



**FCC 47 CFR PART 15 SUBPART E**

**CERTIFICATION TEST REPORT  
CLASS II PERMISSIVE CHANGE**

**FOR**

**QUAD-BAND RADIO WITH WLAN AND BT RADIO**

**MODEL NUMBER: A1507**

**FCC ID: BCG-E2694B**

**REPORT NUMBER: 15U21850-E4V1**

**ISSUE DATE: NOVEMBER 20, 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

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	11/20/2015	Initial Issue	T. Chu

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST METHODOLOGY .....</b>	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>6</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>7</b>
4.1. MEASURING INSTRUMENT CALIBRATION.....	7
4.2. SAMPLE CALCULATION.....	7
4.3. MEASUREMENT UNCERTAINTY .....	7
<b>5. EQUIPMENT UNDER TEST.....</b>	<b>8</b>
5.1. DESCRIPTION OF EUT.....	8
5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE.....	8
5.3. MAXIMUM OUTPUT POWER.....	8
5.4. DESCRIPTION OF AVAILABLE ANTENNAS.....	8
5.5. SOFTWARE AND FIRMWARE .....	8
5.6. WORST-CASE CONFIGURATION AND MODE.....	9
5.7. DESCRIPTION OF TEST SETUP .....	10
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>16</b>
<b>7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS .....</b>	<b>17</b>
7.1. ON TIME AND DUTY CYCLE.....	17
7.2. MEASUREMENT METHODS.....	20
<b>8. ANTENNA PORT TEST RESULTS.....</b>	<b>21</b>
8.1. 802.11a MODE IN THE 5.8 GHz BAND .....	21
8.1.1. 6 dB BANDWIDTH .....	21
8.1.2. 26 dB BANDWIDTH .....	23
8.1.3. 99% BANDWIDTH.....	25
8.1.4. AVERAGE POWER.....	28
8.1.5. OUTPUT POWER .....	29
8.1.6. PSD.....	31
8.2. 802.11n HT20 IN THE 5.8 GHz BAND .....	34
8.2.1. 6 dB BANDWIDTH .....	34
8.2.2. 26 dB BANDWIDTH .....	37
8.2.3. 99% BANDWIDTH.....	40
8.2.4. AVERAGE POWER.....	43
8.2.5. OUTPUT POWER .....	44
8.2.6. PSD.....	46
8.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND.....	49
8.3.1. 6 dB BANDWIDTH .....	49
8.3.2. 26 dB BANDWIDTH .....	51

---

8.3.3.	99% BANDWIDTH.....	53
8.3.4.	AVERAGE POWER.....	55
8.3.5.	OUTPUT POWER.....	56
8.3.6.	PSD.....	58
<b>9.</b>	<b>RADIATED TEST RESULTS .....</b>	<b>61</b>
9.1.	LIMITS AND PROCEDURE.....	61
9.2.	802.11a MODE IN THE 5.8 GHz BAND .....	62
9.3.	802.11n HT20 MODE IN THE 5.8 GHz BAND.....	72
9.4.	802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND.....	82
9.5.	WORST-CASE BELOW 1 GHz .....	90
9.6.	WORST-CASE ABOVE 18 GHz.....	92
<b>10.</b>	<b>AC POWER LINE CONDUCTED EMISSIONS.....</b>	<b>96</b>
10.1.	EUT POWERED BY AC/DC ADAPTER.....	97
10.2.	EUT POWERED BY HOST PC VIA USB CABLE .....	99
<b>11.</b>	<b>SETUP PHOTOS.....</b>	<b>101</b>

# 1. ATTESTATION OF TEST RESULTS

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

**EUT DESCRIPTION:** QUAD-BAND RADIO WITH WLAN AND BT RADIO

**MODEL:** A1507

**SERIAL NUMBER:** C7JKV0NMFLW6(Conducted); C7JL30ELFP16( Radiated)

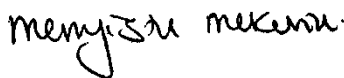
**DATE TESTED:** NOVEMBER 05, 2015 – NOVEMBER 09, 2015

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.

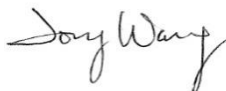
**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. 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:



TONY WANG  
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 789033 D02 v01, FCC, 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
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input checked="" type="checkbox"/> Chamber G
	<input type="checkbox"/> 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:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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

Model A1507 is a mobile phone with multimedia functions (music, application support, and video), cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n, Bluetooth and GPS radio. The rechargeable battery is not user accessible.

### 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 SISO	14.37	27.35
5745 - 5825	802.11n HT20 SISO	14.37	27.35
5755 - 5795	802.11n HT40 SISO	14.40	27.54

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (MHz)	Antenna Gain (dBi)
5725 - 5850	1.59

### 5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was WL Tool FW 6.10.56.166



---

## 5.6. WORST-CASE CONFIGURATION AND MODE

Testing of Model A1507 (FCC ID: BCG-E2694B) is considered representative of Model A1529 (FCC ID: BCG-E2694A). Model A1507 is identical to Model A1529 except for the WWAN functions. Both the WLAN and WWAN antenna locations for both models are identical. Test data in this report was generated using FCC ID: BCG-E2694A since RF characteristic for FCC ID: BCG-E2694A is representative of FCC ID: BCG-E2694B.

The worst-case channel for RF radiated emissions below 1GHz tests is channel with highest RF output power.

For the fundamental investigation, the EUT is investigated for vertical and horizontal antenna orientations and the worst case was determined to be at X-position.

Worst-case data rates were used:

802.11a mode: 6 Mbps  
802.11n HT20mode: MCS0  
802.11n HT40mode: MCS0

Since EUT passed radiated with antenna, no conducted spurious was performed.

## 5.7.DESCRPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude D630	N/A	N/A
AC/DC adapter	Dell	PA-1900-02D	N/A	N/A
Earphone	Apple	NA	NA	N/A
EUT AC/DC adapter	Apple	A1357	W010A051	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	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	3	N/A

### I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
None Used						

### I/O CABLES (RADIATED BELOW 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	AC	1	AC	Un-shielded	3	N/A

### I/O CABLES (AC LINE CONDUCTED: AC/DC ADAPTER)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	AC	1	AC	Un-shielded	3	N/A

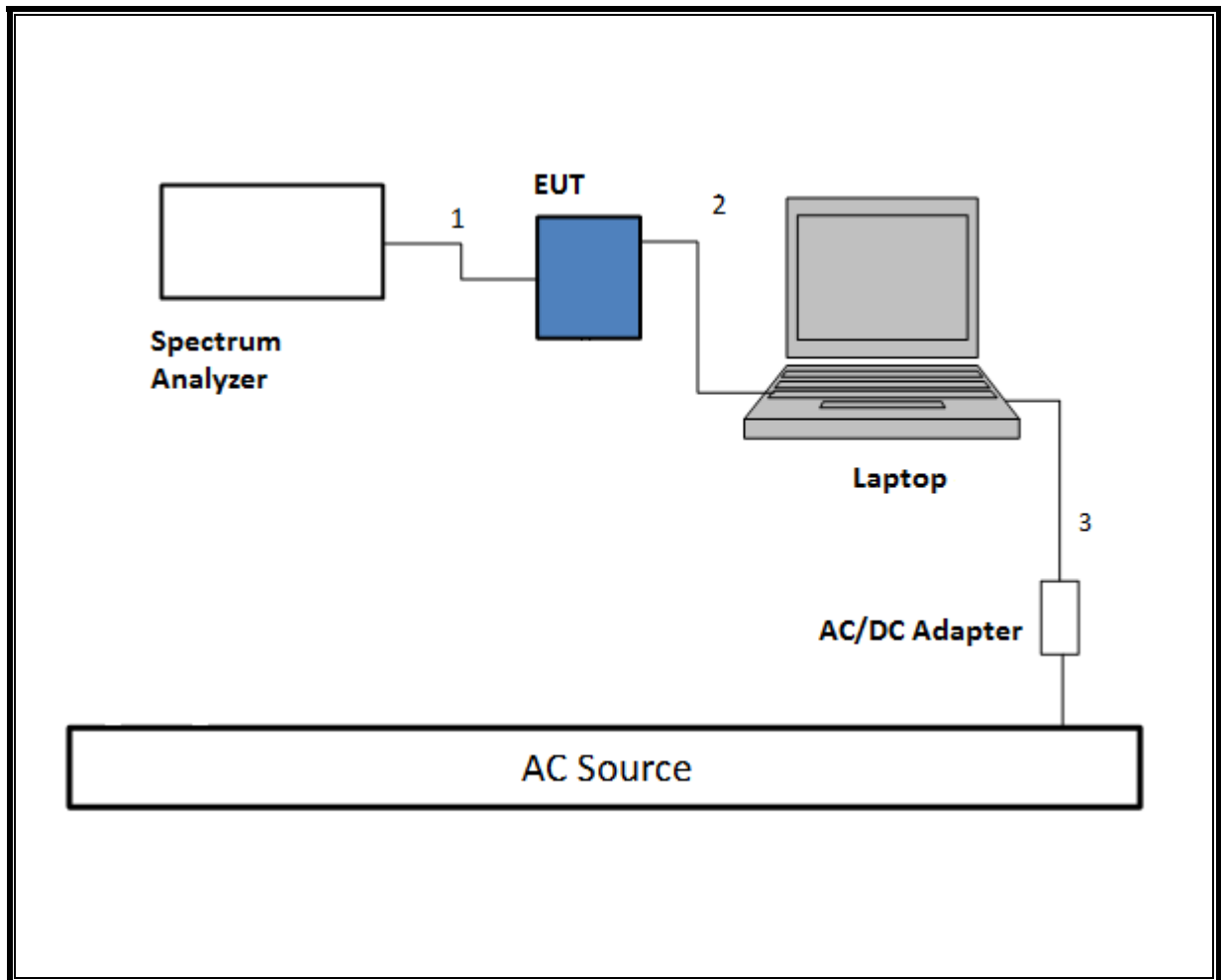
**I/O CABLES (AC LINE CONDUCTED: LAPTOP CONFIGUARTION)**

<b>I/O Cable List</b>						
<b>Cable No</b>	<b>Port</b>	<b># of identical</b>	<b>Connector Type</b>	<b>Cable Type</b>	<b>Cable Length (m)</b>	<b>Remarks</b>
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	3	N/A

**TEST SETUP - CONDUCTED TESTS**

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

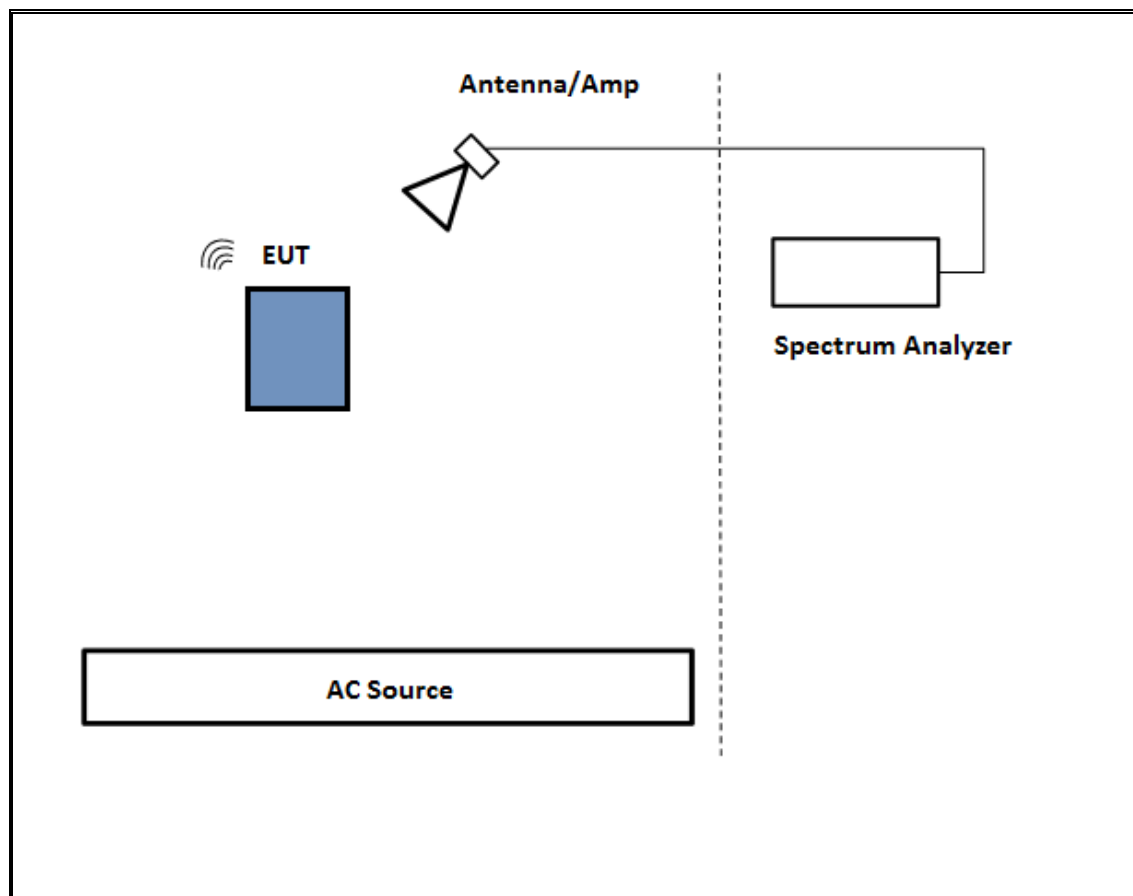
**SETUP DIAGRAM**



**TEST SETUP- RADIATED-ABOVE 1 GHZ**

The EUT was tested battery powered. Test software exercised the EUT.

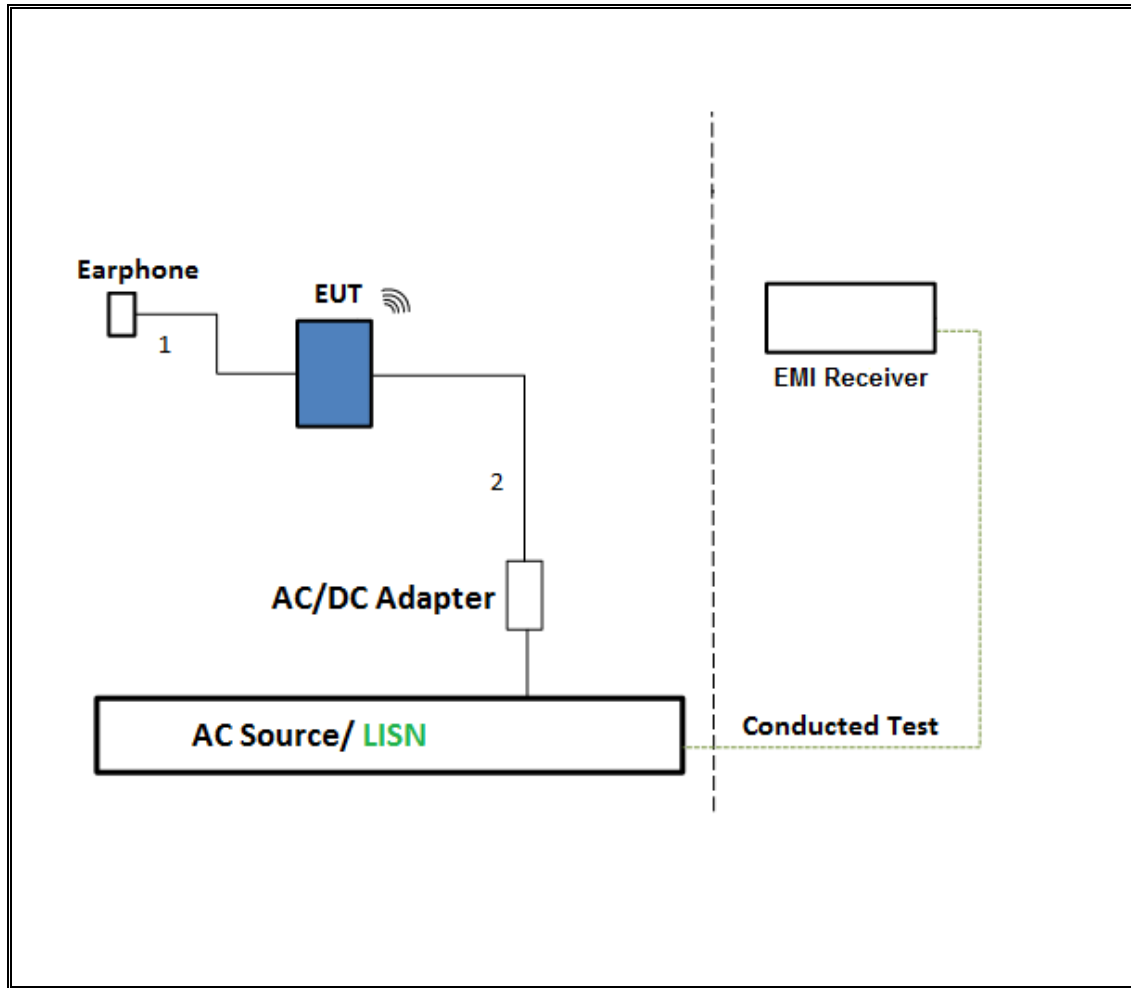
**SETUP DIAGRAM**



**TEST SETUP- AC LINE CONDUCTED: AC/DC ADAPTER**

The EUT was tested with earphone connected and powered by AC/DC adapter via USB cable. Test software exercised the EUT.

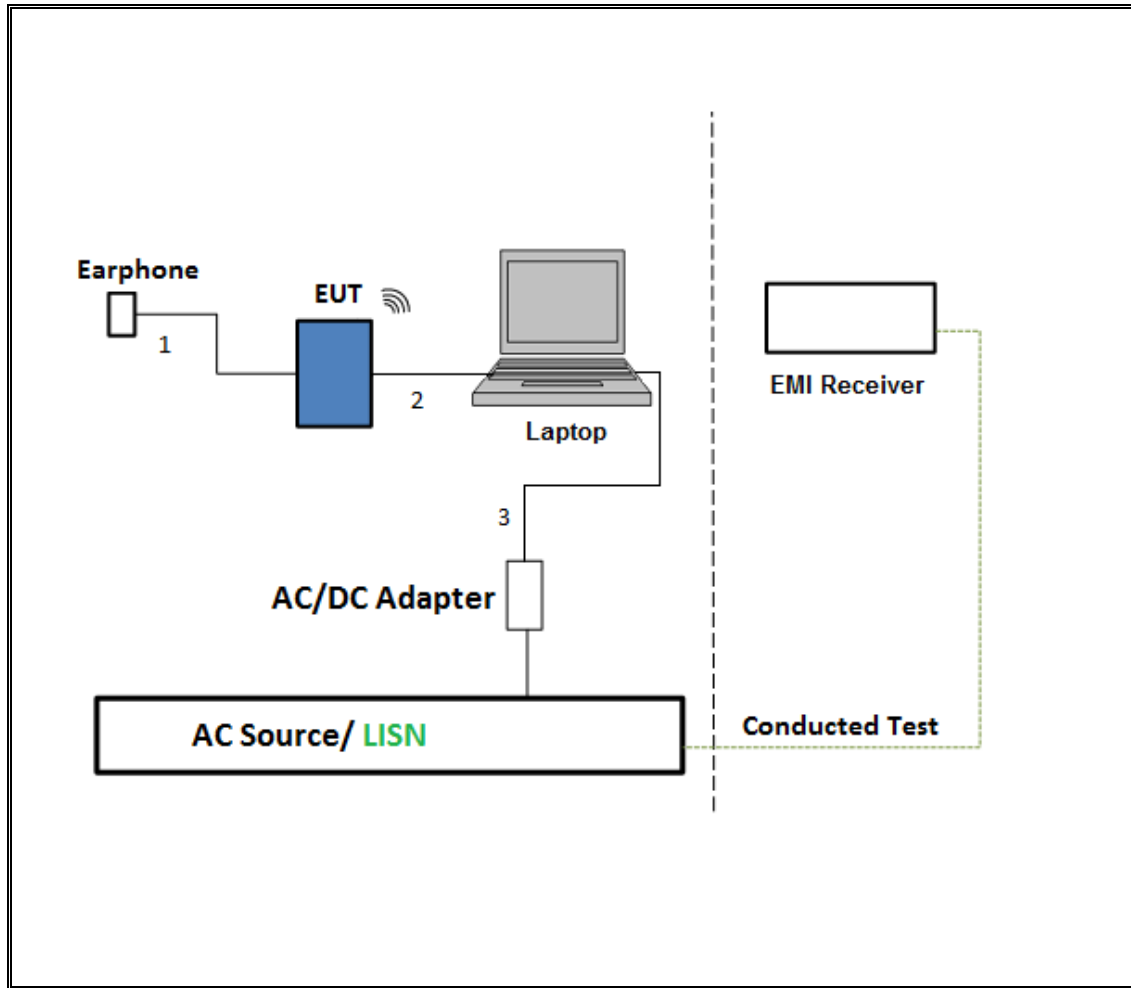
**SETUP DIAGRAM**



**TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION**

The EUT was tested with earphone connected and powered by host PC via USB cable. Test software exercised the EUT.

**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	00165318	4/10/2016
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A051314-2	4/30/2016
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1818464	4/25/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	325118	6/8/2016
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	MY53311010	5/26/2016
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	MY54490254	12/10/2015
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	MY55200002	3/6/2016
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	MY55200004	5/6/2016
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	1049	12/17/2015
Horn Antenna, 40GHz	ARA	MWH-2640/B	1029	7/28/2016
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2016
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	3008A04710	6/29/2016
Amplifier, 26 - 40GHz	Miteq	NSP4000-SP2	924343	4/7/2016
AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	100773	8/7/2016
LISN for Conducted Emissions CISPR-16	FCC	50/250-25-2	114	1/16/2016
Power Cable, Line Conducted Emissions ANSI 63.4	UL	PG1	N/A	7/28/2016
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.

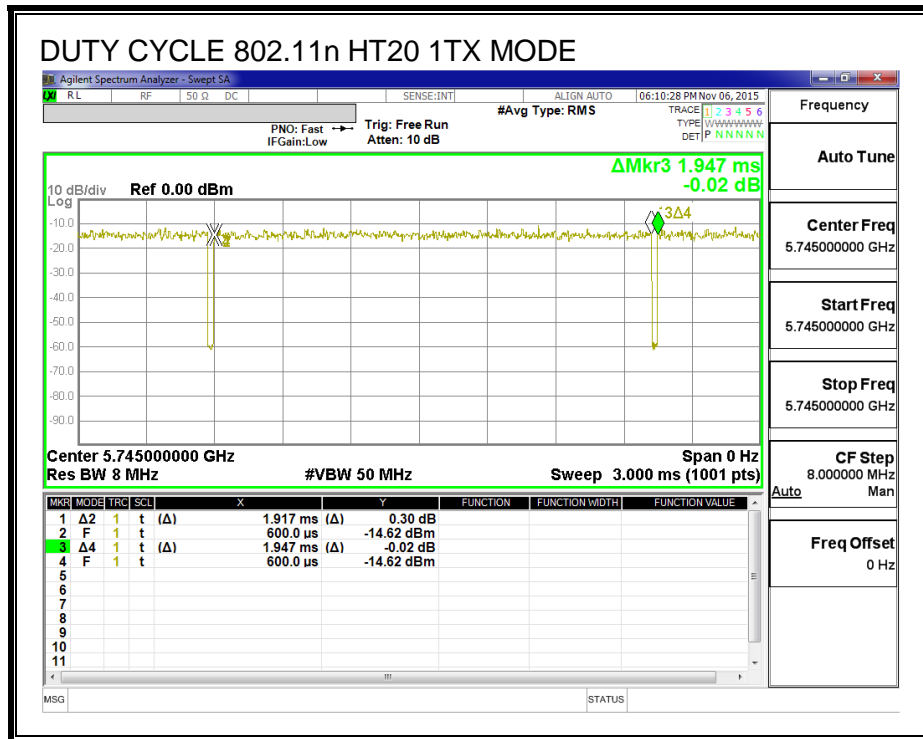
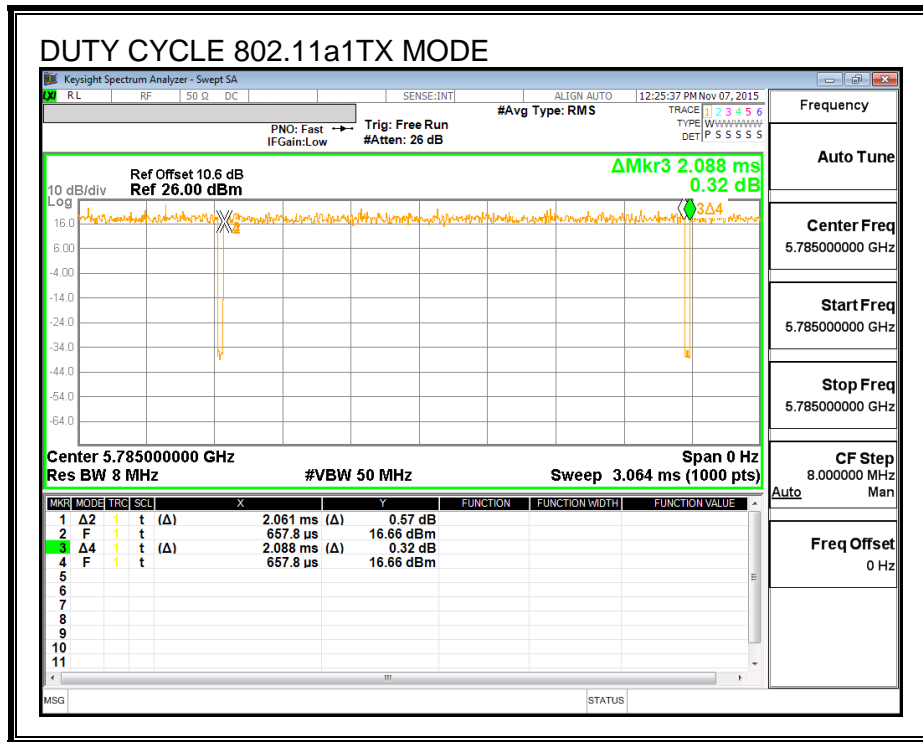
#### PROCEDURE

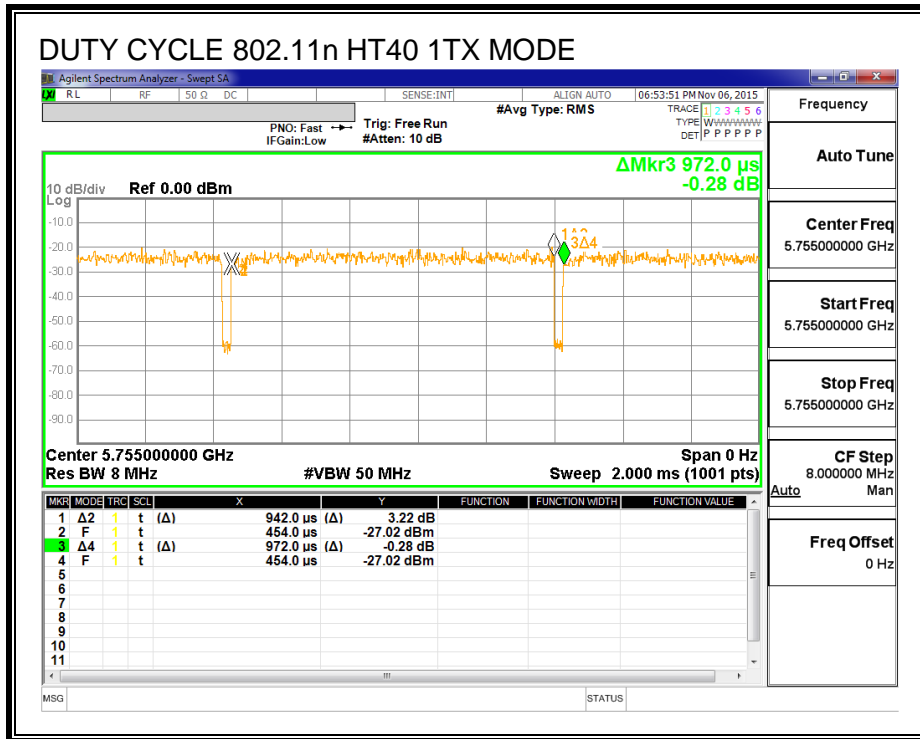
KDB 789033 Zero-Span Spectrum Analyzer Method.

