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

CERTIFICATION TEST REPORT

FOR

WIRELESS CAPABLE SECURITY CAMERA

HVIN: R12
PMN: AXIS M1065-LW

FCC ID: PNB-AXISM1065-LW
IC: 3919A-M1065LW

REPORT NUMBER: 11191821-E2

ISSUE DATE: 2016-08-11

Prepared for
AXIS COMMUNICATIONS AB
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SWEDEN, SE-223 69

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NVLAP Lab code: 200246-0

Revision History

Ver.	Issue Date	Revisions	Revised By
1	2016-07-15	Initial Issue	Brian Kiewra
2	2016-07-21	Added model numbers and more EUT descriptive detail.	Brian Kiewra
3	2016-07-26	Added Line Conducted diagram.	Brian Kiewra
4	2016-08-11	Removed model variants, added HVIN and PMN and editorial changes to references.	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: Wireless Capable Security Camera

HVIN: R12
PMN: AXIS M1065-LW

SERIAL NUMBER: Radiated: ACCC8E23D3A6
Conducted: ACCC8E23D4CF/ACCC8E23D3B2

DATE TESTED: 2016-04-25 to 2016-06-07

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	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.

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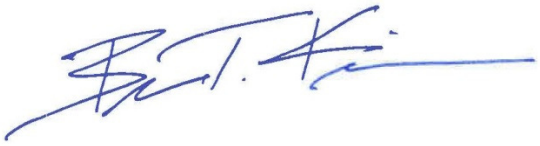
Approved & Released
For UL LLC By:

Jeffrey Moser
EMC Program Manager
UL – Consumer Technology Division

Prepared By:



Brian Kiewra
WISE Engineer
UL – Consumer Technology Division

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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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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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%.

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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. For 5GHz operation, the EUT only operates in the 5.2 GHz band.

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)
5180 - 5240	802.11a	13.45	22.13
5180 - 5240	802.11n HT20	12.45	17.58
5190-5230	802.11n HT40	12.93	19.63

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal inverted-f type antenna. The peak antenna gain is +1.3 dBi for 2.4 GHz band and +2.6 dBi for 5 GHz band.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 6.15_beta52.
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).

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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.

Manufacturer stated that EUT is only intended to operate installed in mounting bracket which is one fixed orientation; therefore, all final radiated testing was performed in stated position.

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

802.11b mode: 5.5 Mbps
802.11g mode: 6 Mbps
802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0

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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	RF	<1m	NA
2	AC Mains	1	AC	>1m	NA
3	Ethernet	1	RJ45	>1m	CAT5E

TEST SETUP

Test software exercised the radio card.

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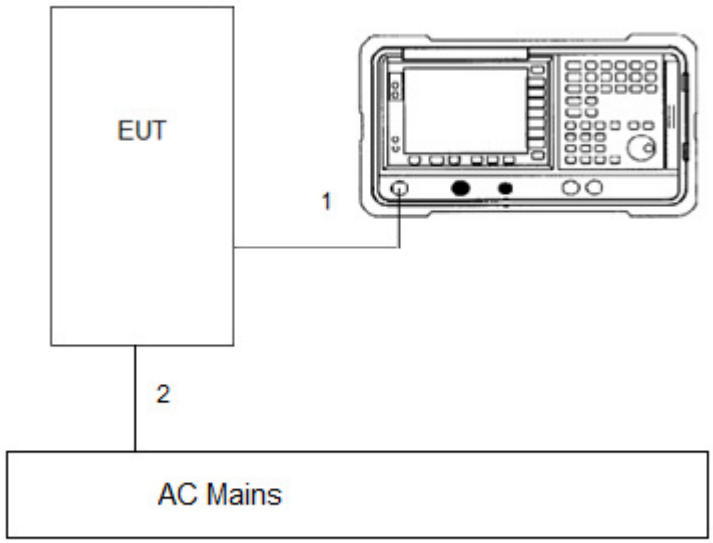
SETUP DIAGRAM FOR TESTS

Conducted Setup



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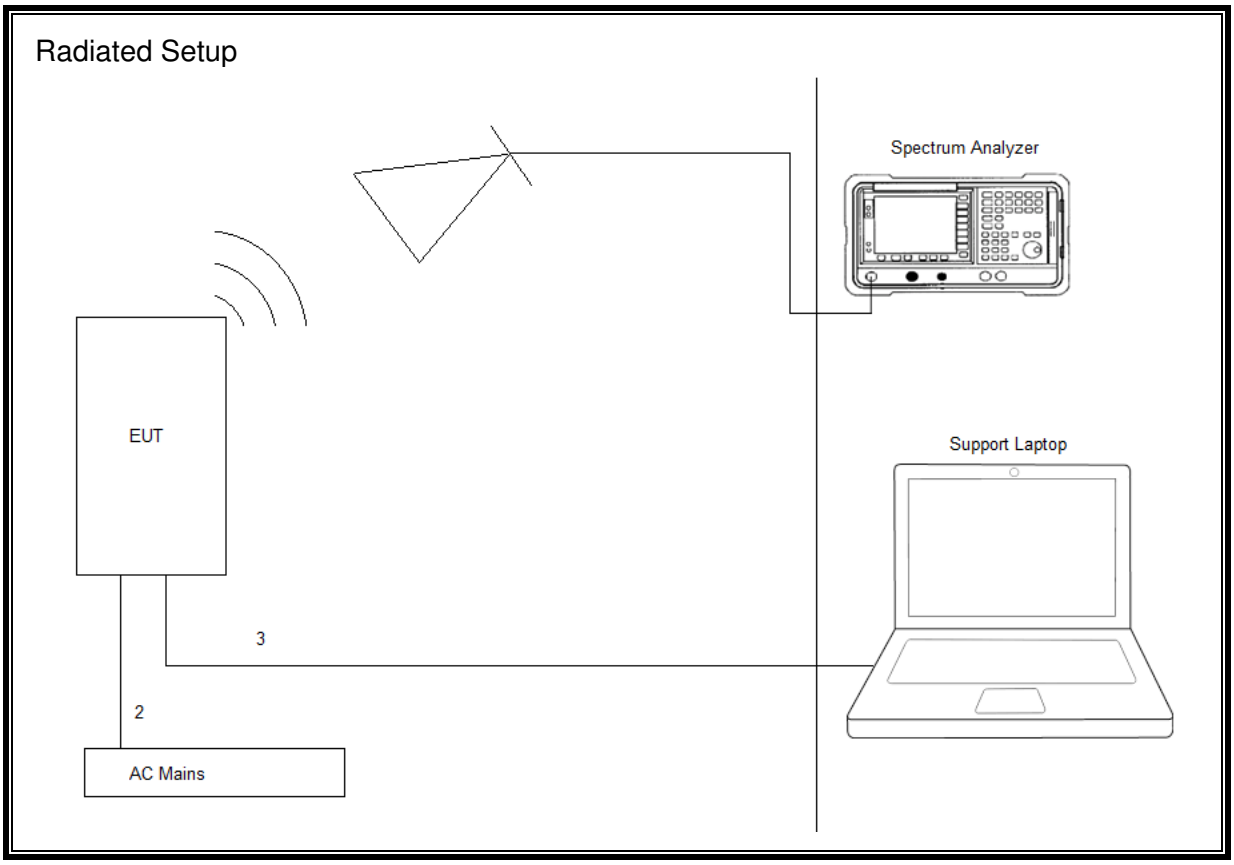

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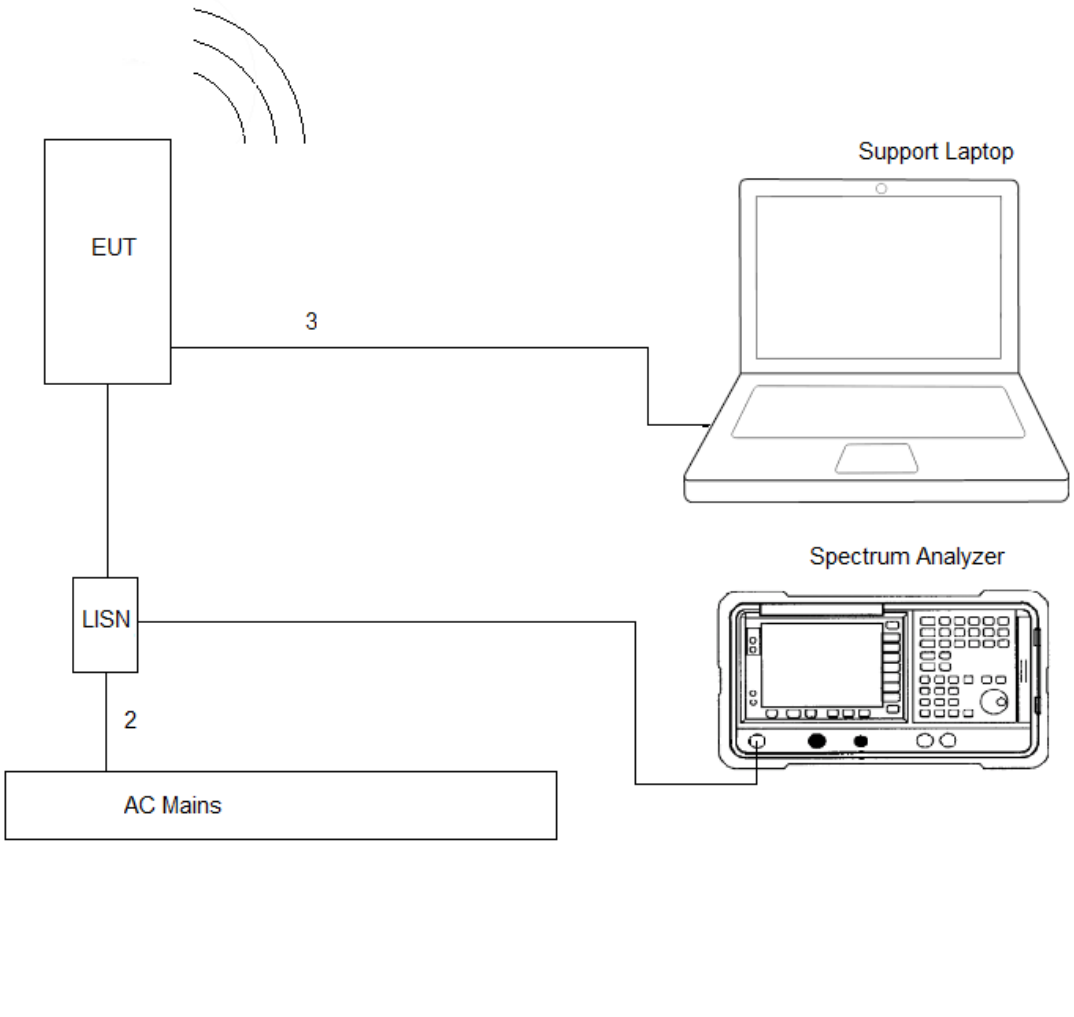
Line Conducted Setup



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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
AT0061	Horn Antenna, 26-40GHz	ARA	MWH-2640/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

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Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
SA0019	Spectrum Analyzer	Agilent Technologies	E4446A	2015-09-02	2016-09-30
SA0026	Spectrum Analyzer	Agilent	N9030A	2016-02-24	2017-02-28
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
SA0026	Spectrum Analyzer	Agilent	N9030A	2016-02-24	2017-02-28
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

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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	2015-10-29	2016-10-31
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
ATA222	Transient Limiter, 0.009-30MHz	Electrometrics	EM-7600	2015-08-30	2016-08-31
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)				
ATA220	ISN for Unshielded Balanced Pairs	Teseq, Inc.	ISN T8	2015-08-24	2016-08-31
TN0129	ISN for Shielded Balanced Pairs	Teseq, Inc.	ISN ST08	2015-08-24	2016-08-31
TN0145	ISN for Cat-6 Unshielded Balanced Pairs	Teseq, Inc.	ISN T8-Cat6	2015-08-25	2016-08-31
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2016-06-04	2017-06-30

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7. MEASUREMENT METHODS

Duty Cycle: KDB 789033 D02 v01r02, section B.

26 dB Emission BW: KDB 789033 D02 v01r02, Section C.

99% Occupied BW: KDB 789033 D02 v01r02, Section D.

Conducted Output Power: KDB 789033 D02 v01r02, Section E.3.a (Method PM).

Power Spectral Density: KDB 789033 D02 v01r02, Section F (Method SA-2).

Unwanted emissions in restricted bands: KDB 789033 D02 v01r02, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r02, Sections G.3, G.4, and G.5.

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

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

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 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)
802.11a 1TX	1.464	1.485	0.986	98.59%	0.00	0.010
802.11n HT20 1TX	1.370	1.394	0.983	98.28%	0.00	0.010
802.11n HT40 1TX	0.680	0.699	0.973	97.32%	0.12	1.471

Test Performed: Jeff Cabrera
Test Date: 2016-04-29

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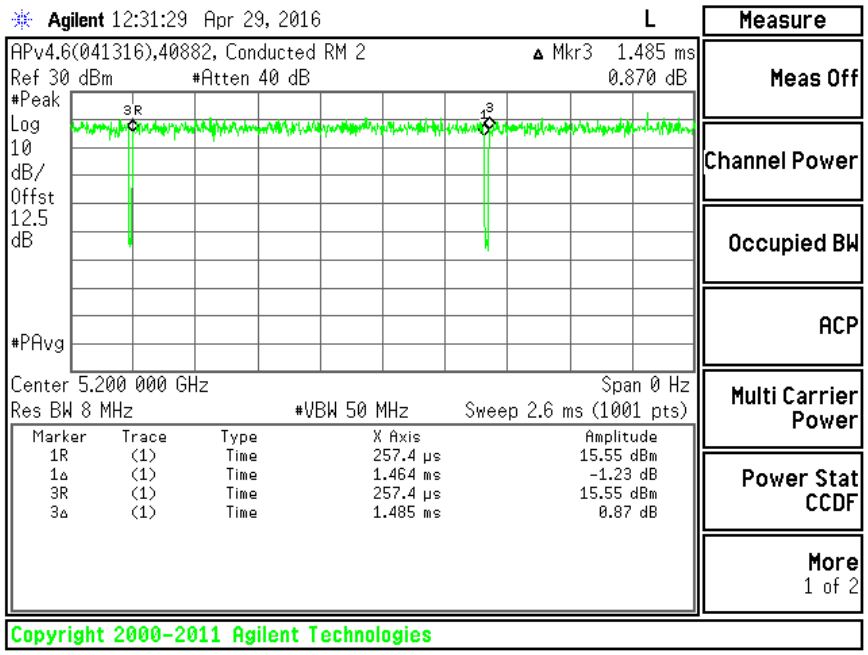
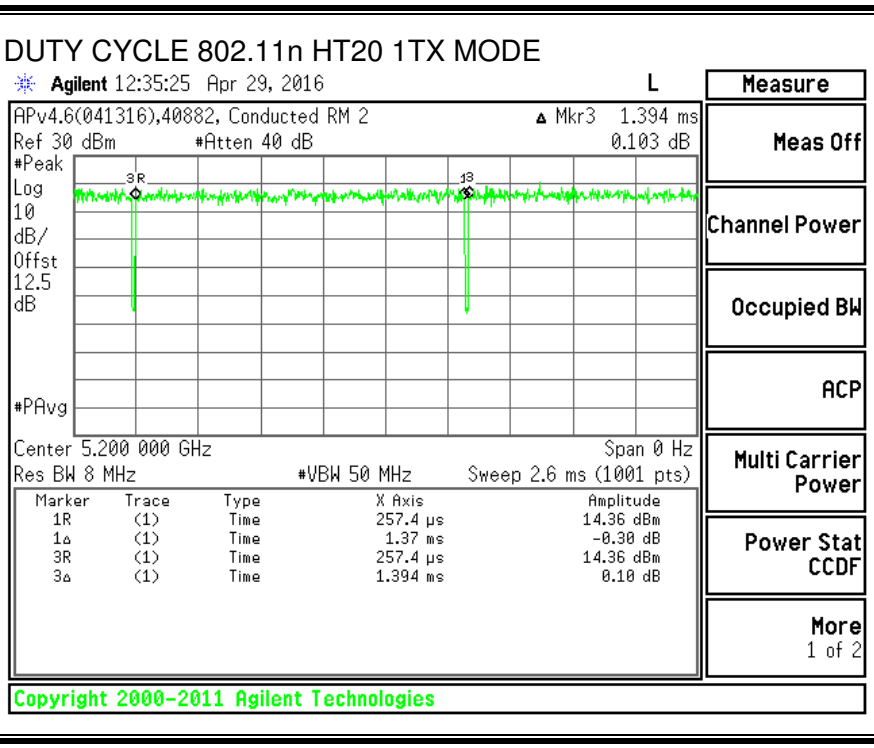
DUTY CYCLE PLOTS

DUTY CYCLE 802.11a 1TX MODE



DUTY CYCLE 802.11n HT20 1TX MODE



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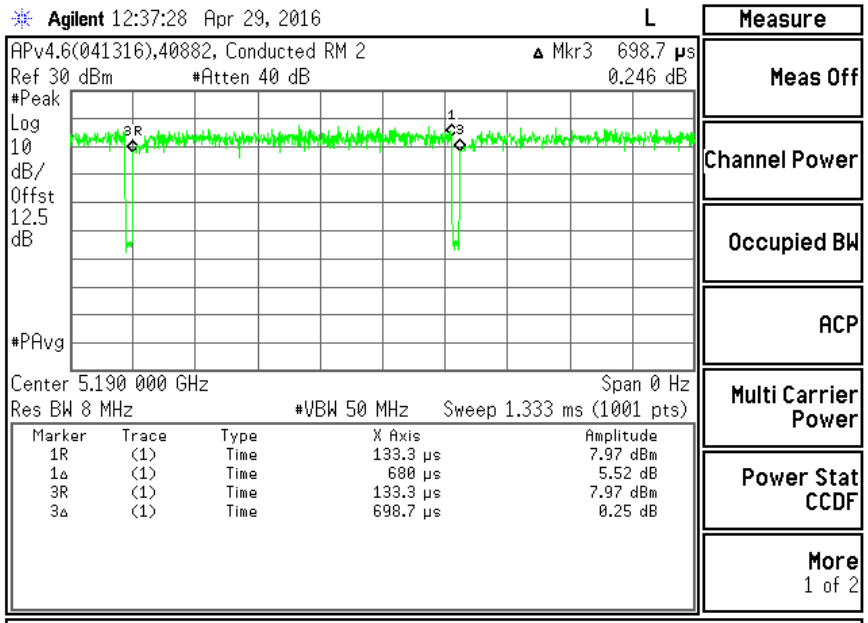
DUTY CYCLE 802.11n HT40 1TX MODE



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8.2. 802.11a MODE IN THE 5.2 GHz BAND

8.2.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only. Tested per FCC §15.403 (i)

