



FCC CFR47 PART 15 SUBPART E  
INDUSTRY CANADA RSS-210 ISSUE 8  
CLASS II PERMISSIVE CHANGE

CERTIFICATION TEST REPORT

FOR

802.11ABGN 3X3 W/NO BEAM FORMING MODULE  
MODEL NUMBER: AR5BHB112

FCC ID: WA7-AR5BHB112  
IC: 6627C-AR5BHB112

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*Prepared for*  
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Revision History

Rev.	Issue Date	Revisions	Revised By
	2/13/12	Initial Issue	T. LEE
A	2/20/12	Corrected Power Limit in 5.3 and 5.6 GHz band	T. LEE
B	2/21/12	Added Original Peak Power Data	T. LEE

## 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>6</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION.....</i>	6
4.2. <i>SAMPLE CALCULATION.....</i>	6
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	6
<b>5. EQUIPMENT UNDER TEST .....</b>	<b>7</b>
5.1. <i>DESCRIPTION OF EUT.....</i>	7
5.1. <i>DESCRIPTION OF CLASS II PERMISSIVE CHANGE.....</i>	7
5.2. <i>MAXIMUM OUTPUT POWER.....</i>	7
5.3. <i>ON TIME, DUTY CYCLE AND MEASUREMENT METHODS.....</i>	8
5.3.1. <i>ON TIME AND DUTY CYCLE RESULTS.....</i>	8
5.3.2. <i>MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz</i>	9
5.3.3. <i>DUTY CYCLE PLOTS.....</i>	10
5.4. <i>DESCRIPTION OF AVAILABLE ANTENNAS.....</i>	11
5.5. <i>SOFTWARE AND FIRMWARE.....</i>	12
5.6. <i>WORST-CASE CONFIGURATION AND MODE .....</i>	12
5.7. <i>DESCRIPTION OF TEST SETUP.....</i>	13
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>15</b>
<b>7. ANTENNA PORT TEST RESULTS .....</b>	<b>16</b>
7.1. <i>OUTPUT POWER.....</i>	16
7.1.1. <i>802.11a MODE IN THE 5.3 GHz BAND.....</i>	16
7.1.2. <i>802.11HT20 MODE IN THE 5.3 GHz BAND .....</i>	20
7.1.3. <i>802.11a MODE IN THE 5.6 GHz BAND.....</i>	24
7.1.4. <i>802.11HT20 MODE IN THE 5.6 GHz BAND .....</i>	28
7.1.5. <i>802.11HT40 MODE IN THE 5.6 GHz BAND .....</i>	36
<b>8. RADIATED TEST RESULTS .....</b>	<b>40</b>
8.1. <i>LIMITS AND PROCEDURE .....</i>	40
8.2. <i>TRANSMITTER ABOVE 1 GHz .....</i>	41
8.2.1. <i>802.11a MODE IN THE LOWER 5.2 GHz BAND.....</i>	41
8.2.2. <i>802.11n HT20 MODE IN 5.2 GHz BAND .....</i>	44
8.2.3. <i>802.11n HT40 MODE IN 5.2 GHz BAND .....</i>	47
8.2.4. <i>802.11a MODE IN 5.3 GHz BAND .....</i>	50
8.2.5. <i>802.11n HT20 MODE IN 5.3GHz BAND .....</i>	53
8.2.6. <i>802.11n HT40 MODE IN 5.3GHz BAND .....</i>	56

8.2.7.	802.11a MODE IN 5.6 GHz BAND .....	59
8.2.8.	802.11n HT20 MODE 5.6 GHz BAND.....	63
8.2.9.	802.11n HT40 MODE 5.6 GHz BAND.....	67
8.3.	<i>RECEIVER ABOVE 1 GHz .....</i>	71
8.3.1.	FOR 20 MHz BANDWIDTH.....	71
8.3.2.	FOR 40 MHz BANDWIDTH.....	72
8.4.	<i>WORST-CASE BELOW 1 GHz.....</i>	73
<b>9.</b>	<b>SETUP PHOTOS.....</b>	<b>74</b>

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** FLUKE NETWORKS  
6920 SEAWAY BOULEVARD  
EVERETT, WA 98203, UNITED STATES.

**EUT DESCRIPTION:** 802.11ABGN 3X3 W/NO BEAM FORMING MODULE

**MODEL:** AR5BHB112

**SERIAL NUMBER:** 000E8E3FEF89

**DATE TESTED:** FEBRUARY 13, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	PASS (Radiated Portion)
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	PASS (Radiated Portion)
INDUSTRY CANADA RSS-GEN Issue 3	PASS (Radiated Portion)

Compliance Certification Services (UL CCS) 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 CCS By:



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Tim Lee  
STAFF ENGINEER  
UL CCS

Tested By:



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CHIN PANG  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, RSS-GEN Issue 3, and RSS-210 Issue 8.

## 3. FACILITIES AND ACCREDITATION

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

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 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	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a 802.11abgn 3x3 w/no beam forming module; add a new ant type w/ lower gain.

The radio module is manufactured by Atheros

### 5.1. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding a new antenna types with lower gain.

### 5.2. MAXIMUM OUTPUT POWER

In order to pass Band edge and Harmonic spurious measurement, 5.3 and 5.6GHz band low, mid and high channels must be reduced from the output powers as table shown below:

#### MEASURED PEAK POWER

Frequency Channel (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5320	802.11a	19.88	97.27
5320	802.11 HT20	19.08	80.91
5700	802.11a	17.58	57.28
5500	802.11n HT20	18.49	70.63
5580	802.11n HT20	19.79	95.28
5700	802.11n HT20	15.24	33.42
5510	802.11n HT40	15.64	36.64
5590	802.11n HT40	18.52	71.12
5670	802.11n HT40	17.25	53.09

#### ORIGINAL PEAK POWER

Frequency Channel (MHz)	Mode	Output Power (dBm)	Max. Limit (dBm)
5180	802.11a	13.22	17.00
5220	802.11a	12.94	17.00
5240	802.11a	13.06	17.00
5180	802.11n HT20	14.98	17.00
5220	802.11n HT20	14.15	17.00
5240	802.11n HT20	14.37	17.00

*The output power results provided in the original filing assumed an antenna gain of 4.76 dBi for each chain, 9.53dBi aggregated over all chains. As this C2PC uses lower gain antennas, the original data continues to demonstrate compliance with the rules."*

### MEASURED AVERAGE POWER

Frequency Channel (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5320	802.11a	19.00	79.43
5320	802.11 HT20	18.60	72.44
5700	802.11a	17.00	50.12
5500	802.11n HT20	18.00	63.10
5580	802.11n HT20	19.00	79.43
5700	802.11n HT20	14.70	29.51
5510	802.11n HT40	14.70	29.51
5590	802.11n HT40	17.70	58.88
5670	802.11n HT40	16.80	47.86

## 5.3. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

### LIMITS

None; for reporting purposes only.

### PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

#### 5.3.1. ON TIME AND DUTY CYCLE RESULTS

##### 802.11a Mode, 6Mbps

Frequency (MHz)	Tx on (msec)	Tx on + Tx off (msec)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
5230	0.6367	0.667	95.46	0.20
5310	0.6367	0.667	95.46	0.20
5590	0.6367	0.665	95.74	0.19
5795	0.6367	0.665	95.74	0.19

**802.11n HT20 Mode, 6.5Mbps**

Frequency (MHz)	Tx on (msec)	Tx on + Tx off (msec)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
5200	1.273	1.319	96.51	0.15
5300	1.273	1.319	96.51	0.15
5600	1.273	1.315	96.81	0.14
5785	1.273	1.315	96.81	0.14

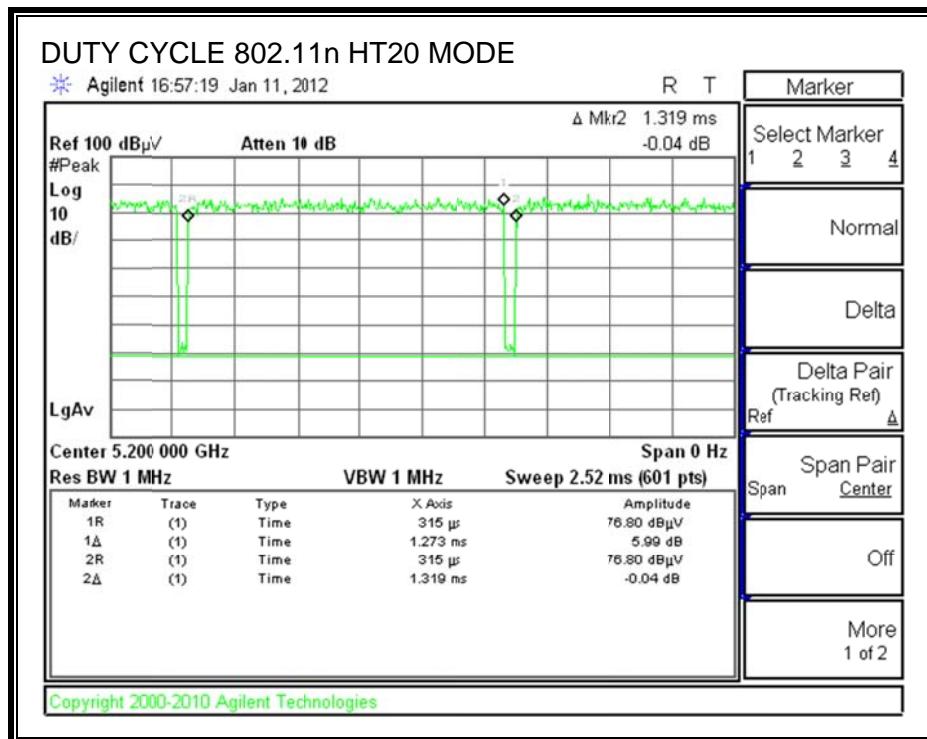
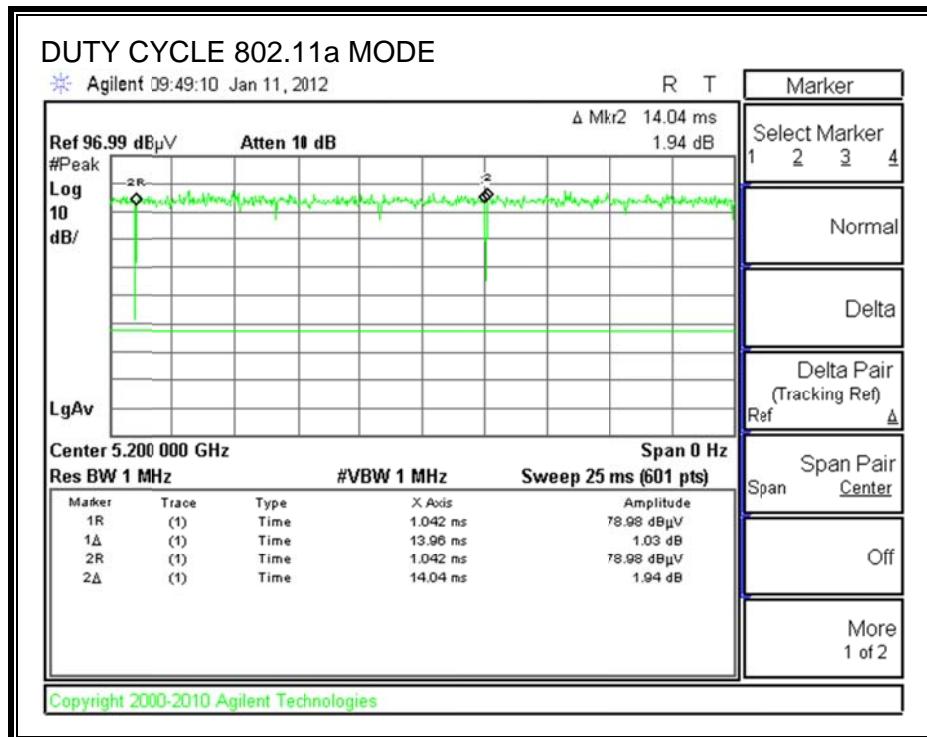
802.11n HT40 Mode, 13.5Mbps

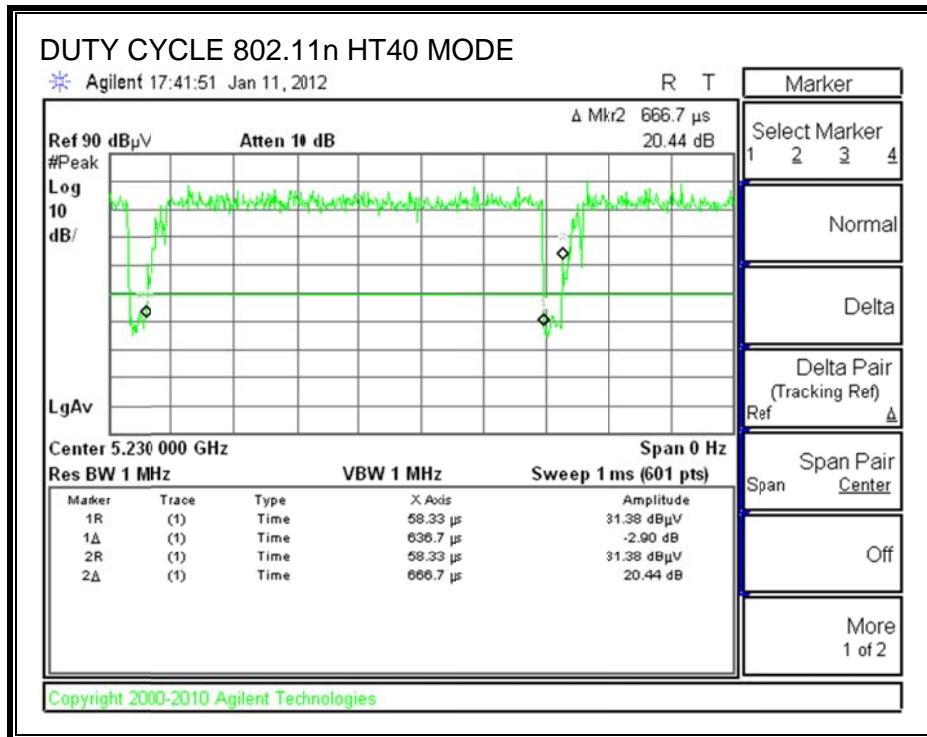
Frequency (MHz)	Tx on (msec)	Tx on + Tx off (msec)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
5230	0.6367	0.667	95.46	0.20
5310	0.6367	0.667	95.46	0.20
5590	0.6367	0.665	95.74	0.19
5795	0.6367	0.665	95.74	0.19

**5.3.2. MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS  
ABOVE 1 GHz**

The Duty Cycle is less than 98% and consistent, KDB 789033 Method AD with Power RMS Averaging and duty cycle correction is used.