#### 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	2.061	2.088	0.987	98.71%	0.00	0.010
802.11n HT20 1TX	1.917	1.947	0.985	98.46%	0.00	0.010
802.11n HT40 1TX	0.942	0.972	0.969	96.91%	0.14	1.062

**DUTY CYCLE PLOTS**





## 7.2. MEASUREMENT METHODS

26 dB Emission BW & 6 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

### 8.1.802.11a MODE IN THE 5.8 GHz BAND

#### 8.1.1. 6 dB BANDWIDTH

#### LIMITS

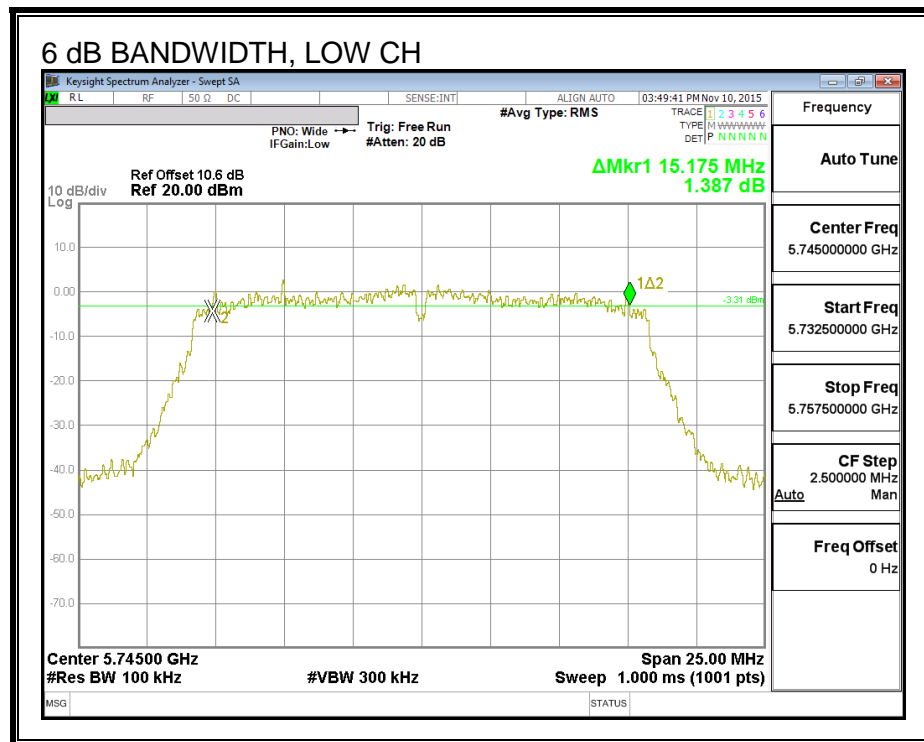
FCC §15.407 (e)

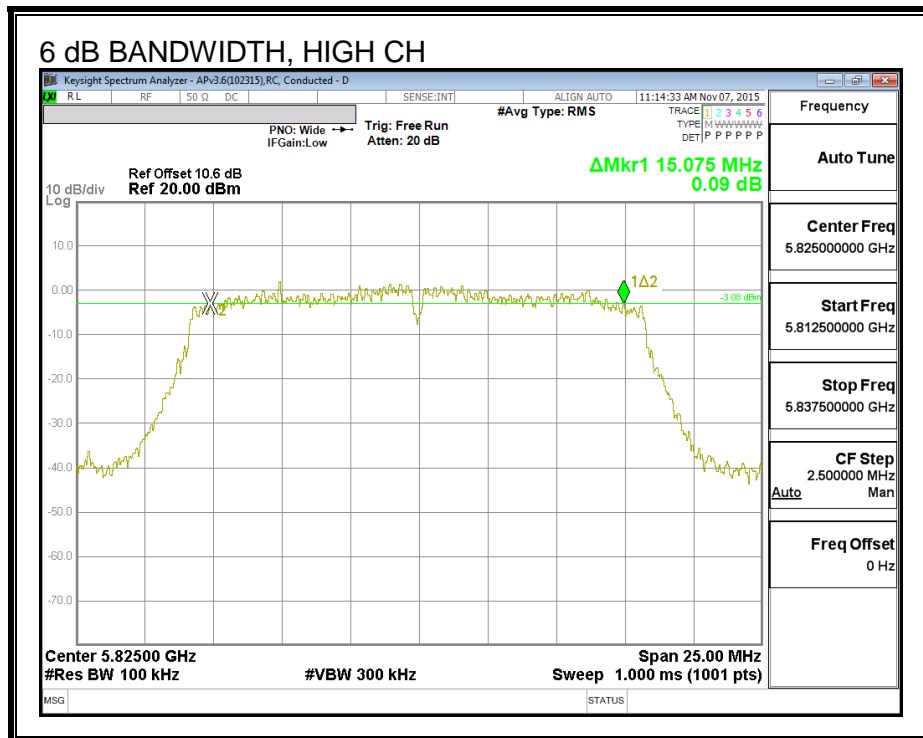
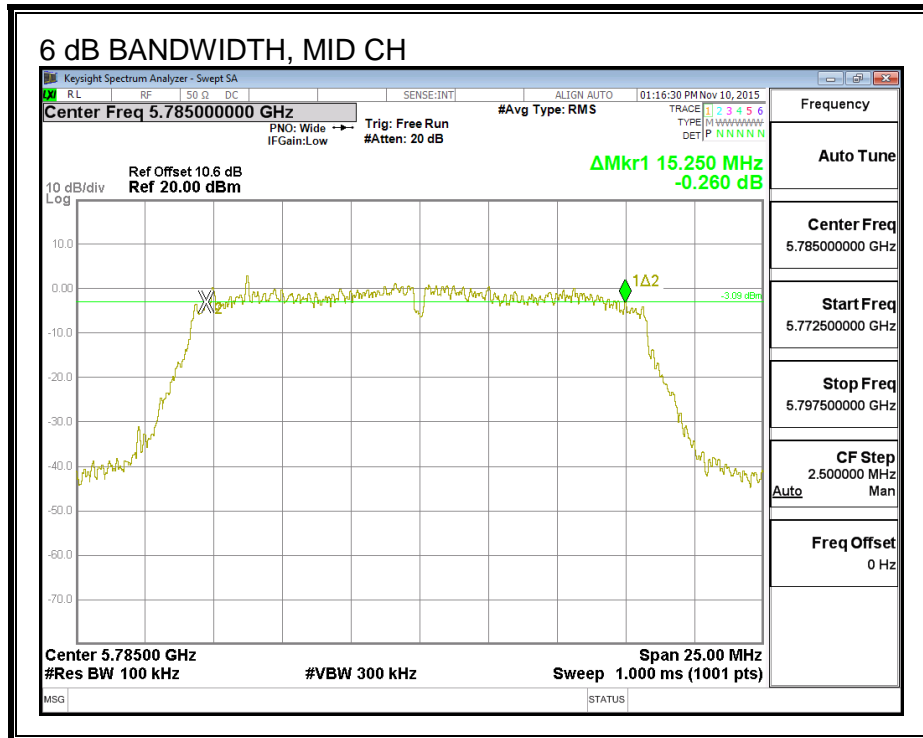
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.175	0.5
Mid	5785	15.250	0.5
High	5825	15.075	0.5

#### 6 dB BANDWIDTH





### 8.1.2. 26 dB BANDWIDTH

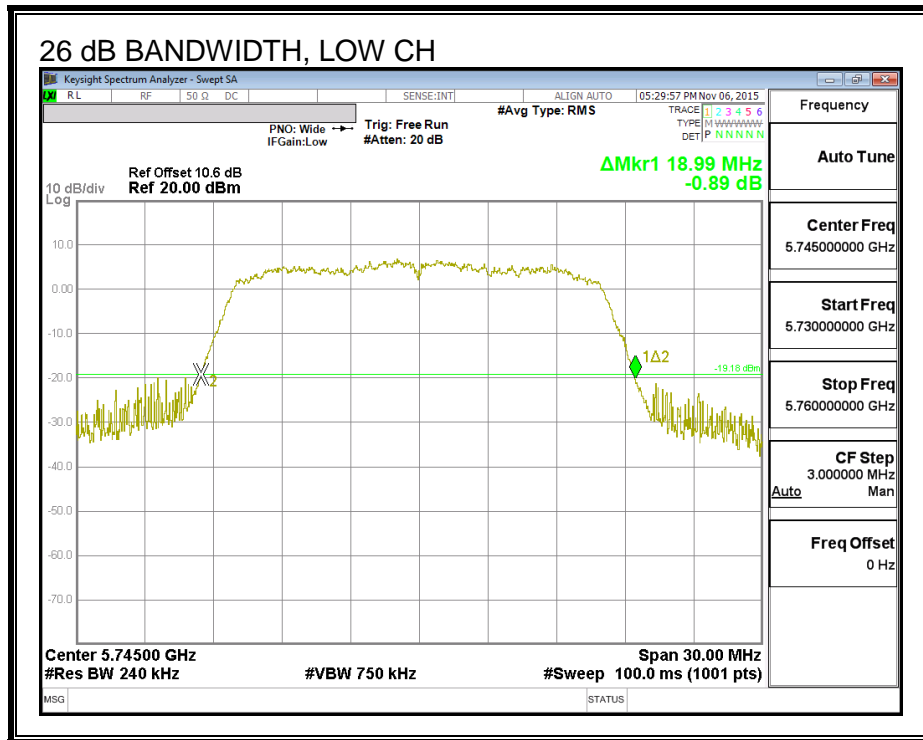
**LIMITS**

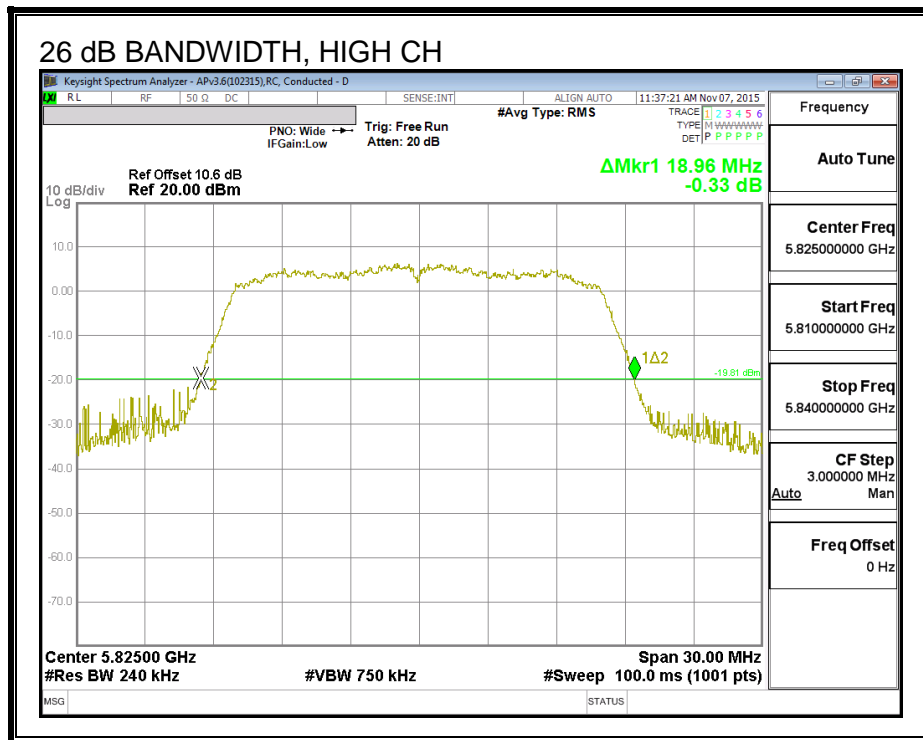
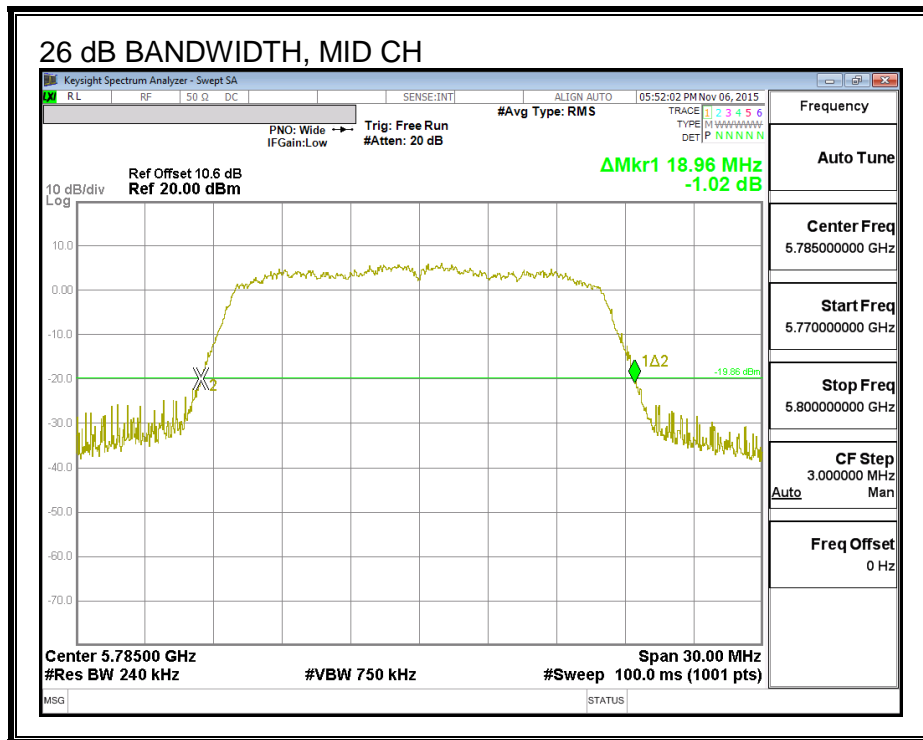
None, for reporting purposes only

**RESULTS**

Frequency (MHz)	26 dB Bandwidth (MHz)
5745	18.99
5785	18.96
5825	18.96

**26 dB BANDWIDTH**







### 8.1.3. 99% BANDWIDTH

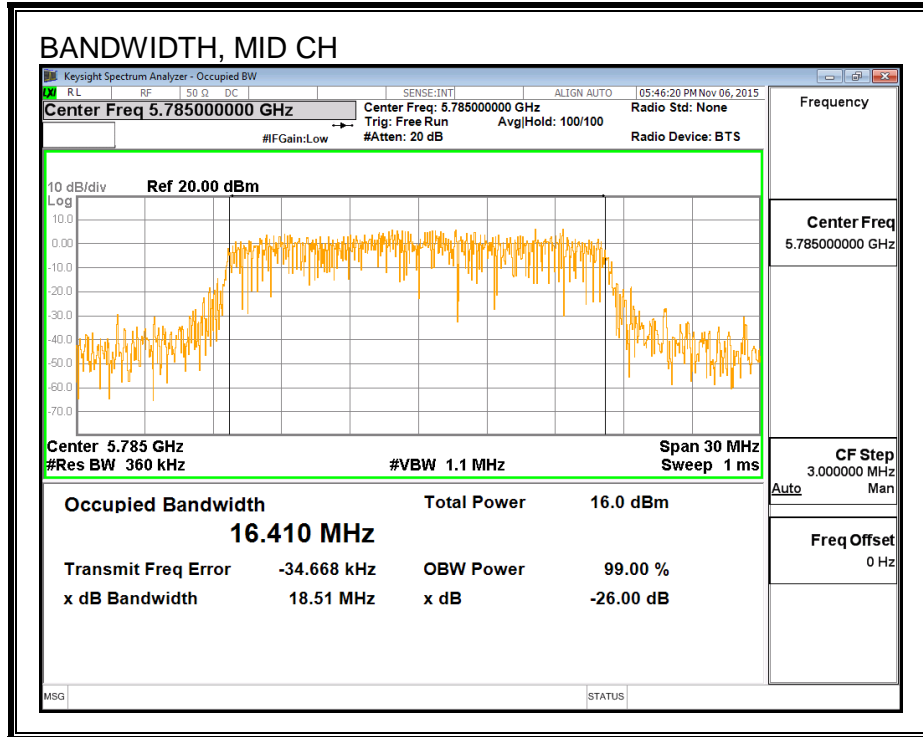
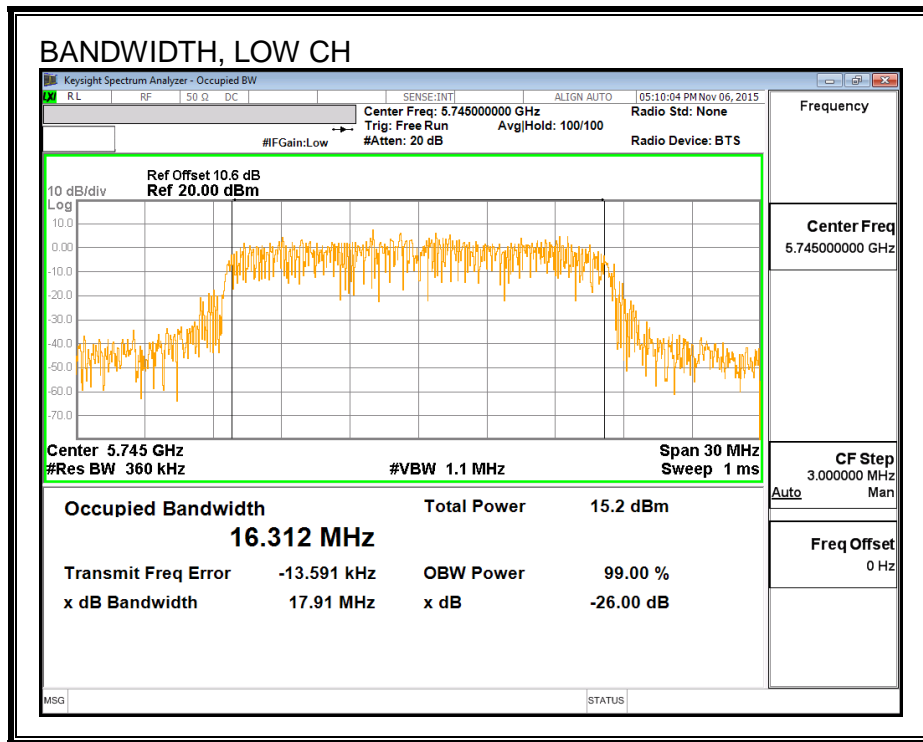
#### LIMITS

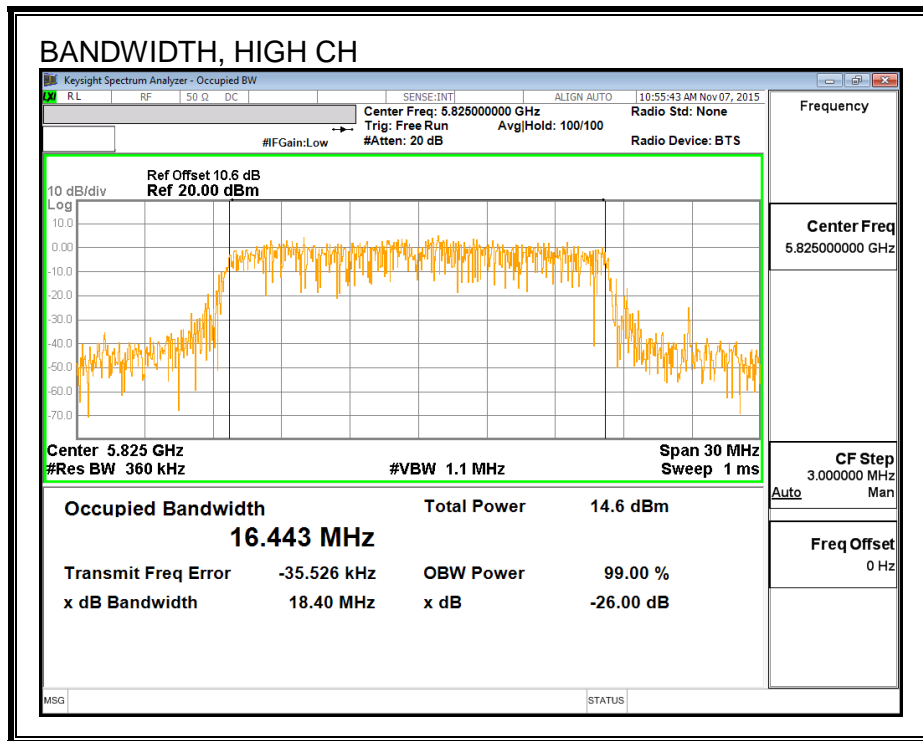
None; for reporting purposes only.

#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.312
Mid	5785	16.410
High	5825	16.443

**99% BANDWIDTH**





### 8.1.4. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5745	14.27
Mid	5785	14.12
High	5825	14.37

### **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.

#### **TEST PROCEDURE**

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### **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	1.59	30.00
Mid	5785	1.59	30.00
High	5825	1.59	30.00

**Output Power Results**

Channel	Frequency (MHz)	Meas Power (dBm)	Total Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	14.27	14.27	30.00	-15.73
Mid	5785	14.12	14.12	30.00	-15.88
High	5825	14.37	14.37	30.00	-15.63

**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**

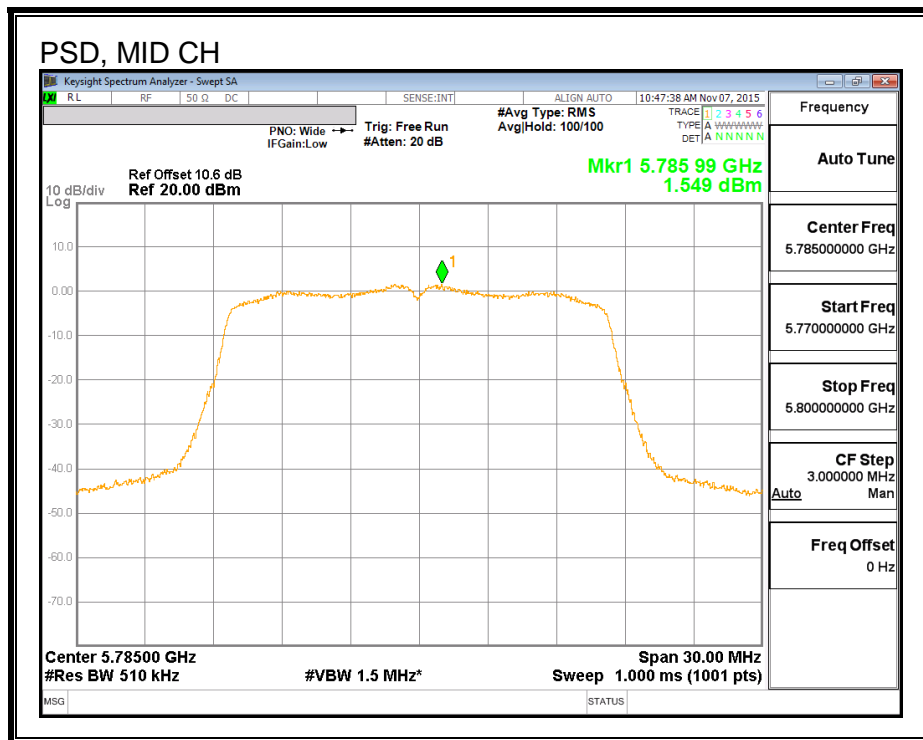
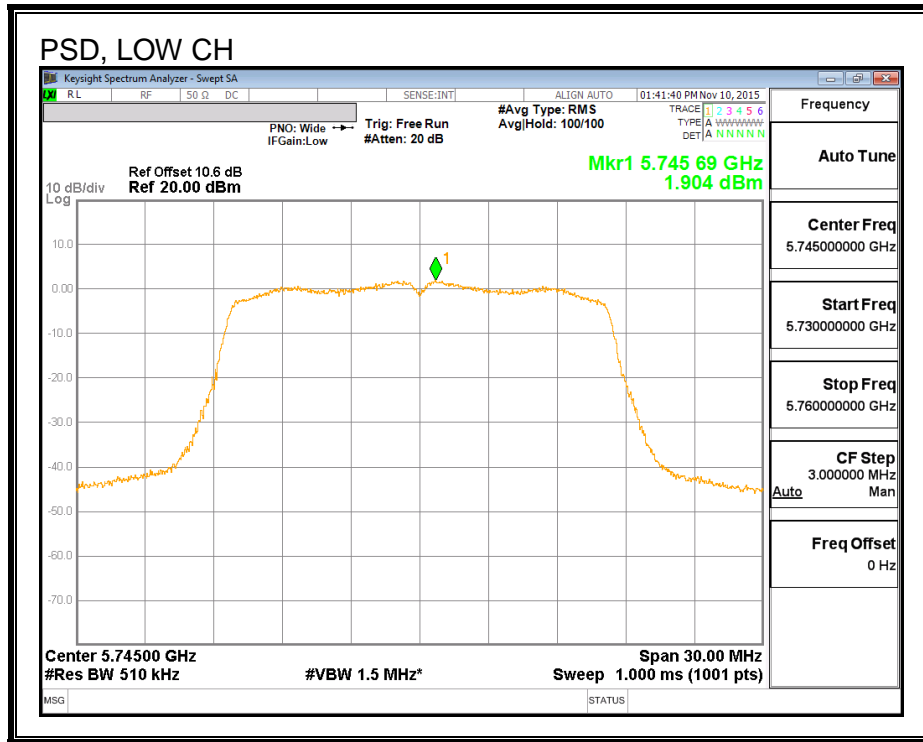
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	1.59	30.00
Mid	5785	1.59	30.00
High	5825	1.59	30.00

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
---------------------------	------	---

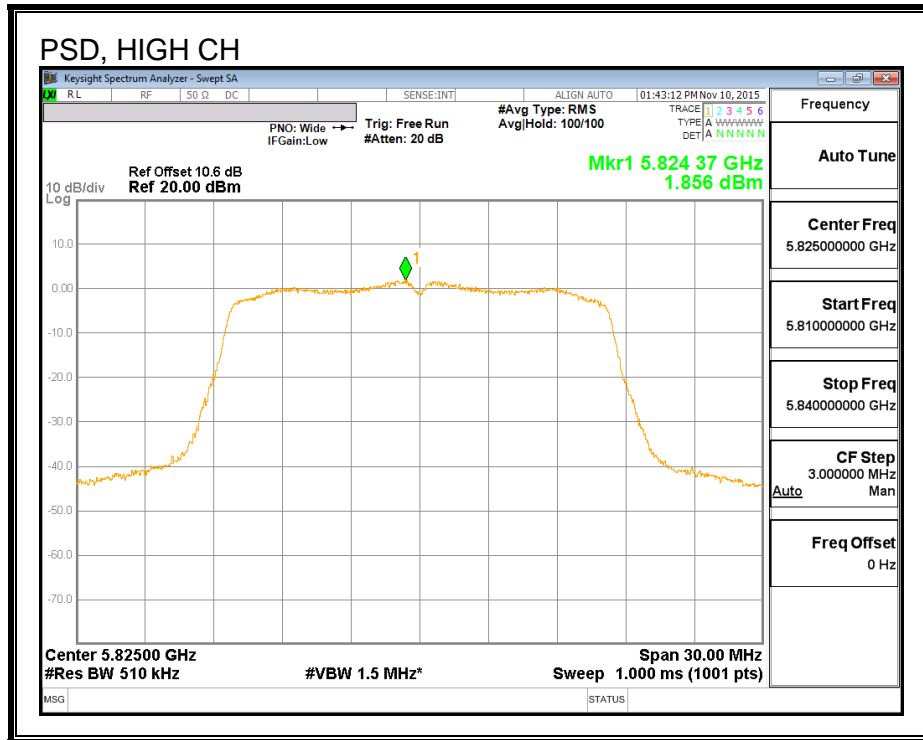
**PSD Results**

Channel	Frequency (MHz)	PSD Meas (dBm)	Total PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	1.90	1.90	30.00	-28.10
Mid	5785	1.55	1.55	30.00	-28.45
High	5825	1.86	1.86	30.00	-28.14

