FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT
CLASS II PERMISSIVE CHANGE

FOR

APPLE TV DEVICE (DIGITAL MEDIA RECEIVER) WITH WIFI AND BLUETOOTH RADIOS

MODEL NUMBER: A1469

FCC ID: BCGA1469

REPORT NUMBER: 15U21850-E16V2

ISSUE DATE: DECEMBER 17, 2015

Prepared for
APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	11/30/2015	Initial Issue	M. Mekuria
V2	12/17/2015	Revised report to address TCB's questions	T. Chu

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: APPLE TV DEVICE (DIGITAL MEDIA RECEIVER) WITH WIFI AND BLUETOOTH RADIOS.

MODEL: A1469

SERIAL NUMBER: PT779512

DATE TESTED: NOVEMBER 12 – NOVEMBER 17, 2015

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

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:

MENGISTU MEKURIA
SENIOR ENGINEER
UL VERIFICATION SERVICES INC.

Tested By:

ERIC YU
EMC LAB ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 905462 D02 v01r02/D03 v01r01/D06 v01, FCC KDB 789033 D02 v01, ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☐ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F
	☒ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple TV device is a digital media receiver designed to play internet content onto a TV through an HDMI port. It incorporates WiFi and Bluetooth radios.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

Upgrade EUT to 5.8GHz band new rule per FCC KDB 789033 D02 v01.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.8GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	18.90	77.62
5745 - 5825	802.11n HT20 SISO	18.90	77.62
5755 - 5795	802.11n HT40 SISO	18.10	64.57

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain
5.8	2.62

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Rel_6_10_56_189.

The test utility software used during testing was Broadcom WL tool Ver. 6.10 RC56.189.

5.6. 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 (Flatbed), Y (Landscape), Z (Portrait), it was determined that (see table below) was worst-case orientations. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency Band (GHz)	Mode	Antenna Port	Worst-case Orientation
5.8	1TX SISO	Chain 0	X-Flatbed

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	T61	AL664	N/A
Laptop AC/DC adapter	Lenovo	42T4418	11S42T4418Z1ZF3B03TAYD	N/A
USB Coupler	N/A	N/A	N/A	N/A
Monitor	Dell	N/A	1722177	N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Shielded	1	USB to mini
3	USB	1	USB	Shielded	1	USB to mini
4	USB	1	USB	Shielded	1	USB to mini
5	DC	1	DC	Shielded	2	N/A
6	AC	1	AC	Un-shielded	1	N/A
7	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer

I/O CABLES FOR ABLVE 1GHz RADIATED TEST

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	2	N/A

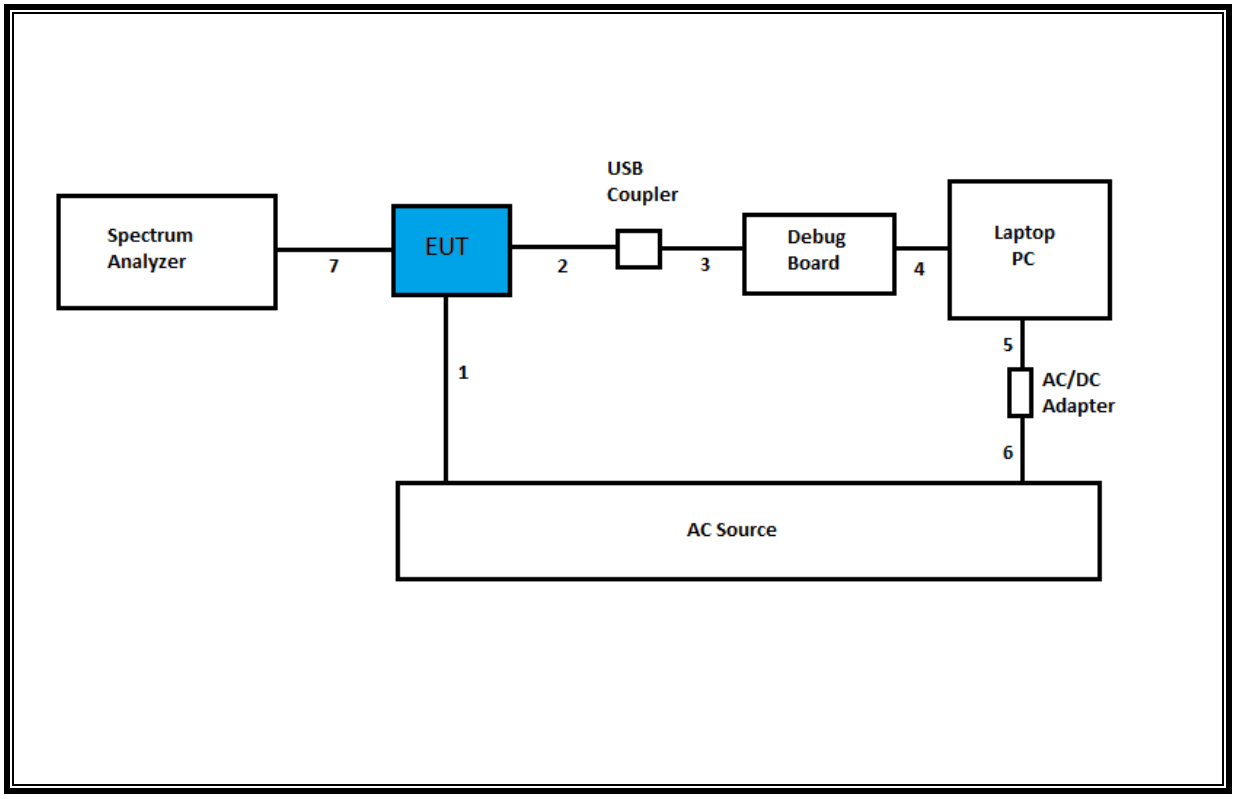
I/O CABLES (RADIATED BELOW 1GHz AND AC LINE CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	2	N/A
1	HDMI	1	AC	Shielded	2	N/A

TEST SETUP - CONDUCTED TESTS

The EUT was connected to a host Laptop via USB cable adapter through Debug Board and it is also connected to spectrum analyzer via antenna port during the test. Test software exercised the EUT during the tests.

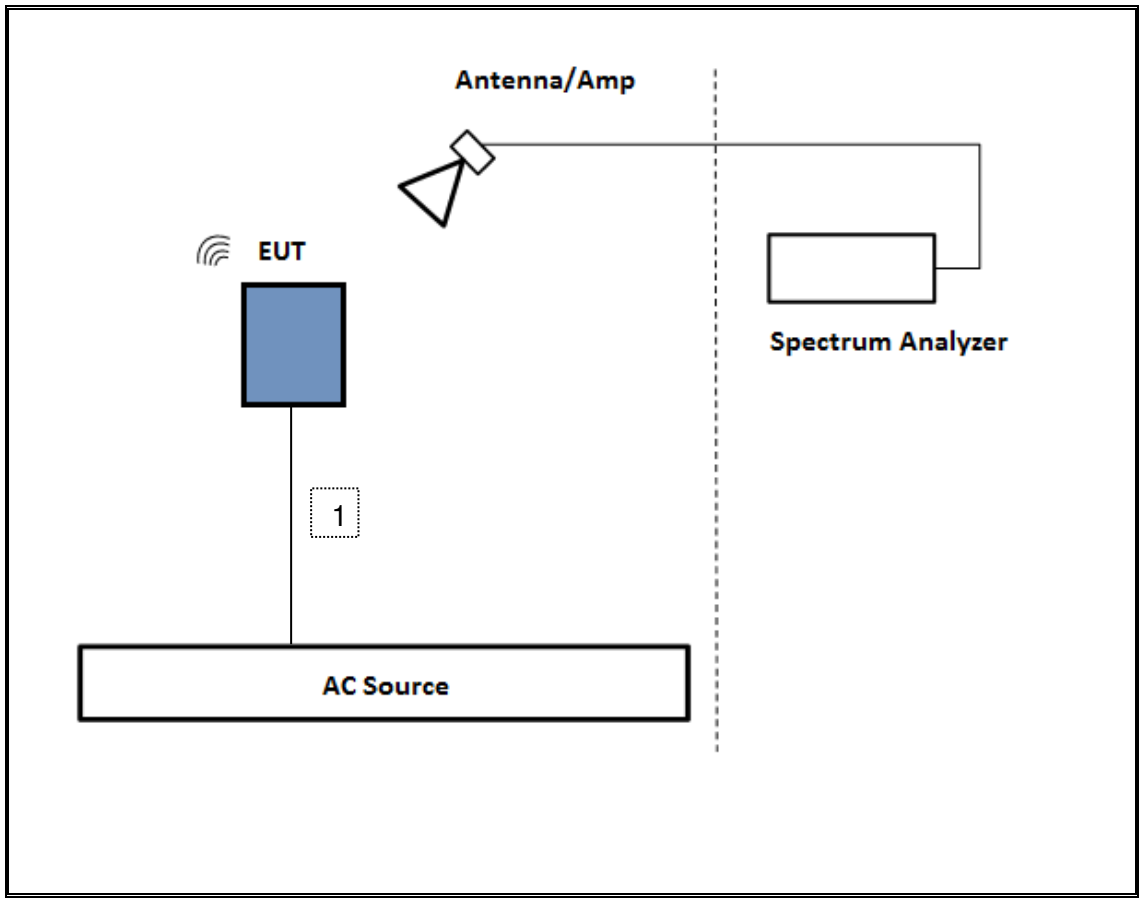
SETUP DIAGRAM



TEST SETUP- RADIATED ABOVE 1GHz

The EUT was tested as standalone devise. Test software exercised the EUT during the tests.

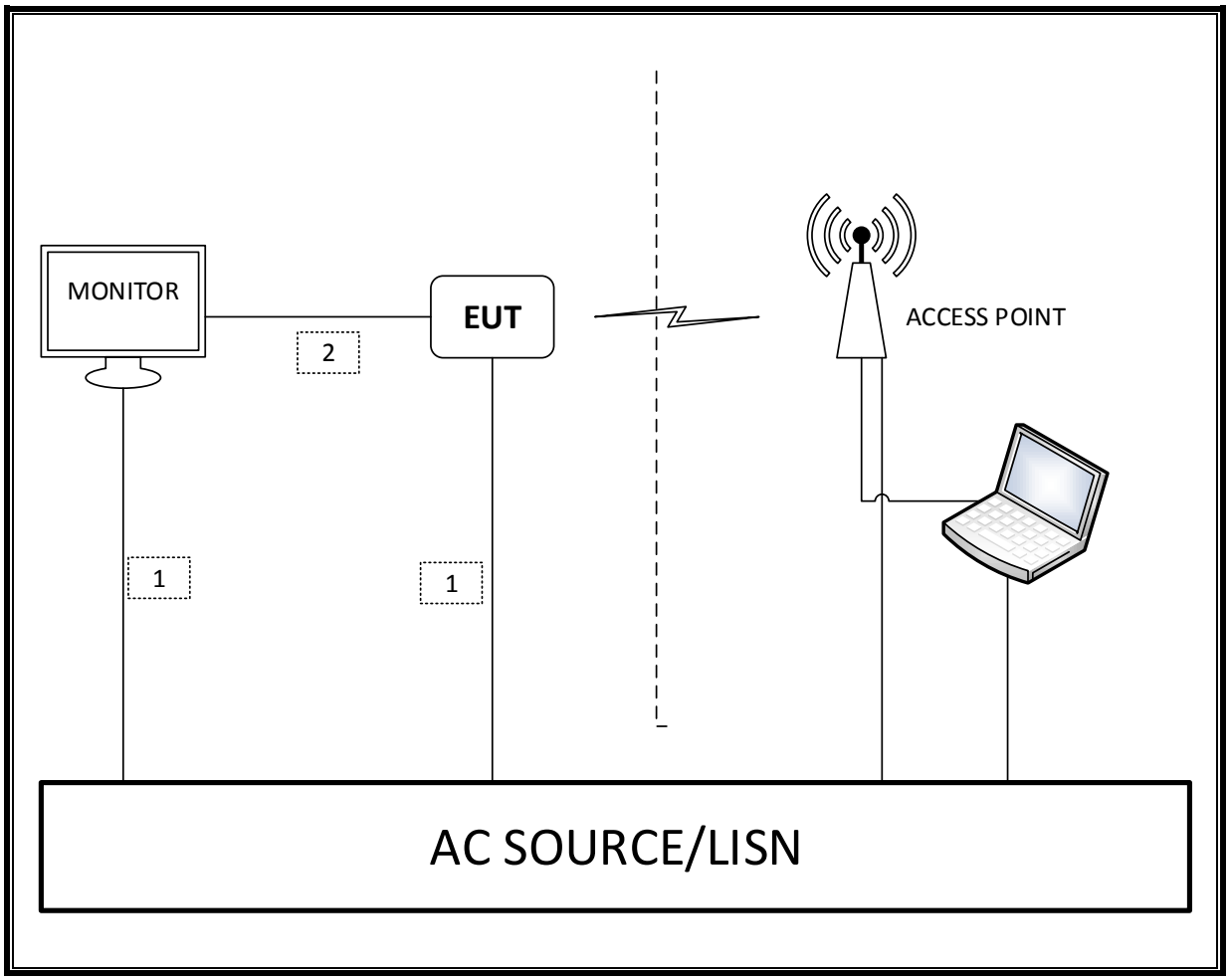
SETUP DIAGRAM



TEST SETUP- RADIATED ABOVE 1GHz

The EUT is wirelessly communicating with an access point while it is streaming video that is monitored on the screen.

SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	00143448	02/10/16
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A022813-1	01/14/16
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1782158	01/26/16
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	323561	06/08/16
Spectrum Analyzer, PXA, 3Hz to 50GHz	Agilent	N9030A	MY52350427	08/04/16
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	325117	06/09/16
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A-544	US51160264	12/23/15
Power Meter, P-series single channel	Agilent	N1911A	GB45100212	09/25/16
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	MY53260010	07/12/16
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	1049	12/17/15
Horn Antenna, 40GHz	ARA	MWH-2640/B	1029	07/15/16
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	08/06/16
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Agilent	8449B	3008A04710	06/29/16
Amplifier, 26 to 40GHz	Miteq	NSP4000-SP2	88	04/07/16
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	100773	08/07/16
N for Conducted Emissions CISP	FCC	50/250-25-2	114	01/16/16
ble, Line Conducted Emissions A	UL	PG1	N/A	07/28/16
UL SOFTWARE				
*Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
*Conducted Software	UL	UL EMC	Ver 2.2, March 31, 2015	
*AC Line Conducted Software	UL	UL EMC	Ver 9.5, April 3, 2015	

Note: * indicates automation software version used in the compliance certification testing

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

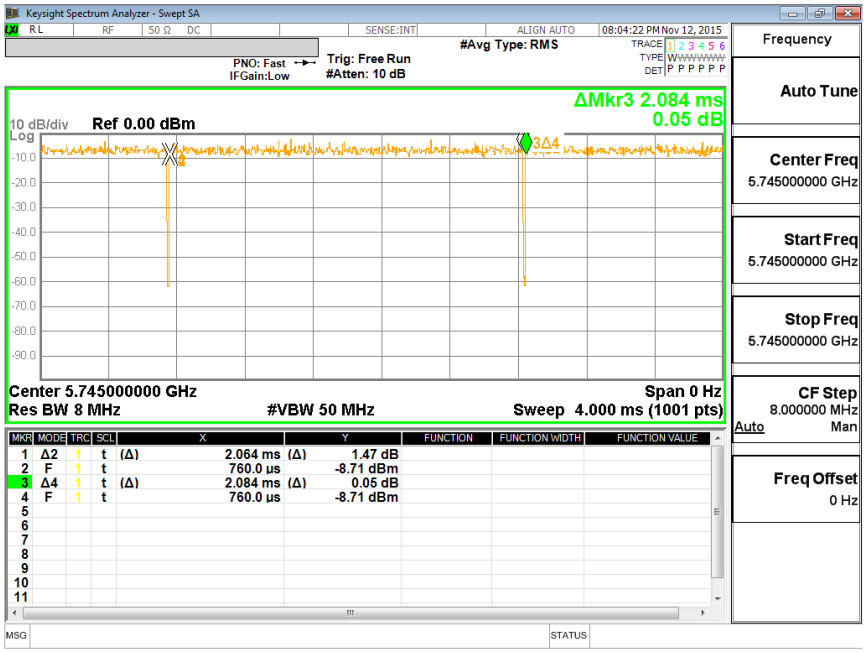
KDB 789033 Zero-Span Spectrum Analyzer Method.

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	2.064	2.084	0.990	99.04%	0.00	0.010
802.11n HT20 1TX	1.920	1.938	0.991	99.07%	0.00	0.010
802.11n HT40 1TX	0.944	0.964	0.979	97.93%	0.09	1.059

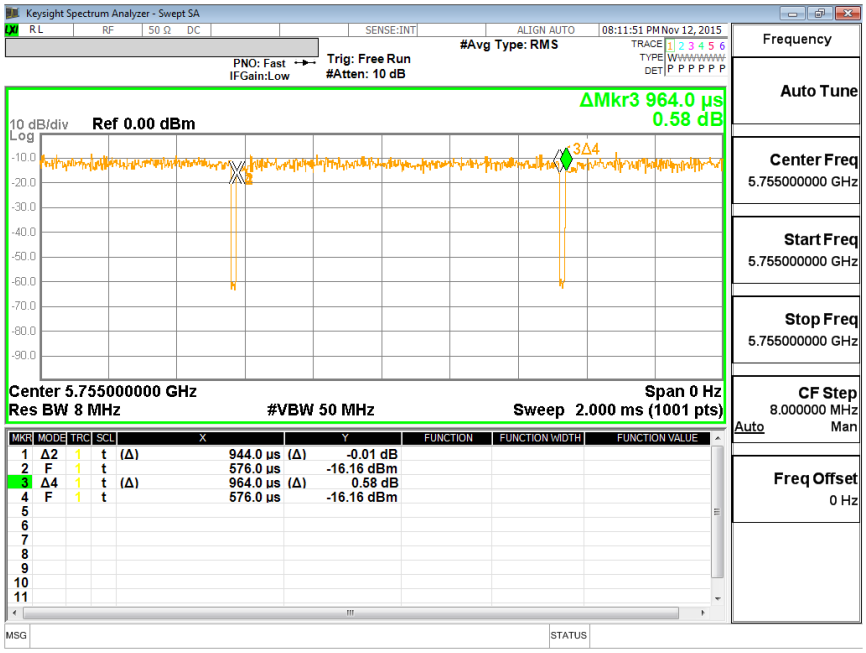
DUTY CYCLE PLOTS

DUTY CYCLE 802.11a 1TX MODE



DUTY CYCLE 802.11n HT20 1TX MODE

DUTY CYCLE 802.11n HT40 1TX MODE



7.2. MEASUREMENT METHODS

26 dB Emission BW: KDB 789033 D02 v01, Section C.

99% Occupied BW: KDB 789033 D02 v01, Section D.

Conducted Output Power: KDB 789033 D02 v01, Section E.3.b (Method PM-G).

Power Spectral Density: KDB 789033 D02 v01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, and G.5.

8. ANTENNA PORT TEST RESULTS

8.1. 802.11 a MODE IN THE 5.8 GHz BAND

8.1.1. 6 dB BANDWIDTH

LIMITS

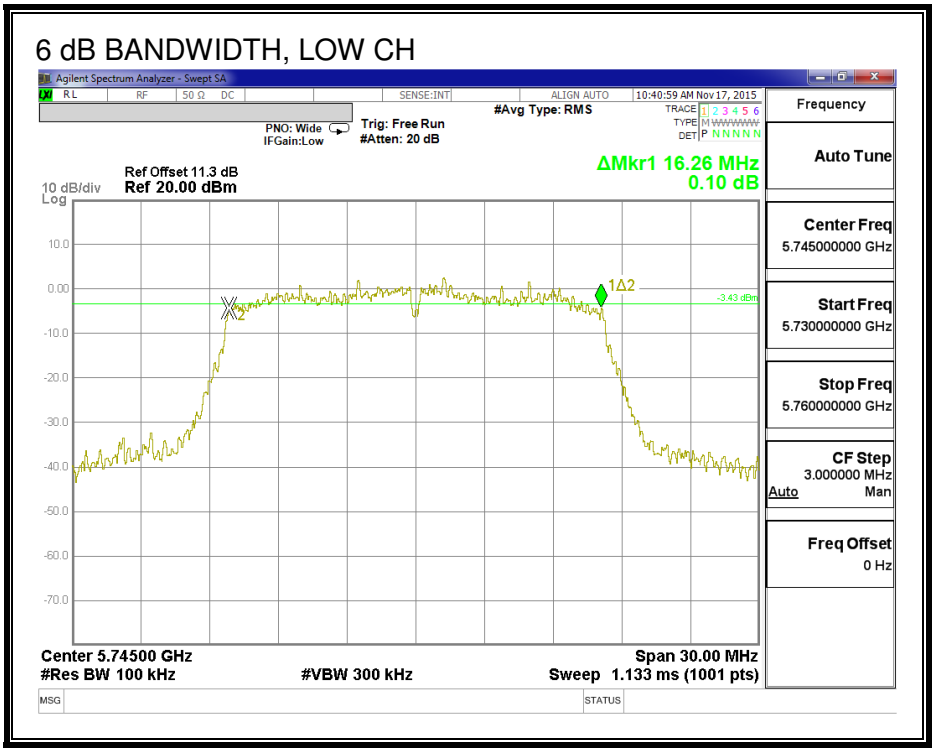
FCC §15.407 (e)

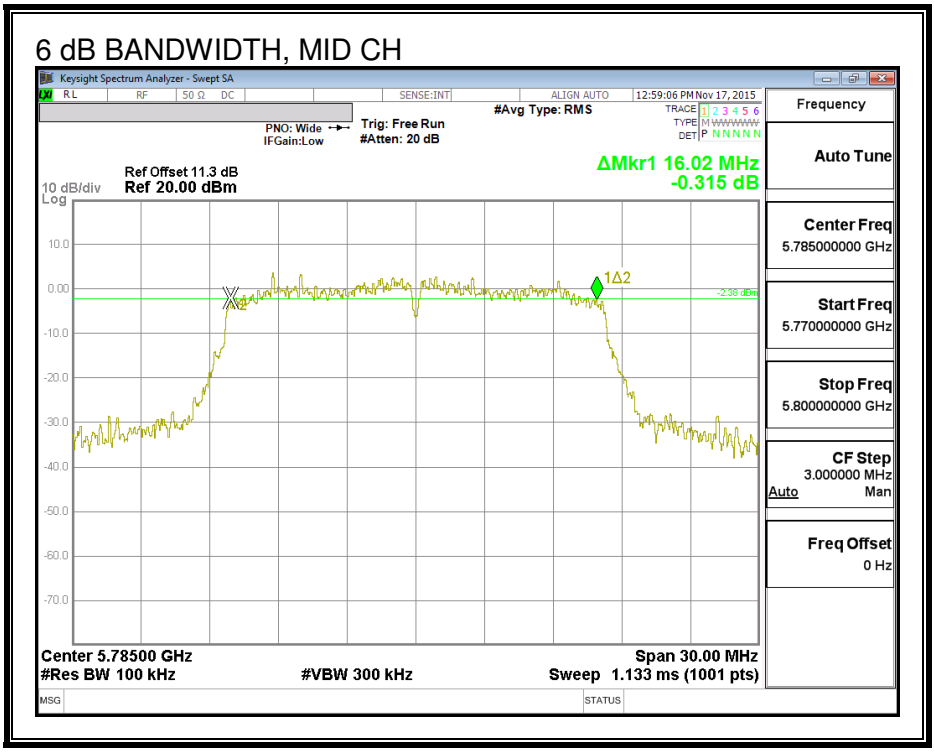
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

