176	112	H
5	* 2.227	50.07	PK2	31.8	-27.3	0	54.57	-	-	74	-19.43	212	136	H
	* 2.227	40.34	MAV1	31.8	-27.3	.15	44.99	54	-9.01	-	-	212	136	H
4	* 2.227	50.05	PK2	31.8	-27.3	0	54.55	-	-	74	-19.45	199	207	V
	* 2.227	40.86	MAV1	31.8	-27.3	.15	45.51	54	-8.49	-	-	199	207	V
6	* 3.618	46.79	PK2	33.3	-34.3	0	45.79	-	-	74	-28.21	13	332	H
	* 3.618	40.67	MAV1	33.3	-34.3	.15	39.82	54	-14.18	-	-	13	332	H
9	* 3.714	49.37	PK2	33.4	-34.7	0	48.07	-	-	74	-25.93	238	310	H
	* 3.712	39.82	MAV1	33.4	-34.7	.15	38.67	54	-15.33	-	-	238	310	H
7	* 3.618	47.49	PK2	33.3	-34.3	0	46.49	-	-	74	-27.51	46	340	V
	* 3.618	41.04	MAV1	33.3	-34.3	.15	40.19	54	-13.81	-	-	46	340	V
8	* 3.712	49.35	PK2	33.4	-34.7	0	48.05	-	-	74	-25.95	138	164	V
	* 3.712	39.88	MAV1	33.4	-34.7	.15	38.73	54	-15.27	-	-	138	164	V
2	1.764	45.6	Pk	29.8	-28.3	0	47.1	-	-	74	-26.9	0-360	200	H
3	1.764	43.28	Pk	29.8	-28.3	0	44.78	-	-	74	-29.22	0-360	101	V

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

Pk - Peak detector

PK2 - Maximum Peak

MAV1 - Maximum RMS Average



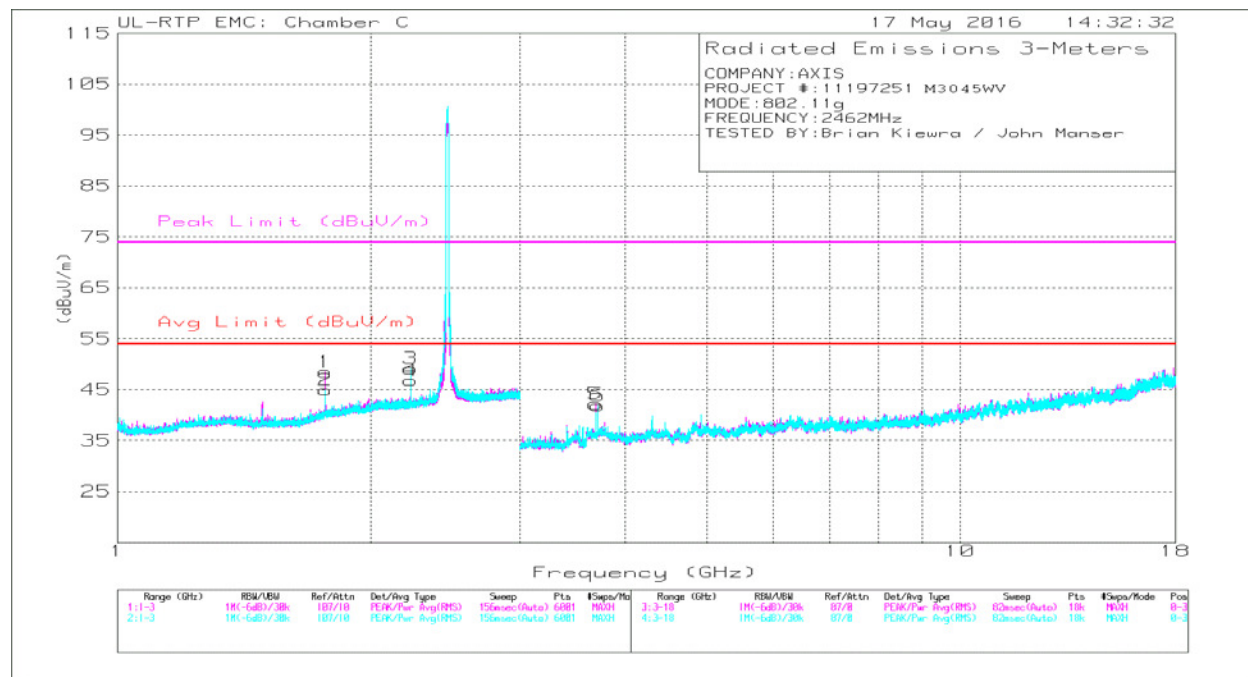
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 2.227	49.62	PK2	31.8	-27.3	0	54.12	-	-	74	-19.88	214	175	H
	* 2.227	40	MAv1	31.8	-27.3	.15	44.65	54	-9.35	-	-	214	175	H
4	* 2.227	50.03	PK2	31.8	-27.3	0	54.53	-	-	74	-19.47	212	257	V
	* 2.227	40.86	MAv1	31.8	-27.3	.15	45.51	54	-8.49	-	-	212	257	V
5	* 3.655	47.08	PK2	33.3	-34.6	0	45.78	-	-	74	-28.22	10	273	H
	* 3.655	41.11	MAv1	33.3	-34.6	.15	39.96	54	-14.04	-	-	10	273	H
6	* 3.712	51.13	PK2	33.4	-34.7	0	49.83	-	-	74	-24.17	233	297	H
	* 3.712	41.72	MAv1	33.4	-34.7	.15	40.57	54	-13.43	-	-	233	297	H
1	1.764	46.27	Pk	29.8	-28.3	0	47.77	-	-	74	-26.23	0-360	101	H
2	1.764	44.29	Pk	29.8	-28.3	0	45.79	-	-	74	-28.21	0-360	200	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 (dB/m)	Amp/Cbl/Filtr/Pad	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
4	* 2.227	49.05	PK2	31.8	-27.3	0	53.55	-	-	74	-20.45	300	134	H
	* 2.227	39.31	MAv1	31.8	-27.3	.15	43.96	54	-10.04	-	-	300	134	H
3	* 2.227	50.82	PK2	31.8	-27.3	0	55.32	-	-	74	-18.68	214	203	V
	* 2.227	41.75	MAv1	31.8	-27.3	.15	46.4	54	-7.6	-	-	214	203	V
5	* 3.693	48.87	PK2	33.4	-34.8	0	47.47	-	-	74	-26.53	7	344	H
	* 3.693	43.44	MAv1	33.4	-34.8	.15	42.19	54	-11.81	-	-	7	344	H
6	* 3.714	49.37	PK2	33.4	-34.7	0	48.07	-	-	74	-25.93	238	310	H
	* 3.712	39.82	MAv1	33.4	-34.7	.15	38.67	54	-15.33	-	-	238	310	H
1	1.764	46.87	Pk	29.9	-28.3	0	48.47	-	-	74	-25.53	0-360	101	H
2	1.764	43.44	Pk	29.8	-28.3	0	44.94	-	-	74	-29.06	0-360	101	V

