



**FCC 47 CFR PART 15 SUBPART E**

**CLASS II PERMISSIVE CHANGE**

**TEST REPORT**

**FOR**

**802.11a/b/g/n/ac WLAN + Bluetooth PCI-E Mini Card**

**MODEL NUMBER: BCM94352HMB**

**FCC ID: QDS-BRCM1068**

**REPORT NUMBER: 15U21620- E1V3**

**ISSUE DATE: January 15, 2016**

*Prepared for*

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**NVLAP LAB CODE 200065-0**

Revision History

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V1	12/23/2015	Initial Issue	H. Mustapha
V2	01/06/16	Updated Section 5.5	H. Mustapha
V3	01/15/16	Updated section 2 and 7 to indicate the latest edition of UNII KDB 789033	H. Mustapha

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** BROADCOM CORPORATION  
190 MATHILDA PLACE  
SUNNYVALE, CA 94086, U.S.A.

**EUT DESCRIPTION:** 802.11a/b/g/n/ac WLAN + Bluetooth PCI-E Mini Card

**MODEL:** BCM94352HMB

**SERIAL NUMBER:** Radiated and Conducted S/N: 001018A9412E

**DATE TESTED:** AUG 31, 2015 – SEPT 3, 2015  
AUG 2, 2012 – SEPT 4, 2015

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

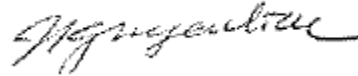
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement 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:

Tested By:

*Huda Mustapha*



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EMC ENGINEER  
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FRANK IBRAHIM  
PROGRAM MANAGER  
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 06-96, FCC KDB 789033 D02 v01r01 and ANSI C63.10-2013.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

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 checked="" type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F
	<input 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:

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

### 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	$\pm 3.52$ dB
Radiated Disturbance, 30 to 1000 MHz	$\pm 4.94$ dB
Radiated Disturbance, 1 to 6 GHz	$\pm 3.86$ dB
Radiated Disturbance, 6 to 18 GHz	$\pm 4.23$ dB
Radiated Disturbance, 18 to 26 GHz	$\pm 5.30$ dB
Radiated Disturbance, 26 to 40 GHz	$\pm 5.23$ dB

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



## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n/ac WLAN + Bluetooth PCI-E Mini Card.

The radio module is manufactured by Broadcom.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Power, Chain 0 (dBm)	Power, Chain 1 (dBm)	Output Power (dBm)	Output Power (mW)
<b>5.8 GHz band, 1TX</b>					
5745-5825	802.11a Legacy	19.42	N/A	19.42	87.50
5745-5825	802.11n HT20	19.10	N/A	19.10	81.28
5755-5795	802.11n HT40	19.62	N/A	19.62	91.62
5775	802.11ac VHT80	14.10	N/A	14.10	25.70
<b>5.8 GHz band, 2TX</b>					
5745-5825	802.11n HT20 CDD	18.85	19.67	22.29	169.42
5755-5795	802.11n HT40 CDD	18.95	19.55	22.27	168.68
5775	802.11ac VHT80 CDD	12.87	13.05	15.97	39.55

#### List of test reduction and modes covering other modes:

Antenna Port Testing		
Band	Mode	Covered by
5 GHz bands	802.11a Legacy 1TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11a CDD 2TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT20 1TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT40 1TX	802.11n HT40 CDD 2TX
5 GHz bands	802.11ac VHT80 1TX	802.11ac VHT80 CDD 2TX

Radiated Testing		
Band	Mode	Covered by
5 GHz bands	802.11a Legacy 1TX (Harmonics)	802.11n HT20 CDD 2TX (Harmonics)
5 GHz bands	802.11a CDD 2TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT20 1TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT40 1TX (Harmonics)	802.11n HT40 CDD 2TX (Harmonics)
5 GHz bands	802.11ac VHT80 1TX (Harmonics)	802.11ac VHT80 CDD 2TX (Harmonics)

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT utilizes the following antennas:

Antenna Type	Model	Peak gain (5725-5850MHz) @5745MHz
802.11 5GHz WLAN, Bluetooth Antenna	HMT05/HFT17-DL07	5.8 dBi

### 5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 6.30.0.0.

The test utility software used during testing was Broadcom MTool, rev. 6.30.RC307.1166.

### 5.5. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The purpose of this C2PC is to upgrade the device described under section 5.1 of this report to the new rules per KDB 789033 D02 v01.

For UNII-1, UNII-2 and UNII-2C bands, we have reviewed the original test report (report no. 12U14473-2E) and are hereby attesting that all the current technical requirements are still met and all applicable test procedures remain the same. Therefore, the original test report is still applicable and no additional testing is done.

## 5.6. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module installed in a test jig board connected to a host Laptop PC.

The EUT can only be setup in desktop orientation; therefore, all radiated testing was performed with the EUT in desktop orientation.

Radiated emission below 1GHz and above 18GHz were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

For all modes with single chain SISO, chain 1 (J1) was used for 5GHz band as worst case.

For 5GHz, band edge preliminary investigation showed that horizontal polarization was worst case for CDD and SISO modes, therefore only horizontal polarization was tested for these modes.

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  
802.11ac VHT80 mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop	DELL	Latitude E6400	17193107269
AC / DC Adapter	DELL	DA90PM111	N/A
PCle. Card	Broadcom	N/A	N/A

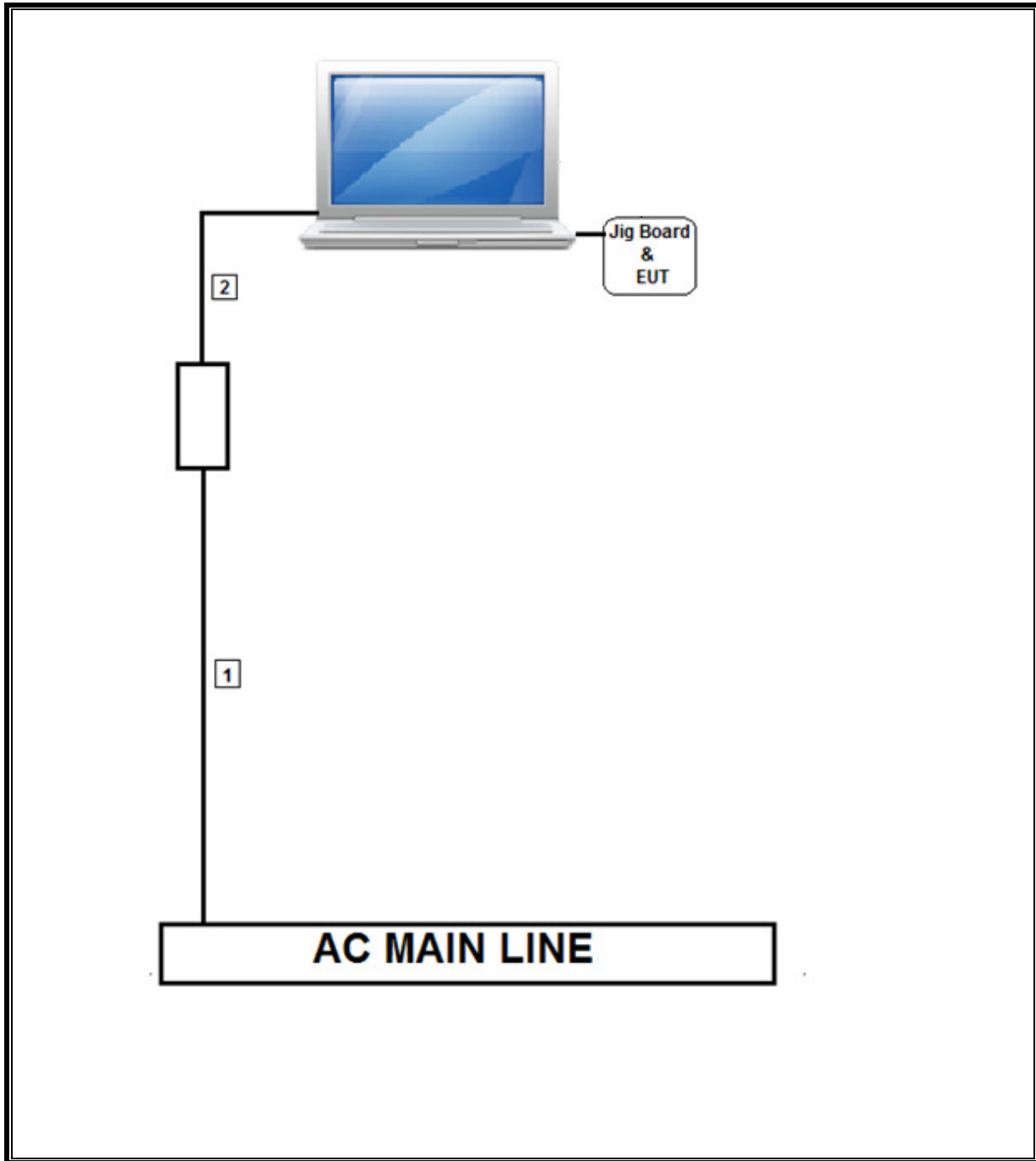
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Shielded	1.5m	NA
2	DC	1	DC	Unshielded	1.5m	Ferrite at laptop's end

### TEST SETUP

The EUT was connected to a host laptop via PCIE card. Test software exercised the EUT.

**SETUP DIAGRAM FOR TESTS**



## 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	T No.	Cal Date	Cal Due
Radiated Software	UL	UL EMC	Ver 9.5, June 6, 2015		
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012		
Bilog Antenna 30-1000MHz	Sunol	JB1	477	06/10/15	06/10/16
Horn Antenna 1-18GHz	ETS	3117	136	01/15/15	01/15/16
Horn Antenna 1-18GHz	ETS	3117	345	03/03/15	03/03/16
Horn Antenna 18-26GHz	ARA	SWH-28	98	12/17/14	12/17/15
Horn Antenna 26.5- 40GHz	ARA	MWH-2640/B	90	07/28/15	07/28/16
Preamp 10kHz-1000MHz	Sonoma	310	300	11/01/14	11/01/15
Preamp 1-8GHz	Miteq	AMF-4D-010008	782	11/18/14	11/18/15
Preamp 1-26.5GHz	Agilent	8449B	404	04/13/15	04/13/16
Amplifier, 26-40GHz	Miteq	NSP4000-SP2	88	04/07/15	04/07/16
Spectrum Analyzer 3kHz - 44GHz	Agilent	N9030A	907	05/15/15	05/15/16
Spectrum Analyzer 9kHz - 40GHz	HP	8564E	106	08/14/15	08/14/16
Coaxial Switchbox	Agilent	SP6T	927	03/03/15	03/03/16
3GHz HPF	Micro-Tronics	HPM17543	487	01/31/15	01/31/16
EMI Test Receiver	Rohde & Schwarz	ECSI 7	212	08/07/15	08/07/16
Spectrum Analzer 3Hz to 44GHz	Agilent	E4440A	123	10/28/14	10/28/15
Power Meter	Agilent	N1911A	T1268	06/07/15	06/07/16
Power Sensor	Agilent	N1921A	1223	06/07/15	02/06/16

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## 7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v01r01, Section B

26 dB Emission BW: KDB 789033 D02 v01r01, Section C

Conducted Output Power: KDB 789033 D02 v01r01, Section E.3.b (Method PM-G), and KDB 662911 D01 v02r01.

Power Spectral Density: KDB 789033 D02 v01r01, Section F, and KDB 662911 D01 v02r01.

Unwanted emissions in restricted bands: KDB 789033 D02 v01r01, Sections G.2, G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r01, Sections G.2, G.3, G.4, and G.5

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

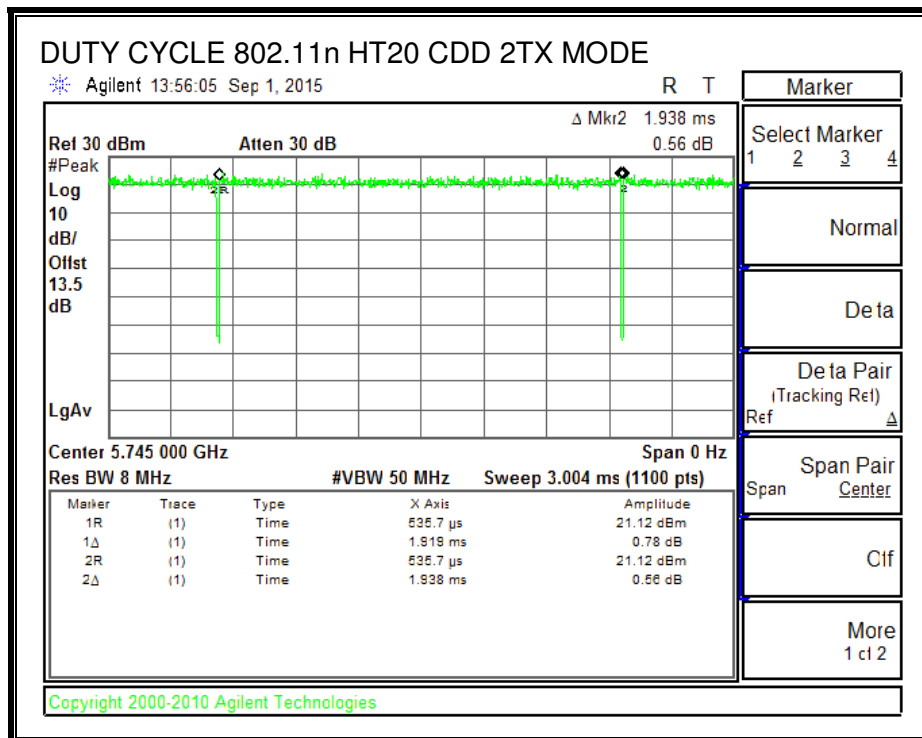
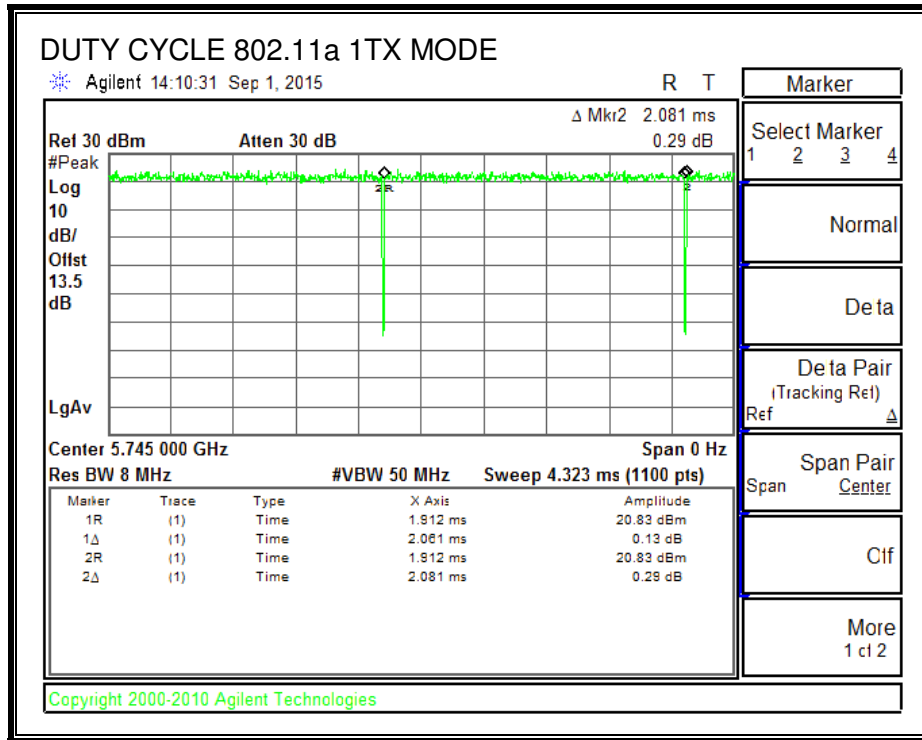
None; for reporting purposes only.

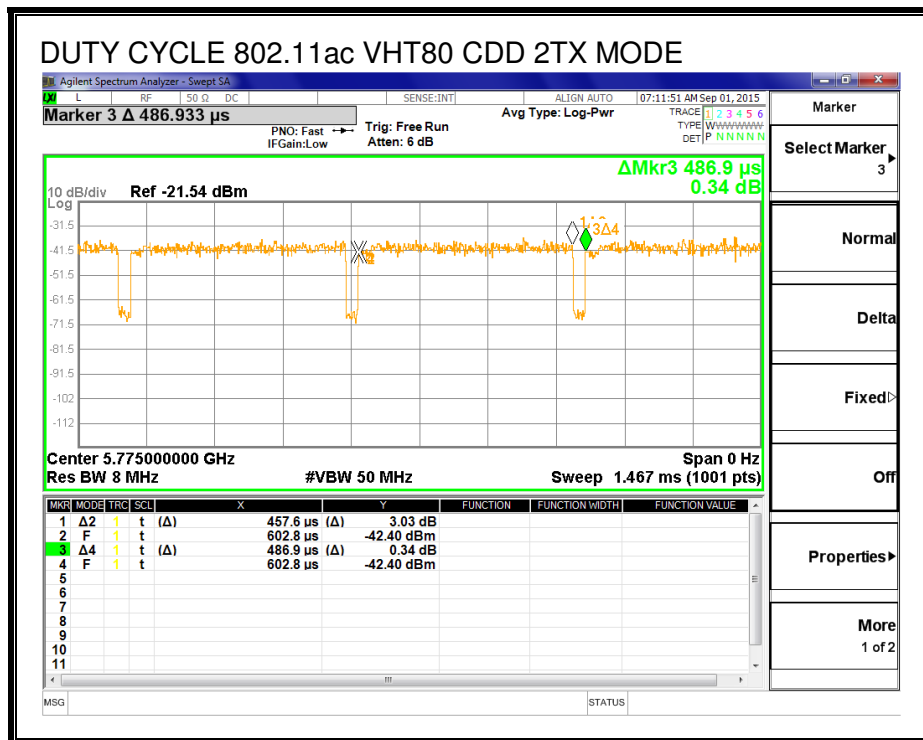
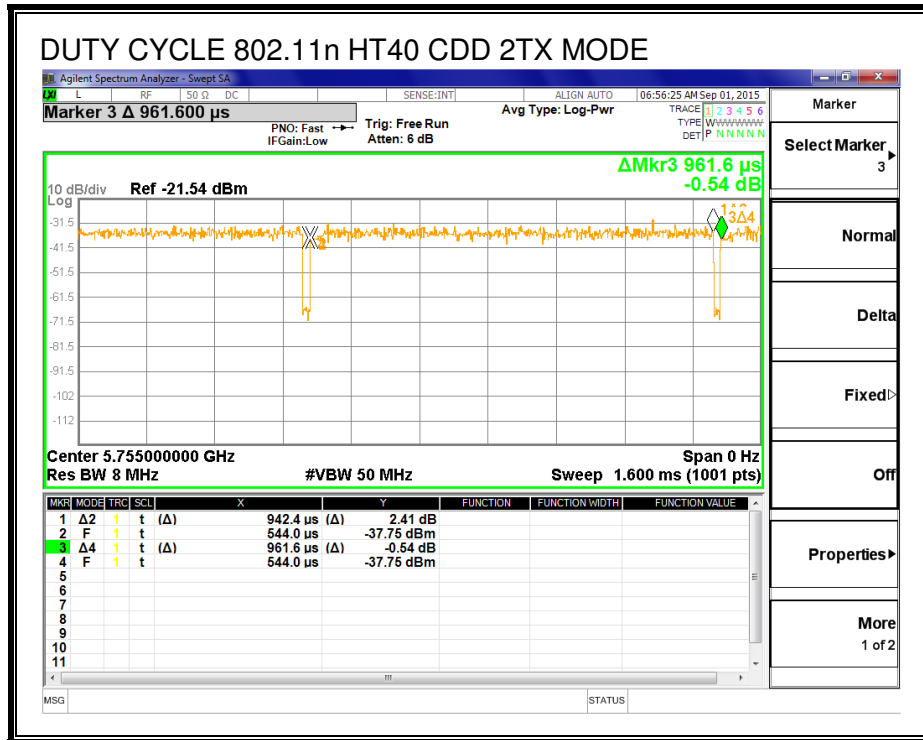
#### ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
<b>5GHz Band</b>						
802.11a 1TX	2.061	2.081	0.990	99.04%	0.00	0.010
802.11n HT20 CDD 2TX	1.919	1.938	0.990	99.02%	0.00	0.010
802.11n HT40 CDD 2TX	0.9424	0.9616	0.980	98.00%	0.00	0.010
802.11ac VHT80 CDD 2TX	0.4576	0.4869	0.940	93.98%	0.27	2.185