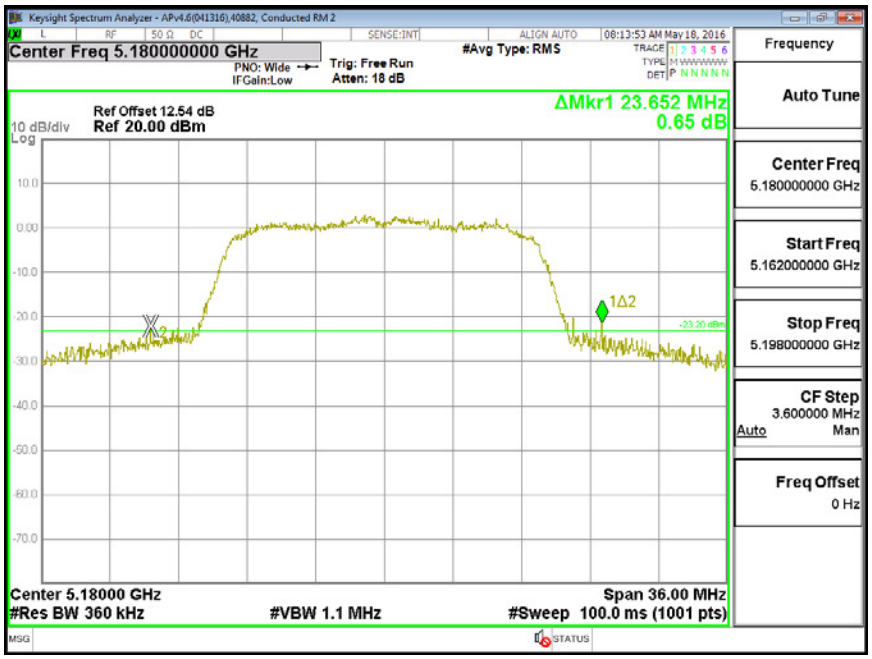
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	23.65
Mid	5200	20.27
High	5240	19.08

Test Performed: Jeff Cabrera
Test Date: 2016-05-18

26 dB BANDWIDTH

BANDWIDTH LOW CH



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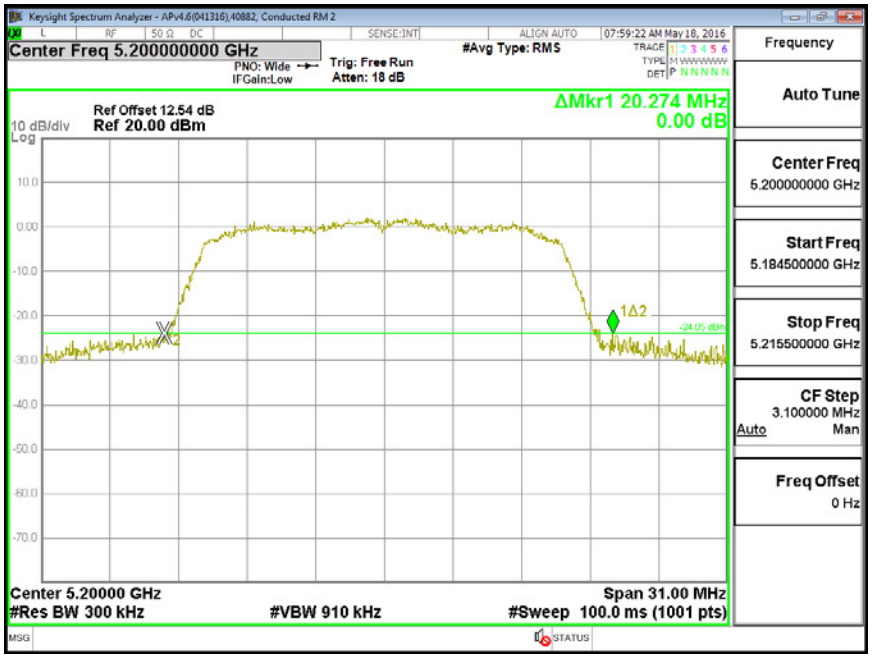
BANDWIDTH MID CH



BANDWIDTH HIGH CH

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8.2.2. 99% BANDWIDTH

LIMITS

RSS-Gen Clause 6.6, RSS-247 6.2.1 (2)

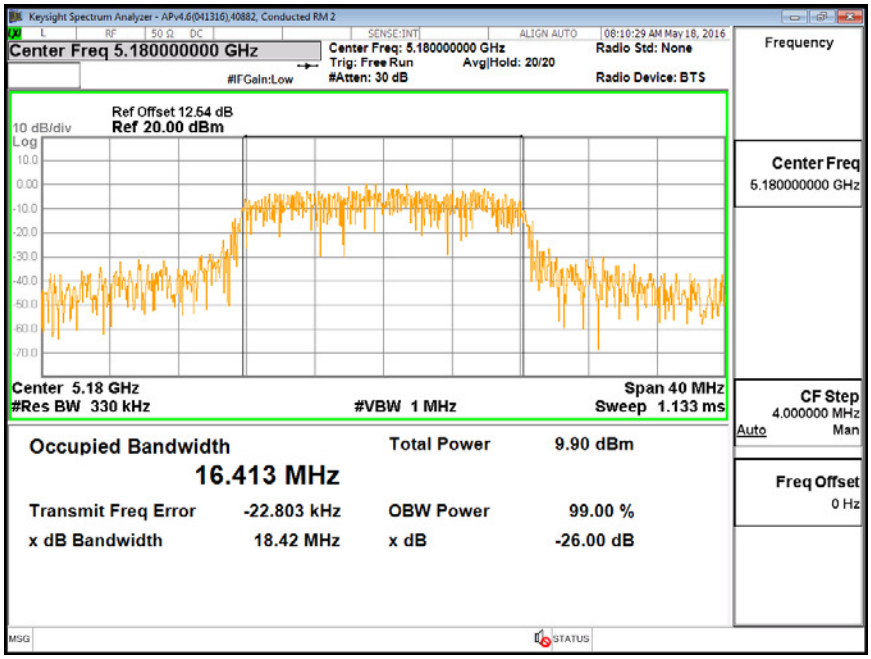
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)	Maximum Ch Freq	Does Ch. Freq. Fall in UNII 2A? Y/N
Low	5180	16.4130	5188.207	N
Mid	5200	16.3760	5208.188	N
High	5240	16.4140	5248.207	N

Test Performed: Jeff Cabrera
Test Date: 2016-05-18

99% BANDWIDTH

BANDWIDTH LOW CH



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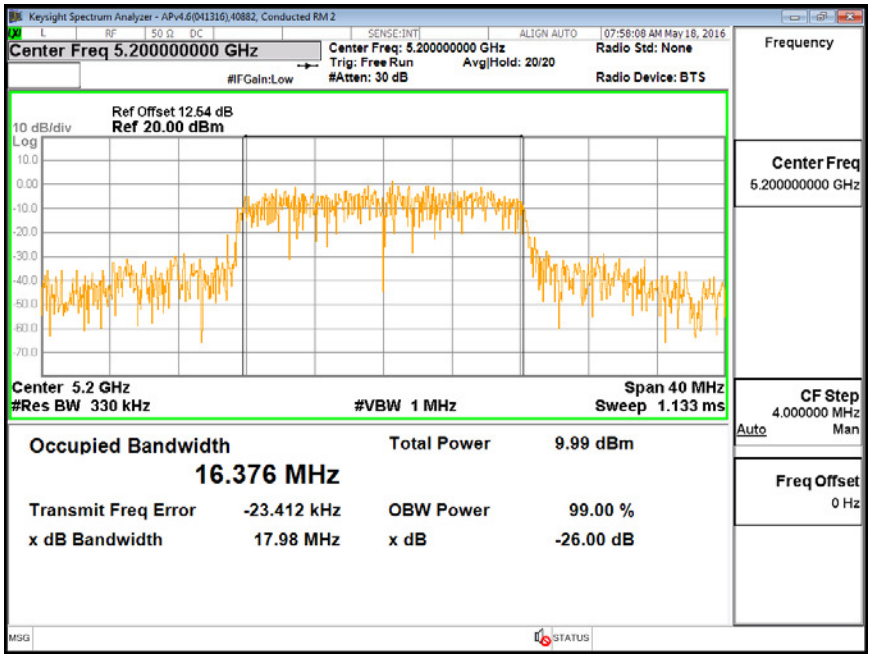
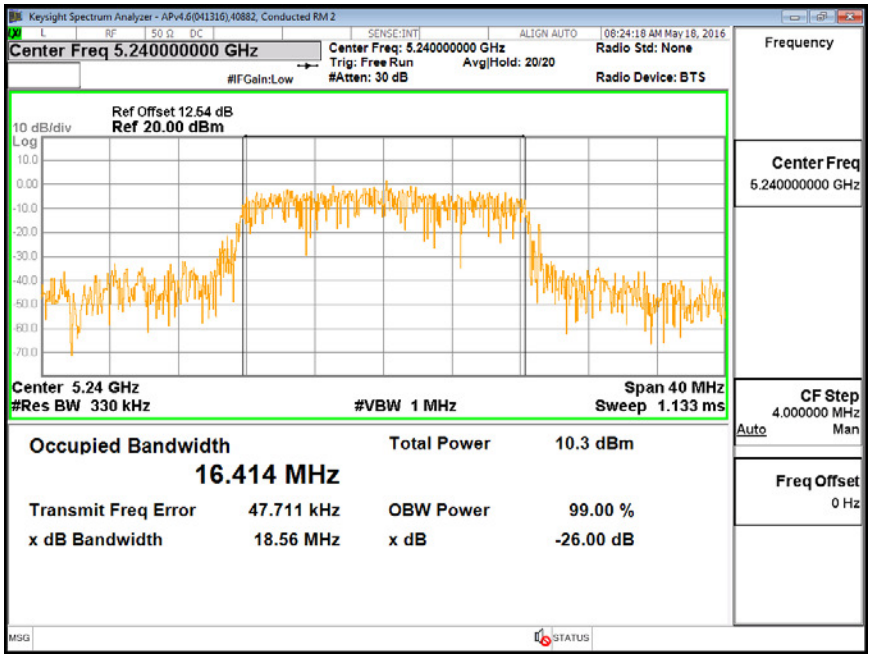
BANDWIDTH MID CH



BANDWIDTH HIGH CH



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8.2.3. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

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

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RESULTS

Test Performed: Jeff Cabrera
Test Date: 2016-04-29, 2016-05-18

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	2.60	2.60	24.00	11.00
Mid	5200	2.60	2.60	24.00	11.00
High	5240	2.60	2.60	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.41	13.41	24.00	-10.59
Mid	5200	13.45	13.45	24.00	-10.55
High	5240	13.28	13.28	24.00	-10.72

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	-1.08	-1.08	11.00	-12.08
Mid	5200	-0.83	-0.83	11.00	-11.83
High	5240	-0.73	-0.73	11.00	-11.73

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OUTPUT POWER AND PSD, Chain 0

OUTPUT POWER AND PSD, Chain 0 LOW CH

OUTPUT POWER AND PSD, Chain 0 MID CH

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OUTPUT POWER AND PSD, Chain 0 HIGH CH

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8.2.1. OUTPUT POWER AND PPSD (IC)

LIMITS

IC RSS-247 6.2.1 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

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RESULTS - 802.11a, 5.2 GHz band

Test Performed: Jeff Cabrera
Test Date: 2016-04-29, 2016-05-18

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5180	16.413	2.60
Mid	5200	16.376	2.60
High	5240	16.414	2.60

Limits

Channel	Frequency (MHz)	IC EIRP Limit (dBm)	IC eirp PSD Limit (dBm)
Low	5180	22.15	10.00
Mid	5200	22.14	10.00
High	5240	22.15	10.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.41	16.01	22.15	-6.14
Mid	5200	13.45	16.05	22.14	-6.09
High	5240	13.28	15.88	22.15	-6.27

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd EIRP PSD (dBm)	PPSD Limit (dBm)	PSD Margin (dB)
Low	5180	-1.08	1.52	10.00	-8.48
Mid	5200	-0.83	1.77	10.00	-8.23
High	5240	-0.73	1.87	10.00	-8.13

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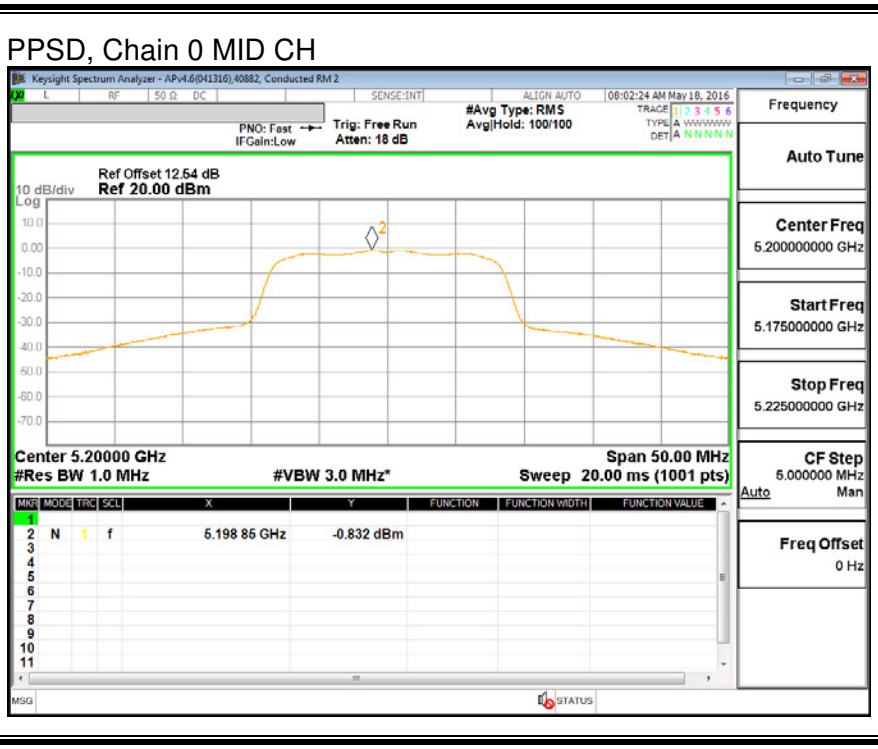
PPSD

PPSD, Chain 0 LOW CH

PPSD, Chain 0 MID CH



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PPSD, Chain 0 HIGH CH

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8.3. 802.11n HT20 MODE IN THE 5.2 GHz BAND

8.3.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only. Tested per FCC §15.403 (i)

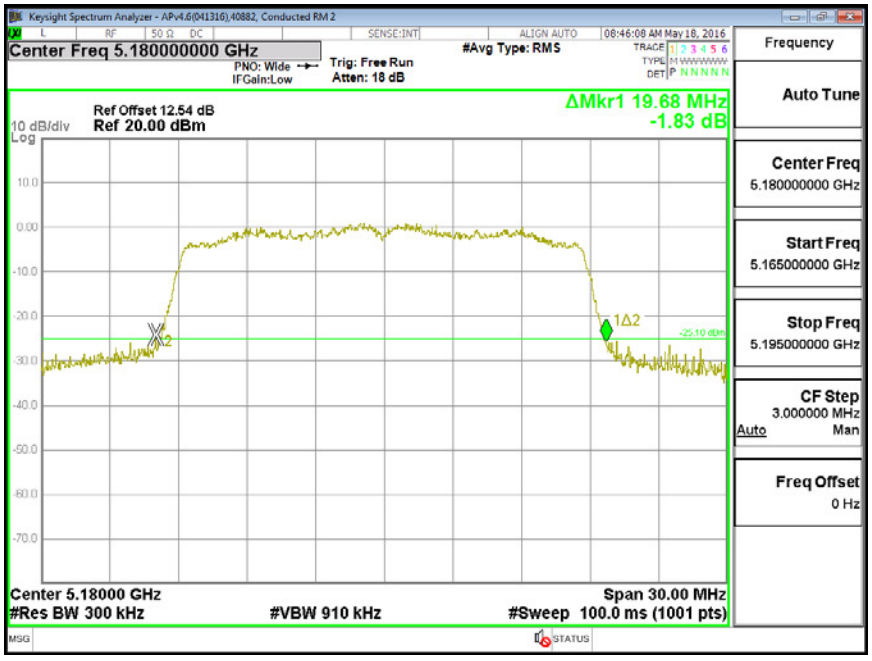
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)
Low	5180	19.68
Mid	5200	19.74
High	5240	19.38

Test Performed: Jeff Cabrera
Test Date: 2016-05-18

26 dB BANDWIDTH, Chain 0

BANDWIDTH Chain 0 LOW CH



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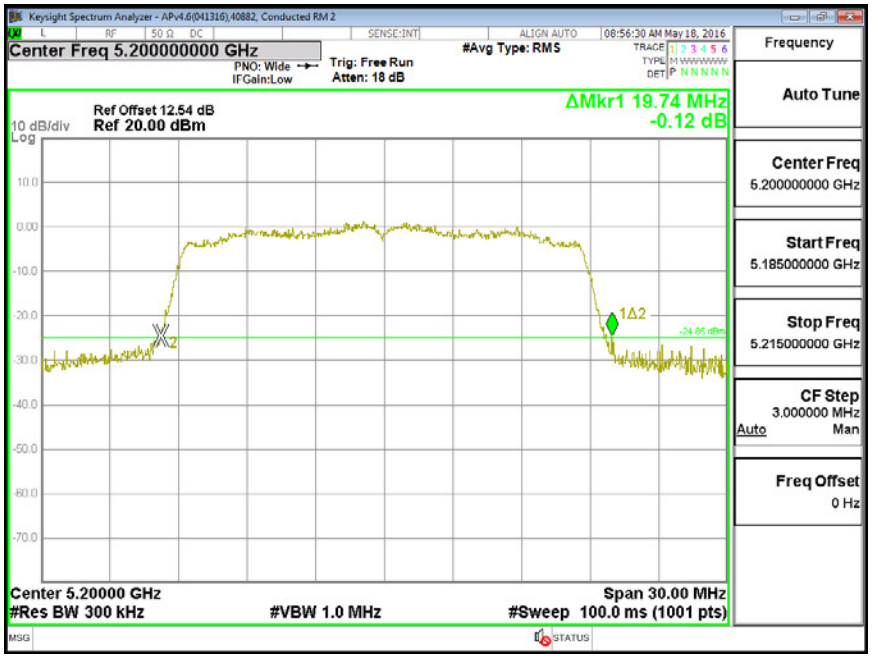
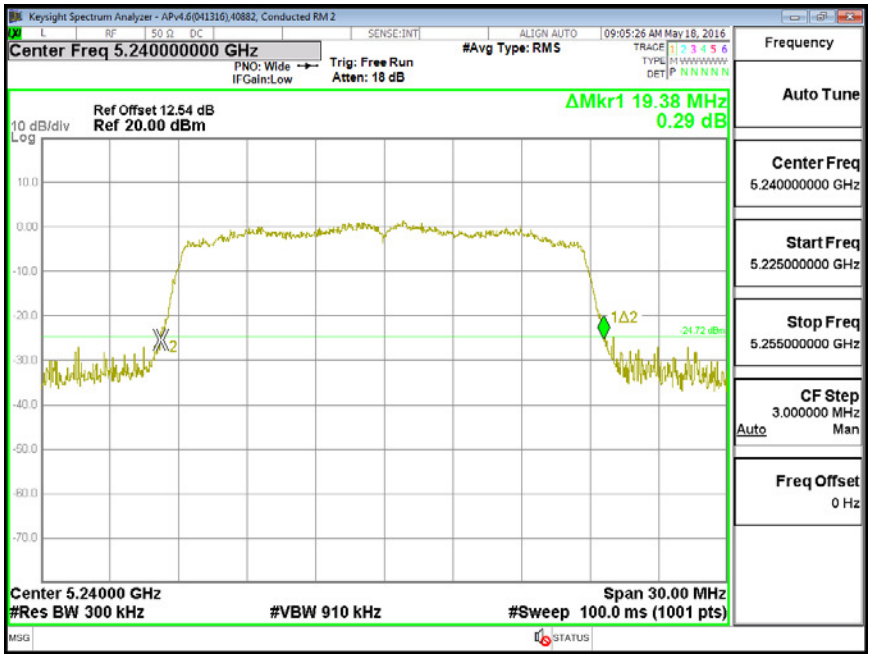
BANDWIDTH Chain 0 MID CH