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

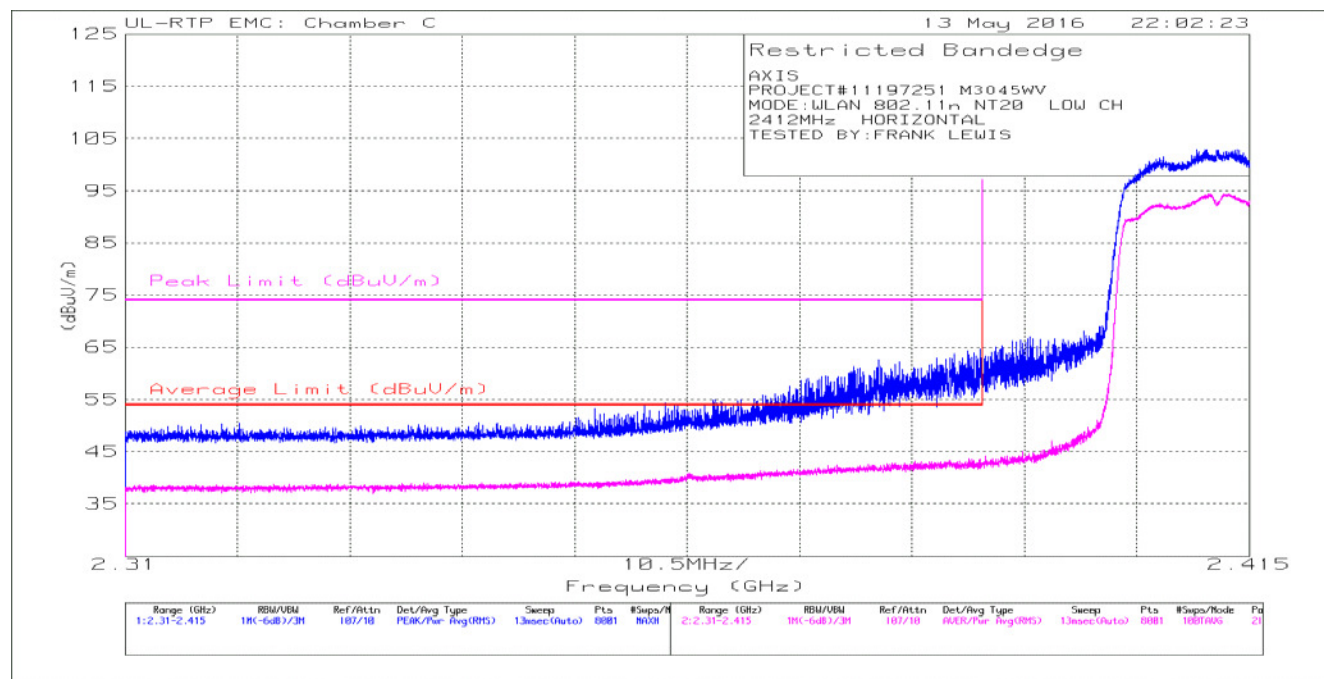
Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

9.4. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

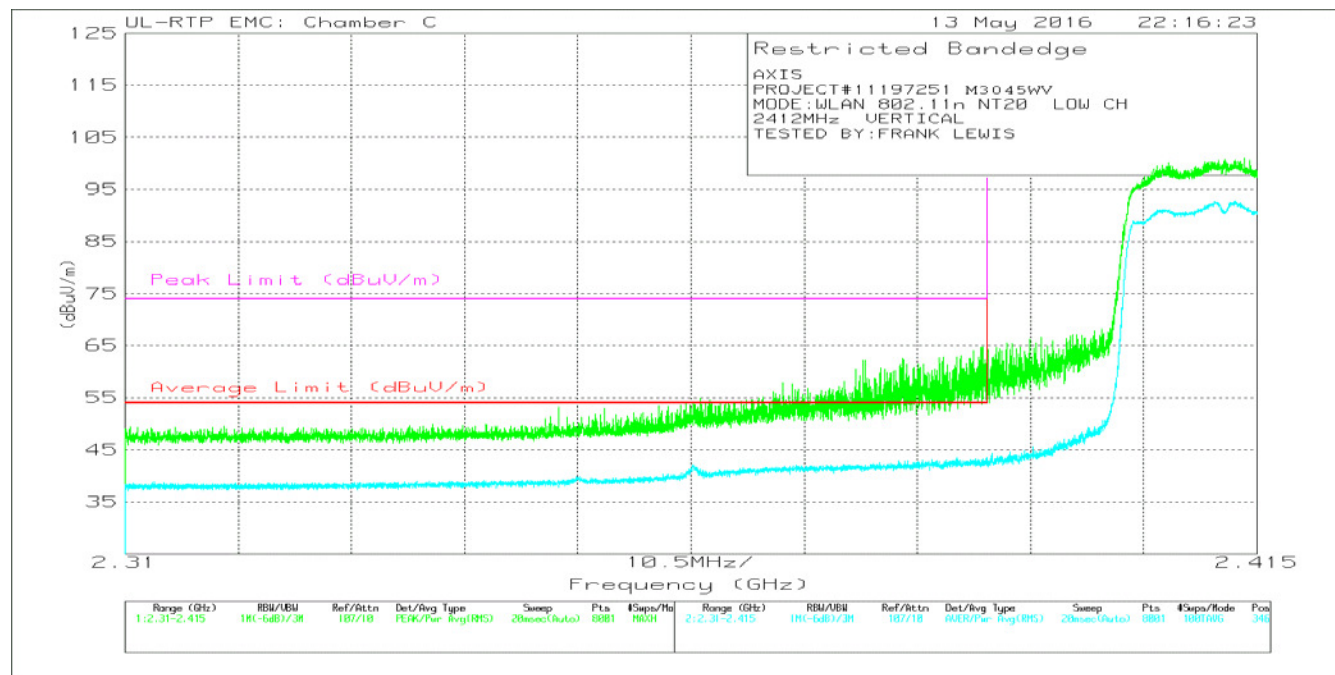


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/ Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	54.7	Pk	32	-26.8	0	59.9	-	-	74	-14.1	218	180	H
2	* 2.39	59.53	Pk	32	-26.8	0	64.73	-	-	74	-9.27	218	180	H
3	* 2.39	37.29	RMS	32	-26.8	.17	42.66	54	-11.34	-	-	218	180	H
4	* 2.389	38.35	RMS	32	-26.8	.17	43.72	54	-10.28	-	-	218	180	H