### 5.3.3. DUTY CYCLE PLOTS





## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes Savvi Embedded Ceramic antenna, with the maximum gain as table below:

Frequency Band ( GHz)	Peak Gain (dBi)
2.4-2.5	1.1
4.9-5.8	3.2

## 5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Atheros AR93 Anwi Diagnostic Kernel Driver.

The test utility software used during testing was Atheros artgui Art2\_ver\_2\_14

## 5.6. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module connected to a host Laptop PC via a test fixture.

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:

All final tests in the 802.11a Mode (Legacy) were made at 9 Mb/s.

All final tests in the 802.11n HT20 Mode were made at MCS0

All final tests in the 802.11n HT40 Mode were made at MCS0

Worst-case mode and channel used for 30-1000 MHz radiated was the mode and channel with the highest output power.

To determine the worst-position of highest emissions, the EUT was investigated for X, Y, Z positions, and the worst position was turned out to be antenna at Y-position.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Delta	GA240PE1-00	CN-OJ211H-48661-134-09VU	DoC
Laptop	Dell	Precision M6200	FBSNQ61	DoC
PCB Board	Qualcomm	NA	NA	NA
Antenna AC Adapter	V-Infinity	3A-124DA09	1039A	DoC

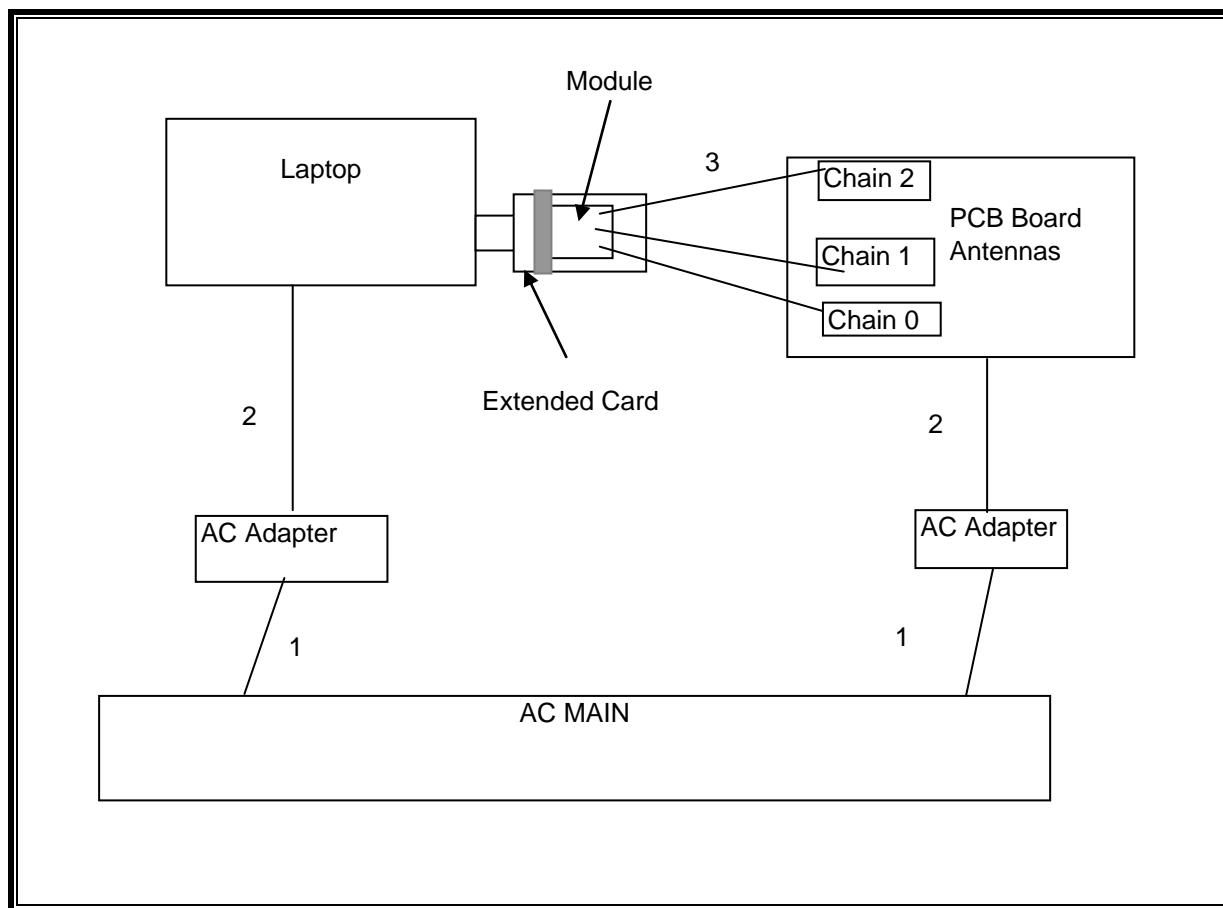
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US115V	Unshielded	1m	Ferrite on laptop's end
2	DC	2	DC	Unshielded	2m	NA
3	Ant Port	1		Unshielded	0.2m	NA

### TEST SETUP

The EUT is connected to a host laptop computer via a PCI-E adapter board during the test. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	6/14/2012
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	8/2/2012
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02601	CNR
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02679	CNR
Reject Filter, 5.47-5.725 GHz	Micro-Tronics	BRC13191	N02678	CNR
Power Sensor, 4.2 GHz	Agilent / HP	8482A	N02369	4/14/2013
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	6/14/2012
Power Meter	Agilent / HP	437B	None	2/8/2012
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	8/15/2012
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00996	5/4/2012
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/2012
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	None	7/6/2012
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	7/16/2012
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	1/27/2012

## 7. ANTENNA PORT TEST RESULTS

### 7.1. OUTPUT POWER

#### 7.1.1. 802.11a MODE IN THE 5.3 GHz BAND

##### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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 (3 chains) (dB)	Correlated Chains Directional Gain (dBi)
3.20	4.77	7.97

## RESULTS

### Limits

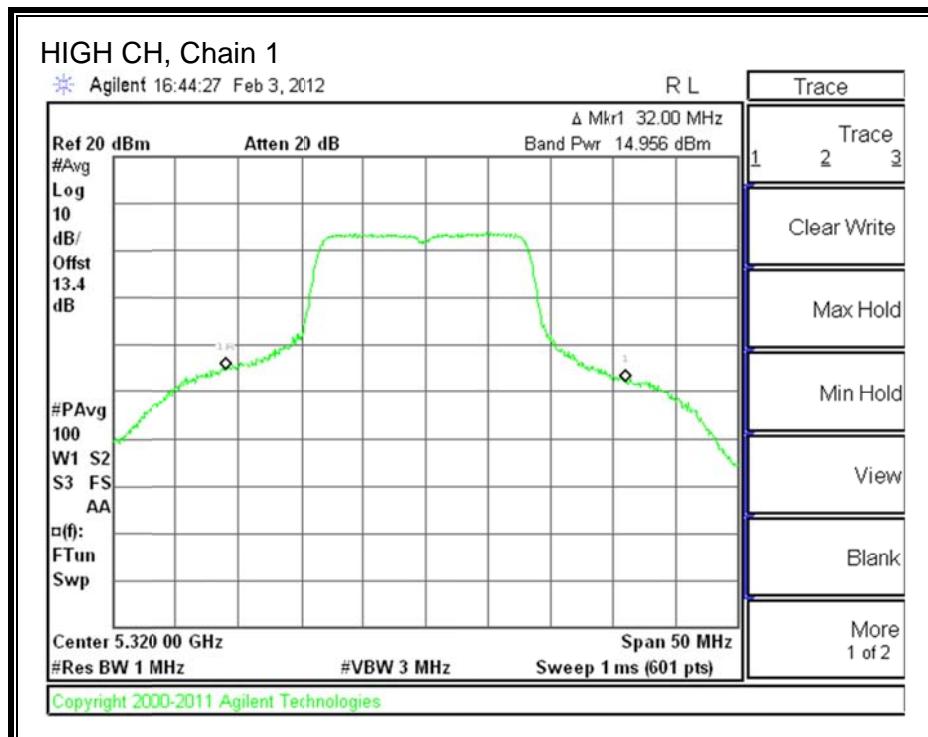
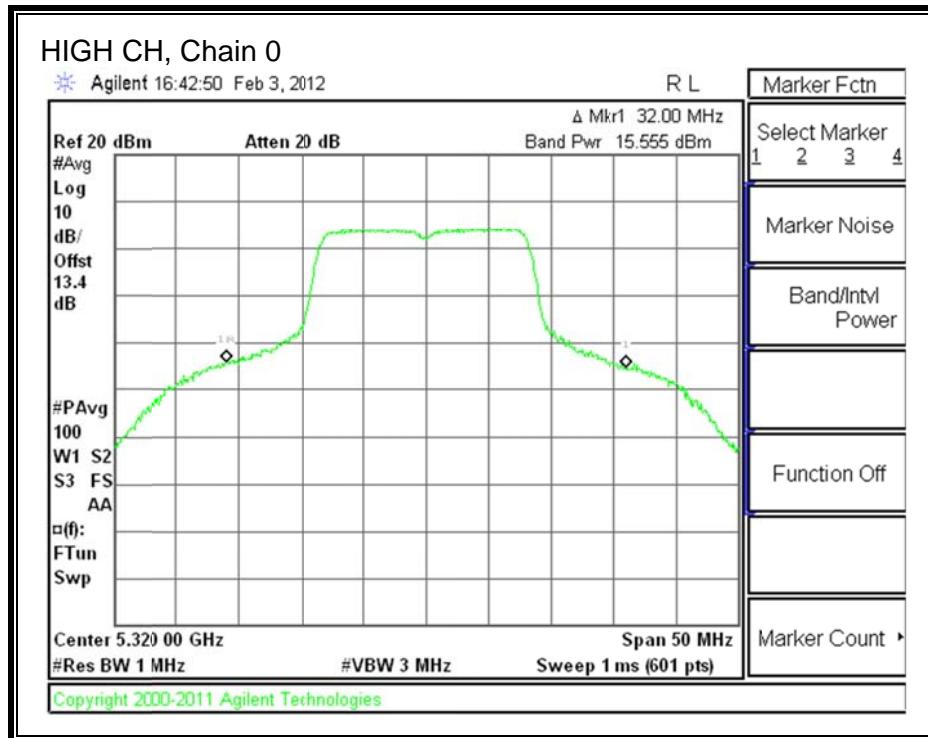
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
High	5320	24	32.0	26.05	7.97	22.03	9.03

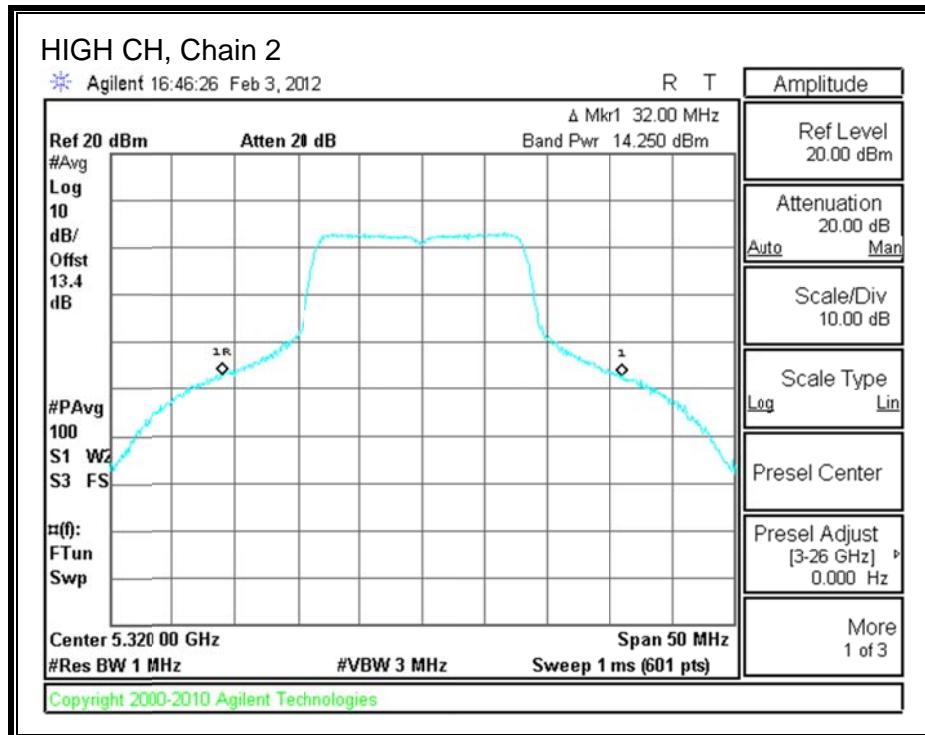
Duty Cycle CF (dB)	0.15	Included in Calculations of Corr'd Power & PPSD
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### Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
High	5320	15.56	14.96	14.25	19.88	22.03	-2.15

**802.11a 5.3GHz**





## 7.1.2. 802.11HT20 MODE IN THE 5.3 GHz BAND

### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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:

Use this table for correlated chains and equal antenna gain

Antenna Gain (dBi)	10 * Log (3 chains) (dB)	Correlated Chains Directional Gain (dBi)
3.20	4.77	7.97