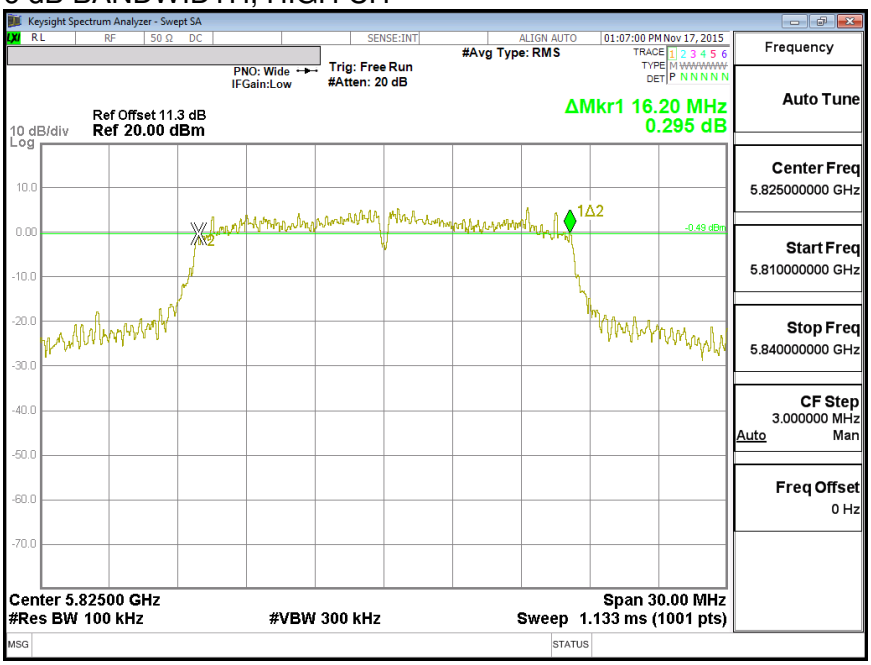
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.26	0.5
Mid	5785	16.02	0.5
High	5825	16.20	0.5

6 dB BANDWIDTH





6 dB BANDWIDTH, HIGH CH



8.1.2. 26 dB BANDWIDTH

LIMITS

None, for reporting purposes only

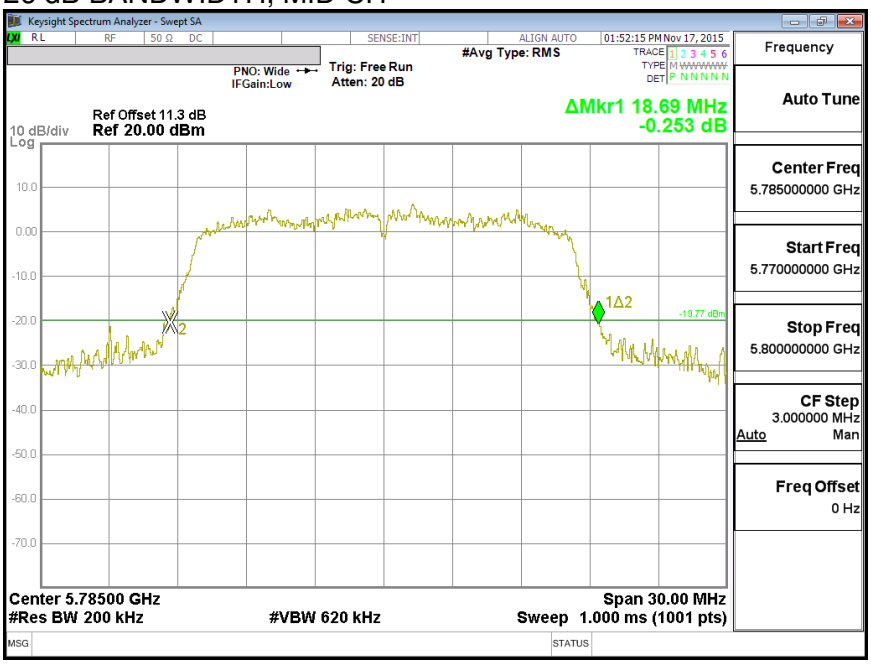
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	18.78
Mid	5785	18.69
High	5825	18.75

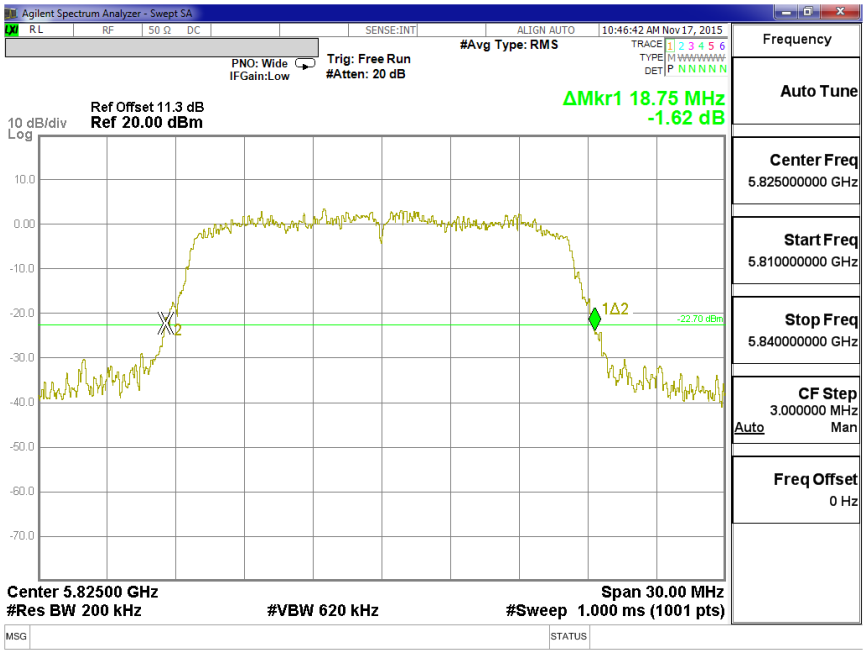
26 dB BANDWIDTH

26 dB BANDWIDTH, LOW CH

26 dB BANDWIDTH, MID CH



26 dB BANDWIDTH, HIGH CH



8.1.3. 99% BANDWIDTH

LIMITS

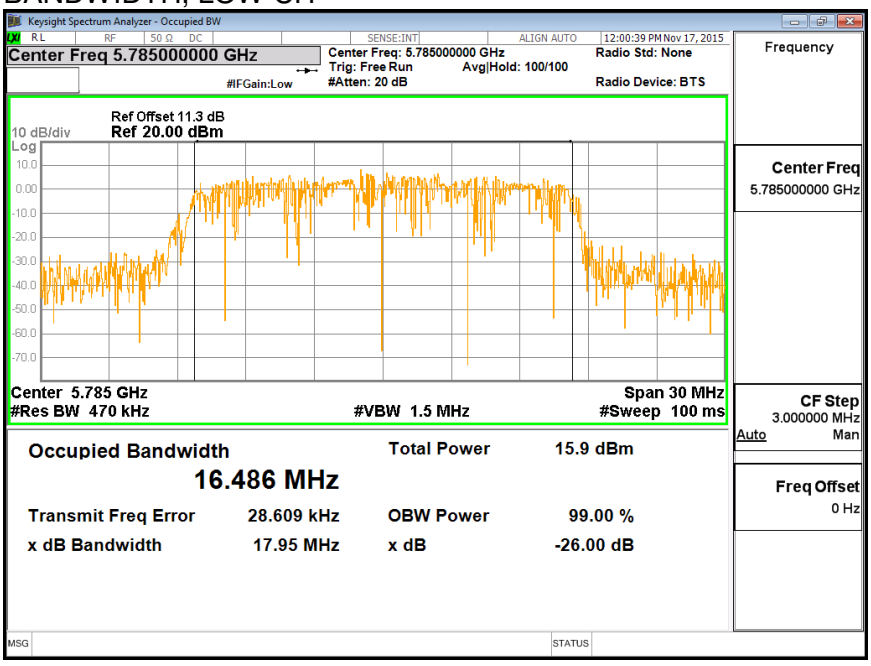
None; for reporting purposes only.

RESULTS

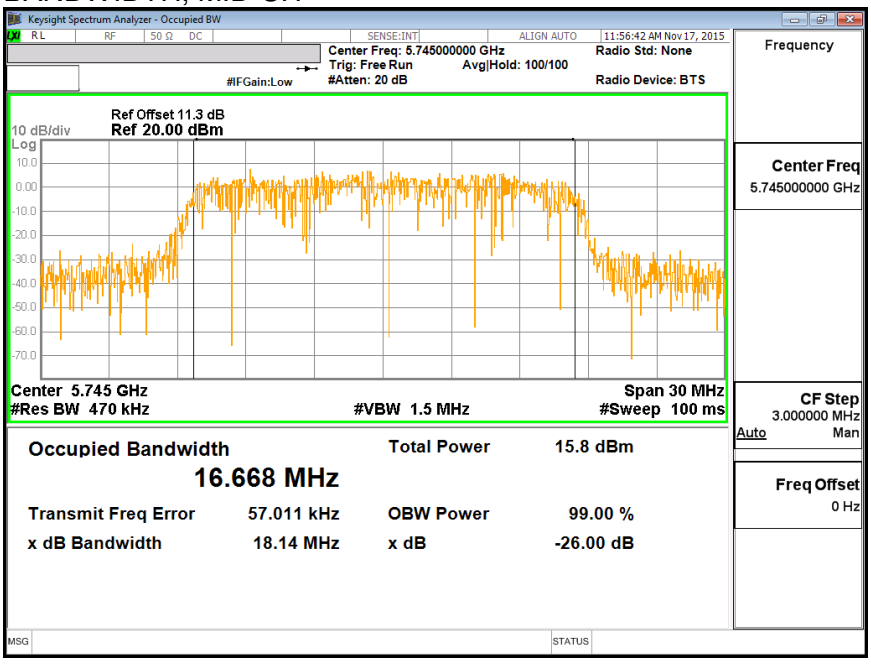
Frequency (MHz)	99% Bandwidth (MHz)
5745	16.486
5785	16.668
5825	16.342

99% BANDWIDTH

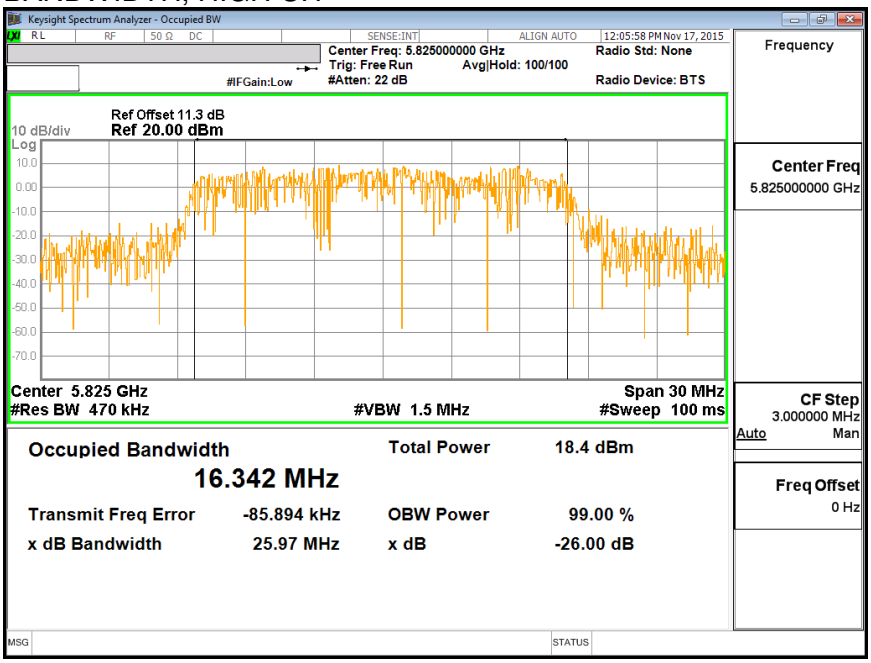
BANDWIDTH, LOW CH



BANDWIDTH, MID CH



BANDWIDTH, HIGH CH



8.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5745	15.60
Mid	5785	18.90
High	5825	18.00

8.1.5. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	2.62	30.00
Mid	5785	2.62	30.00
High	5825	2.62	30.00

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.60	15.60	30.00	-14.40
Mid	5785	18.90	18.90	30.00	-11.10
High	5825	18.00	18.00	30.00	-12.00

8.1.6. PSD

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	2.62	30.00
Mid	5785	2.62	30.00
High	5825	2.62	30.00

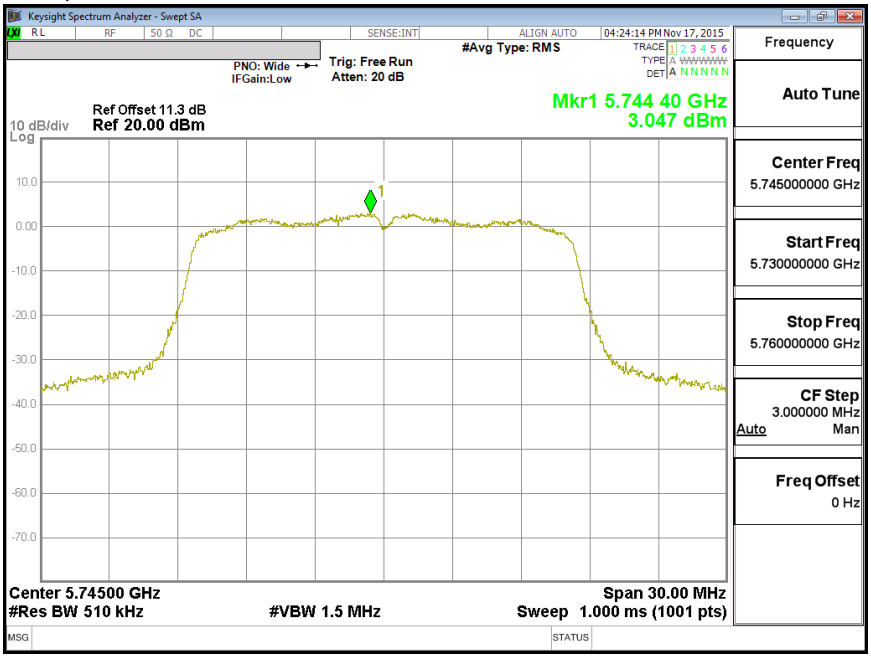
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

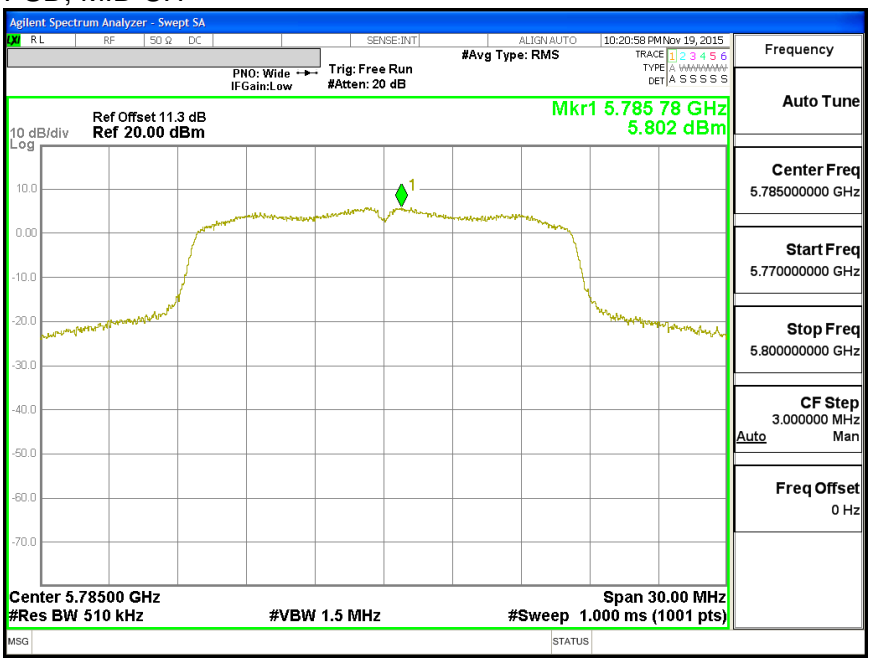
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	3.05	3.05	30.00	-26.95
Mid	5785	5.80	5.80	30.00	-24.20
High	5825	5.49	5.49	30.00	-24.51

PSD,

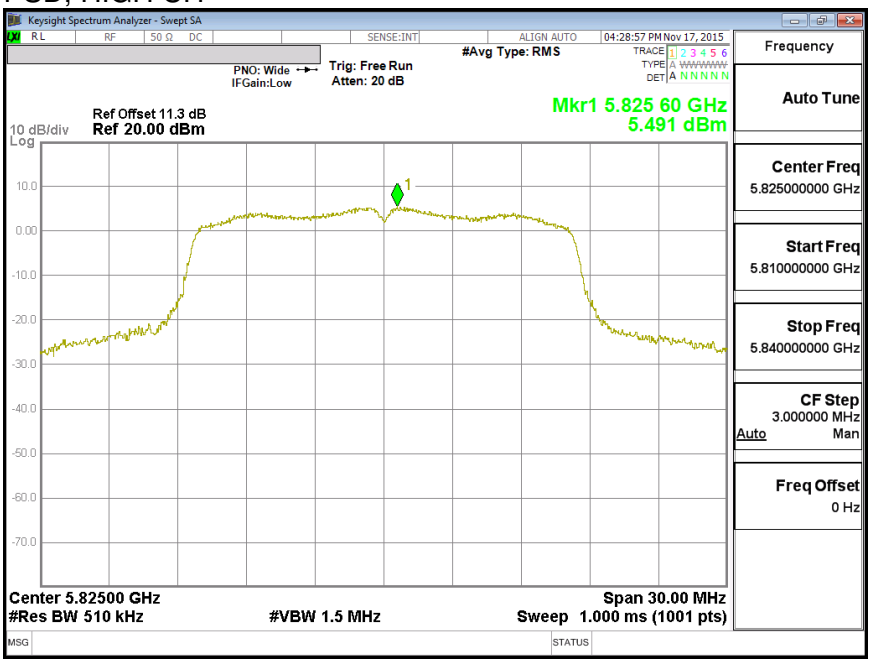
PSD, LOW CH



PSD, MID CH



PSD, HIGH CH



8.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

8.2.1. 6 dB BANDWIDTH

LIMITS

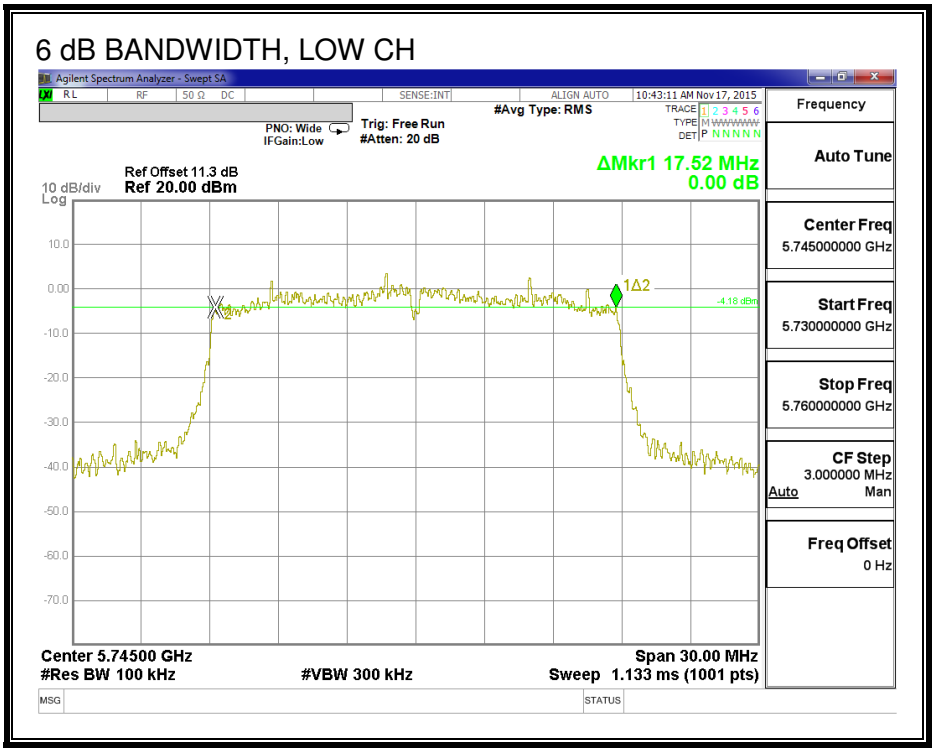
FCC §15.407 (e)

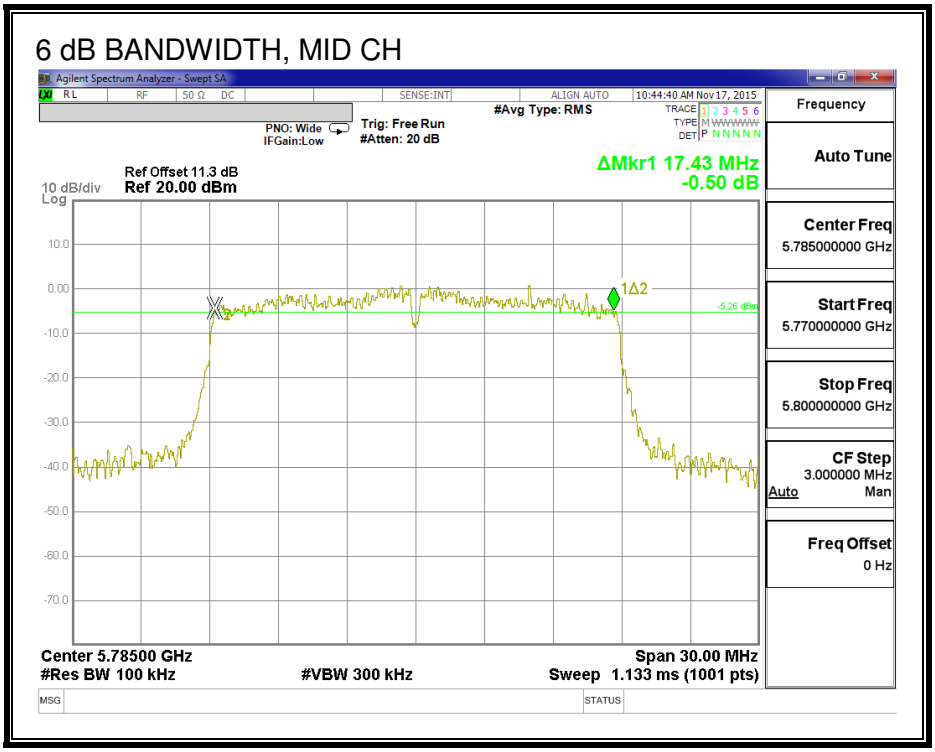
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