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

Pk - Peak detector

RMS - RMS detection



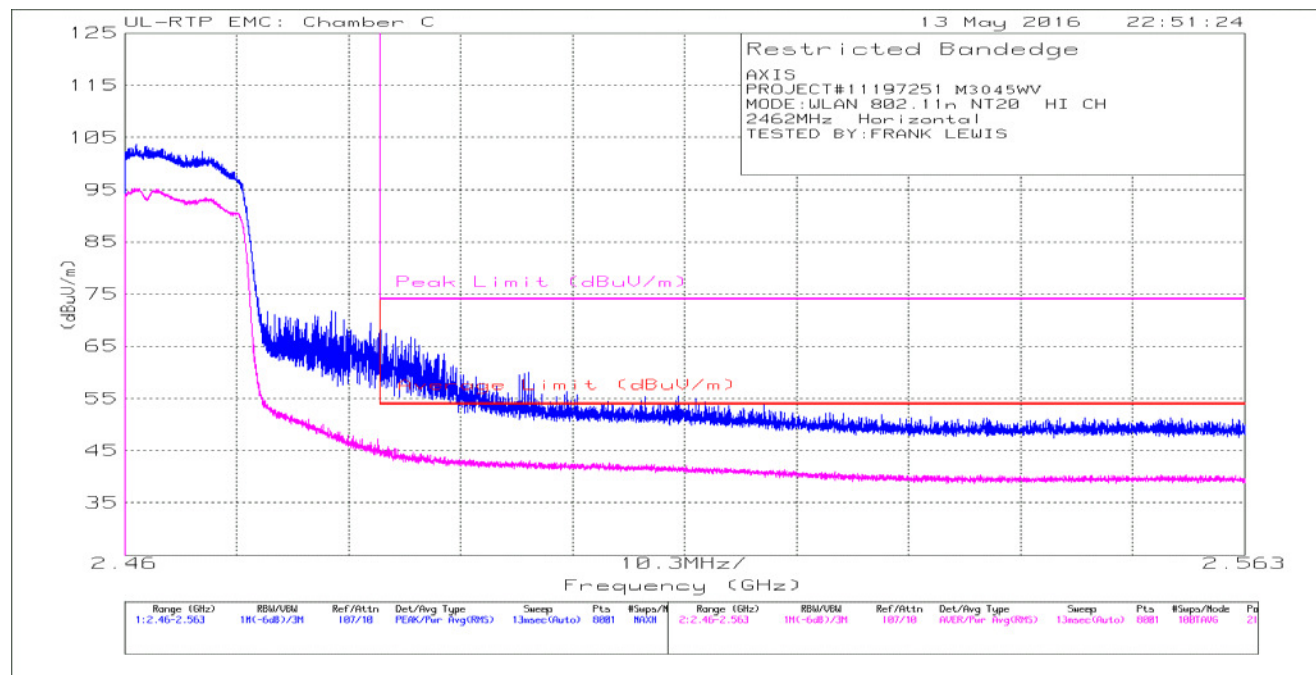
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/ Fitr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	49.48	Pk	32	-26.8	0	54.68	-	-	74	-19.32	346	152	V
2	* 2.39	59.54	Pk	32	-26.8	0	64.74	-	-	74	-9.26	346	152	V
3	* 2.39	36.97	RMS	32	-26.8	.17	42.34	54	-11.66	-	-	346	152	V
4	* 2.387	38.23	RMS	32	-26.8	.17	43.60	54	-10.40	-	-	346	152	V

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

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

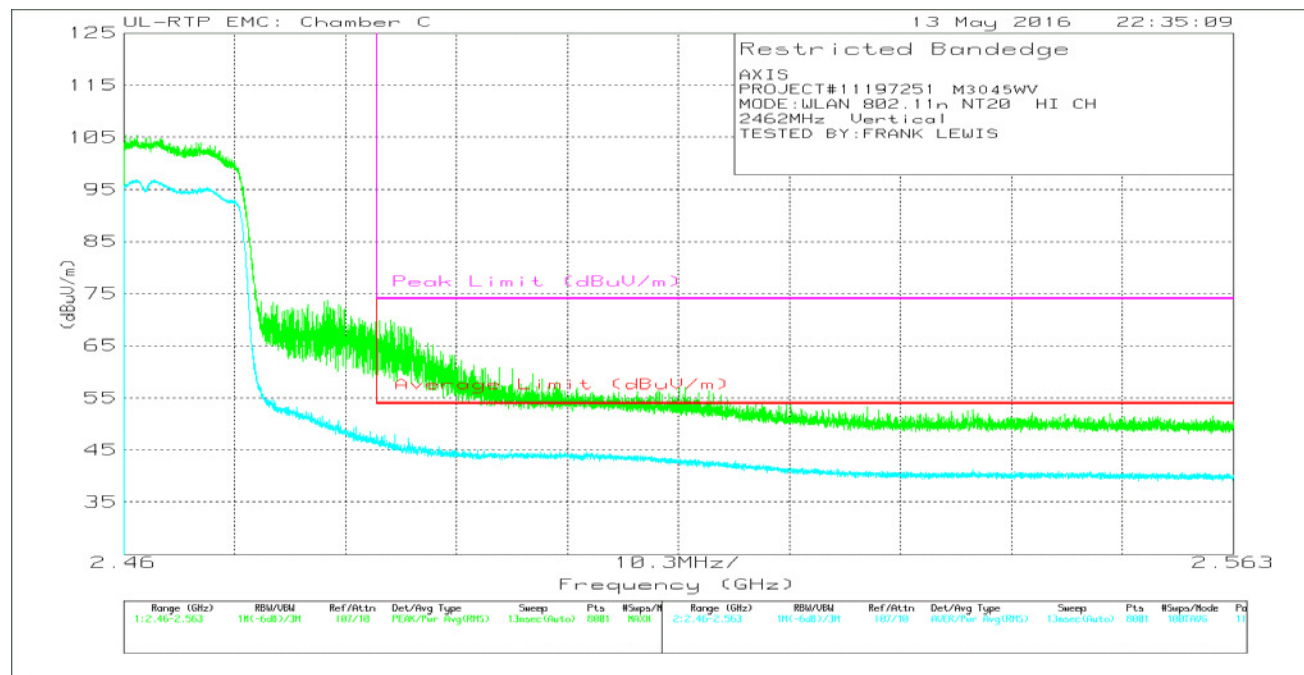


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Filtr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.84	Pk	32.6	-26.6	0	60.84	-	-	74	-13.16	216	166	H
2	* 2.484	62.15	Pk	32.6	-26.6	0	68.15	-	-	74	-5.85	216	166	H
3	* 2.484	37.84	RMS	32.6	-26.6	.17	44.01	54	-9.99	-	-	216	166	H
4	* 2.484	39.58	RMS	32.6	-26.6	.17	45.75	54	-8.25	-	-	216	166	H