## RESULTS

### Limits

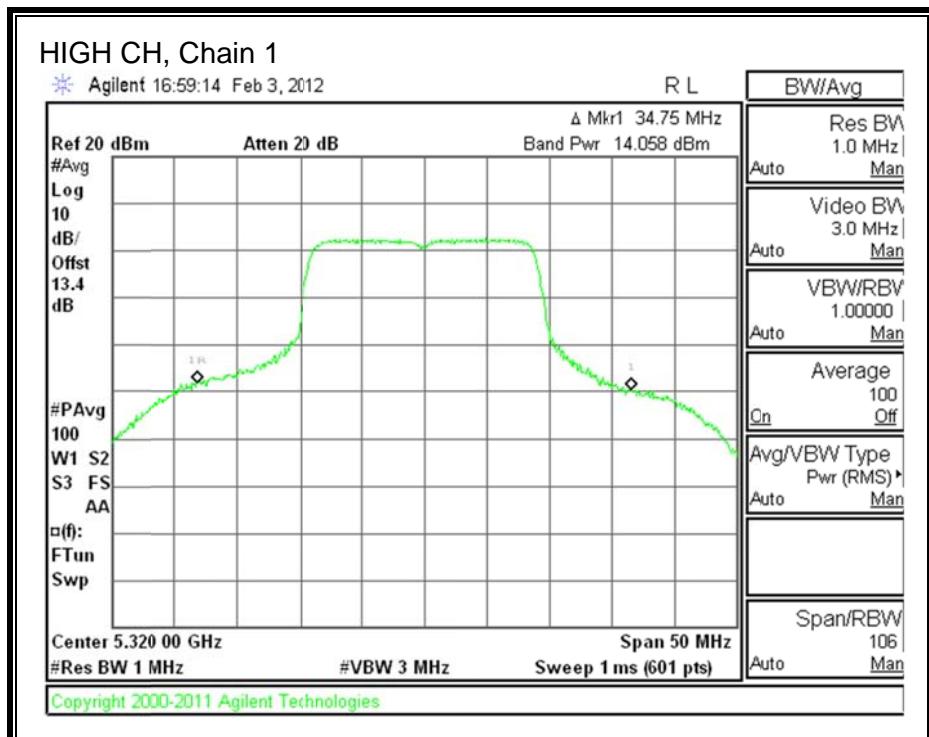
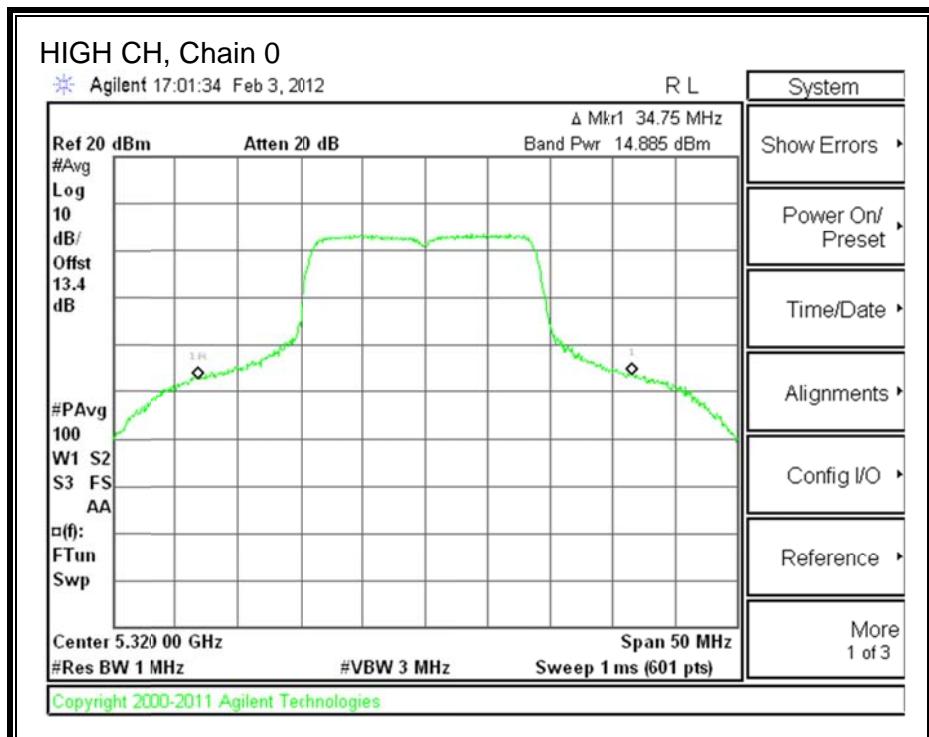
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
High	5320	24	34.8	26.42	7.97	22.03	9.03

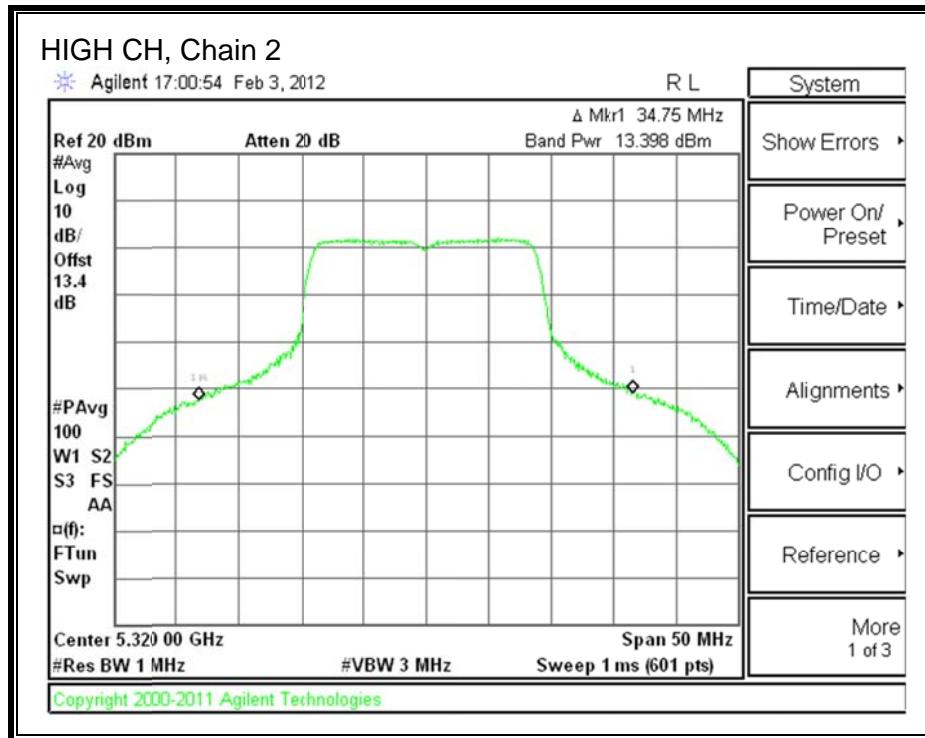
Duty Cycle CF (dB)	0.15	Included in Calculations of Corr'd Power & PPSD
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### Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
High	5320	14.89	14.06	13.40	19.08	22.03	-2.95

**5.3GHz, 802.11HT20**





### 7.1.3. 802.11a MODE IN THE 5.6 GHz BAND

#### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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 (3 chains) (dB)	Correlated Chains Directional Gain (dBi)
3.20	4.77	7.97

## RESULTS

Legacy Mode

### Limits

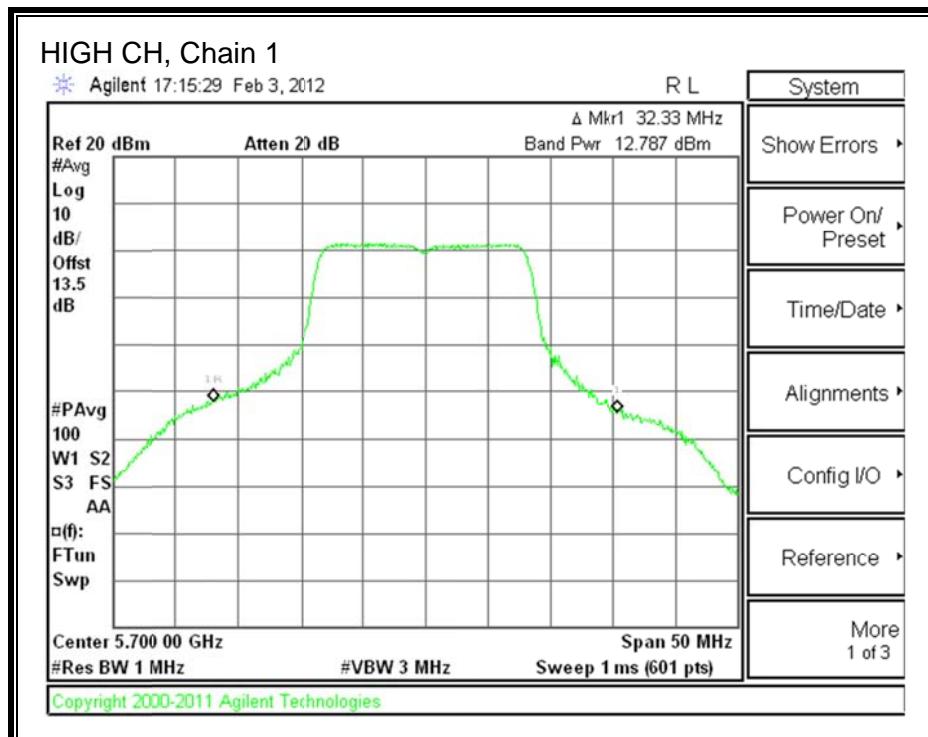
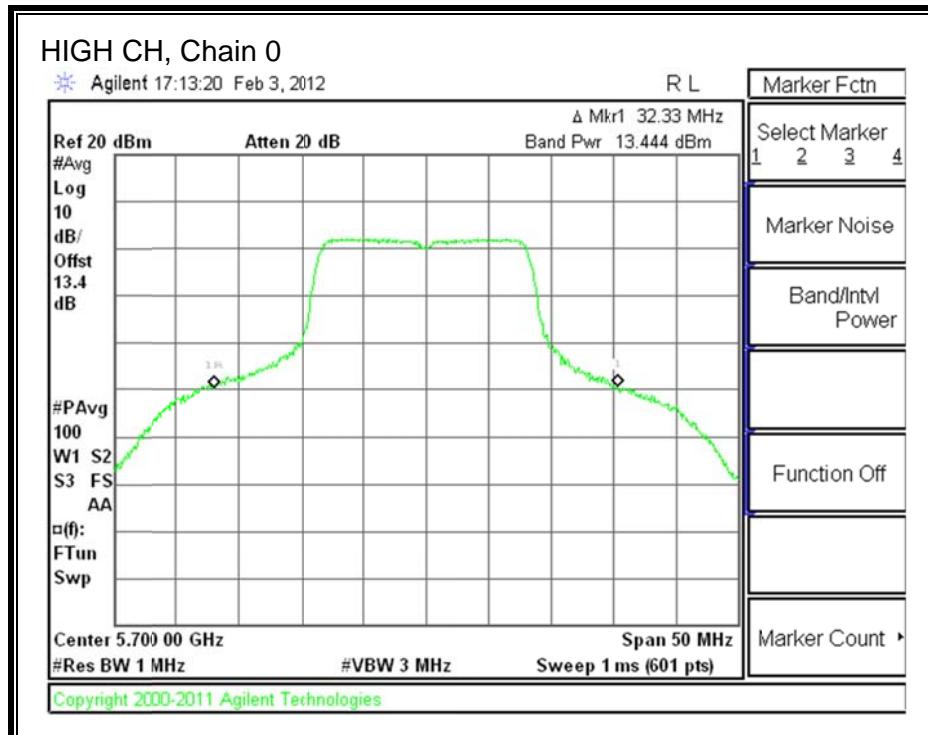
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
High	5700	24	32.3	26.09	7.97	22.03	9.03

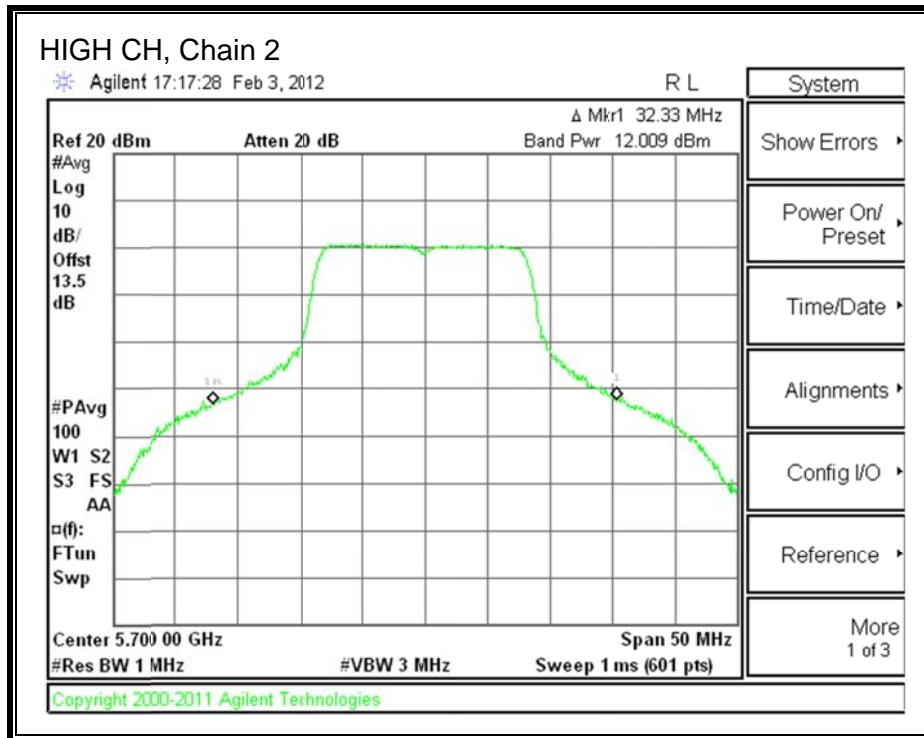
Duty Cycle CF (dB)	0.02	Included in Calculations of Corr'd Power & PPSD
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### Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
High	5700	13.44	12.79	12.01	17.58	22.03	-4.45

**5.6GHz, 802.11a**





#### 7.1.4. 802.11HT20 MODE IN THE 5.6 GHz BAND

##### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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 (3 chains) (dB)	Correlated Chains Directional Gain (dBi)
3.20	4.77	7.97