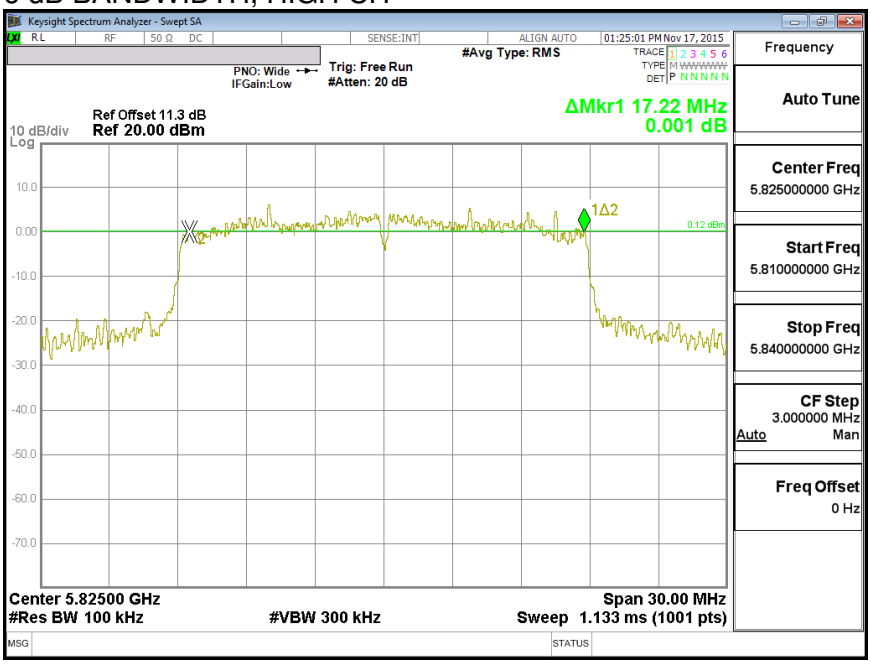
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	Minimum Limit (MHz)
Low	5745	17.52	0.5
Mid	5785	17.43	0.5
High	5825	17.22	0.5

6 dB BANDWIDTH, CHAIN 0





6 dB BANDWIDTH, HIGH CH



8.2.2. 26 dB BANDWIDTH

LIMITS

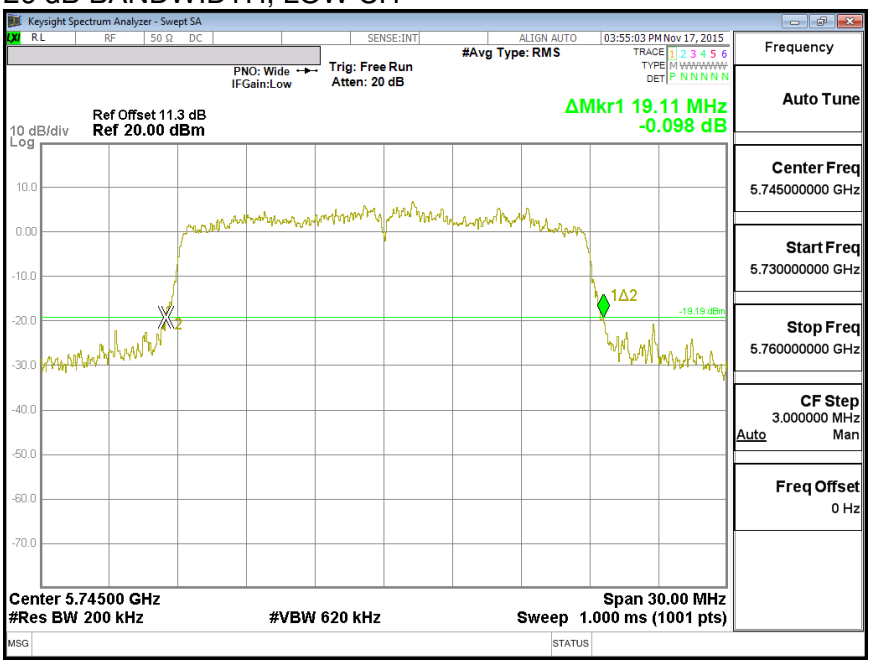
None, for reporting purposes only.

RESULTS

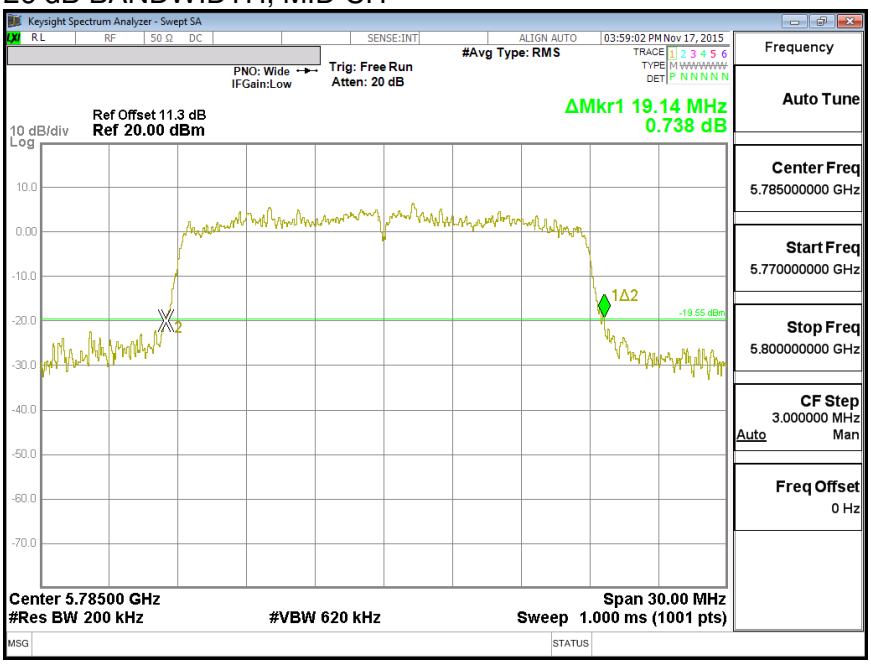
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)
Low	5745	19.11
Mid	5785	19.14
High	5825	19.50

26 dB BANDWIDTH, CHAIN 0

26 dB BANDWIDTH, LOW CH



26 dB BANDWIDTH, MID CH



26 dB BANDWIDTH, HIGH CH

8.2.3. 99% BANDWIDTH

LIMITS

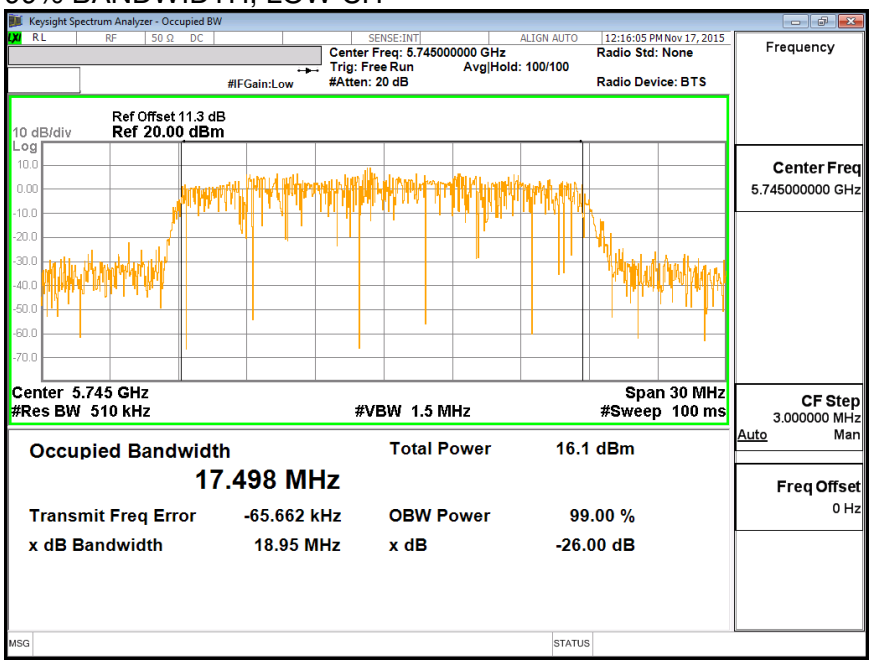
None; for reporting purposes only.

RESULTS

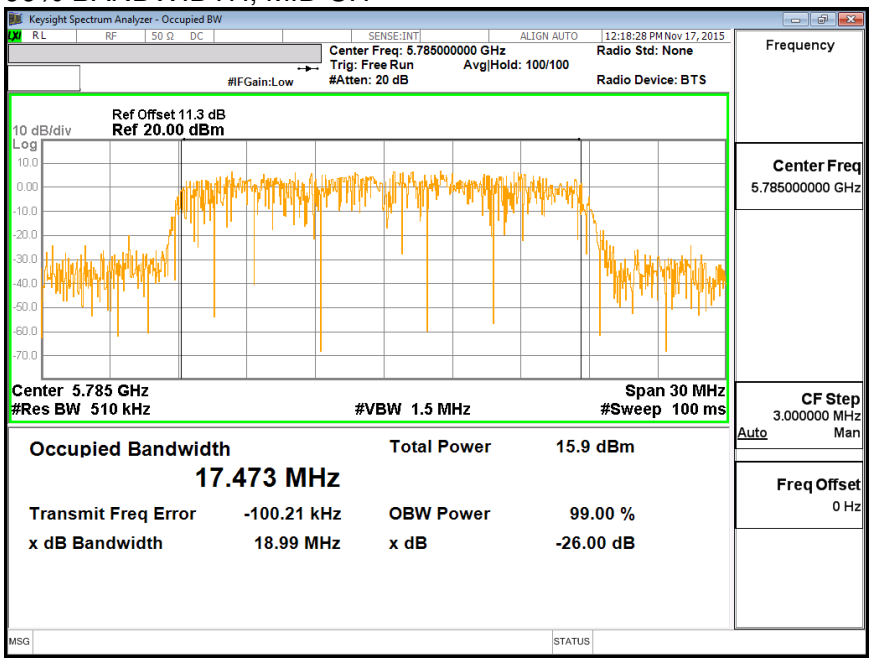
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)
Low	5745	17.498
Mid	5785	17.473
High	5825	17.624

99% BANDWIDTH, CHAIN 0

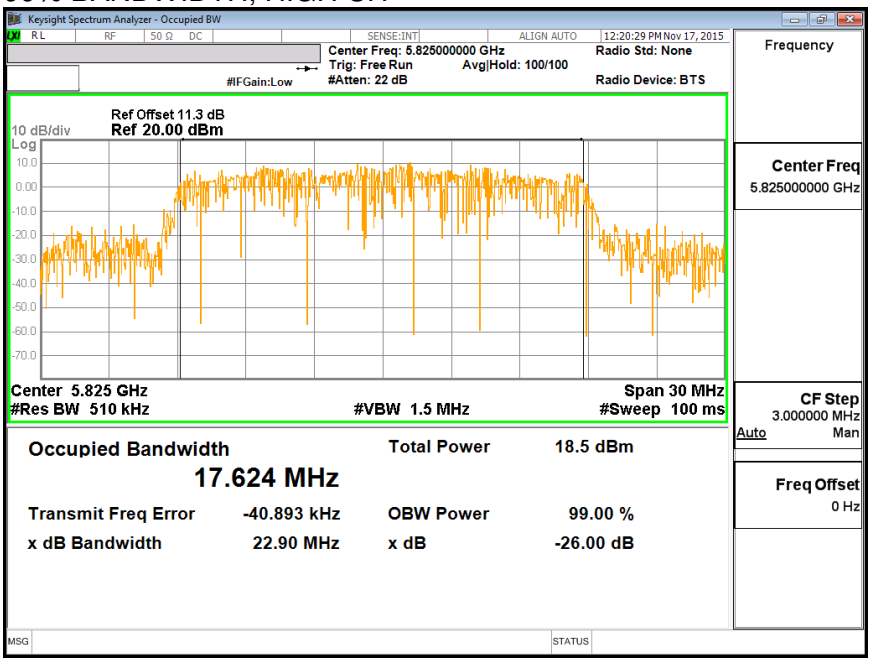
99% BANDWIDTH, LOW CH



99% BANDWIDTH, MID CH



99% BANDWIDTH, HIGH CH



8.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5745	15.80
Mid	5785	18.90
High	5825	17.90

8.2.5. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	2.62	30.00
Mid	5785	2.62	30.00
High	5825	2.62	30.00

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.80	15.80	30.00	-14.20
Mid	5785	18.90	18.90	30.00	-11.10
High	5825	17.90	17.90	30.00	-12.10

8.2.6. PSD

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	2.62	30.00
Mid	5785	2.62	30.00
High	5825	2.62	30.00

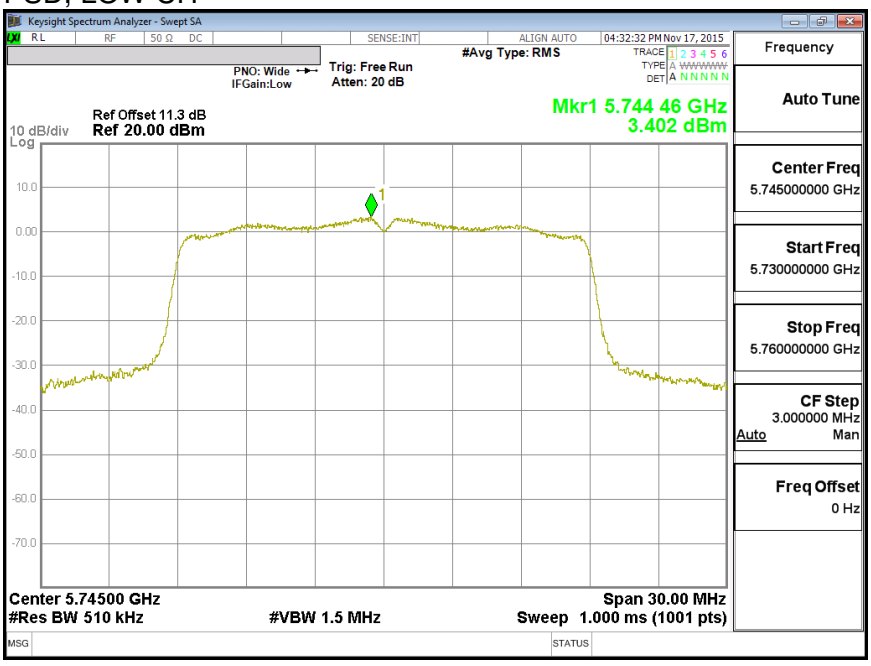
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

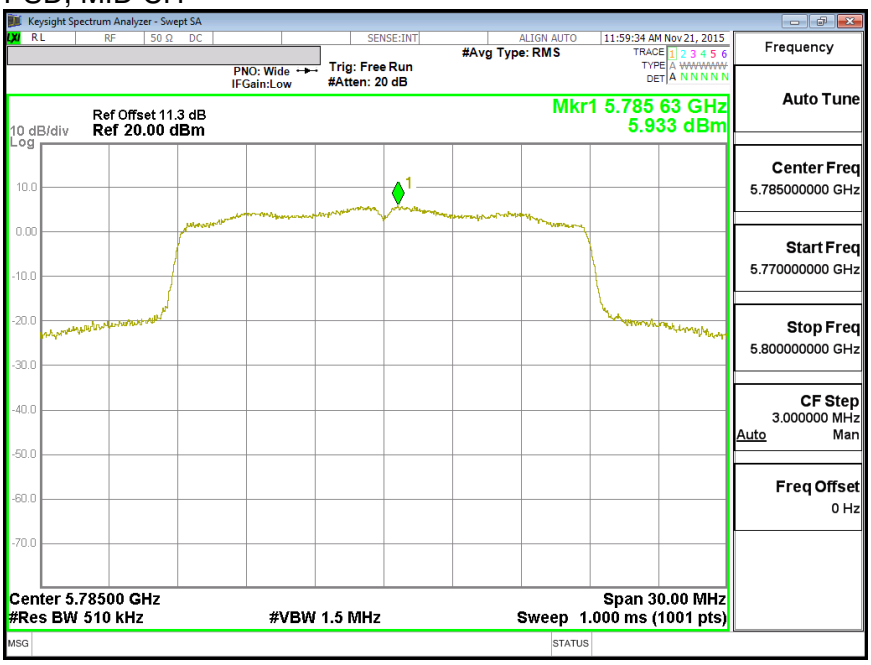
Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	3.40	3.40	30.00	-26.60
Mid	5785	5.93	5.93	30.00	-24.07
High	5825	5.07	5.07	30.00	-24.93

PSD,

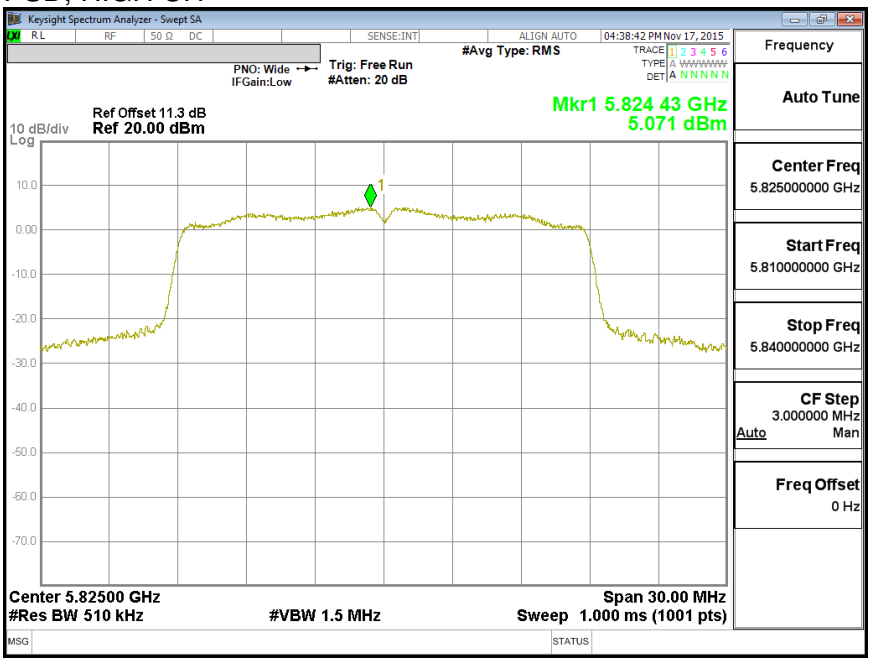
PSD, LOW CH



PSD, MID CH



PSD, HIGH CH



8.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

8.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

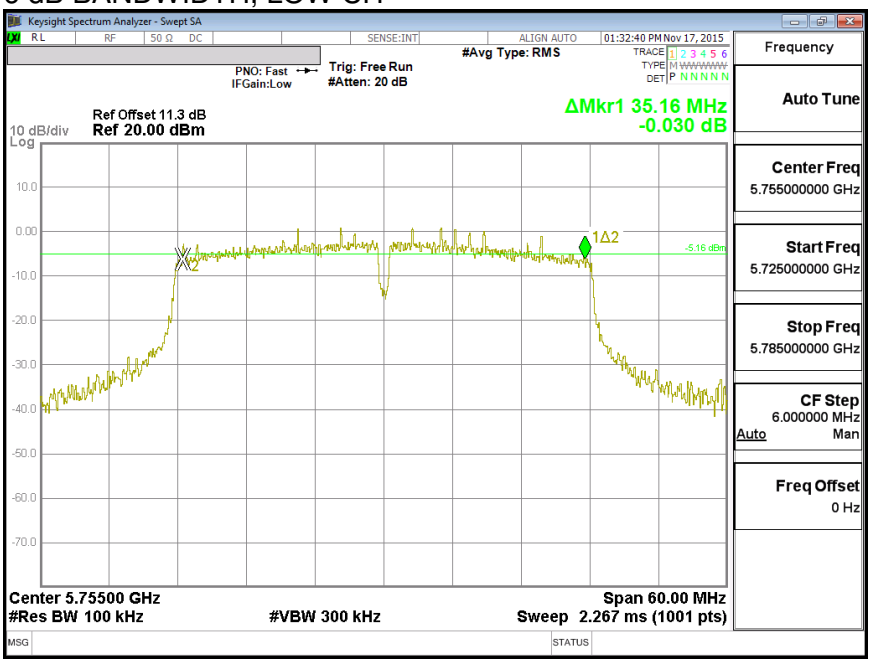
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

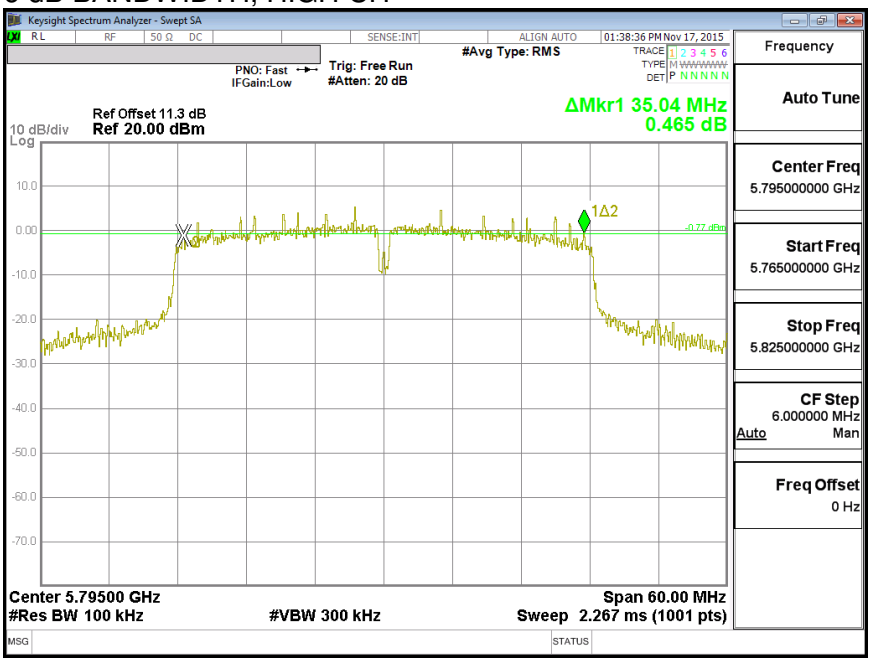
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	35.16	0.5
High	5795	35.04	0.5