**PSD**







## 8.2.802.11n HT20 IN THE 5.8 GHz BAND

### 8.2.1. 6 dB BANDWIDTH

#### LIMITS

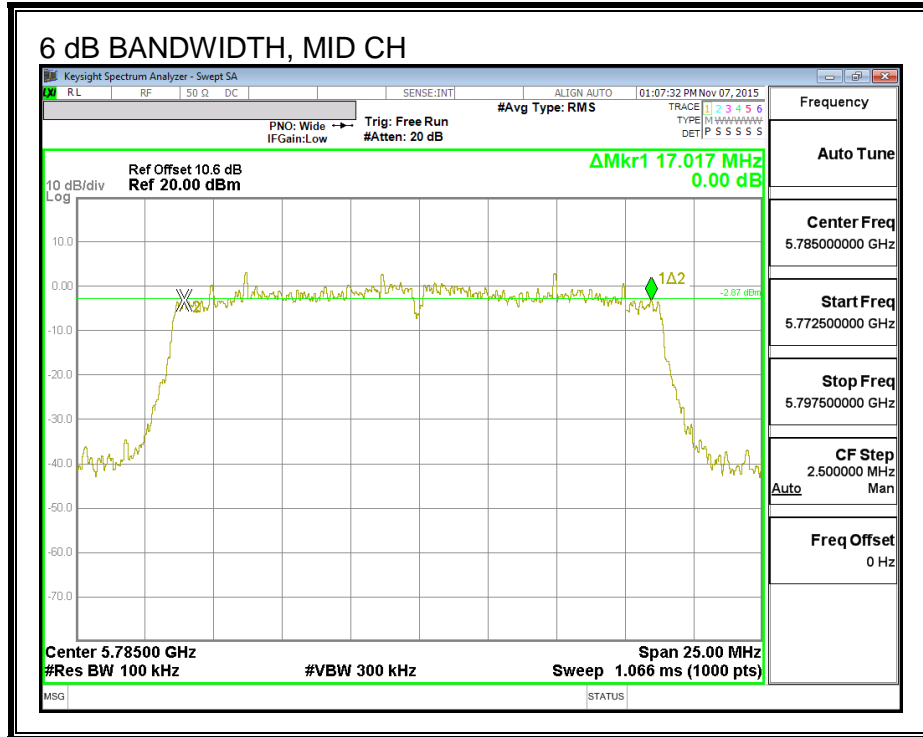
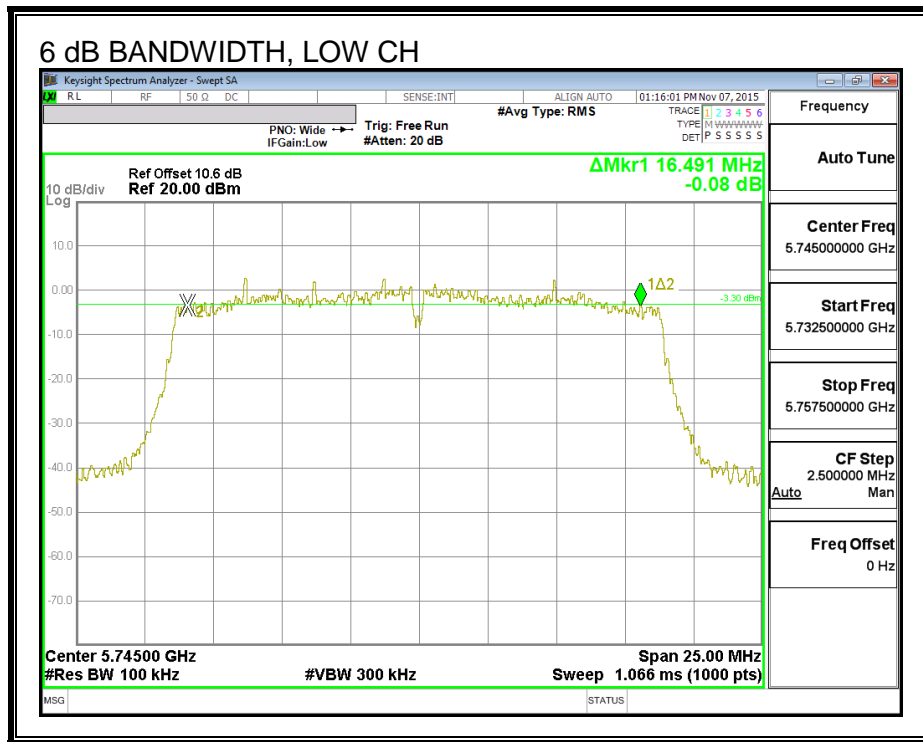
FCC §15.407 (e)

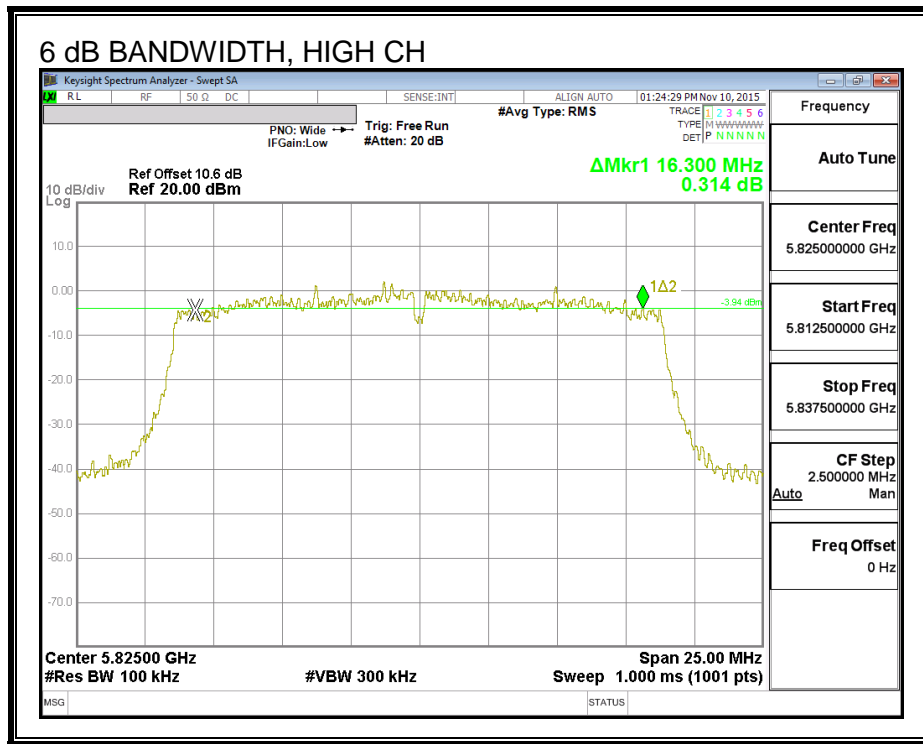
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.491	0.5
Mid	5785	17.017	0.5
High	5825	16.300	0.5

**6 dB BANDWIDTH**





### 8.2.2. 26 dB BANDWIDTH

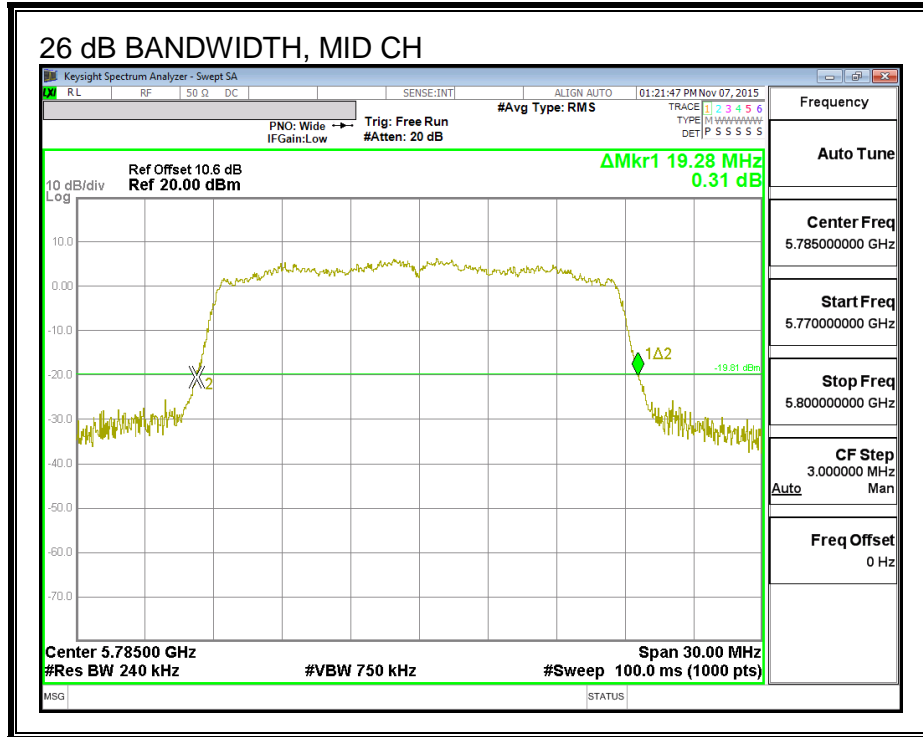
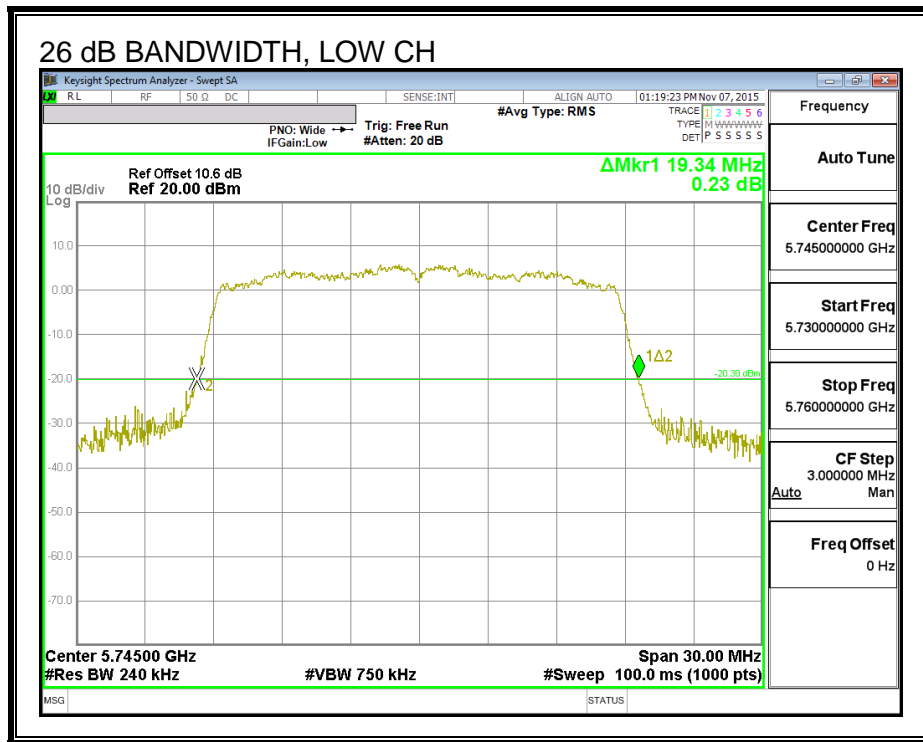
#### LIMITS

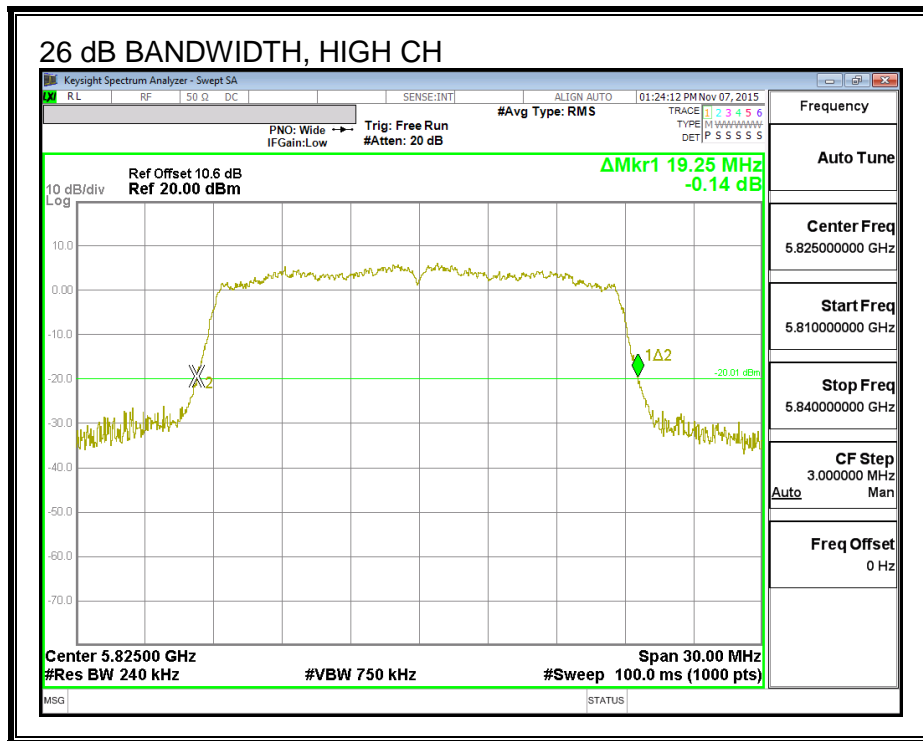
None, for reporting purposes only

#### RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	19.34
Mid	5785	19.28
High	5825	19.25

**26 dB BANDWIDTH**





### 8.2.3. 99% BANDWIDTH

#### LIMITS

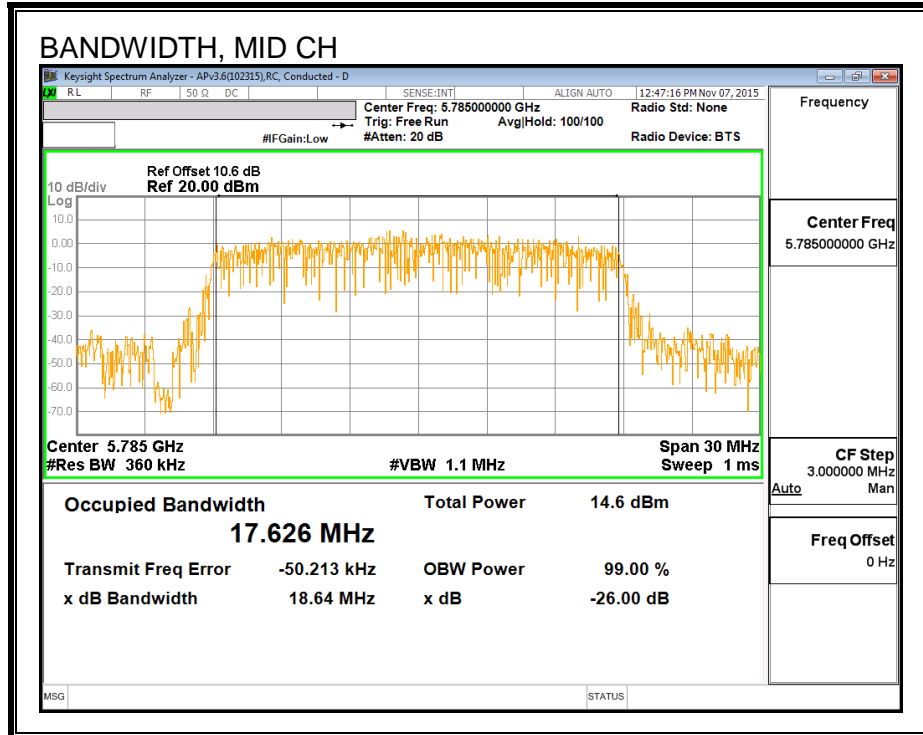
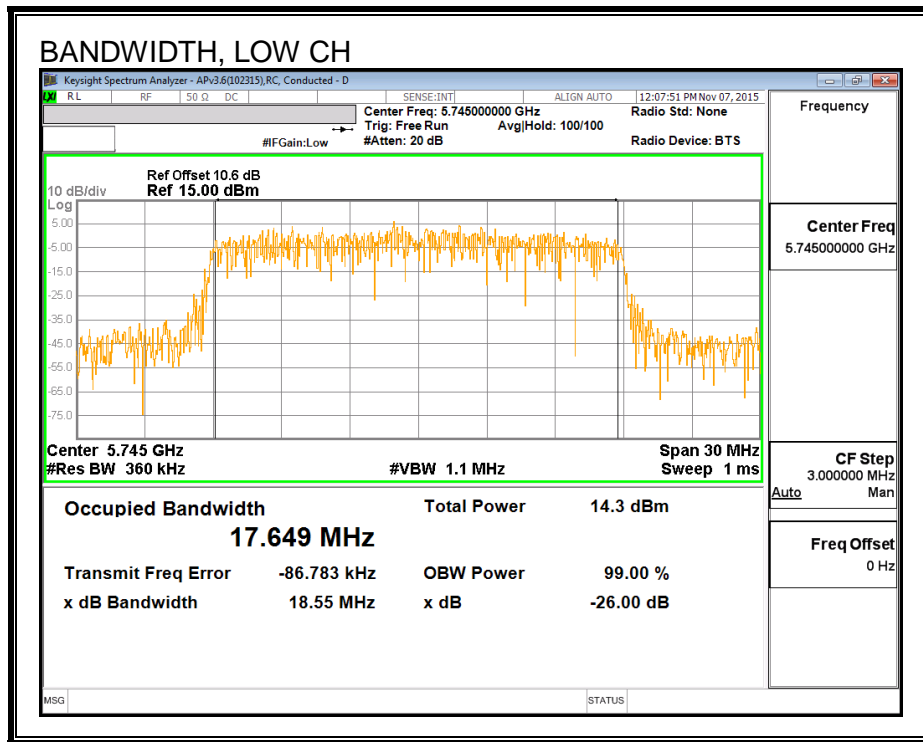
None; for reporting purposes only.

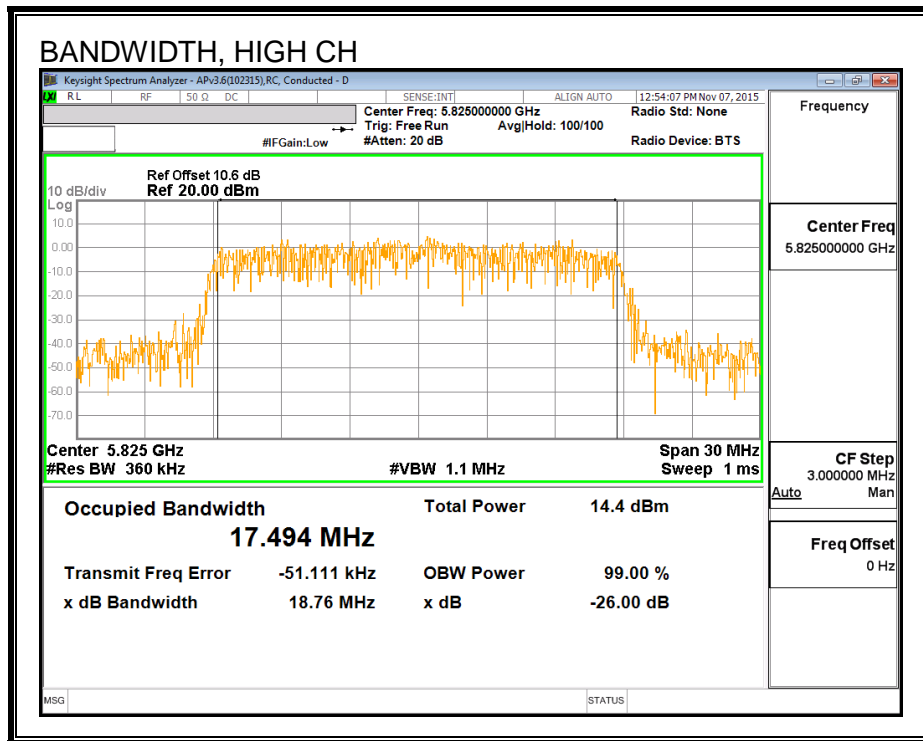
#### RESULTS

Frequency (MHz)	99% Bandwidth (MHz)
5745	17.649
5785	17.626
5825	17.494



**99% BANDWIDTH**





## 8.2.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5745	14.32
Mid	5785	14.37
High	5825	14.31

## **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.

### **TEST PROCEDURE**

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### **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	1.59	30.00
Mid	5785	1.59	30.00
High	5825	1.59	30.00

**Output Power Results**

Channel	Frequency (MHz)	Power Meas (dBm)	Total Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	14.32	14.32	30.00	-15.68
Mid	5785	14.37	14.37	30.00	-15.63
High	5825	14.31	14.31	30.00	-15.69

### 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

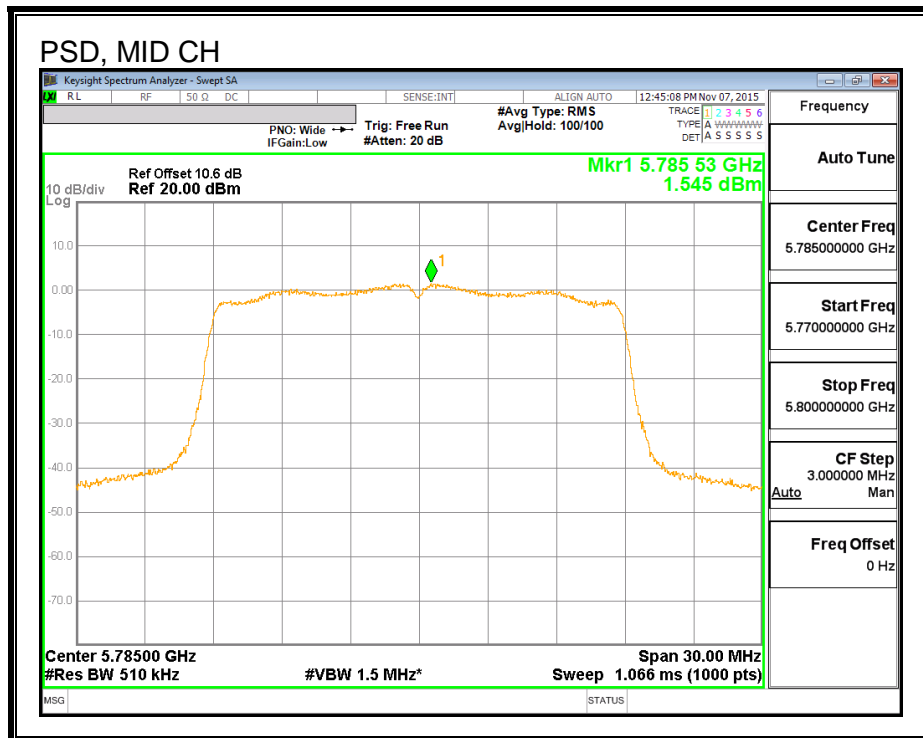
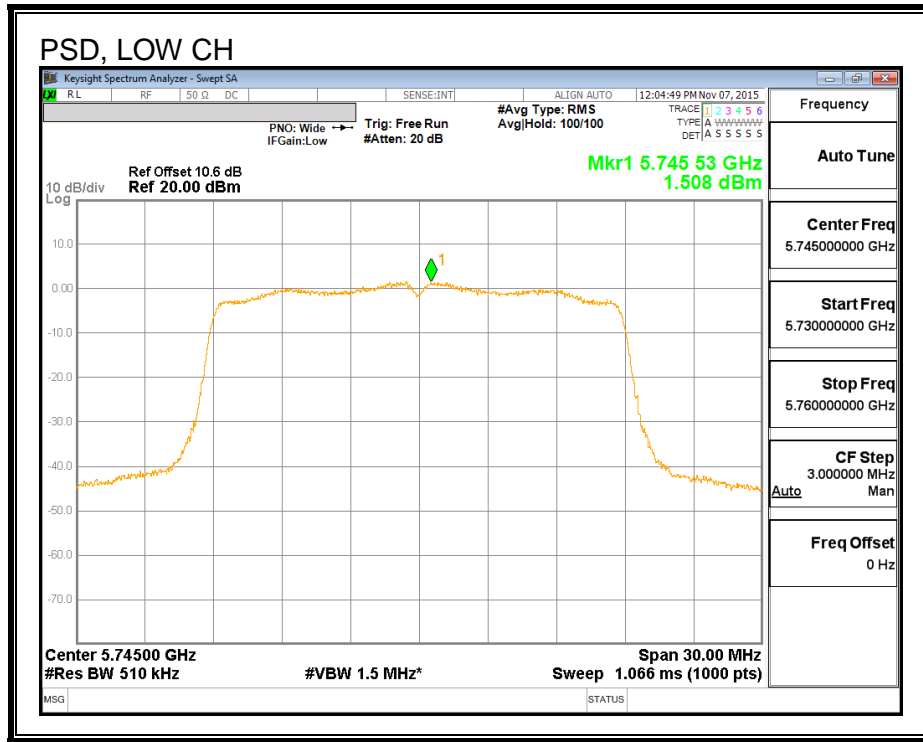
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	1.59	30.00
Mid	5785	1.59	30.00
High	5825	1.59	30.00

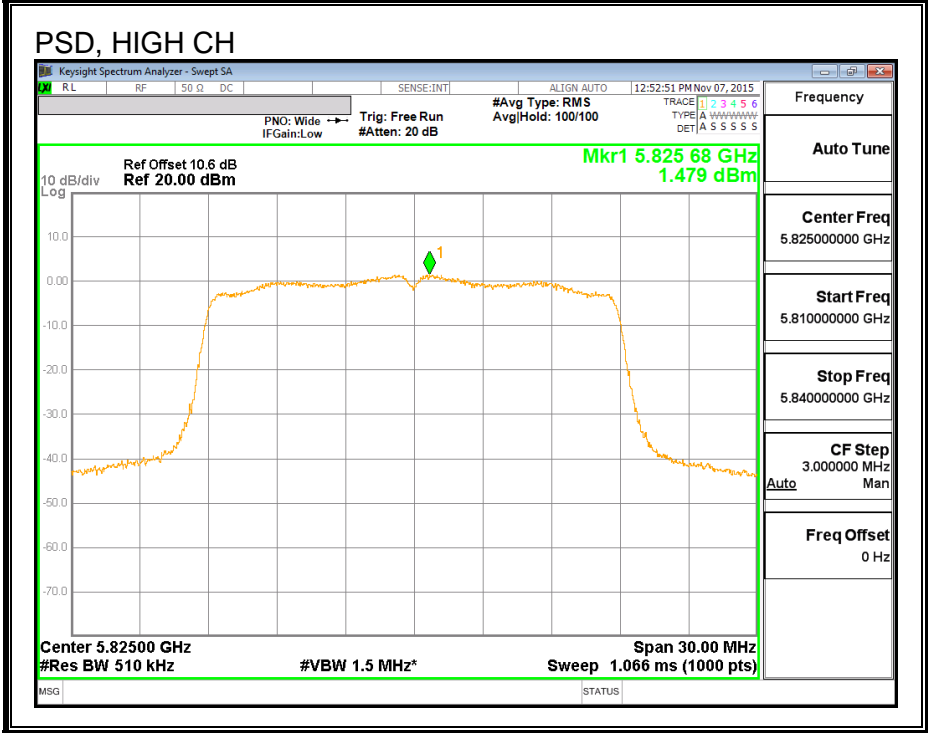
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
---------------------------	------	---

##### PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm)	Total PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	1.51	1.51	30.00	-28.49
Mid	5785	1.55	1.55	30.00	-28.46
High	5825	1.48	1.48	30.00	-28.52

**PSD**







### 8.3.802.11n HT40 MODE IN THE 5.8 GHz BAND

#### 8.3.1. 6 dB BANDWIDTH

##### LIMITS

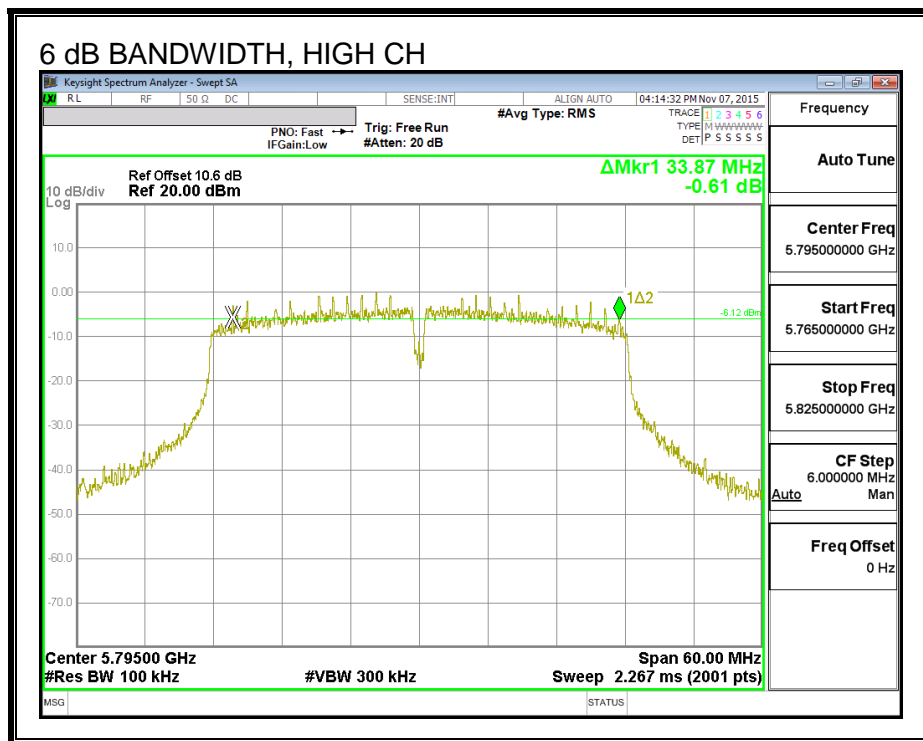
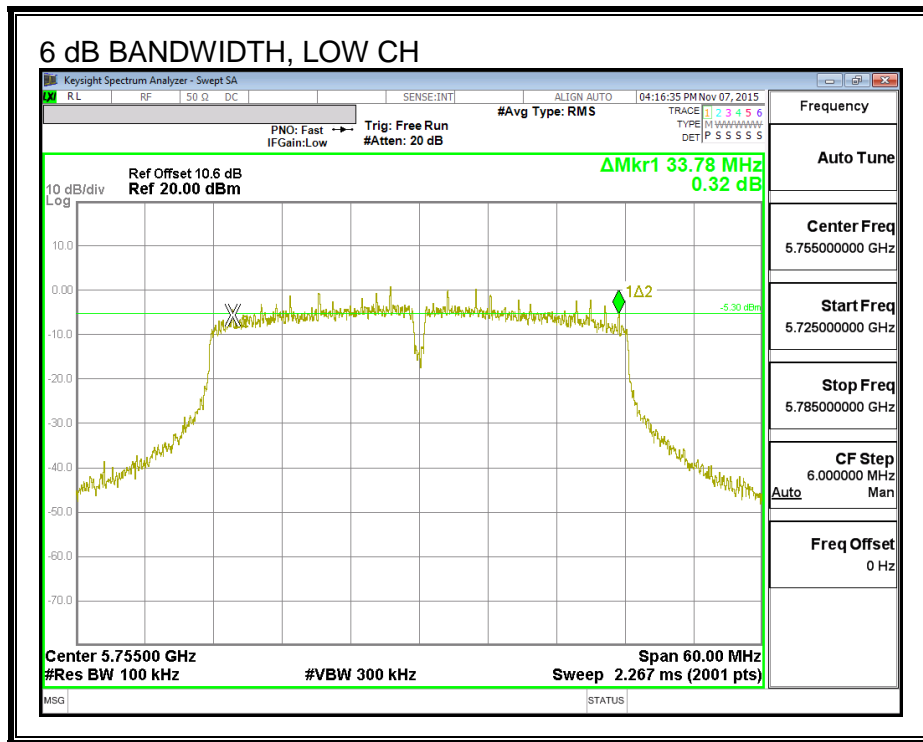
FCC §15.407 (e)