BANDWIDTH Chain 0 HIGH CH



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8.3.2. 99% BANDWIDTH

LIMITS

RSS-Gen Clause 6.6, RSS-247 6.2.1 (2)

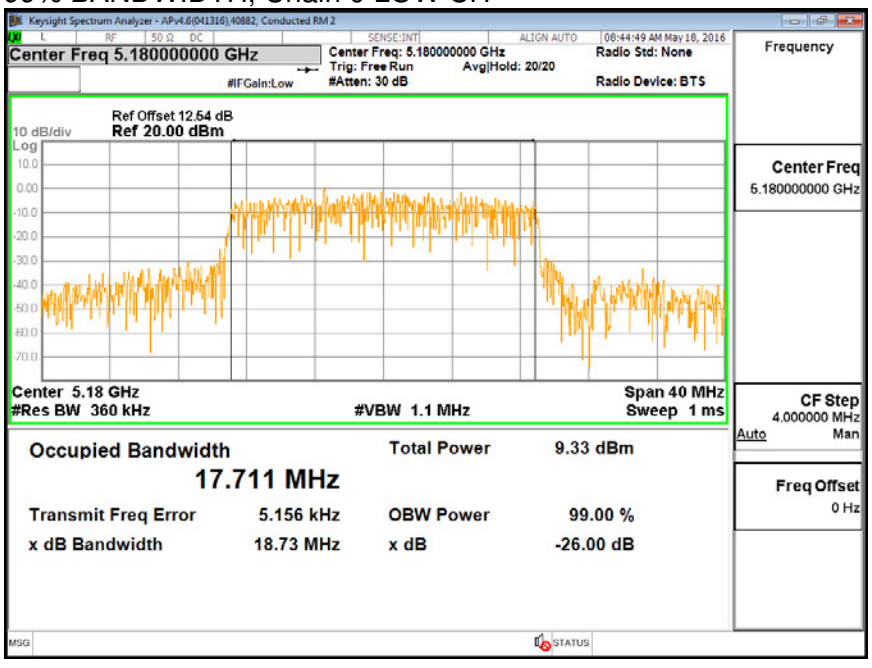
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)	Maximum Ch Freq	Does Ch. Freq. Fall in UNII 2A? Y/N
Low	5180	17.7110	5188.856	N
Mid	5200	17.5380	5208.769	N
High	5240	17.5280	5248.764	N

Test Performed: Jeff Cabrera
Test Date: 2016-05-18

99% BANDWIDTH, Chain 0

99% BANDWIDTH, Chain 0 LOW CH



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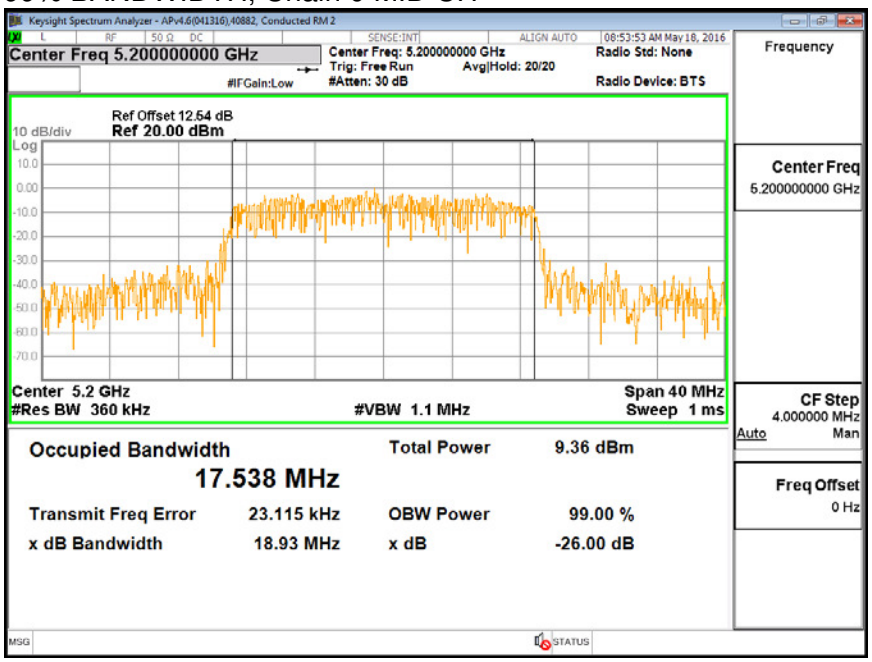
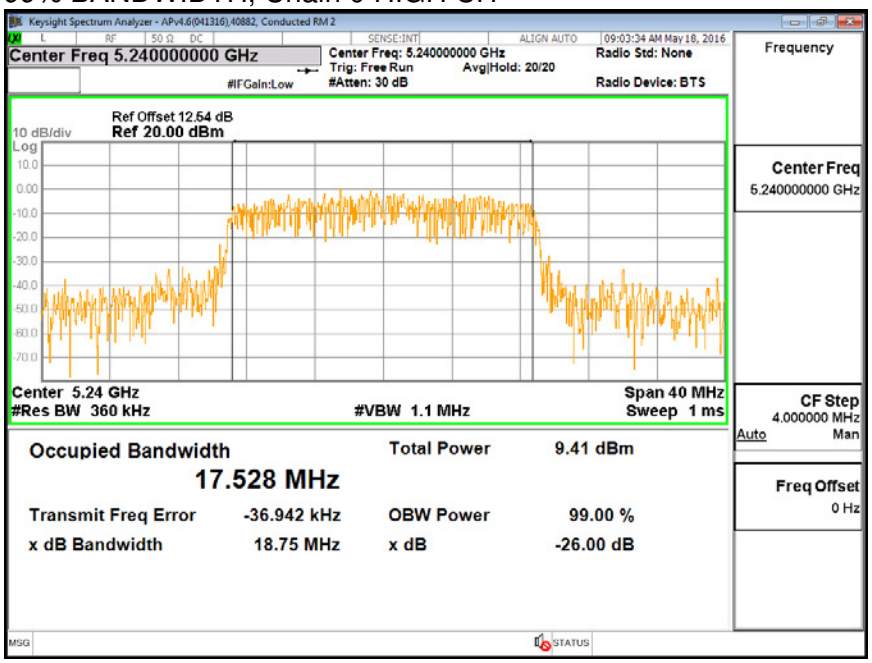
99% BANDWIDTH, Chain 0 MID CH



99% BANDWIDTH, Chain 0 HIGH CH



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8.3.3. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

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

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RESULTS

Test Performed: Jeff Cabrera
Test Date: 2016-04-29, 2016-05-18

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	2.60	2.60	24.00	11.00
Mid	5200	2.60	2.60	24.00	11.00
High	5240	2.60	2.60	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.43	12.43	24.00	-11.57
Mid	5200	12.45	12.45	24.00	-11.55
High	5240	12.37	12.37	24.00	-11.63

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	-2.18	-2.18	11.00	-13.18
Mid	5200	-2.03	-2.03	11.00	-13.03
High	5240	-1.90	-1.90	11.00	-12.90

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OUTPUT POWER AND PSD, Chain 0

OUTPUT POWER AND PSD, Chain 0 LOW CH

OUTPUT POWER AND PSD, Chain 0 MID CH

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OUTPUT POWER AND PSD, Chain 0 HIGH CH

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8.3.4. OUTPUT POWER AND PPSD (IC)

LIMITS

IC RSS-247 6.2.1 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

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RESULTS - 802.11n, 5.2 GHz band

Test Performed: Jeff Cabrera
Test Date: 2016-04-29, 2016-05-18

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5180	17.711	2.60
Mid	5200	17.538	2.60
High	5240	17.528	2.60

Limits

Channel	Frequency (MHz)	IC EIRP Limit (dBm)	IC eirp PSD Limit (dBm)
Low	5180	22.48	10.00
Mid	5200	22.44	10.00
High	5240	22.44	10.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.43	15.03	22.48	-7.45
Mid	5200	12.45	15.05	22.44	-7.39
High	5240	12.37	14.97	22.44	-7.47

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd EIRP PSD (dBm)	PPSD Limit (dBm)	PSD Margin (dB)
Low	5180	-2.18	0.42	10.00	-9.58
Mid	5200	-2.03	0.57	10.00	-9.43
High	5240	-1.90	0.70	10.00	-9.30

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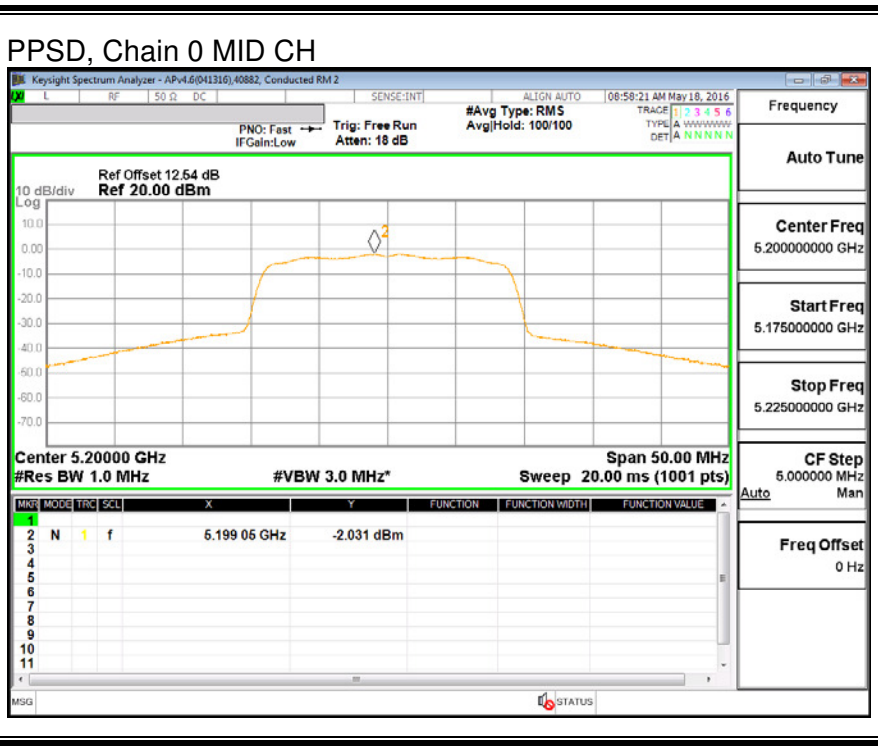
PPSD

PPSD, Chain 0 LOW CH

PPSD, Chain 0 MID CH



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PPSD, Chain 0 HIGH CH

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8.4. 802.11n HT40 MODE IN THE 5.2 GHz BAND

8.4.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only. Tested per FCC §15.403 (i)

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	40.02
High	5230	40.08

Test Performed: Jeff Cabrera
Test Date: 2016-05-18

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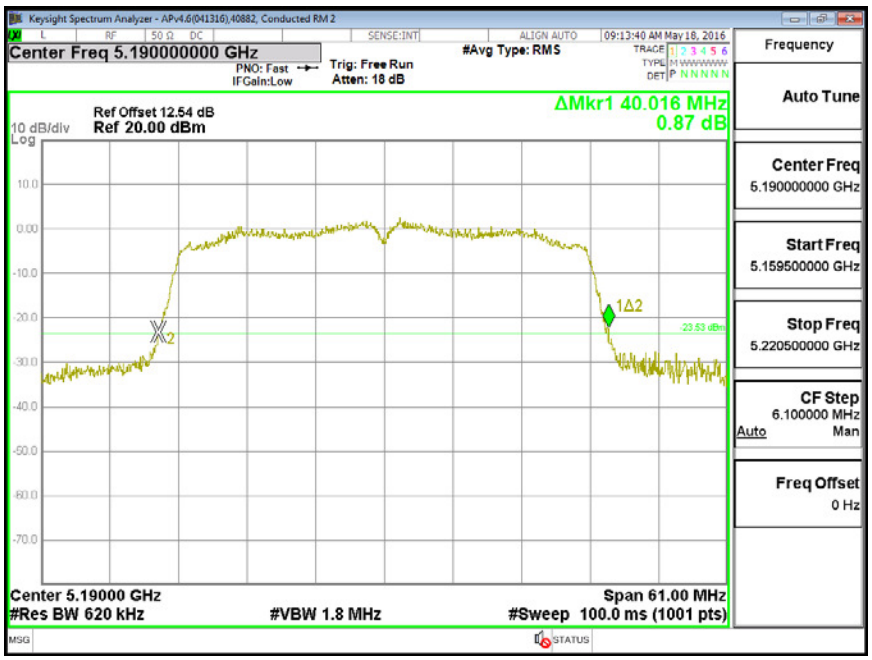
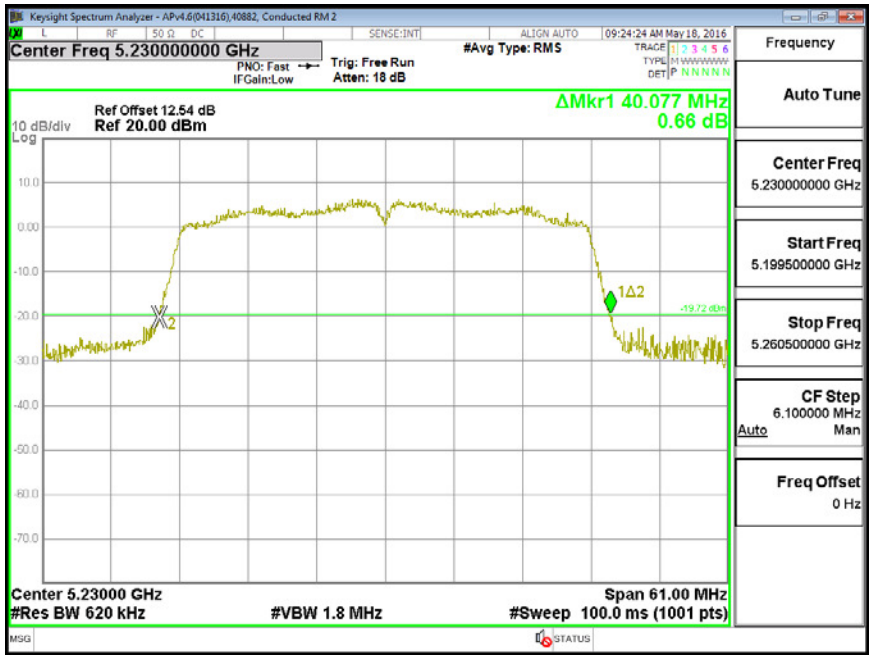
26 dB BANDWIDTH

BANDWIDTH LOW CH



BANDWIDTH HIGH CH



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8.4.2. 99% BANDWIDTH

LIMITS

RSS-Gen Clause 6.6, RSS-247 6.2.1 (2)

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)	Maximum Ch Freq	Does Ch. Freq. Fall in UNII 2A? Y/N
Low	5190	36.0544	5208.027	N
High	5230	36.1003	5248.050	N

Test Performed: Jeff Cabrera
Test Date: 2016-05-24

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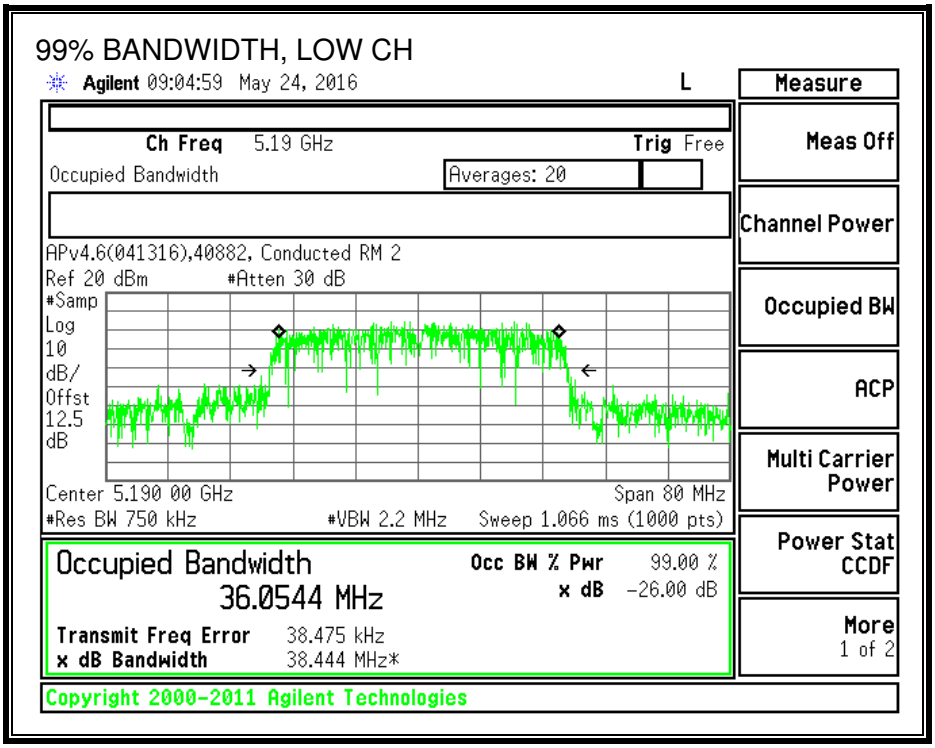
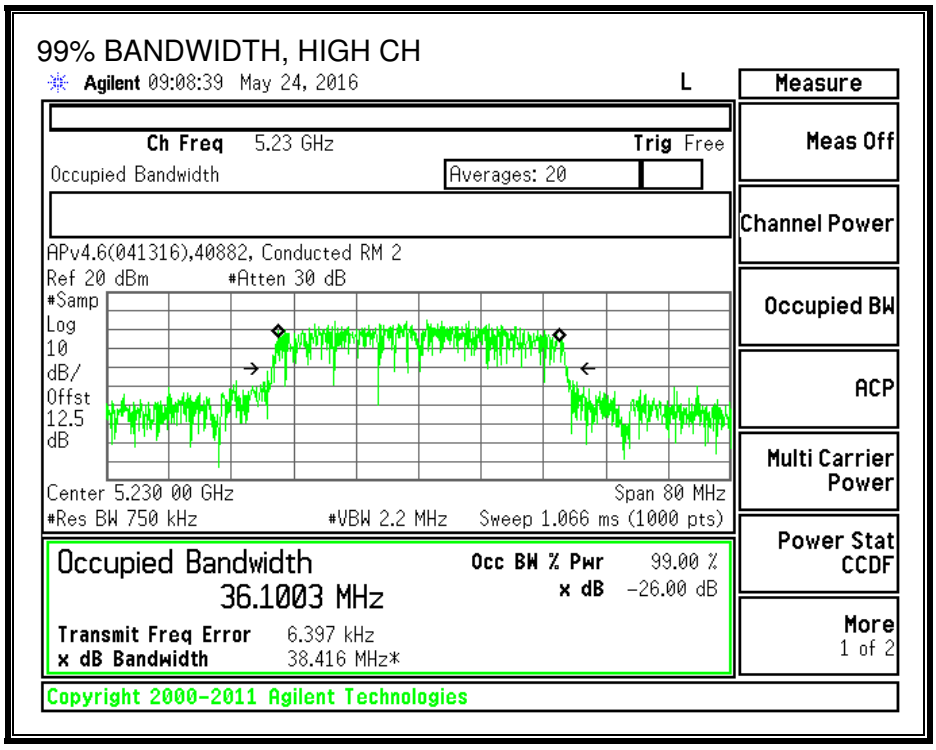
99% BANDWIDTH