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

Pk - Peak detector

RMS - RMS detection



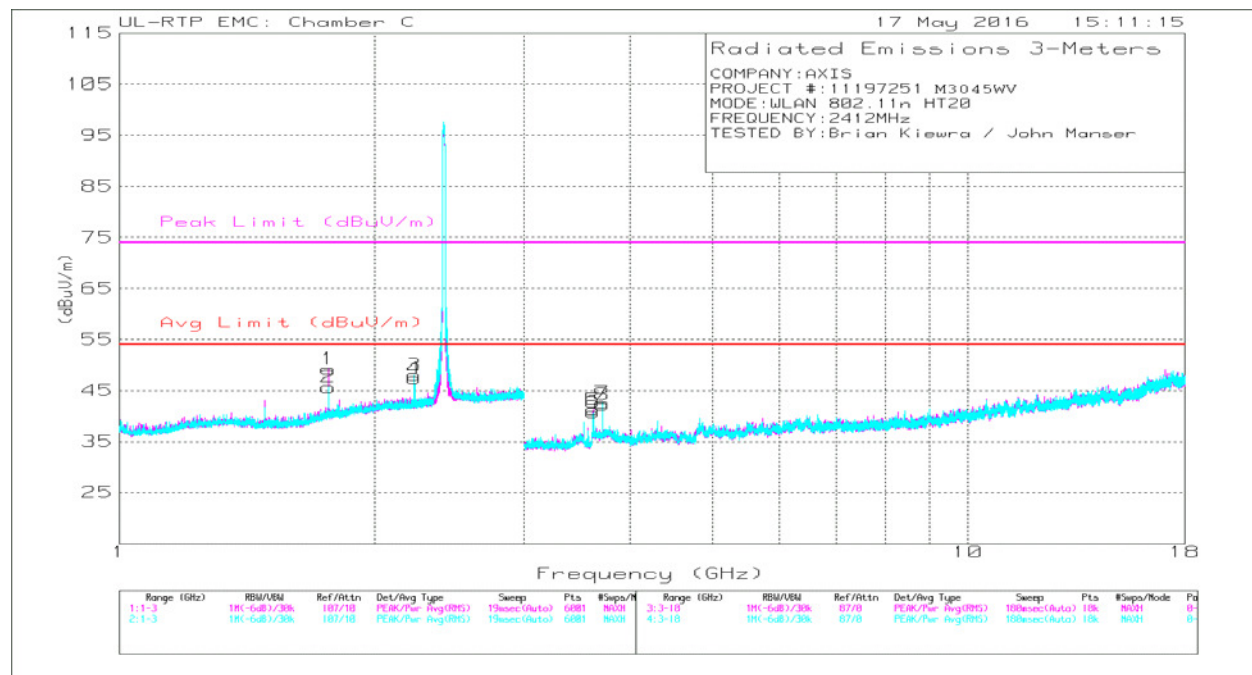
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	61.35	Pk	32.6	-26.6	0	67.35	-	-	74	-6.65	11	102	V
2	* 2.485	63.99	Pk	32.6	-26.6	0	69.99	-	-	74	-4.01	11	102	V
3	* 2.484	40.48	RMS	32.6	-26.6	.17	46.65	54	-7.35	-	-	11	102	V
4	* 2.485	41.79	RMS	32.6	-26.6	.17	47.96	54	-6.04	-	-	11	102	V

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

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS



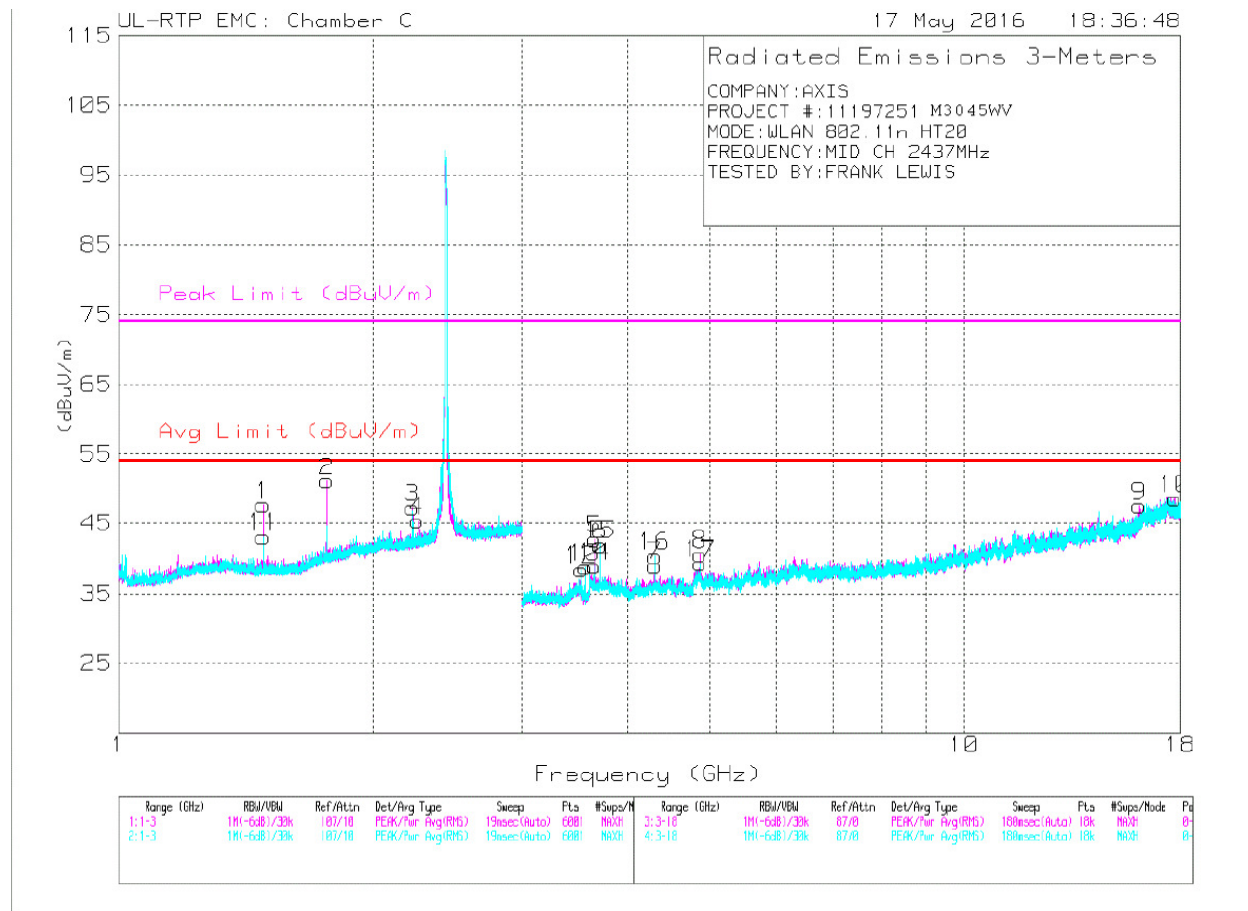
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/ Fitr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.228	49.72	PK2	31.8	-27.3	0	54.22	-	-	74	-19.78	215	178	H
	* 2.227	40.5	MAV1	31.8	-27.3	.17	45.17	54	-8.83	-	-	215	178	H
5	* 3.618	47.56	PK2	33.3	-34.3	0	46.56	-	-	74	-27.44	21	231	H
	* 3.618	41.28	MAV1	33.3	-34.3	.17	40.45	54	-13.55	-	-	21	231	H
8	* 3.712	50.53	PK2	33.4	-34.7	0	49.23	-	-	74	-24.77	238	242	H
	* 3.712	41.03	MAV1	33.4	-34.7	.17	39.9	54	-14.1	-	-	238	242	H
3	* 2.227	50.75	PK2	31.8	-27.3	0	55.25	-	-	74	-18.75	211	213	V
	* 2.227	40.74	MAV1	31.8	-27.3	.17	45.41	54	-8.59	-	-	211	213	V
6	* 3.618	45.77	PK2	33.3	-34.3	0	44.77	-	-	74	-29.23	290	359	V
	* 3.618	37.93	MAV1	33.3	-34.3	.17	37.1	54	-16.9	-	-	290	359	V
7	* 3.712	47.2	PK2	33.4	-34.7	0	45.9	-	-	74	-28.1	0	398	V
	* 3.712	36.68	MAV1	33.4	-34.7	.17	35.55	54	-18.45	-	-	0	398	V
1	1.764	47.66	Pk	29.8	-28.3	0	49.16	-	-	74	-24.84	0-360	101	H
2	1.764	44.14	Pk	29.8	-28.3	0	45.64	-	-	74	-28.36	0-360	200	V