## 8.2. DUTY CYCLE PLOTS





### **8.3. 802.11a LEGACY MODE IN THE 5.8 GHz BAND**

#### **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**

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

**RESULTS**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	5.80	30.00
Mid	5785	5.80	30.00
High	5825	5.80	30.00

**Output Power Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.88	15.88	30.00	-14.12
Mid	5785	19.35	19.35	30.00	-10.65
High	5825	19.42	19.42	30.00	-10.58

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## **8.4. 802.11n HT20 CDD SISO MODE IN THE 5.8 GHz BAND**

### **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**

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

**RESULTS**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	5.80	30.00
High	5825	5.80	30.00

**Output Power Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	17.83	17.83	30.00	-12.17
High	5825	19.10	19.10	30.00	-10.90

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.5. 802.11n HT20 CDD 2Tx MODE IN THE 5.8 GHz BAND

### 6 dB BANDWIDTH

#### LIMITS

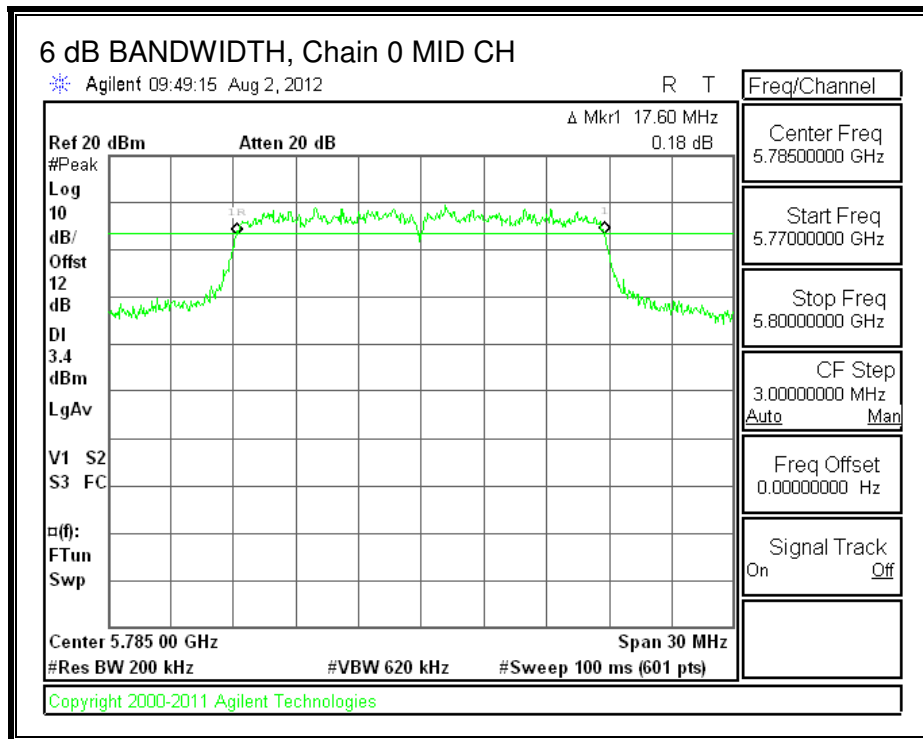
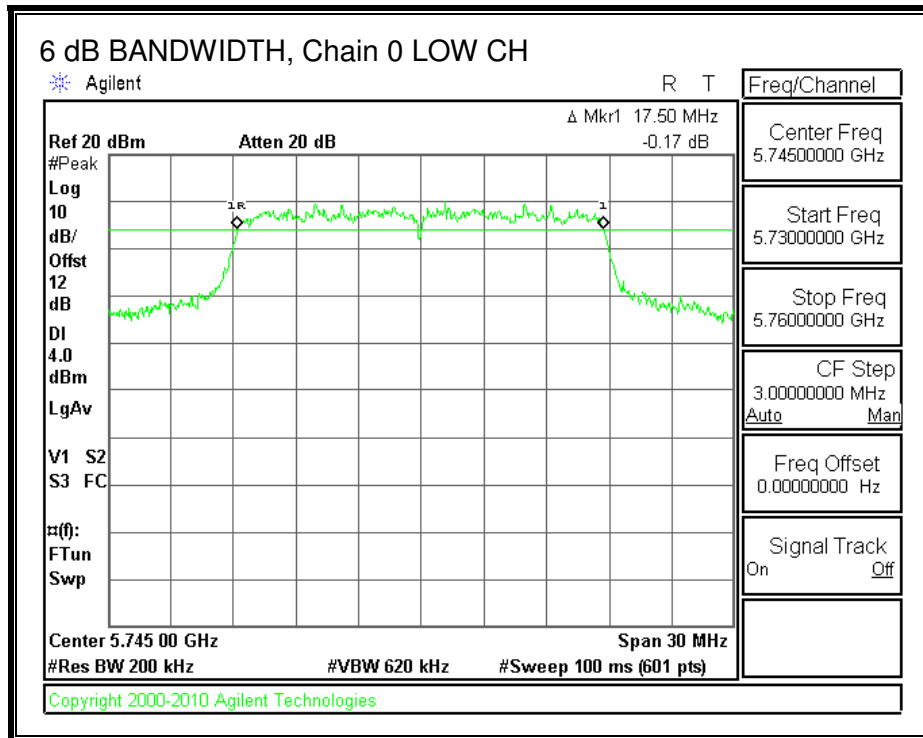
FCC §15.407 (e)

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

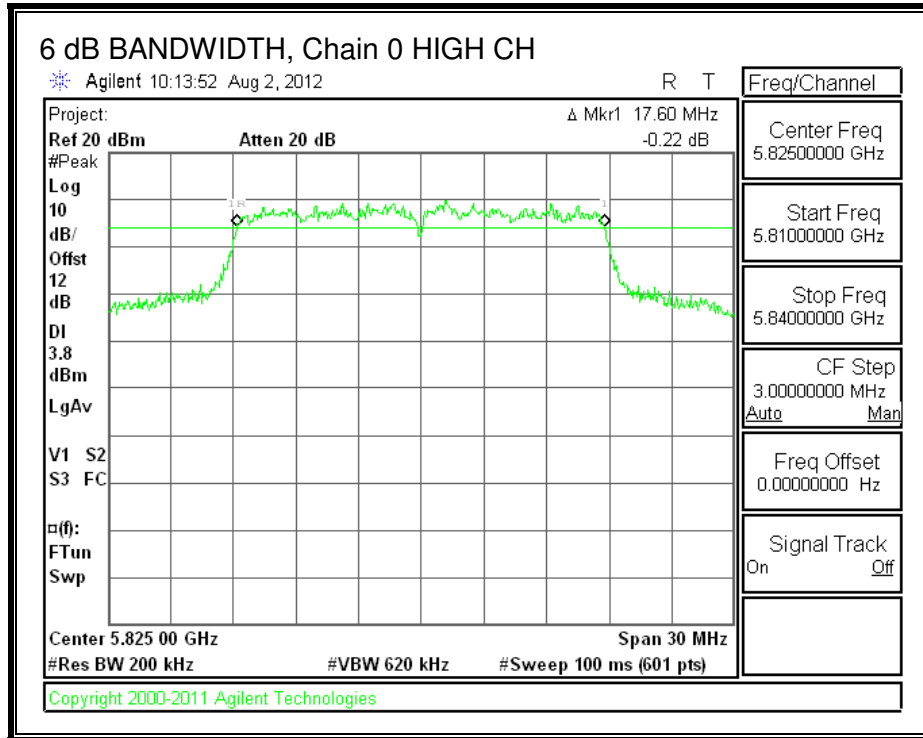
#### RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5745	17.50	17.60	0.5
Mid	5785	17.60	17.70	0.5
High	5825	17.60	17.70	0.5

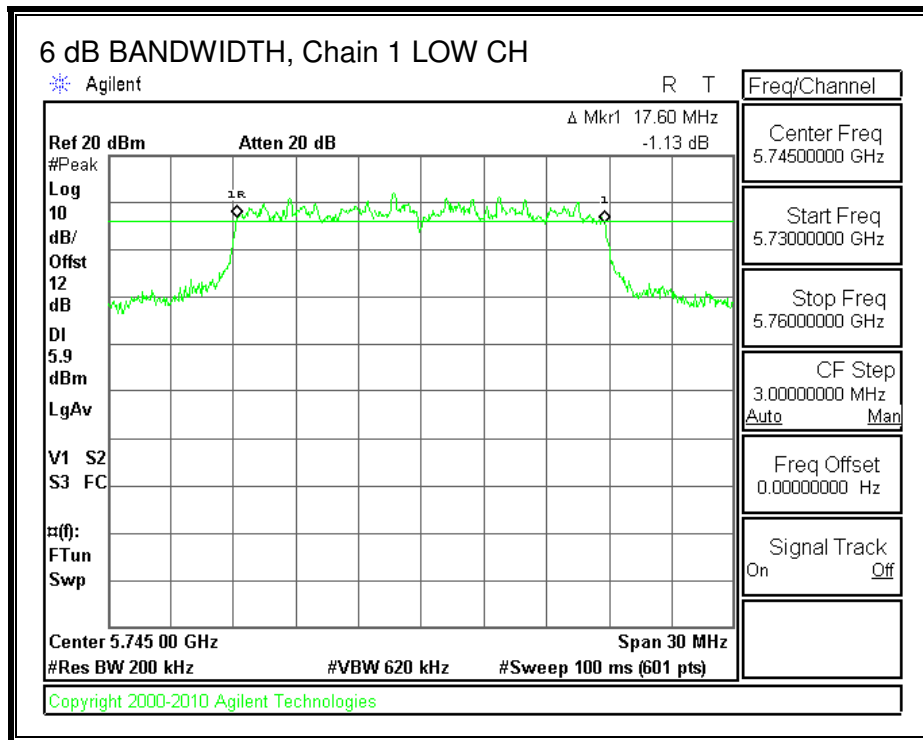
**6 dB BANDWIDTH, Chain 0**

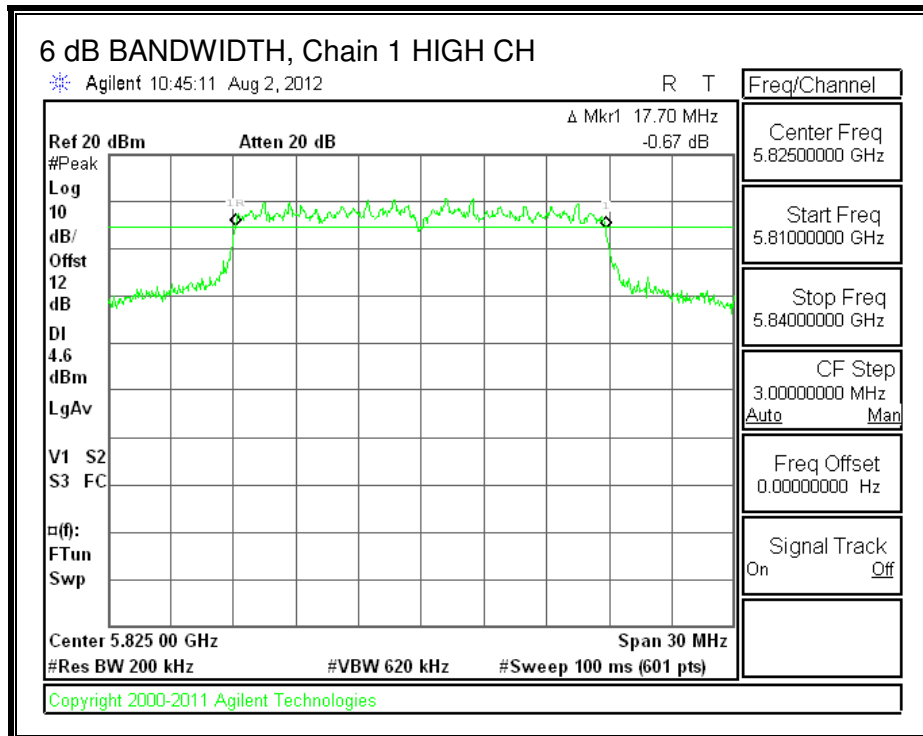
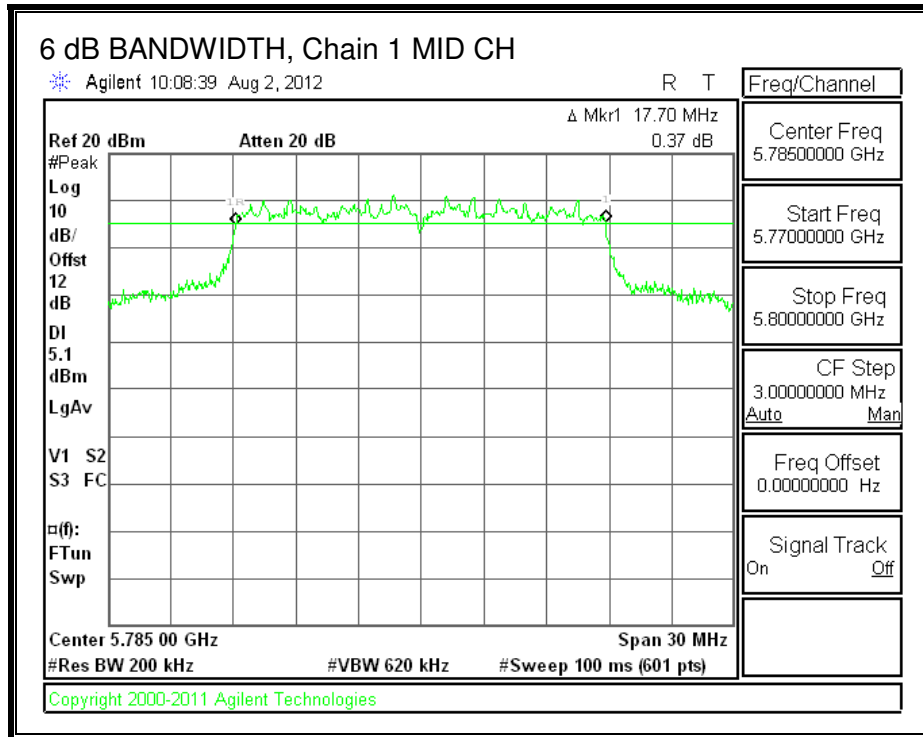






**6 dB BANDWIDTH, Chain 1**





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## **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**

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain, 5.8 dBi.

**RESULTS**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5745	5.80	30.00
Mid	5785	5.80	30.00
High	5825	5.80	30.00

**Output Power Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.07	16.10	18.63	30.00	-11.37
Mid	5785	18.85	19.67	22.29	30.00	-7.71
High	5825	18.71	18.87	21.80	30.00	-8.20

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## Maximum Power Spectral Density (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

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.80	3.01	8.81

**RESULTS**

**Antenna Gain and Limit**

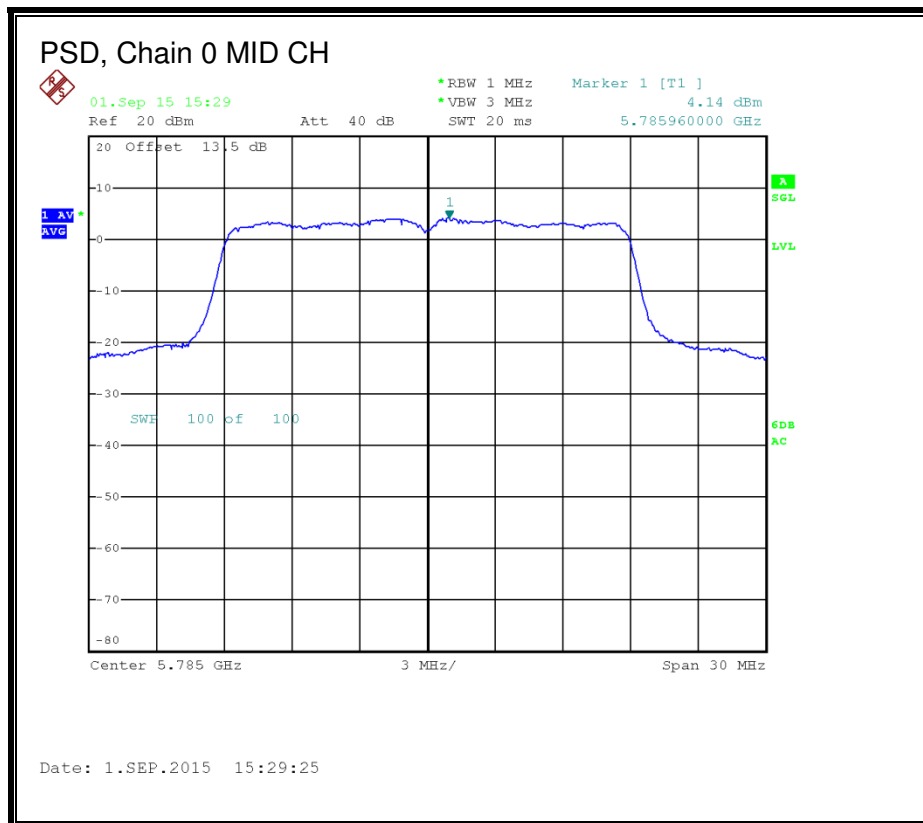
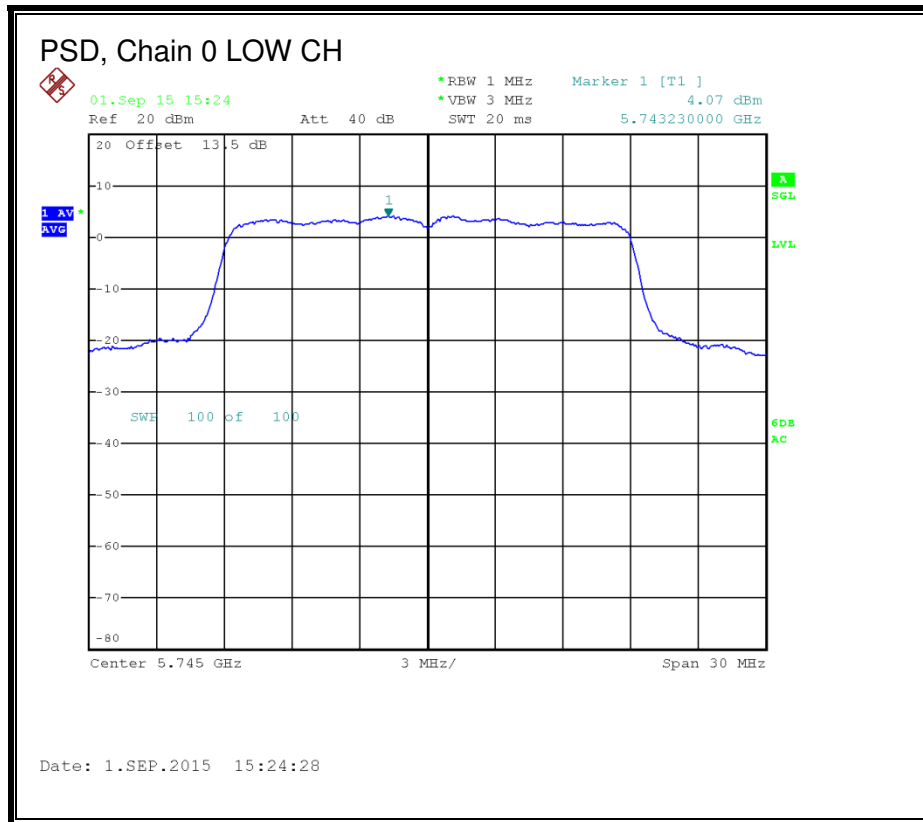
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	8.81	27.19
Mid	5785	8.81	27.19
High	5825	8.81	27.19