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

##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	33.78	0.5
High	5795	33.87	0.5

**6 dB BANDWIDTH**



### 8.3.2. 26 dB BANDWIDTH

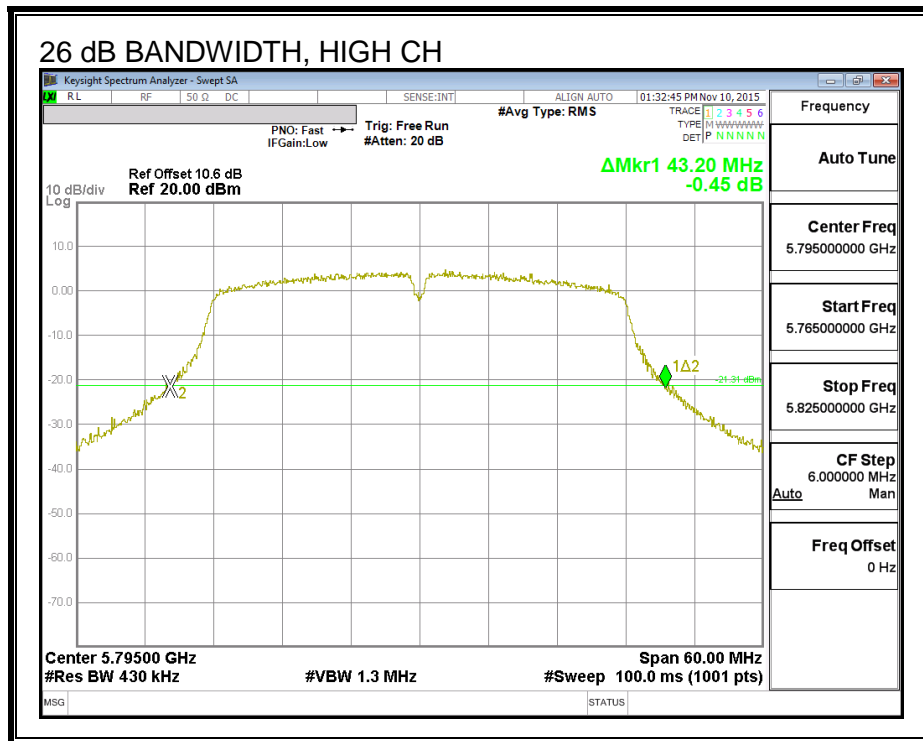
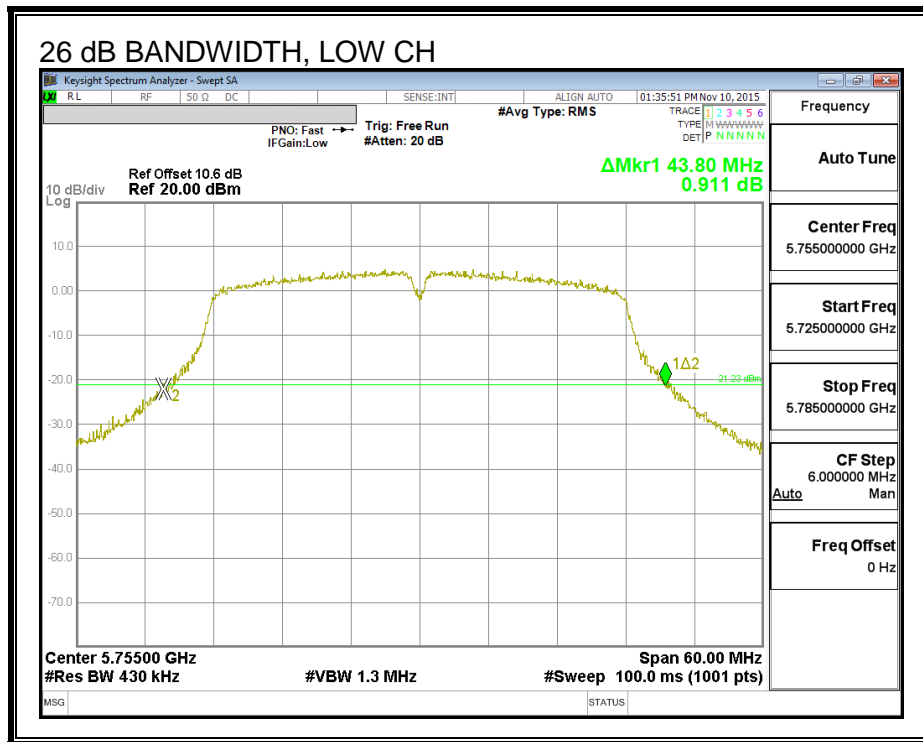
#### LIMITS

None, for reporting purposes only.

#### RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5755	43.80
High	5795	43.20

**26 dB BANDWIDTH**



### 8.3.3. 99% BANDWIDTH

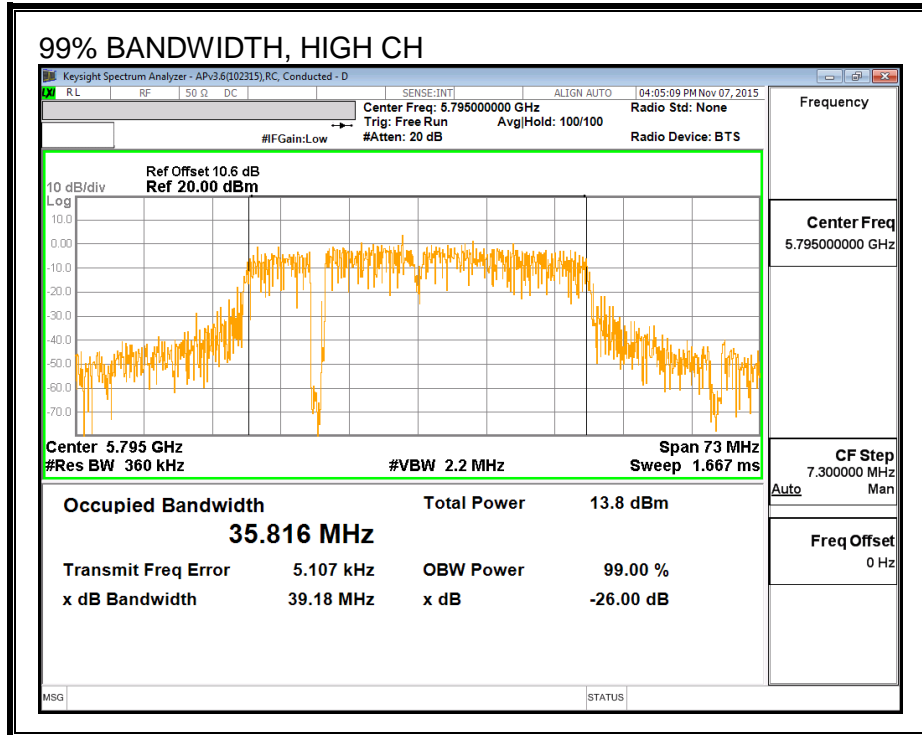
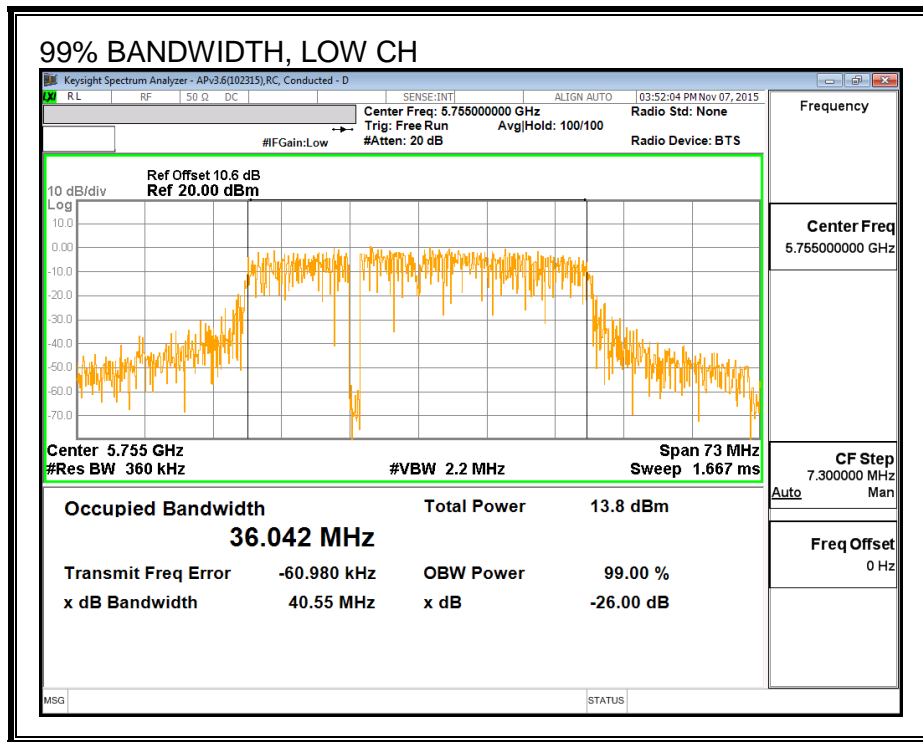
#### LIMITS

None; for reporting purposes only.

#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.042
High	5795	35.816

**99% BANDWIDTH**



### 8.3.4. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5755	14.40
High	5795	14.33

### **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.

#### **TEST PROCEDURE**

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### **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	1.59	30.00
High	5795	1.59	30.00

**Output Power Results**

Channel	Frequency (MHz)	Meas Power (dBm)	Total Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	14.40	14.40	30.00	-15.60
High	5795	14.33	14.33	30.00	-15.67

### **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**

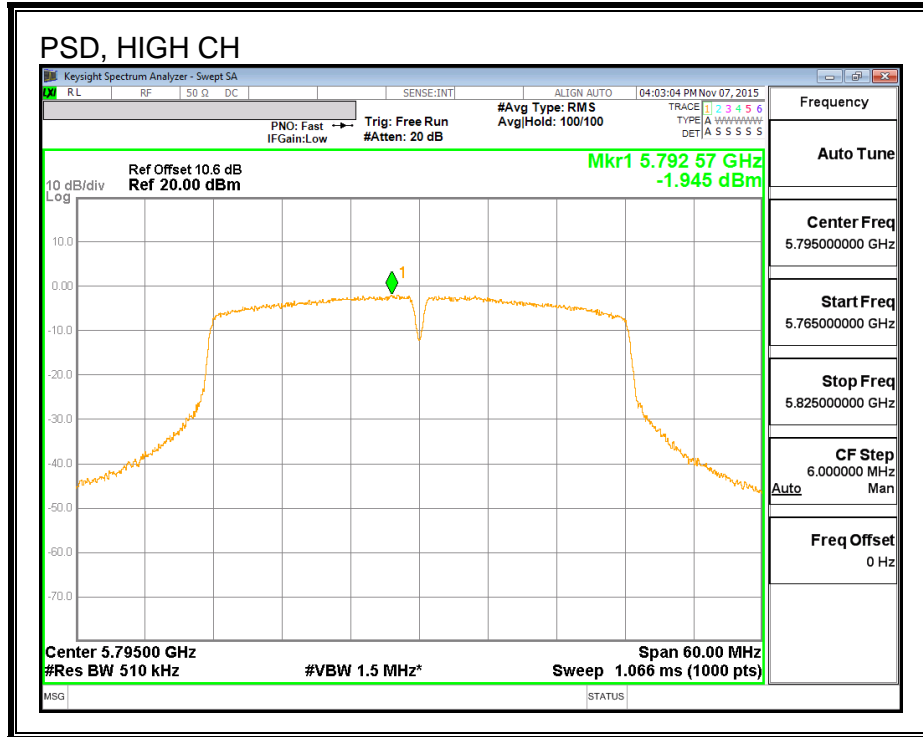
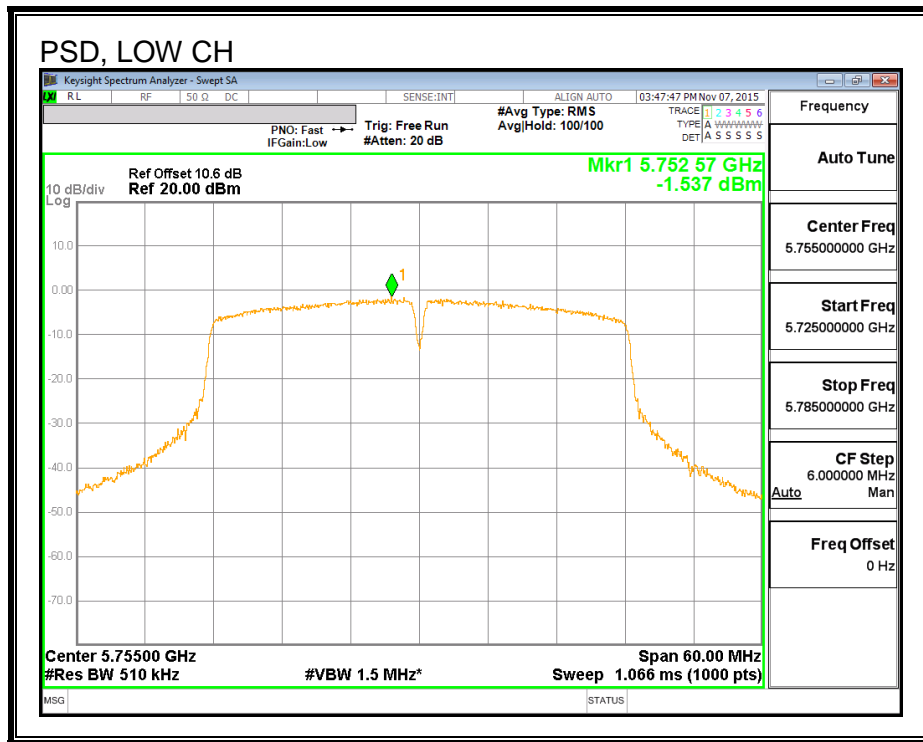
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	1.59	30.00
High	5795	1.59	30.00

<b>Duty Cycle CF (dB)</b>	0.14	<b>Included in Calculations of Corr'd PSD</b>
---------------------------	------	---

**PSD Results**

Channel	Frequency (MHz)	Meas PSD (dBm)	Total PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-1.54	-1.40	30.00	-31.40
High	5795	-1.95	-1.81	30.00	-31.81

**PSD**



## 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.

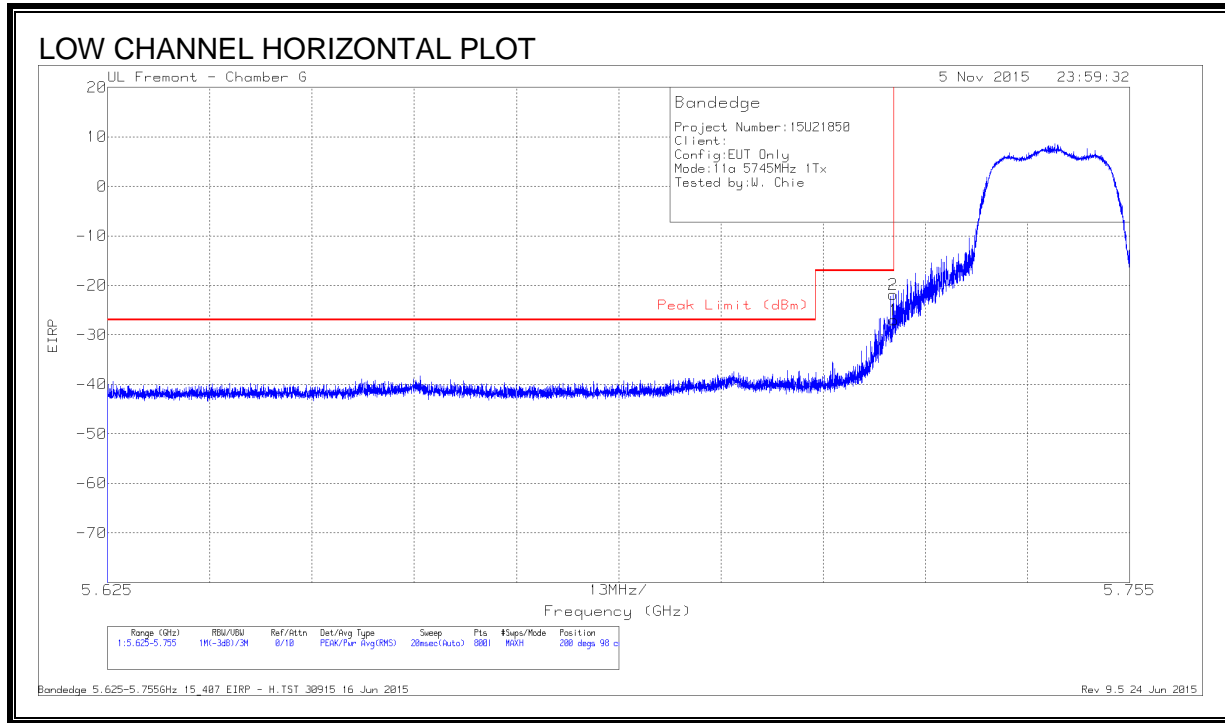
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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..

## 9.2.802.11a MODE IN THE 5.8 GHz BAND

### RESTRICTED BANDEDGE, (LOW CHANNEL)



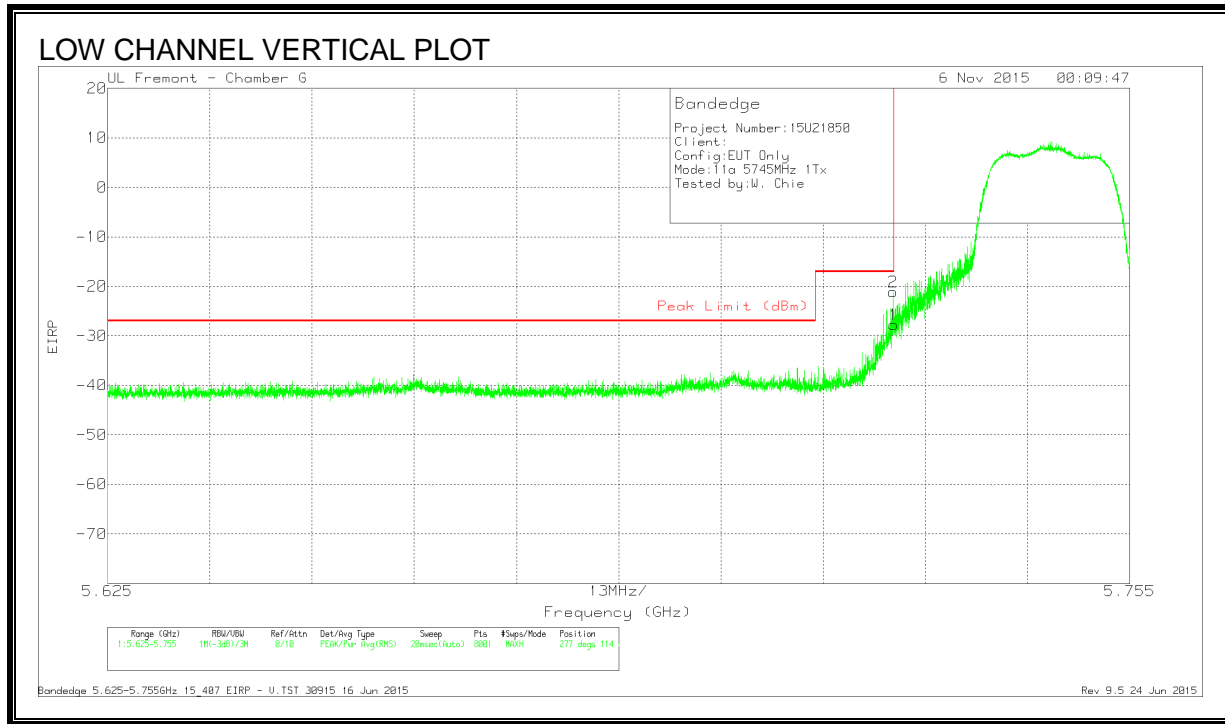
### DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-50.87	Pk	35	-22.9	11.8	-26.97	-17	-9.97	200	98	H
2	5.725	-45.79	Pk	35	-22.9	11.8	-21.89	-17	-4.89	200	98	H

Pk - Peak detector

Bandedge 5.625-5.755GHz 15\_407 EIRP - H.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015



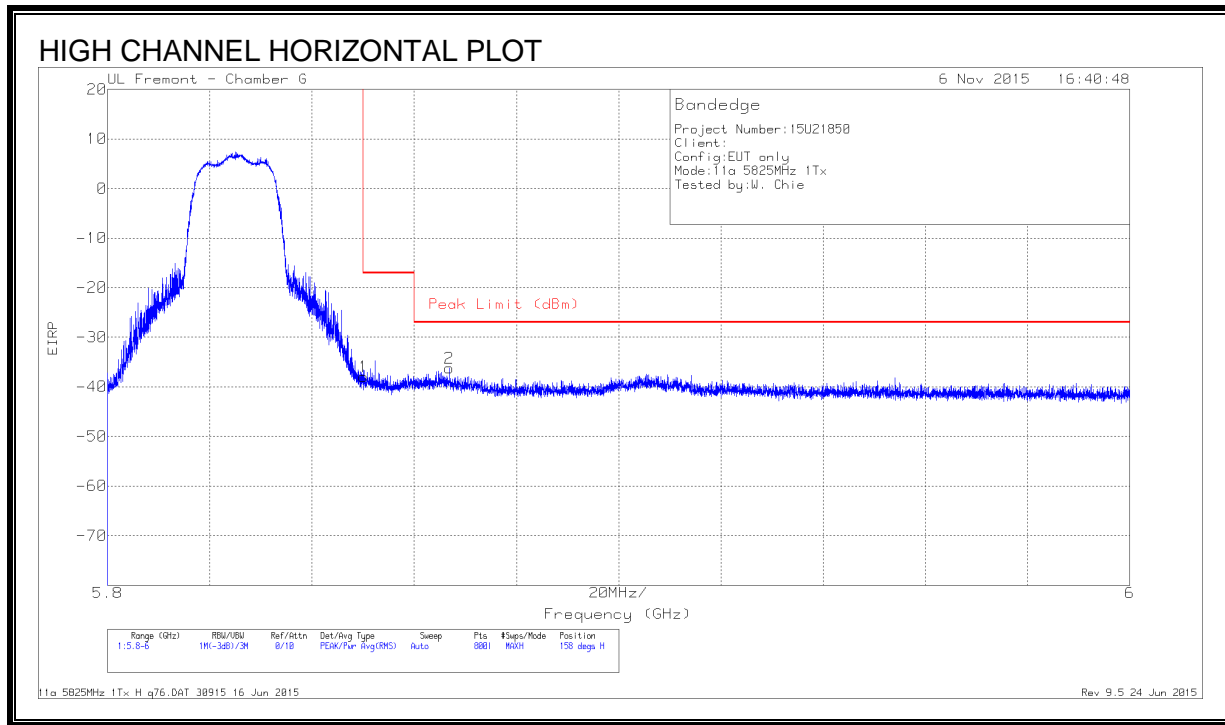
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-51.61	Pk	35	-22.9	11.8	-27.71	-17	-10.71	277	114	V
2	5.725	-45.01	Pk	35	-22.9	11.8	-21.11	-17	-4.11	277	114	V

Pk - Peak detector

Bandedge 5.625-5.755GHz 15\_407 EIRP - V.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015

**RESTRICTED BANDEDGE, (HIGH CHANNEL)**



**DATA**

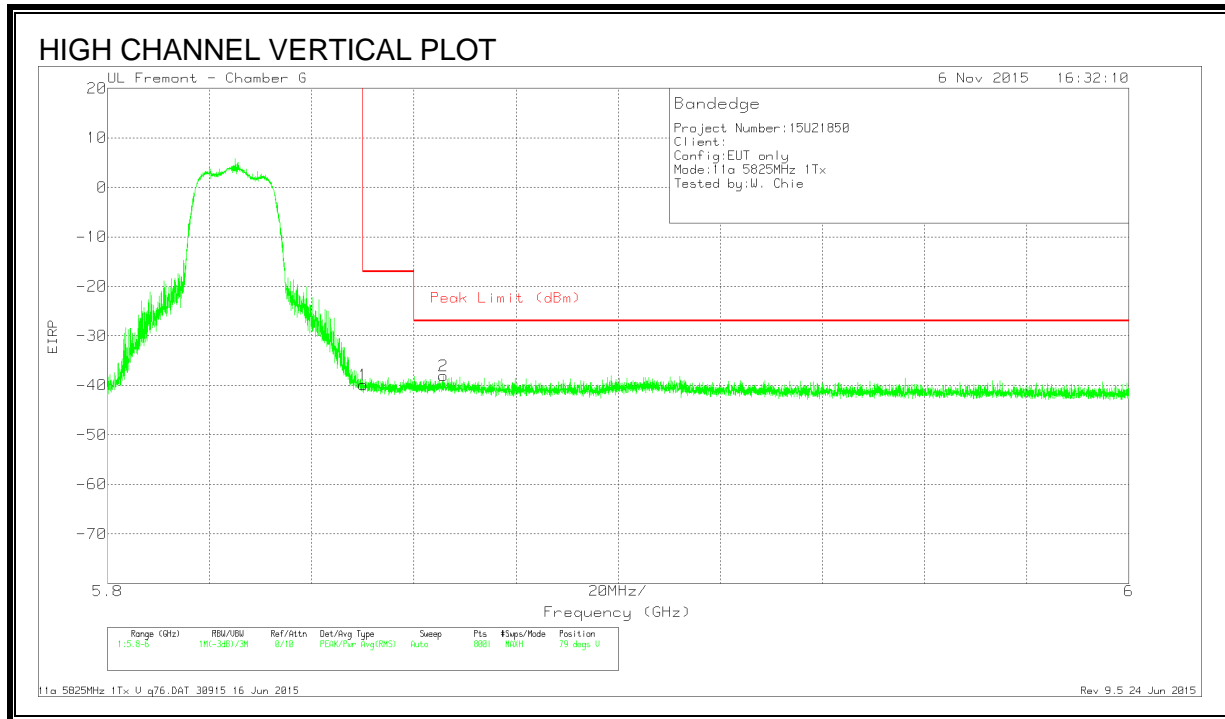
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/Fltr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-61.83	Pk	35.1	-23	11.8	-37.93	-17	-20.93	158	133	H
2	5.867	-59.99	Pk	35.1	-23.1	11.8	-36.19	-27	-9.19	158	133	H

Pk - Peak detector

Bandedge 5.850-6GHz 15\_407 EIRP - H.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015