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8.4.3. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

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

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RESULTS

Test Performed: Jeff Cabrera
Test Date: 2016-04-29, 2016-05-18

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	2.60	2.60	24.00	11.00
High	5230	2.60	2.60	24.00	11.00

Duty Cycle CF (dB)	0.12	Included in Calculations of Corr'd Power & PSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.81	12.93	24.00	-11.07
High	5230	12.63	12.75	24.00	-11.25

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-4.50	-4.38	11.00	-15.38
High	5230	-0.06	0.06	11.00	-10.94

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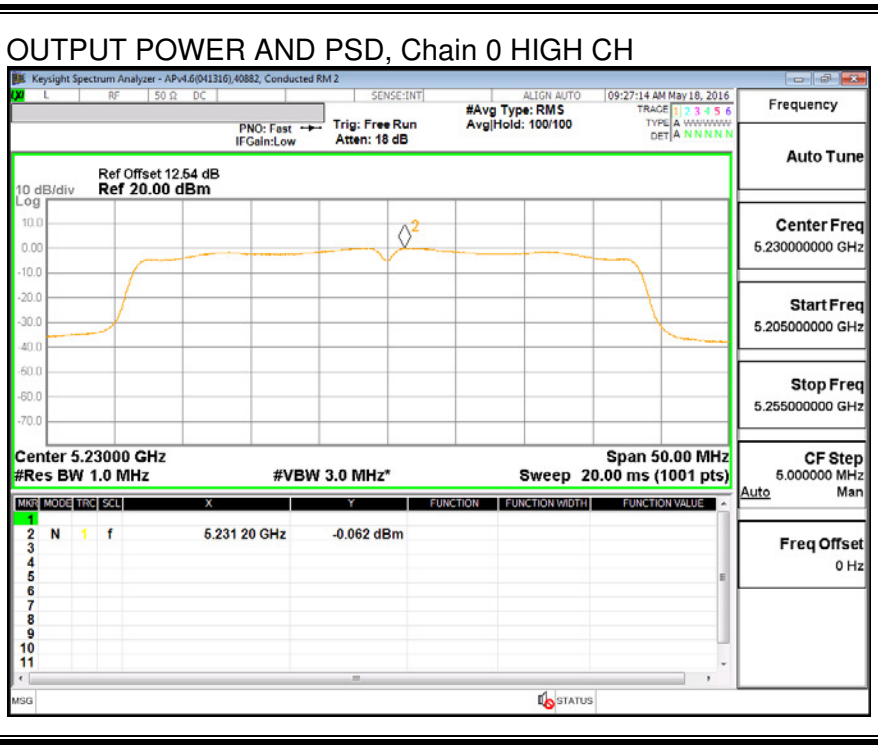
OUTPUT POWER AND PSD, Chain 0

OUTPUT POWER AND PSD, Chain 0 LOW CH

OUTPUT POWER AND PSD, Chain 0 HIGH CH



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8.4.4. OUTPUT POWER AND PPSD (IC)

LIMITS

IC RSS-247 6.2.1 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

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RESULTS - 802.11n, 5.2 GHz band

Test Performed: Jeff Cabrera
Test Date: 2016-04-29, 2016-05-18

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5190	36.054	2.60
High	5230	36.100	2.60

Limits

Channel	Frequency (MHz)	IC EIRP Limit (dBm)	IC eirp PSD Limit (dBm)
Low	5190	23.00	10.00
High	5230	23.00	10.00

Duty Cycle CF (dB)	0.12	Included in Calculations of Corr'd Power & PSD

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.81	15.53	23.00	-7.47
High	5230	12.63	15.35	23.00	-7.65

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd EIRP PSD (dBm)	PPSD Limit (dBm)	PSD Margin (dB)
Low	5190	-4.50	-1.78	10.00	-11.78
High	5230	-0.06	2.66	10.00	-7.34

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PPSD

PPSD, Chain 0 LOW CH

PPSD, Chain 0 HIGH CH

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9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205, §15.209, §15.407 (b) (1)

IC RSS-GEN Clause 8.9 (Transmitter), RSS-247 6.2.1 (2)

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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements. For this evaluation, RMS Power Averaging was used and the resolution/video bandwidth settings were 1MHz/3MHz.

The spectrum from 30 MHz to 40 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.

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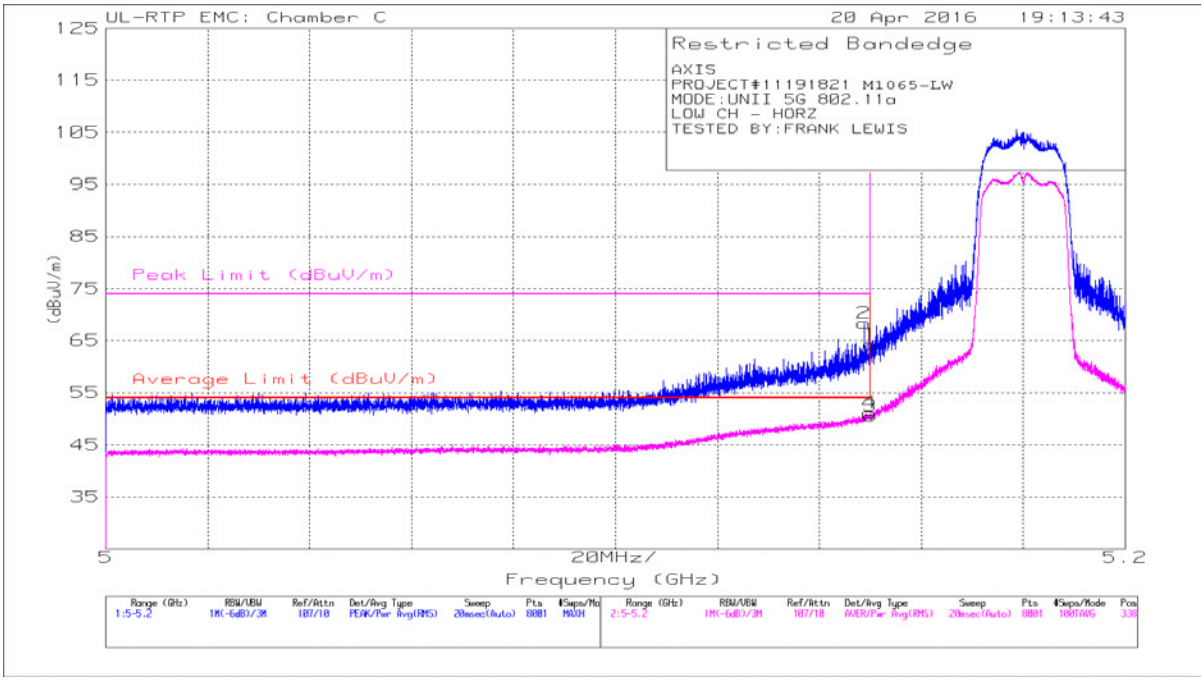
9.2. TRANSMITTER 1-18 GHz

9.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

Horizontal



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
2	* 5.149	57.34	Pk	34.3	-23.3	0	68.34	-	-	74	-5.66	338	107	H
4	* 5.15	40	RMS	34.3	-23.3	0	51.0	54	-3.0	-	-	338	107	H
1	5.15	53.33	Pk	34.3	-23.3	0	64.33	-	-	74	-9.67	338	107	H
3	5.15	39.39	RMS	34.3	-23.3	0	50.39	54	-3.61	-	-	338	107	H

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

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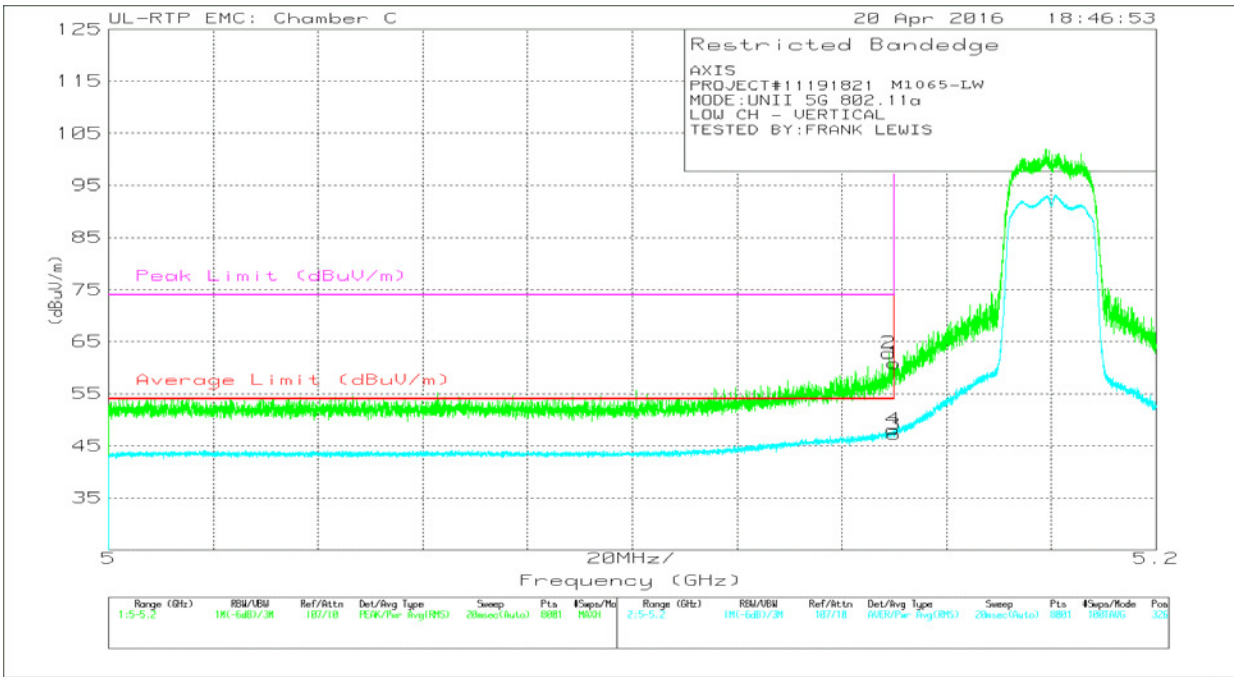
Vertical



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
2	* 5.149	51.82	Pk	34.3	-23.3	0	62.82	-	-	74	-11.18	326	198	V
4	* 5.15	37.05	RMS	34.3	-23.3	0	48.05	54	-5.95	-	-	326	198	V
1	5.15	49.87	Pk	34.3	-23.3	0	60.87	-	-	74	-13.13	326	198	V
3	5.15	36.15	RMS	34.3	-23.3	0	47.15	54	-6.85	-	-	326	198	V

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

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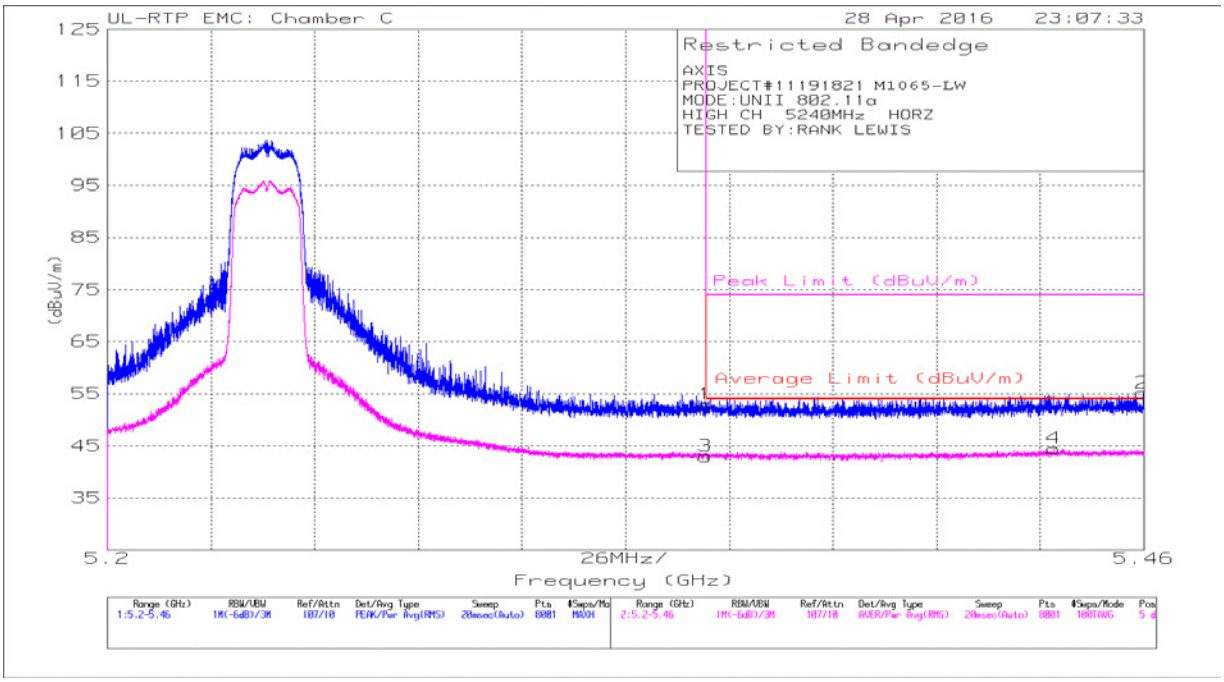
AUTHORIZED BANDEDGE (HIGH CHANNEL)

Horizontal



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	* 5.35	41.05	Pk	34.7	-22.8	0	52.95	-	-	74	-21.05	5	191	H
2	* 5.46	42.41	Pk	34.7	-22	0	55.11	-	-	74	-18.89	5	191	H
3	* 5.35	31.03	RMS	34.7	-22.8	0	42.93	54	-11.07	-	-	5	191	H
4	* 5.437	31.89	RMS	34.7	-22.2	0	44.39	54	-9.61	-	-	5	191	H

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

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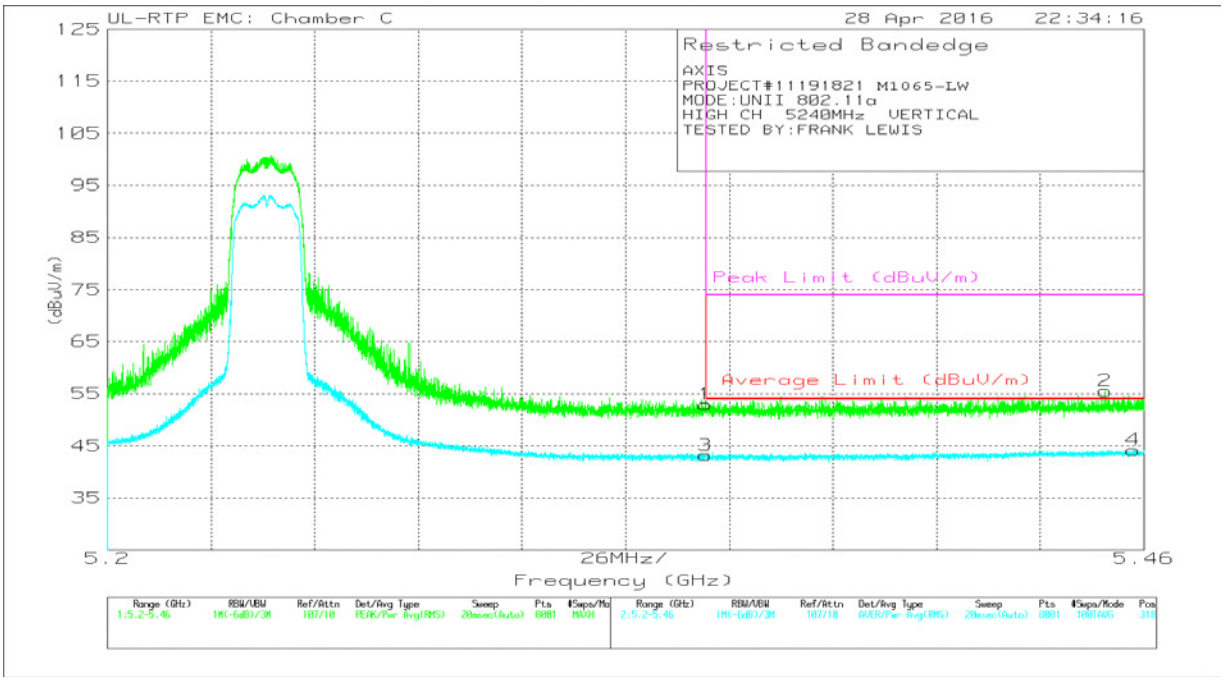
Vertical