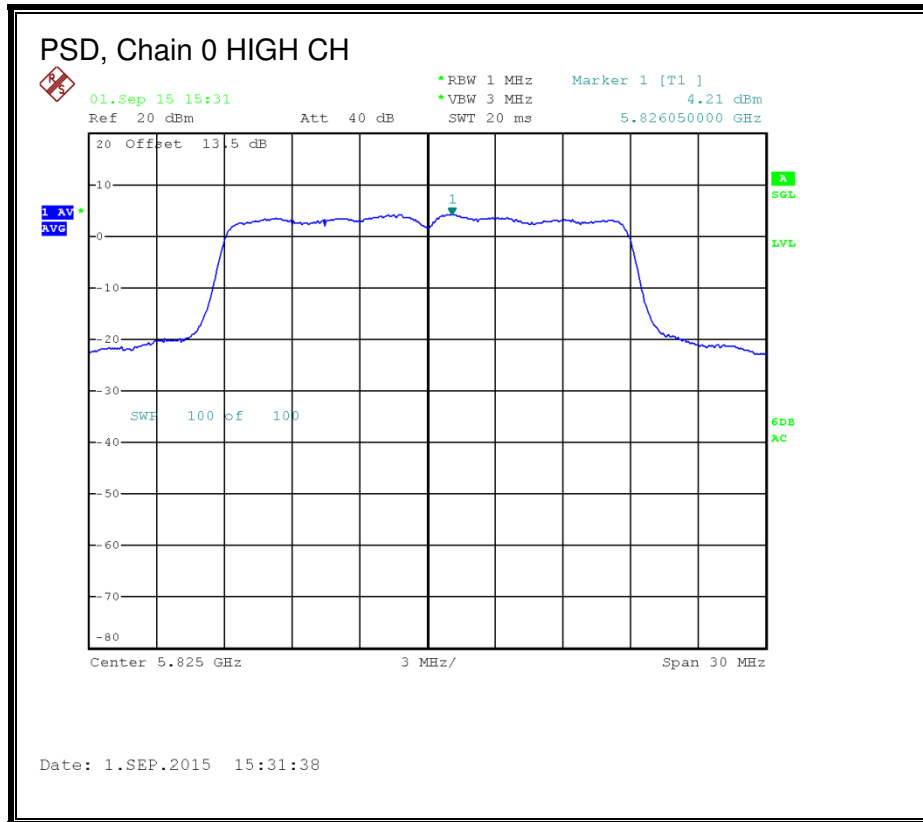
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd PSD</b>
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**PSD Results**

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	4.07	5.56	7.89	27.19	-19.30
Mid	5785	4.14	4.97	7.59	27.19	-19.60
High	5825	4.21	5.22	7.75	27.19	-19.44

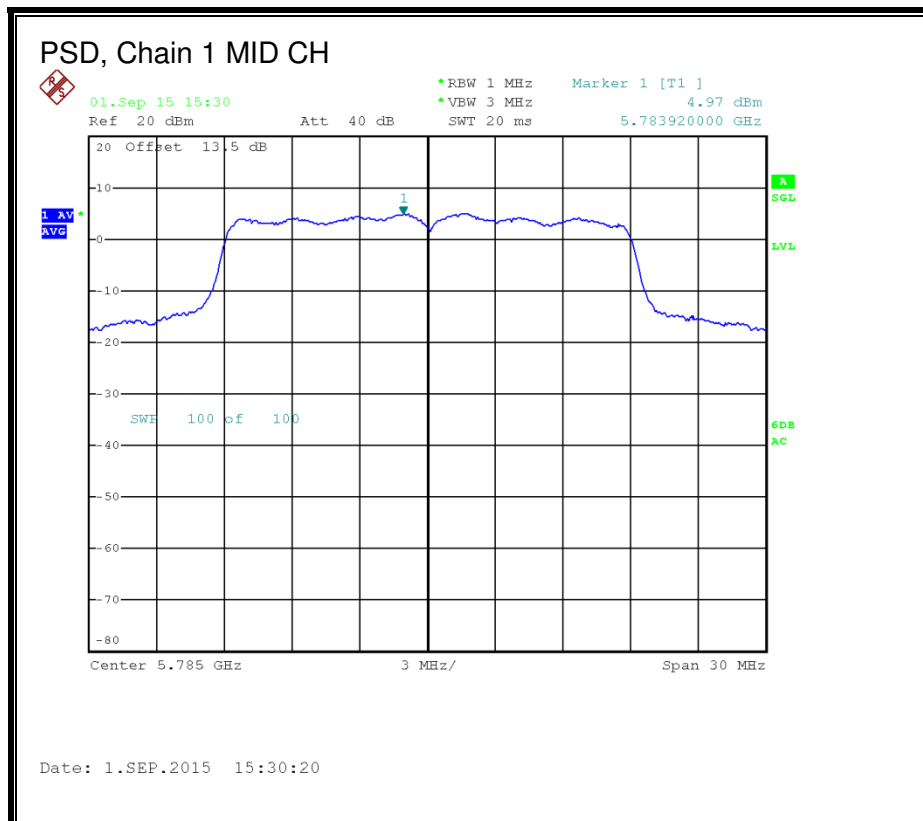
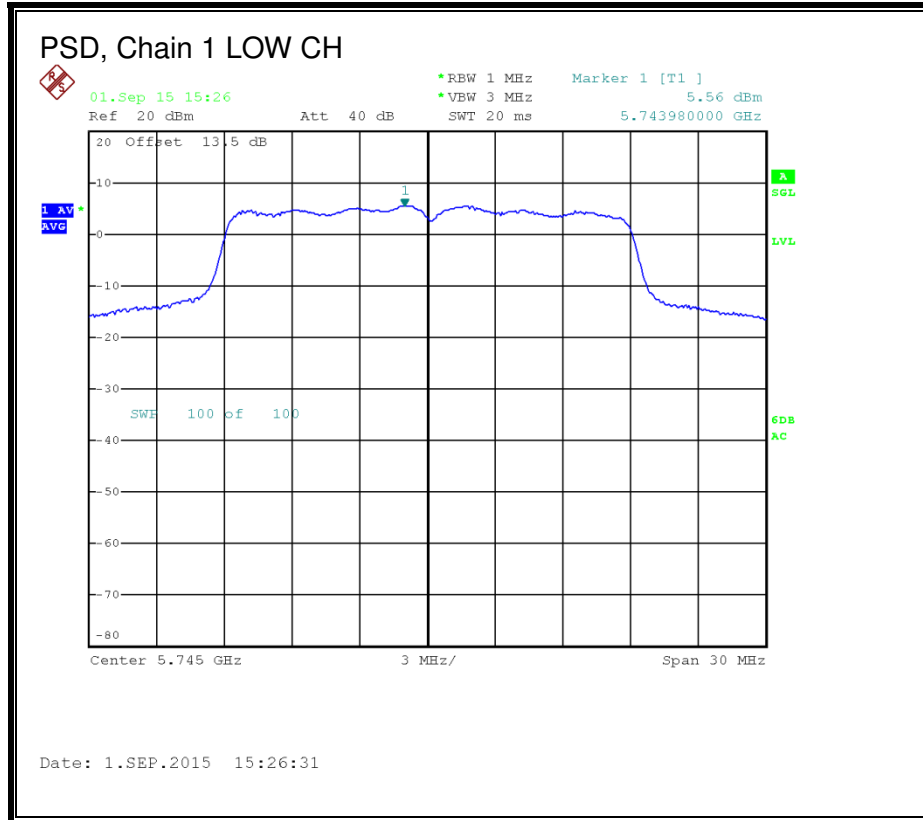
**PSD, Chain 0**

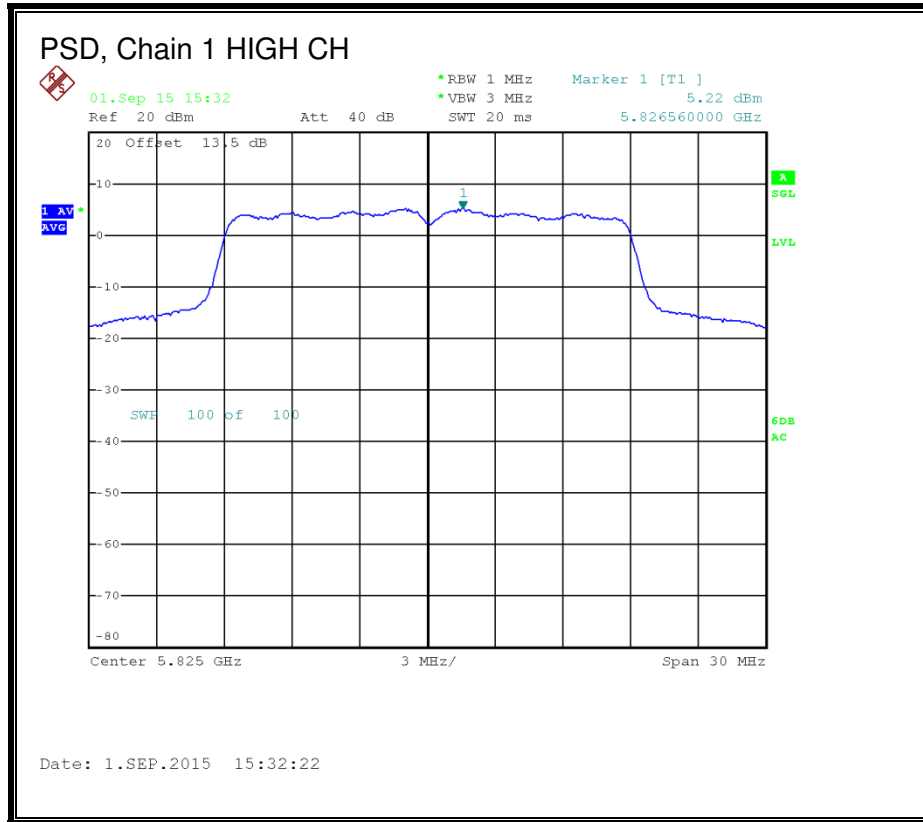






**PSD, Chain 1**





## 8.6. 802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

### 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

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

#### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	5.80	30.00
High	5795	5.80	30.00

#### Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	17.00	17.00	30.00	-13.00
High	5795	19.62	19.62	30.00	-10.38

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## 8.7. 802.11n HT40 CDD 2Tx MODE IN THE 5.8 GHz BAND

### 6 dB BANDWIDTH

#### LIMITS

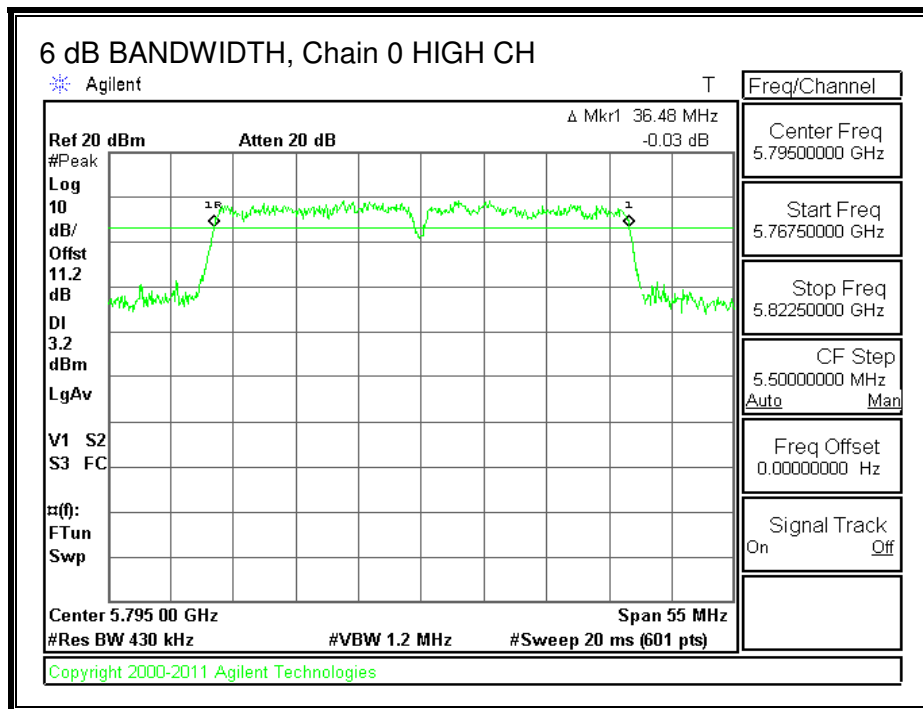
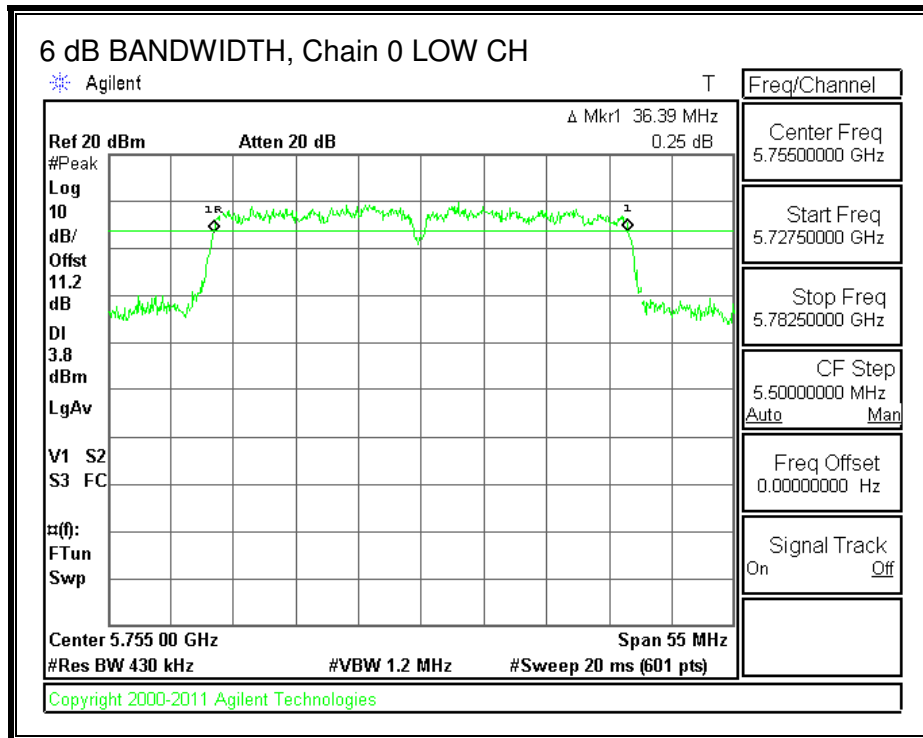
FCC §15.407 (e)

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

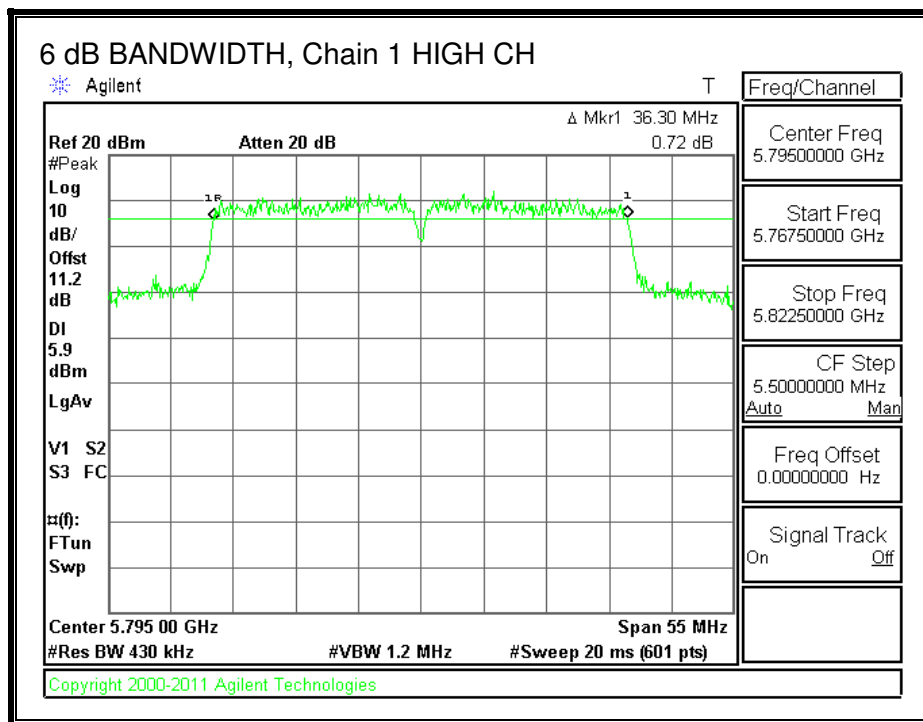
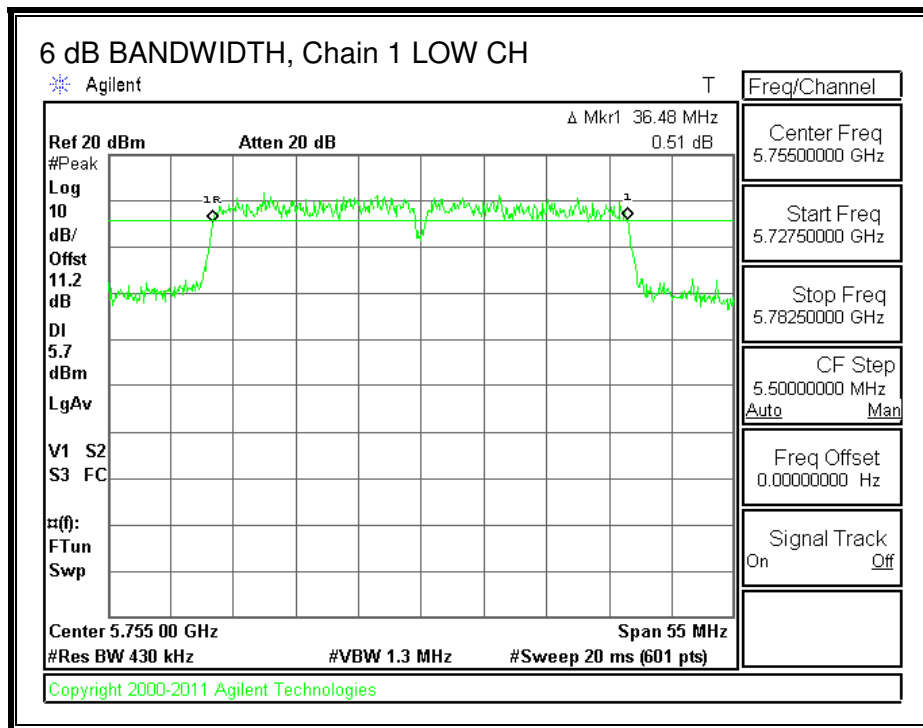
#### RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.39	36.48	0.5
High	5795	36.48	36.30	0.5

**6 dB BANDWIDTH, Chain 0**



**6 dB BANDWIDTH, Chain 1**



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## **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**

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain, 5.8 dBi.

**RESULTS**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	5.80	30.00
High	5795	5.80	30.00

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power</b>
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**Output Power Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	14.20	15.05	17.66	30.00	-12.34
High	5795	18.95	19.55	22.27	30.00	-7.73

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.