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

Pk - Peak detector

PK2 - Maximum Peak

MAV1 - Maximum RMS Average



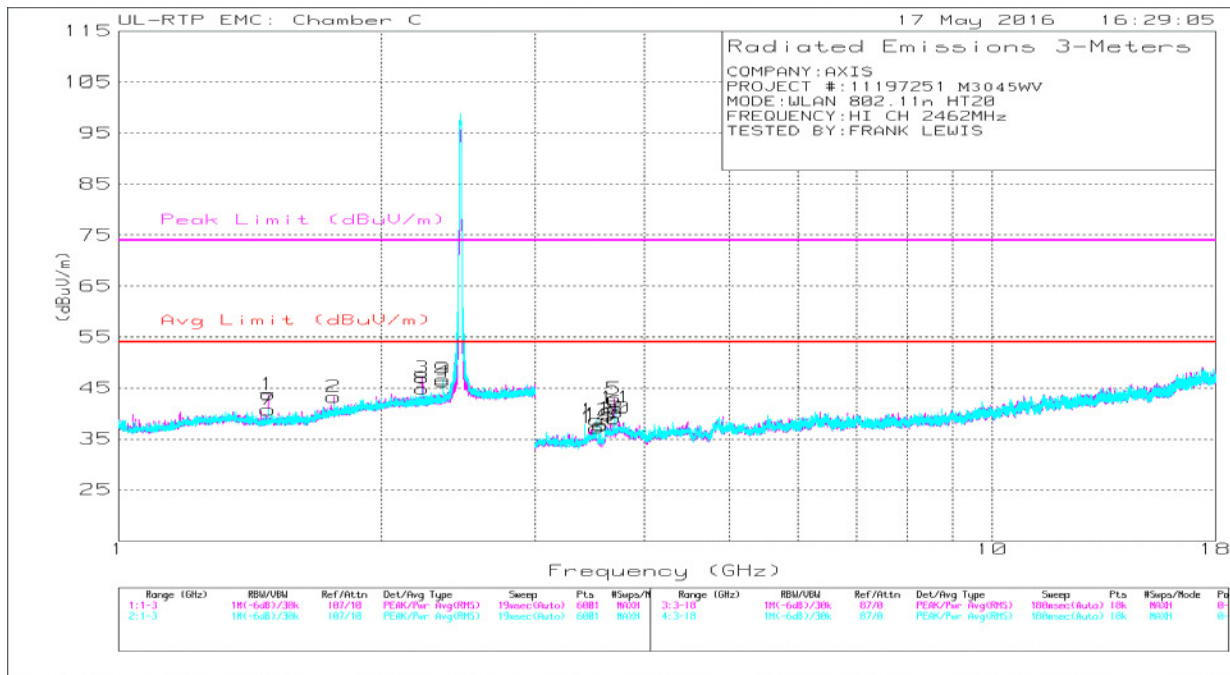
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl/ Fltr/Pad	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.485	54.29	PK2	28.1	-28.9	0	53.49	-	-	74	-20.51	174	150	H
	* 1.485	46	MAv1	28.1	-28.9	.17	45.37	54	-8.63	-	-	174	150	H
3	* 2.228	49.83	PK2	31.8	-27.3	0	54.33	-	-	74	-19.67	297	125	H
	* 2.227	40.58	MAv1	31.8	-27.3	.17	45.25	54	-8.75	-	-	297	125	H
4	* 2.259	45.09	PK2	31.8	-27.2	0	49.69	-	-	74	-24.31	47	249	H
	* 2.257	33.04	MAv1	31.8	-27.2	.17	37.81	54	-16.19	-	-	47	249	H
5	* 3.656	47.82	PK2	33.3	-34.6	0	46.52	-	-	74	-27.48	19	376	H
	* 3.656	41.75	MAv1	33.3	-34.6	.17	40.62	54	-13.38	-	-	19	376	H
6	* 3.712	49.46	PK2	33.4	-34.7	0	48.16	-	-	74	-25.84	257	346	H
	* 3.712	39.52	MAv1	33.4	-34.7	.17	38.39	54	-15.61	-	-	257	346	H
7	* 4.305	47.45	PK2	33.7	-33.5	0	47.65	-	-	74	-26.35	183	124	H
	* 4.306	36.07	MAv1	33.7	-33.5	.17	36.44	54	-17.56	-	-	183	124	H
8	* 4.874	44.62	PK2	34.1	-33.2	0	45.52	-	-	74	-28.48	45	308	H
	* 4.874	37.8	MAv1	34.1	-33.2	.17	38.87	54	-15.13	-	-	45	308	H
9	* 16.09	34.99	PK2	41	-24.2	0	51.79	-	-	74	-22.21	118	392	H
	* 16.092	24	MAv1	41	-24.2	.17	40.97	54	-13.03	-	-	118	392	H
10	* 17.733	32.74	PK2	41.4	-20.8	0	53.34	-	-	74	-20.66	162	107	H
	* 17.736	21.38	MAv1	41.4	-20.7	.17	42.25	54	-11.75	-	-	162	107	H
11	* 1.485	51.56	PK2	28.1	-28.9	0	50.76	-	-	74	-23.24	210	294	V
	* 1.485	42.59	MAv1	28.1	-28.9	.17	41.96	54	-12.04	-	-	210	294	V
12	* 3.528	47.68	PK2	33.7	-34.7	0	46.68	-	-	74	-27.32	28	190	V
	* 3.528	35.4	MAv1	33.7	-34.7	.17	34.57	54	-19.43	-	-	28	190	V
13	* 3.565	48.11	PK2	33.2	-34.7	0	46.61	-	-	74	-27.39	9	386	V
	* 3.564	36.42	MAv1	33.2	-34.7	.17	35.09	54	-18.91	-	-	9	386	V
14	* 3.655	46.16	PK2	33.3	-34.6	0	44.86	-	-	74	-29.14	312	283	V
	* 3.656	37.45	MAv1	33.3	-34.6	.17	36.32	54	-17.68	-	-	312	283	V
15	* 3.713	50.44	PK2	33.4	-34.7	0	49.14	-	-	74	-24.86	136	151	V
	* 3.712	40.73	MAv1	33.4	-34.7	.17	39.6	54	-14.4	-	-	136	151	V
16	* 4.305	46.12	PK2	33.7	-33.5	0	46.32	-	-	74	-27.68	188	202	V
	* 4.306	34.71	MAv1	33.7	-33.5	.17	35.08	54	-18.92	-	-	188	202	V
17	* 4.874	44.02	PK2	34.1	-33.2	0	44.92	-	-	74	-29.08	276	246	V
	* 4.874	35.66	MAv1	34.1	-33.2	.17	36.73	54	-17.27	-	-	276	246	V
2	1.764	49.6	Pk	29.8	-28.3	0	51.1	-	-	74	-22.9	0-360	200	H