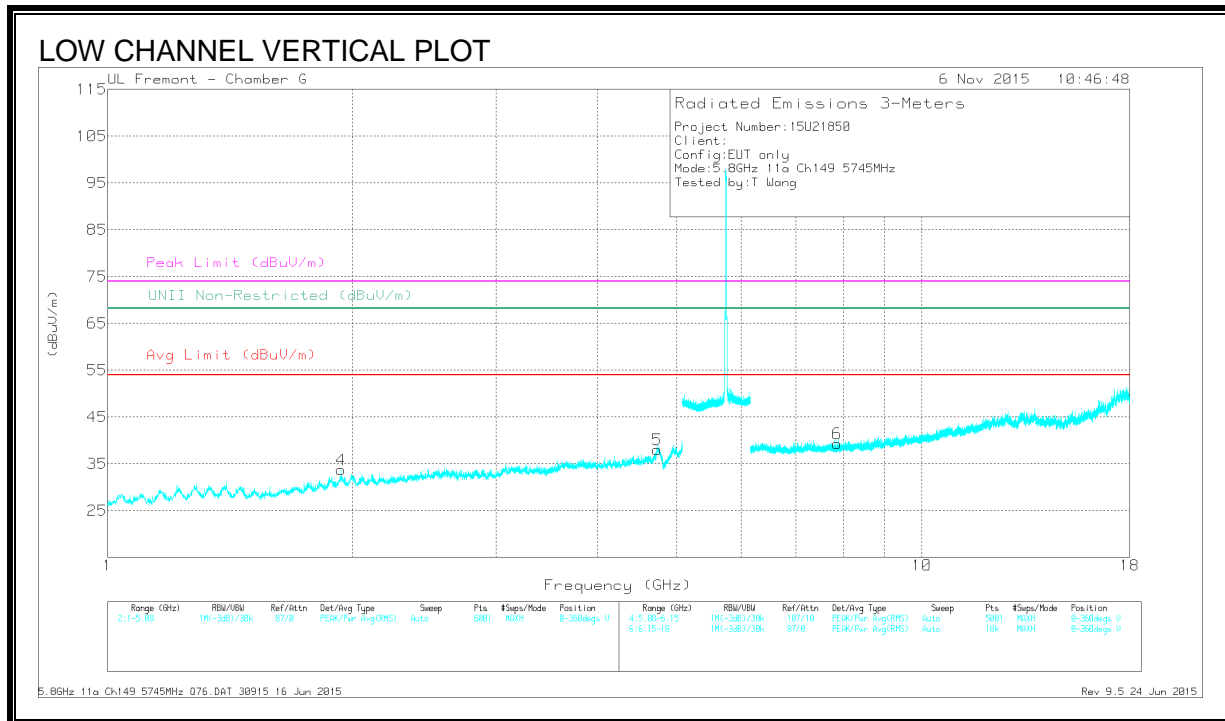
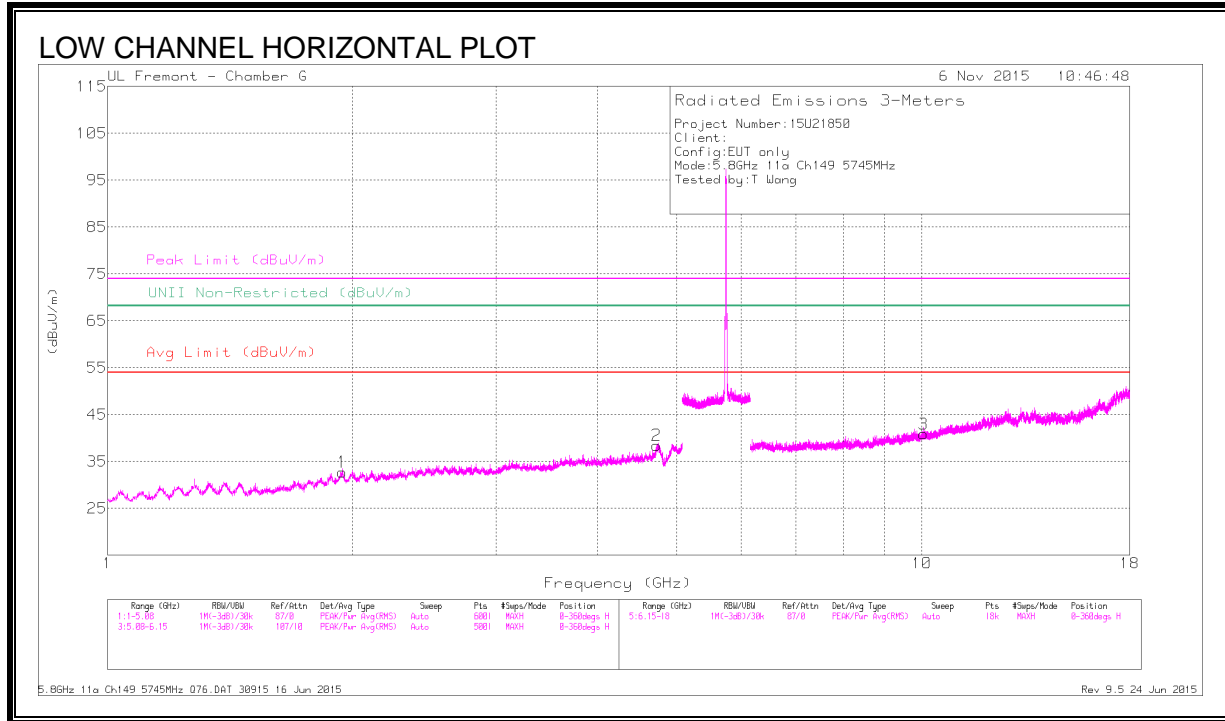
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-63.83	Pk	35.1	-23	11.8	-39.93	-17	-22.93	79	198	V
2	5.866	-61.83	Pk	35.1	-23.1	11.8	-38.03	-27	-11.03	79	198	V

Pk - Peak detector

Bandedge 5.850-6GHz 15\_407 EIRP - V.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015

**LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS**



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/F Itr/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
2	* 4.722	43.97	PK-U	33.9	-31.9	45.97	-	-	74	-28.03	-	-	333	248	H
	* 4.722	32.29	ADR	33.9	-31.9	34.29	54	-19.71	-	-	-	-	333	248	H
5	* 4.734	43.76	PK-U	33.9	-31.9	45.76	-	-	74	-28.24	-	-	132	353	V
	* 4.734	32.7	ADR	33.9	-31.9	34.7	54	-19.3	-	-	-	-	332	353	V
4	1.934	43.51	PK-U	31	-34.1	40.41	-	-	-	-	68.2	-27.79	333	248	V
1	1.943	43.49	PK-U	31.1	-34.1	40.49	-	-	-	-	68.2	-27.71	267	242	H
6	7.871	40.33	PK-U	35.7	-30	46.03	-	-	-	-	68.2	-22.17	151	350	V
3	10.044	38.62	PK-U	37	-27.3	48.32	-	-	-	-	68.2	-19.88	223	261	H

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

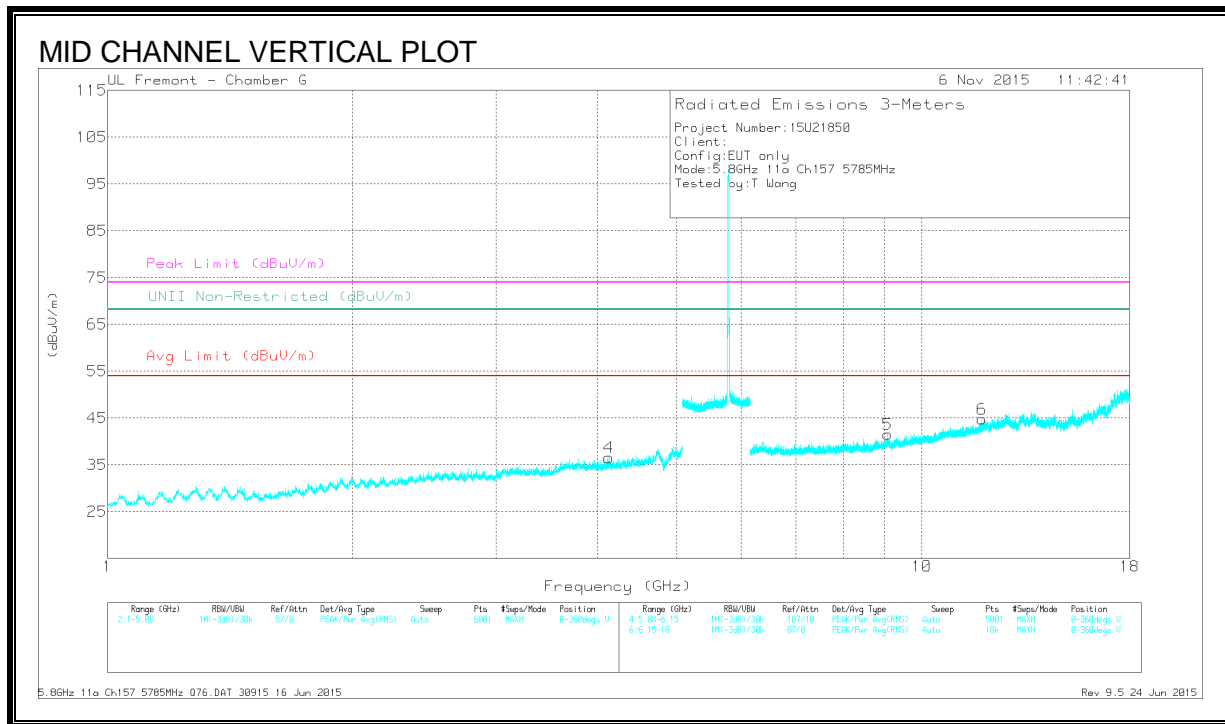
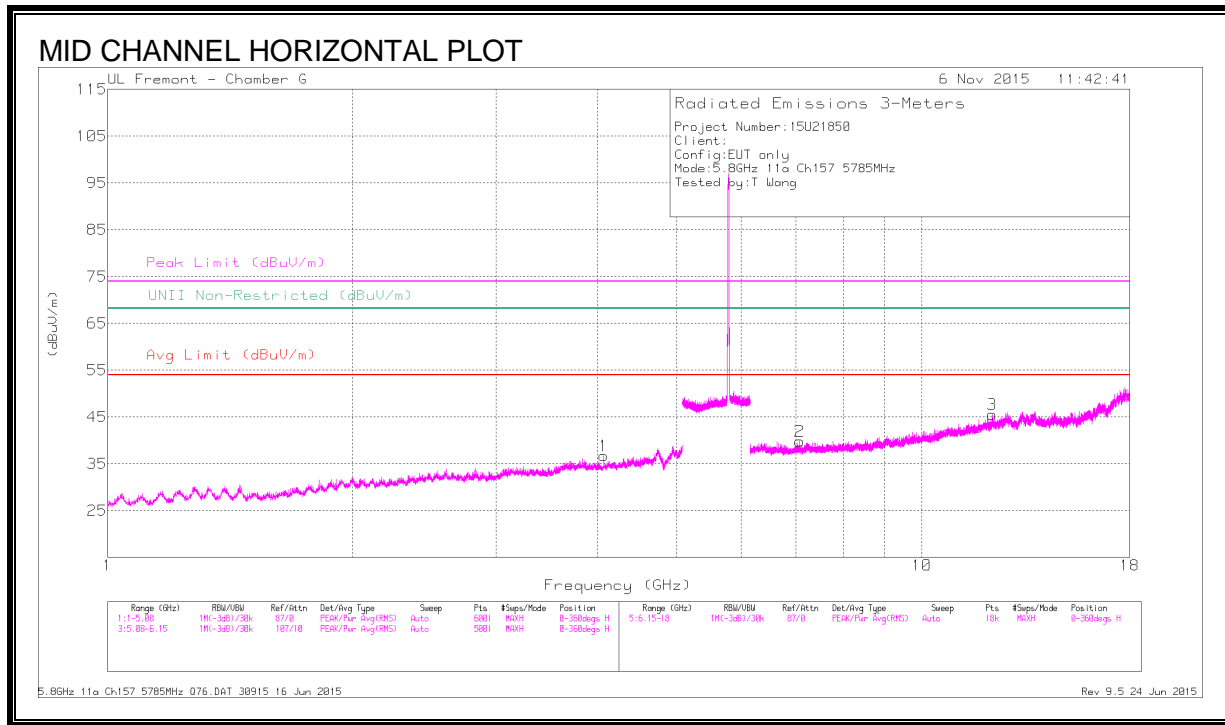
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

5.8GHz 11a Ch149 5745MHz Q76.DAT 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

**MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS**



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/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	* 4.067	41.75	PK-U	33.3	-32.9	42.15	-	-	74	-31.85	-	-	236	114	H
	* 4.071	30.65	ADR	33.3	-32.9	31.05	54	-22.95	-	-	-	-	236	114	H
4	* 4.125	42.54	PK-U	33.3	-32.9	42.94	-	-	74	-31.06	-	-	291	336	V
	* 4.125	30.85	ADR	33.3	-32.9	31.25	54	-22.75	-	-	-	-	291	336	V
3	* 12.208	37.11	PK-U	39	-24.7	51.41	-	-	74	-22.59	-	-	229	113	H
	* 12.209	26.44	ADR	39	-24.7	40.74	54	-13.26	-	-	-	-	229	113	H
5	* 9.083	39.36	PK-U	36.2	-28.3	47.26	-	-	74	-26.74	-	-	275	351	V
	* 9.081	28.29	ADR	36.2	-28.3	36.19	54	-17.81	-	-	-	-	275	351	V
6	* 11.842	38.08	PK-U	38.6	-26.1	50.58	-	-	74	-23.42	-	-	291	338	V
	* 11.842	27.01	ADR	38.6	-26.2	39.41	54	-14.59	-	-	-	-	291	338	V
2	7.082	41.13	PK-U	35.6	-30.9	45.83	-	-	-	-	68.2	-22.37	244	125	H

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

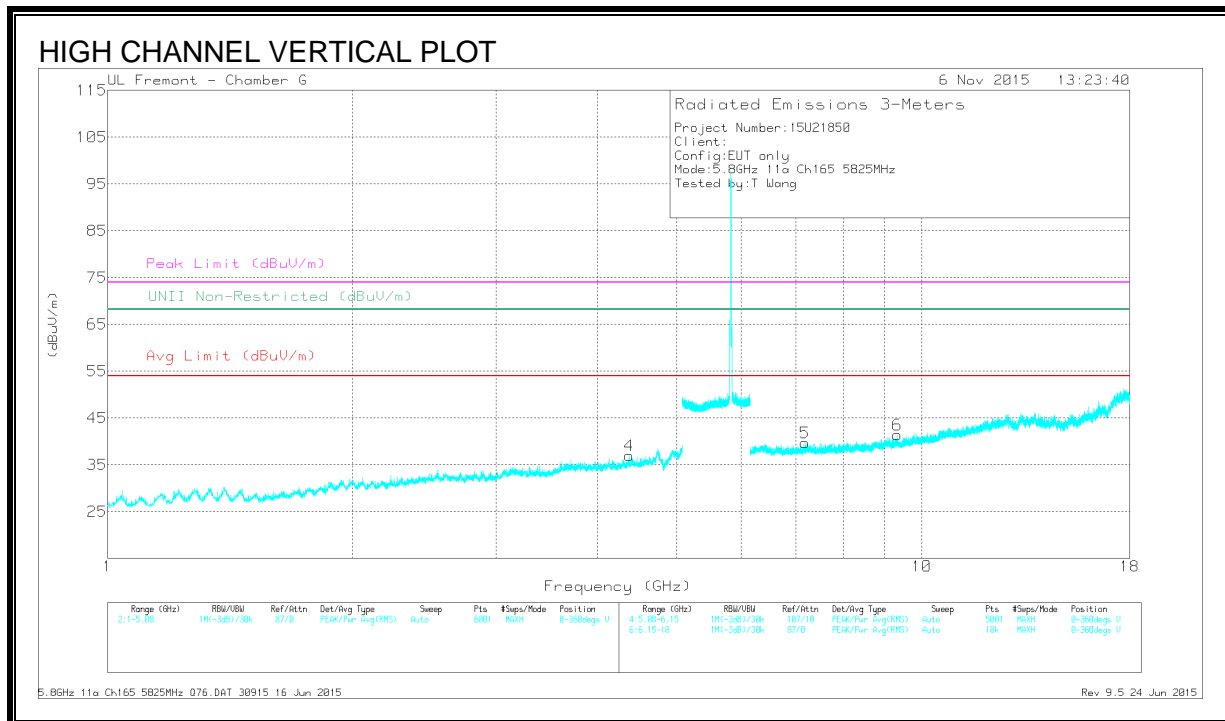
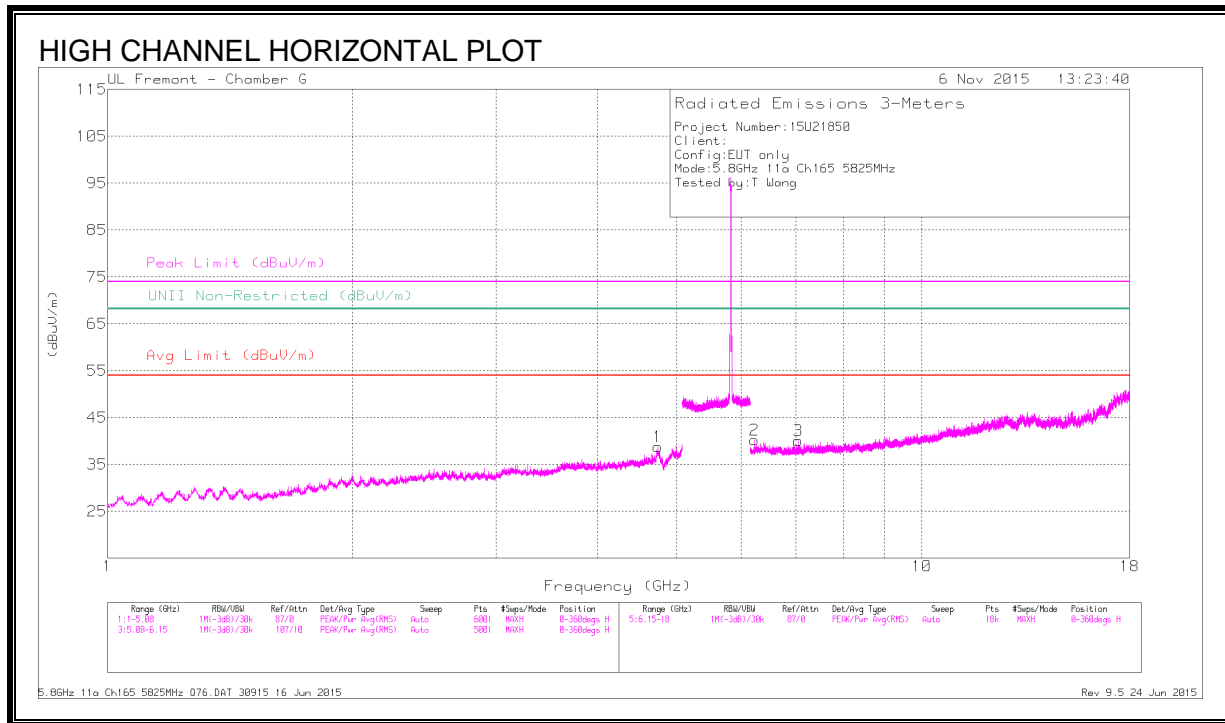
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

**HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS**



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/F Itr/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	* 4.741	43.96	PK-U	33.9	-31.9	45.96	-	-	74	-28.04	-	-	205	251	H
	* 4.74	32.03	ADR	33.9	-31.8	34.13	54	-19.87	-	-	-	-	205	251	H
4	* 4.367	41.5	PK-U	33.6	-32.2	42.9	-	-	74	-31.1	-	-	180	187	V
	* 4.366	29.82	ADR	33.6	-32.2	31.22	54	-22.78	-	-	-	-	180	187	V
6	* 9.322	40.25	PK-U	36.5	-28.5	48.25	-	-	74	-25.75	-	-	194	211	V
	* 9.325	28.48	ADR	36.5	-28.5	36.48	54	-17.52	-	-	-	-	194	211	V
2	6.228	41.57	PK-U	35.6	-31.8	45.37	-	-	-	-	68.2	-22.83	216	243	H
3	7.054	41.6	PK-U	35.5	-31.3	45.8	-	-	-	-	68.2	-22.4	225	259	H
5	7.186	41.06	PK-U	35.6	-30.5	46.16	-	-	-	-	68.2	-22.04	184	192	V

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

PK-U - U-NII: Maximum Peak

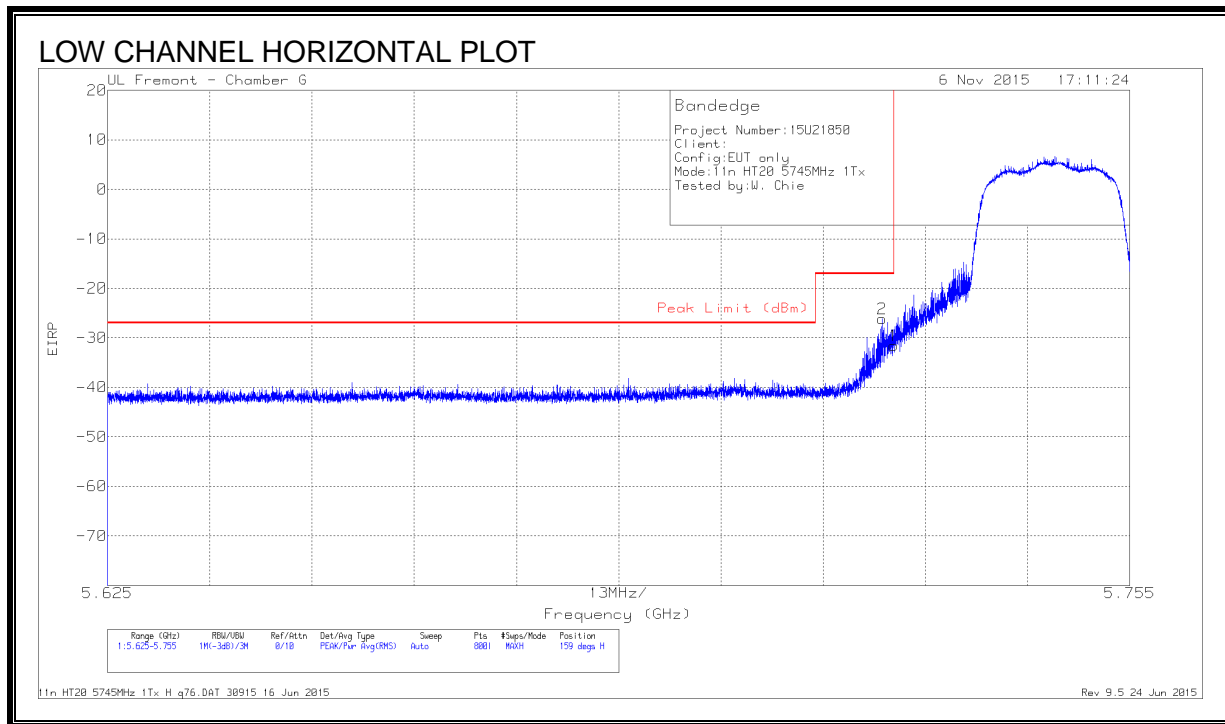
ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

### 9.3.802.11n HT20 MODE IN THE 5.8 GHz BAND

#### RESTRICTED BANDEDGE, (LOW CHANNEL)



#### DATA

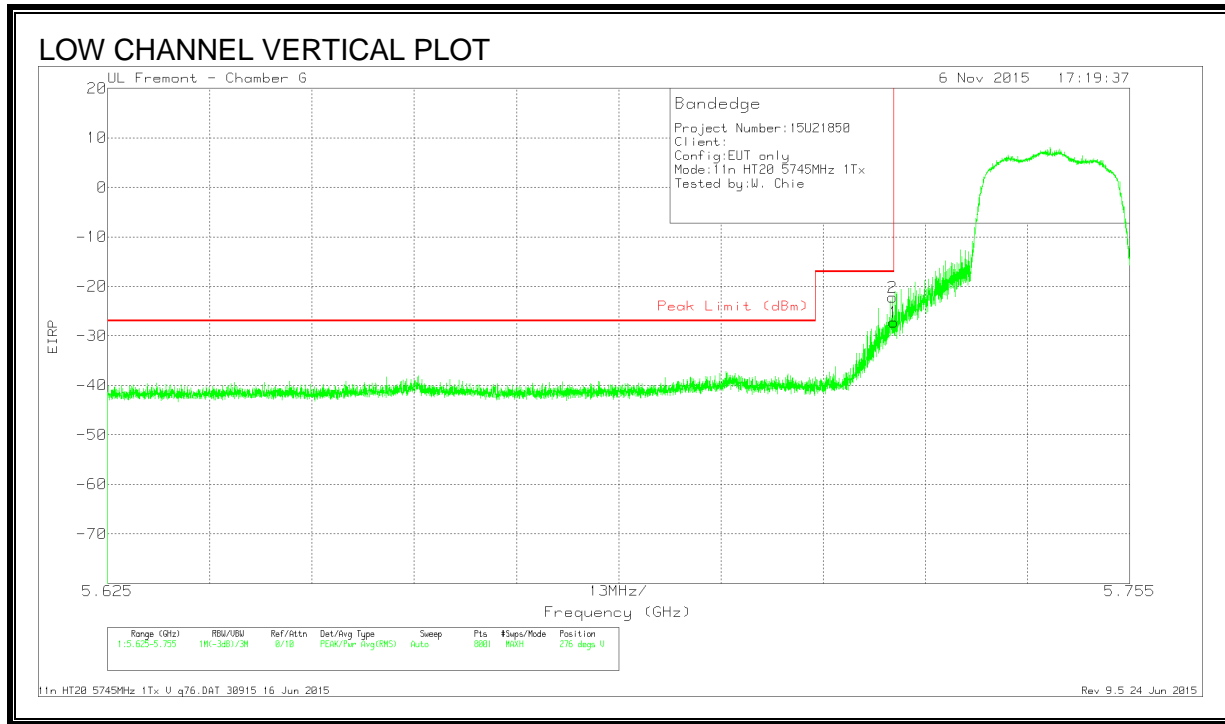
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.724	-50.08	Pk	35	-22.9	11.8	-26.18	-17	-9.18	159	101	H
1	5.725	-55.47	Pk	35	-22.9	11.8	-31.57	-17	-14.57	159	101	H

Pk - Peak detector

Bandedge 5.625-5.755GHz 15\_407 EIRP - H.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015





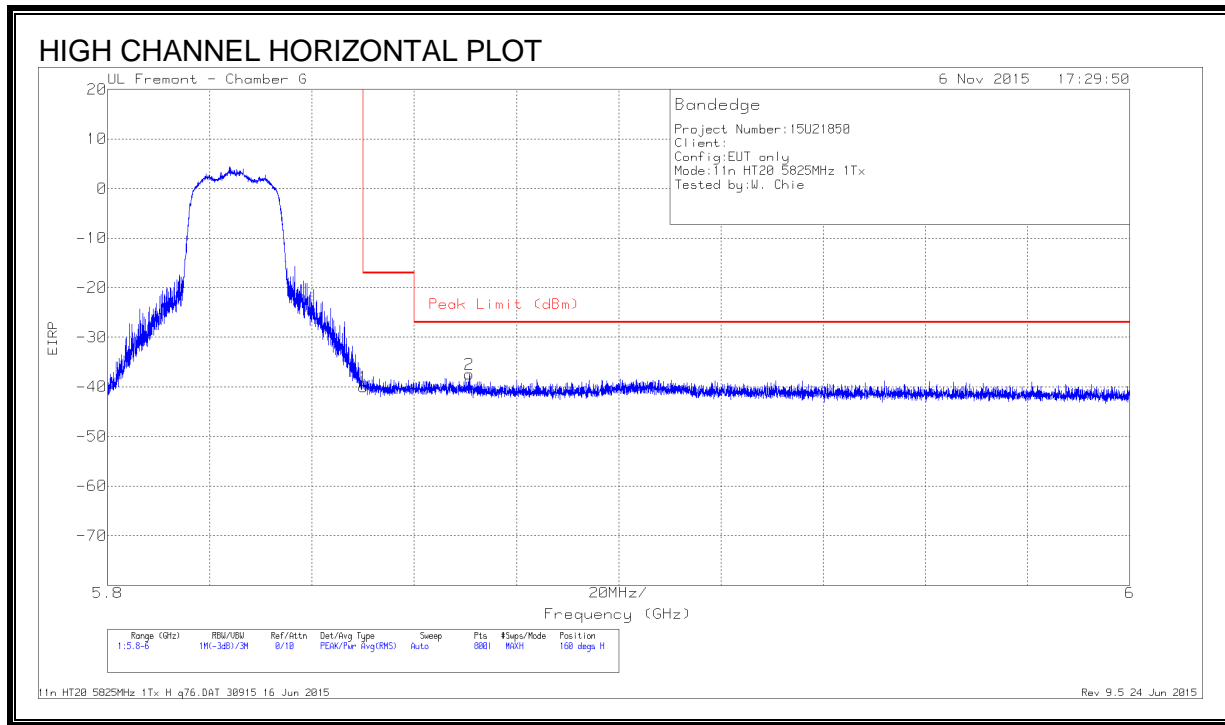
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.725	-51.15	Pk	35	-22.9	11.8	-27.25	-17	-10.25	276	126	V
2	5.725	-46.15	Pk	35	-22.9	11.8	-22.25	-17	-5.25	276	126	V

Pk - Peak detector

Bandedge 5.625-5.755GHz 15\_407 EIRP - V.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015