## Maximum Power Spectral Density (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

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.80	3.01	8.81

**RESULTS**

**Antenna Gain and Limit**

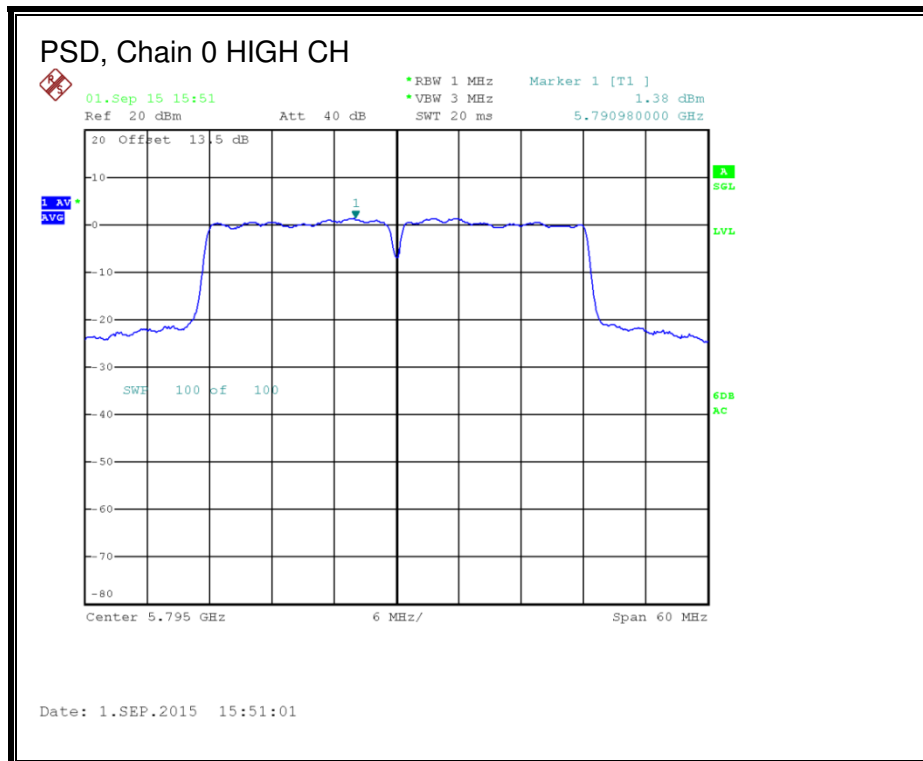
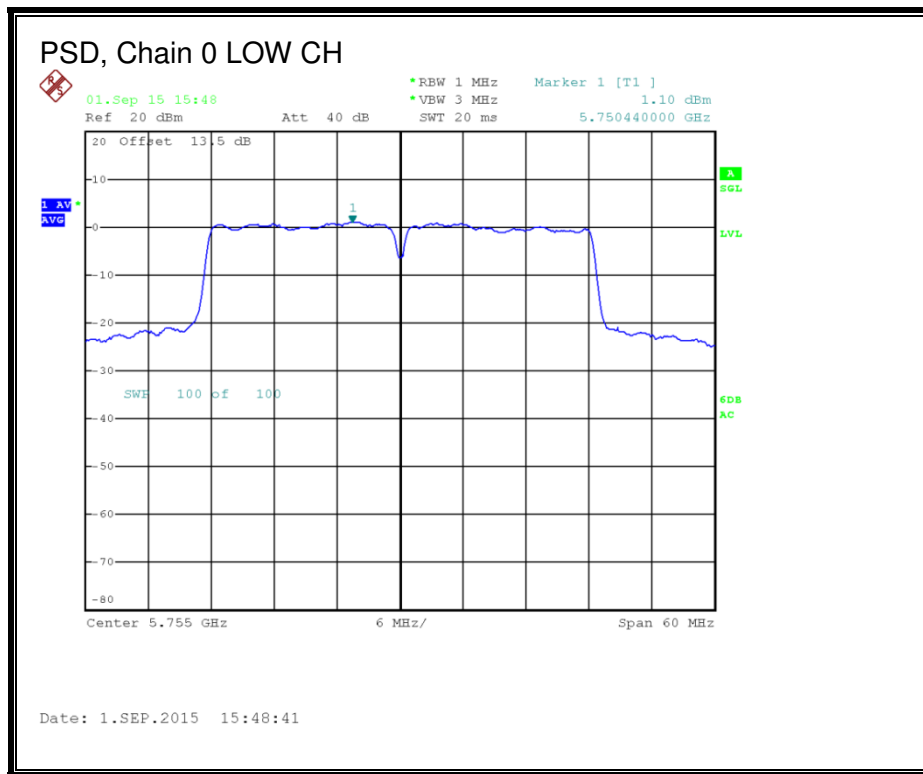
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	8.81	27.19
High	5795	8.81	27.19

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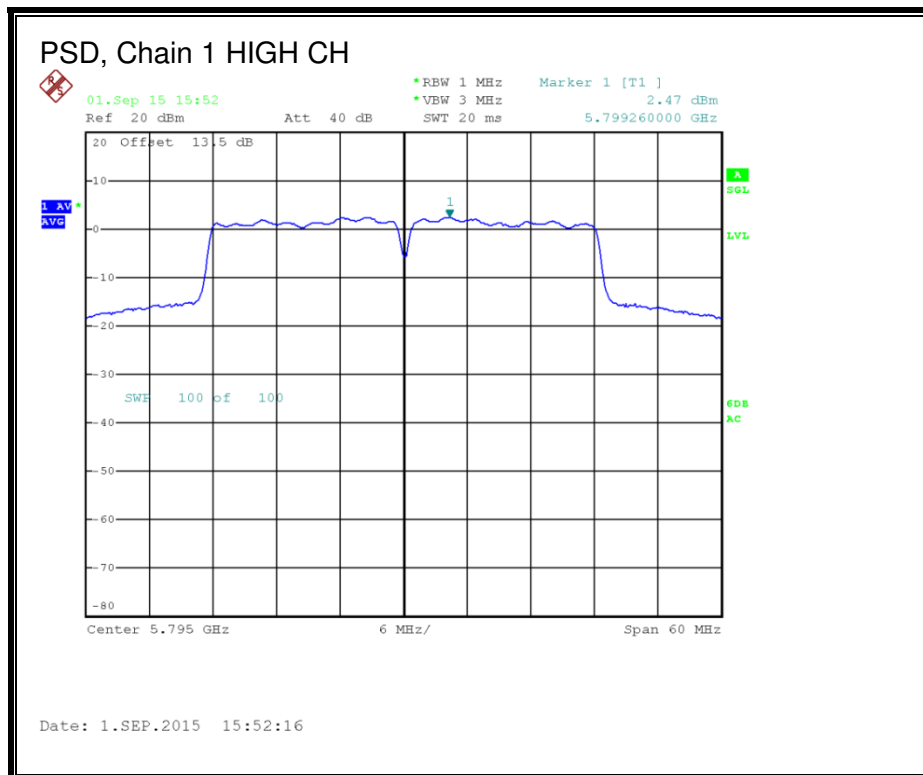
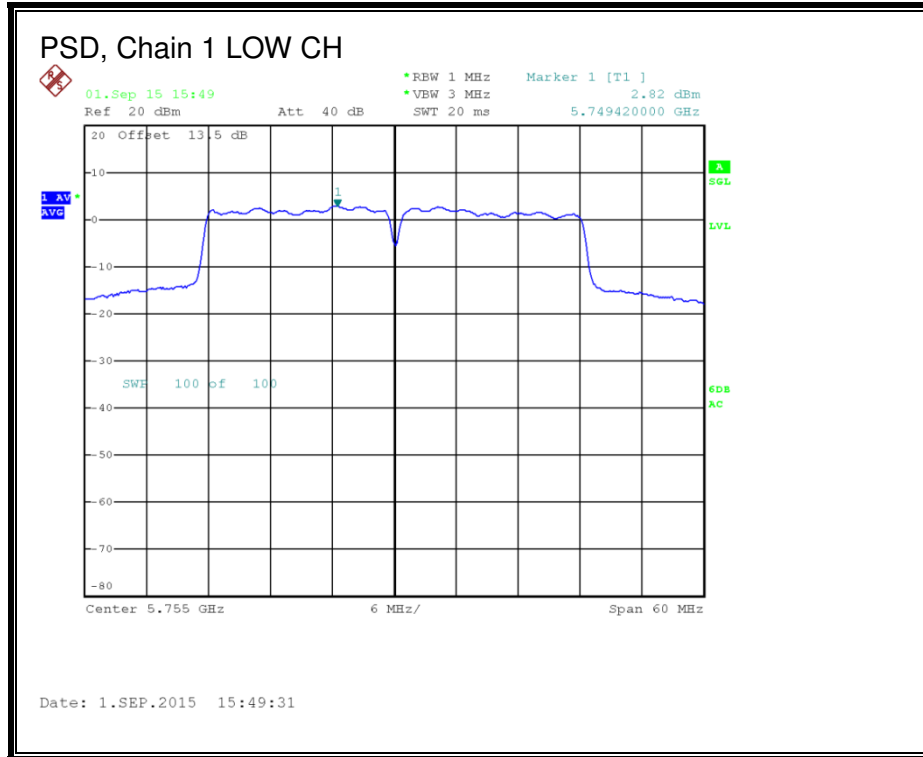
**PSD Results**

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	1.10	2.82	5.05	27.19	-22.14
High	5795	1.38	2.47	4.97	27.19	-22.22

**PSD, Chain 0**



**PSD, Chain 1**



## **8.8. 802.11ac VHT80 1Tx MODE IN THE 5.8 GHz BAND**

### **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**

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

**RESULTS**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Mid	5775	5.80	30.00

**Output Power Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	14.10	14.10	30.00	-15.90

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

**8.9. 802.11ac VHT80 CDD 2Tx MODE IN THE 5.8 GHz BAND**  
**6 dB BANDWIDTH**

**LIMITS**

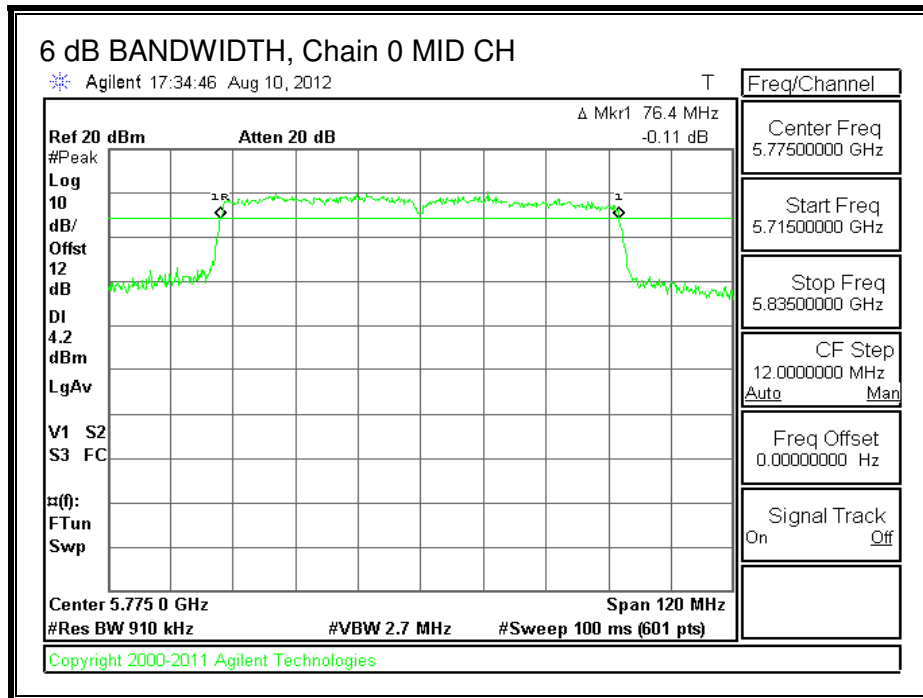
FCC §15.247 (a) (2)

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

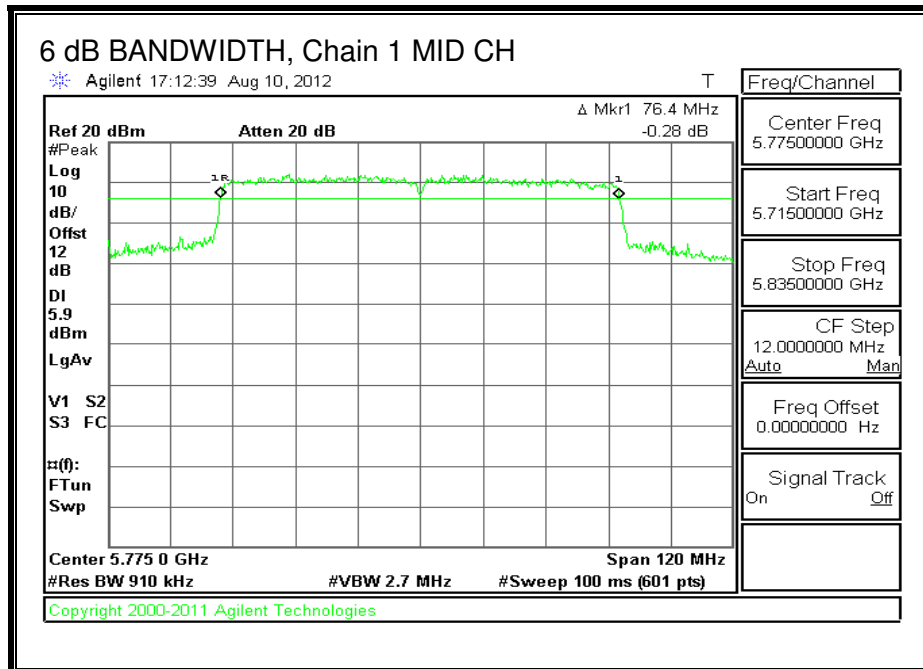
**RESULTS**

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Mid	5775	76.4	76.4	0.5

**6 dB BANDWIDTH, Chain 0**



**6 dB BANDWIDTH, Chain 1**





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## **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**

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain, 5.8 dBi.

**RESULTS**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Mid	5775	5.80	30.00

**Output Power Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	12.87	13.05	15.97	30.00	-14.03

**Note:** the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

## Maximum Power Spectral Density (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

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.80	3.01	8.81

**RESULTS**

**Antenna Gain and Limit**

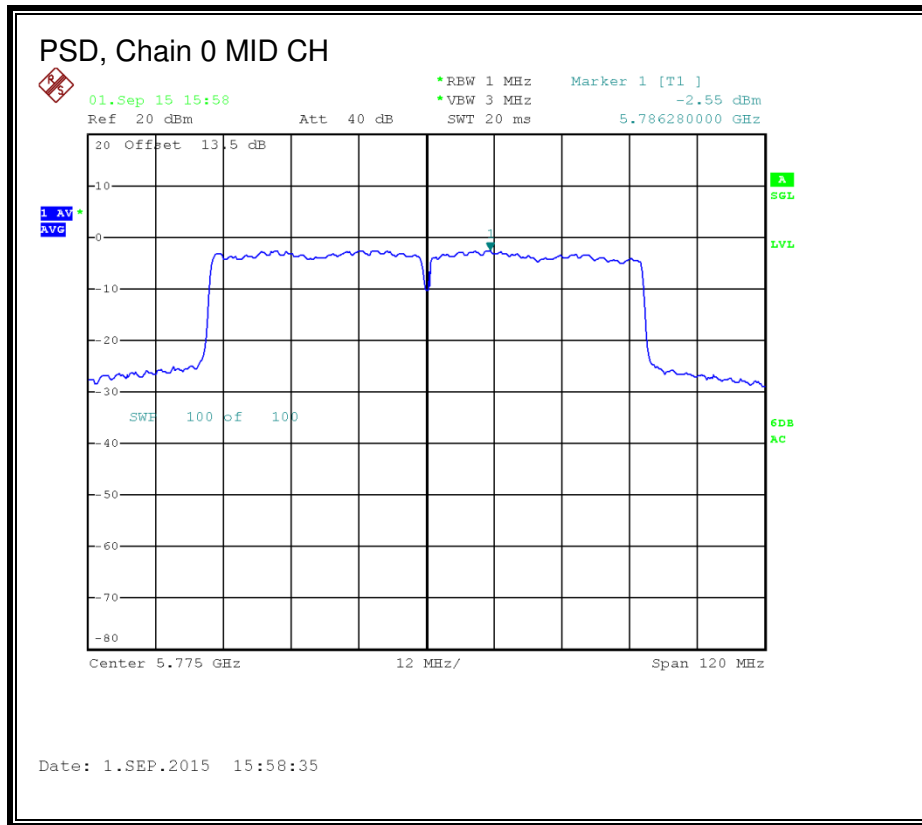
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Mid	5775	8.81	27.19

<b>Duty Cycle CF (dB)</b>	0.27	<b>Included in Calculations of Corr'd PSD</b>
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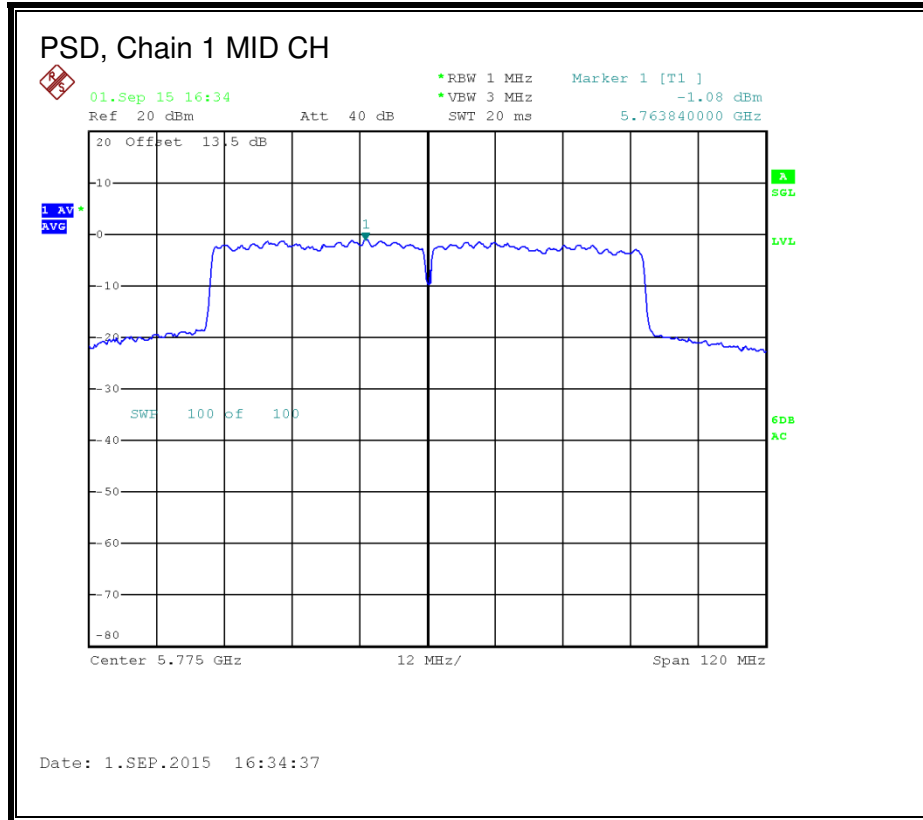
**PSD Results**

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5775	-2.55	-1.08	1.53	27.19	-25.66

**PSD, Chain 0**



**PSD, Chain 1**



## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE

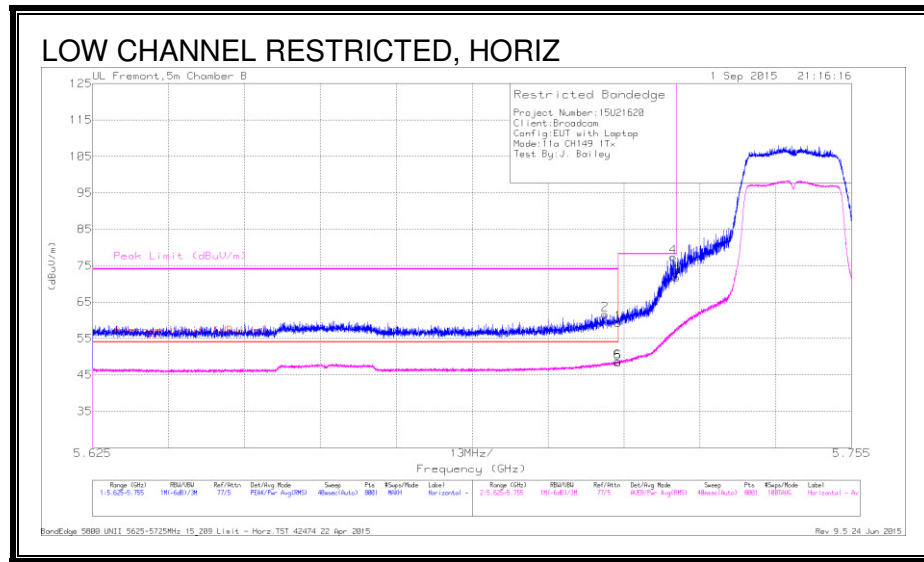
#### LIMITS

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

## 9.2. TX ABOVE 1 GHz 802.11a 1Tx MODE IN THE 5.8 GHz BAND

### RESTRICTED BANDEDGE (LOW CHANNEL)



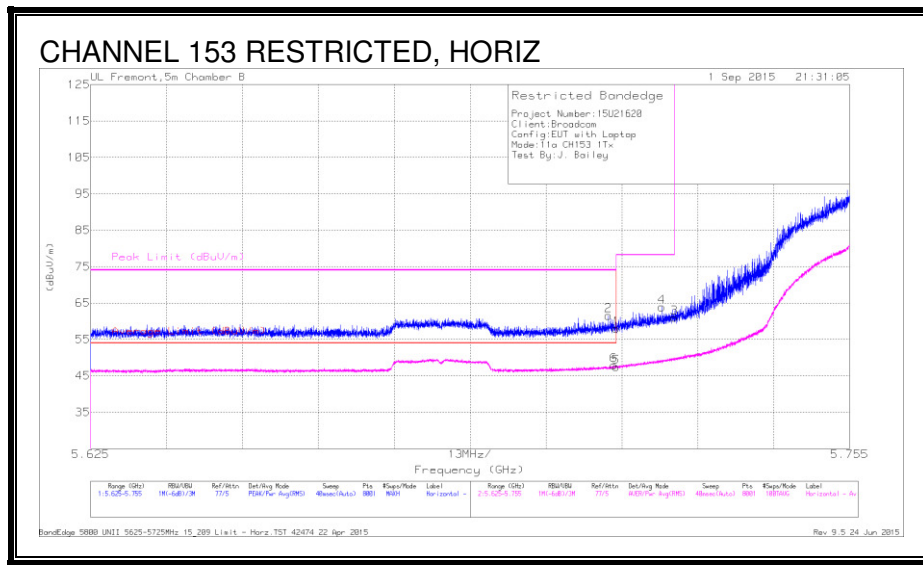
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dBm)	Bypass (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.713	19.35	Pk	35	7.3	61.65	-	-	74	-12.35	95	266	H
1	5.715	16.98	Pk	35	7.3	59.28	-	-	74	-14.72	95	266	H
5	5.715	5.97	RMS	35	7.3	48.27	54	-5.73	-	-	95	266	H
6	5.715	6.39	RMS	35	7.3	48.69	54	-5.31	-	-	95	266	H
4	5.724	34.98	Pk	35	7.4	77.38	-	-	78.2	-0.82	95	266	H
3	5.725	29.37	Pk	35	7.4	71.77	-	-	78.2	-6.43	95	266	H