* - 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 (dB/m)	Amp/Cbl/ Fitr/Pad	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	* 1.485	50.86	PK2	28.1	-28.9	0	50.06	-	-	74	-23.94	166	261	H
	* 1.485	41.2	MAv1	28.1	-28.9	.17	40.57	54	-13.43	-	-	166	261	H
3	* 2.227	50.03	PK2	31.8	-27.3	0	54.53	-	-	74	-19.47	304	118	H
	* 2.227	40.3	MAv1	31.8	-27.3	.17	44.97	54	-9.03	-	-	304	118	H
4	* 2.352	48.58	PK2	32	-26.9	0	53.68	-	-	74	-20.32	142	188	H
	* 2.352	38.45	MAv1	32	-26.9	.17	43.72	54	-10.28	-	-	142	188	H
5	* 3.693	48.24	PK2	33.4	-34.8	0	46.84	-	-	74	-27.16	4	379	H
	* 3.693	42.69	MAv1	33.4	-34.8	.17	41.46	54	-12.54	-	-	4	379	H
6	* 3.712	48.8	PK2	33.4	-34.7	0	47.5	-	-	74	-26.5	253	380	H
	* 3.712	38.35	MAv1	33.4	-34.7	.17	37.22	54	-16.78	-	-	253	380	H
14	* 3.528	46.37	PK2	33.7	-34.7	0	45.37	-	-	74	-28.63	175	315	H
	* 3.528	33.78	MAv1	33.7	-34.7	.17	32.95	54	-21.05	-	-	175	315	H
15	* 3.565	48.05	PK2	33.2	-34.7	0	46.55	-	-	74	-27.45	342	322	H
	* 3.564	37.06	MAv1	33.2	-34.7	.17	35.73	54	-18.27	-	-	342	322	H
7	* 1.485	49.24	PK2	28.1	-28.9	0	48.44	-	-	74	-25.56	147	102	V
	* 1.485	38.69	MAv1	28.1	-28.9	.17	38.06	54	-15.94	-	-	147	102	V
8	* 2.227	47.89	PK2	31.8	-27.3	0	52.39	-	-	74	-21.61	233	188	V
	* 2.227	38.03	MAv1	31.8	-27.3	.17	42.7	54	-11.3	-	-	233	188	V
9	* 2.352	48.4	PK2	32	-26.9	0	53.5	-	-	74	-20.5	187	201	V
	* 2.352	38.48	MAv1	32	-26.9	.17	43.75	54	-10.25	-	-	187	201	V
10	* 3.693	46.35	PK2	33.4	-34.8	0	44.95	-	-	74	-29.05	295	122	V
	* 3.693	38	MAv1	33.4	-34.8	.17	36.77	54	-17.23	-	-	295	122	V
11	* 3.713	48.56	PK2	33.4	-34.7	0	47.26	-	-	74	-26.74	136	150	V
	* 3.712	38.69	MAv1	33.4	-34.7	.17	37.56	54	-16.44	-	-	136	150	V
12	* 3.528	46.88	PK2	33.7	-34.7	0	45.88	-	-	74	-28.12	151	272	V
	* 3.528	35.66	MAv1	33.7	-34.7	.17	34.83	54	-19.17	-	-	151	272	V
13	* 3.564	47.13	PK2	33.2	-34.7	0	45.63	-	-	74	-28.37	32	292	V
	* 3.564	35.89	MAv1	33.2	-34.7	.17	34.56	54	-19.44	-	-	32	292	V
2	1.764	41.68	Pk	29.9	-28.3	0	43.28	-	-	74	-30.72	0-360	200	H