## RESULTS

HT20 Mode

### Limits

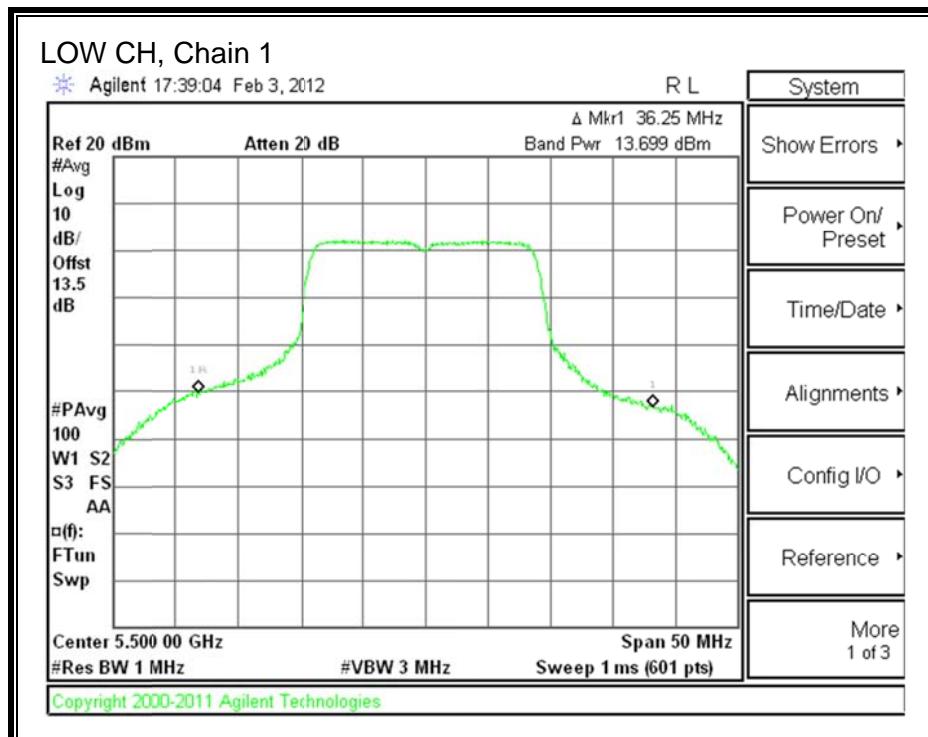
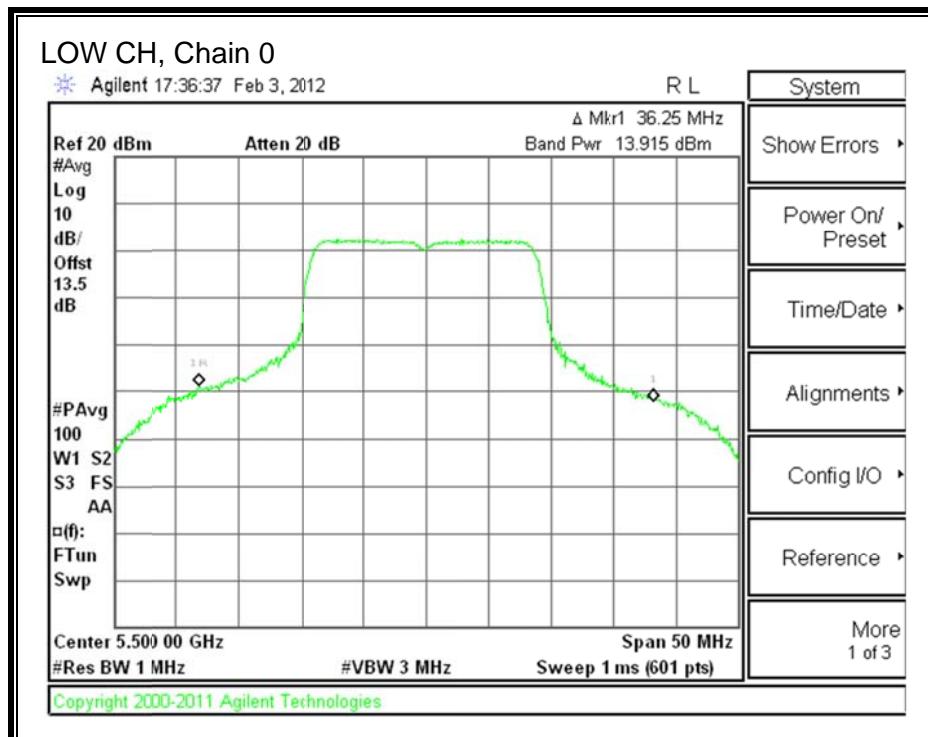
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5500	24	36.25	26.59	7.97	22.03	9.03
Mid	5580	24	36.25	26.59	7.97	22.03	9.03
High	5700	24	36.25	26.59	7.97	22.03	9.03

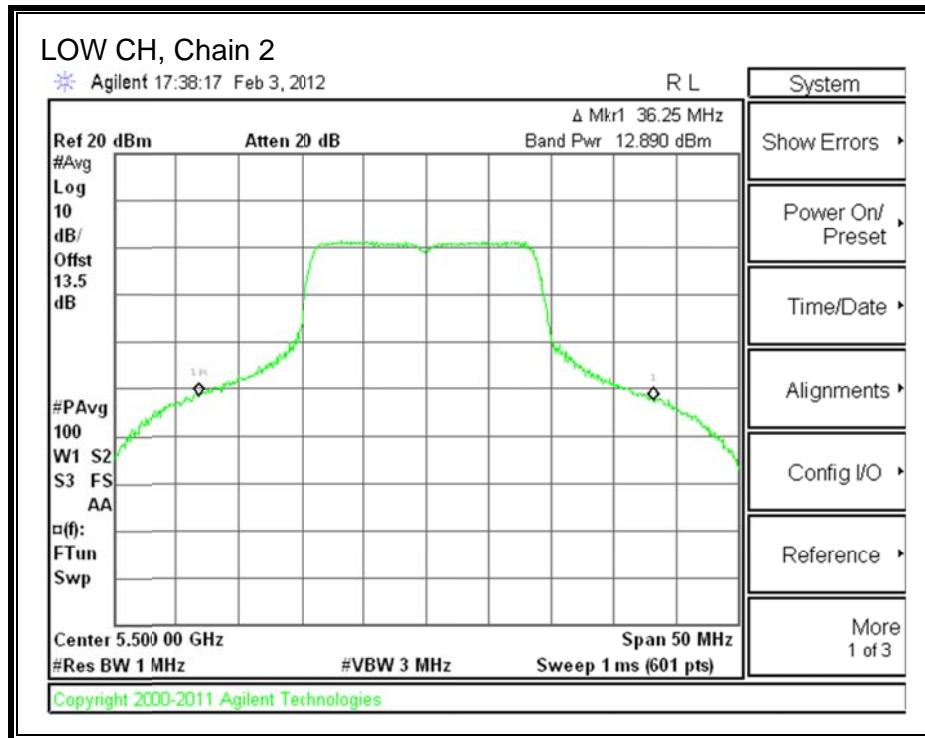
Duty Cycle CF (dB)	0.20	Included in Calculations of Corr'd Power & PPSD
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### Output Power Results

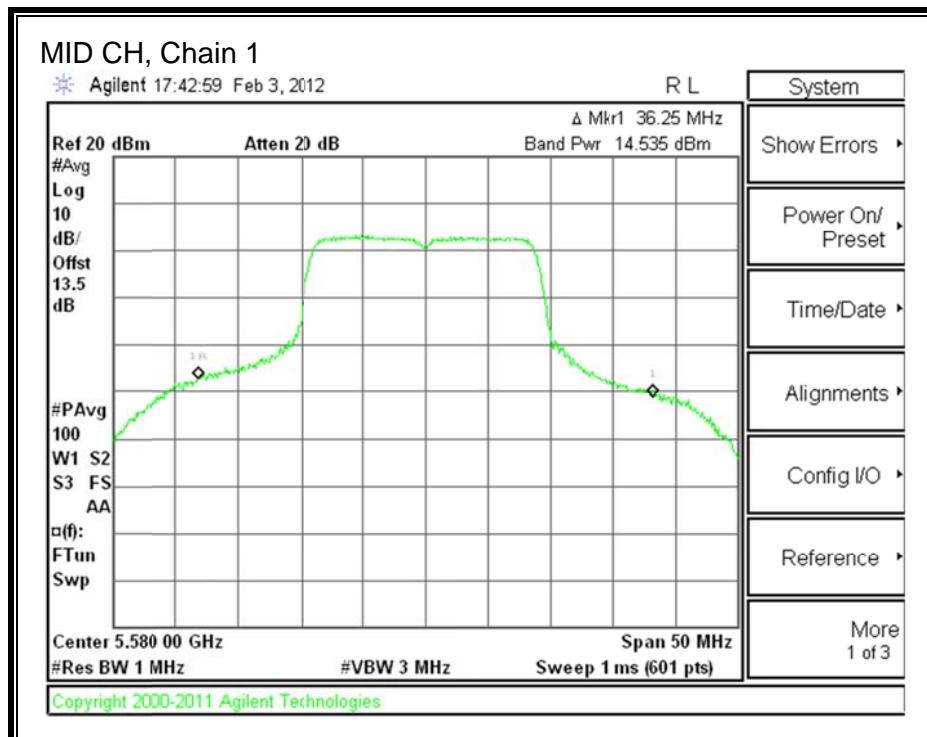
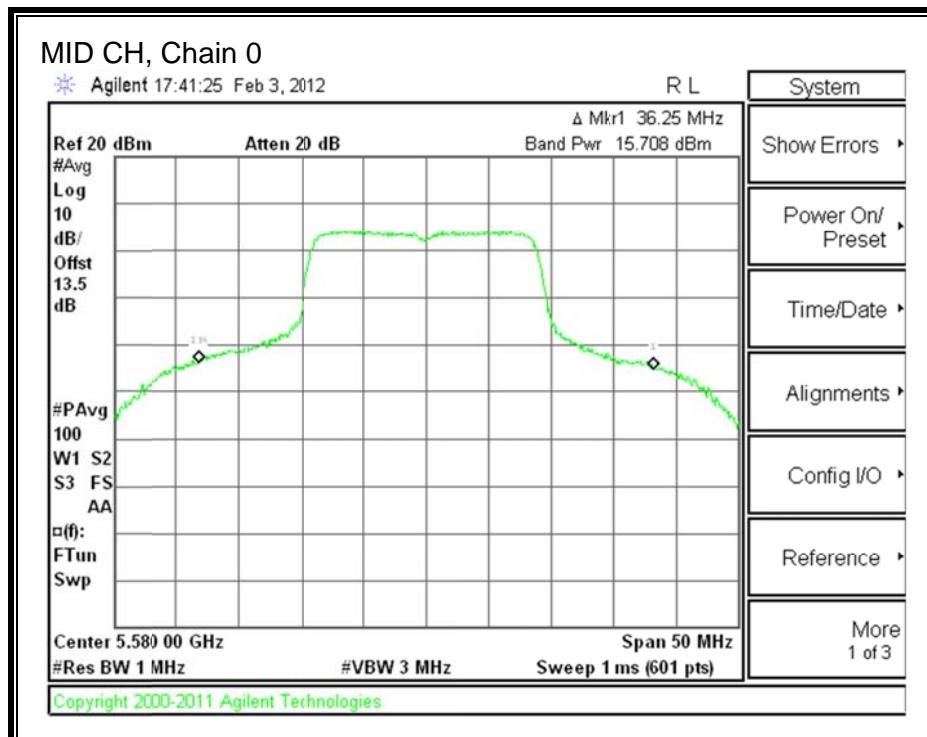
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.92	13.70	12.89	18.49	22.03	-3.54
Mid	5580	15.71	14.54	14.03	19.79	22.03	-2.24
High	5700	10.70	10.62	9.37	15.24	22.03	-6.79