Pk - Peak detector  
 RMS - RMS detection



**RESTRICTED BANDEGE (CHANNEL 153)**

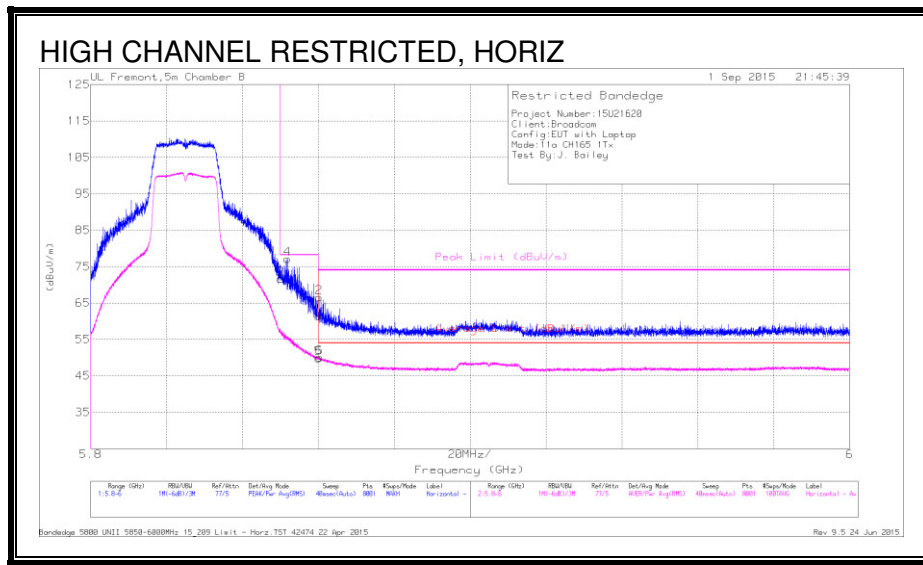


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	19.23	Pk	35	7.3	61.53	-	-	74	-12.47	94	262	H
1	5.715	15.71	Pk	35	7.3	58.01	-	-	74	-15.99	94	262	H
5	5.715	5.09	RMS	35	7.3	47.39	54	-6.61	-	-	94	262	H
6	5.715	5.59	RMS	35	7.3	47.89	54	-6.11	-	-	94	262	H
4	5.723	21.49	Pk	35	7.4	63.89	-	-	78.2	-14.31	94	262	H
3	5.725	18.58	Pk	35	7.4	60.98	-	-	78.2	-17.22	94	262	H

Pk - Peak detector  
 RMS - RMS detection

**RESTRICTED BANDEDGE (HIGH CHANNEL)**



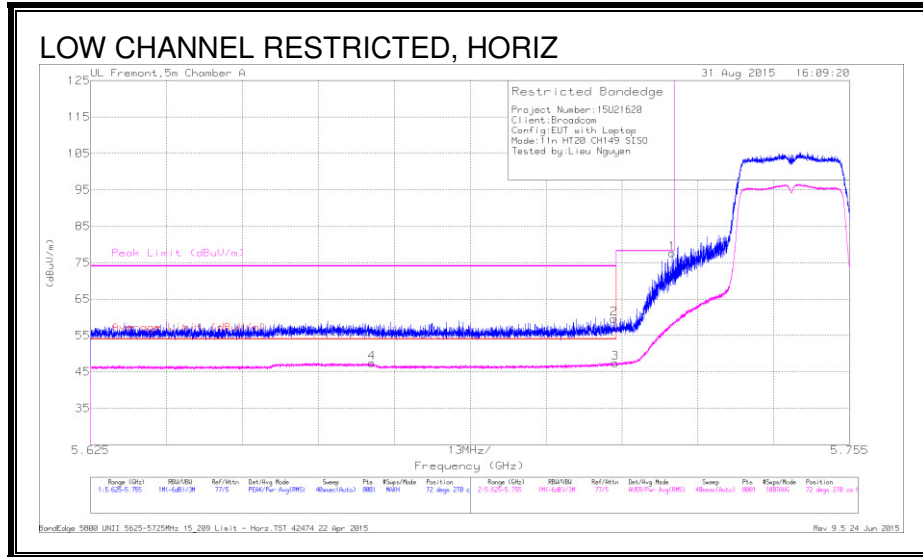
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	28.77	Pk	35.4	7.5	71.67	-	-	78.2	-6.53	97	257	H
4	5.852	34.3	Pk	35.4	7.4	77.1	-	-	78.2	-1.1	97	257	H
1	5.86	18.48	Pk	35.4	7.5	61.38	-	-	74	-12.62	97	257	H
2	5.86	23.66	Pk	35.4	7.5	66.56	-	-	74	-7.44	97	257	H
5	5.86	6.93	RMS	35.4	7.5	49.83	54	-4.17	-	-	97	257	H
6	5.86	7.2	RMS	35.4	7.5	50.1	54	-3.9	-	-	97	257	H

Pk - Peak detector  
 RMS - RMS detection

### 9.3. TX ABOVE 1 GHz 802.11n HT20 1Tx MODE IN THE 5.8 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL)

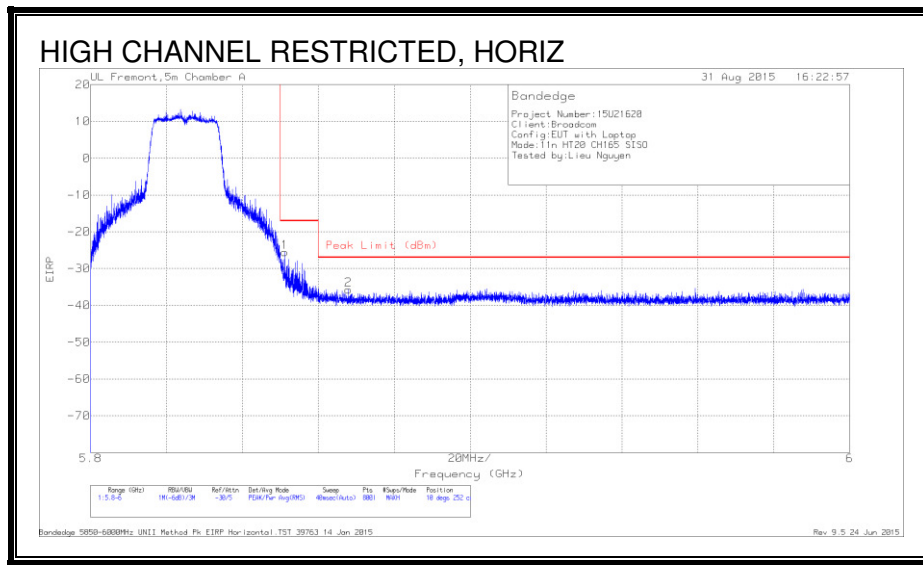


#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Bypass (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	5.673	4.98	RMS	34.6	7.8	47.38	54	-6.62	-	-	72	270	H
2	5.715	17.06	Pk	34.7	7.8	59.56	-	-	74	-14.44	72	270	H
3	5.715	4.97	RMS	34.7	7.8	47.47	54	-6.53	-	-	72	270	H
1	5.725	35.15	Pk	34.7	7.8	77.65	-	-	78.2	-55	72	270	H

Pk - Peak detector  
 RMS - RMS detection

**RESTRICTED BANDEDGE (HIGH CHANNEL)**



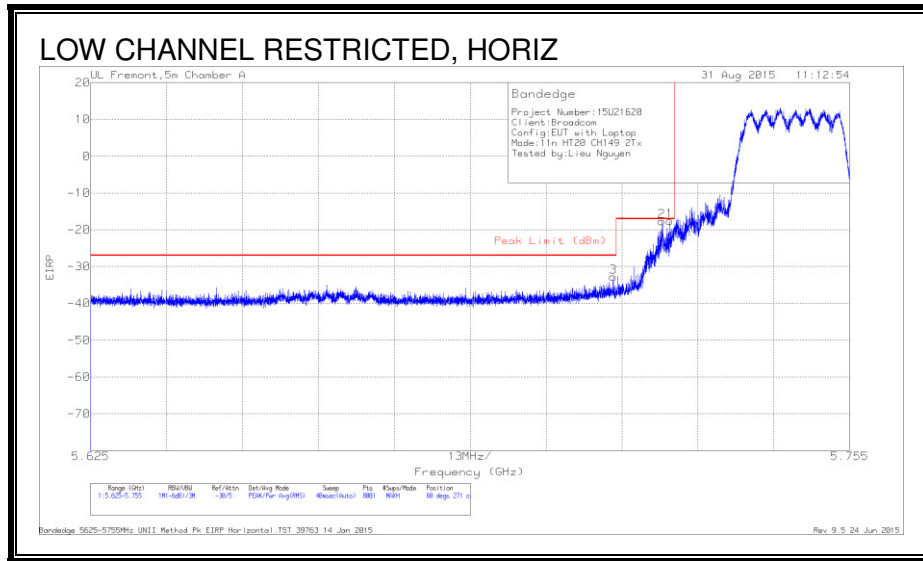
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T136 (dB/m)	Bypass (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.851	-80.32	Pk	35.1	7.9	11.8	0	-25.52	-17	-8.52	10	252	H
2	5.868	-90.47	Pk	35.1	7.9	11.8	0	-35.67	-27	-8.67	10	252	H

Pk - Peak detector

### 9.4. TX ABOVE 1 GHz 802.11n HT20 CDD 2TX MODE IN THE 5.8 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL)

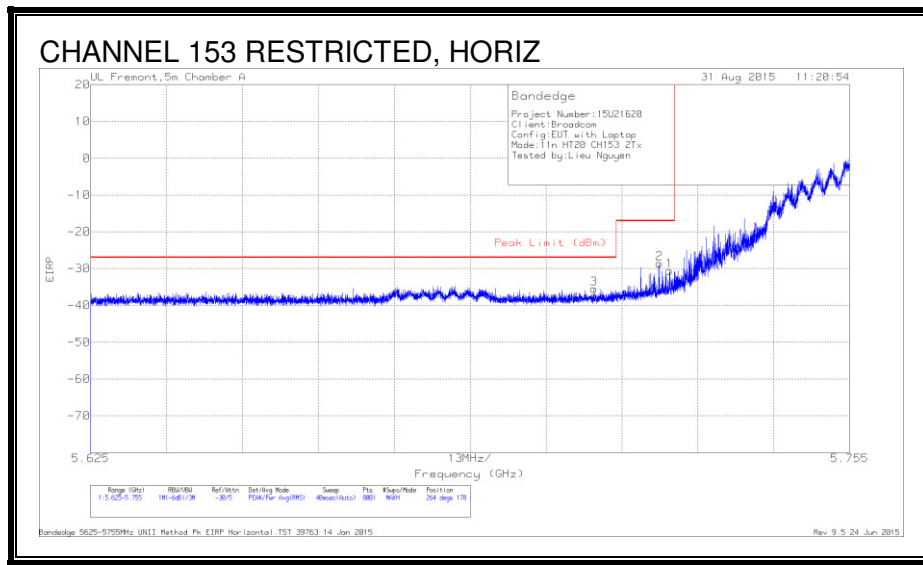


#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T136 (dB/m)	Bypass (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.715	-87.08	Pk	34.7	7.8	11.8	0	-32.78	-27	-5.78	80	271	H
2	5.723	-71.97	Pk	34.7	7.8	11.8	0	-17.67	-17	-.67	80	271	H
1	5.724	-71.8	Pk	34.7	7.8	11.8	0	-17.5	-17	-.5	80	271	H

Pk - Peak detector

**RESTRICTED BANDEDGE (CHANNEL 153)**

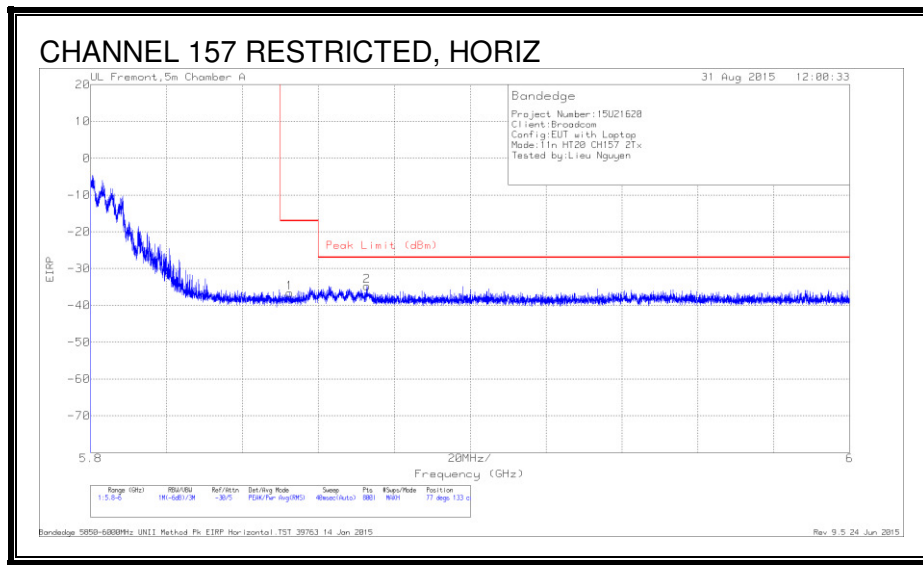


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T136 (dB/m)	Bypass (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.711	-89.77	Pk	34.7	7.8	11.8	0	-35.47	-27	-8.47	264	178	H
2	5.722	-82.94	Pk	34.7	7.8	11.8	0	-28.64	-17	-11.64	264	178	H
1	5.724	-84.87	Pk	34.7	7.8	11.8	0	-30.57	-17	-13.57	264	178	H

Pk - Peak detector

**RESTRICTED BANDEDGE (CHANNEL 157)**

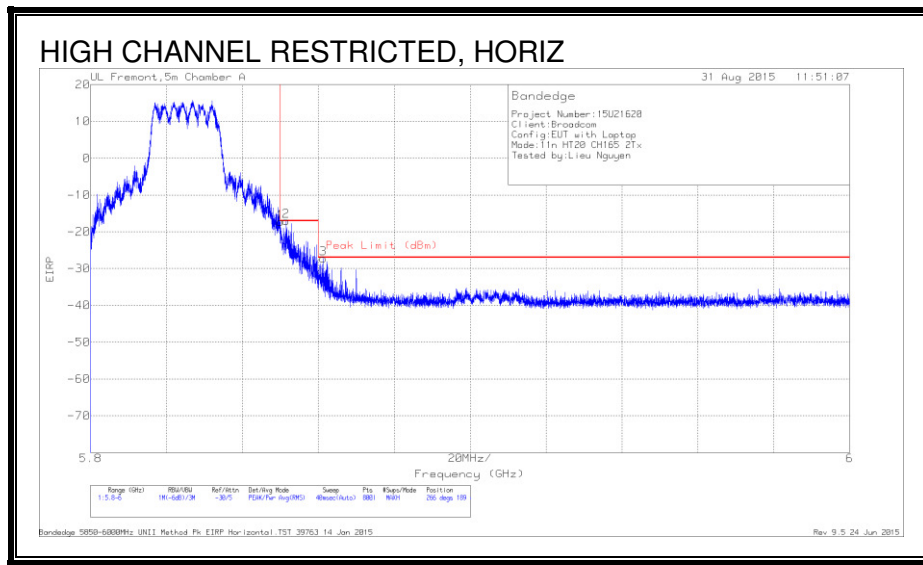


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T136 (dB/m)	Bypass (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.852	-91.41	Pk	35.1	7.9	11.8	0	-36.61	-17	-19.61	77	133	H
2	5.873	-89.55	Pk	35.1	7.9	11.8	0	-34.75	-27	-7.75	77	133	H

Pk - Peak detector

**RESTRICTED BANDEDGE (HIGH CHANNEL)**



Trace Markers

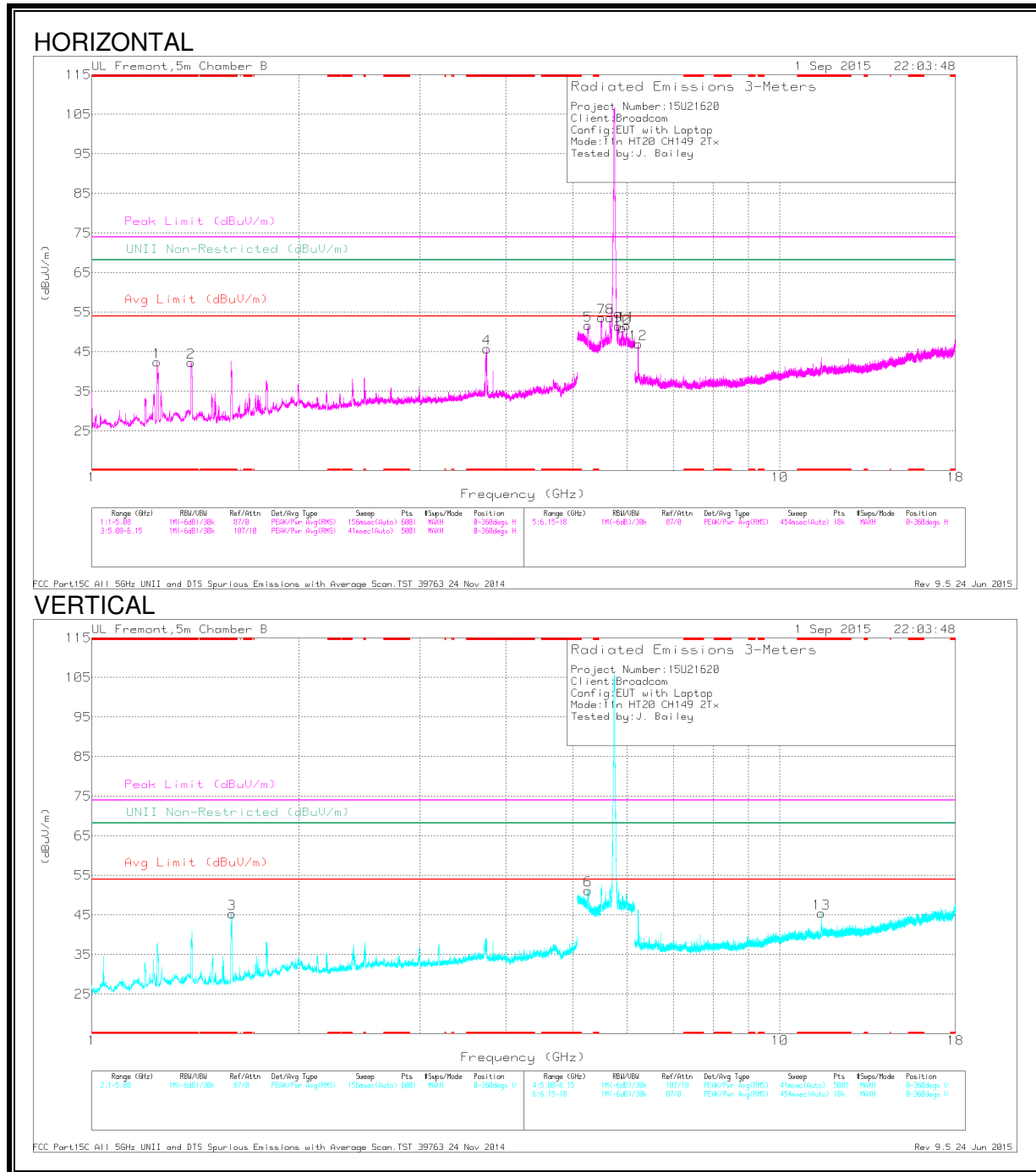
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T136 (dB/m)	Bypass (dB)	Conversion Factor (dB)	DC Corr (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-72.11	Pk	35.1	7.9	11.8	0	-17.31	-17	-.31	266	189	H
2	5.852	-71.88	Pk	35.1	7.9	11.8	0	-17.08	-17	-.08	266	189	H
3	5.861	-82.05	Pk	35.1	7.9	11.8	0	-27.25	-27	-.25	266	189	H