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

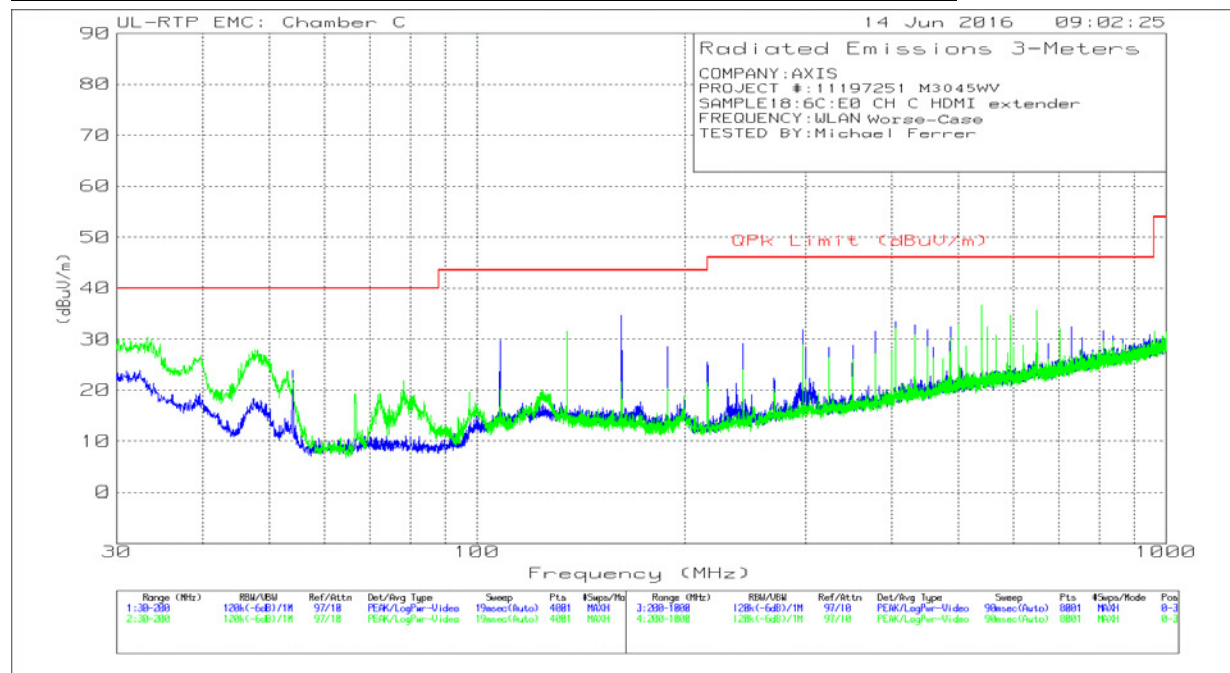
Pk - Peak detector

PK2 - Maximum Peak

MAv1 - Maximum RMS Average

9.5. WORST-CASE BELOW 1 GHz

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

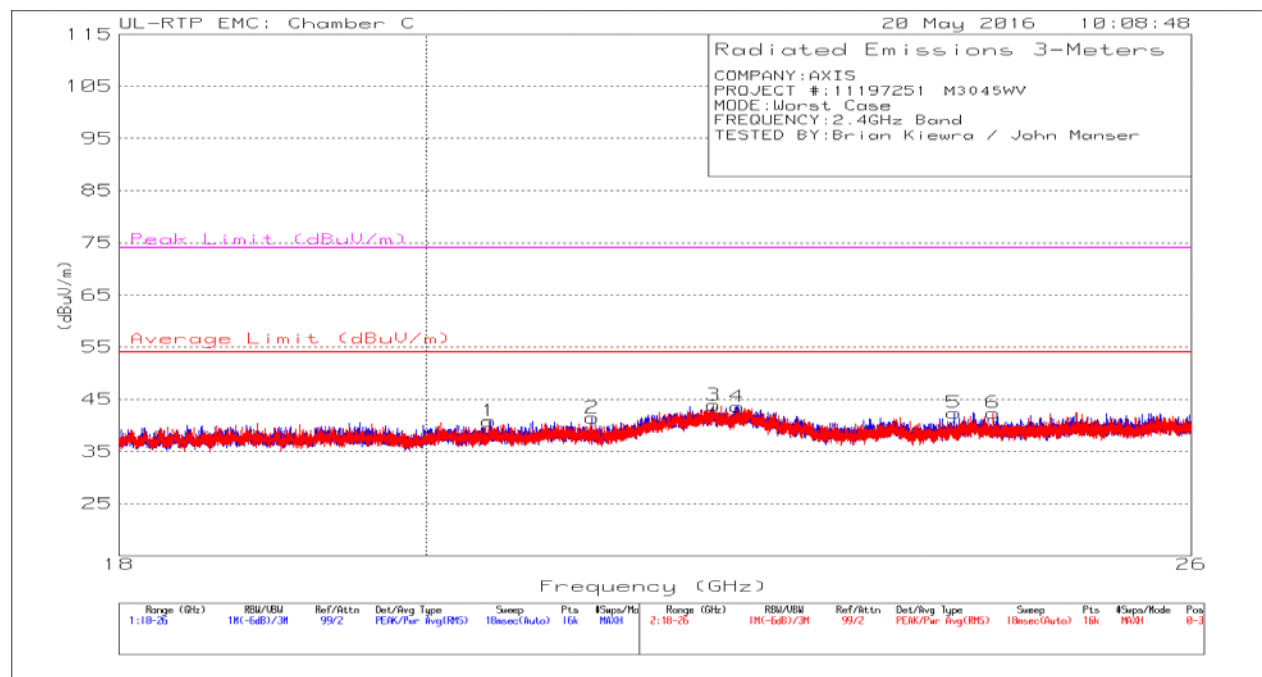


Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	33.655	38.18	Pk	23.3	-31.5	29.98	40	-10.02	0-360	101	V
2	135.0175	44.3	Pk	17.9	-30.6	31.6	43.52	-11.92	0-360	101	V
3	162.005	48.22	Pk	17	-30.5	34.72	43.52	-8.8	0-360	100	H
4	297	43.65	Pk	18	-29.8	31.85	46.02	-14.17	0-360	101	H
5	405	42.35	Pk	20.5	-29.3	33.55	46.02	-12.47	0-360	101	H
6	540	42.54	Pk	22.7	-28.5	36.74	46.02	-9.28	0-360	100	V

Pk - Peak detector

9.6. WORST-CASE 18-26GHz

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



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF (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
2	* 21.172	48.76	Pk	33.3	-40.6	0	41.46	54	-12.54	74	-32.54	0-360	150	H
4	* 22.254	47.91	Pk	36.2	-40.5	0	43.61	54	-10.39	74	-30.39	0-360	150	H
5	* 23.971	48.82	Pk	33.5	-39.9	0	42.42	54	-11.58	74	-31.58	0-360	200	H
1	* 20.435	48.65	Pk	33.1	-40.9	0	40.85	54	-13.15	74	-33.15	0-360	151	V
3	* 22.072	47.94	Pk	36.6	-40.6	0	43.94	54	-10.06	74	-30.06	0-360	151	V
6	24.293	48.21	Pk	33.5	-39.3	0	42.41	54	-11.59	74	-31.59	0-360	151	V

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

Pk - Peak detector

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.