6 dB BANDWIDTH

6 dB BANDWIDTH, LOW CH



6 dB BANDWIDTH, HIGH CH



8.3.2. 26 dB BANDWIDTH

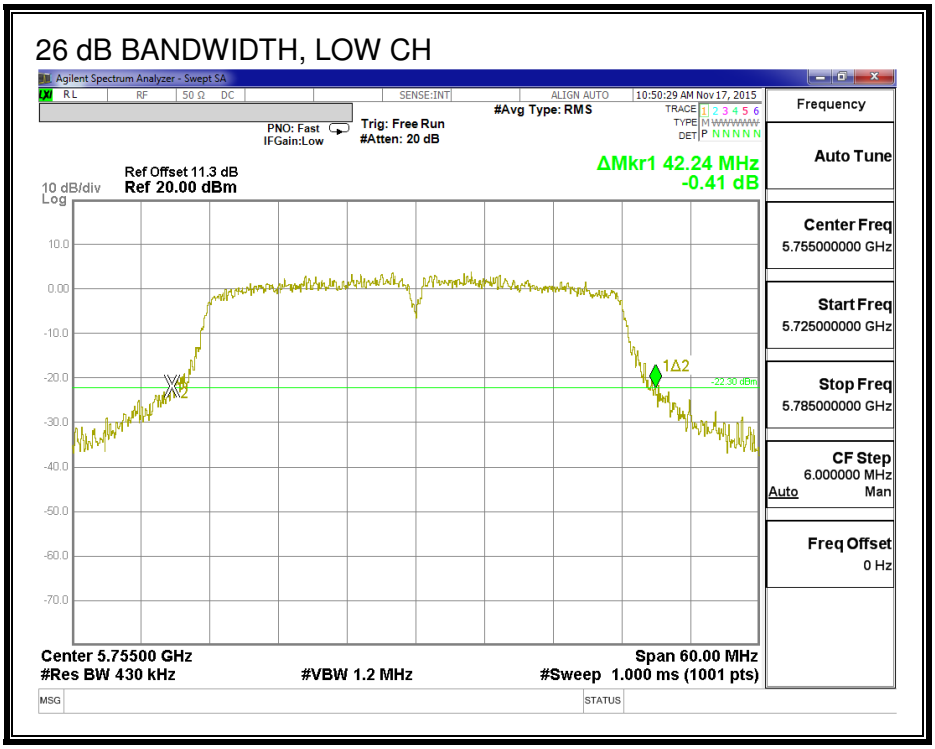
LIMITS

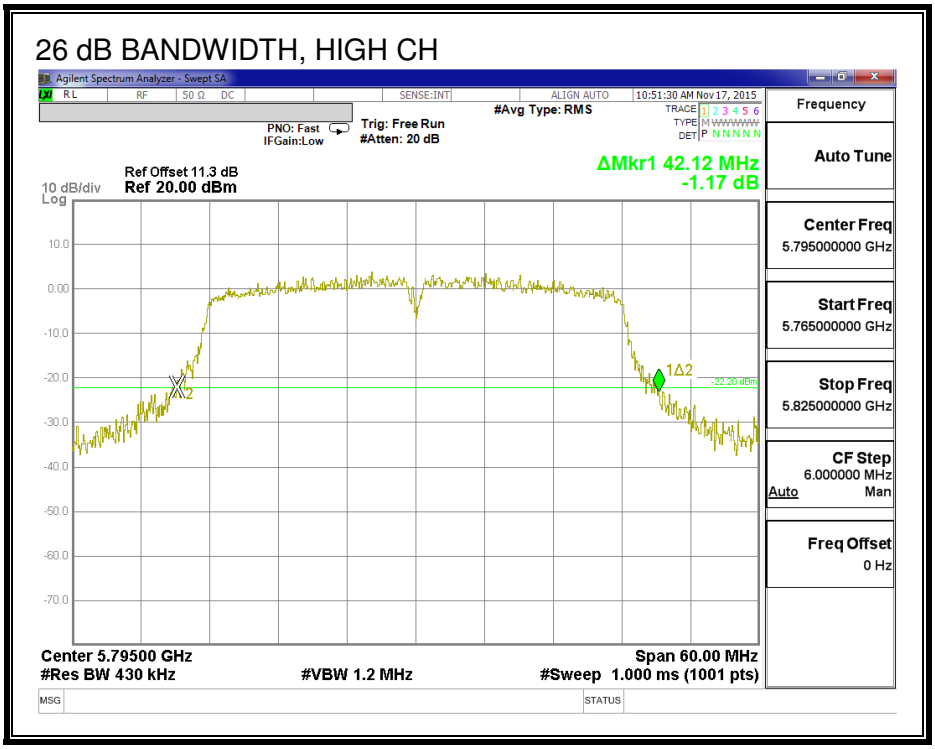
None, for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5755	42.24
High	5795	42.12

26 dB BANDWIDTH





8.3.3. 99% BANDWIDTH

LIMITS

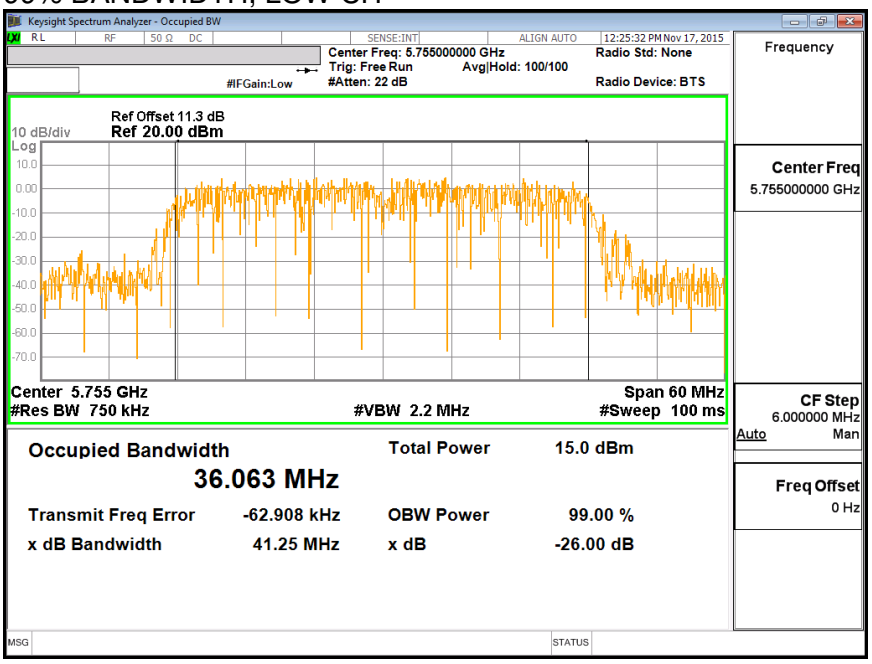
None; for reporting purposes only.

RESULTS

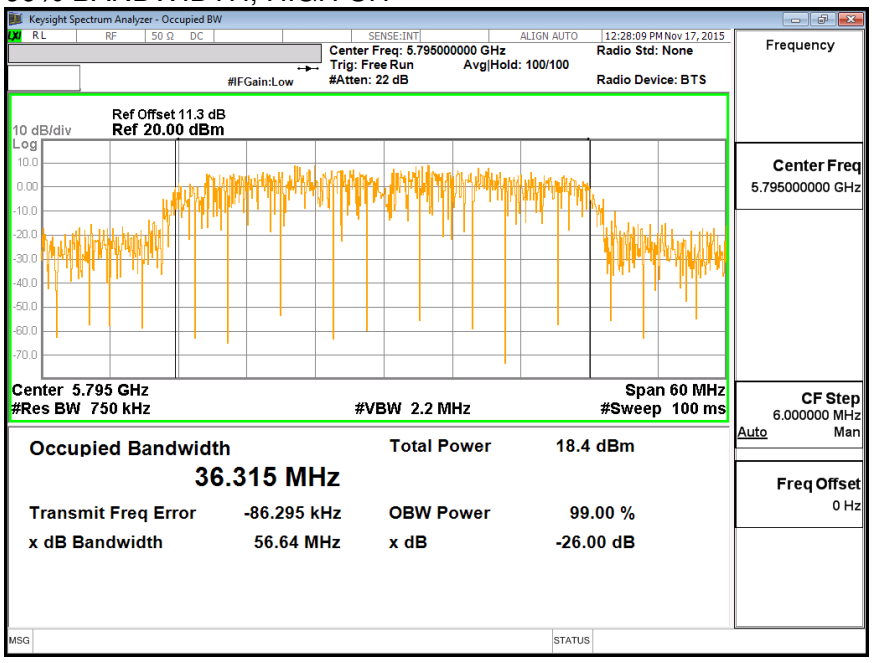
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.063
High	5795	36.315

99% BANDWIDTH

99% BANDWIDTH, LOW CH



99% BANDWIDTH, HIGH CH



8.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5755	14.60
High	5795	18.10

8.3.5. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	2.62	30.00
High	5795	2.62	30.00

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	14.60	14.60	30.00	-15.40
High	5795	18.10	18.10	30.00	-11.90

8.3.6. PSD

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	2.62	30.00
High	5795	2.62	30.00

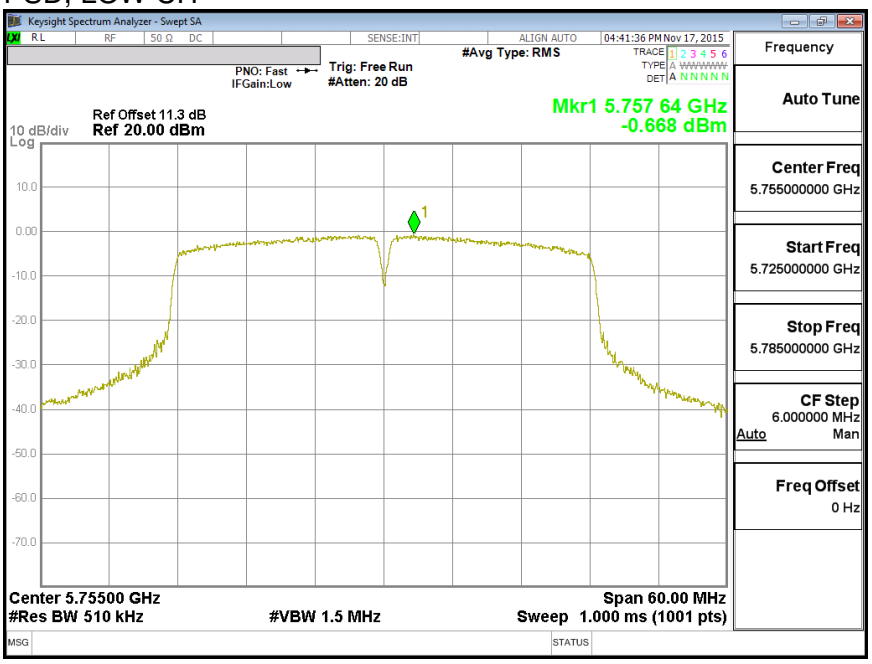
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD

PSD Results

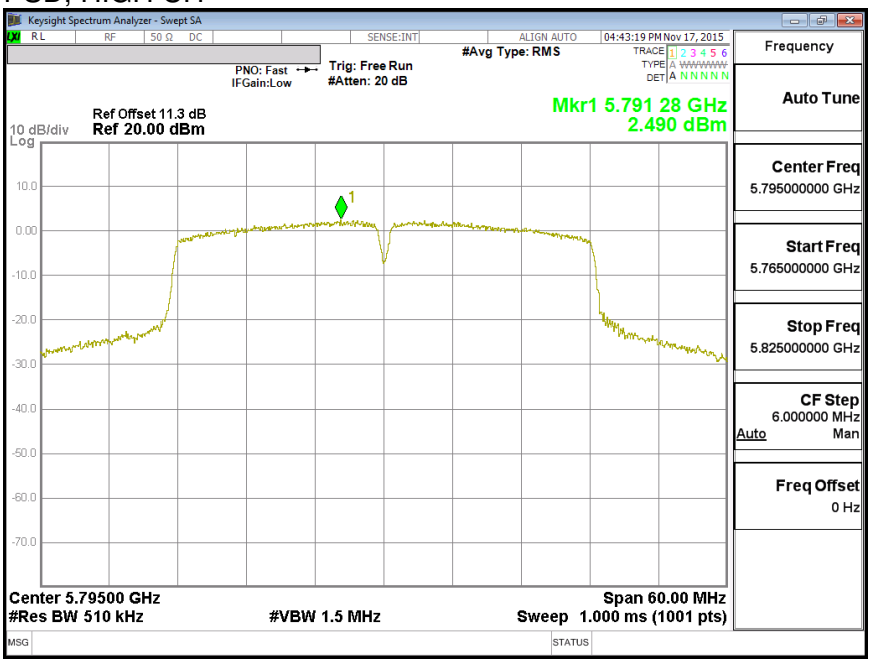
Channel	Frequency (MHz)	Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-0.67	-0.58	30.00	-30.58
High	5795	2.49	2.58	30.00	-27.42

PSD

PSD, LOW CH



PSD, HIGH CH



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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 measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. 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.

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.

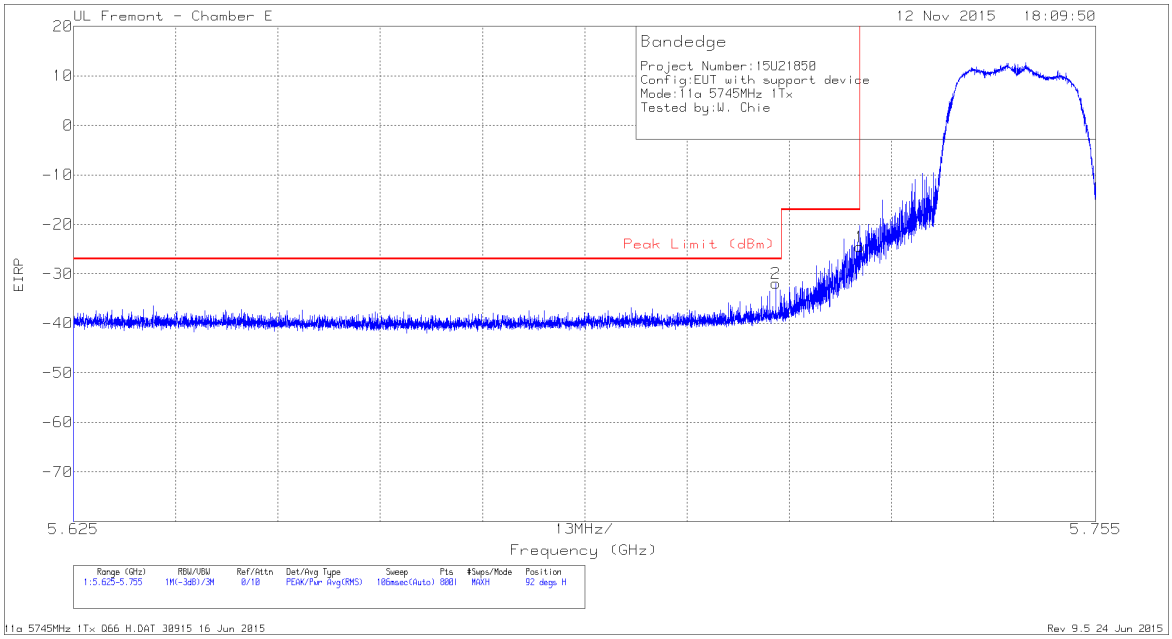
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

9.1.1. 802.11a MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE, CHAIN 0 (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

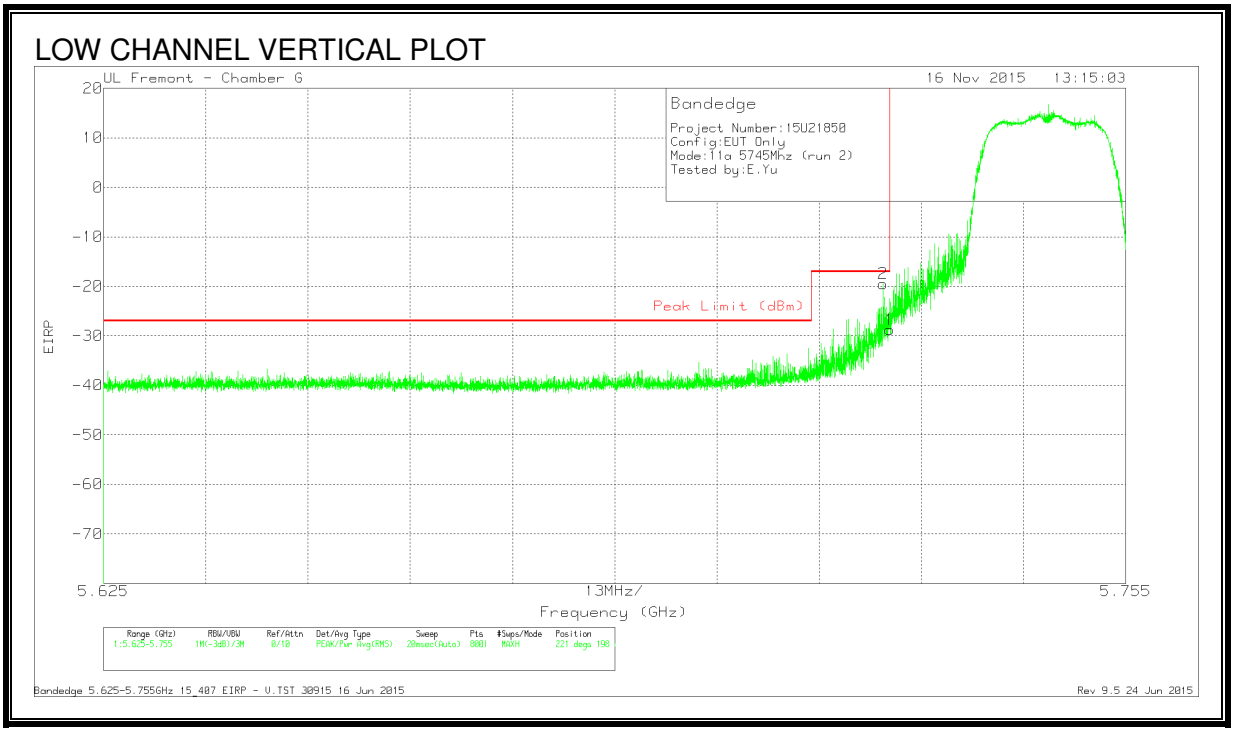


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	-58.37	Pk	34.7	-20.1	11.8	-31.97	-27	-4.97	92	380	H
1	5.725	-50.97	Pk	34.7	-20.1	11.8	-24.57	-17	-7.57	92	380	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT

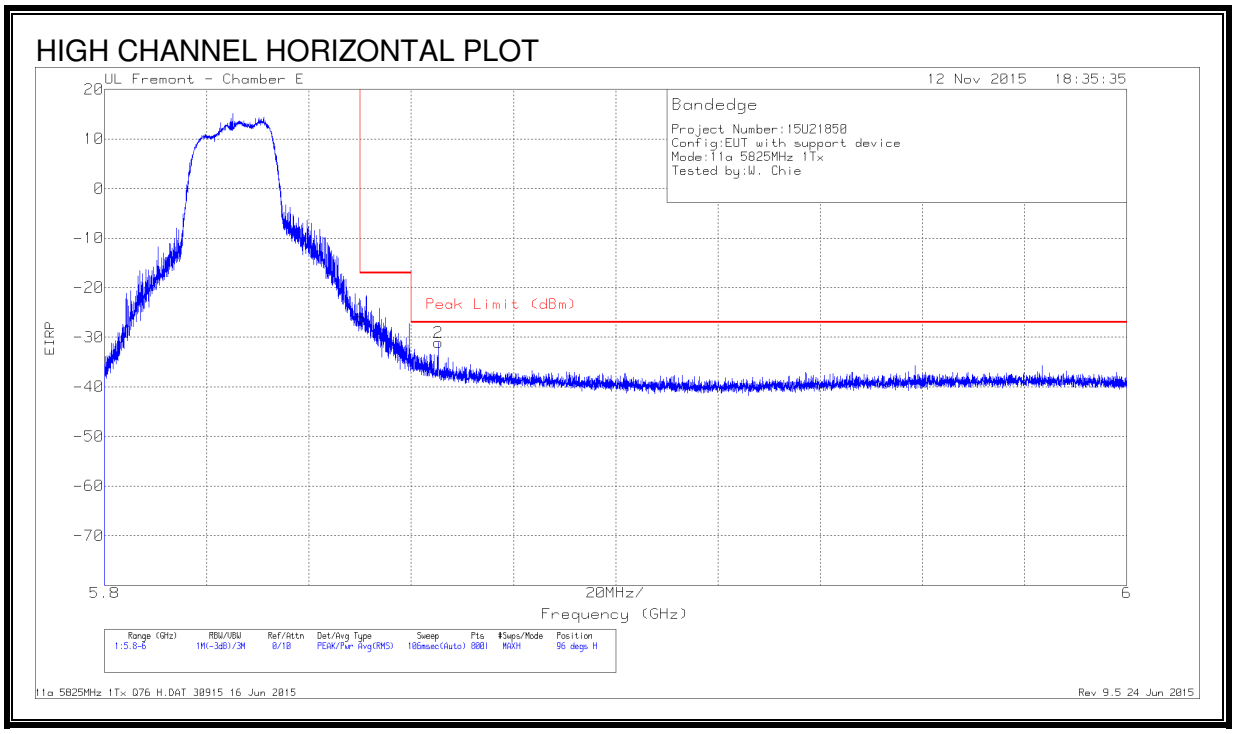


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.724	-43.35	Pk	35	-22.9	11.8	-19.45	-17	-2.45	221	198	V
1	5.725	-52.67	Pk	35	-22.9	11.8	-28.77	-17	-11.77	221	198	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 0 (HIGH CHANNEL)

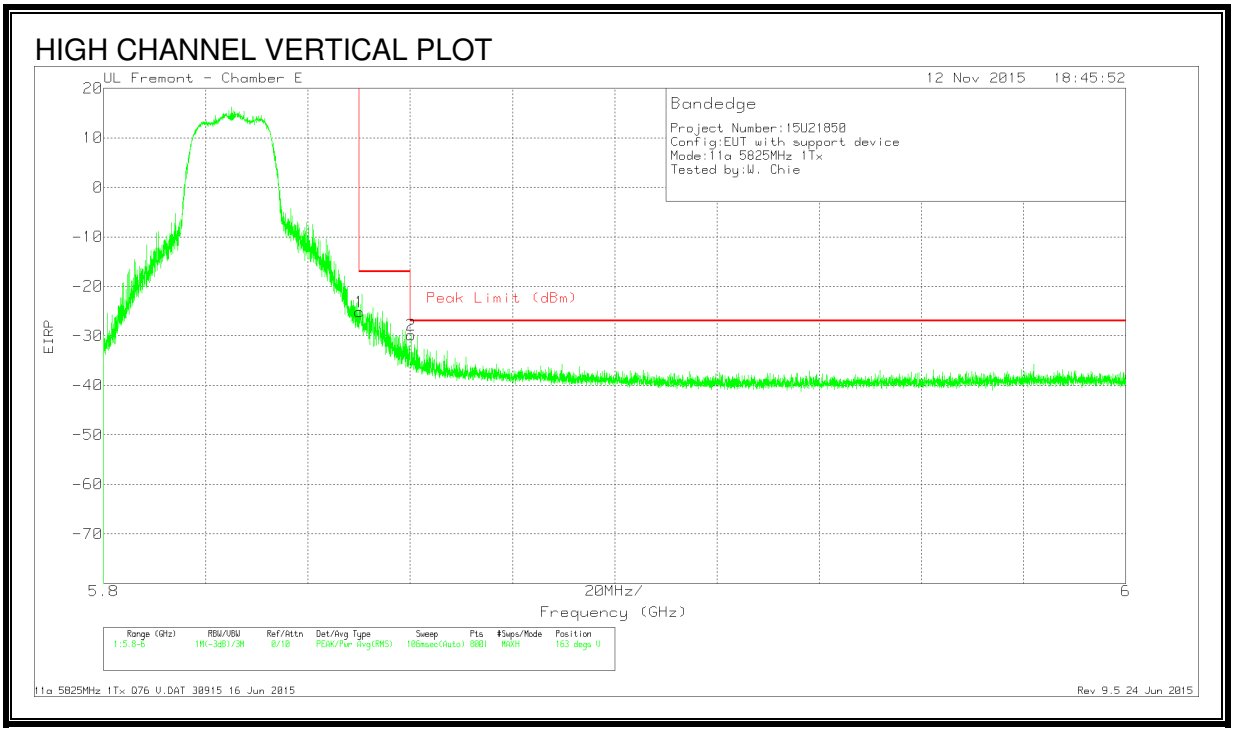


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-52.52	Pk	34.9	-20.3	11.8	-26.12	-17	-9.12	96	383	H
2	5.865	-57.33	Pk	34.9	-20.4	11.8	-31.03	-27	-4.03	96	383	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