Pk - Peak detector



**HARMONICS AND SPURIOUS EMISSIONS**

**LOW CHANNEL**



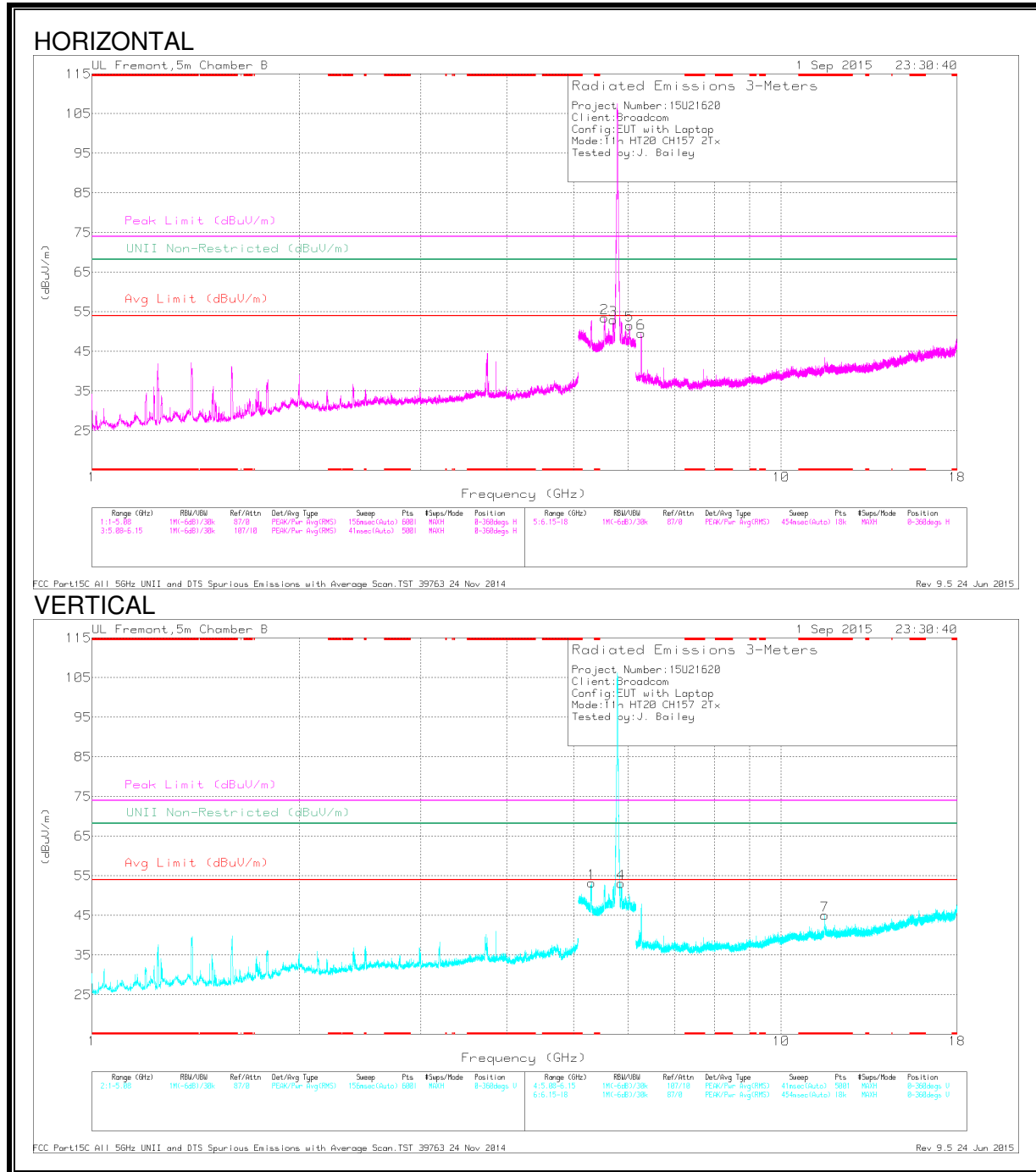
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fitr /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	* 1.229	50.13	PK-U	28.8	-35.8	43.13	-	-	74	-30.87	-	-	350	175	H
	* 1.229	32.78	ADR	28.8	-35.8	25.78	54	-28.22	-	-	-	-	350	175	H
2	* 1.394	54.17	PK-U	29.4	-34.7	48.87	-	-	74	-25.13	-	-	244	155	H
	* 1.394	36.69	ADR	29.4	-34.7	31.39	54	-22.61	-	-	-	-	244	155	H
4	* 3.748	51.18	PK-U	33.5	-32.7	51.98	-	-	74	-22.02	-	-	346	122	H
	* 3.747	32.01	ADR	33.5	-32.7	32.81	54	-21.19	-	-	-	-	346	122	H
3	* 1.596	62.06	PK-U	28.8	-35.2	55.66	-	-	74	-18.34	-	-	350	297	V
	* 1.599	44.99	ADR	28.8	-35.1	38.69	54	-15.31	-	-	-	-	350	297	V
13	* 11.491	46.95	PK-U	38.3	-25.4	59.85	-	-	74	-14.15	-	-	268	356	V
	* 11.491	32.25	ADR	38.3	-25.4	45.15	54	-8.85	-	-	-	-	268	356	V
5	5.263	45.54	PK-U	34.3	-19.6	60.24	-	-	-	-	68.2	-7.96	101	277	H
6	5.264	45.79	PK-U	34.3	-19.6	60.49	-	-	-	-	68.2	-7.71	142	101	V
7	5.507	49.32	PK-U	34.5	-20.5	63.32	-	-	-	-	68.2	-4.88	103	306	H
8	**5.671	39.62	Pk	34.9	-20.9	53.62	-	-	-	-	68.2	-14.58	0-360	101	H
9	***5.822	37.19	Pk	35.3	-20.9	51.59	-	-	-	-	-	-	0-360	101	H
10	5.907	44.04	PK-U	35.5	-20.7	58.84	-	-	-	-	68.2	-9.36	91	214	H
11	5.985	43.23	PK-U	35.6	-20.7	58.13	-	-	-	-	68.2	-10.07	98	400	H
12	6.223	50.28	PK-U	35.5	-31.4	54.38	-	-	-	-	68.2	-13.82	108	248	H

\* - indicates frequency in CFR15.205/IC8.10 Restricted Band.  
 \*\* - indicates frequency covered by the radiated band edge.  
 \*\*\* - indicates frequency in authorized frequency band.

PK - Peak detector  
 PK-U - U-NII: Maximum Peak  
 ADR - U-NII AD primary method, RMS average

**MID CHANNEL**



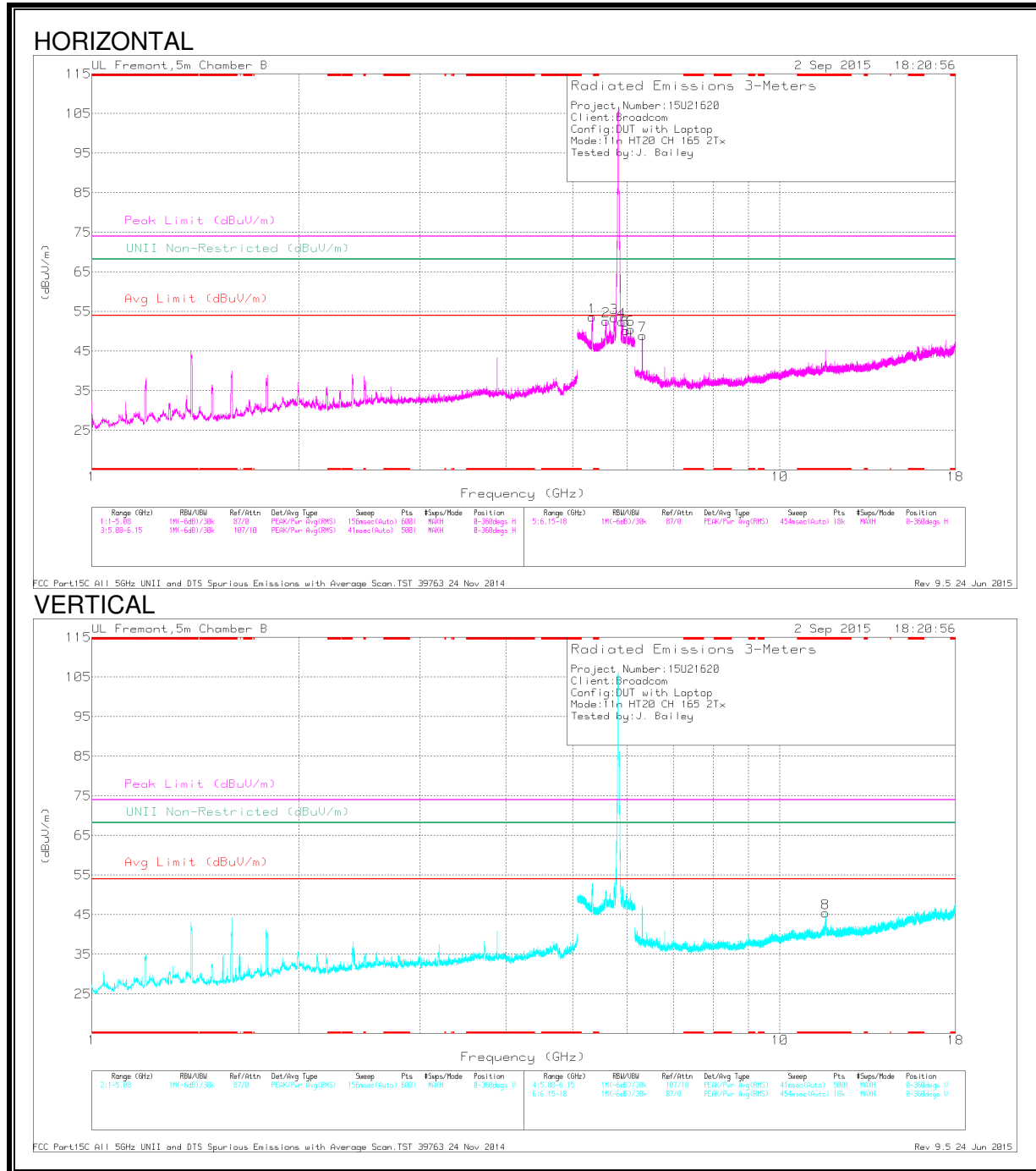
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fitr /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
7	* 11.57	45.83	PK-U	38.4	-24.6	59.63	-	-	74	-14.37	-	-	286	331	V
	* 11.57	31.39	ADR	38.4	-24.6	45.19	54	-8.81	-	-	-	-	286	331	V
1	5.31	46.47	PK-U	34.4	-19.3	61.57	-	-	-	-	68.2	-6.63	141	104	V
2	5.54	49.66	PK-U	34.6	-20.7	63.56	-	-	-	-	68.2	-4.64	105	299	H
3	5.708	46.86	PK-U	35	-21	60.86	-	-	-	-	68.2	-7.34	47	175	H
4	5.864	46.29	PK-U	35.4	-20.7	60.99	-	-	-	-	68.2	-7.21	138	104	V
5	6.027	44.9	PK-U	35.6	-20.7	59.8	-	-	-	-	68.2	-8.4	88	220	H
6	6.267	55.73	PK-U	35.5	-31.6	59.63	-	-	-	-	68.2	-8.57	55	373	H

\* - indicates frequency in CFR15.205/IC8.10 Restricted Band.

PK-U - U-NII: Maximum Peak  
 ADR - U-NII AD primary method, RMS average

**HIGH CHANNEL**



Trace Markers

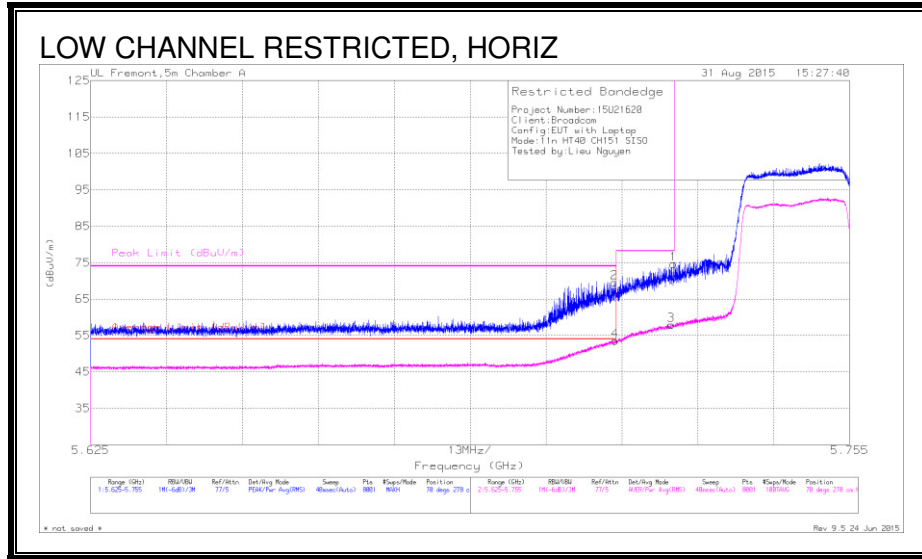
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
8	* 11.651	44.19	PK-U	38.5	-24.8	57.89	-	-	74	-16.11	-	-	80	242	V
	* 11.65	32.29	ADR	38.5	-24.8	45.99	54	-8.01	-	-	-	-	80	242	V
1	5.338	47.51	PK-U	34.4	-19.8	62.11	-	-	-	-	68.2	-6.09	112	190	H
2	5.588	47.6	PK-U	34.7	-20.8	61.5	-	-	-	-	68.2	-6.7	99	237	H
3	**5.747	39.37	Pk	35.1	-21	53.47	-	-	-	-	68.2	-14.73	0-360	101	H
4	***5.899	37.8	Pk	35.5	-20.8	52.5	-	-	-	-	-	-	0-360	199	H
5	***5.979	35.57	Pk	35.6	-20.9	50.27	-	-	-	-	-	-	0-360	101	H
6	6.07	44.63	PK-U	35.5	-20.4	59.73	-	-	-	-	68.2	-8.47	360	125	H
7	6.309	53.83	PK-U	35.6	-31.3	58.13	-	-	-	-	68.2	-10.07	54	382	H

\* - indicates frequency in CFR15.205/IC8.10 Restricted Band.  
 \*\* - indicates frequency covered by the radiated band edge.  
 \*\*\* - indicates frequency in authorized frequency band.

PK - Peak detector  
 PK-U - U-NII: Maximum Peak  
 ADR - U-NII AD primary method, RMS average

## 9.5. TX ABOVE 1 GHz 802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

### RESTRICTED BANDEDGE (LOW CHANNEL)



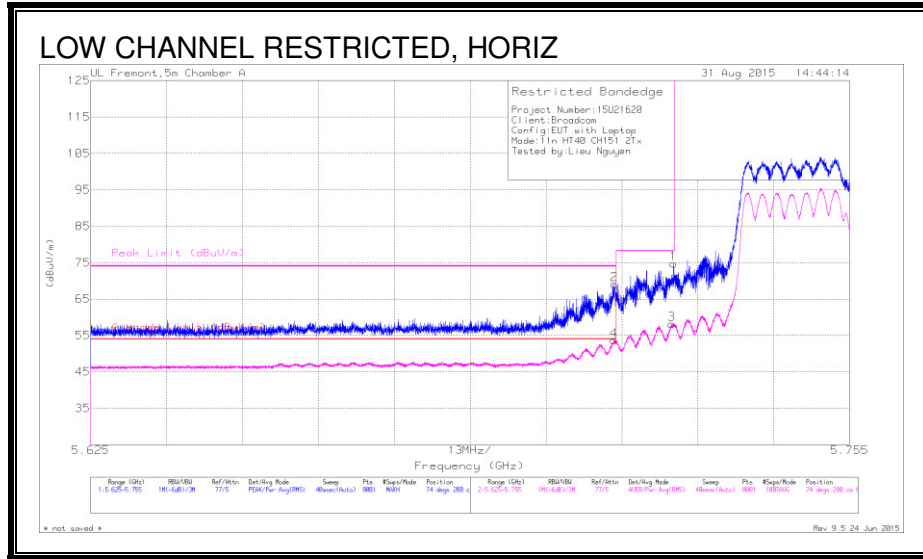
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	27.08	Pk	34.7	7.8	0	69.58	-	-	74	-4.42	70	278	H
4	5.715	11.06	RMS	34.7	7.8	0	53.56	54	-44	-	-	70	278	H
3	5.724	15.4	RMS	34.7	7.8	0	57.9	-	-	-	-	70	278	H
1	5.725	32.08	Pk	34.7	7.8	0	74.58	-	-	78.2	-3.62	70	278	H

Pk - Peak detector  
 RMS - RMS detection

## 9.6. TX ABOVE 1 GHz 802.11n HT40 CDD 2TX MODE IN THE 5.8 GHz BAND

### RESTRICTED BANDEDGE (LOW CHANNEL)



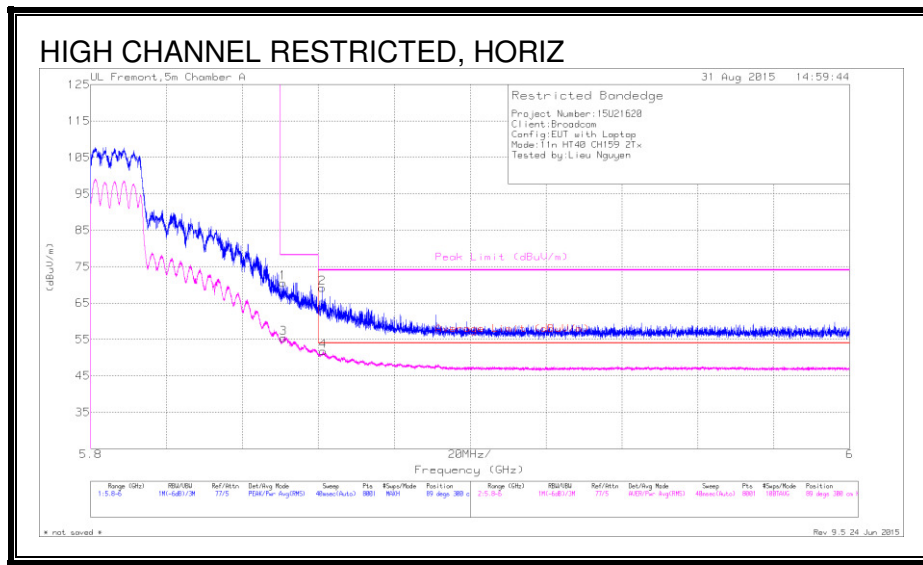
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.715	26.54	Pk	34.7	7.8	0	69.04	-	-	74	-4.96	74	280	H
4	5.715	11.11	RMS	34.7	7.8	0	53.61	54	-0.39	-	-	74	280	H
1	5.725	32.27	Pk	34.7	7.8	0	74.77	-	-	78.2	-3.43	74	280	H
3	5.725	15.56	RMS	34.7	7.8	0	58.06	-	-	-	-	74	280	H