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	* 5.35	41.06	Pk	34.7	-22.8	0	52.96	-	-	74	-21.04	318	188	V
2	* 5.45	42.92	Pk	34.7	-22.1	0	55.52	-	-	74	-18.48	318	188	V
3	* 5.35	31.19	RMS	34.7	-22.8	0	43.09	54	-10.91	-	-	318	188	V
4	* 5.457	31.51	RMS	34.7	-22.1	0	44.11	54	-9.89	-	-	318	188	V

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

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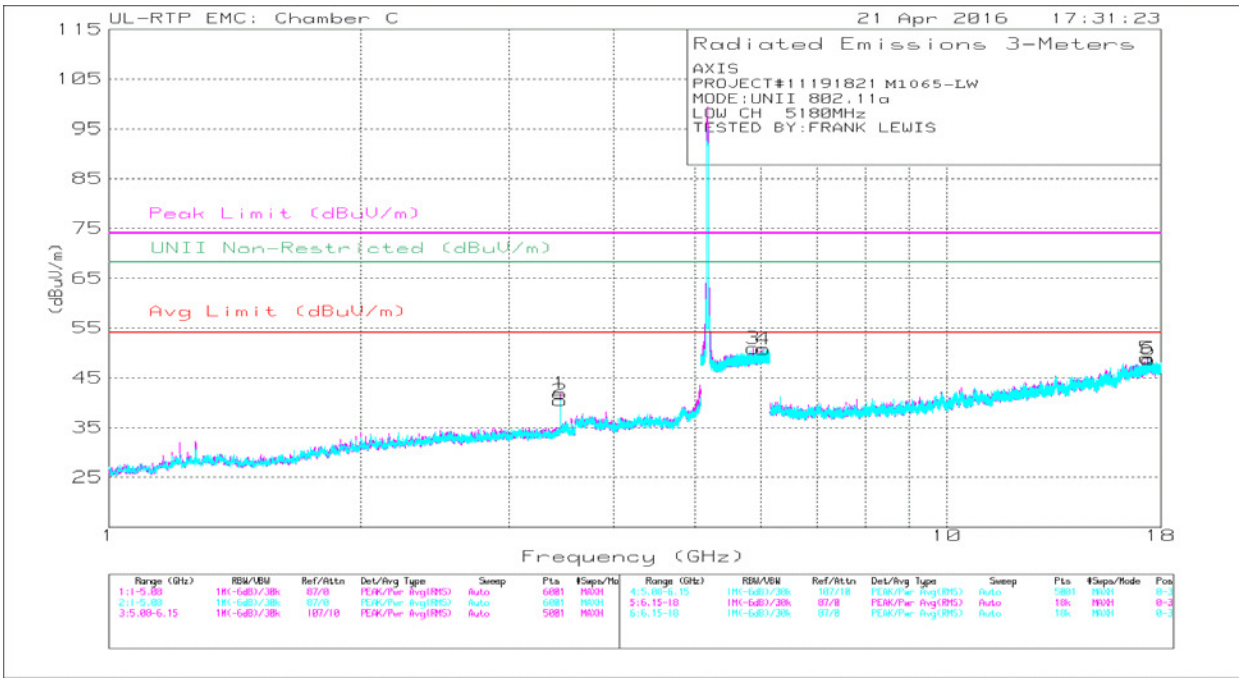
HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.453	47.99	PK-U	33	-33.7	0	47.29	-	-	-	-	68.2	-20.91	43	101	H
3	5.861	42.61	PK-U	34.8	-21.2	0	56.21	-	-	-	-	68.2	-11.99	72	285	H
5	17.357	32.33	PK-U	41.6	-20.4	0	53.53	-	-	-	-	68.2	-14.67	240	174	H
2	3.453	46.43	PK-U	33	-33.7	0	45.73	-	-	-	-	68.2	-22.47	87	101	V
4	6.021	41.69	PK-U	35.2	-20.6	0	56.29	-	-	-	-	68.2	-11.91	195	364	V
6	17.425	32.44	PK-U	41.7	-19.9	0	54.24	-	-	-	-	68.2	-13.96	40	287	V

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

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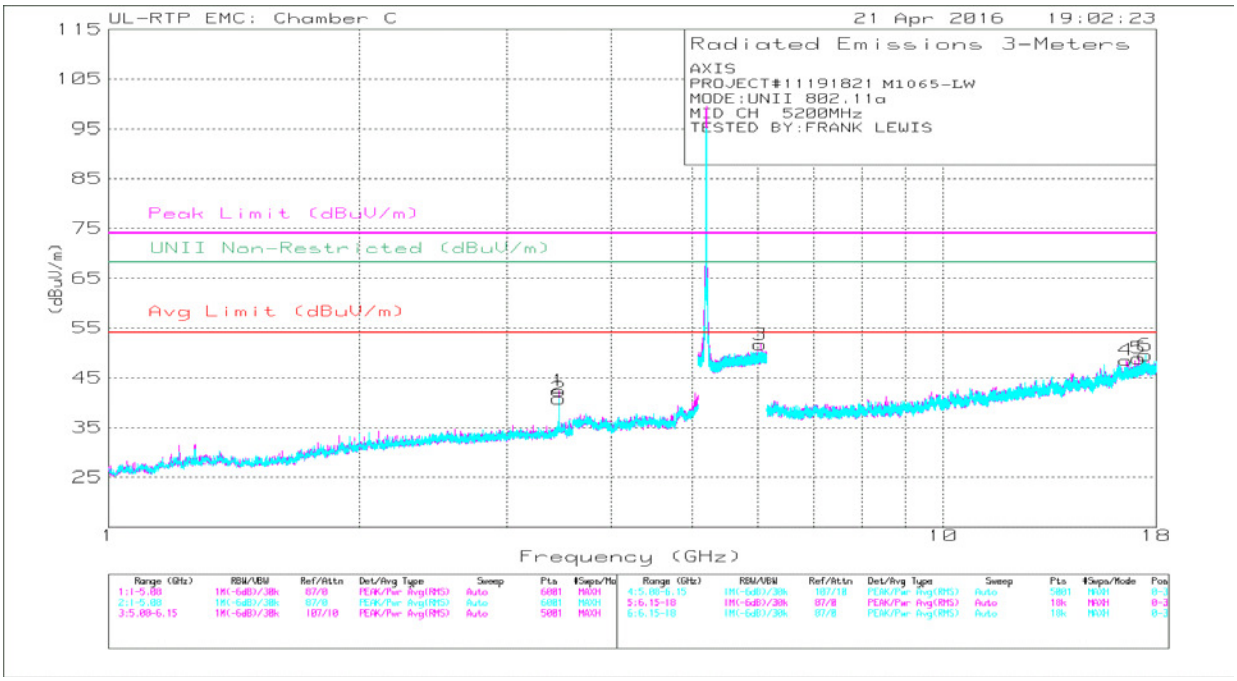
Mid Channel



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.467	48.34	PK-U	33.4	-33.9	0	47.84	-	-	-	-	68.2	-20.36	54	125	H
3	6.037	41.44	PK-U	35.3	-20.6	0	56.14	-	-	-	-	68.2	-12.06	318	136	H
4	16.555	33.29	PK-U	41.6	-21.5	0	53.39	-	-	-	-	68.2	-14.81	5	143	H
5	17.162	33.44	PK-U	41.5	-20.8	0	54.14	-	-	-	-	68.2	-14.06	301	385	H
2	3.467	46.96	PK-U	33.4	-33.9	0	46.46	-	-	-	-	68.2	-21.74	86	106	V
6	17.471	32.11	PK-U	41.6	-20.1	0	53.61	-	-	-	-	68.2	-14.59	46	143	V

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

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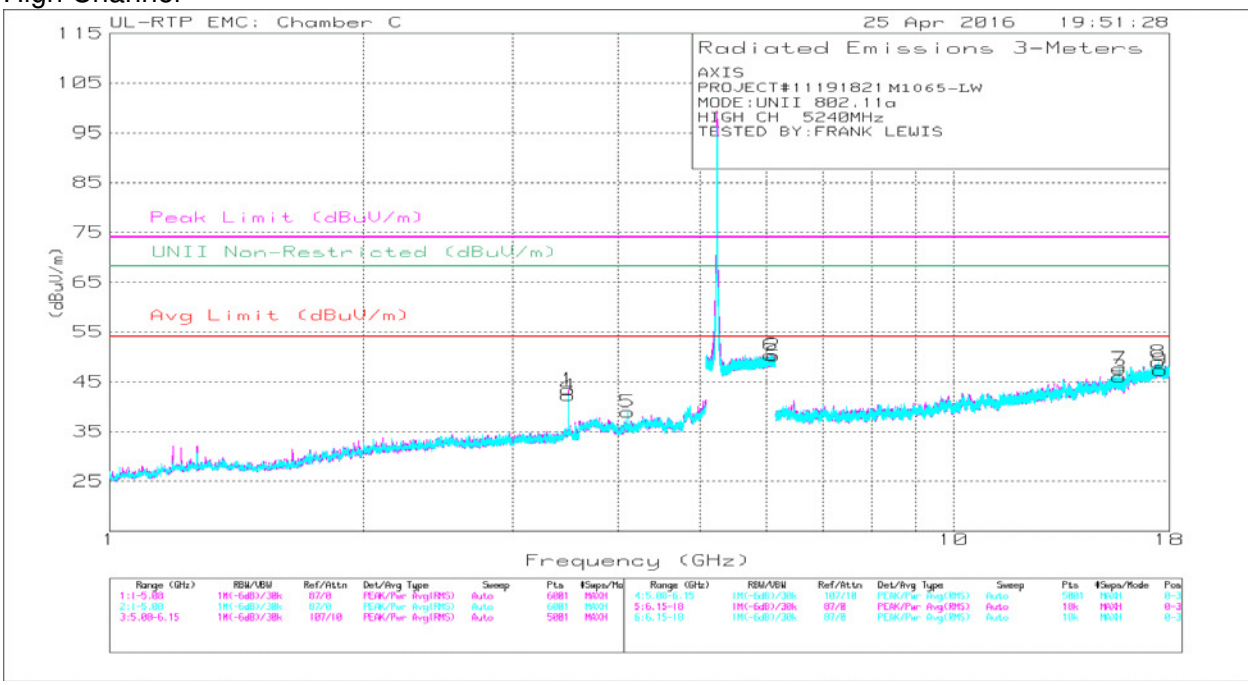
High Channel



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.115	43.61	PK-U	33.6	-33.6	0	43.61	-	-	74	-30.39	-	-	355	392	V
	* 4.116	31.42	ADR	33.6	-33.7	0	31.32	54	-22.68	-	-	-	-	355	392	V
3	* 15.721	37.35	PK-U	40.5	-24.3	0	53.55	-	-	74	-20.45	-	-	41	219	H
	* 15.721	25.68	ADR	40.5	-24.3	0	41.88	54	-12.12	-	-	-	-	41	219	H
7	* 15.719	39.68	PK-U	40.5	-24.3	0	55.88	-	-	74	-18.12	-	-	46	190	V
	* 15.72	27.7	ADR	40.5	-24.3	0	43.90	54	-10.10	-	-	-	-	46	190	V
1	3.493	48	PK-U	34.1	-34.3	0	47.8	-	-	-	-	68.2	-20.4	44	109	H
2	6.12	41.72	PK-U	35.3	-20.5	0	56.52	-	-	-	-	68.2	-11.68	138	400	H
9	17.581	32.86	PK-U	41.5	-20.1	0	54.26	-	-	-	-	68.2	-13.94	104	248	H
4	3.493	47.16	PK-U	34.1	-34.3	0	46.96	-	-	-	-	68.2	-21.24	69	102	V
6	6.076	41.65	PK-U	35.3	-20.4	0	56.55	-	-	-	-	68.2	-11.65	339	116	V
8	17.478	33.05	PK-U	41.6	-20.2	0	54.45	-	-	-	-	68.2	-13.75	283	314	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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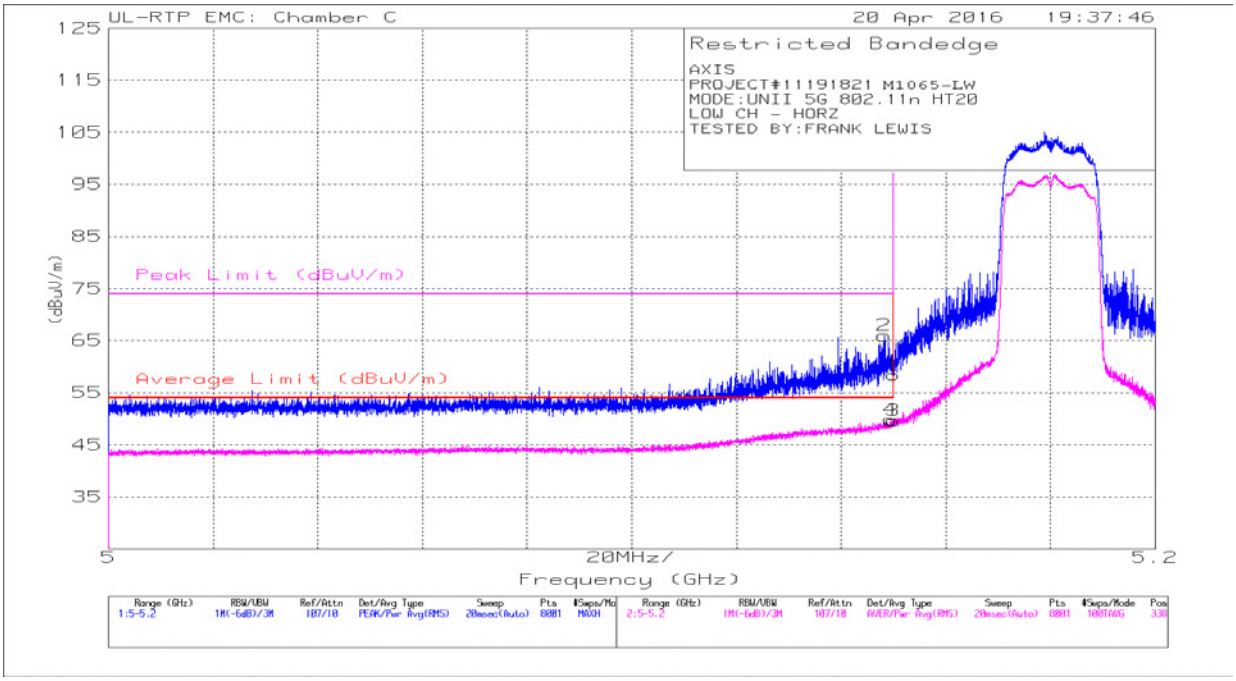
9.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

Horizontal



Marker	Freq. (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
2	* 5.148	54.94	Pk	34.3	-23.3	0	65.94	-	-	74	-8.06	338	102	H
4	* 5.149	38.72	RMS	34.3	-23.3	0	49.72	54	-4.28	-	-	338	102	H
1	5.15	47.45	Pk	34.3	-23.3	0	58.45	-	-	74	-15.55	338	102	H
3	5.15	38.59	RMS	34.3	-23.3	0	49.59	54	-4.41	-	-	338	102	H

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

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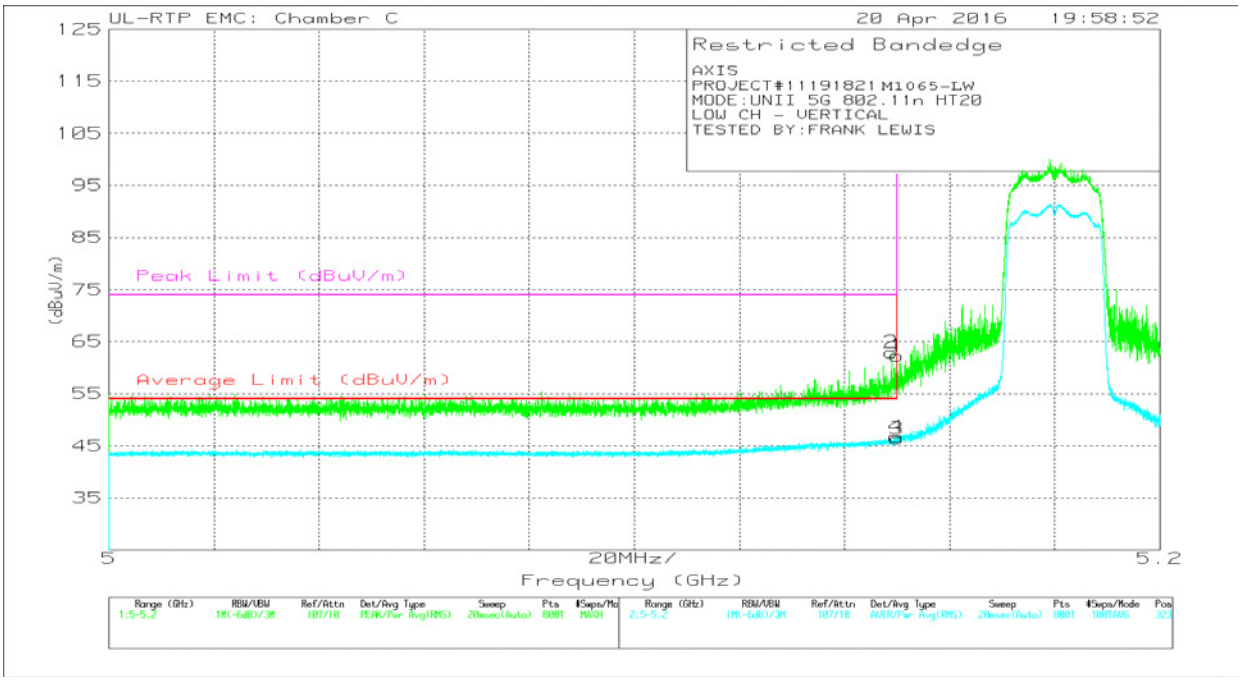
Vertical



Marker	Freq (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
2	* 5.149	51.93	Pk	34.3	-23.3	0	62.93	-	-	74	-11.07	323	199	V
4	* 5.15	35.65	RMS	34.3	-23.3	0	46.65	54	-7.35	-	-	323	199	V
1	5.15	51.29	Pk	34.3	-23.3	0	62.29	-	-	74	-11.71	323	199	V
3	5.15	35.28	RMS	34.3	-23.3	0	46.28	54	-7.72	-	-	323	199	V