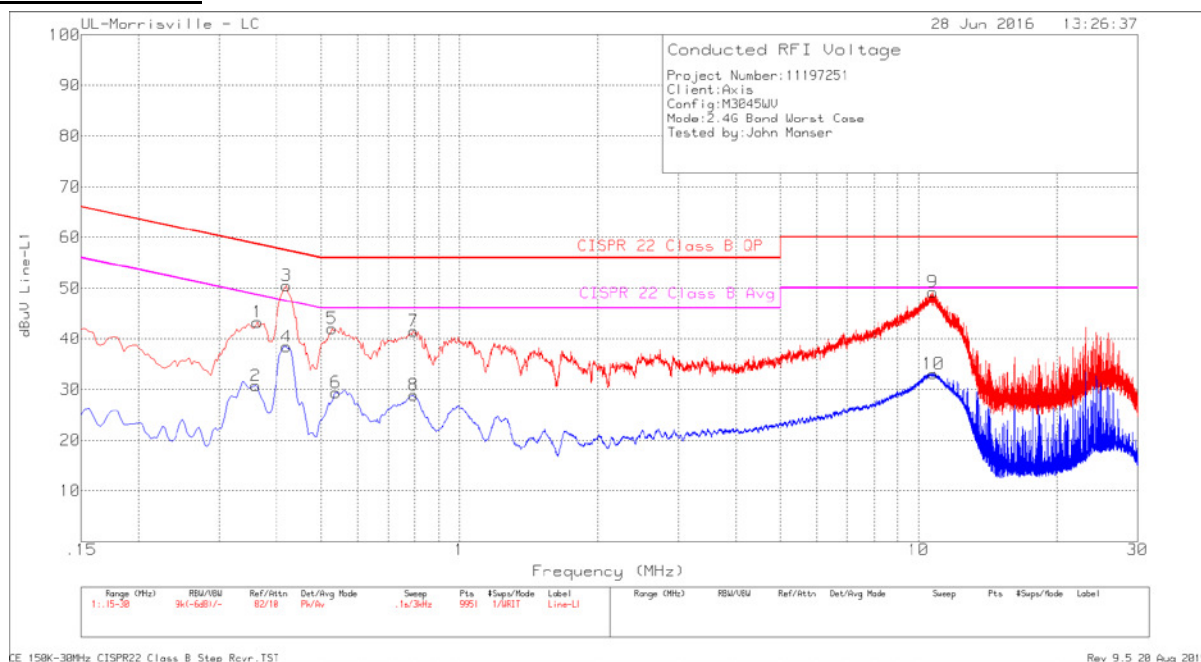
TEST PROCEDURE

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.

LINE 1 RESULTS

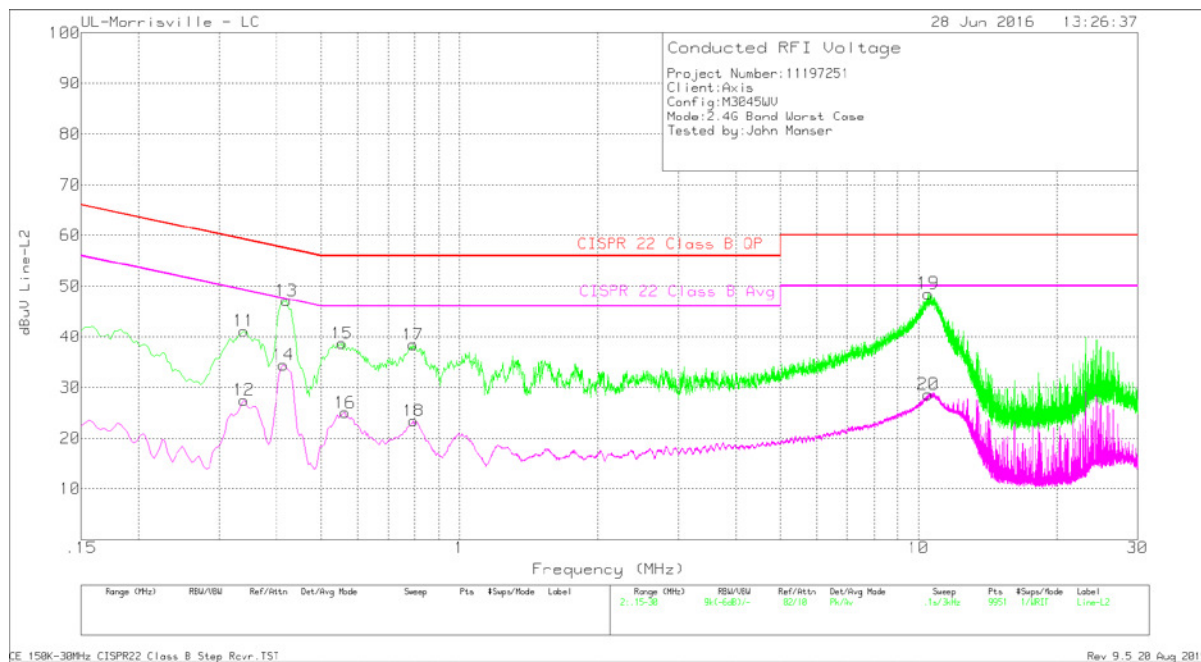


Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF [dB]	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	AVE Limit	Margin (dB)
1	.363	33.22	Pk	.1	10	43.32	58.66	-15.34	-	-
2	.36	20.69	Av	.1	10	30.79	-	-	48.73	-17.94
3	.42	40.4	Pk	.1	10	50.5	57.45	-6.95	-	-
4	.42	28.39	Av	.1	10	38.49	-	-	47.45	-8.96
5	.528	31.95	Pk	.1	10	42.05	56	-13.95	-	-
6	.537	19.31	Av	.1	10	29.41	-	-	46	-16.59
7	.795	31.5	Pk	0	10	41.5	56	-14.5	-	-
8	.795	18.87	Av	0	10	28.87	-	-	46	-17.13
9	10.746	38.9	Pk	.1	10.3	49.3	60	-10.7	-	-
10	10.752	22.74	Av	.1	10.3	33.14	-	-	50	-16.86

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)	AVE Limit	Margin (dB)
11	.339	31.04	Pk	.1	10	41.14	59.23	-18.09	-	-
12	.339	17.41	Av	.1	10	27.51	-	-	49.23	-21.72
13	.42	37.05	Pk	.1	10	47.15	57.45	-10.3	-	-
14	.414	24.39	Av	.1	10	34.49	-	-	47.57	-13.08
15	.555	28.71	Pk	0	10	38.71	56	-17.29	-	-
16	.564	15.01	Av	0	10	25.01	-	-	46	-20.99
17	.792	28.48	Pk	0	10	38.48	56	-17.52	-	-
18	.795	13.39	Av	0	10	23.39	-	-	46	-22.61
19	10.485	38.17	Pk	.1	10.3	48.57	60	-11.43	-	-
20	10.512	18.26	Av	.1	10.3	28.66	-	-	50	-21.34

Pk - Peak detector

Av - Average detection