Pk - Peak detector  
 RMS - RMS detection



**RESTRICTED BANDEDGE (HIGH CHANNEL)**



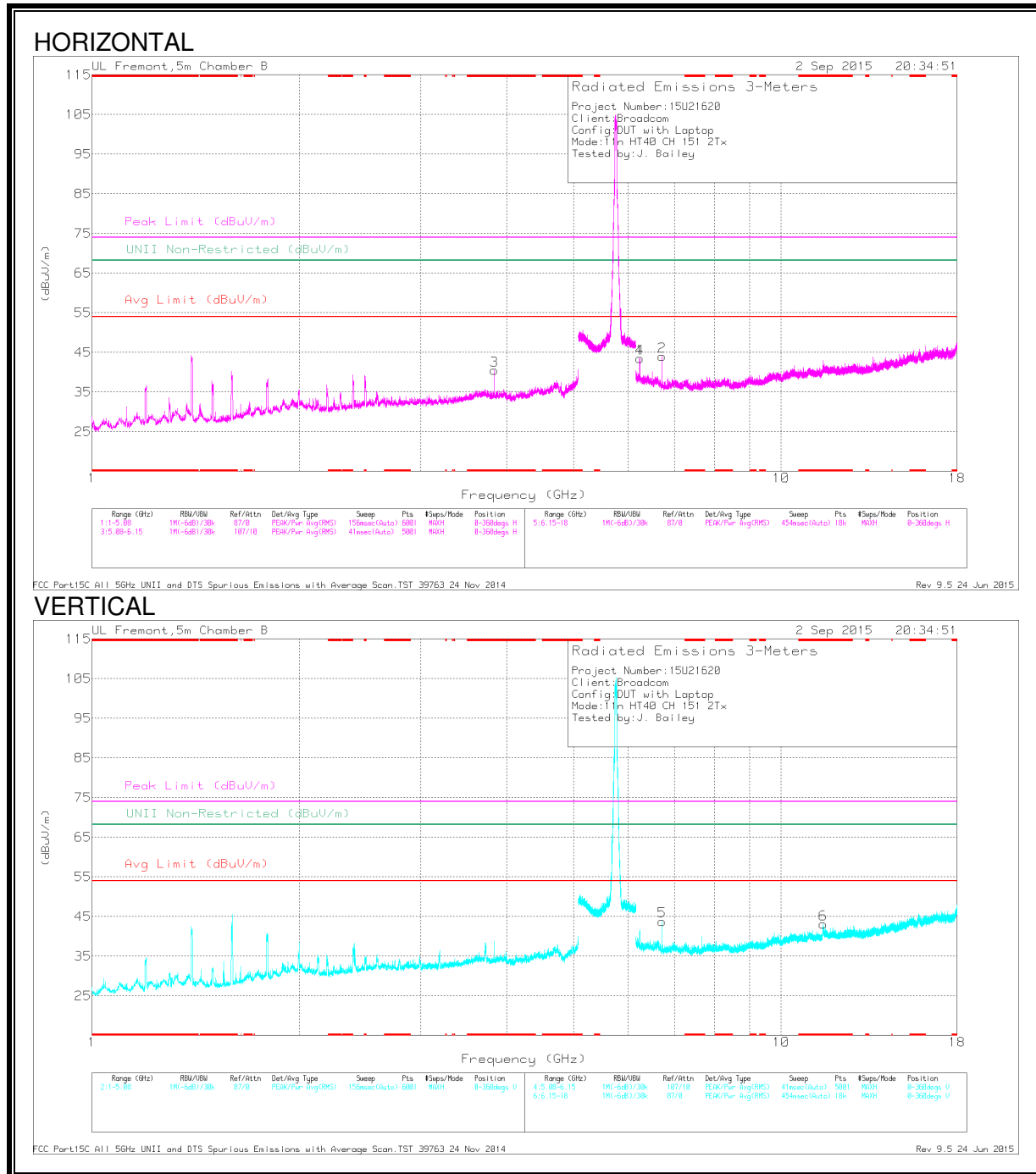
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.851	27.59	Pk	35.1	7.9	0	70.59	-	-	78.2	-7.61	89	300	H
3	5.851	12.4	RMS	35.1	7.9	0	55.4	-	-	-	-	89	300	H
2	5.861	26.18	Pk	35.1	7.9	0	69.18	-	-	74	-4.82	89	300	H
4	5.861	8.73	RMS	35.1	7.9	0	51.73	54	-2.27	-	-	89	300	H

Pk - Peak detector  
 RMS - RMS detection

**HARMONICS AND SPURIOUS EMISSIONS**

**LOW CHANNEL**



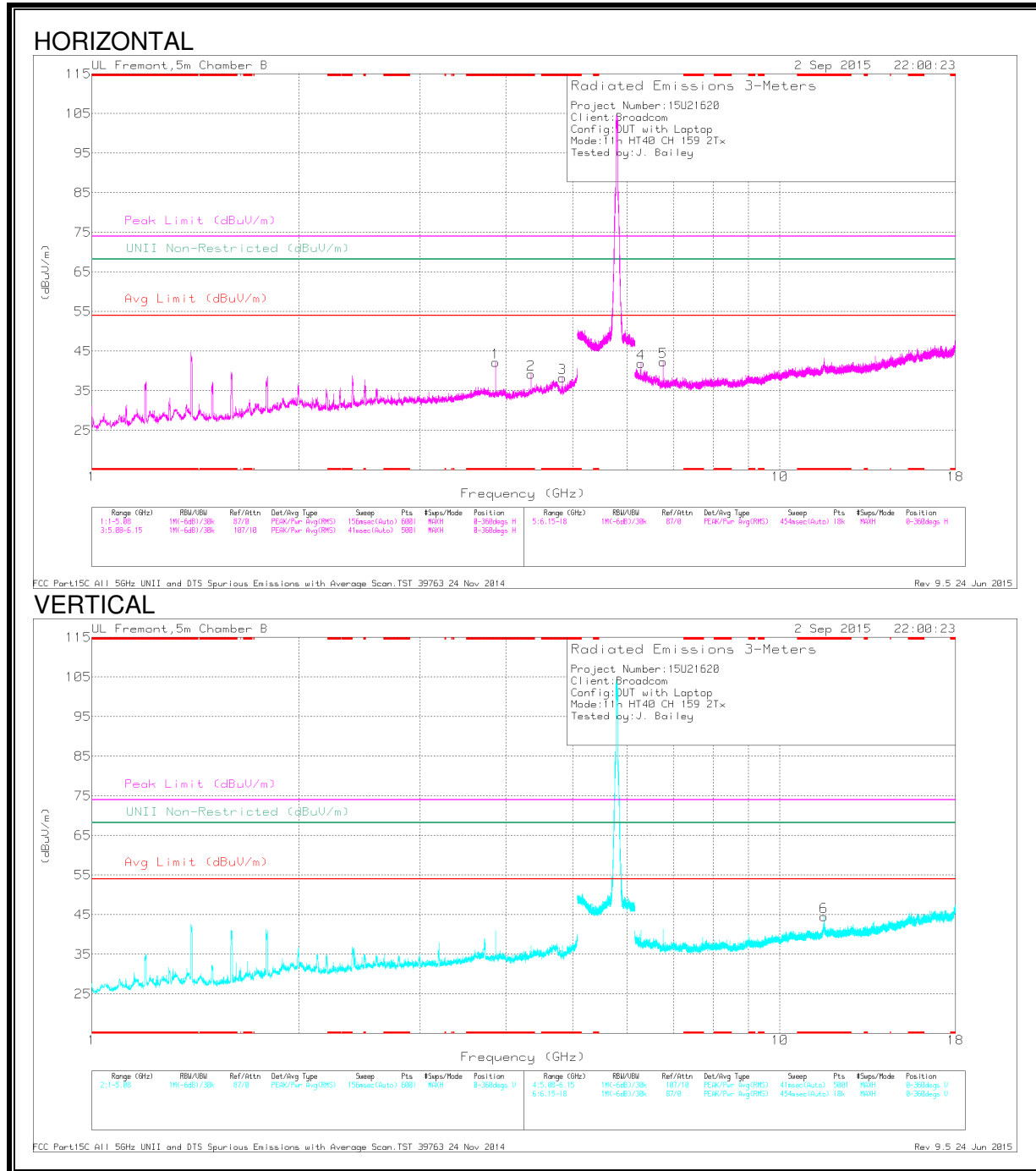
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fitr /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	* 3.837	45.94	PK-U	33.4	-33	46.34	-	-	74	-27.66	-	-	342	118	H
	* 3.837	39.58	ADR	33.4	-33	39.98	54	-14.02	-	-	-	-	342	118	H
6	* 11.51	43.49	PK-U	38.3	-25.3	56.49	-	-	74	-17.51	-	-	69	317	V
	* 11.51	30.26	ADR	38.3	-25.3	43.26	54	-10.74	-	-	-	-	69	317	V
1	6.235	47.28	PK-U	35.5	-31.6	51.18	-	-	-	-	68.2	-17.02	360	120	H
4	6.235	48.58	PK-U	35.5	-31.6	52.48	-	-	-	-	68.2	-15.72	0	125	H
2	6.714	45.63	PK-U	35.9	-31	50.53	-	-	-	-	68.2	-17.67	92	188	H
5	6.714	44.88	PK-U	35.9	-31	49.78	-	-	-	-	68.2	-18.42	98	308	V

\* - indicates frequency in CFR15.205/IC8.10 Restricted Band.

PK-U - U-NII: Maximum Peak  
 ADR - U-NII AD primary method, RMS average

**HIGH CHANNEL**



Trace Markers

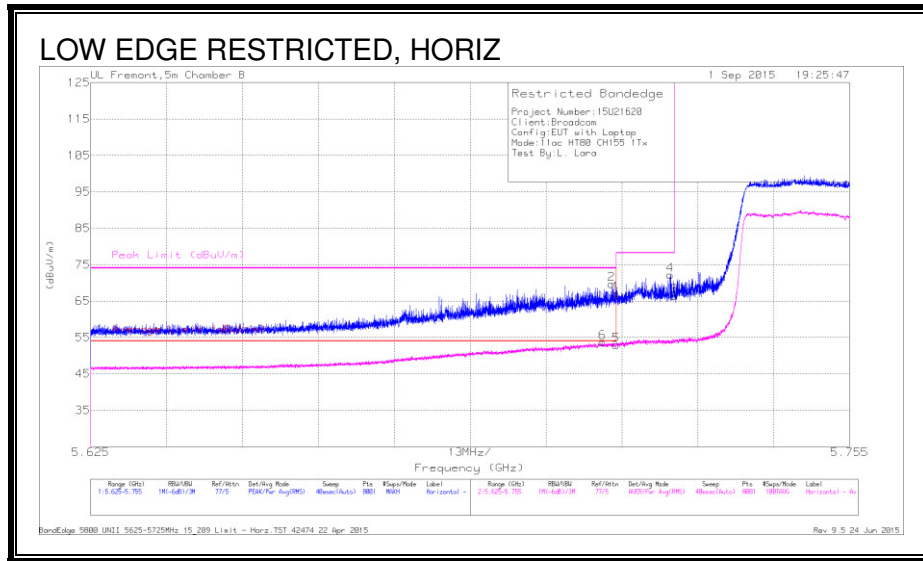
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.863	46.85	PK-U	33.4	-32.8	47.45	-	-	74	-26.55	-	-	96	388	H
	* 3.863	41.58	ADR	33.4	-32.8	42.18	54	-11.82	-	-	-	-	96	388	H
2	* 4.347	45.02	PK-U	33.8	-32.2	46.62	-	-	74	-27.38	-	-	90	228	H
	* 4.346	37.31	ADR	33.8	-32.2	38.91	54	-15.09	-	-	-	-	90	228	H
3	* 4.829	44.74	PK-U	34.3	-32.1	46.94	-	-	74	-27.06	-	-	88	293	H
	* 4.829	36.95	ADR	34.3	-32.1	39.15	54	-14.85	-	-	-	-	88	293	H
6	* 11.59	41.68	PK-U	38.4	-24.7	55.38	-	-	74	-18.62	-	-	68	328	V
	* 11.59	28.91	ADR	38.4	-24.7	42.61	54	-11.39	-	-	-	-	68	328	V
4	6.278	45.68	PK-U	35.5	-31.6	49.58	-	-	-	-	68.2	-18.62	99	191	H
5	6.761	44.76	PK-U	35.9	-30.9	49.76	-	-	-	-	68.2	-18.44	96	189	H

\* - indicates frequency in CFR15.205/IC8.10 Restricted Band.

PK-U - U-NII: Maximum Peak  
 ADR - U-NII AD primary method, RMS average

## 9.7. TX ABOVE 1 GHz 802.11ac VHT80 1Tx MODE IN THE 5.8 GHz BAND

### RESTRICTED BANDEGE (CHANNEL 155 LOW EDGE)

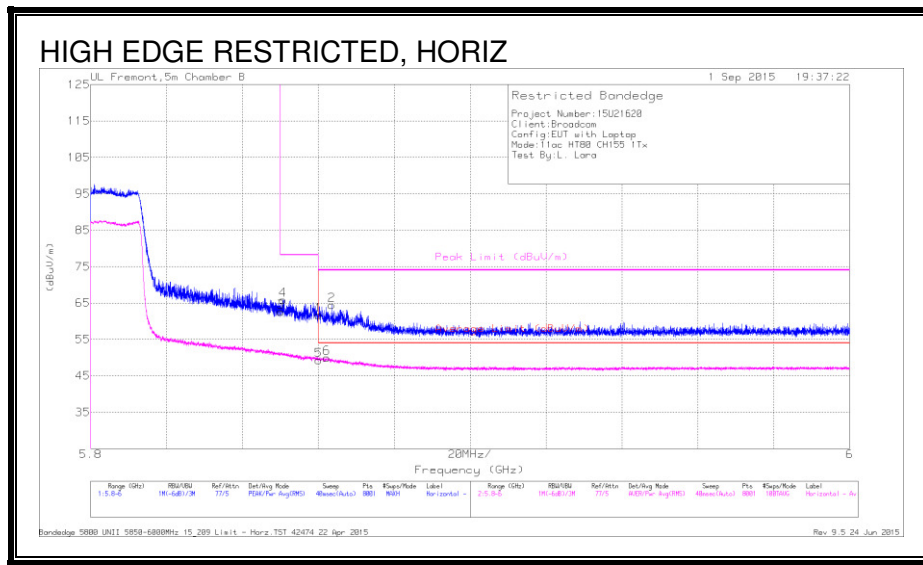


### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	5.713	11.13	RMS	35	7.3	.27	53.7	54	-.3	-	-	97	267	H
2	5.714	27.4	Pk	35	7.3	0	69.7	-	-	74	-4.3	97	267	H
1	5.715	24.74	Pk	35	7.3	0	67.04	-	-	74	-6.96	97	267	H
5	5.715	10.35	RMS	35	7.3	.27	52.92	54	-1.08	-	-	97	267	H
4	5.724	29.73	Pk	35	7.4	0	72.13	-	-	78.2	-6.07	97	267	H
3	5.725	23.94	Pk	35	7.4	0	66.34	-	-	78.2	-11.86	97	267	H

Pk - Peak detector  
 RMS - RMS detection

**RESTRICTED BANDEGE (CHANNEL 155 HIGH EDGE)**



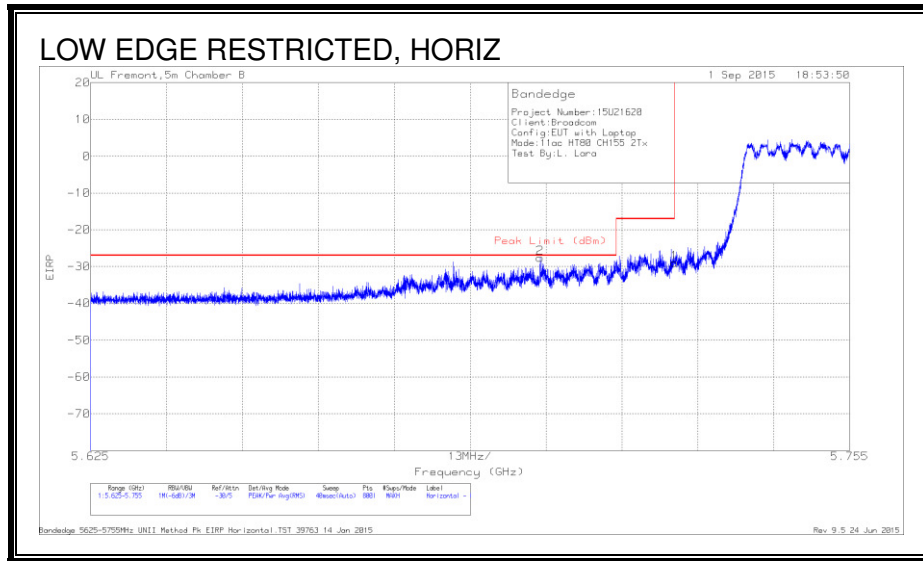
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	19.69	Pk	35.4	7.5	0	62.59	-	-	78.2	-15.61	98	255	H
4	5.851	22.97	Pk	35.4	7.5	0	65.87	-	-	78.2	-12.33	98	255	H
1	5.86	18.86	Pk	35.4	7.5	0	61.76	-	-	74	-12.24	98	255	H
5	5.86	6.41	RMS	35.4	7.5	.27	49.58	54	-4.42	-	-	98	255	H
6	5.862	7	RMS	35.4	7.5	.27	50.17	54	-3.83	-	-	98	255	H
2	5.864	21.52	Pk	35.4	7.5	0	64.42	-	-	74	-9.58	98	255	H

Pk - Peak detector  
 RMS - RMS detection

## 9.8. TX ABOVE 1 GHz 802.11ac VHT80 CDD 2TX MODE IN THE 5.8 GHz BAND

### RESTRICTED BANDEDGE (CHANNEL 155 LOW EDGE)



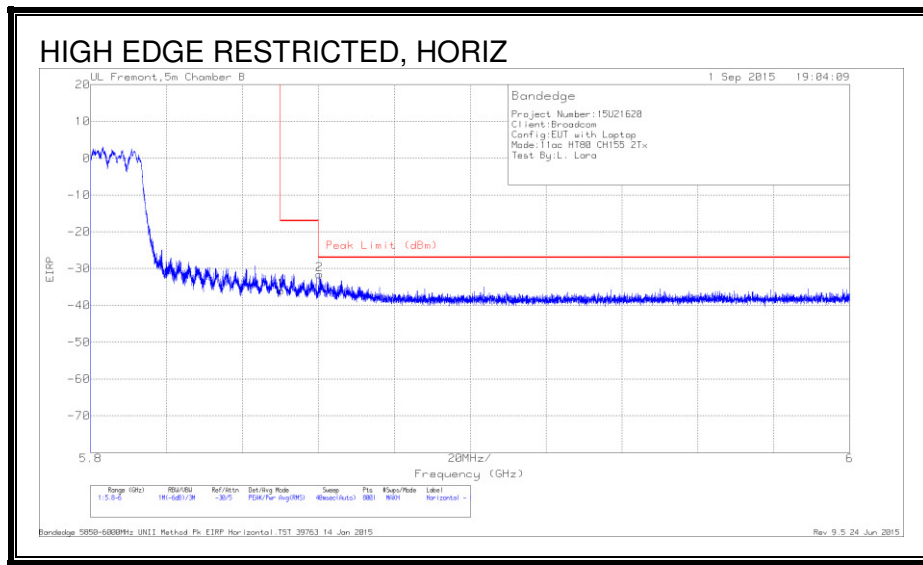
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T345 (dB/m)	Bypass (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.702	-81.82	Pk	35	7.4	11.8	-27.62	-27	-62	103	212	H
1	5.725	-83.12	Pk	35	7.4	11.8	-28.92	-17	-11.92	103	212	H