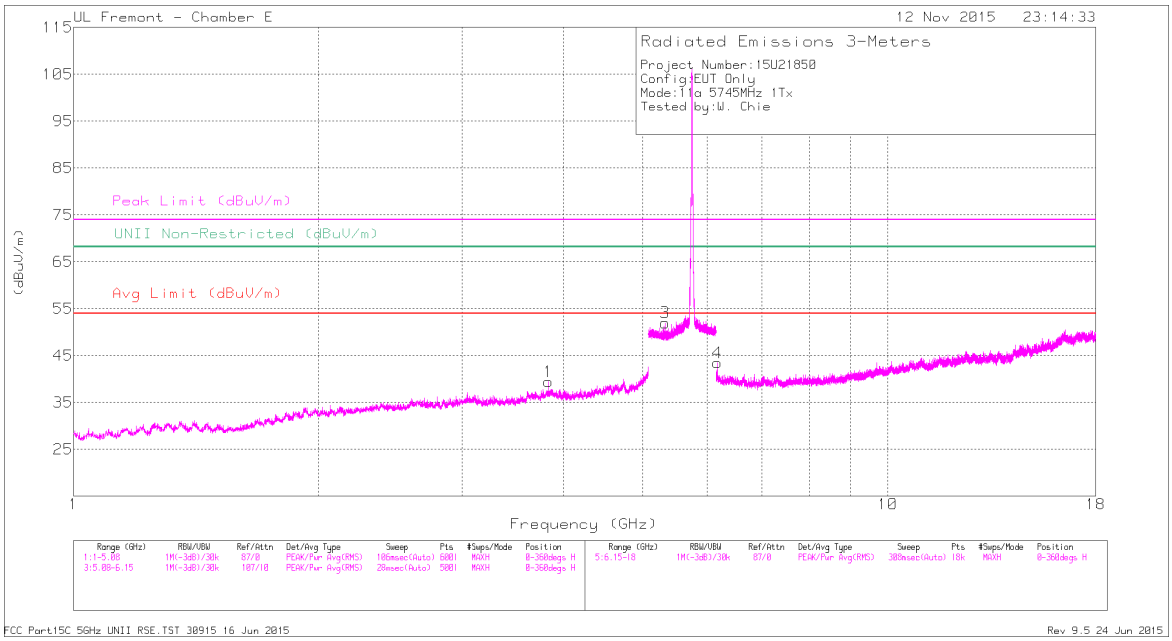
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-51.52	Pk	34.9	-20.3	11.8	-25.12	-17	-8.12	163	386	V
2	5.86	-56.15	Pk	34.9	-20.4	11.8	-29.85	-27	-2.85	163	386	V

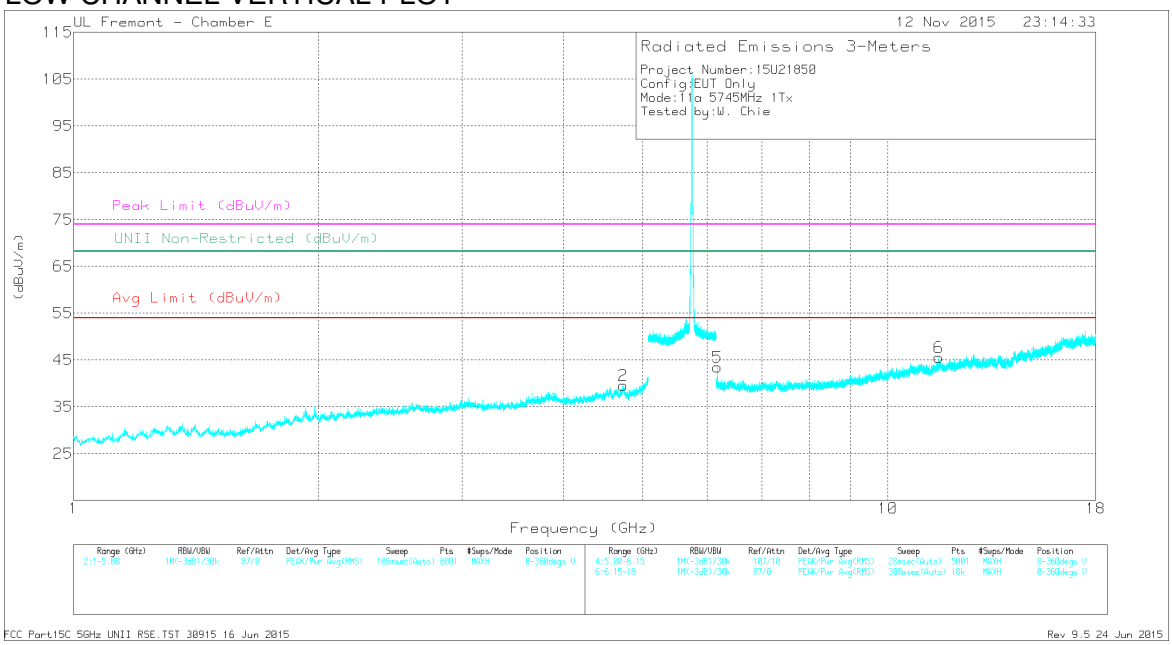
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Marler	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (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	* 3.83	42.99	PK-U	33.5	-29.9	46.59	-	-	74	-27.41	-	-	170	118	H
	* 3.83	34.87	ADR	33.5	-29.9	38.47	54	-15.53	-	-	-	-	170	118	H
2	* 4.729	40.4	PK-U	34.2	-28.8	45.8	-	-	74	-28.2	-	-	32	178	V
	* 4.729	28.96	ADR	34.2	-28.8	34.36	54	-19.64	-	-	-	-	32	178	V
6	* 11.549	36.64	PK-U	38.1	-22.9	51.84	-	-	74	-22.16	-	-	342	145	V
	* 11.545	24.6	ADR	38.1	-23.1	39.6	54	-14.4	-	-	-	-	342	145	V
3	5.325	42.78	PK-U	34.5	-20.5	56.78	-	-	-	-	68.2	-11.42	103	207	H
4	6.175	41.8	PK-U	35.3	-28.2	48.9	-	-	-	-	68.2	-19.3	179	216	V
5	6.177	41.46	PK-U	35.3	-28.2	48.56	-	-	-	-	68.2	-19.64	144	190	H

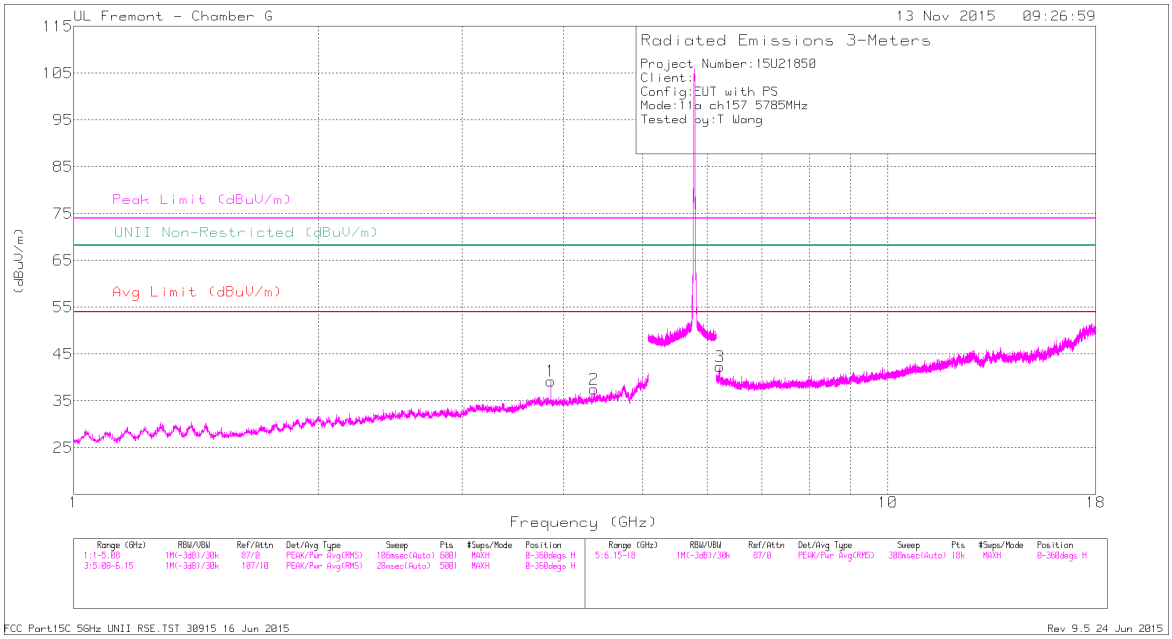
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

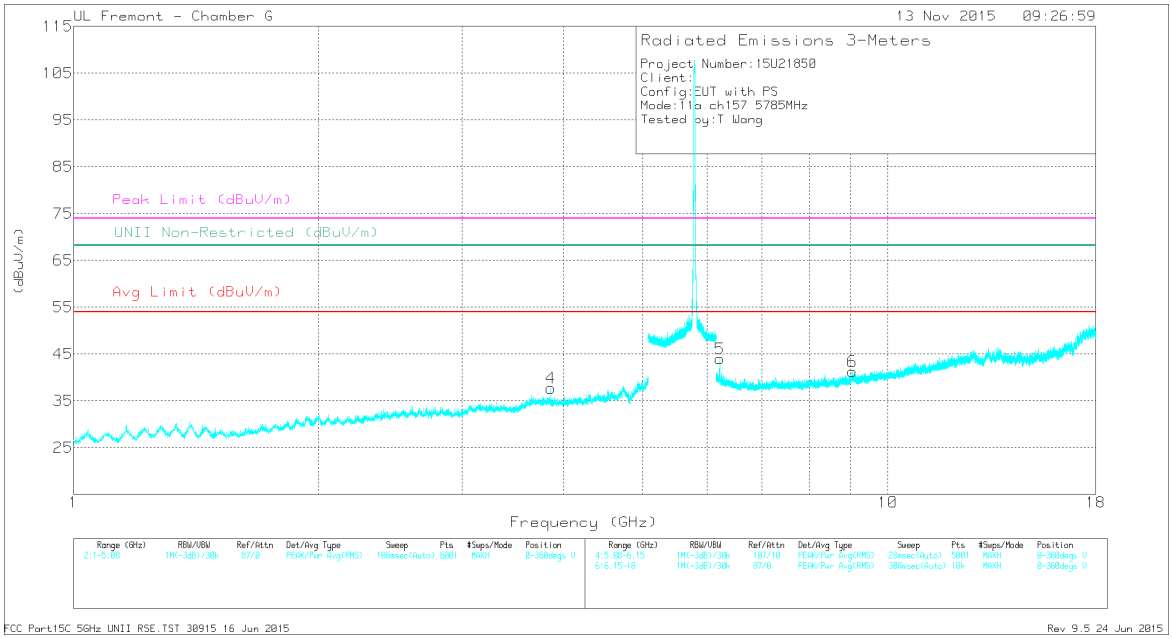
ADR - U-NII AD primary method, RMS average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (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
* 3.857	45.67	PK-U	33.1	-32.8	45.97	-	-	74	-28.03	-	-	181	163	H
* 3.857	38.19	ADR	33.1	-32.8	38.49	54	-15.51	-	-	-	-	181	163	H
* 4.356	41.46	PK-U	33.6	-32.2	42.86	-	-	74	-31.14	-	-	179	158	H
* 4.356	30.29	ADR	33.6	-32.2	31.69	54	-22.31	-	-	-	-	179	158	H
* 3.857	44.98	PK-U	33.1	-32.8	45.28	-	-	74	-28.72	-	-	193	304	V
* 3.857	37.56	ADR	33.1	-32.8	37.86	54	-16.14	-	-	-	-	193	304	V
* 9.047	39.38	PK-U	36.2	-28.2	47.38	-	-	74	-26.62	-	-	200	175	V
* 9.05	27.74	ADR	36.2	-28.2	35.74	54	-18.26	-	-	-	-	200	175	V
6.219	45.64	PK-U	35.5	-31.7	49.44	-	-	-	-	68.2	-18.76	211	323	V
6.221	42.66	PK-U	35.5	-31.7	46.46	-	-	-	-	68.2	-21.74	186	172	H

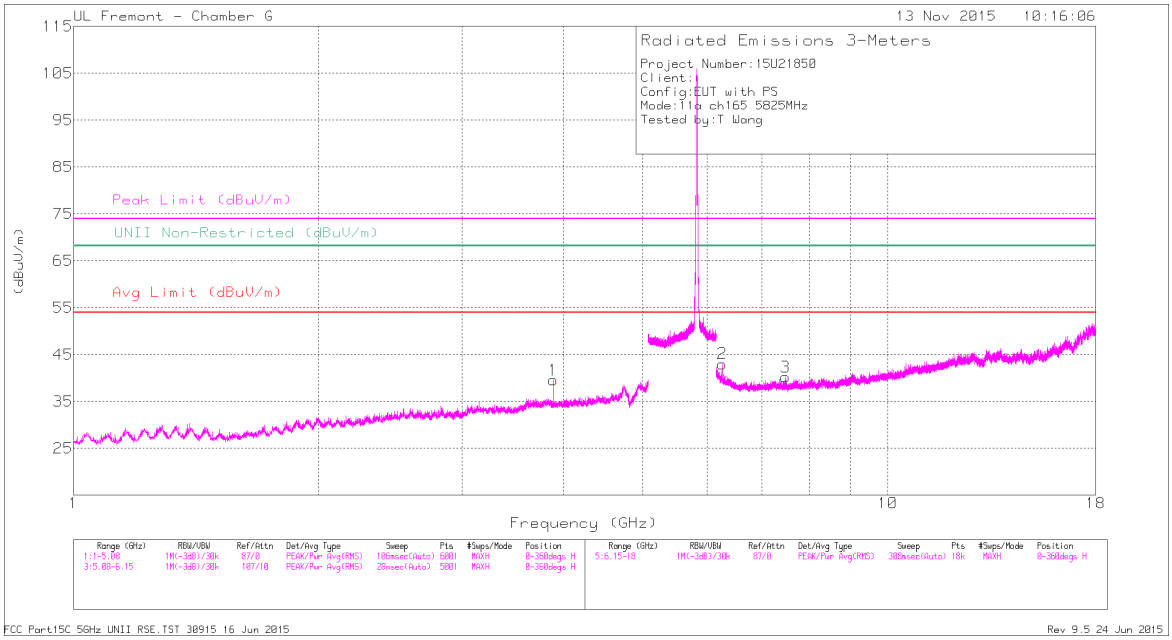
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

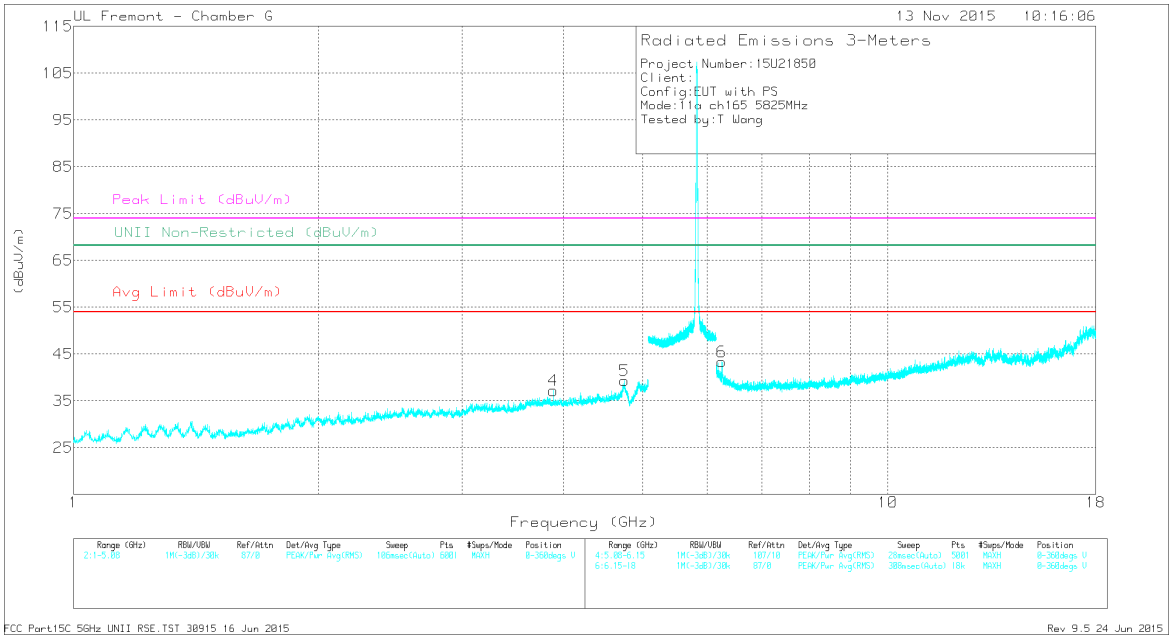
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (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
* 3.883	45.14	PK-U	33.1	-33	45.24	-	-	74	-28.76	-	-	179	100	H
* 3.883	37.97	ADR	33.1	-33	38.07	54	-15.93	-	-	-	-	179	100	H
* 3.883	45.14	PK-U	33.1	-33	45.24	-	-	74	-28.76	-	-	203	329	V
* 3.883	38.79	ADR	33.1	-33	38.89	54	-15.11	-	-	-	-	203	329	V
* 4.742	44.27	PK-U	33.9	-31.9	46.27	-	-	74	-27.73	-	-	215	334	V
* 4.745	32.87	ADR	33.9	-31.9	34.87	54	-19.13	-	-	-	-	215	334	V
* 7.487	40.5	PK-U	35.5	-30.4	45.6	-	-	74	-28.4	-	-	151	365	H
* 7.489	29.01	ADR	35.5	-30.5	34.01	54	-19.99	-	-	-	-	151	365	H
6.25	44.53	PK-U	35.6	-31.5	48.63	-	-	-	-	68.2	-19.57	222	344	V
6.262	41.75	PK-U	35.6	-31.2	46.15	-	-	-	-	68.2	-22.05	163	359	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

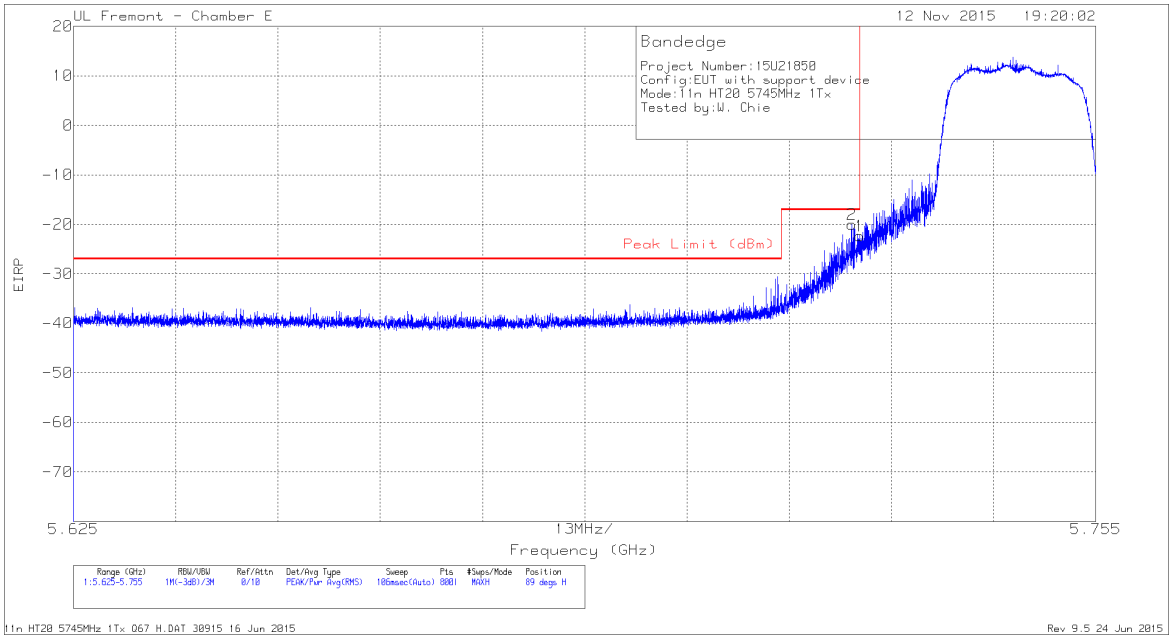
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.1.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

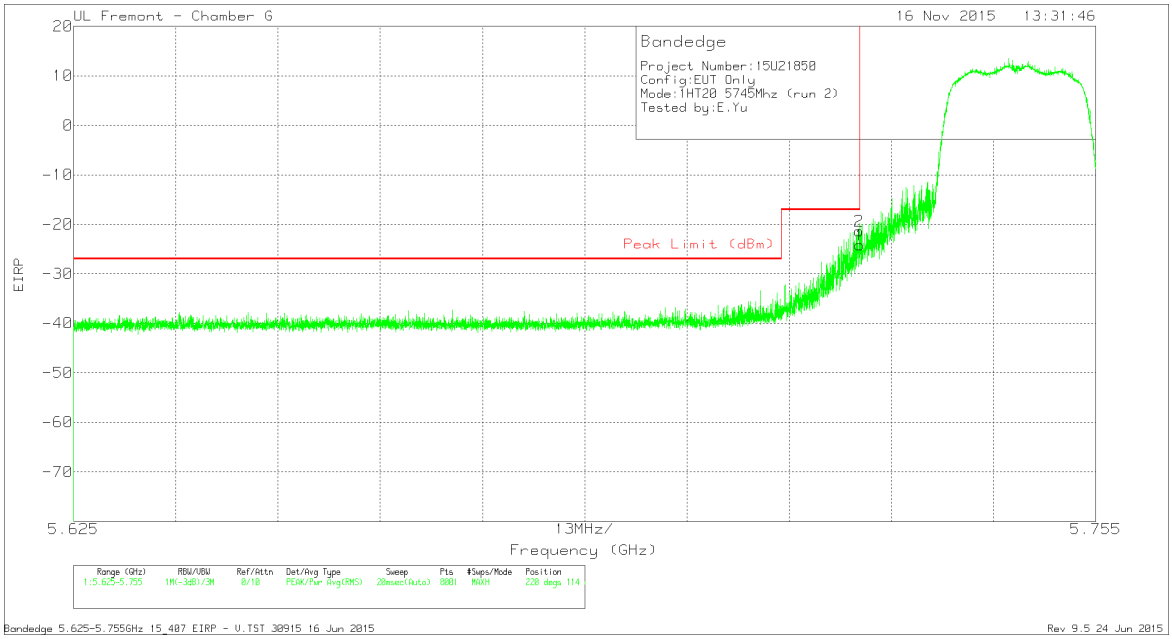


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.724	-46.45	Pk	34.7	-20.1	11.8	-20.05	-17	-3.05	89	380	H
1	5.725	-48.73	Pk	34.7	-20.1	11.8	-22.33	-17	-5.33	89	380	H