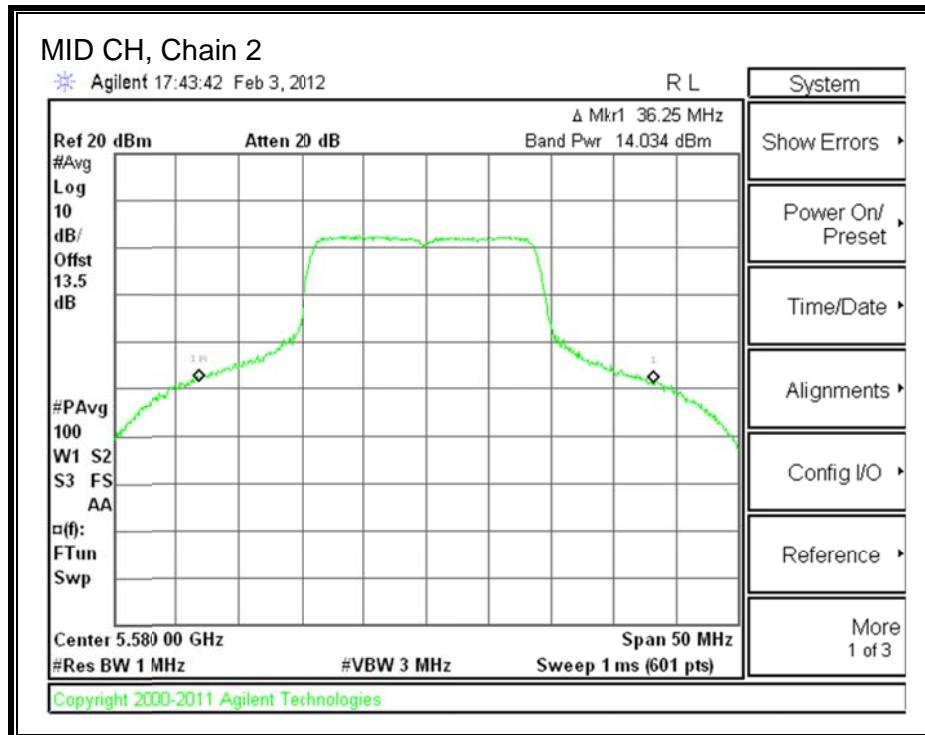
**5.6GHz, 802.11HT20**



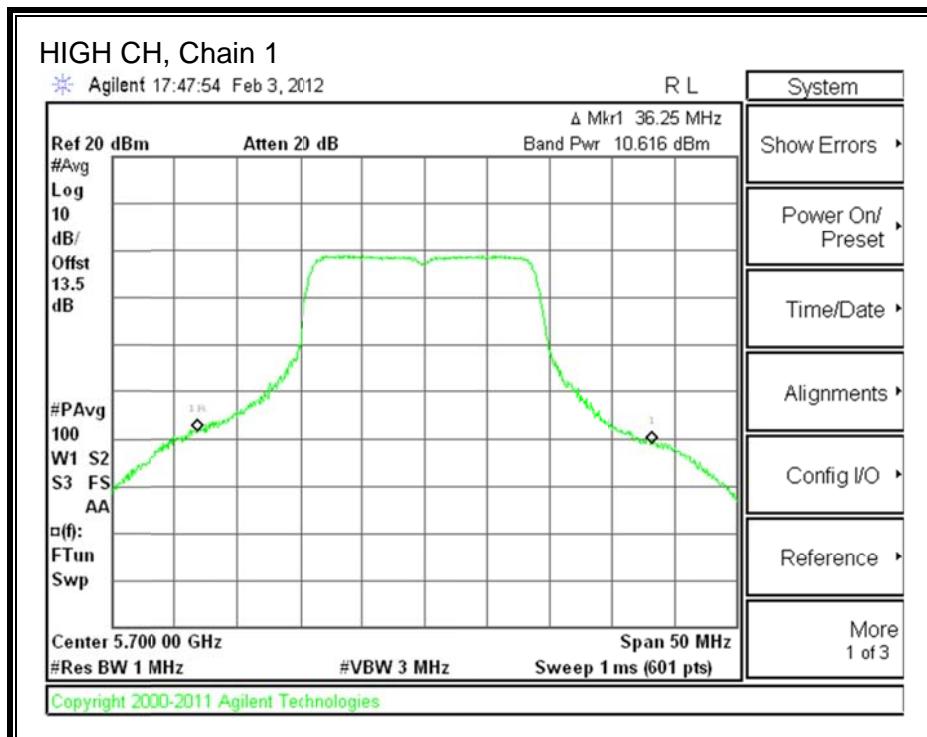
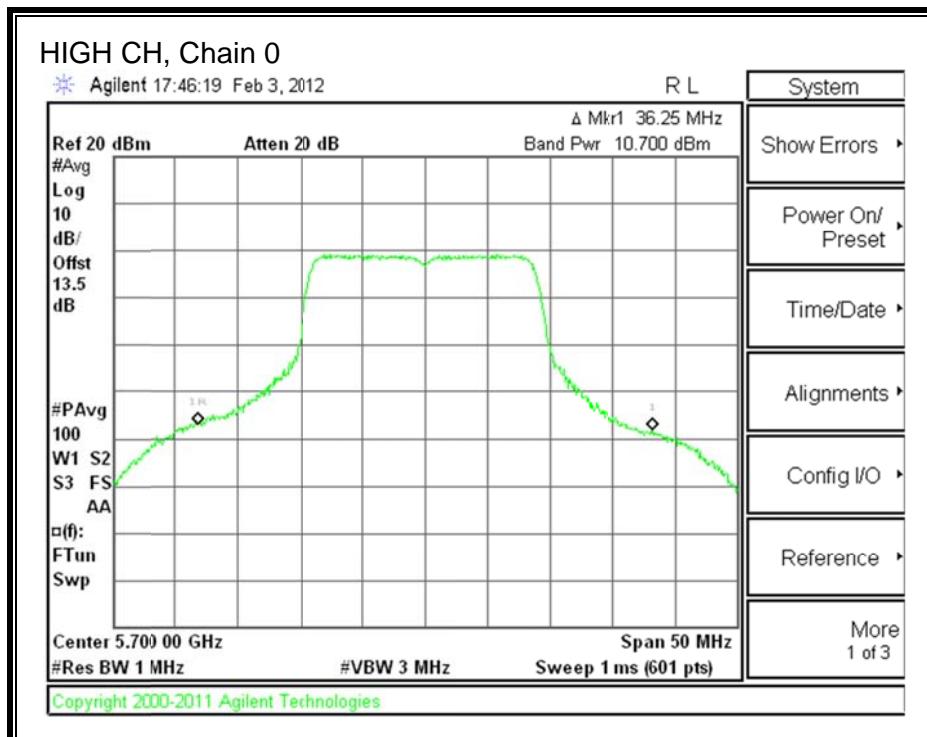


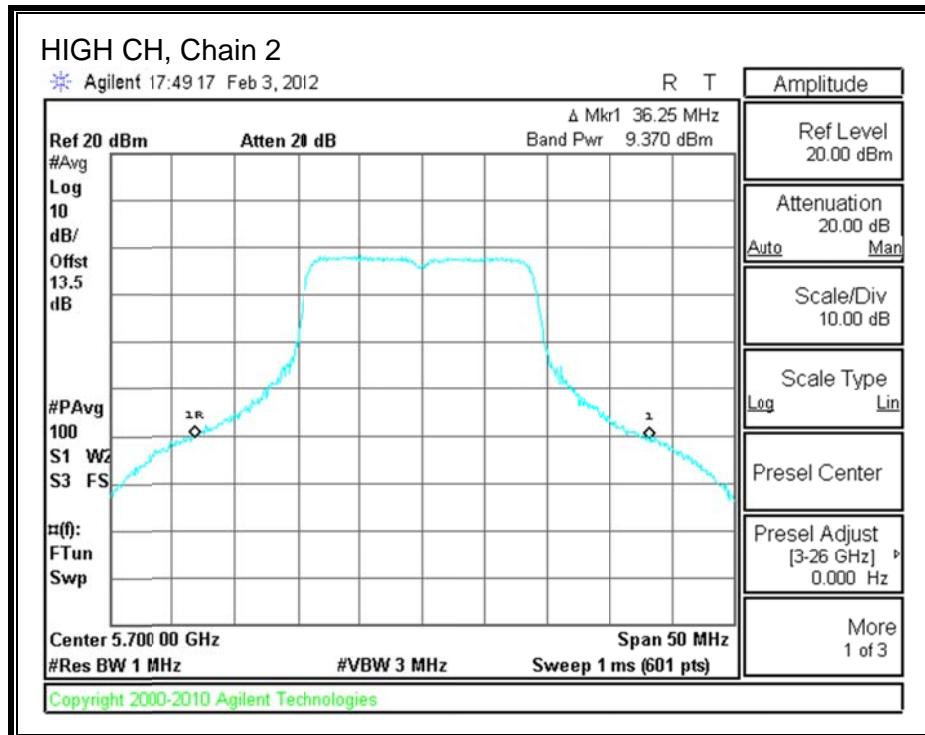
**5.6GHz, 802.11HT20**





**5.6GHz, 802.11HT20**





### 7.1.5. 802.11HT40 MODE IN THE 5.6 GHz BAND

#### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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 unequal among the chains. The directional gain is:

Antenna Gain (dBi)	10 * Log (3 chains) (dB)	Correlated Chains Directional Gain (dBi)
3.20	4.77	7.97

## RESULTS

### Limits

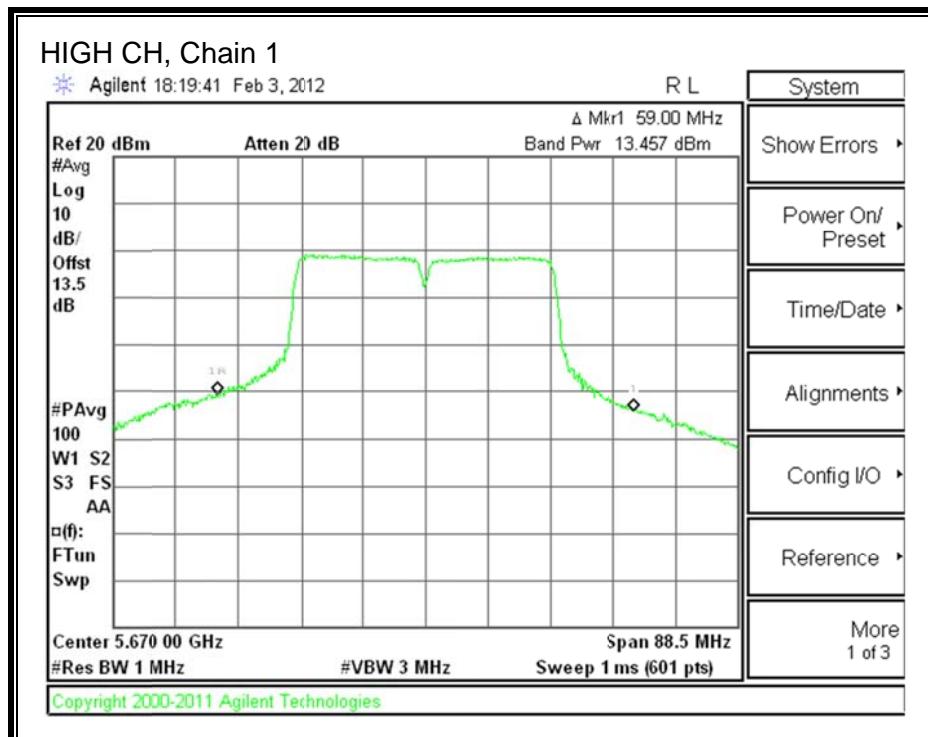
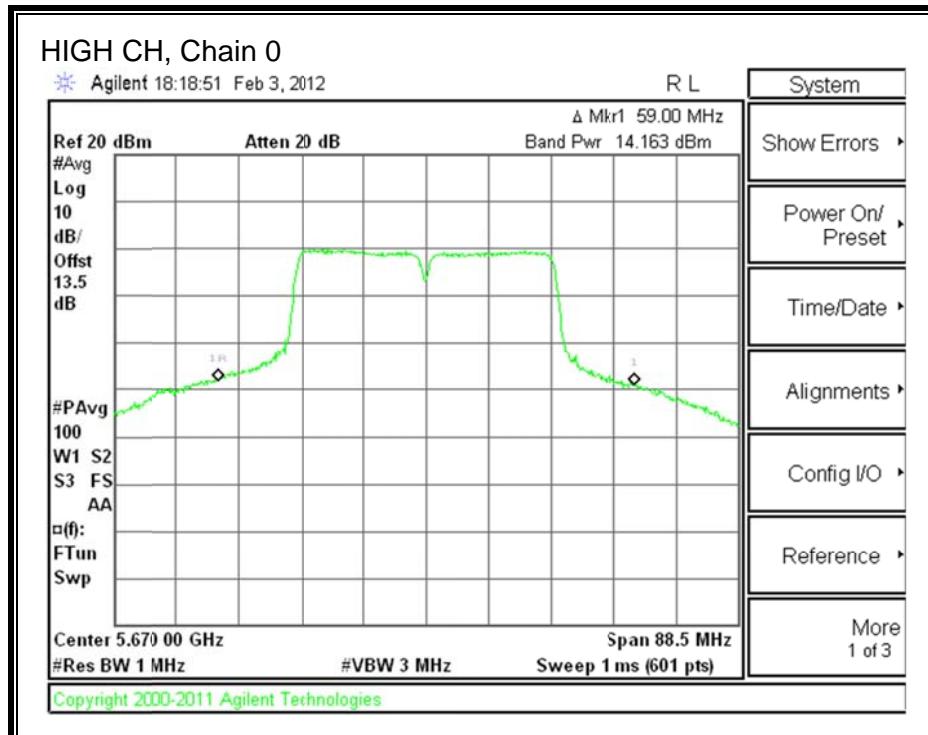
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5510	24	59.0	28.71	7.97	22.03	9.03
Mid	5550	24	59.0	28.71	7.97	22.03	9.03
High	5670	24	59.0	28.71	7.97	22.03	9.03

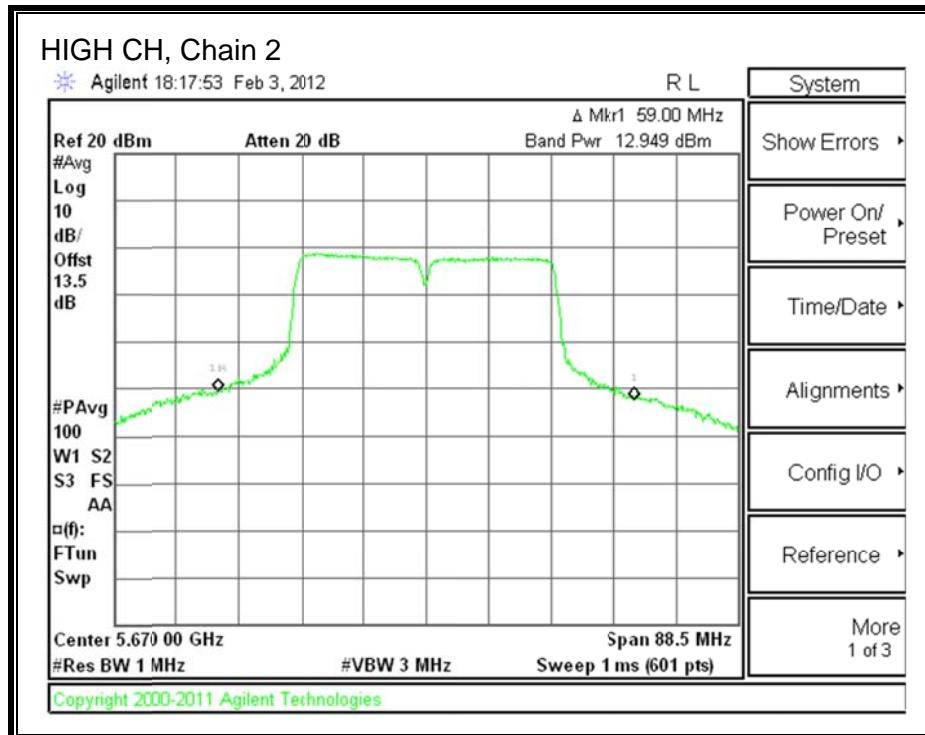
Duty Cycle CF (dB)	0.20	Included in Calculations of Corr'd Power & PPSD
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### Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	11.49	10.30	10.08	15.64	22.03	-6.39
Mid	5550	14.16	13.46	12.95	18.52	22.03	-3.51
High	5670	13.20	11.92	11.54	17.25	22.03	-4.78

**5.6GHz, 802.11HT40**





## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. 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, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