Pk - Peak detector



**RESTRICTED BANDEDGE (CHANNEL 155 HIGH EDGE)**



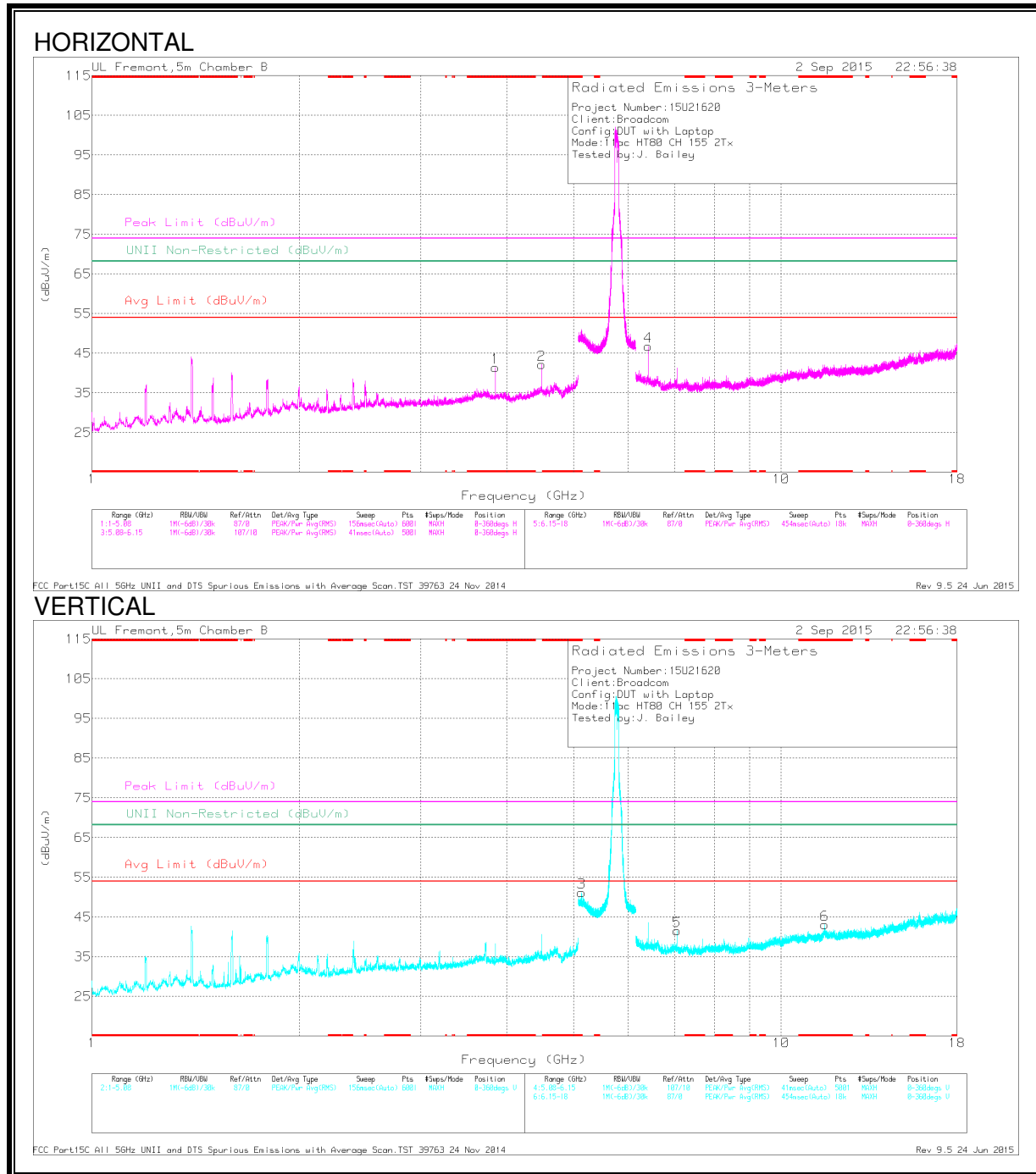
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T345 (dB/m)	Bypass (dB)	Conversion Factor (dB)	Corrected Reading EIRP	Peak Limit (dBm)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	5.85	-90.62	Pk	35.4	7.5	11.8	-35.92	-17	-18.92	105	137	H
2	5.86	-86.21	Pk	35.4	7.5	11.8	-31.51	-27	-4.51	105	137	H

Pk - Peak detector

**HARMONICS AND SPURIOUS EMISSIONS**

**CHANNEL 155**



Trace Markers

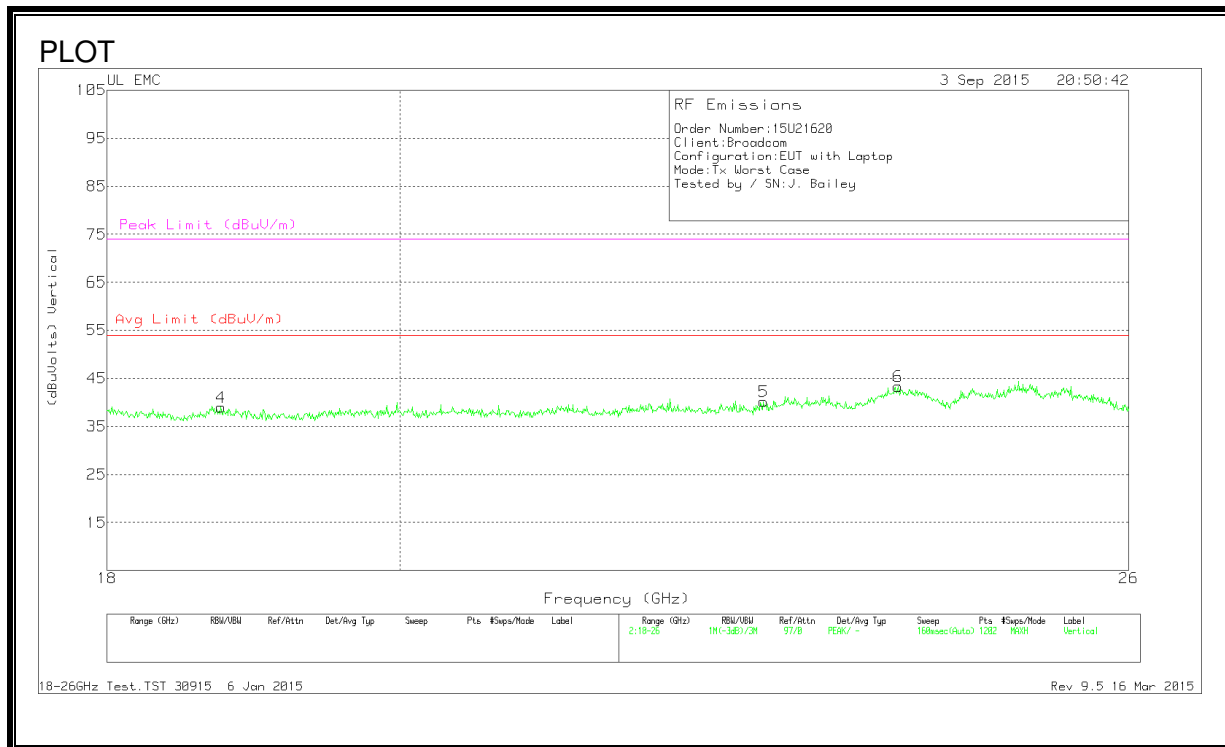
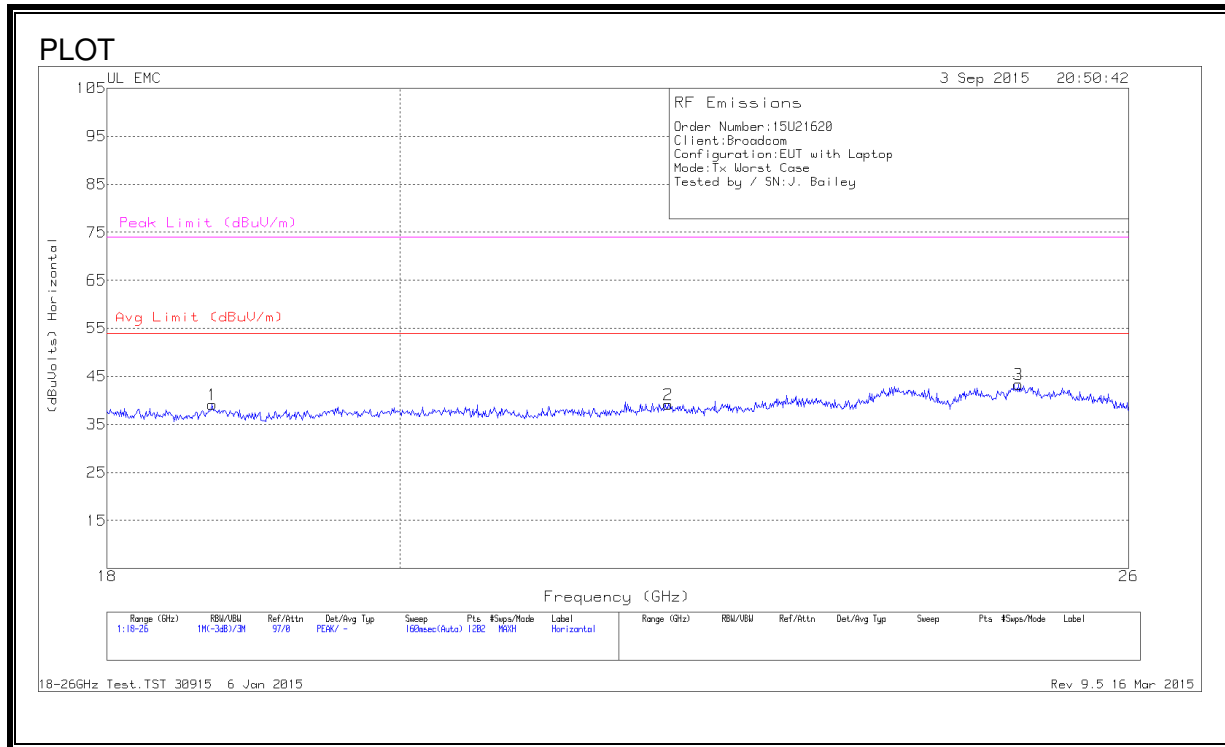
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Filtz/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.85	46.92	PK-U	33.4	-33	0	47.32	-	-	74	-26.68	-	-	95	395	H
	* 3.85	40.73	ADR	33.4	-33	.27	41.4	54	-12.6	-	-	-	-	95	395	H
3	* 5.133	43.8	PK-U	34.1	-19.1	0	58.8	-	-	74	-15.2	-	-	140	101	V
	* 5.133	33.78	ADR	34.1	-19.1	.27	49.05	54	-4.95	-	-	-	-	140	101	V
6	* 11.572	38.14	PK-U	38.4	-24.6	0	51.94	-	-	74	-22.06	-	-	7	228	V
	* 11.562	25.38	ADR	38.4	-24.6	.27	39.45	54	-14.55	-	-	-	-	7	228	V
2	4.492	46.26	PK-U	34	-31.7	0	48.56	-	-	-	-	68.2	-19.64	95	175	H
4	6.417	48.71	PK-U	35.7	-29.9	0	54.51	-	-	-	-	68.2	-13.69	53	354	H
5	7.059	41.68	PK-U	35.8	-29.9	0	47.58	-	-	-	-	68.2	-20.62	125	122	V

\* - indicates frequency in CFR15.205/IC8.10 Restricted Band.

PK-U - U-NII: Maximum Peak  
 ADR - U-NII AD primary method, RMS average

### 9.9. WORST-CASE ABOVE 18GHZ

#### SPURIOUS EMISSIONS 18 – 26 GHz

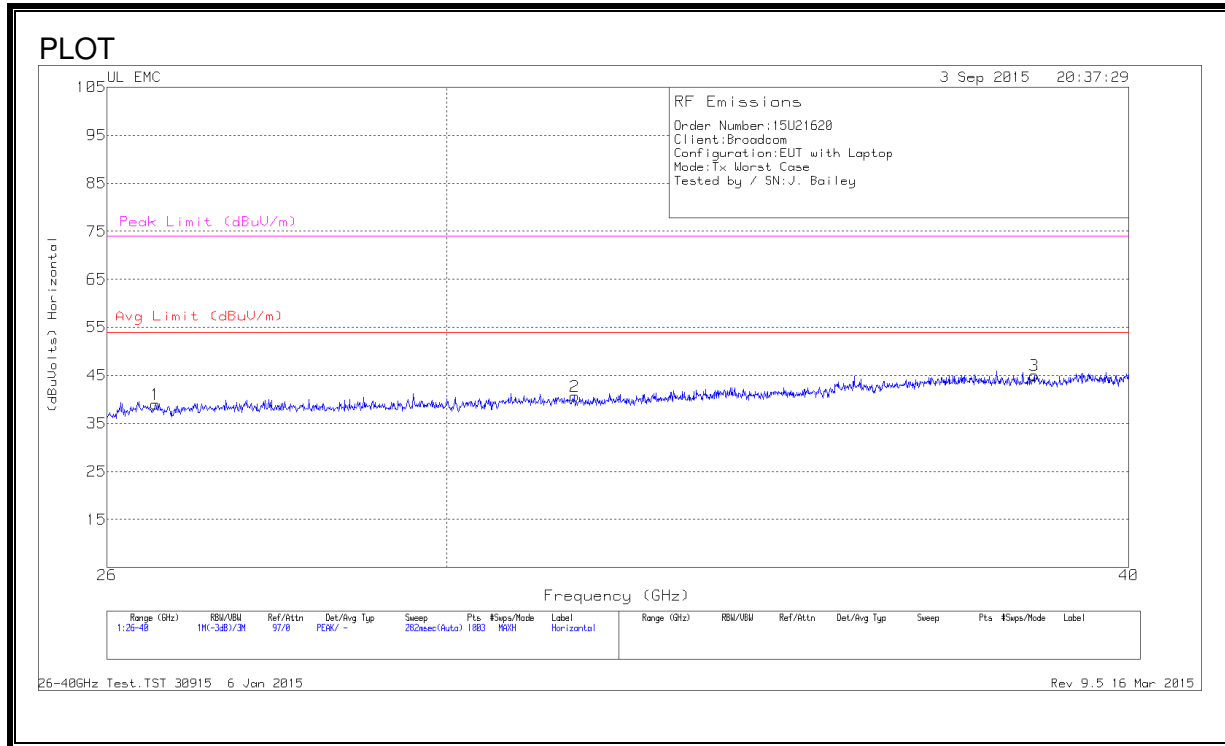


Trace Markers

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	18.693	40.37	Pk	32.5	-24.2	-9.5	39.17	54	-14.83	74	-34.83
2	22.03	40.47	Pk	33.2	-25	-9.5	39.17	54	-14.83	74	-34.83
3	24.988	43.03	Pk	34.2	-24.4	-9.5	43.33	54	-10.67	74	-30.67
4	18.753	40.5	Pk	32.6	-24.6	-9.5	39.00	54	-15.00	74	-35.00
5	22.796	41.57	Pk	33.2	-25.1	-9.5	40.17	54	-13.83	74	-33.83
6	23.928	43.43	Pk	33.4	-24	-9.5	43.33	54	-10.67	74	-30.67

Pk - Peak detector

**SPURIOUS EMISSIONS 26 – 40GHz**



Trace Markers

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	26.536	43.2	Pk	35.5	-30.2	-9.5	39.00	54	-15.00	74	-35.00
2	31.664	46.97	Pk	36.3	-33.1	-9.5	40.67	54	-13.33	74	-33.33
3	38.438	49.6	Pk	37	-32.1	-9.5	45.00	54	-9.00	74	-29.00
4	27.593	45.97	Pk	35.8	-31.6	-9.5	40.67	54	-13.33	74	-33.33
5	33.031	46.4	Pk	36.7	-32.6	-9.5	41.00	54	-13.00	74	-33.00
6	36.822	50.63	Pk	37.1	-32.9	-9.5	45.33	54	-8.67	74	-28.67

Pk - Peak detector

## 9.10. WORST-CASE BELOW 1 GHz

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

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 119.9984	51.39	Qp	17.7	-30.4	38.69	43.52	-4.83	285	296	H
1	61.025	43.47	Pk	11.4	-30.8	24.07	40	-15.93	0-360	101	V
3	430.8	45.86	Pk	20.5	-29	37.36	46.02	-8.66	0-360	199	H
4	599.6	38.74	Pk	22.3	-28.6	32.44	46.02	-13.58	0-360	101	V
5	730.8	39.15	Pk	24.4	-28.3	35.25	46.02	-10.77	0-360	199	V
6	799.412	48.04	Qp	25.3	-28.2	45.14	46.02	-.88	83	101	H

\* - indicates frequency in CFR15.205 Restricted Band

Pk - Peak detector



## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

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

\* Decreases with the logarithm of the frequency.

### TEST PROCEDURE

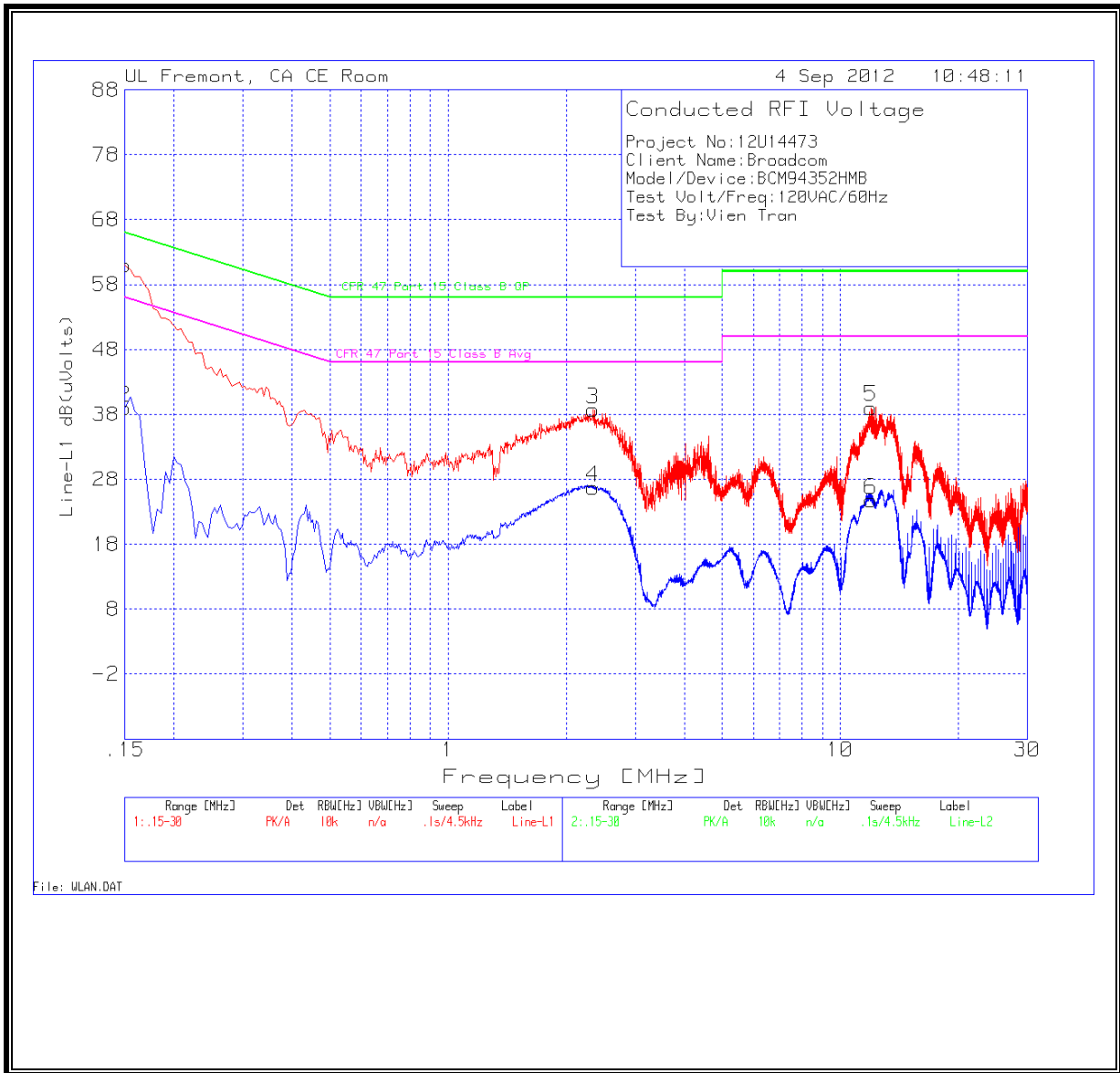
ANSI C63.4

**RESULTS**

**6 WORST EMISSIONS**

Project No:12U14473									
Client Name:Broadcom									
Model/Device:BCM94352HMB									
Test Volt/Freq:120VAC/60Hz									
Test By:Vien Tran									
Frequency MHz	Reading dB(μV)	Detector	T24 LISN dB	Cables dB	Corrected dB(μV)	Class B QP Limit dB(μV)	QP Margin dB	Class B Av Limit dB(μV)	Av Margin dB
<b>Line-L1 .15 - 30MHz</b>									
0.15	60.88	PK	0.1	0	60.98	66	-5.02	-	-
0.15	38.86	Av	0.1	0	38.96	-	-	56	-17.04
2.3415	38.6	PK	0.1	0.1	38.8	56	-17.2	-	-
2.3415	26.55	Av	0.1	0.1	26.75	-	-	46	-19.25
12.003	38.67	PK	0.2	0.2	39.07	60	-20.93	-	-
12.003	24.42	Av	0.2	0.2	24.82	-	-	50	-25.18
<b>Line-L2 .15 - 30MHz</b>									
0.15	59.32	PK	0.1	0	59.42	66	-6.58	-	-
0.15	37.04	Av	0.1	0	37.14	-	-	56	-18.86
2.679	38.52	PK	0.1	0.1	38.72	56	-17.28	-	-
2.679	25.94	Av	0.1	0.1	26.14	-	-	46	-19.86
12.1155	37.77	PK	0.2	0.2	38.17	60	-21.83	-	-
12.1155	21.56	Av	0.2	0.2	21.96	-	-	50	-28.04
PK - Peak detector									
QP - Quasi-Peak detector									
Av - Average detector									
Text File: WLAN.TXT									
File: WLAN.DAT									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