**RESTRICTED BANDEDGE, (HIGH CHANNEL)**



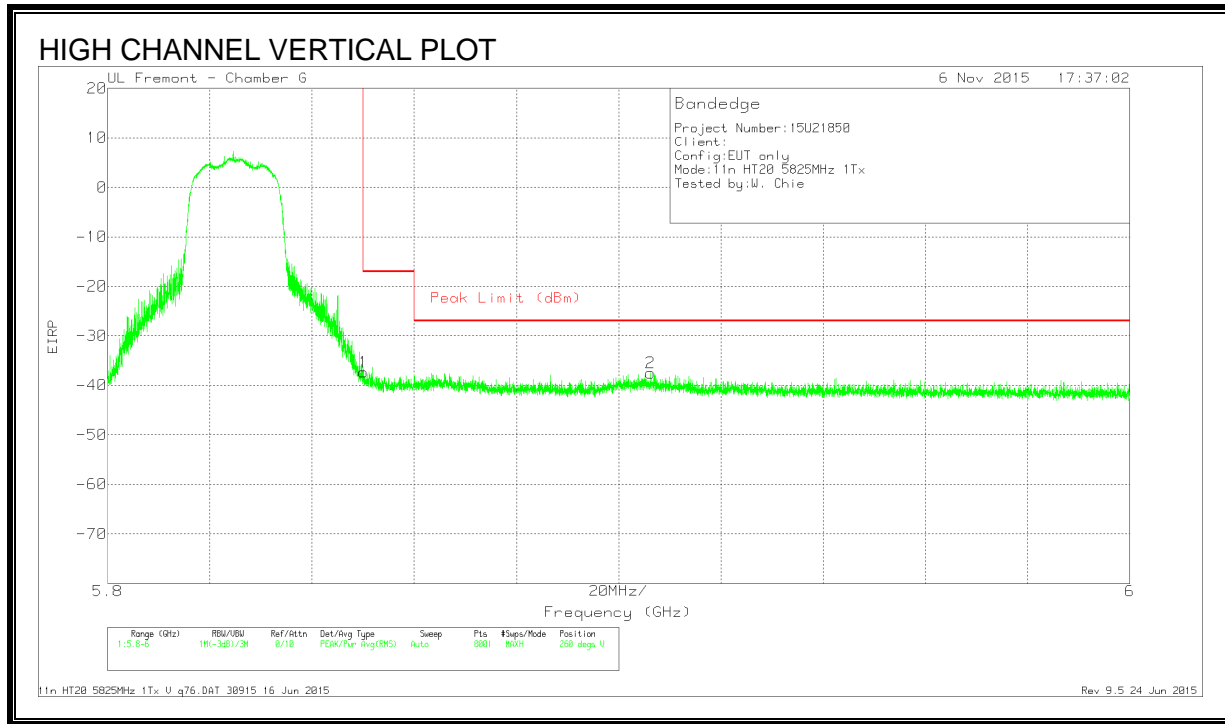
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-63.93	Pk	35.1	-23	11.8	-40.03	-17	-23.03	160	131	H
2	5.871	-61.2	Pk	35.1	-23.1	11.8	-37.4	-27	-10.4	160	131	H

Pk - Peak detector

Bandedge 5.850-6GHz 15\_407 EIRP - H.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015



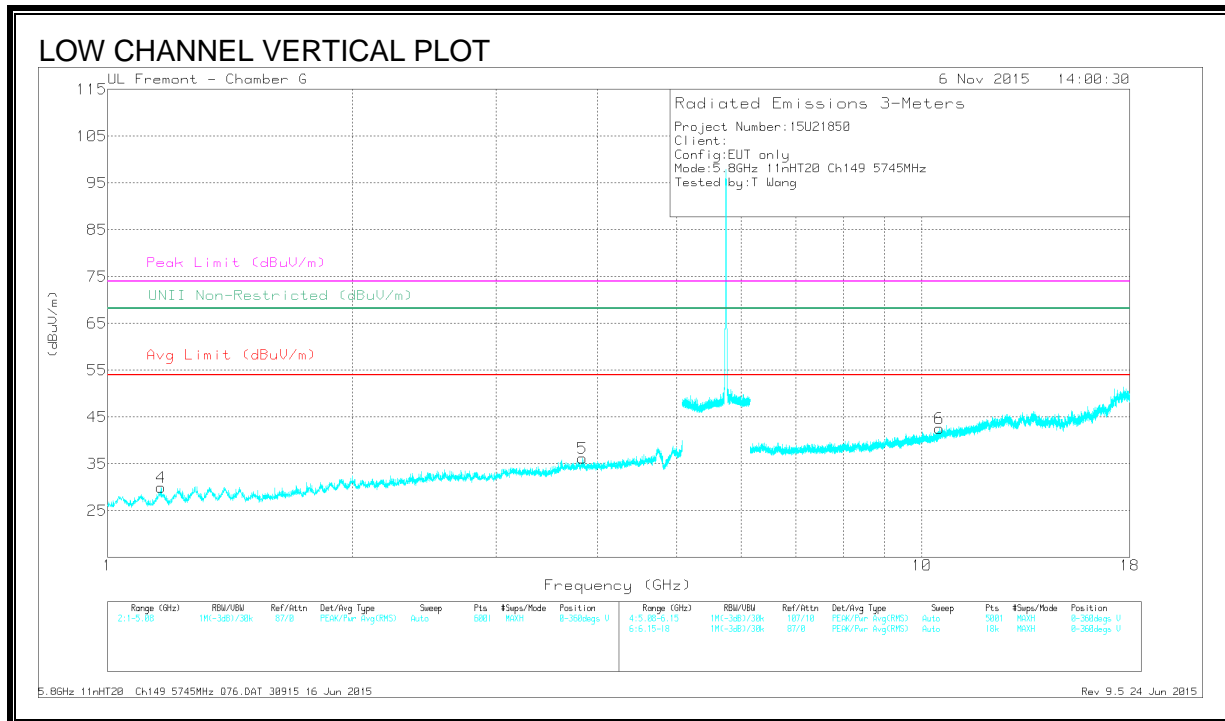
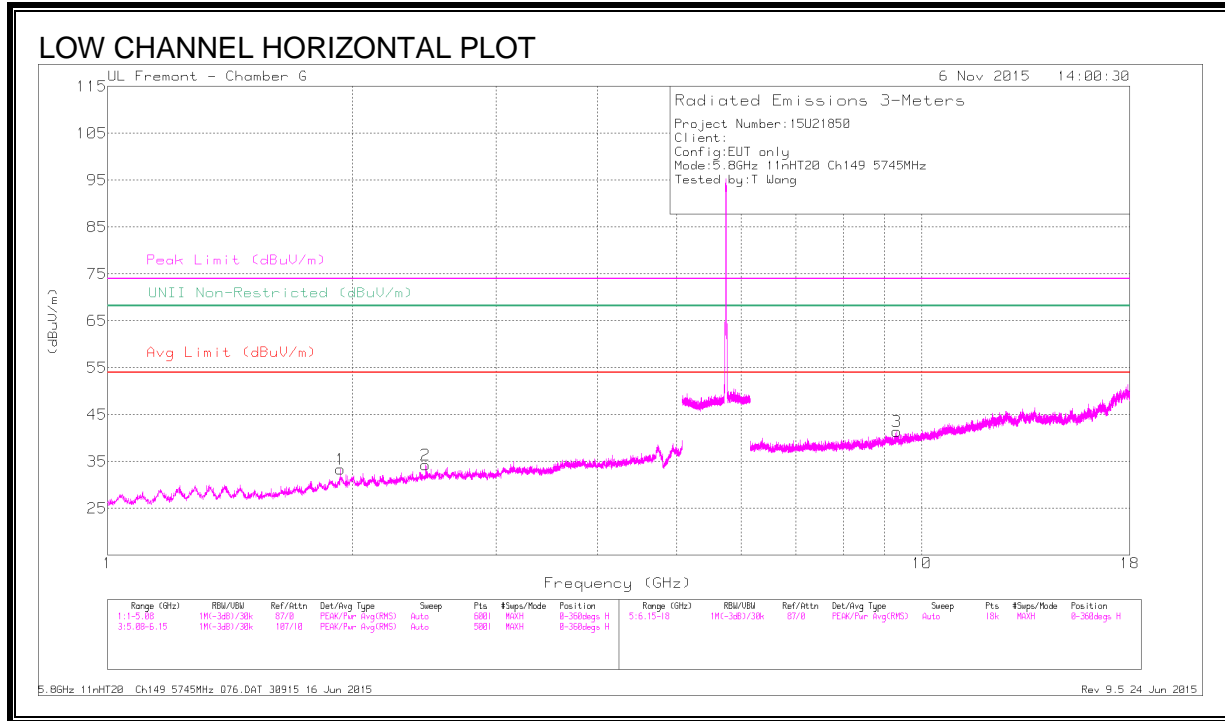
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-61.21	Pk	35.1	-23	11.8	-37.31	-17	-20.31	260	128	V
2	5.906	-61.2	Pk	35.1	-23.2	11.8	-37.5	-27	-10.5	260	128	V

Pk - Peak detector

Bandedge 5.850-6GHz 15\_407 EIRP - V.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015

**LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS**



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/F Itr/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
5	* 3.83	42.9	PK-U	33.1	-32.8	43.2	-	-	74	-30.8	-	-	74	281	V
	* 3.83	31.99	ADR	33.1	-32.8	32.29	54	-21.71	-	-	-	-	74	281	V
4	* 1.163	43.78	PK-U	28	-35.2	36.58	-	-	74	-37.42	-	-	91	265	V
	* 1.163	32.5	ADR	28	-35.2	25.3	54	-28.7	-	-	-	-	91	265	V
3	* 9.323	39.6	PK-U	36.5	-28.5	47.6	-	-	74	-26.4	-	-	356	350	H
	* 9.321	27.8	ADR	36.4	-28.5	35.7	54	-18.3	-	-	-	-	356	350	H
1	1.932	42.06	PK-U	31	-34.1	38.96	-	-	-	-	68.2	-29.24	331	334	H
2	2.458	41.99	PK-U	32.2	-34.1	40.09	-	-	-	-	68.2	-28.11	326	348	H
6	10.498	38.28	PK-U	37.5	-26.9	48.88	-	-	-	-	68.2	-19.32	87	294	V

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

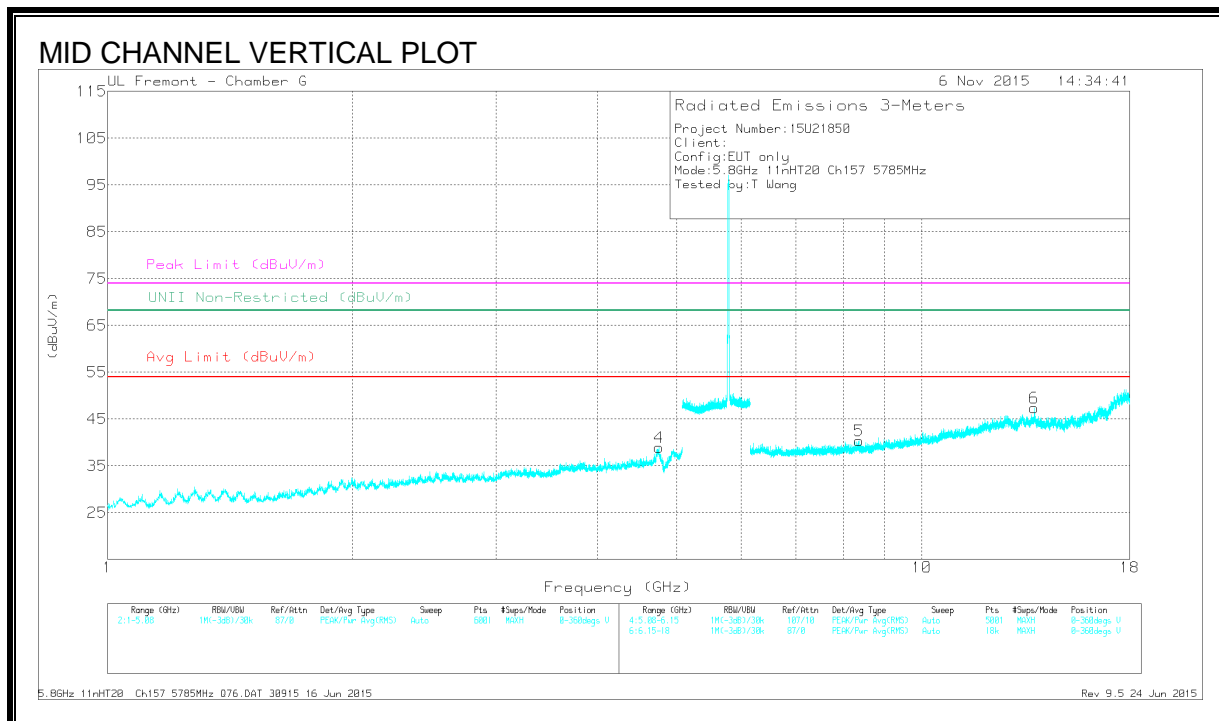
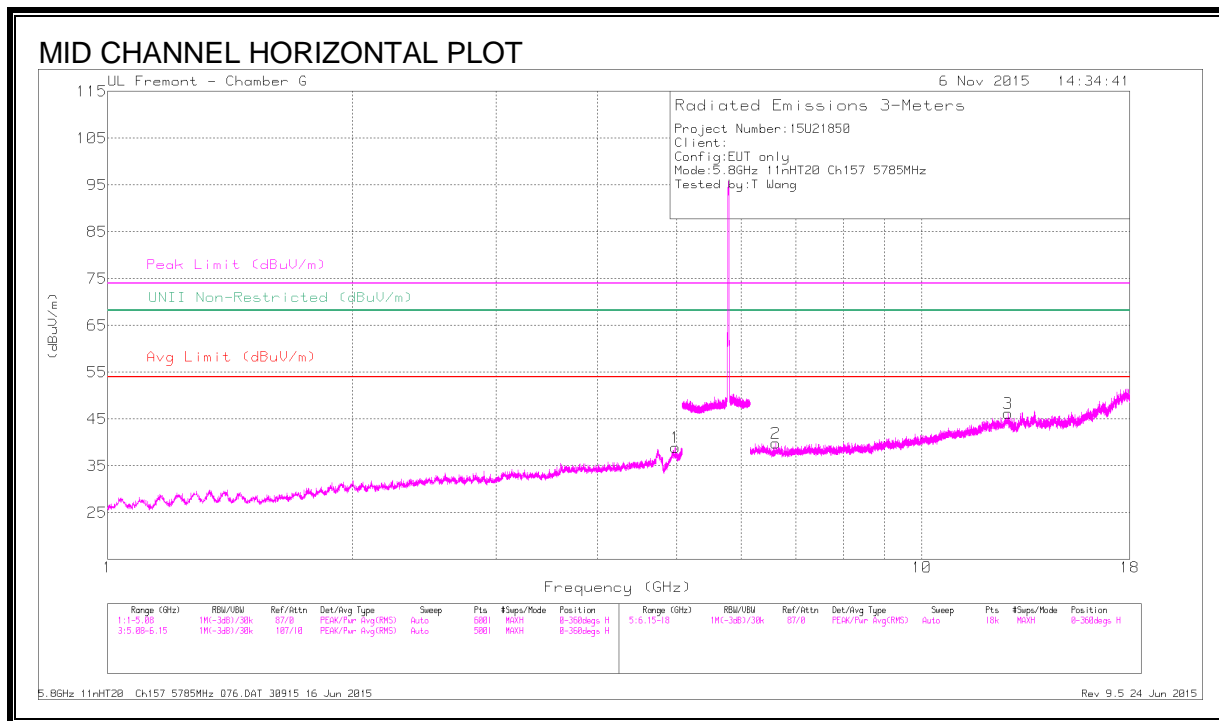
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

**MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS**



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/F Itr/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	* 4.98	42.73	PK-U	34.2	-31.4	45.53	-	-	74	-28.47	-	-	113	388	H
	* 4.978	30.9	ADR	34.2	-31.4	33.7	54	-20.3	-	-	-	-	113	388	H
4	* 4.758	44.34	PK-U	33.9	-32.1	46.14	-	-	74	-27.86	-	-	72	188	V
	* 4.759	32.33	ADR	33.9	-32.1	34.13	54	-19.87	-	-	-	-	72	188	V
5	* 8.371	40.07	PK-U	35.7	-29.6	46.17	-	-	74	-27.83	-	-	96	195	V
	* 8.371	29.06	ADR	35.7	-29.6	35.16	54	-18.84	-	-	-	-	96	195	V
2	6.61	41.19	PK-U	35.7	-31.7	45.19	-	-	-	-	68.2	-23.01	105	376	H
3	12.752	37.51	PK-U	39.2	-24.2	52.51	-	-	-	-	68.2	-15.69	87	368	H
6	13.745	38.68	PK-U	39.2	-24.6	53.28	-	-	-	-	68.2	-14.92	88	196	V

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

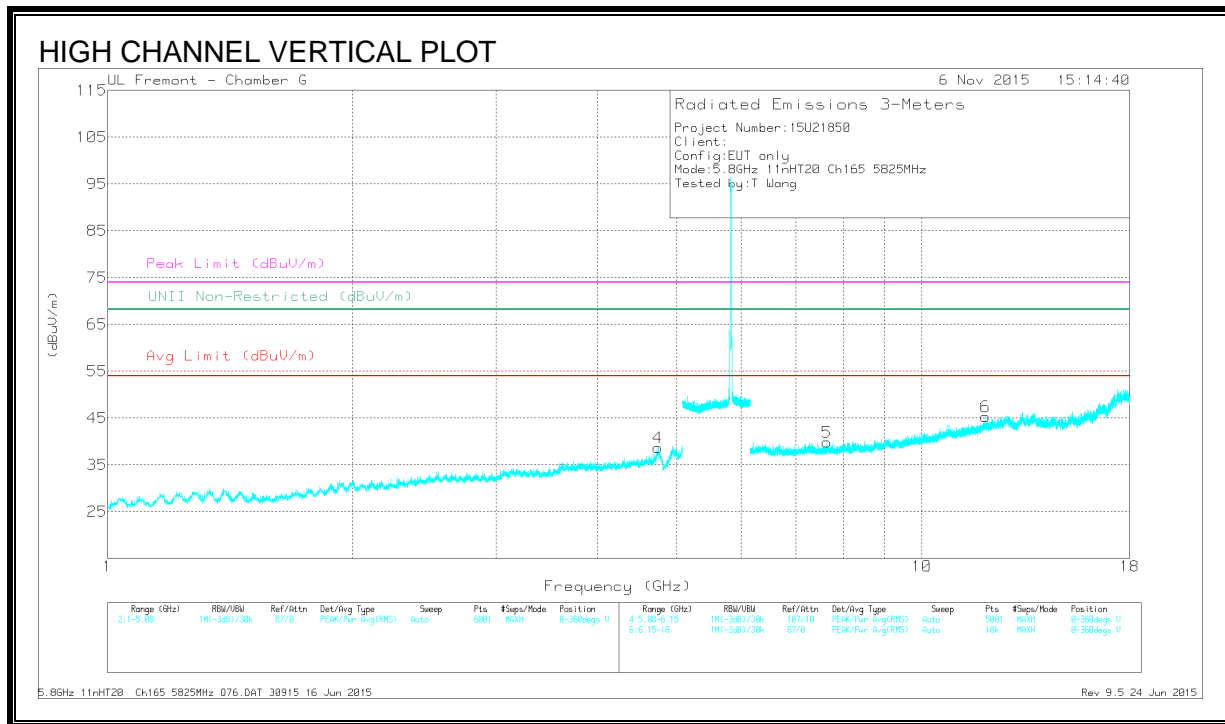
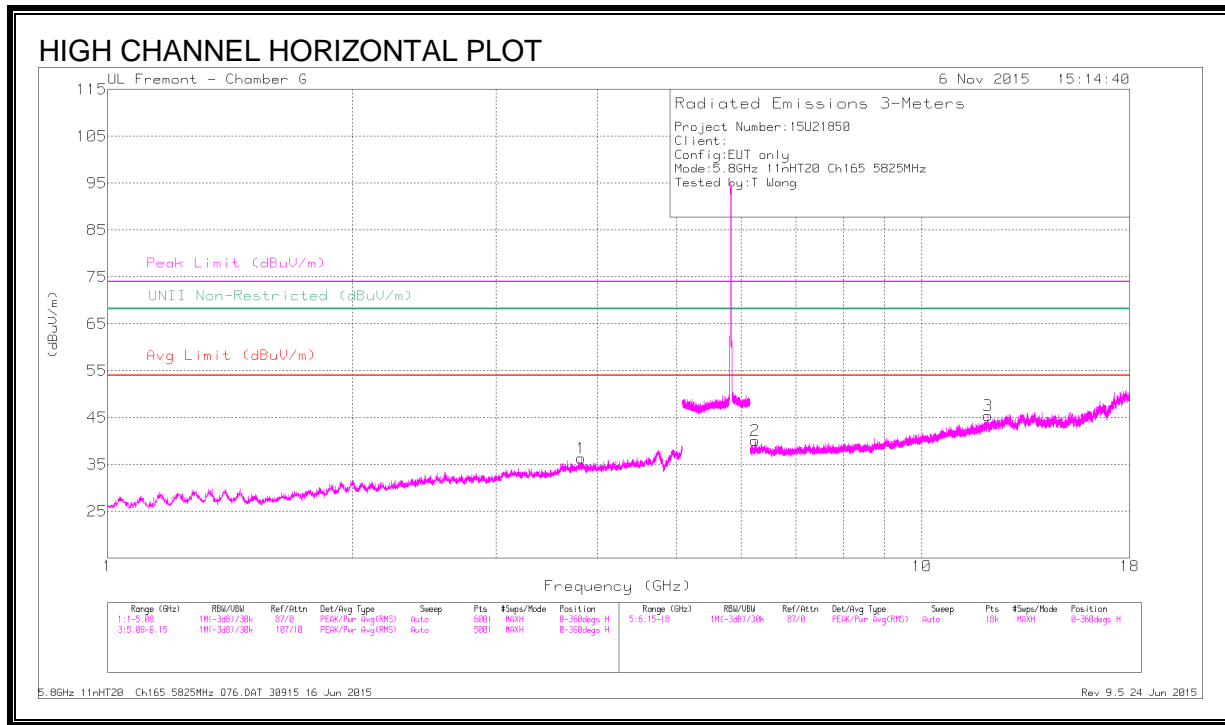
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

**HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS**





**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/F Itr/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	* 3.813	42.4	PK-U	33.1	-32.8	42.7	-	-	74	-31.3	-	-	119	289	H
	* 3.816	30.14	ADR	33.1	-32.8	30.44	54	-23.56	-	-	-	-	119	289	H
4	* 4.743	44.37	PK-U	33.9	-31.9	46.37	-	-	74	-27.63	-	-	137	229	V
	* 4.741	32.45	ADR	33.9	-31.9	34.45	54	-19.55	-	-	-	-	137	229	V
3	* 12.048	37.93	PK-U	38.9	-25.1	51.73	-	-	74	-22.27	-	-	121	267	H
	* 12.046	26.66	ADR	38.9	-25.2	40.36	54	-13.64	-	-	-	-	121	267	H
5	* 7.637	40.56	PK-U	35.6	-30.2	45.96	-	-	74	-28.04	-	-	145	236	V
	* 7.638	29.52	ADR	35.6	-30.2	34.92	54	-19.08	-	-	-	-	145	236	V
6	* 11.967	38.14	PK-U	38.8	-25.6	51.34	-	-	74	-22.66	-	-	152	243	V
	* 11.968	26.86	ADR	38.8	-25.6	40.06	54	-13.94	-	-	-	-	152	243	V
2	6.236	41.36	PK-U	35.6	-31.7	45.26	-	-	-	-	68.2	-22.94	113	277	H

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

PK-U - U-NII: Maximum Peak

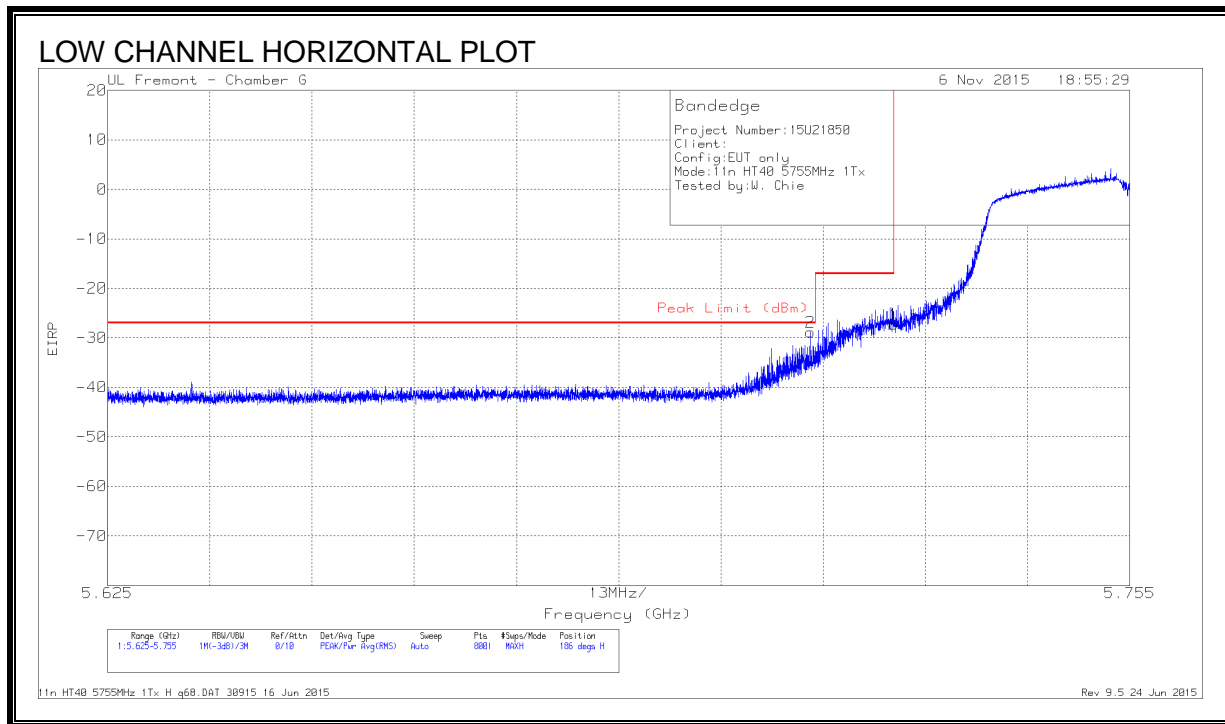
ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

### 9.4.802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

#### RESTRICTED BANDEDGE, (LOW CHANNEL)

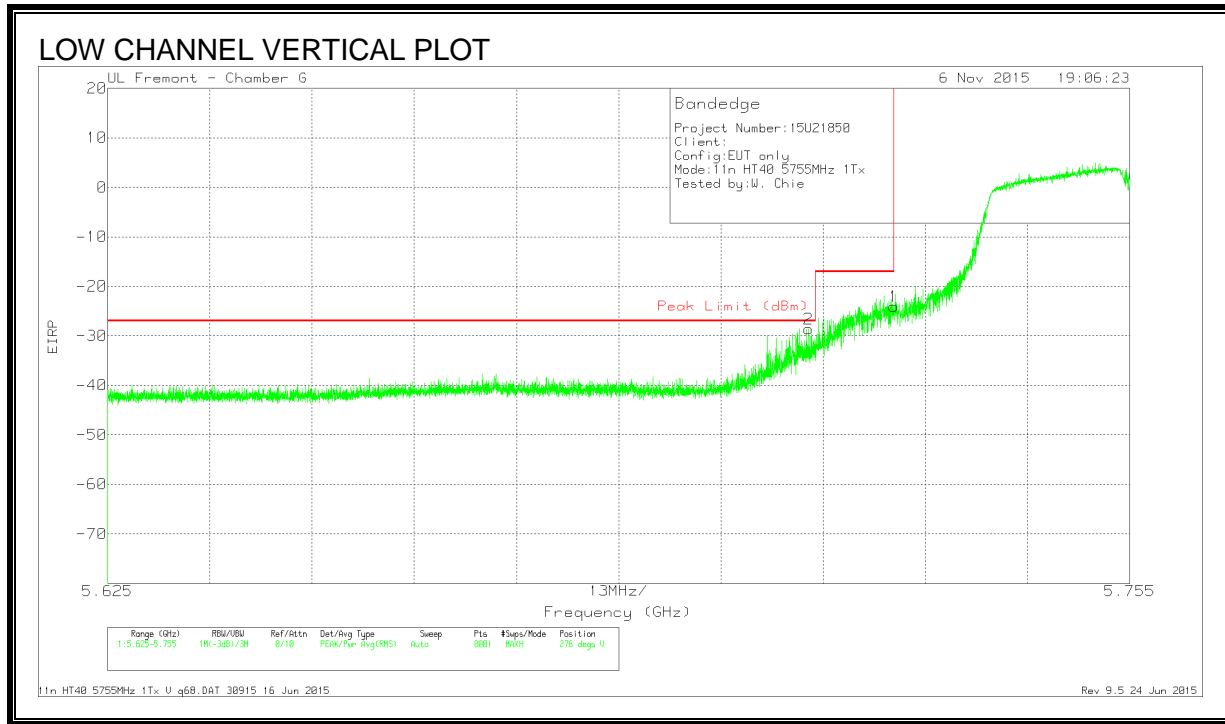


#### DATA

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	-52.6	Pk	34.9	-22.9	11.8	-28.8	-27	-1.8	186	110	H
1	5.725	-51.13	Pk	35	-22.9	11.8	-27.23	-17	-10.23	186	110	H