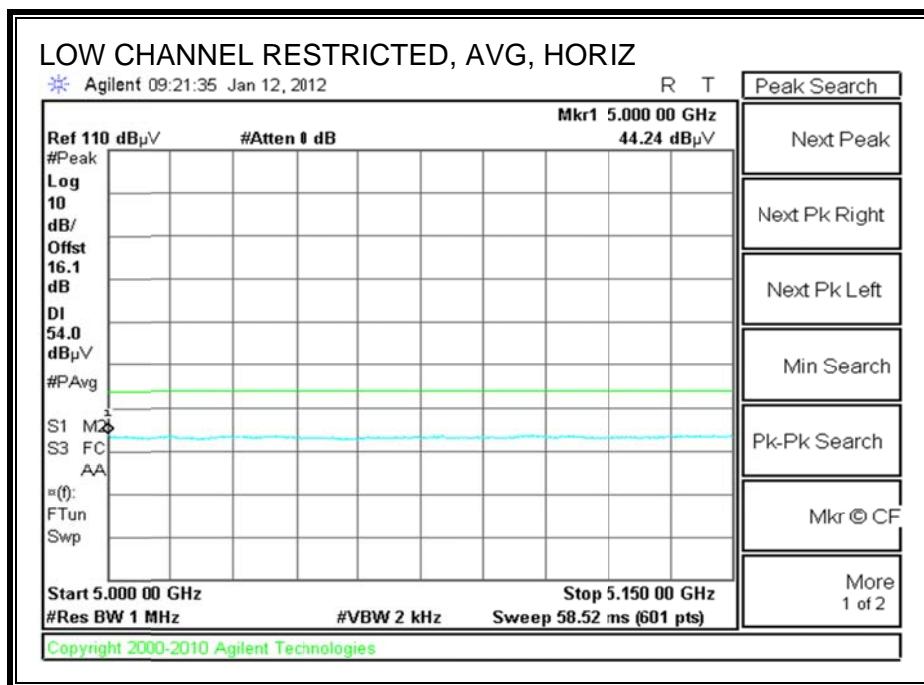
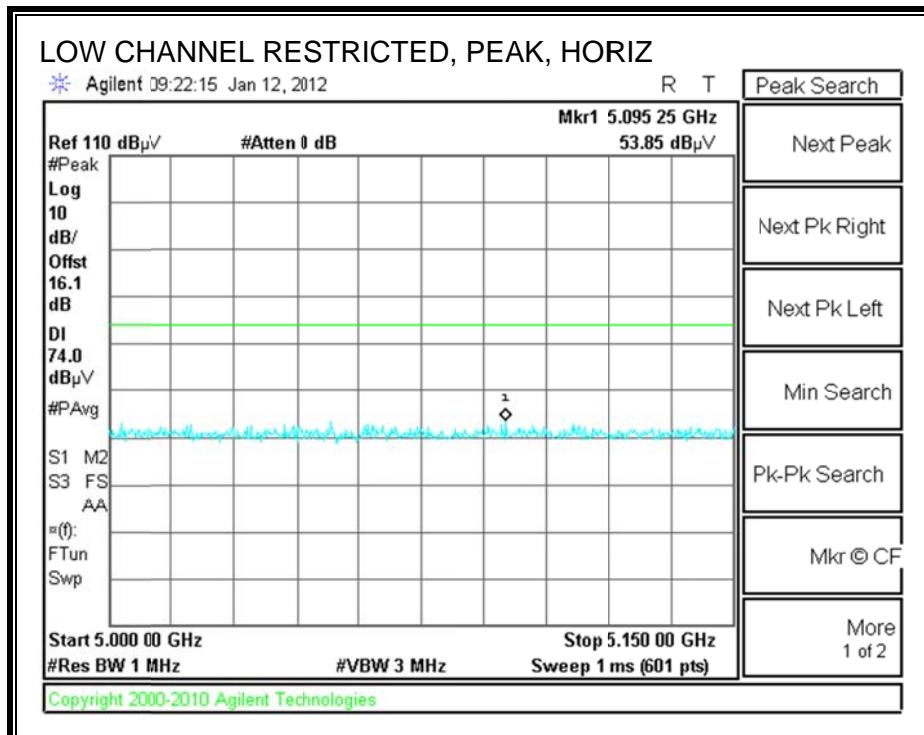
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

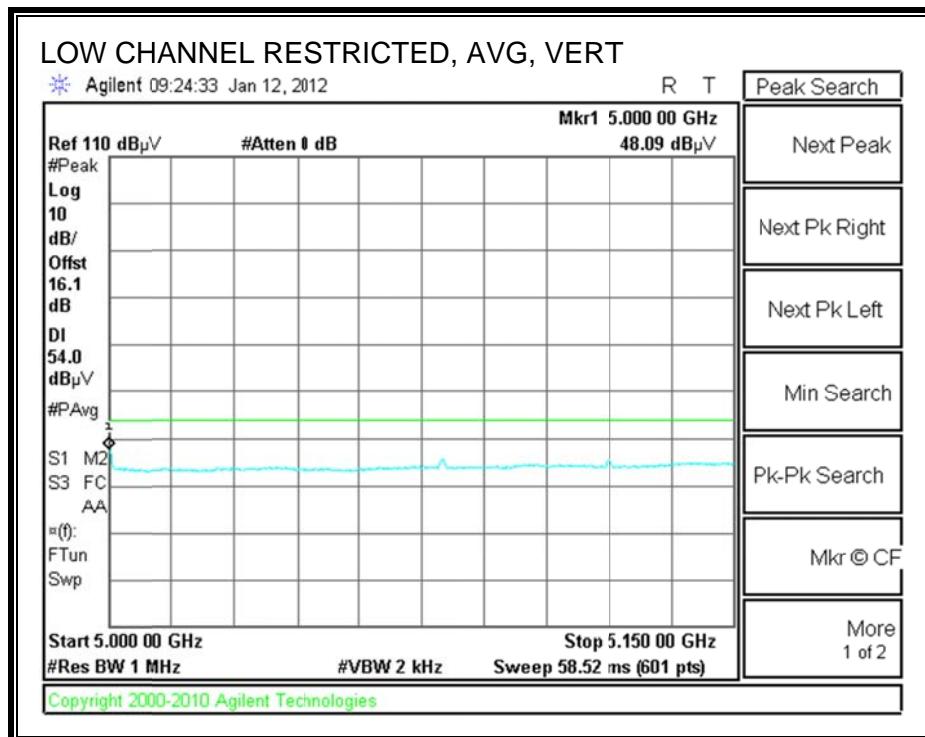
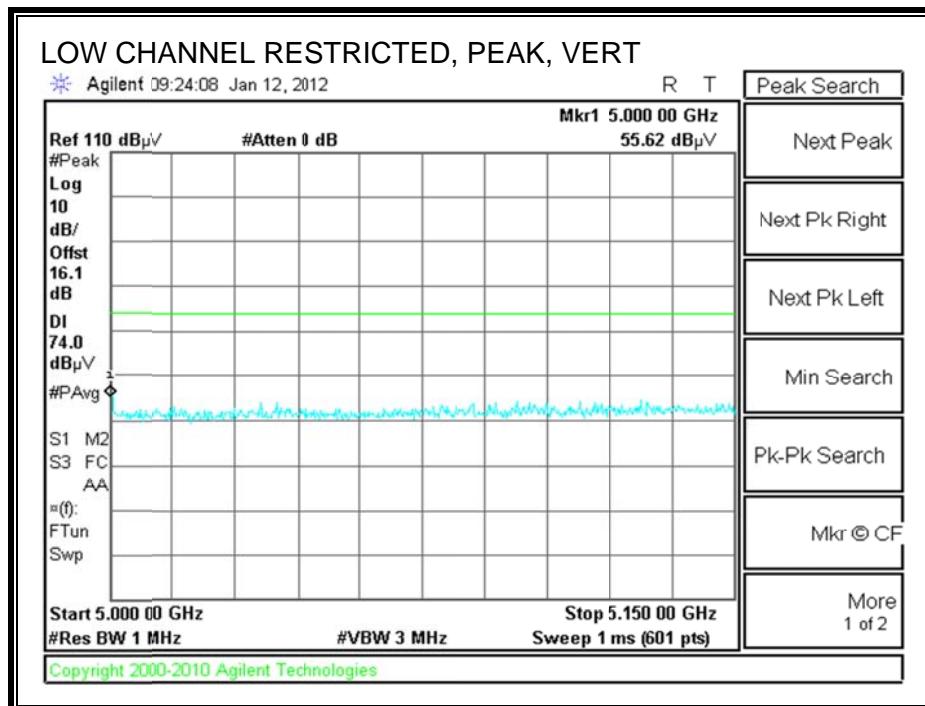
## 8.2. TRANSMITTER ABOVE 1 GHz

### 8.2.1. 802.11a MODE IN THE LOWER 5.2 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

### High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang  
Date: 01/05/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.2GHz, a mode

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HFF	High Pass Filter	

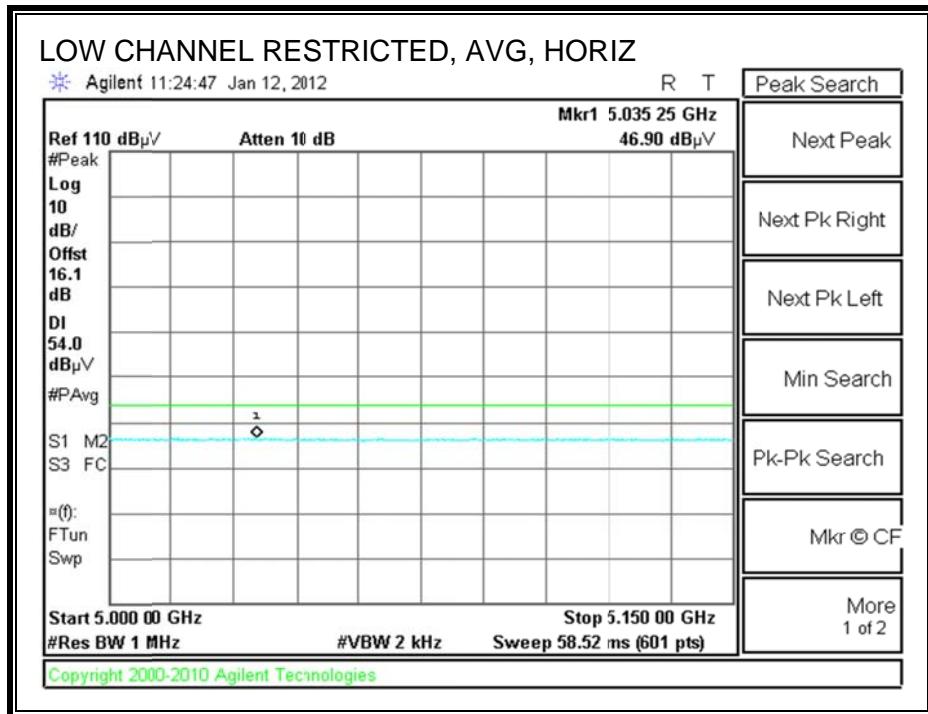
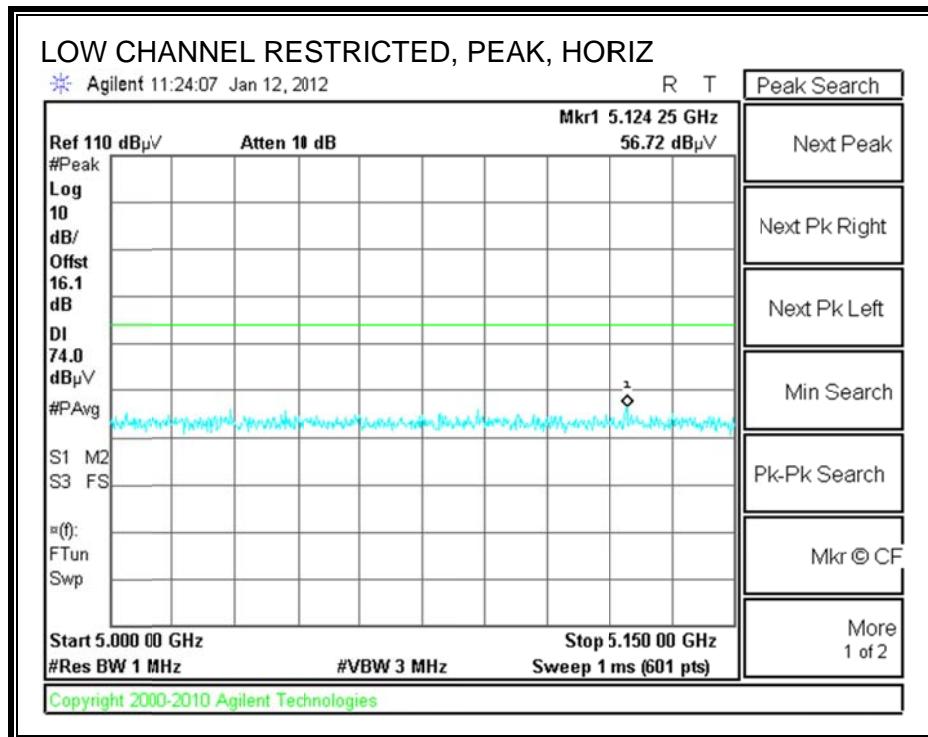
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr	Corr.	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>low Ch, 5180MHz</b>													
15.540	3.0	33.9	39.9	11.3	-32.3	0.0	0.7	53.5	74.0	-20.5	H	P	
15.540	3.0	22.1	39.9	11.3	-32.3	0.0	0.7	41.7	54.0	-12.3	H	A	
15.540	3.0	33.8	39.9	11.3	-32.3	0.0	0.7	53.4	74.0	-20.6	V	P	
15.540	3.0	21.8	39.9	11.3	-32.3	0.0	0.7	41.5	54.0	-12.5	V	A	
<b>Mid Ch, 5200MHz</b>													
15.600	3.0	44.4	39.7	11.4	-32.3	0.0	0.7	63.9	74.0	-10.1	H	P	
15.600	3.0	27.4	39.7	11.4	-32.3	0.0	0.7	46.9	54.0	-7.1	H	A	
15.600	3.0	42.5	39.7	11.4	-32.3	0.0	0.7	62.0	74.0	-12.0	V	P	
15.600	3.0	25.9	39.7	11.4	-32.3	0.0	0.7	45.4	54.0	-8.6	V	A	
<b>High Ch, 5320MHz</b>													
10.640	3.0	46.2	38.4	9.1	-34.2	0.0	0.8	60.2	74.0	-13.8	H	P	
10.640	3.0	32.1	38.4	9.1	-34.2	0.0	0.8	46.1	54.0	-7.9	H	A	
15.960	3.0	43.8	38.7	11.5	-32.2	0.0	0.7	62.5	74.0	-11.5	H	P	
15.960	3.0	28.6	38.7	11.5	-32.2	0.0	0.7	47.4	54.0	-6.6	H	A	
10.640	3.0	42.3	38.4	9.1	-34.2	0.0	0.8	56.3	74.0	-17.7	V	P	
10.640	3.0	28.1	38.4	9.1	-34.2	0.0	0.8	42.1	54.0	-11.9	V	A	
15.960	3.0	44.5	38.7	11.5	-32.2	0.0	0.7	63.2	74.0	-10.8	V	P	
15.960	3.0	29.4	38.7	11.5	-32.2	0.0	0.7	48.2	54.0	-5.8	V	A	