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT

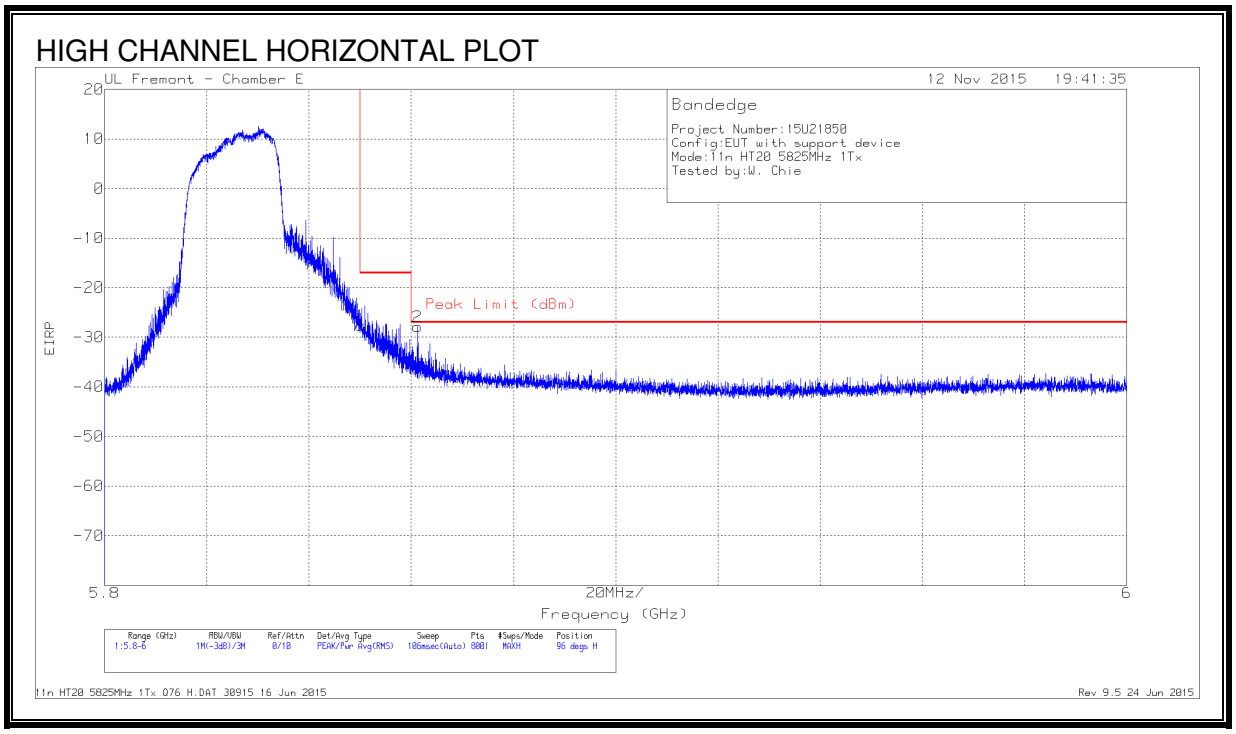


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-48.04	Pk	35	-22.9	11.8	-24.14	-17	-7.14	220	114	V
2	5.725	-45.21	Pk	35	-22.9	11.8	-21.31	-17	-4.31	220	114	V

Pk - Peak detector

RESTRICTED BANDEDGE (HIGH CHANNEL)

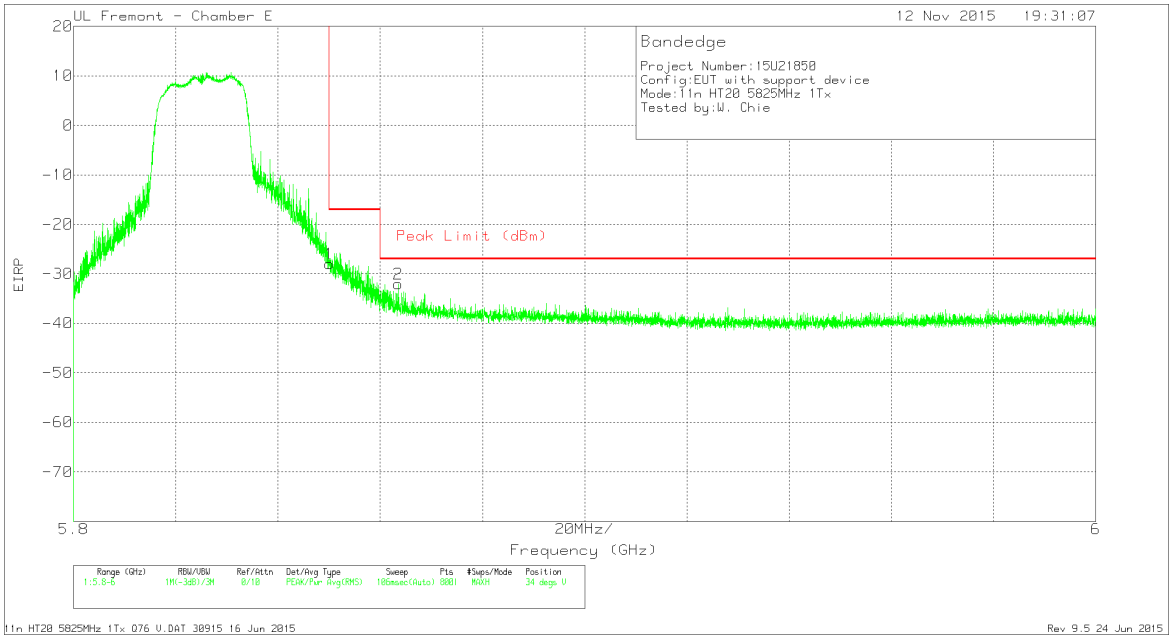


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-54.01	Pk	34.9	-20.3	11.8	-27.61	-17	-10.61	96	381	H
2	5.861	-54.21	Pk	34.9	-20.4	11.8	-27.91	-27	-.91	96	381	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



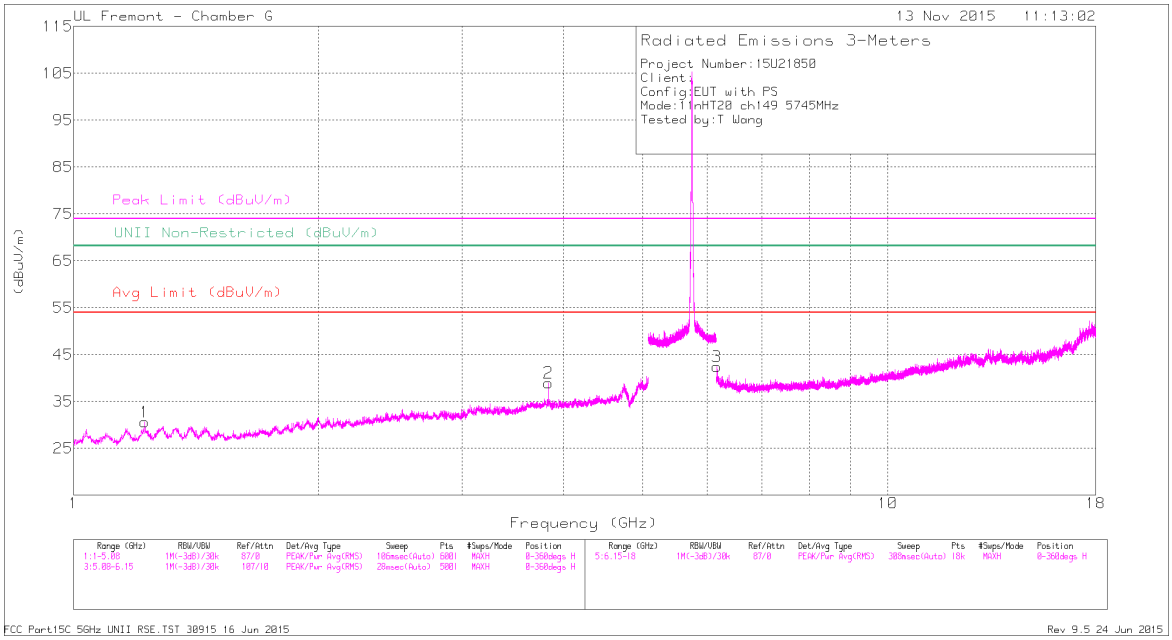
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-54.36	Pk	34.9	-20.3	11.8	-27.96	-17	-10.96	34	378	V
2	5.864	-58.33	Pk	34.9	-20.4	11.8	-32.03	-27	-5.03	34	378	V

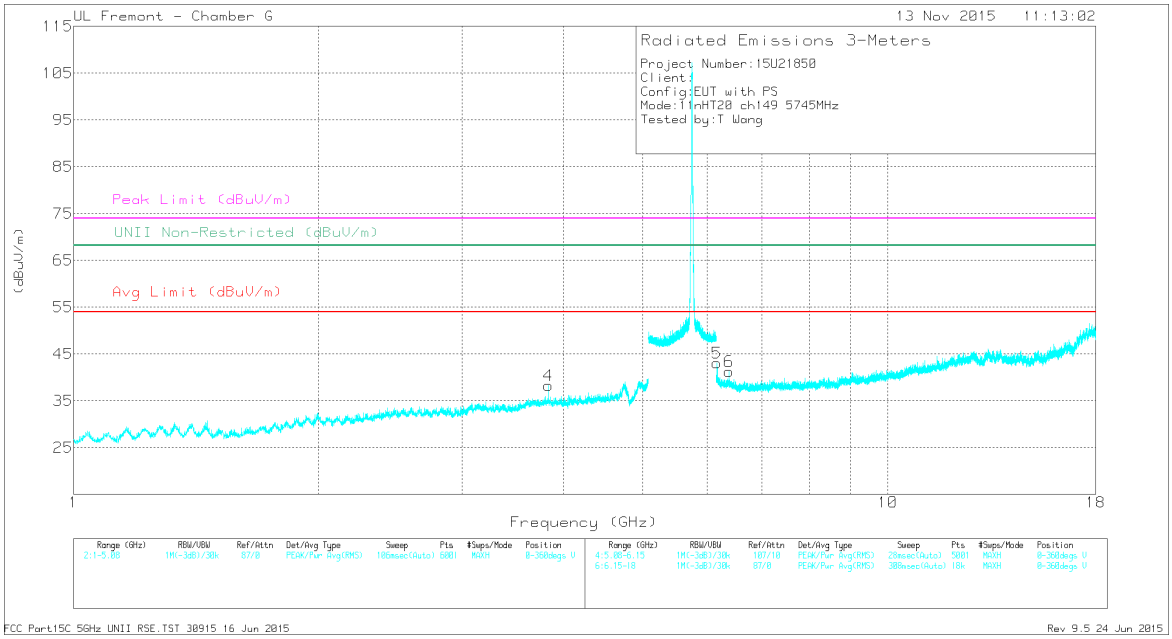
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (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
* 3.83	45.31	PK-U	33.1	-32.8	45.61	-	-	74	-28.39	-	-	182	158	H
* 3.83	37.54	ADR	33.1	-32.8	37.84	54	-16.16	-	-	-	-	182	158	H
* 1.223	43.08	PK-U	28.6	-35.2	36.48	-	-	74	-37.52	-	-	164	132	H
* 1.223	31.97	ADR	28.6	-35.2	25.37	54	-28.63	-	-	-	-	164	132	H
* 3.83	45.04	PK-U	33.1	-32.8	45.34	-	-	74	-28.66	-	-	185	271	V
* 3.83	35.37	ADR	33.1	-32.8	35.67	54	-18.33	-	-	-	-	185	271	V
6.162	43.86	PK-U	35.4	-31.6	47.66	-	-	-	-	68.2	-20.54	197	283	V
6.164	43.06	PK-U	35.4	-31.6	46.86	-	-	-	-	68.2	-21.34	191	163	H
6.383	42.63	PK-U	35.8	-31.7	46.73	-	-	-	-	68.2	-21.47	194	279	V

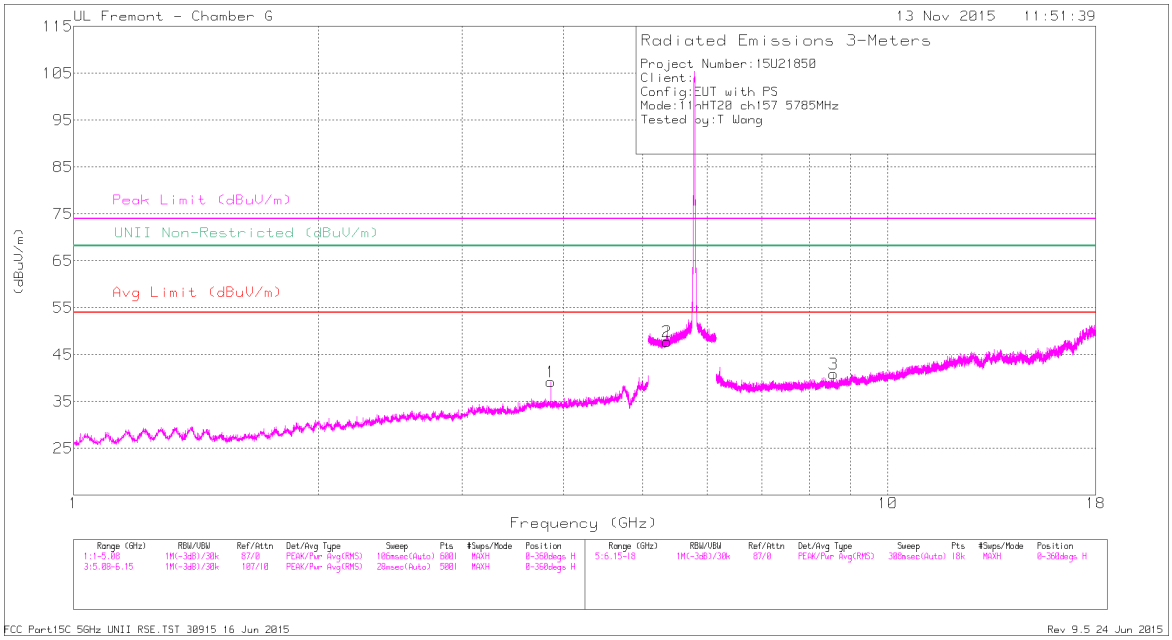
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

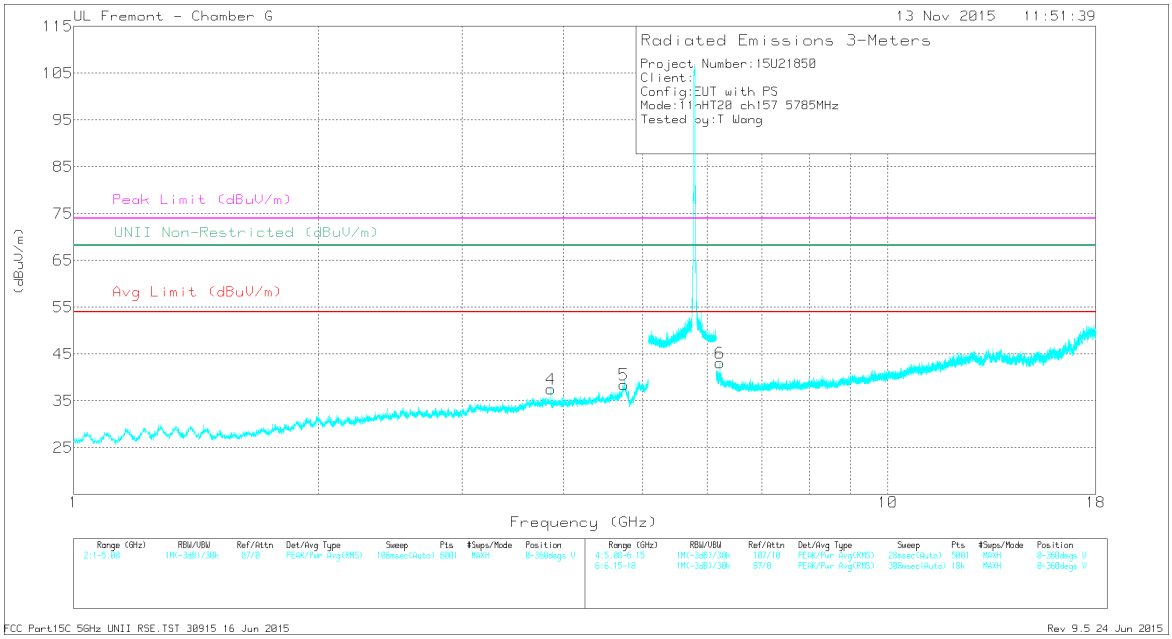
ADR - U-NII AD primary method, RMS average

MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (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
* 3.857	45.45	PK-U	33.1	-32.8	45.75	-	-	74	-28.25	-	-	182	116	H
* 3.857	38.21	ADR	33.1	-32.8	38.51	54	-15.49	-	-	-	-	182	116	H
* 3.857	45.14	PK-U	33.1	-32.8	45.44	-	-	74	-28.56	-	-	197	283	V
* 3.857	37.18	ADR	33.1	-32.8	37.48	54	-16.52	-	-	-	-	197	283	V
* 4.738	43.81	PK-U	33.9	-31.9	45.81	-	-	74	-28.19	-	-	213	289	V
* 4.738	32.8	ADR	33.9	-31.9	34.8	54	-19.2	-	-	-	-	213	289	V
* 5.353	44.55	PK-U	34.4	-23.1	55.85	-	-	74	-18.15	-	-	175	110	H
* 5.352	32.97	ADR	34.4	-23.1	44.27	54	-9.73	-	-	-	-	175	110	H
6.219	45.67	PK-U	35.5	-31.7	49.47	-	-	-	-	68.2	-18.73	208	291	V
8.571	39.71	PK-U	35.7	-28.7	46.71	-	-	-	-	68.2	-21.49	176	122	H

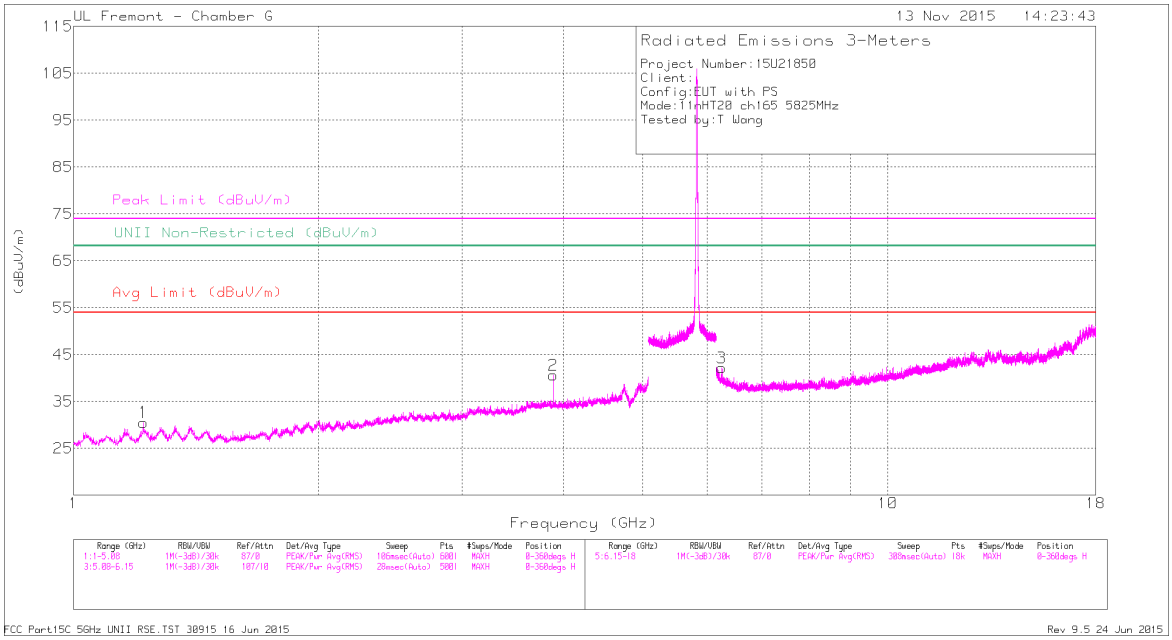
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

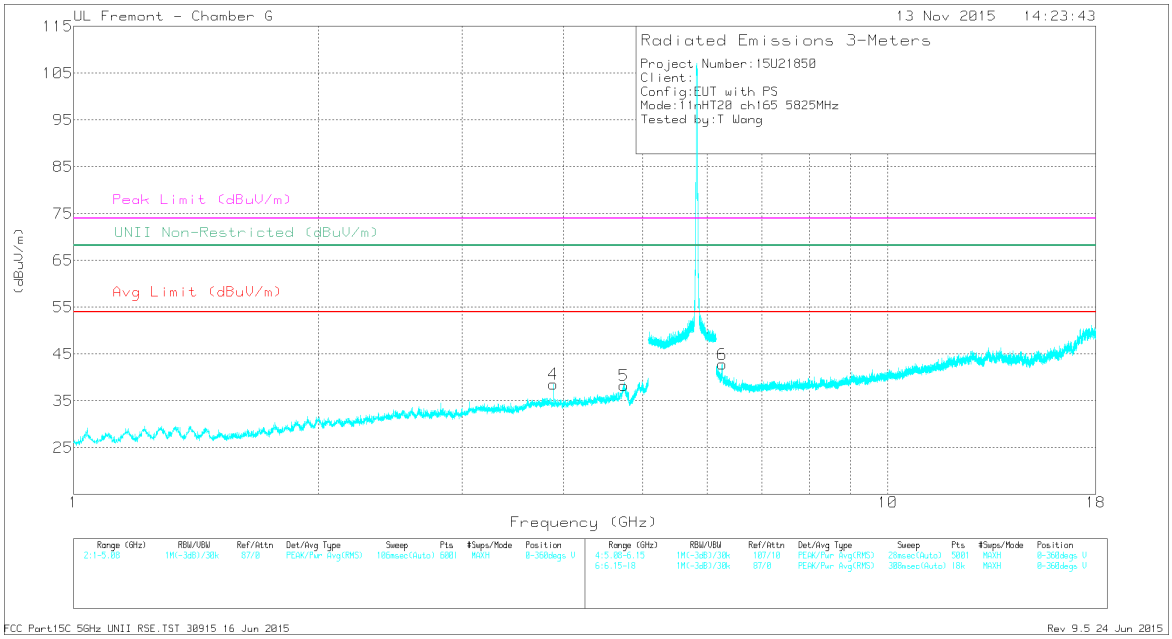
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (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
* 3.884	44.84	PK-U	33.1	-33	44.94	-	-	74	-29.06	-	-	178	101	H
* 3.883	37.73	ADR	33.1	-33	37.83	54	-16.17	-	-	-	-	178	101	H
* 1.219	42.79	PK-U	28.6	-35.2	36.19	-	-	74	-37.81	-	-	166	114	H
* 1.219	31.4	ADR	28.6	-35.2	24.8	54	-29.2	-	-	-	-	166	114	H
* 3.883	45.39	PK-U	33.1	-33	45.49	-	-	74	-28.51	-	-	203	331	V
* 3.883	38.98	ADR	33.1	-33	39.08	54	-14.92	-	-	-	-	203	331	V
* 4.741	43.96	PK-U	33.9	-31.9	45.96	-	-	74	-28.04	-	-	211	339	V
* 4.741	32.76	ADR	33.9	-31.9	34.76	54	-19.24	-	-	-	-	211	339	V
6.249	43.04	PK-U	35.6	-31.5	47.14	-	-	-	-	68.2	-21.06	169	94	H
6.263	44.54	PK-U	35.6	-31.2	48.94	-	-	-	-	68.2	-19.26	220	342	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