Pk - Peak detector

Bandedge 5.625-5.755GHz 15\_407 EIRP - H.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015



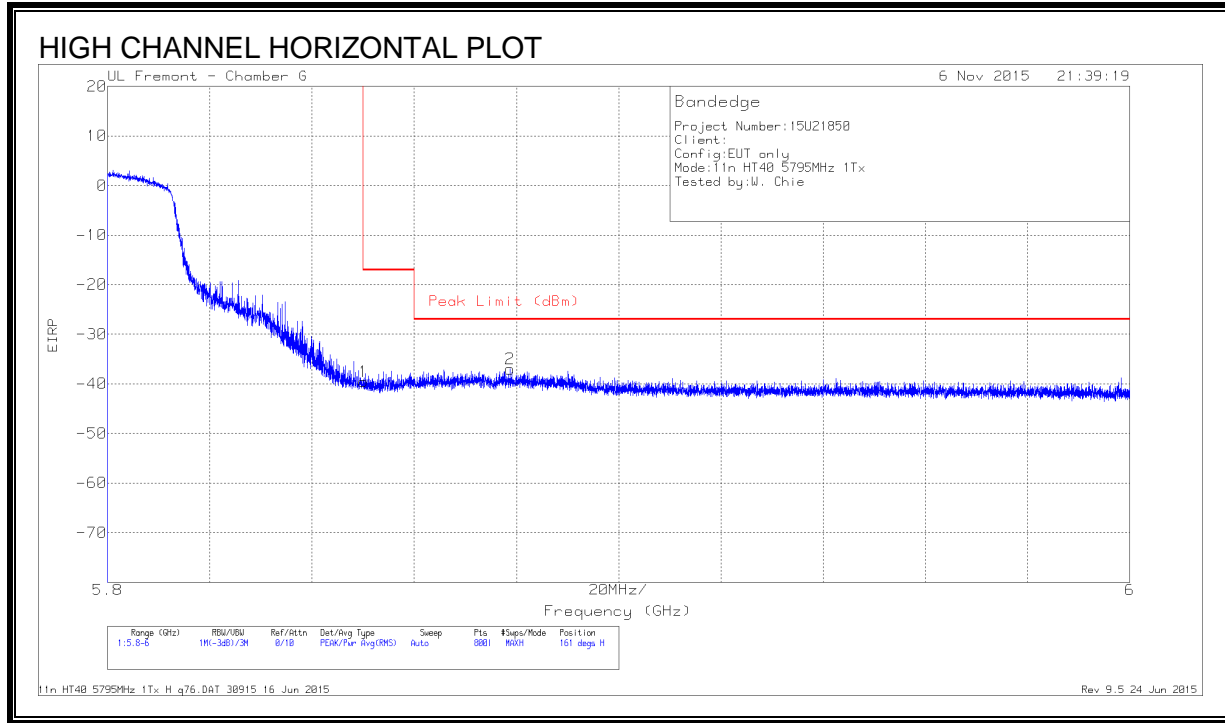
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	-52.38	Pk	34.9	-22.9	11.8	-28.58	-27	-1.58	276	119	V
1	5.725	-48	Pk	35	-22.9	11.8	-24.1	-17	-7.1	276	119	V

Pk - Peak detector

Bandedge 5.625-5.755GHz 15\_407 EIRP - V.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015

**RESTRICTED BANDEDGE, (HIGH CHANNEL)**



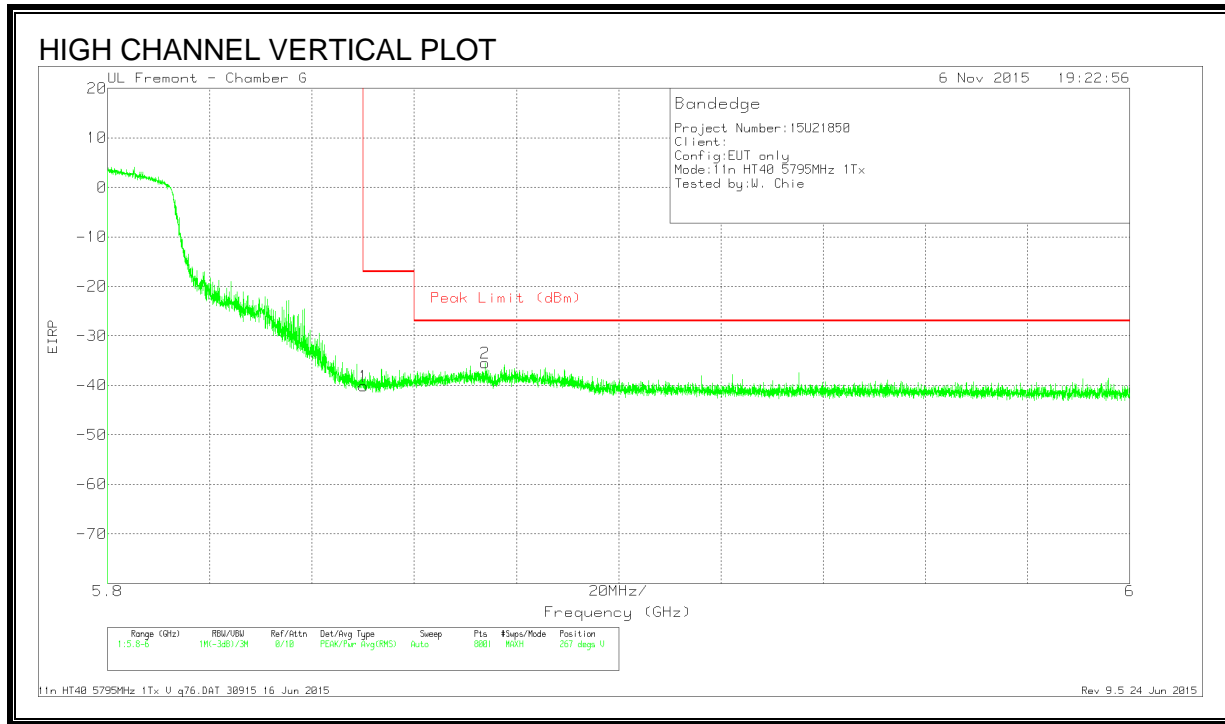
**DATA**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-63.48	Pk	35.1	-23	11.8	0	-39.58	-17	-22.58	161	107	H
2	5.879	-60.81	Pk	35.1	-23.1	11.8	0	-37.01	-27	-10.01	161	107	H

Pk - Peak detector

Bandedge 5.850-6GHz 15\_407 EIRP - H.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015



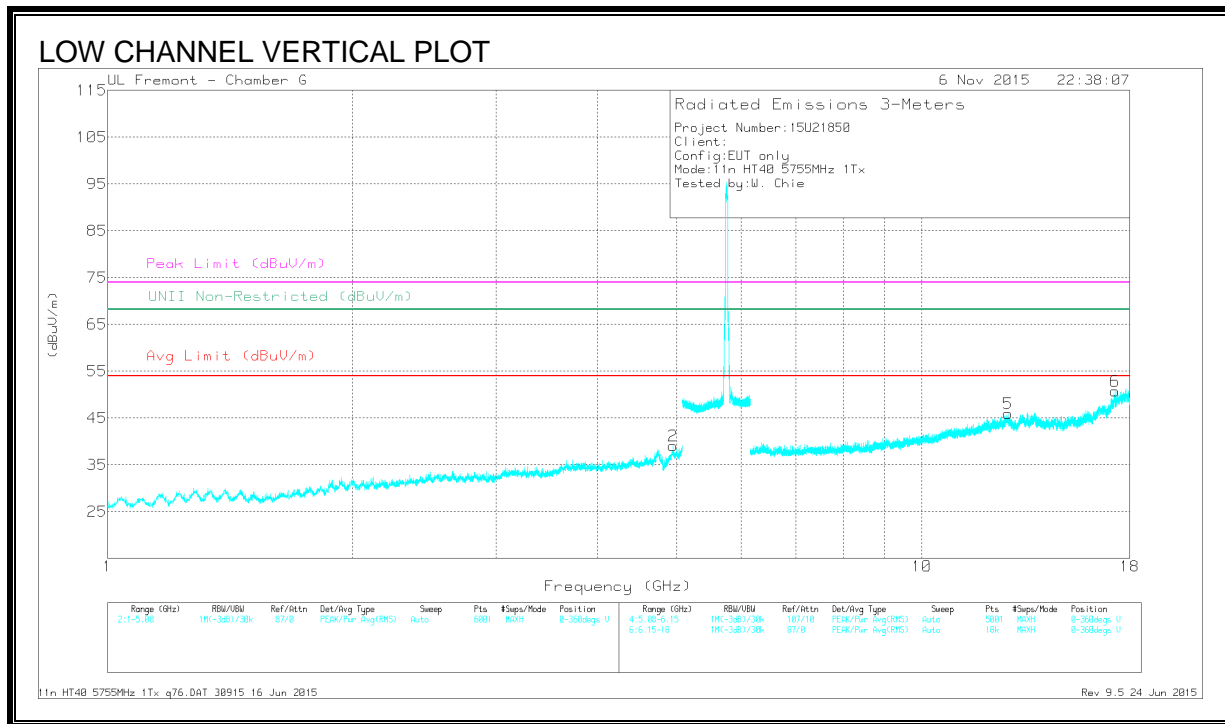
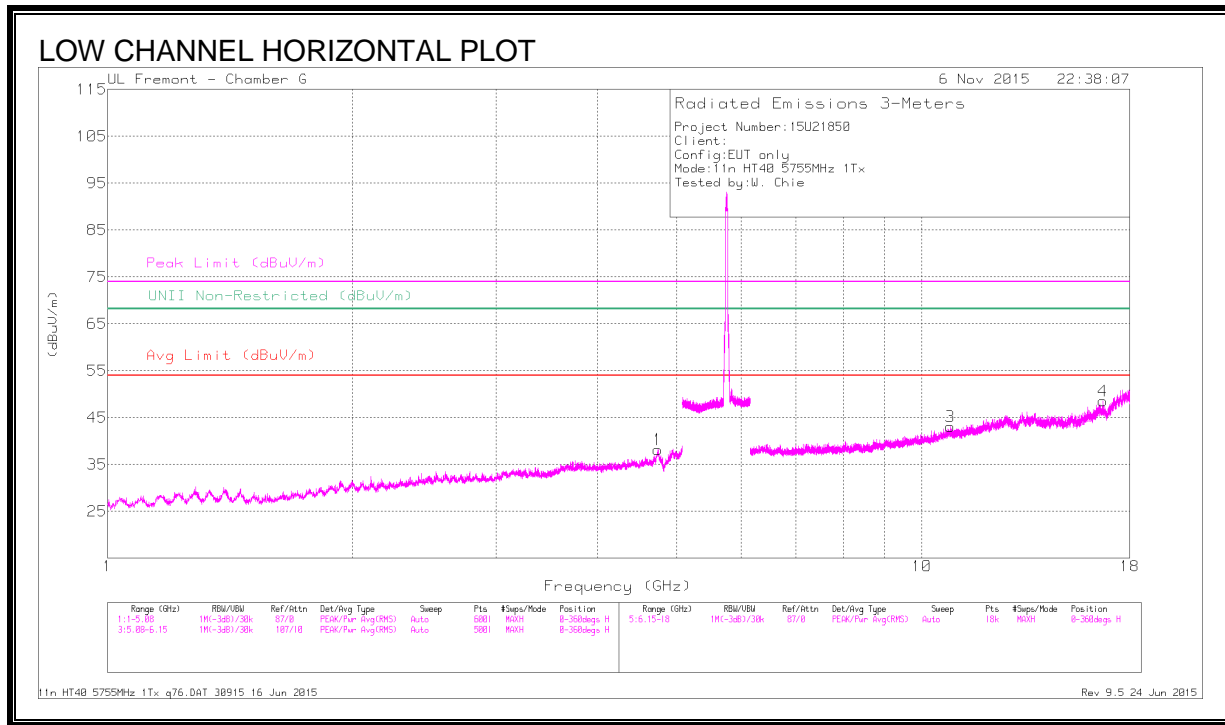
**DATA**

Marker	Frequenc y (GHz)	Meter Reading (dBm)	Det	AF T862 (dB/m)	Amp/Cb/ Fitr/Pad (dB)	Conversi on Factor (dB)	Correcte d Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-64.03	Pk	35.1	-23	11.8	-40.13	-17	-23.13	267	110	V
2	5.874	-59.32	Pk	35.1	-23.1	11.8	-35.52	-27	-8.52	267	110	V

Pk - Peak detector

Bandedge 5.850-6GHz 15\_407 EIRP - V.TST 30915 16 Jun 2015  
 Rev 9.5 24 Jun 2015

**LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS**



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/F ltr/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	* 4.741	44.79	PK-U	33.9	-31.9	0	46.79	-	-	74	-27.21	-	-	35	150	H
	* 4.741	32.18	ADR	33.9	-31.9	.14	34.32	54	-19.68	-	-	-	-	35	150	H
2	* 4.946	42.42	PK-U	34.1	-31.2	0	45.32	-	-	74	-28.68	-	-	2	161	V
	* 4.945	30.99	ADR	34.1	-31.2	.14	34.03	54	-19.97	-	-	-	-	2	161	V
3	* 10.835	37.78	PK-U	38	-26.6	0	49.18	-	-	74	-24.82	-	-	1	202	H
	* 10.836	26.14	ADR	38	-26.6	.14	37.68	54	-16.32	-	-	-	-	1	202	H
5	12.756	37.57	PK-U	39.2	-24.1	0	52.67	-	-	-	-	68.2	-15.53	130	237	V
4	16.681	36.93	PK-U	41.1	-23.5	0	54.53	-	-	-	-	68.2	-13.67	88	272	H
6	17.255	36.33	PK-U	41.2	-21.5	0	56.03	-	-	-	-	68.2	-12.17	117	255	V

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

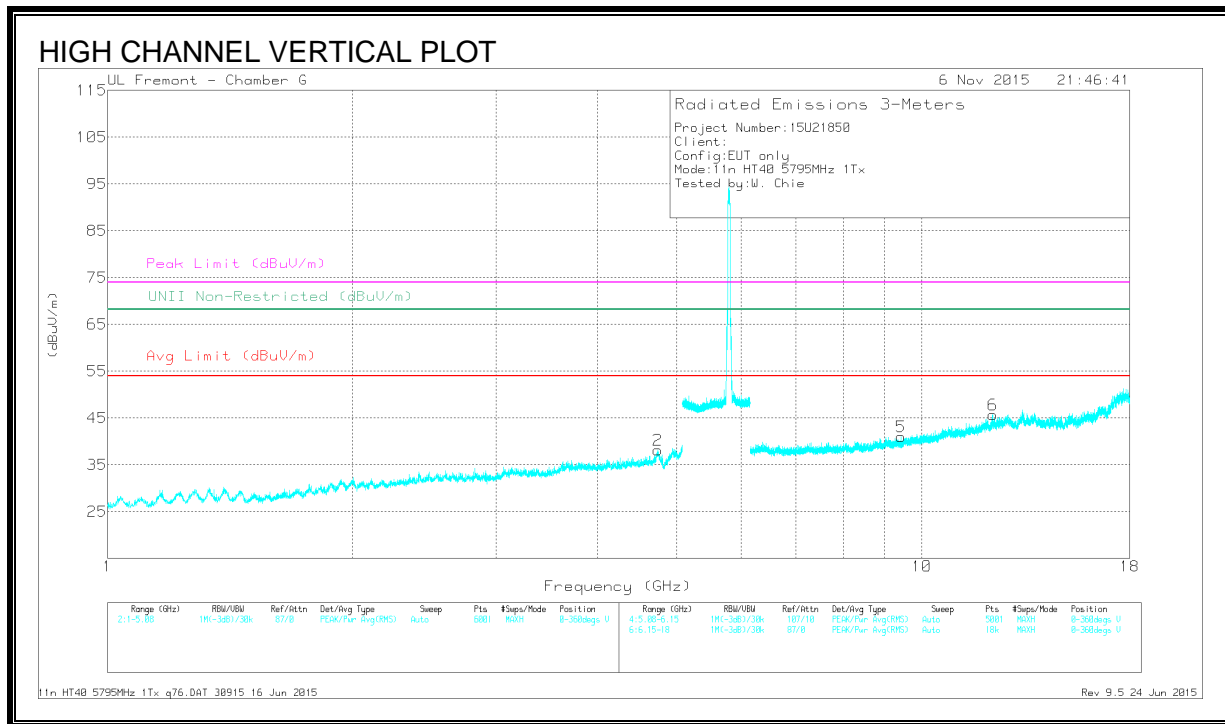
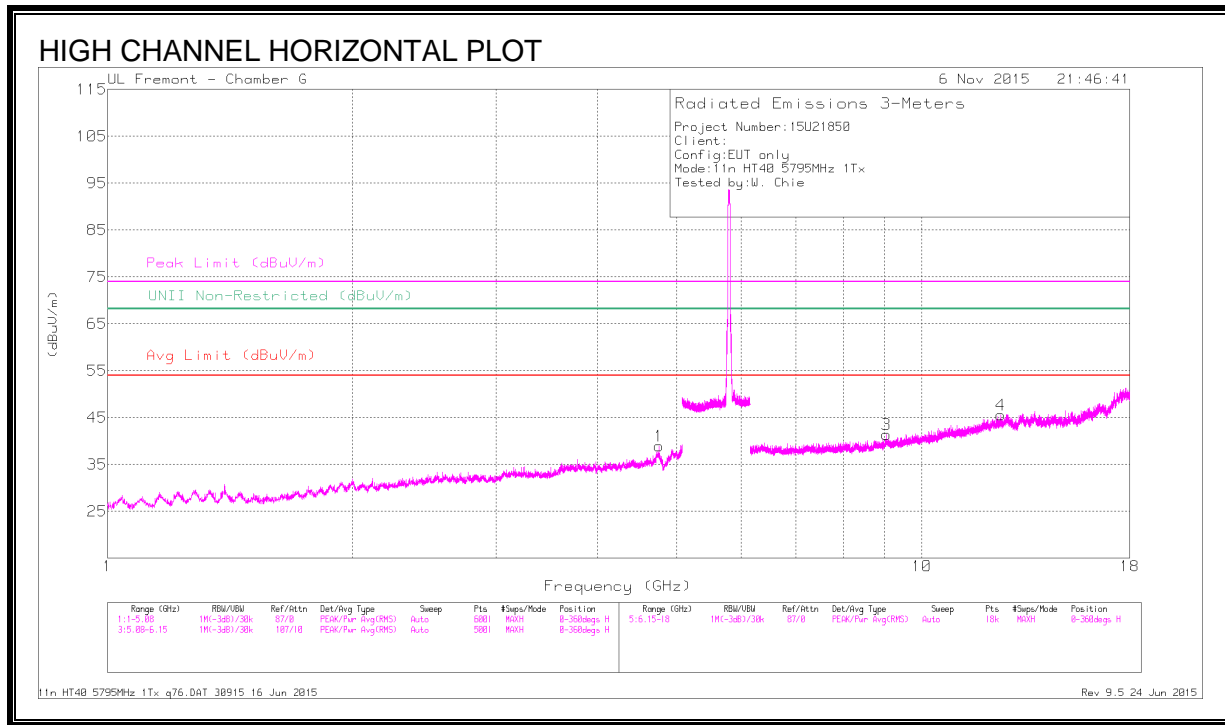
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

**HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS**





**DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cb/F ltr/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	* 4.758	43.62	PK-U	33.9	-32.1	0	45.42	-	-	74	-28.58	-	-	10	149	H
	* 4.76	32.08	ADR	34	-32.1	.14	34.12	54	-19.88	-	-	-	-	10	149	H
2	* 4.738	44.55	PK-U	33.9	-31.9	0	46.55	-	-	74	-27.45	-	-	0	151	V
	* 4.738	32.27	ADR	33.9	-31.9	.14	34.41	54	-19.59	-	-	-	-	0	151	V
3	* 9.051	39.59	PK-U	36.2	-28.2	0	47.59	-	-	74	-26.41	-	-	245	159	H
	* 9.051	27.7	ADR	36.2	-28.2	.14	35.64	54	-18.16	-	-	-	-	245	159	H
4	* 12.497	37.64	PK-U	39.1	-25.3	0	51.44	-	-	74	-22.56	-	-	96	119	H
	* 12.499	26.33	ADR	39.1	-25.2	.14	40.37	54	-13.63	-	-	-	-	96	119	H
5	* 9.421	39.13	PK-U	36.5	-28.9	0	46.73	-	-	74	-27.27	-	-	6	360	V
	* 9.423	27.53	ADR	36.5	-28.9	.14	35.27	54	-18.73	-	-	-	-	6	360	V
6	* 12.213	37.69	PK-U	39	-24.7	0	51.99	-	-	74	-22.01	-	-	354	156	V
	* 12.212	26.25	ADR	39	-24.7	.14	40.69	54	-13.31	-	-	-	-	354	156	V

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

PK-U - U-NII: Maximum Peak

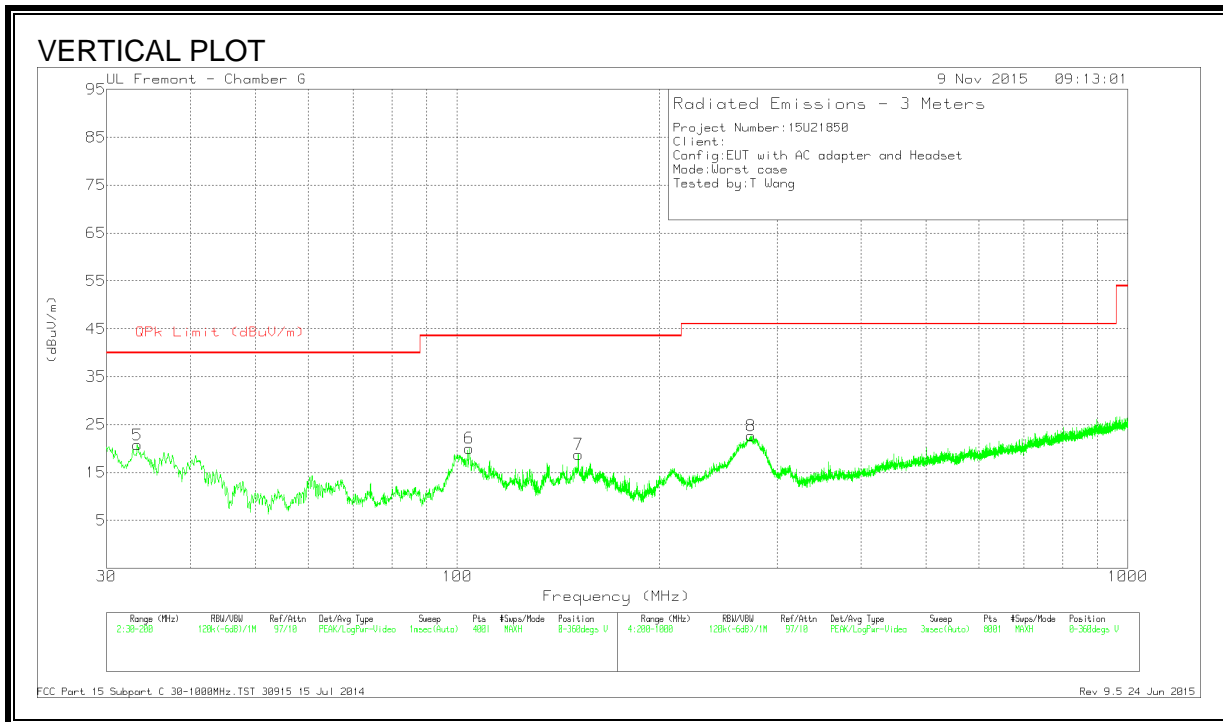
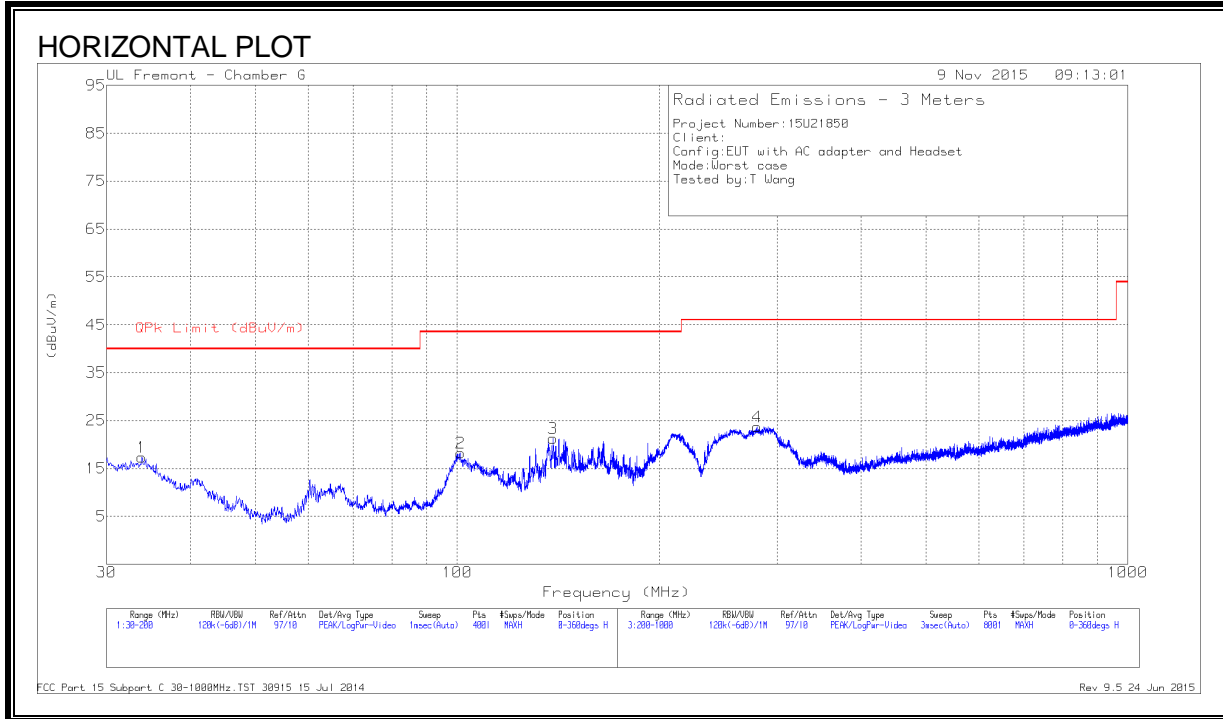
ADR - U-NII AD primary method, RMS average

FCC Part15C 5GHz UNII RSE.TST 30915 16 Jun 2015

Rev 9.5 24 Jun 2015

### 9.5. WORST-CASE BELOW 1 GHz

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



**HORIZONTAL AND VERTICAL DATA**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T899 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 279.8	39.22	Pk	13.5	-29	23.72	46.02	-22.3	0-360	100	H
8	* 274.3	38.54	Pk	13.3	-29.1	22.74	46.02	-23.28	0-360	201	V
5	33.3575	32.77	Pk	19.3	-31.3	20.77	40	-19.23	0-360	100	V
1	33.825	29.69	Pk	19	-31.3	17.39	40	-22.61	0-360	101	H
2	101.23	38.09	Pk	10.6	-30.4	18.29	43.52	-25.23	0-360	301	H
6	104.205	39.08	Pk	11.4	-30.4	20.08	43.52	-23.44	0-360	100	V
3	138.9275	38.09	Pk	13.3	-30.1	21.29	43.52	-22.23	0-360	201	H
7	151.55	36.41	Pk	12.4	-30	18.81	43.52	-24.71	0-360	100	V