Rev. 4.1.2.7

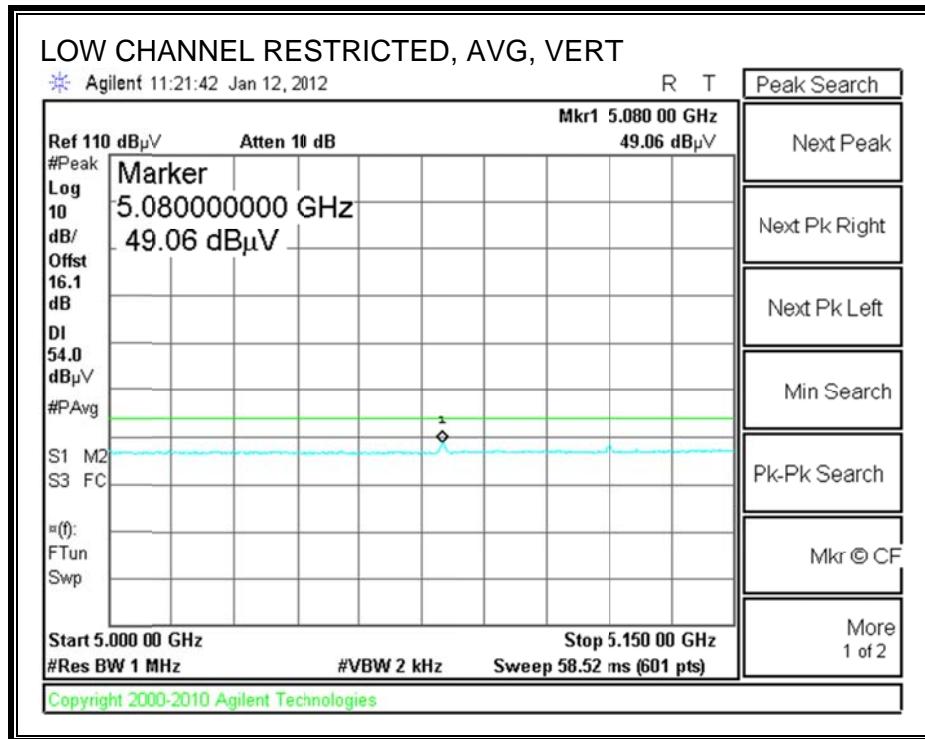
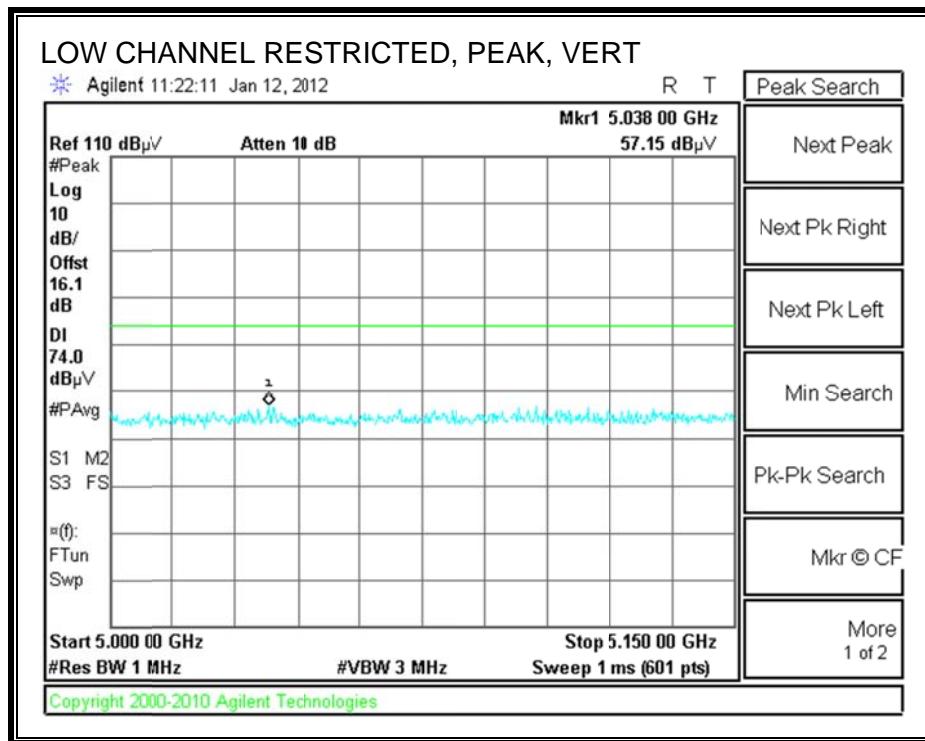
Note: No other emissions were detected above the system noise floor.

### 8.2.2. 802.11n HT20 MODE IN 5.2 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**  
**Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Chin Pang  
Date: 01/05/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.2GHz Band, HT20

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average FieldStrength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HFF	High Pass Filter	

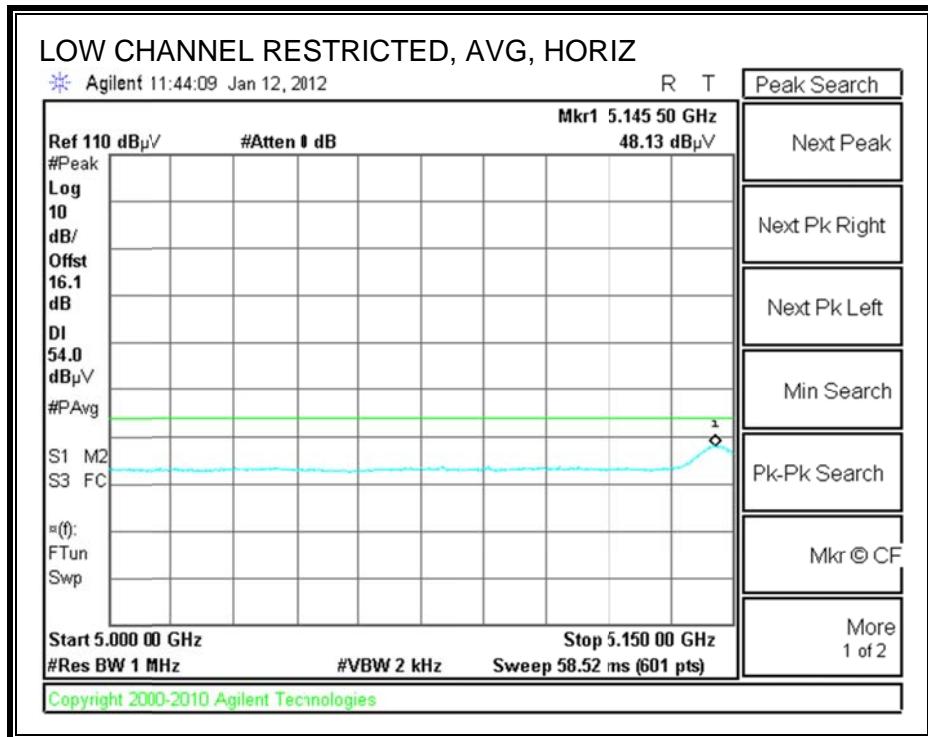
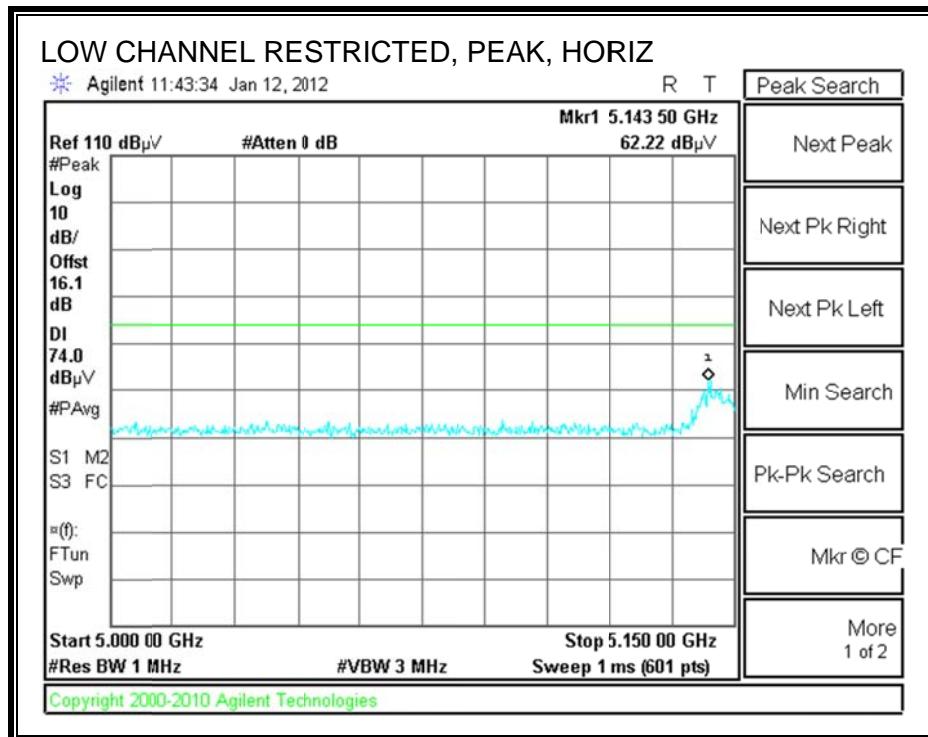
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
<b>Low Ch, 5180MHz</b>													
15.540	3.0	33.9	39.9	11.3	-32.3	0.0	0.0	52.8	74.0	-21.2	H	P	
15.540	3.0	21.8	39.9	11.3	-32.3	0.0	0.0	40.7	54.0	-13.3	H	A	
15.540	3.0	34.3	39.9	11.3	-32.3	0.0	0.0	53.2	74.0	-20.8	V	P	
15.540	3.0	21.6	39.9	11.3	-32.3	0.0	0.0	40.5	54.0	-13.5	V	A	
<b>Mid Ch, 5200MHz</b>													
15.600	3.0	35.7	39.7	11.4	-32.3	0.0	0.0	54.5	74.0	-19.5	H	P	
15.600	3.0	22.4	39.7	11.4	-32.3	0.0	0.0	41.2	54.0	-12.8	H	A	
15.600	3.0	33.9	39.7	11.4	-32.3	0.0	0.0	52.7	74.0	-21.3	V	P	
15.600	3.0	21.6	39.7	11.4	-32.3	0.0	0.0	40.3	54.0	-13.7	V	A	
<b>High Ch, 5240MHz</b>													
15.720	3.0	33.5	39.4	11.4	-32.3	0.0	0.0	52.0	74.0	-22.0	H	P	
15.720	3.0	20.7	39.4	11.4	-32.3	0.0	0.0	39.2	54.0	-14.8	H	A	
15.720	3.0	33.2	39.4	11.4	-32.3	0.0	0.0	51.8	74.0	-22.2	V	P	
15.720	3.0	20.8	39.4	11.4	-32.3	0.0	0.0	39.3	54.0	-14.7	V	A	

Rev. 4.1.2.7

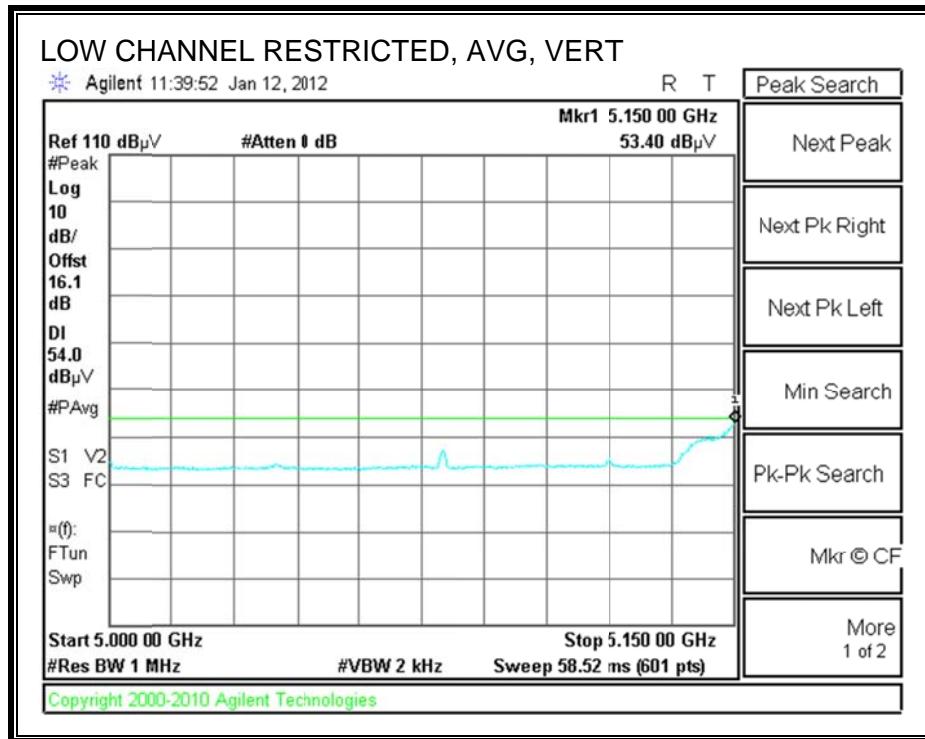
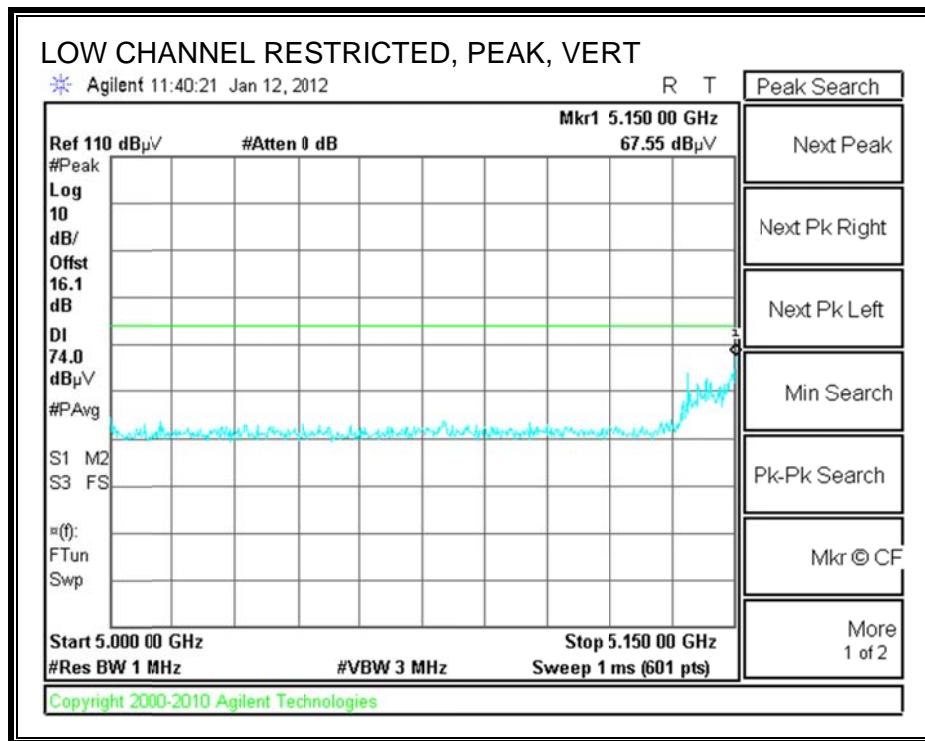
Note: No other emissions were detected above the system noise floor.