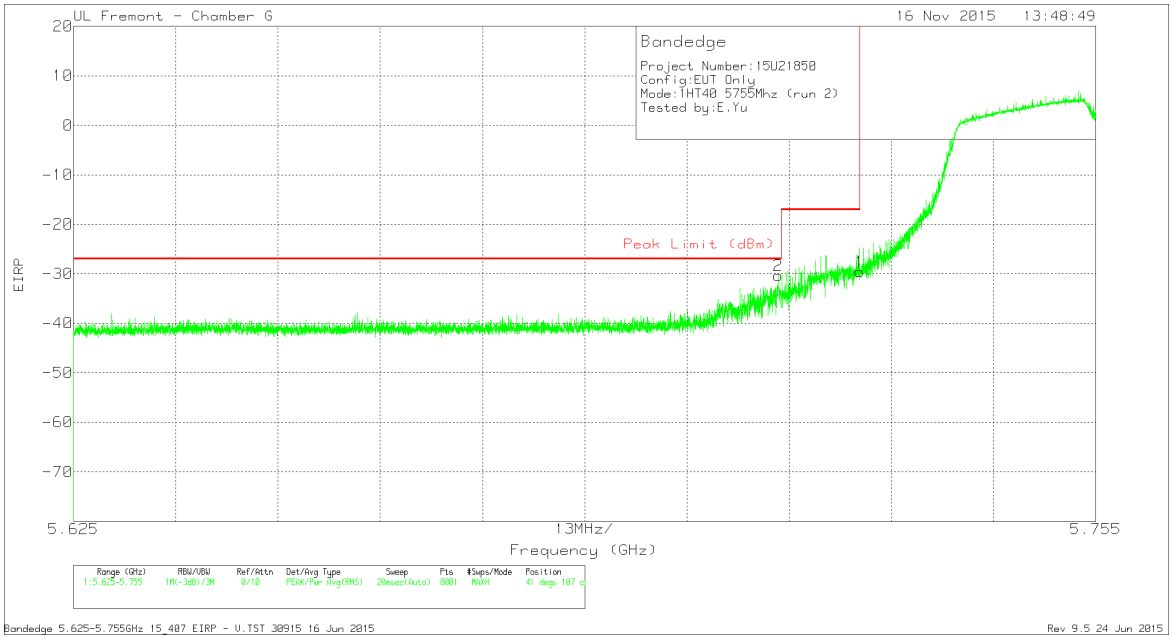
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.1.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE, CHAIN 0 (LOW CHANNEL)

LOW CHANNEL HORIZONTAL PLOT

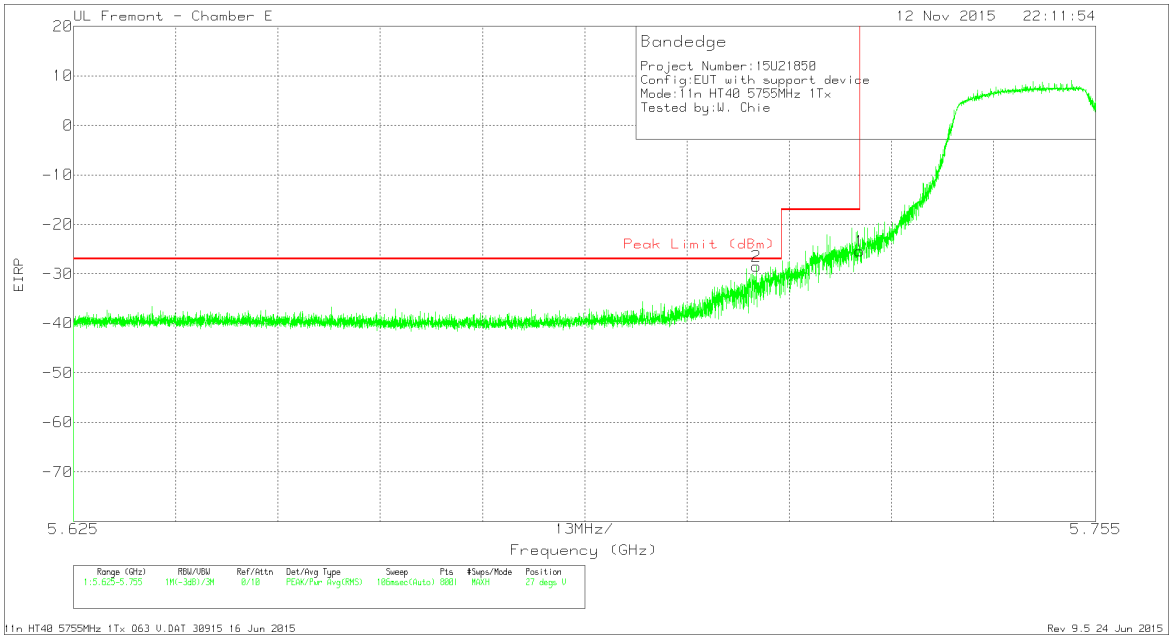


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	-54.1	Pk	34.9	-22.9	11.8	-30.3	-27	-3.3	41	107	V
1	5.725	-53.47	Pk	35	-22.9	11.8	-29.57	-17	-12.57	41	107	V

Pk - Peak detector

LOW CHANNEL VERTICAL PLOT



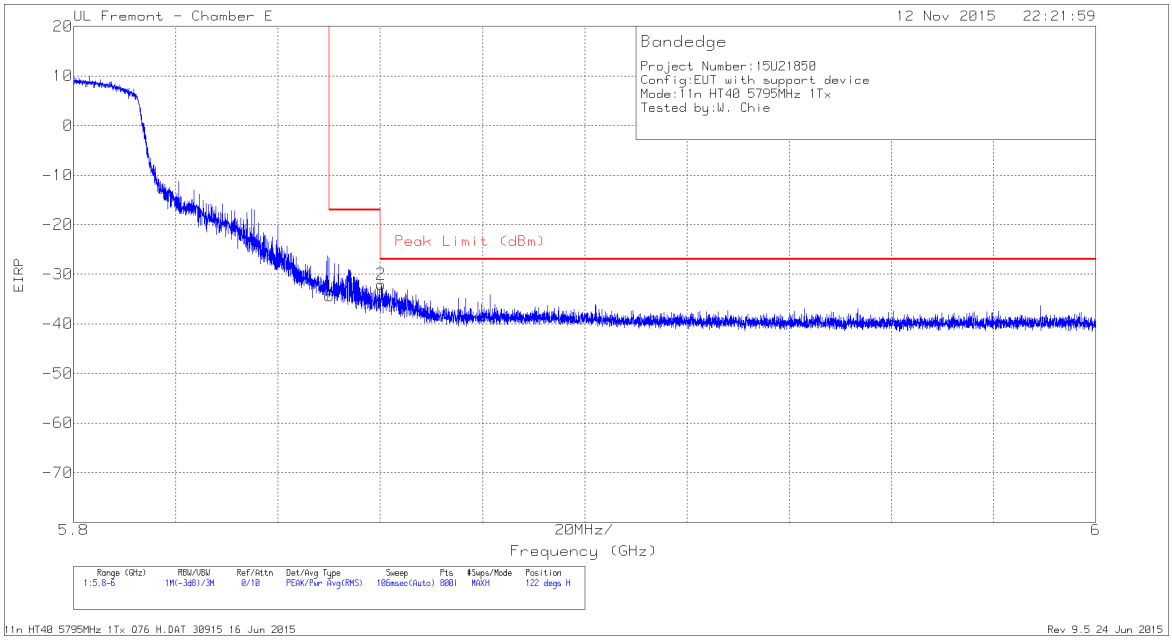
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.712	-54.87	Pk	34.7	-20.1	11.8	-28.47	-27	-1.47	27	400	V
1	5.725	-51.78	Pk	34.7	-20.1	11.8	-25.38	-17	-8.38	27	400	V

Pk - Peak detector

RESTRICTED BANDEDGE, CHAIN 0 (HIGH CHANNEL)

HIGH CHANNEL HORIZONTAL PLOT

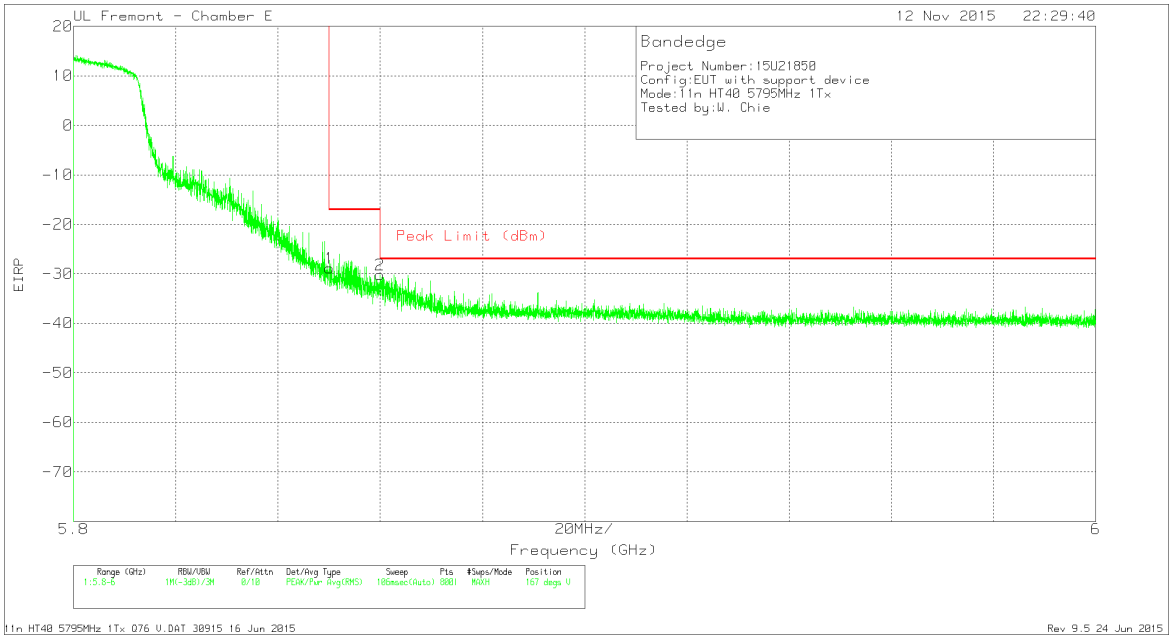


DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-60.8	Pk	34.9	-20.3	11.8	-34.4	-17	-17.4	122	240	H
2	5.86	-58.28	Pk	34.9	-20.4	11.8	-31.98	-27	-4.98	122	240	H

Pk - Peak detector

HIGH CHANNEL VERTICAL PLOT



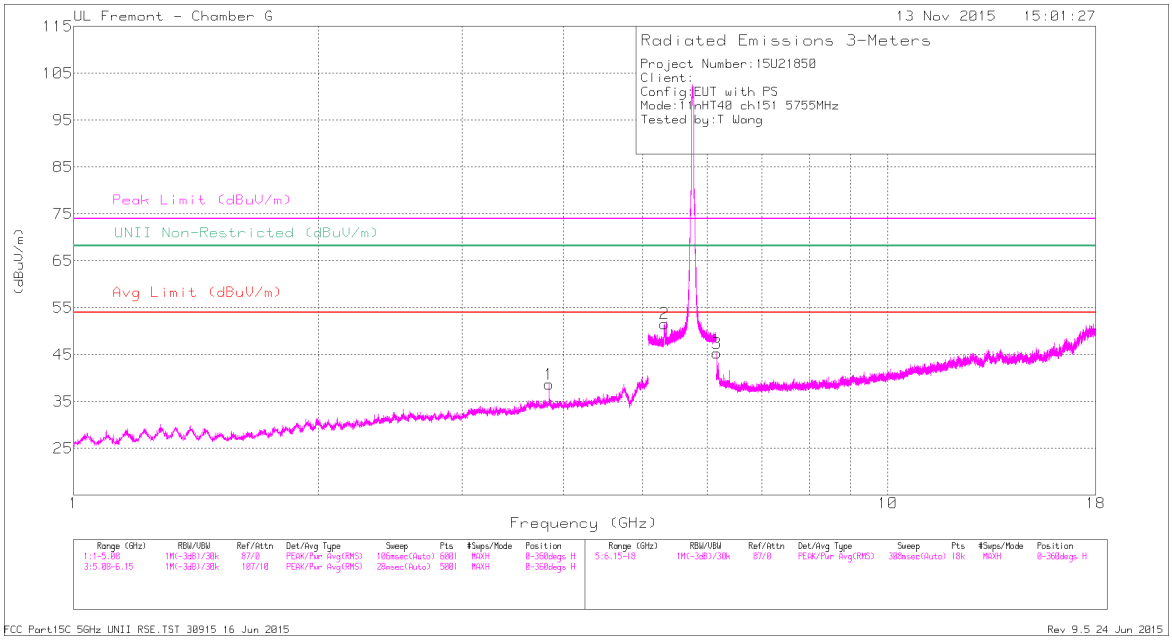
DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T346 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-55.28	Pk	34.9	-20.3	11.8	-28.88	-17	-11.88	167	297	V
2	5.86	-56.46	Pk	34.9	-20.4	11.8	-30.16	-27	-3.16	167	297	V

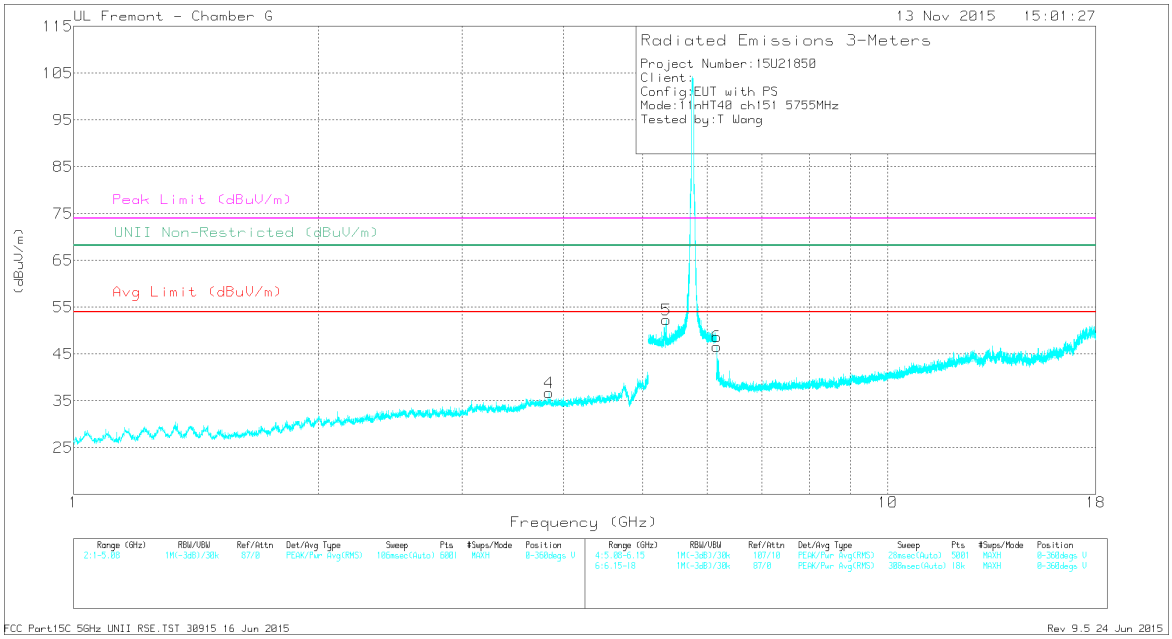
Pk - Peak detector

LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL PLOT



LOW CHANNEL VERTICAL PLOT



DATA

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.836	44.67	PK-U	33.1	-32.7	0	45.07	-	-	74	-28.93	-	-	178	132	H
* 3.837	37.17	ADR	33.1	-32.7	.09	37.66	54	-16.34	-	-	-	-	178	132	H
* 3.837	44.36	PK-U	33.1	-32.7	0	44.76	-	-	74	-29.24	-	-	193	310	V
* 3.837	36.06	ADR	33.1	-32.7	.09	36.55	54	-17.45	-	-	-	-	193	310	V
5.315	46.26	PK-U	34.4	-23.2	0	57.46	-	-	-	-	68.2	-10.74	188	139	H
5.346	49.12	PK-U	34.4	-23.1	0	60.42	-	-	-	-	68.2	-7.78	212	321	V
6.164	47.41	PK-U	35.4	-31.6	0	51.21	-	-	-	-	68.2	-16.99	208	307	V
6.167	43.25	PK-U	35.4	-31.7	0	46.95	-	-	-	-	68.2	-21.25	186	128	H

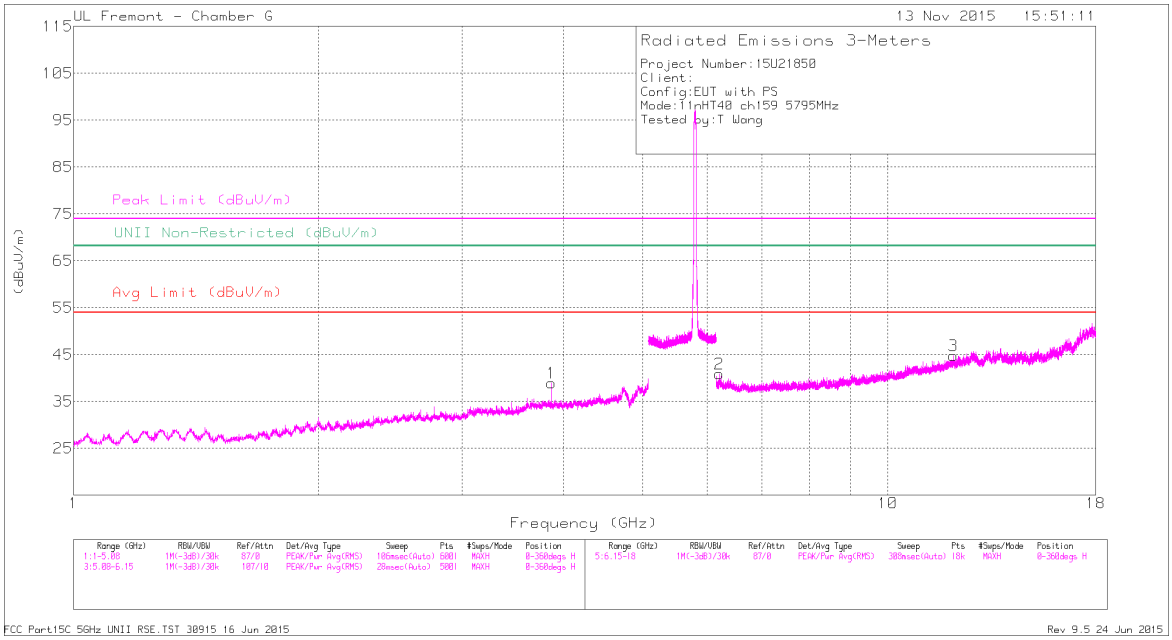
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

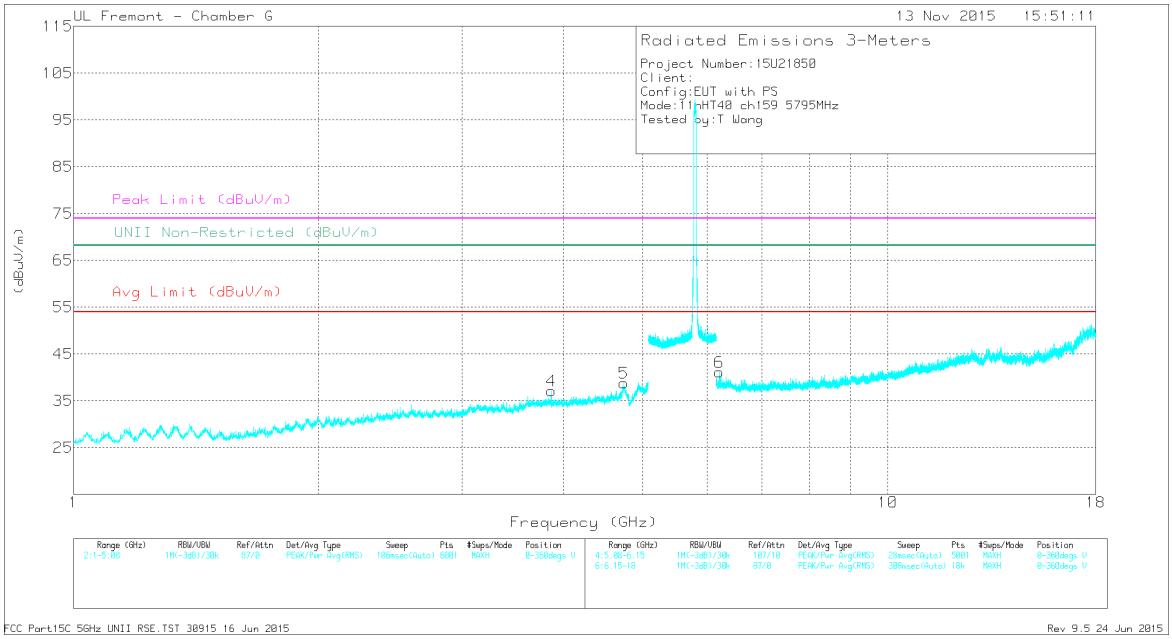
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.863	44.25	PK-U	33.1	-32.9	0	44.45	-	-	74	-29.55	-	-	175	153	H
	* 3.863	36.13	ADR	33.1	-32.9	.09	36.42	54	-17.58	-	-	-	-	175	153	H
4	* 3.863	44.04	PK-U	33.1	-32.9	0	44.24	-	-	74	-29.76	-	-	193	339	V
	* 3.863	36.04	ADR	33.1	-32.9	.09	36.33	54	-17.67	-	-	-	-	193	339	V
5	* 4.739	44.35	PK-U	33.9	-31.9	0	46.35	-	-	74	-27.65	-	-	279	270	V
	* 4.742	32.33	ADR	33.9	-31.9	.09	34.42	54	-19.58	-	-	-	-	279	270	V
3	* 12.028	38.23	PK-U	38.9	-25.4	0	51.73	-	-	74	-22.27	-	-	175	153	H
	* 12.027	26.69	ADR	38.9	-25.4	.09	40.28	54	-13.72	-	-	-	-	175	153	H
2	6.207	43.23	PK-U	35.5	-31.8	0	46.93	-	-	-	-	68.2	-21.27	175	153	H
6	6.207	43.64	PK-U	35.5	-31.8	0	47.34	-	-	-	-	68.2	-20.86	182	224	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

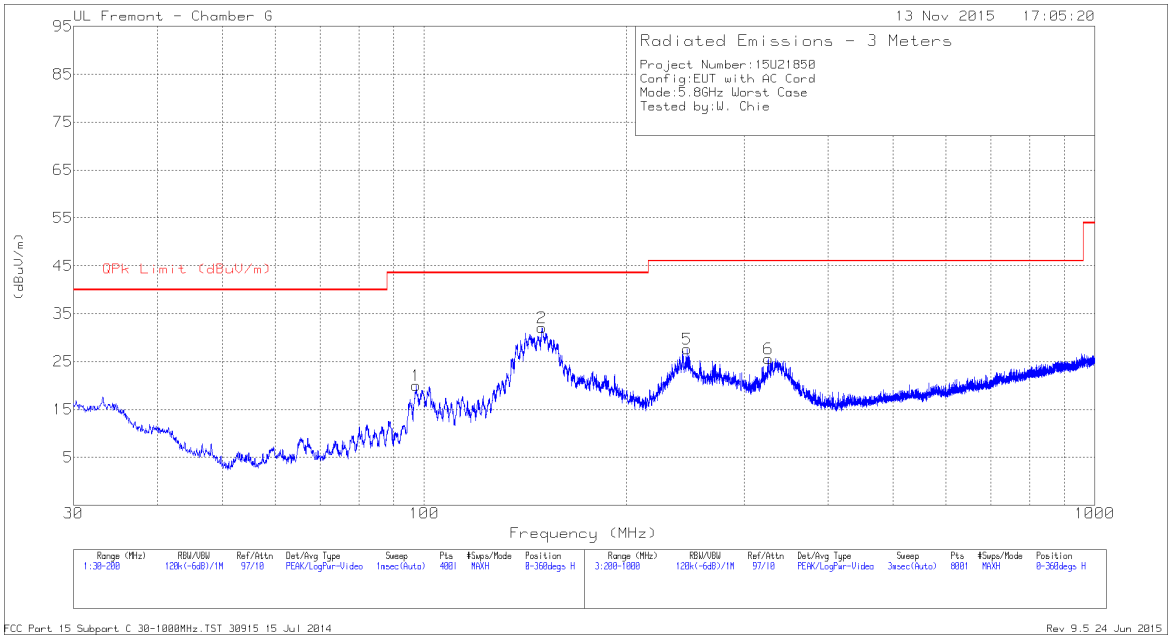
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