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

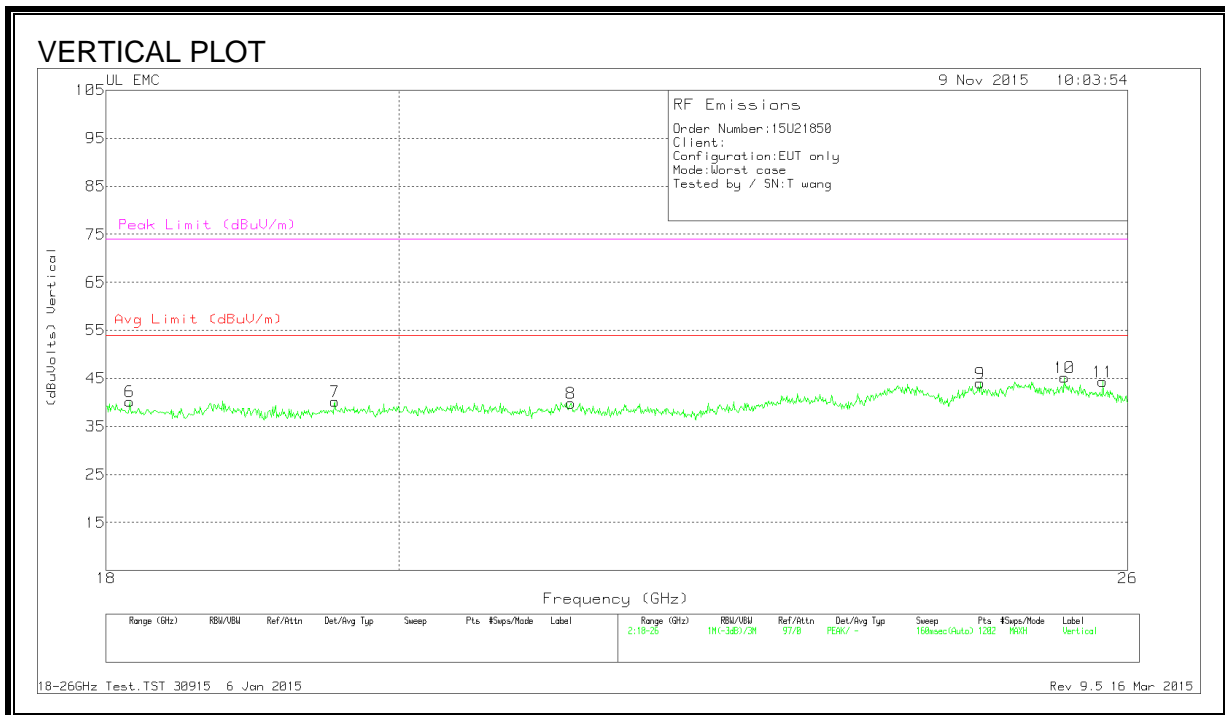
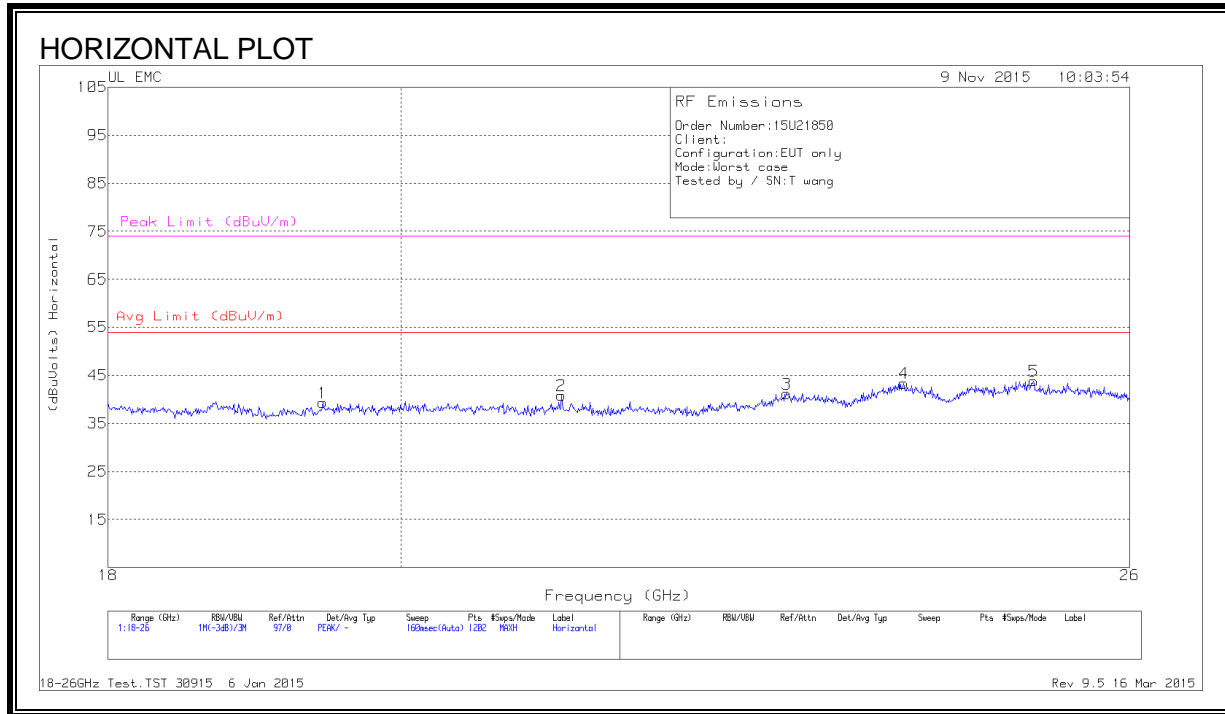
Pk - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 15 Jul 2014

Rev 9.5 24 Jun 2015

### 9.6. WORST-CASE ABOVE 18 GHz

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

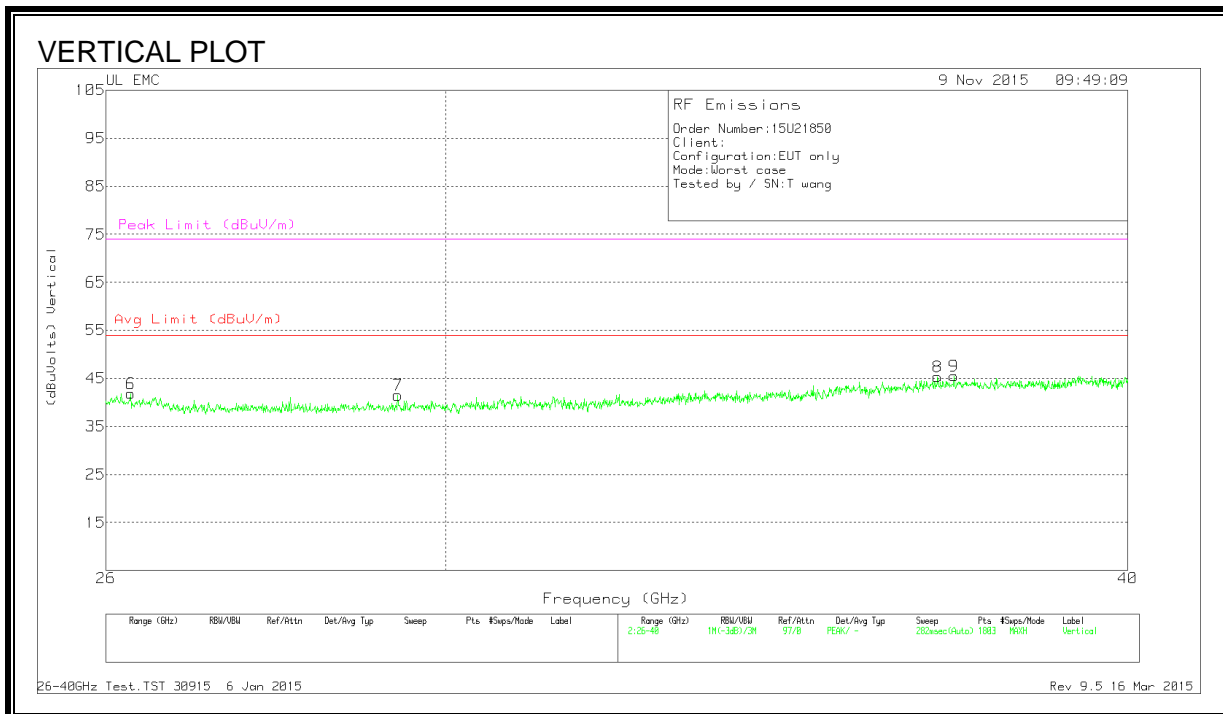
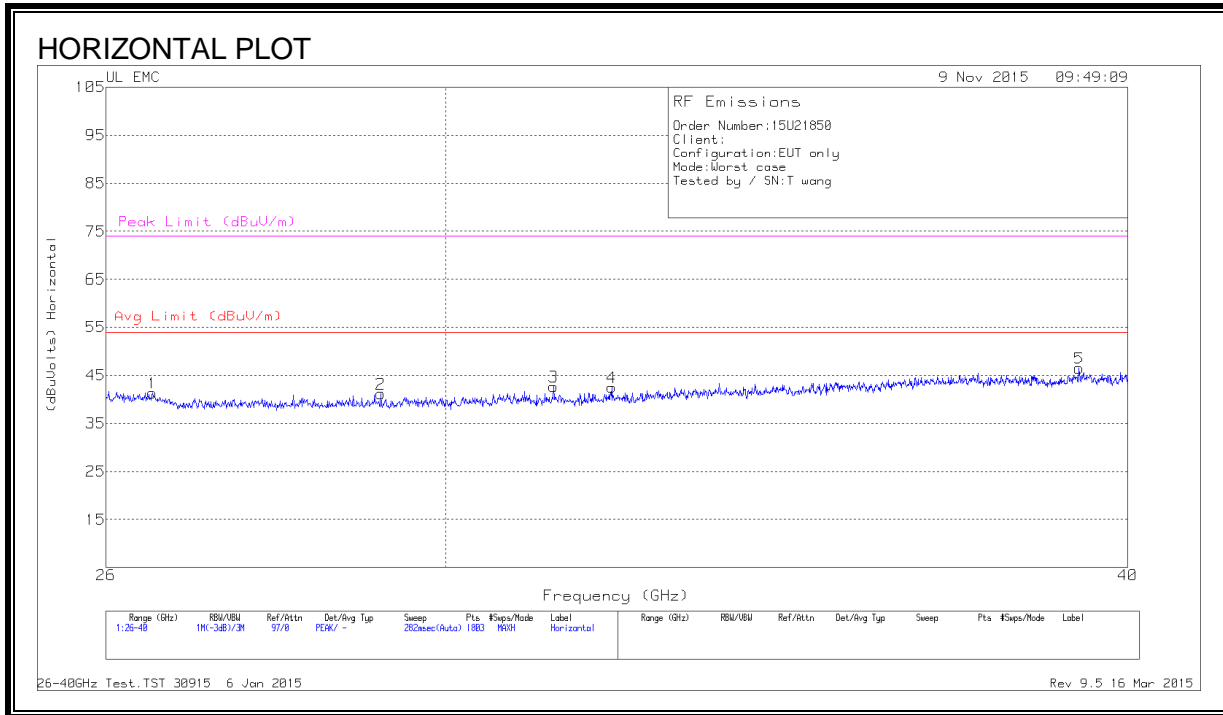


**HORIZONTAL AND VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cb l (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.445	41.03	Pk	32.5	-24.7	-9.5	39.33	54	-14.67	74	-34.67
2	21.191	42.43	Pk	33	-25.1	-9.5	40.83	54	-13.17	74	-33.17
3	22.979	42.17	Pk	33.5	-25	-9.5	41.17	54	-12.83	74	-32.83
4	23.968	43.73	Pk	33.3	-24.2	-9.5	43.33	54	-10.67	74	-30.67
5	25.114	43.93	Pk	33.9	-24.5	-9.5	43.83	54	-10.17	74	-30.17
6	18.153	42.87	Pk	32.4	-25.6	-9.5	40.17	54	-13.83	74	-33.83
7	19.545	42.27	Pk	32.5	-25.1	-9.5	40.17	54	-13.83	74	-33.83
8	21.277	41.43	Pk	33.2	-25.3	-9.5	39.83	54	-14.17	74	-34.17
9	24.654	44.1	Pk	33.9	-24.5	-9.5	44	54	-10	74	-30
10	25.414	45.17	Pk	33.8	-24.3	-9.5	45.17	54	-8.83	74	-28.83
11	25.767	44.43	Pk	34.1	-24.7	-9.5	44.33	54	-9.67	74	-29.67

Pk - Peak detector  
 18-26GHz Test.TST 30915 6 Jan 2015  
 Rev 9.5 16 Mar 2015

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



**HORIZONTAL AND VERTICAL DATA**

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Correcte d Reading (dBuVOLT s)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	26.513	46.03	Pk	35.5	-30.7	-9.5	41.33	54	-12.67	74	-32.67
2	29.193	46.97	Pk	35.9	-32.2	-9.5	41.17	54	-12.83	74	-32.83
3	31.4	48.87	Pk	36.1	-32.8	-9.5	42.67	54	-11.33	74	-31.33
4	32.176	48.5	Pk	36.4	-32.9	-9.5	42.5	54	-11.5	74	-31.5
5	39.184	49.8	Pk	38.2	-32	-9.5	46.5	54	-7.5	74	-27.5
6	26.272	46.73	Pk	35.6	-31	-9.5	41.83	54	-12.17	74	-32.17
7	29.403	47.3	Pk	35.9	-32.2	-9.5	41.5	54	-12.5	74	-32.5
8	36.916	50.63	Pk	37.2	-33	-9.5	45.33	54	-8.67	74	-28.67
9	37.172	51	Pk	37.2	-33.2	-9.5	45.5	54	-8.5	74	-28.5

Pk - Peak detector

26-40GHz Test.TST 30915 6 Jan 2015

Rev 9.5 16 Mar 2015

## 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.

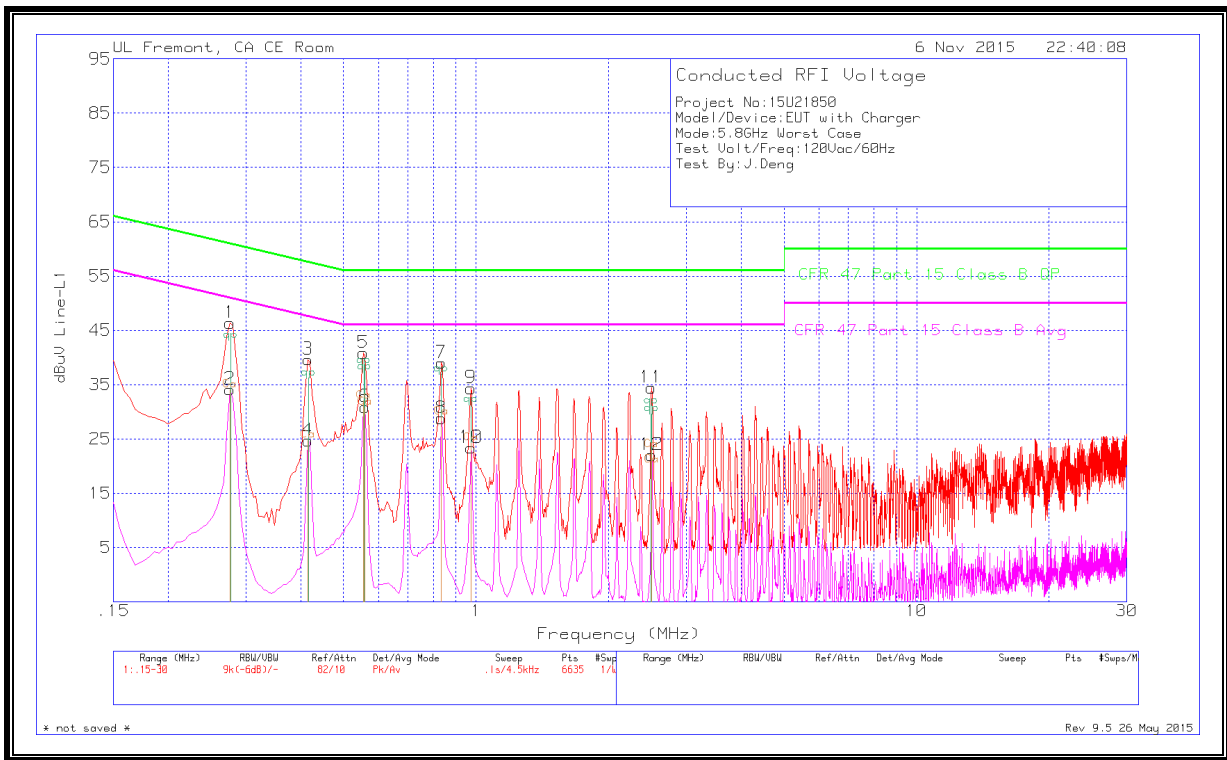
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS



### 10.1. EUT POWERED BY AC/DC ADAPTER

#### LINE 1 RESULTS



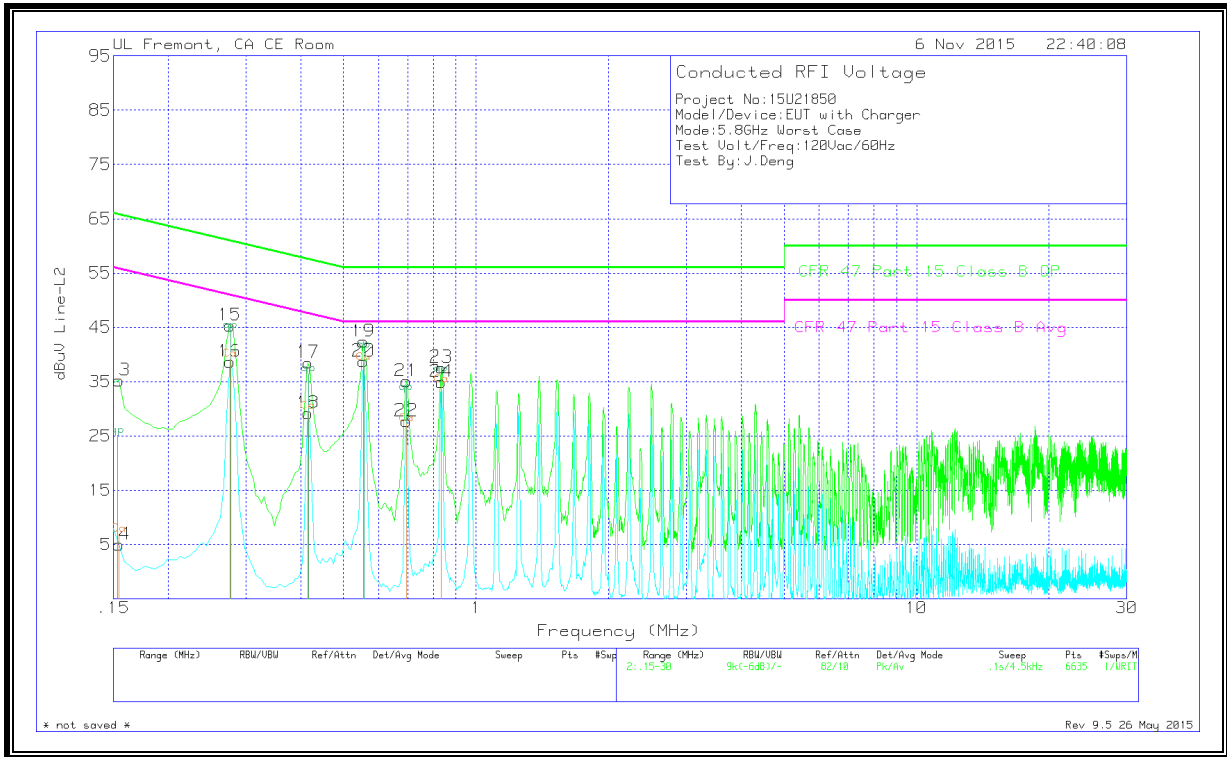
#### WORST EMISSIONS

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	.276	45.78	Pk	.6	0	46.38	60.94	-14.56	-	-
2	.276	33.53	Av	.6	0	34.13	-	-	50.94	-16.81
3	.4155	39.24	Pk	.4	0	39.64	57.54	-17.9	-	-
4	.4155	24.34	Av	.4	0	24.74	-	-	47.54	-22.8
5	.555	40.55	Pk	.3	0	40.85	56	-15.15	-	-
6	.5595	30.6	Av	.3	0	30.9	-	-	46	-15.1
7	.834	38.71	Pk	.3	0	39.01	56	-16.99	-	-
8	.834	28.53	Av	.3	0	28.83	-	-	46	-17.17
9	.9735	34.06	Pk	.3	0	34.36	56	-21.64	-	-
10	.9735	23.07	Av	.3	0	23.37	-	-	46	-22.63
11	2.499	34.15	Pk	.2	.1	34.45	56	-21.55	-	-
12	2.5035	21.76	Av	.2	.1	22.06	-	-	46	-23.94

Pk - Peak detector  
 Av - Average detection

**LINE 2 RESULTS**



**WORST EMISSIONS**

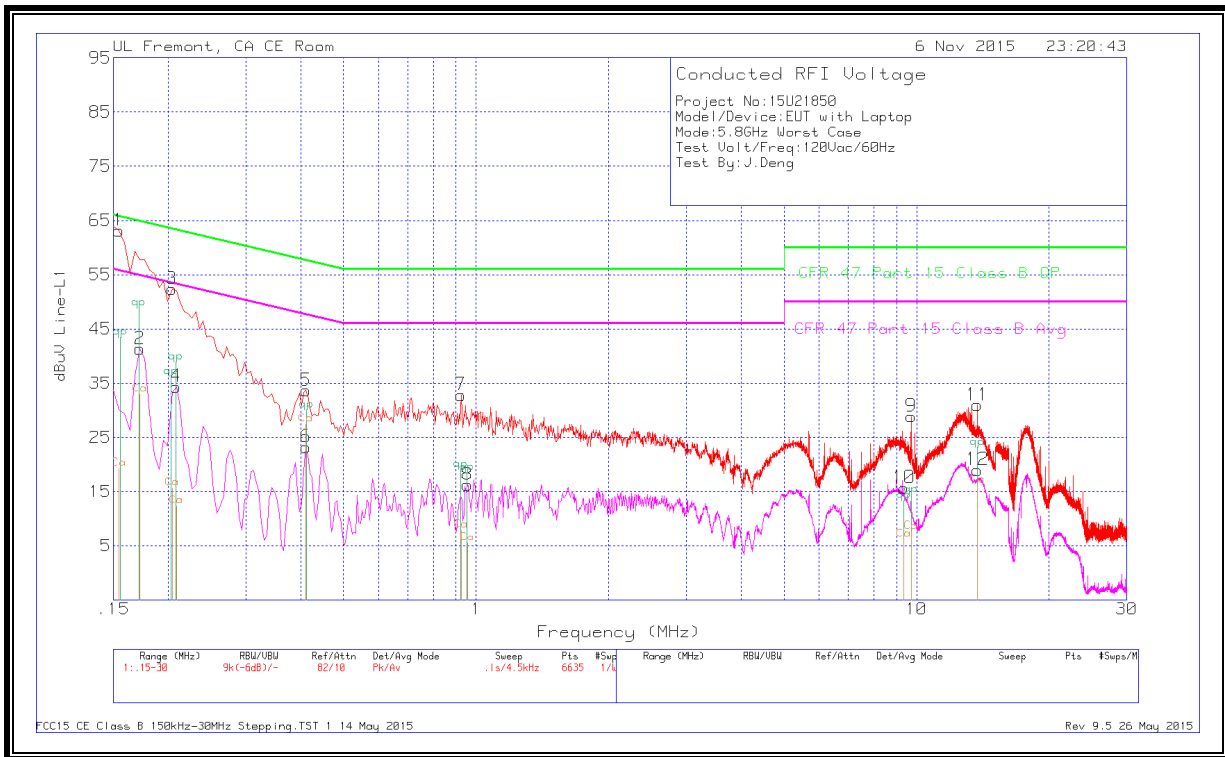
Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
13	.1545	33.8	Pk	1.4	0	35.2	65.75	-30.55	-	-
14	.1545	3.57	Av	1.4	0	4.97	-	-	55.75	-50.78
15	.276	44.66	Pk	.7	0	45.36	60.94	-15.58	-	-
16	.276	37.98	Av	.7	0	38.68	-	-	50.94	-12.26
17	.4155	38.07	Pk	.4	0	38.47	57.54	-19.07	-	-
18	.4155	28.81	Av	.4	0	29.21	-	-	47.54	-18.33
19	.555	42.08	Pk	.3	0	42.38	56	-13.62	-	-
20	.555	38.43	Av	.3	0	38.73	-	-	46	-7.27
21	.6945	34.79	Pk	.3	0	35.09	56	-20.91	-	-
22	.6945	27.44	Av	.3	0	27.74	-	-	46	-18.26
23	.834	37.29	Pk	.3	0	37.59	56	-18.41	-	-
24	.834	34.64	Av	.3	0	34.94	-	-	46	-11.06

Pk - Peak detector  
 Av - Average detection

## 10.2. EUT POWERED BY HOST PC VIA USB CABLE

### LINE 1 RESULTS



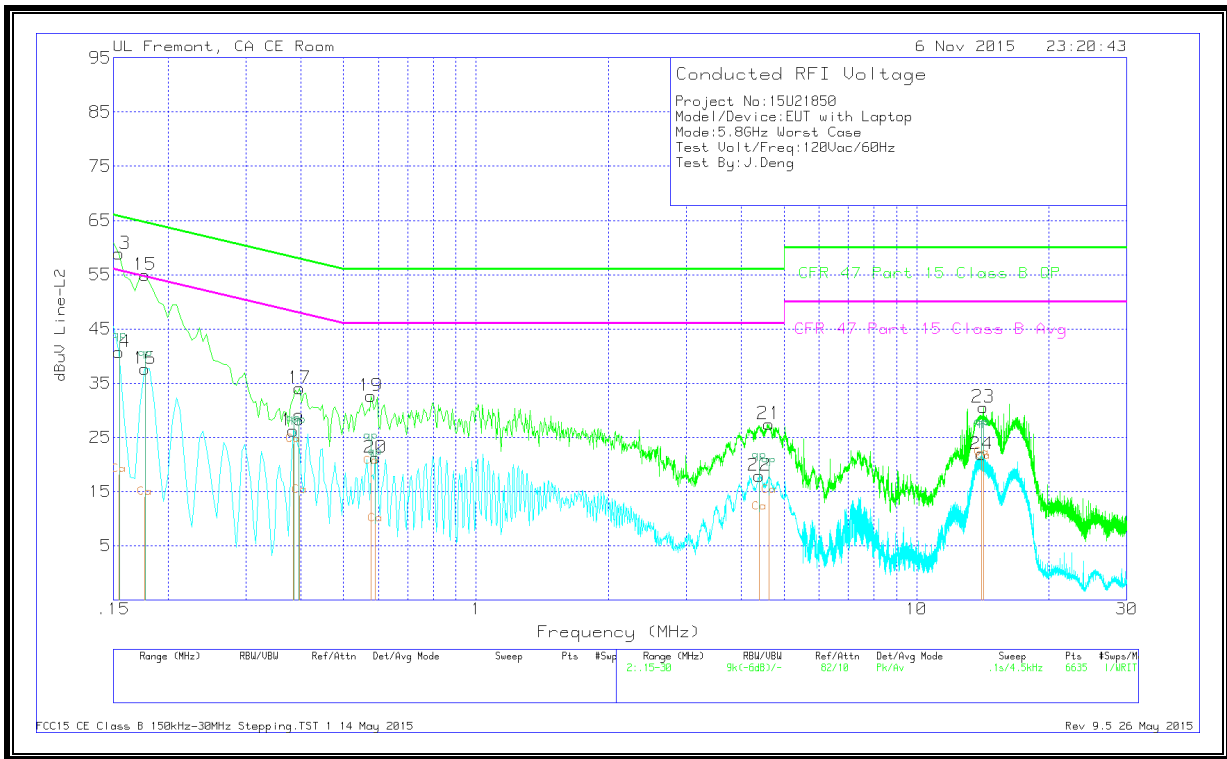
### WORST EMISSIONS

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	.1545	61.85	Pk	1.3	0	63.15	65.75	-2.6	-	-
	.15563	42.12	Qp	1.3	0	43.42	65.69	-22.27	-	-
2	.1725	40.23	Av	1.1	0	41.33	-	-	54.84	-13.51
3	.204	51.48	Pk	.9	0	52.38	63.45	-11.07	-	-
4	.2085	33.46	Av	.9	0	34.36	-	-	53.26	-18.9
5	.411	33.25	Pk	.4	0	33.65	57.63	-23.98	-	-
6	.411	22.82	Av	.4	0	23.22	-	-	47.63	-24.41
7	.924	32.53	Pk	.3	0	32.83	56	-23.17	-	-
8	.9555	15.86	Av	.3	.1	16.26	-	-	46	-29.74
9	9.717	28.47	Pk	.2	.2	28.87	60	-31.13	-	-
10	9.3615	15.29	Av	.2	.2	15.69	-	-	50	-34.31
11	13.749	30.56	Pk	.2	.2	30.96	60	-29.04	-	-
12	13.749	18.59	Av	.2	.2	18.99	-	-	50	-31.01

Pk - Peak detector  
 Av - Average detection  
 Qp - Quasi-Peak detector

**LINE 2 RESULTS**



**WORST EMISSIONS**

Range 2: Line-L2 .15 - 30MHz

Marker	Frequenc y (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
13	.1545	57.47	Pk	1.4	0	58.87	65.75	-6.88	-	-
14	.1545	39.32	Av	1.4	0	40.72	-	-	55.75	-15.03
15	.177	53.75	Pk	1.2	0	54.95	64.63	-9.68	-	-
16	.177	36.45	Av	1.2	0	37.65	-	-	54.63	-16.98
17	.3975	33.64	Pk	.4	0	34.04	57.91	-23.87	-	-
18	.384	25.75	Av	.5	0	26.25	-	-	48.19	-21.94
19	.5775	32.34	Pk	.3	0	32.64	56	-23.36	-	-
20	.591	20.94	Av	.3	0	21.24	-	-	46	-24.76
21	4.623	27.16	Pk	.2	.1	27.46	56	-28.54	-	-
22	4.398	17.66	Av	.2	.1	17.96	-	-	46	-28.04
23	14.172	30.14	Pk	.2	.2	30.54	60	-29.46	-	-
24	14.046	21.49	Av	.2	.2	21.89	-	-	50	-28.11

Pk - Peak detector  
 Av - Average detection