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

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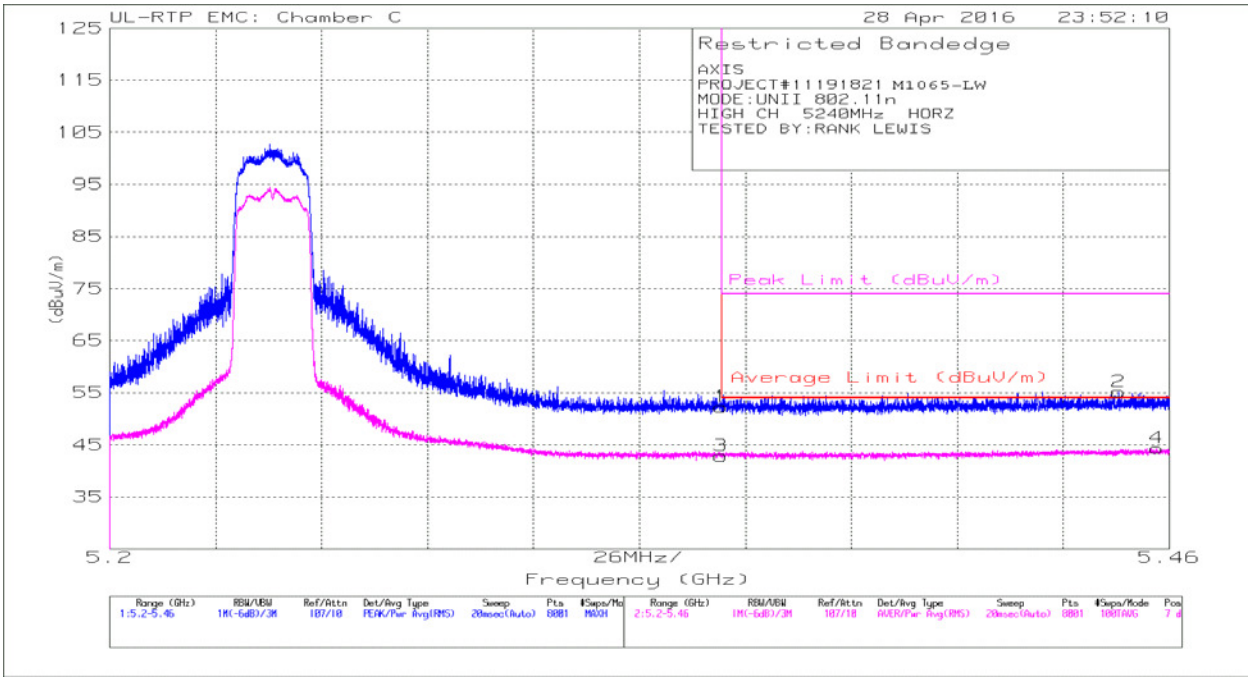
AUTHORIZED BANDEDGE (HIGH CHANNEL)

Horizontal



Marker	Freq. (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	* 5.35	40.37	Pk	34.7	-22.8	0	52.27	-	-	74	-21.73	7	205	H
2	* 5.448	42.58	Pk	34.7	-22.1	0	55.18	-	-	74	-18.82	7	205	H
3	* 5.35	30.9	RMS	34.7	-22.8	0	42.80	54	-11.20	-	-	7	205	H
4	* 5.457	31.68	RMS	34.7	-22.1	0	44.28	54	-9.72	-	-	7	205	H

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

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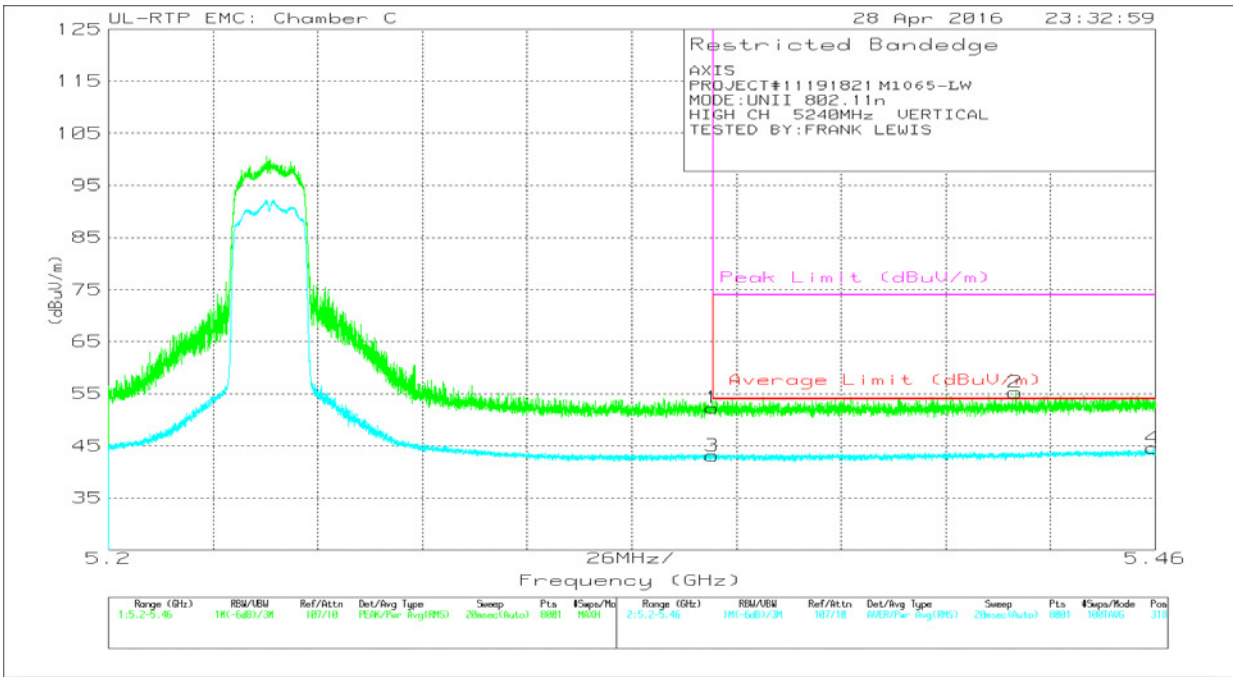
Vertical



Marker	Freq. (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	* 5.35	40.4	Pk	34.7	-22.8	0	52.3	-	-	74	-21.7	318	204	V
2	* 5.425	42.99	Pk	34.7	-22.4	0	55.29	-	-	74	-18.71	318	204	V
3	* 5.35	31.12	RMS	34.7	-22.8	0	43.02	54	-10.98	-	-	318	204	V
4	* 5.459	31.74	RMS	34.7	-22	0	44.44	54	-9.56	-	-	318	204	V

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

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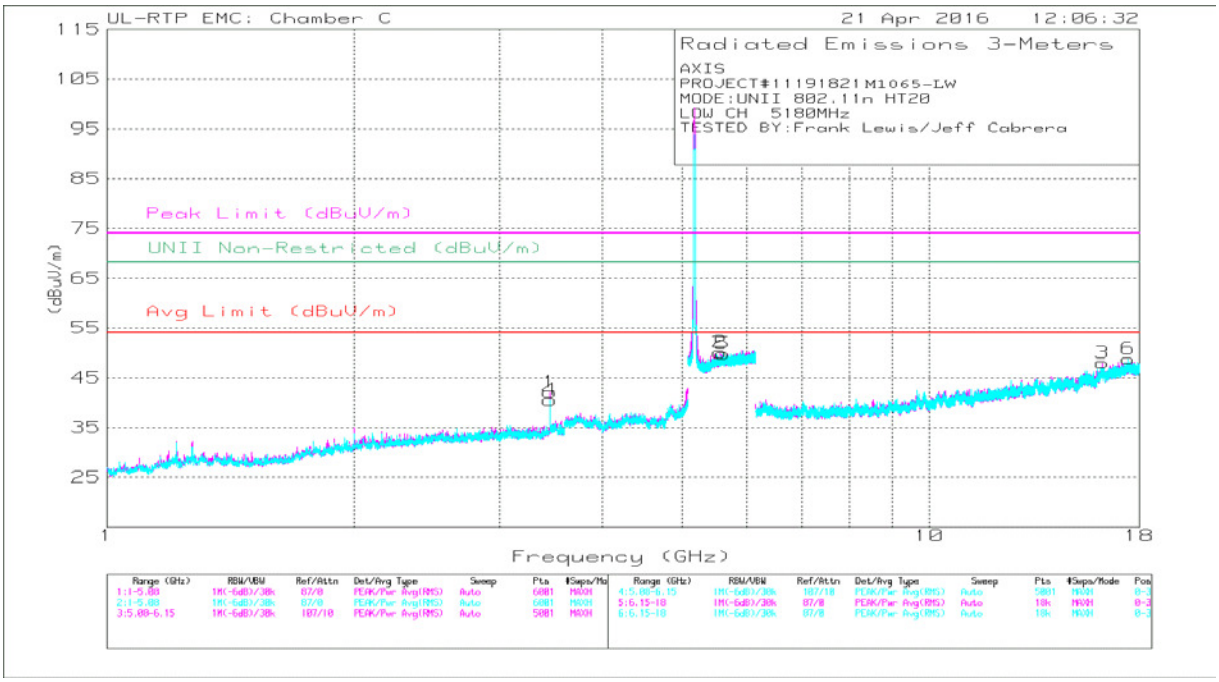
HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.453	47.13	PK-U	33	-33.7	0	46.43	-	-	-	-	68.2	-21.77	51	118	H
2	5.589	43.47	PK-U	34.5	-22	0	55.97	-	-	-	-	68.2	-12.23	335	252	H
3	16.241	34.66	PK-U	41.1	-21.8	0	53.96	-	-	-	-	68.2	-14.24	37	323	H
4	3.453	46.69	PK-U	33	-33.7	0	45.99	-	-	-	-	68.2	-22.21	88	110	V
5	5.611	43.4	PK-U	34.5	-22	0	55.9	-	-	-	-	68.2	-12.3	36	127	V
6	17.452	33.07	PK-U	41.6	-19.8	0	54.87	-	-	-	-	68.2	-13.33	145	179	V

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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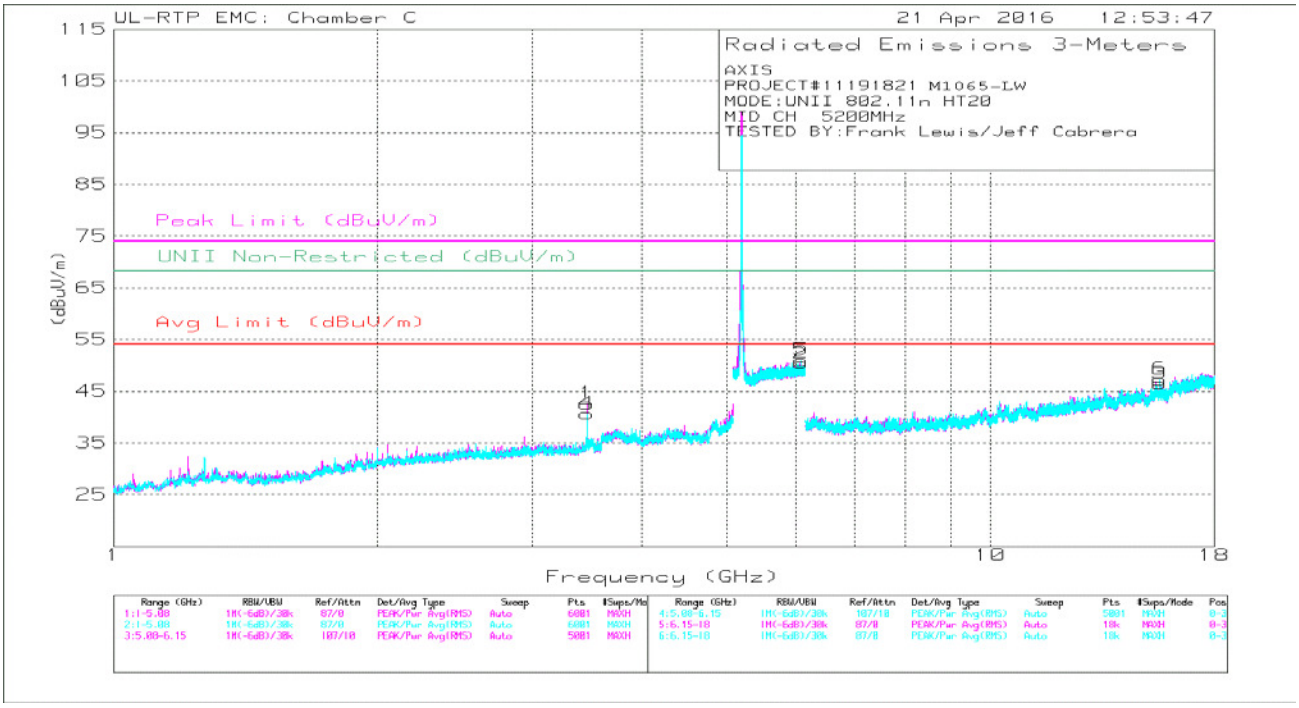
Mid Channel



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 15.602	35.77	PK-U	40.5	-23.5	0	52.77	-	-	74	-21.23	-	-	312	156	H
	* 15.602	23.79	ADR	40.5	-23.6	0	40.69	54	-13.31	-	-	-	-	312	156	H
6	* 15.597	37.89	PK-U	40.5	-23.7	0	54.69	-	-	74	-19.31	-	-	45	183	V
	* 15.597	25.14	ADR	40.5	-23.6	0	42.04	54	-11.96	-	-	-	-	45	183	V
1	3.467	48.24	PK-U	33.4	-33.9	0	47.74	-	-	-	-	68.2	-20.46	53	111	H
2	6.086	41.34	PK-U	35.3	-20.4	0	56.24	-	-	-	-	68.2	-11.96	96	121	H
4	3.467	46.88	PK-U	33.4	-33.9	0	46.38	-	-	-	-	68.2	-21.82	13	106	V
5	6.074	42.65	PK-U	35.3	-20.5	0	57.45	-	-	-	-	68.2	-10.75	360	206	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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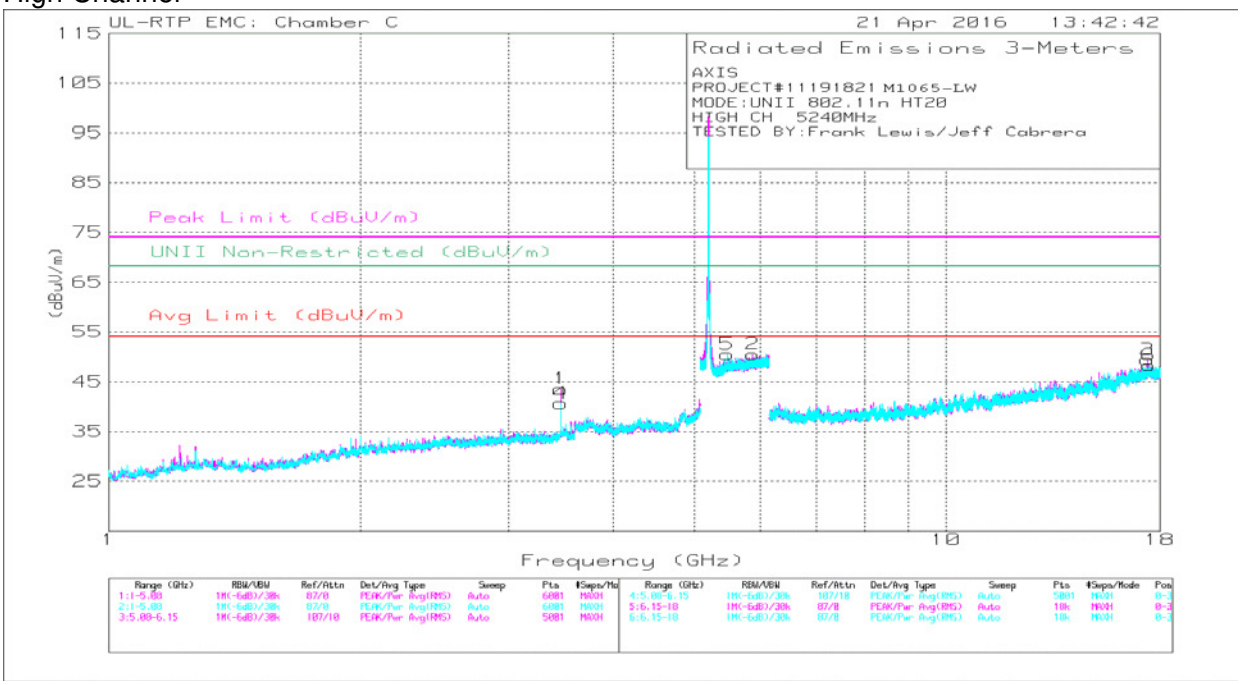
High Channel



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.493	47.94	PK-U	34.2	-34.3	0	47.84	-	-	-	-	68.2	-20.36	39	101	H
2	5.876	43.37	PK-U	34.9	-21.1	0	57.17	-	-	-	-	68.2	-11.03	11	224	H
3	17.393	33.95	PK-U	41.8	-20.6	0	55.15	-	-	-	-	68.2	-13.05	191	240	H
4	3.493	46.84	PK-U	34.2	-34.3	0	46.74	-	-	-	-	68.2	-21.46	69	102	V
5	5.477	43.32	PK-U	34.6	-22	0	55.92	-	-	-	-	68.2	-12.28	139	185	V
6	17.47	32.98	PK-U	41.6	-20	0	54.58	-	-	-	-	68.2	-13.62	211	354	V

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

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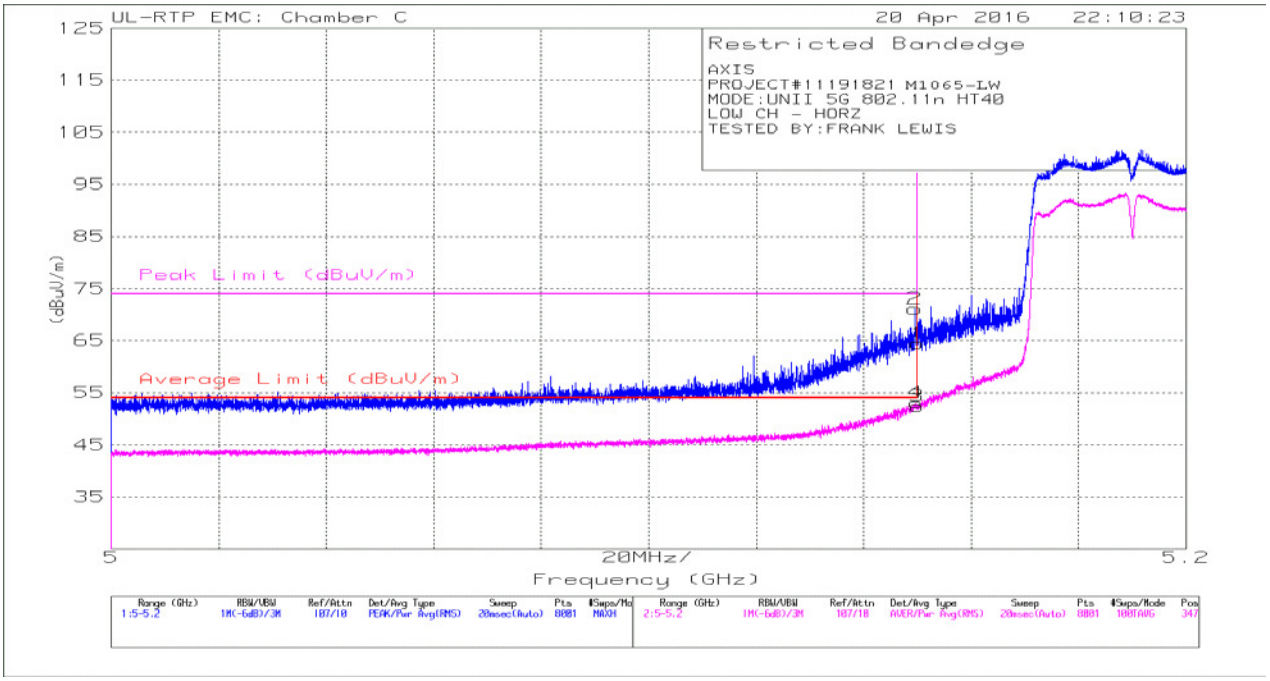
9.2.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