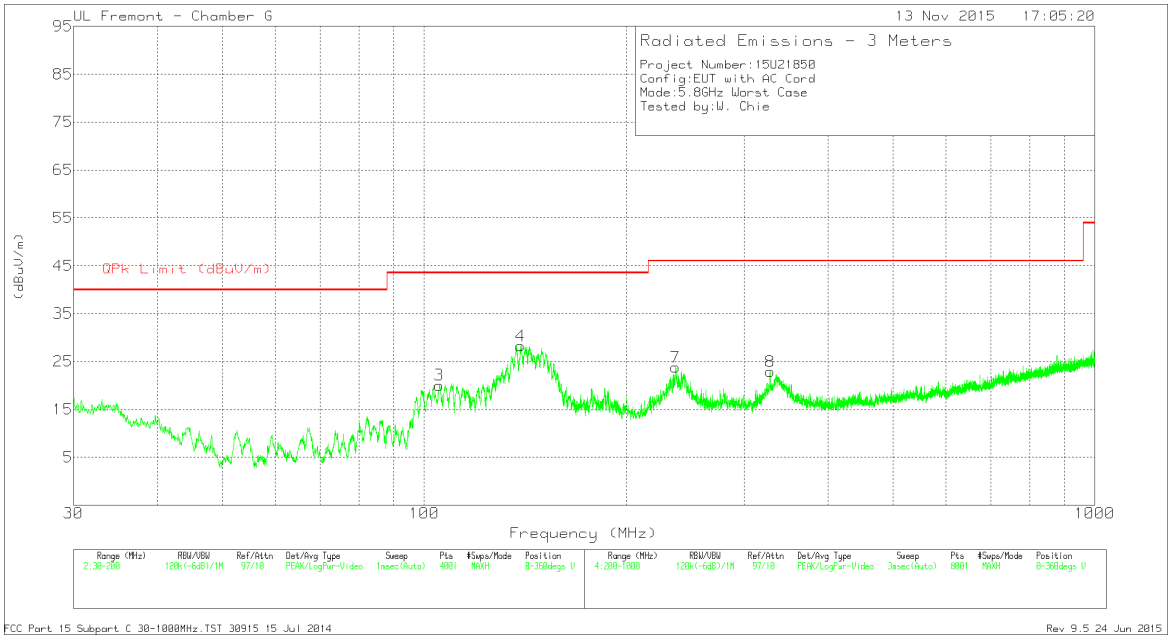
9.1.4. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)

HORIZONTAL PLOT



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T899 (dB/m)	Amp Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 246.6	45.59	Pk	11.3	-29.3	0	27.59	46.02	-18.43	0-360	100	H
6	* 325.8	40.54	Pk	13.8	-28.7	0	25.64	46.02	-20.38	0-360	100	H
8	* 327.9	37.99	Pk	13.8	-28.8	0	22.99	46.02	-23.03	0-360	100	V
1	97.32	40.87	Pk	9.6	-30.5	0	19.97	43.52	-23.55	0-360	301	H
3	105.31	38.78	Pk	11.7	-30.4	0	20.08	43.52	-23.44	0-360	100	V
4	139.225	45.04	Pk	13.3	-30.1	0	28.24	43.52	-15.28	0-360	100	V
2	149.7225	49.63	Pk	12.5	-30	0	32.13	43.52	-11.39	0-360	201	H
7	237.2	42.17	Pk	11.1	-29.4	0	23.87	46.02	-22.15	0-360	201	V

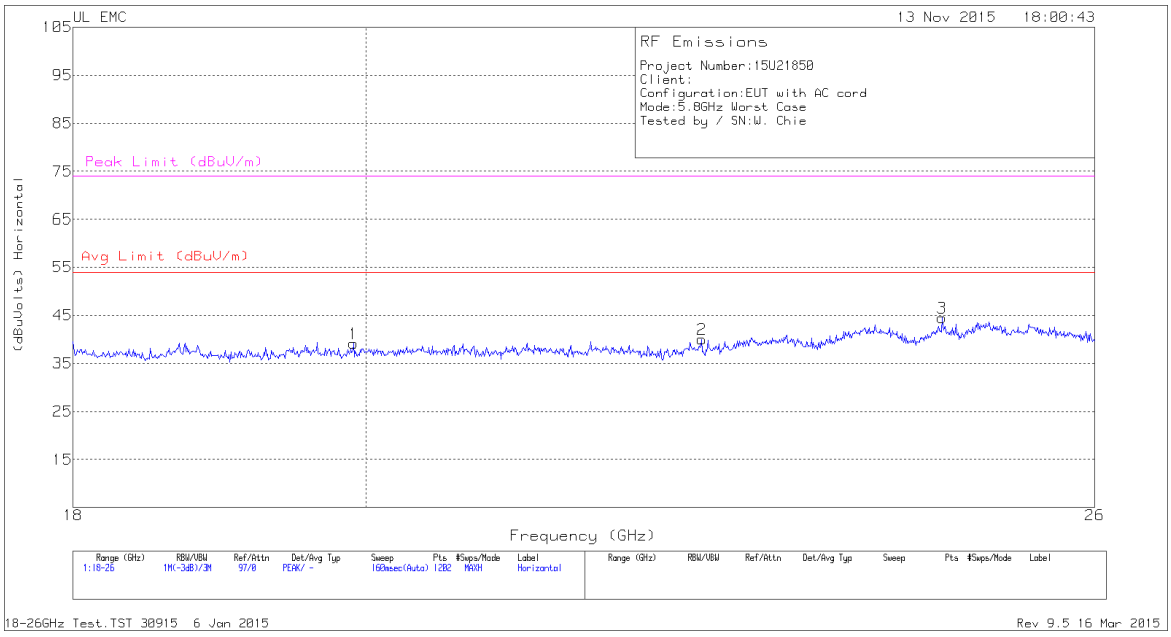
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

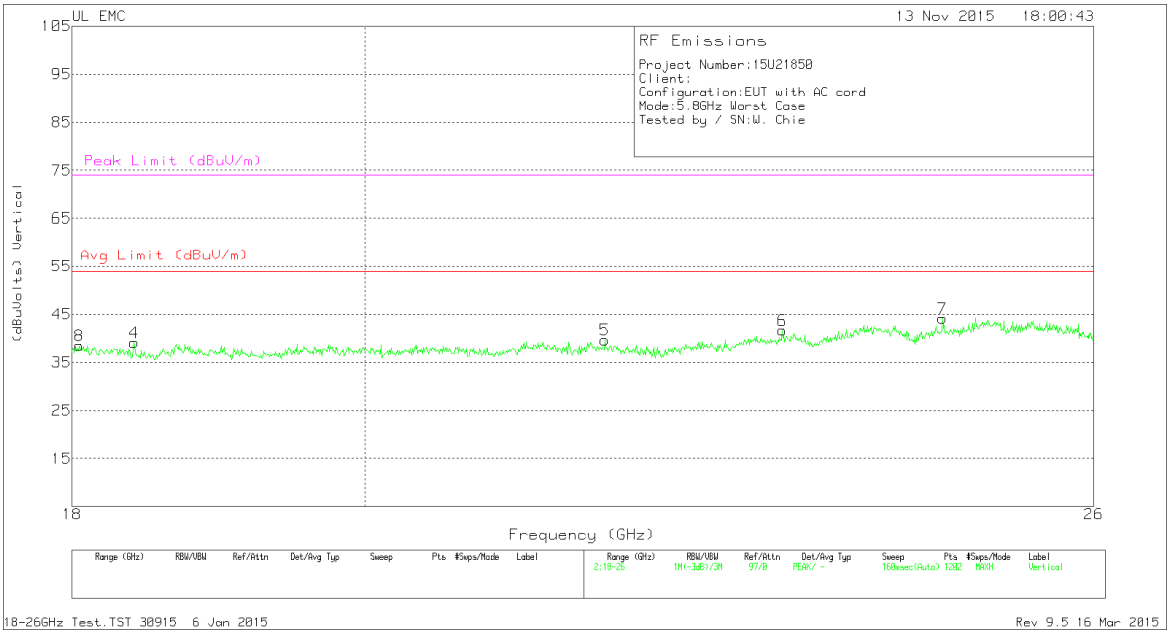
9.1.5. WORST-CASE ABOVE 18 GHz

SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



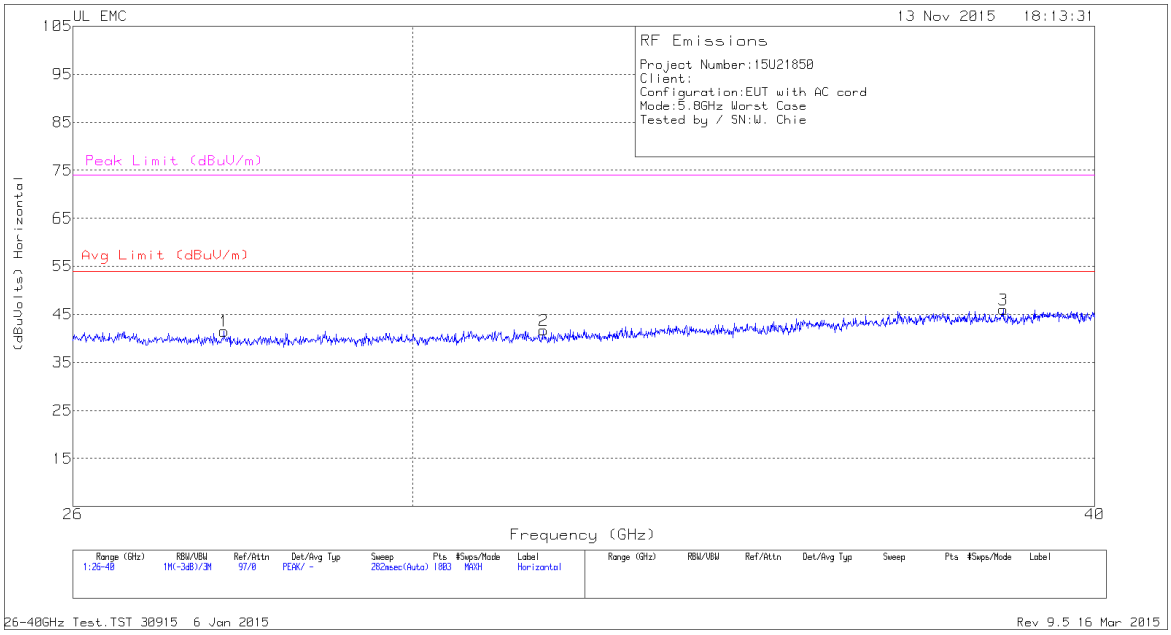
HORIZONTAL AND VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.912	40.87	Pk	32.9	-25.1	-9.5	39.16666	54	-14.83333	74	-34.83333
2	22.57	41.1	Pk	33.3	-24.9	-9.5	40	54	-14	74	-34
3	24.608	44.4	Pk	33.9	-24.3	-9.5	44.5	54	-9.5	74	-29.5
4	18.406	41.37	Pk	32.4	-25.1	-9.5	39.16667	54	-14.8333	74	-34.8333
5	21.803	40.27	Pk	33.3	-24.4	-9.5	39.66667	54	-14.3333	74	-34.3333
6	23.242	42.67	Pk	33.5	-25	-9.5	41.66667	54	-12.3333	74	-32.3333
7	24.621	44.07	Pk	33.9	-24.3	-9.5	44.16667	54	-9.83333	74	-29.8333
8	18.047	40.7	Pk	32.5	-25.2	-9.5	38.5	54	-15.5	74	-35.5

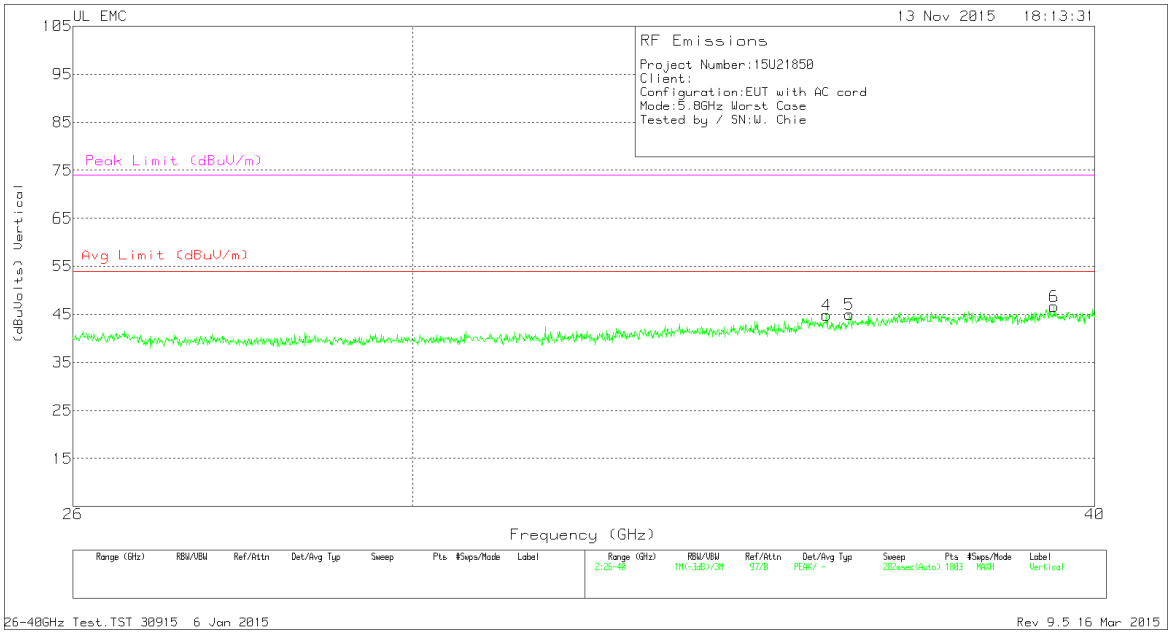
Pk - Peak detector

SPURIOUS EMISSIONS 26000 TO 40000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	27.709	46.6	Pk	35.8	-31.4	-9.5	41.5	54	-12.5	74	-32.5
2	31.703	47.77	Pk	36.3	-32.9	-9.5	41.66667	54	-12.3333	74	-32.3333
3	38.485	50.5	Pk	37	-32	-9.5	46	54	-8.00	74	-28
4	35.719	50.33	Pk	37.3	-33.3	-9.5	44.83333	54	-9.16667	74	-29.1667
5	36.069	50.4	Pk	37.2	-33.1	-9.5	45	54	-9	74	-29
6	39.316	49.87	Pk	38.3	-32	-9.5	46.66667	54	-7.33333	74	-27.3333

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

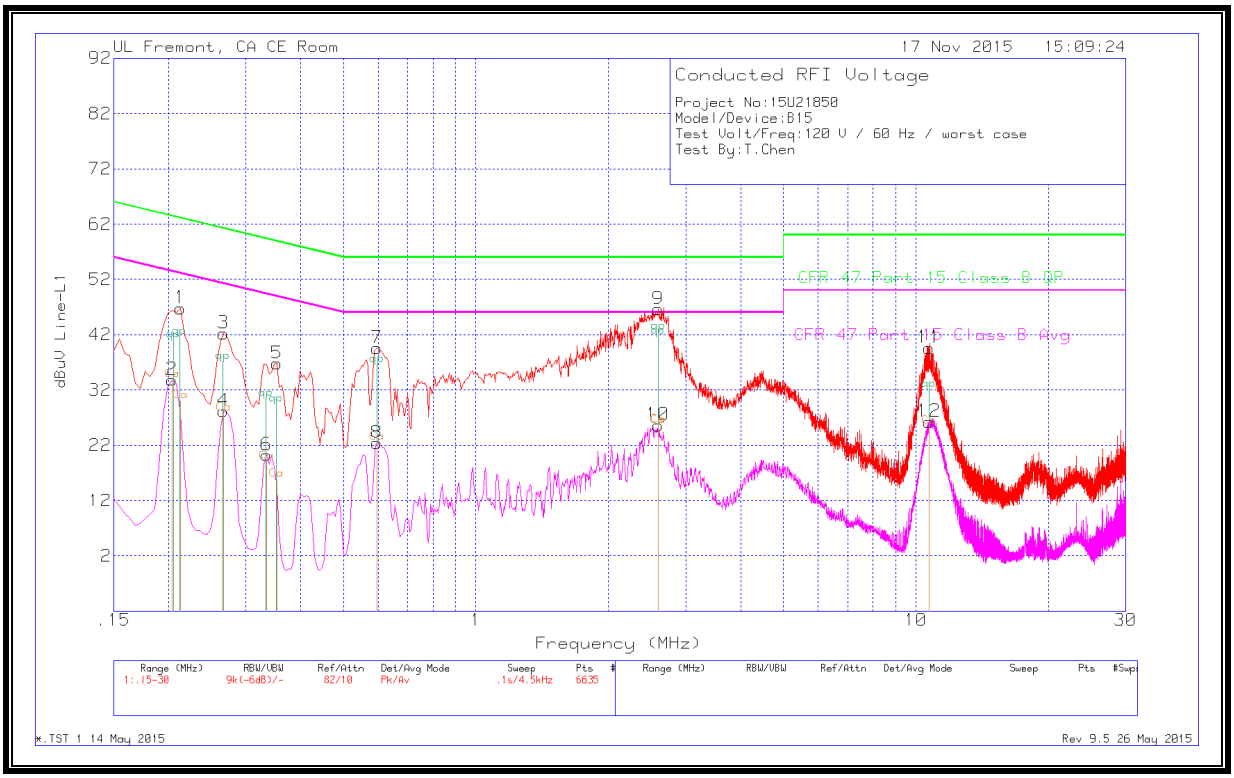
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

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

RESULTS

LINE 1 RESULTS

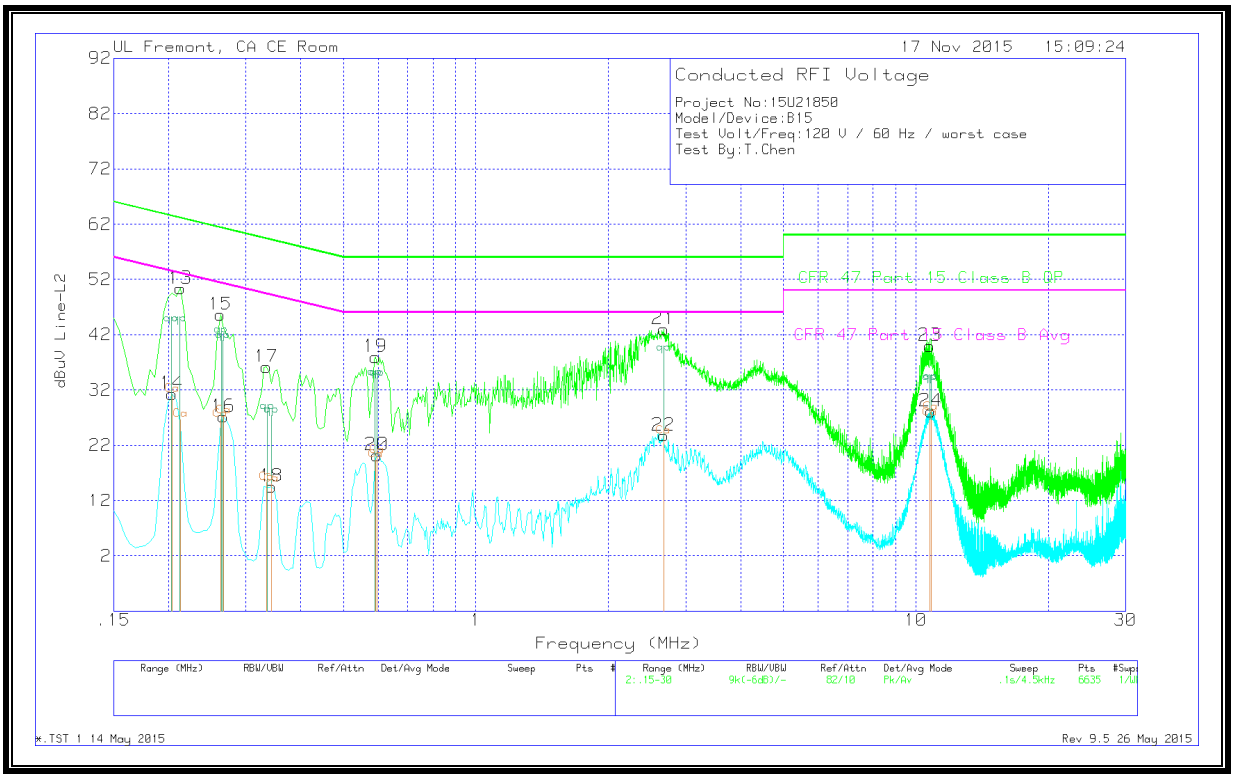


WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
1	.21188	40.73	Qp	.9	0	41.63	63.13	-21.5	-	-
2	.21188	29.11	Ca	.9	0	30.01	-	-	53.13	-23.12
3	.26588	36.53	Qp	.6	0	37.13	61.25	-24.12	-	-
4	.26588	27.18	Ca	.6	0	27.78	-	-	51.25	-23.47
5	.35138	28.93	Qp	.5	0	29.43	58.93	-29.5	-	-
6	.35138	15.34	Ca	.5	0	15.84	-	-	48.93	-33.09
7	.59663	36.26	Qp	.3	0	36.56	56	-19.44	-	-
8	.59663	22.19	Ca	.3	0	22.49	-	-	46	-23.51
9	2.59868	42.21	Qp	.2	.1	42.51	56	-13.49	-	-
10	2.59868	25.33	Ca	.2	.1	25.63	-	-	46	-20.37
11	10.7077	31.66	Qp	.2	.2	32.06	60	-27.94	-	-
12	10.7077	24.96	Ca	.2	.2	25.36	-	-	50	-24.64

Ca - CISPR average detection
Qp - Quasi-Peak detector

LINE 2 RESULTS



WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
1	.21188	40.73	Qp	.9	0	41.63	63.13	-21.5	-	-
2	.21188	29.11	Ca	.9	0	30.01	-	-	53.13	-23.12
3	.26588	36.53	Qp	.6	0	37.13	61.25	-24.12	-	-
4	.26588	27.18	Ca	.6	0	27.78	-	-	51.25	-23.47
5	.35138	28.93	Qp	.5	0	29.43	58.93	-29.5	-	-
6	.35138	15.34	Ca	.5	0	15.84	-	-	48.93	-33.09
7	.59663	36.26	Qp	.3	0	36.56	56	-19.44	-	-
8	.59663	22.19	Ca	.3	0	22.49	-	-	46	-23.51
9	2.59868	42.21	Qp	.2	.1	42.51	56	-13.49	-	-
10	2.59868	25.33	Ca	.2	.1	25.63	-	-	46	-20.37
11	10.7077	31.66	Qp	.2	.2	32.06	60	-27.94	-	-
12	10.7077	24.96	Ca	.2	.2	25.36	-	-	50	-24.64

Ca - CISPR average detection
Qp - Quasi-Peak detector