Horizontal



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
2	* 5.15	60.13	Pk	34.3	-23.3	0	71.13	-	-	74	-2.87	347	105	H
4	* 5.15	42	RMS	34.3	-23.3	.12	53.12	54	-0.88	-	-	347	105	H
1	5.15	53.47	Pk	34.3	-23.3	0	64.47	-	-	74	-9.53	347	105	H
3	5.15	41.29	RMS	34.3	-23.3	.12	52.41	54	-1.59	-	-	347	105	H

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

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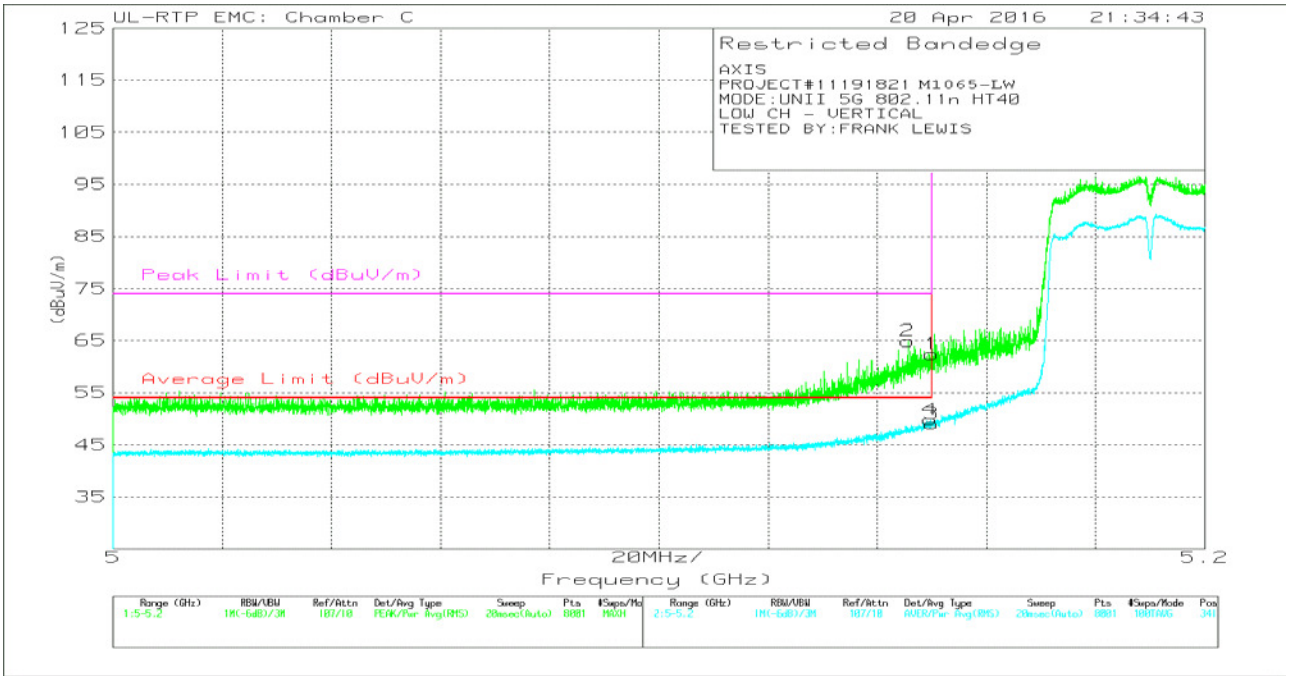
Vertical



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
2	* 5.146	53.91	Pk	34.3	-23.3	0	64.91	-	-	74	-9.09	341	200	V
4	* 5.15	38.74	RMS	34.3	-23.3	.12	49.86	54	-4.14	-	-	341	200	V
1	5.15	51.45	Pk	34.3	-23.3	0	62.45	-	-	74	-11.55	341	200	V
3	5.15	37.95	RMS	34.3	-23.3	.12	49.07	54	-4.93	-	-	341	200	V

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

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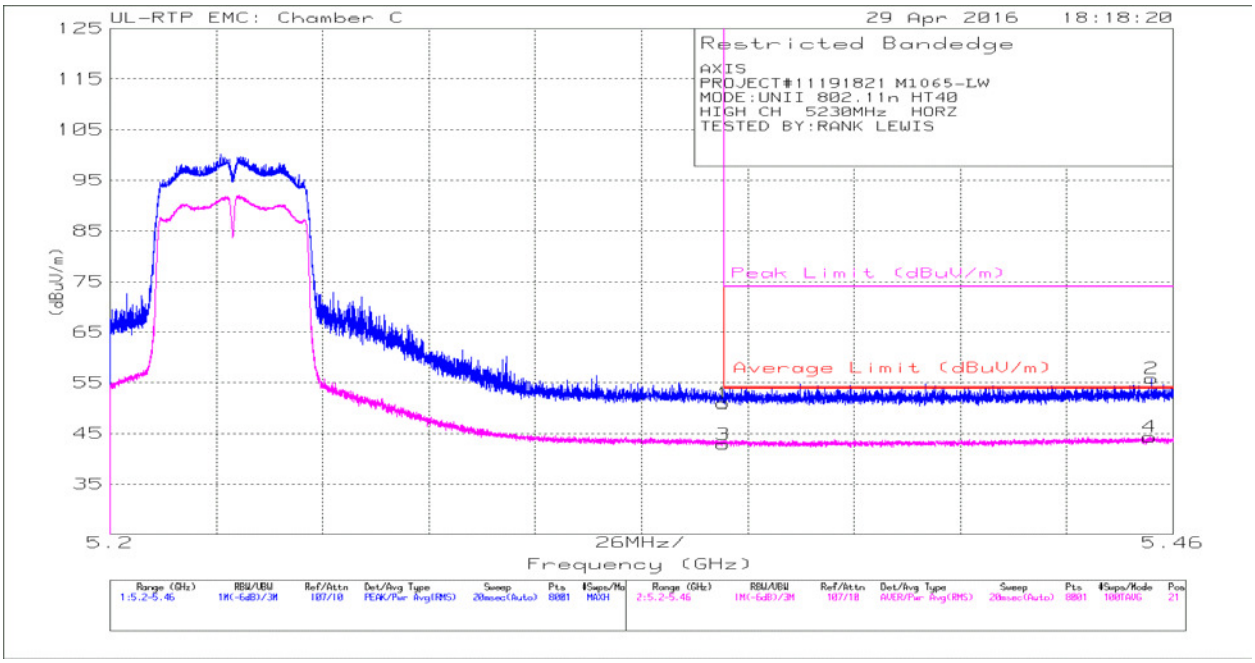
AUTHORIZED BANDEDGE (HIGH CHANNEL)

Horizontal



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	* 5.35	39.05	Pk	34.7	-22.8	0	50.95	-	-	74	-23.05	21	146	H
2	* 5.455	43.26	Pk	34.7	-22.1	0	55.86	-	-	74	-18.14	21	146	H
3	* 5.35	30.84	RMS	34.7	-22.8	.12	42.86	54	-11.14	-	-	21	146	H
4	* 5.454	31.62	RMS	34.7	-22.1	.12	44.34	54	-9.66	-	-	21	146	H

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

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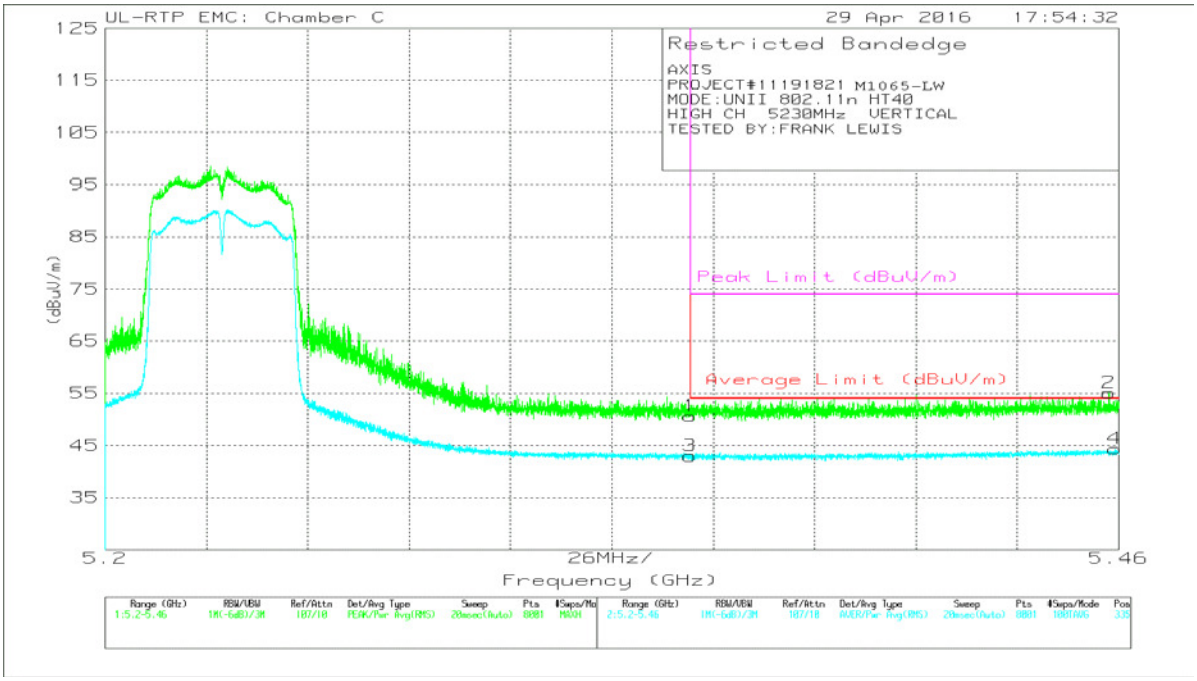
Vertical



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	* 5.35	38.75	Pk	34.7	-22.8	0	50.65	-	-	74	-23.35	335	196	V
2	* 5.457	42.49	Pk	34.7	-22.1	0	55.09	-	-	74	-18.91	335	196	V
3	* 5.35	31.03	RMS	34.7	-22.8	.12	43.05	54	-10.95	-	-	335	196	V
4	* 5.459	31.69	RMS	34.7	-22.1	.12	44.41	54	-9.59	-	-	335	196	V

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

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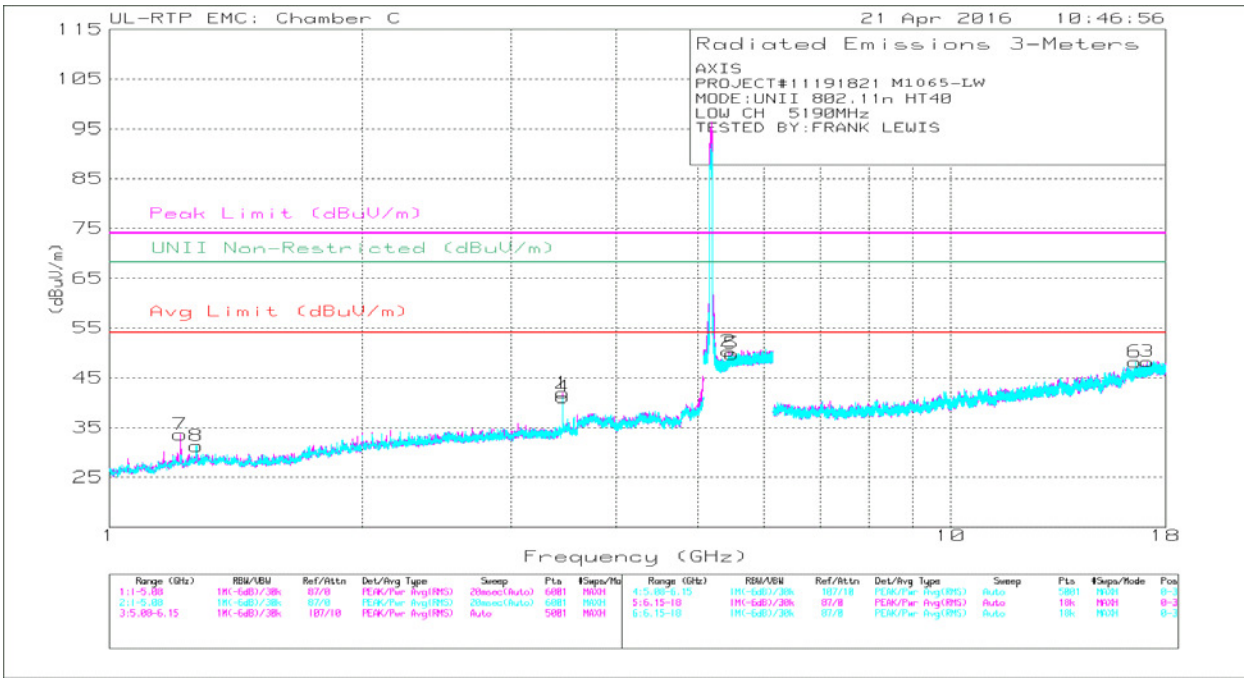
HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Marker	Freq (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7	* 1.215	48.64	PK-U	28.3	-39.6	0	37.34	-	-	74	-36.66	-	-	219	187	H
	* 1.215	39.12	ADR	28.3	-39.6	.12	27.94	54	-26.06	-	-	-	-	219	187	H
8	* 1.269	49.96	PK-U	28.4	-39.4	0	38.96	-	-	74	-35.04	-	-	264	147	H
	* 1.269	40.79	ADR	28.4	-39.4	.12	29.91	54	-24.09	-	-	-	-	264	147	H
2	* 5.449	42.76	PK-U	34.7	-22.1	0	55.36	-	-	74	-18.64	-	-	291	384	H
	* 5.451	31.04	ADR	34.7	-22.1	.12	43.76	54	-10.24	-	-	-	-	291	384	H
1	3.46	47.58	PK-U	33.2	-33.8	0	46.98	-	-	-	-	68.2	-21.22	48	113	H
3	17.127	33.78	PK-U	41.6	-20.6	0	54.78	-	-	-	-	68.2	-13.42	321	144	H
4	3.46	46.69	PK-U	33.2	-33.8	0	46.09	-	-	-	-	68.2	-22.11	90	112	V
5	5.506	43.96	PK-U	34.6	-22	0	56.56	-	-	-	-	68.2	-11.64	210	303	V
6	16.559	33.98	PK-U	41.6	-21.5	0	54.08	-	-	-	-	68.2	-14.12	79	280	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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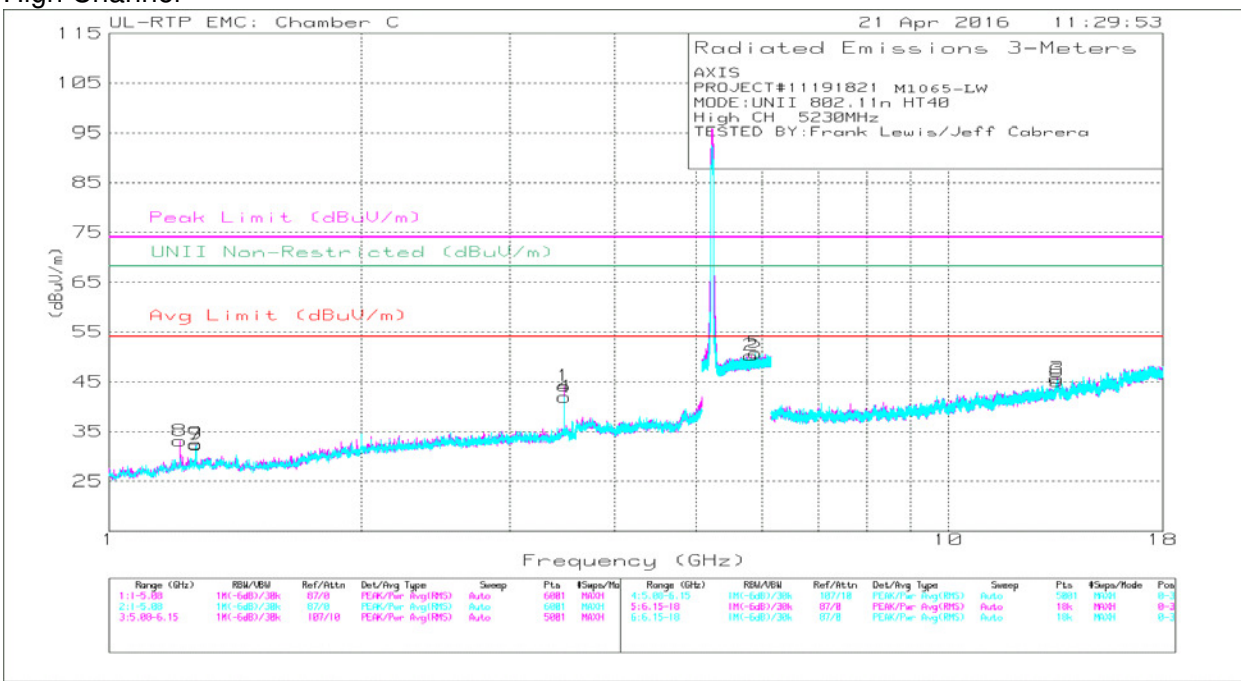
High Channel



Marker	Freq (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7	* 1.269	49.42	PK-U	28.4	-39.4	0	38.42	-	-	74	-35.58	-	-	264	197	H
	* 1.269	40.5	ADR	28.4	-39.4	.12	29.62	54	-24.38	-	-	-	-	264	197	H
8	* 1.215	49.19	PK-U	28.3	-39.6	0	37.89	-	-	74	-36.11	-	-	212	199	H
	* 1.215	39.65	ADR	28.3	-39.6	.12	28.47	54	-25.53	-	-	-	-	212	199	H
9	* 1.269	48.94	PK-U	28.4	-39.4	0	37.94	-	-	74	-36.06	-	-	108	130	V
	* 1.269	38.78	ADR	28.4	-39.4	.12	27.90	54	-26.10	-	-	-	-	108	130	V
1	3.487	48.1	PK-U	34	-34.1	0	48	-	-	-	-	68.2	-20.2	56	101	H
4	3.487	47.25	PK-U	34	-34.1	0	47.15	-	-	-	-	68.2	-21.05	70	101	V
2	5.819	42.74	PK-U	34.7	-21.3	0	56.14	-	-	-	-	68.2	-12.06	165	139	H
5	5.88	43.14	PK-U	34.9	-21.1	0	56.94	-	-	-	-	68.2	-11.26	226	388	V
3	13.449	35.56	PK-U	39.1	-23.7	0	50.96	-	-	-	-	68.2	-17.24	123	398	H
6	13.464	35.81	PK-U	39	-23.2	0	51.61	-	-	-	-	68.2	-16.59	169	208	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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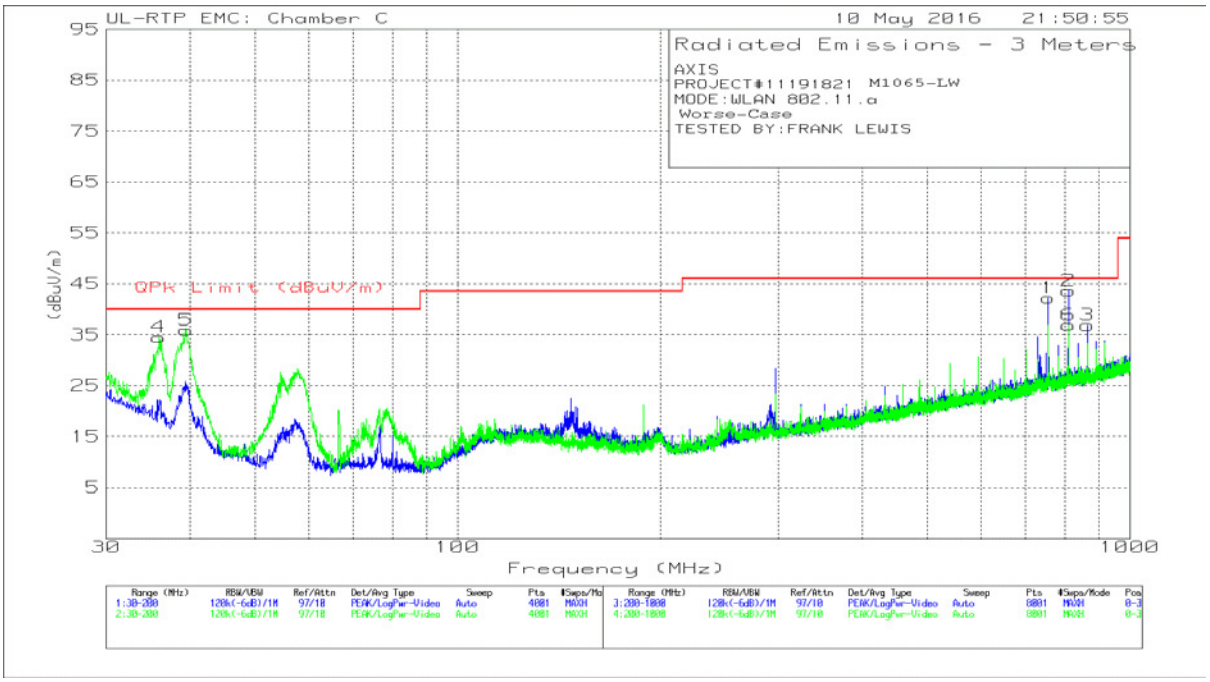
9.3. WORST-CASE BELOW 1 GHz

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	756.0132	46.19	Qp	25.8	-28.3	43.69	46.02	-2.33	280	117	H
2	810.0127	46.31	Qp	26.3	-28	44.61	46.02	-1.41	227	101	H
3	864.0204	38.93	Qp	26.5	-27.6	37.83	46.02	-8.19	50	101	H
4	35.925	40.84	Qp	21.6	-31.5	30.94	40	-9.06	42	115	V
5	39.4835	44.87	Qp	18.8	-31.5	32.17	40	-7.83	51	105	V
6	810.016	43.02	Qp	26.3	-28	41.32	46.02	-4.7	323	131	V

Pk - Peak detector
Qp - Quasi-Peak detector

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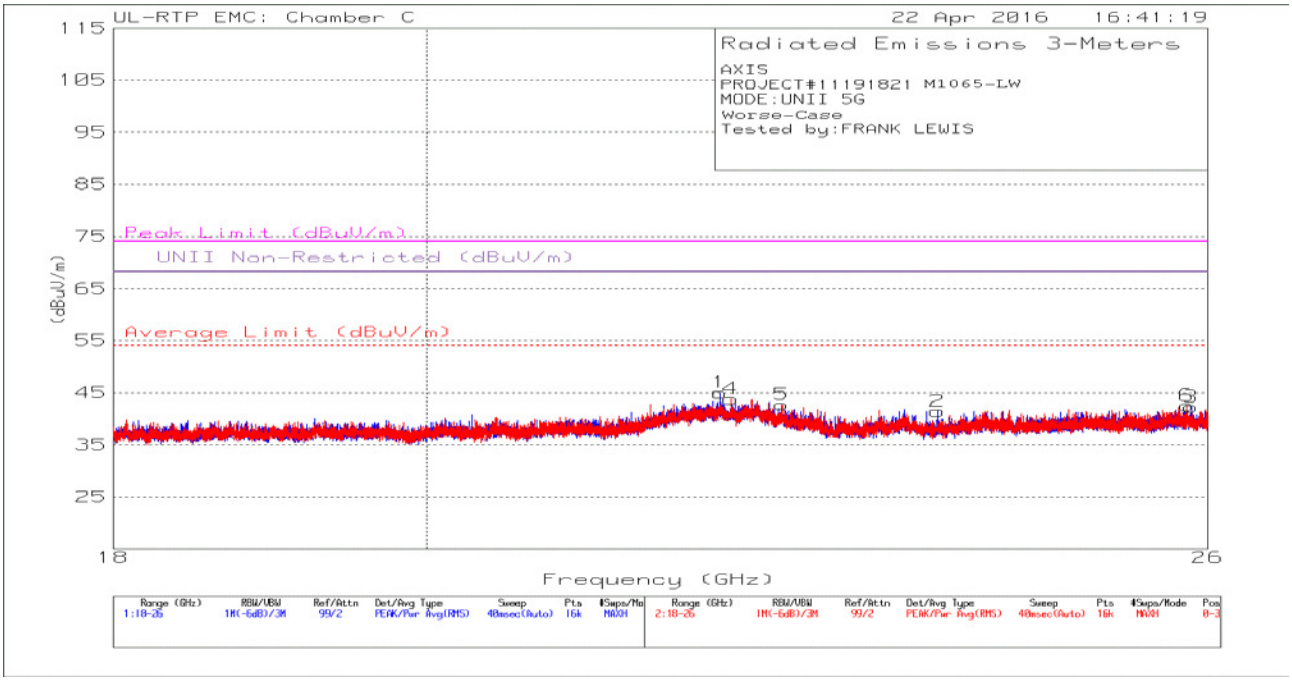
9.4. WORST-CASE 18-40GHz

SPURIOUS EMISSIONS 18 to 40GHz (WORST-CASE CONFIGURATION)



Marker	Freq. (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 22.076	48.02	PK-U	36.6	-40.7	0	43.92	54	-10.08	74	-30.08	-	-	185	116	H
2	* 23.753	48.01	PK-U	33.6	-39.5	0	42.11	54	-11.89	74	-31.89	-	-	127	190	H
4	* 22.154	47.61	PK-U	36.3	-40.5	0	43.41	54	-10.59	74	-30.59	-	-	311	242	V
5	* 22.537	48.68	PK-U	34.6	-40.3	0	42.98	54	-11.02	74	-31.02	-	-	75	201	V
3	25.854	47.79	PK-U	33.8	-37.8	0	43.79	-	-	-	-	68.2	-24.41	254	341	H
6	25.819	47.32	PK-U	33.9	-37.7	0	43.52	-	-	-	-	68.2	-24.68	24	329	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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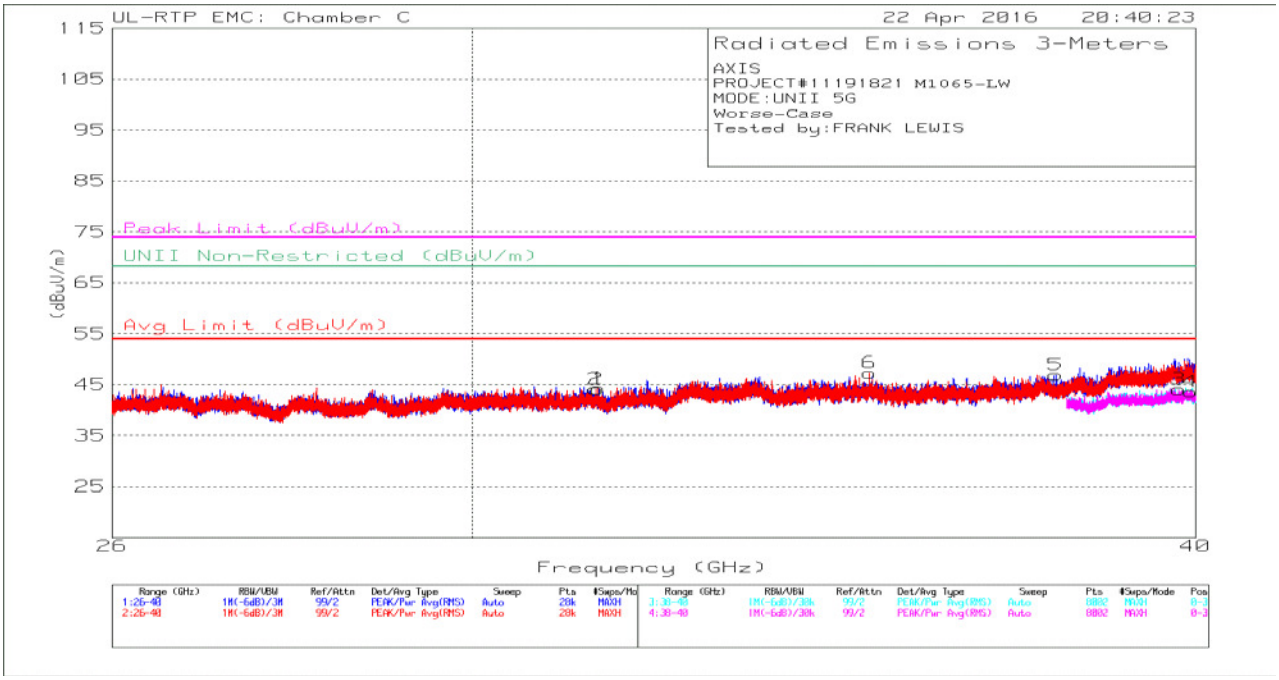

Marker	Freq. (GHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/ Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 31.543	43.32	PK-U	36.6	-35.1	0	44.82	54	-9.18	74	-29.18	-	-	328	310	H
3	* 39.74	43.11	PK-U	38.3	-31.8	0	49.61	-	-	74	-24.39	-	-	263	100	H
	* 39.731	31.89	ADR	38.3	-31.9	.12	38.41	54	-15.59	-	-	-	-	263	100	H
2	* 31.52	42.99	PK-U	36.5	-34.8	0	44.69	54	-9.31	74	-29.31	-	-	172	387	V
4	* 39.925	43.25	PK-U	38.4	-31.6	0	50.05	-	-	74	-23.95	-	-	2	295	V
	* 39.926	31.73	ADR	38.4	-31.6	.12	38.65	54	-15.35	-	-	-	-	2	295	V
5	37.837	44.59	PK-U	38	-34.6	0	47.99	-	-	-	-	68.2	-20.21	183	269	H
6	35.141	46.05	PK-U	37.3	-35.8	0	47.55	-	-	-	-	68.2	-20.65	73	136	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

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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.

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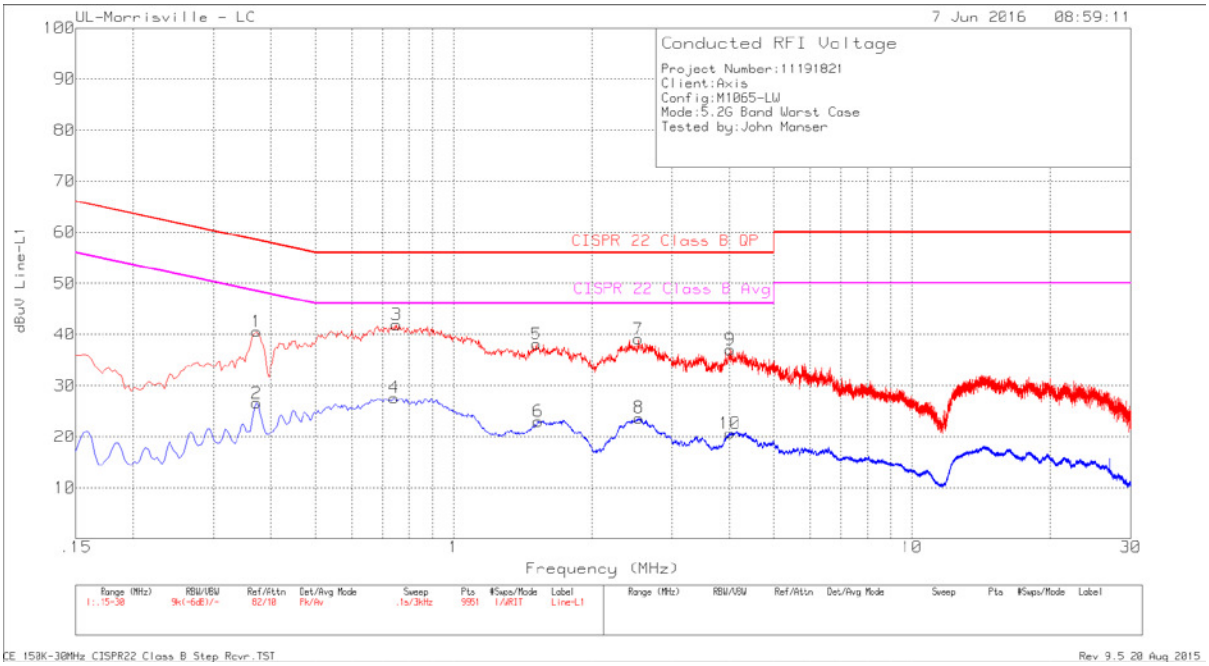
RESULTS

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	.372	30.79	Pk	.1	9.7	40.59	58.46	-17.87	-	-
2	.372	16.76	Av	.1	9.7	26.56	-	-	48.46	-21.9
3	.75	32.14	Pk	0	9.8	41.94	56	-14.06	-	-
4	.741	17.82	Av	0	9.8	27.62	-	-	46	-18.38
5	1.518	28.3	Pk	0	9.8	38.1	56	-17.9	-	-
6	1.53	13.22	Av	0	9.8	23.02	-	-	46	-22.98
7	2.532	29.18	Pk	.1	9.8	39.08	56	-16.92	-	-
8	2.538	13.77	Av	.1	9.8	23.67	-	-	46	-22.33
9	4.008	27.16	Pk	.1	9.8	37.06	56	-18.94	-	-
10	4.008	10.78	Av	.1	9.8	20.68	-	-	46	-25.32

Pk - Peak detector
Av - Average detection

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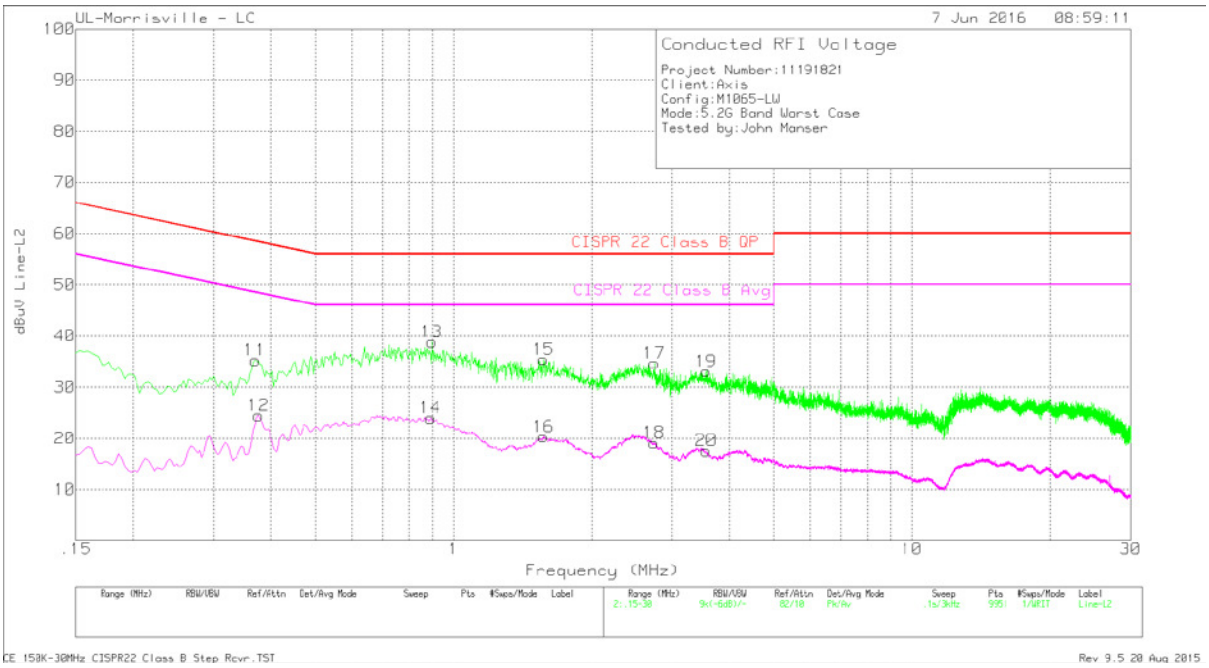
LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF [dB]	Cbl/Limiter (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
11	.369	25.45	Pk	.1	9.7	35.25	58.52	-23.27	-	-
12	.375	14.63	Av	.1	9.7	24.43	-	-	48.39	-23.96
13	.897	29.02	Pk	0	9.8	38.82	56	-17.18	-	-
14	.891	14.14	Av	0	9.8	23.94	-	-	46	-22.06
15	1.572	25.59	Pk	0	9.8	35.39	56	-20.61	-	-
16	1.572	10.49	Av	0	9.8	20.29	-	-	46	-25.71
17	2.742	24.91	Pk	0	9.8	34.71	56	-21.29	-	-
18	2.739	9.32	Av	0	9.8	19.12	-	-	46	-26.88
19	3.558	23.18	Pk	.1	9.8	33.08	56	-22.92	-	-
20	3.561	7.65	Av	.1	9.8	17.55	-	-	46	-28.45

Pk - Peak detector
Av - Average detection

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