### 8.2.3. 802.11n HT40 MODE IN 5.2 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**  
**Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Chin Pang  
Date: 01/05/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.2GHz Band, HT40

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HFF	High Pass Filter	

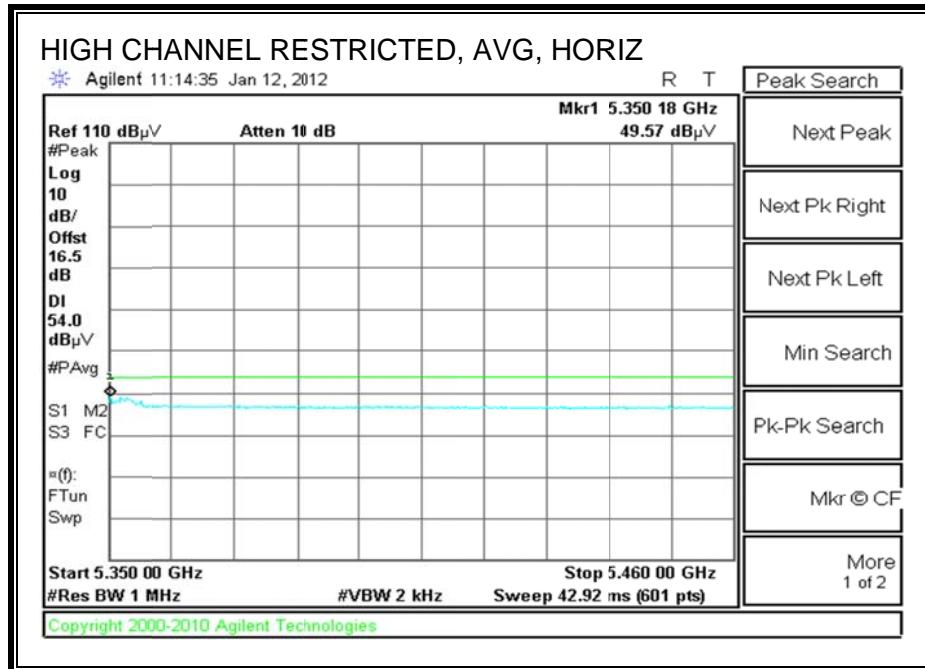
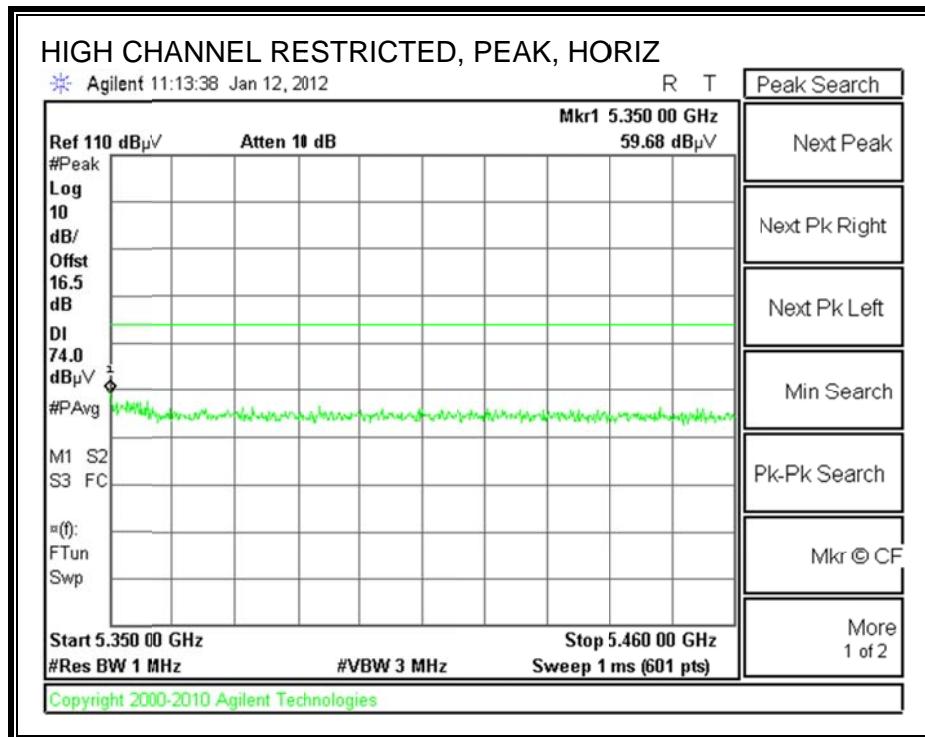
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
<b>Low Ch, 5190MHz</b>													
15.570	3.0	34.2	39.8	11.4	-32.3	0.0	0.0	53.0	74.0	-21.0	H	P	
15.570	3.0	22.2	39.8	11.4	-32.3	0.0	0.0	41.0	54.0	-13.0	H	A	
15.570	3.0	33.8	39.8	11.4	-32.3	0.0	0.0	52.6	74.0	-21.4	V	P	
15.570	3.0	21.6	39.8	11.4	-32.3	0.0	0.0	40.5	54.0	-13.5	V	A	
<b>High Ch, 5230MHz</b>													
15.690	3.0	33.6	39.4	11.4	-32.3	0.0	0.0	52.2	74.0	-21.8	H	P	
15.690	3.0	21.9	39.4	11.4	-32.3	0.0	0.0	40.5	54.0	-13.5	H	A	
15.690	3.0	33.3	39.4	11.4	-32.3	0.0	0.0	51.9	74.0	-22.1	V	P	
15.690	3.0	21.3	39.4	11.4	-32.3	0.0	0.0	39.9	54.0	-14.1	V	A	

Rev. 4.1.2.7

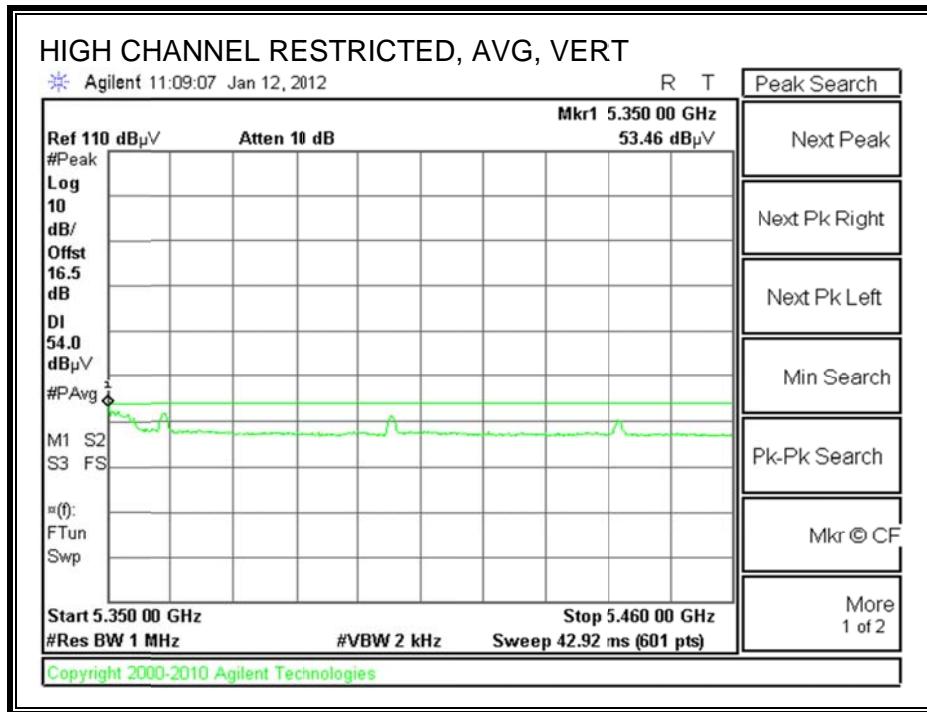
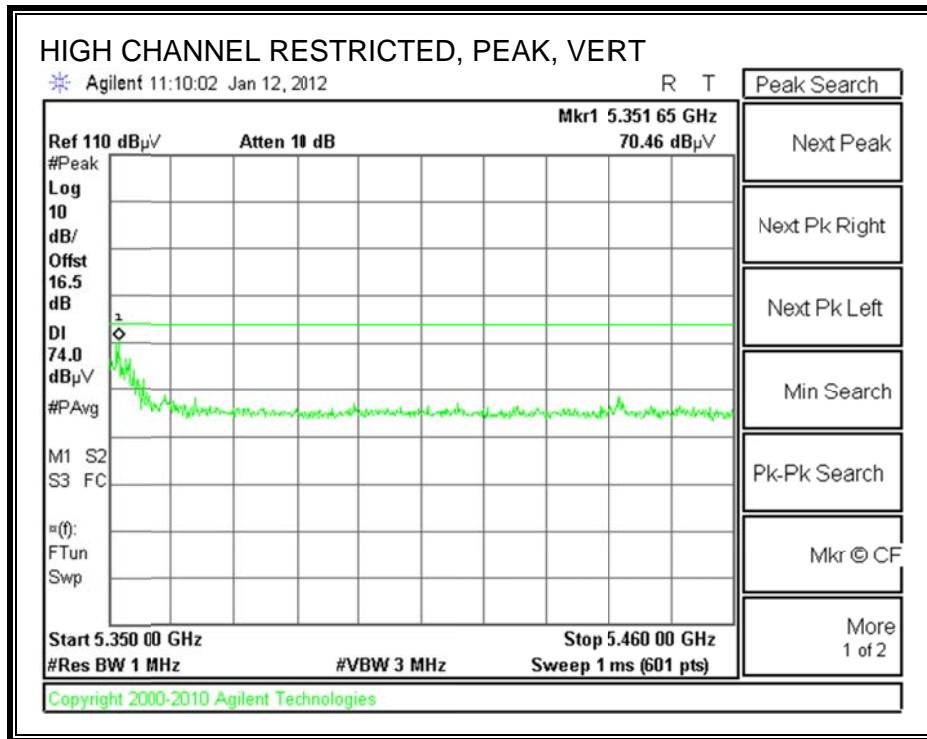
Note: No other emissions were detected above the system noise floor.

### 8.2.4. 802.11a MODE IN 5.3 GHz BAND

#### RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

### High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang  
Date: 01/05/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.3GHz Band, TX, a mode

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HFF	High Pass Filter	

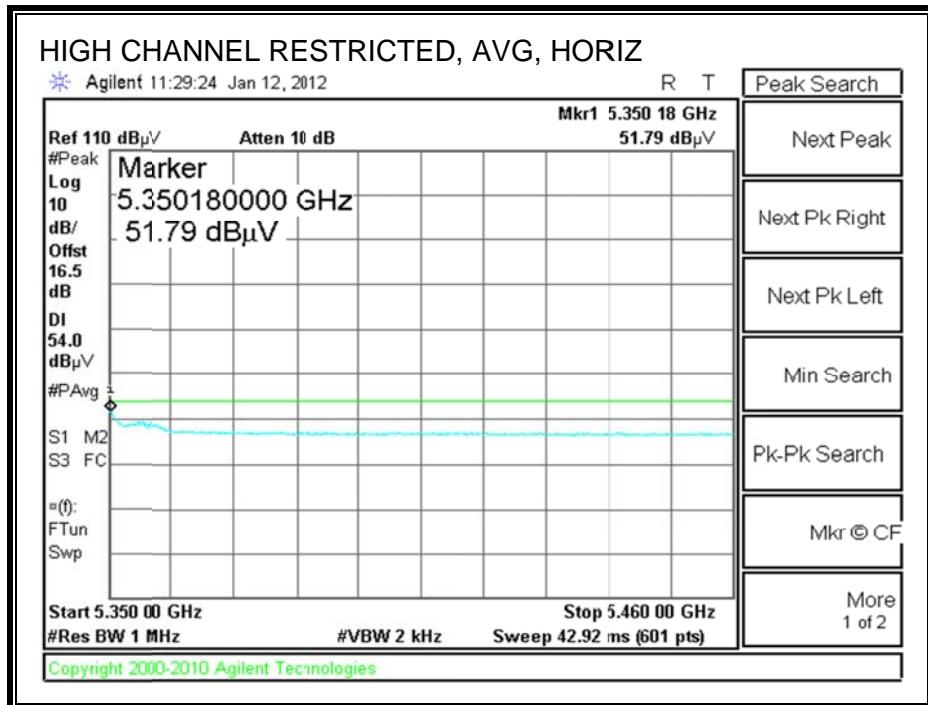
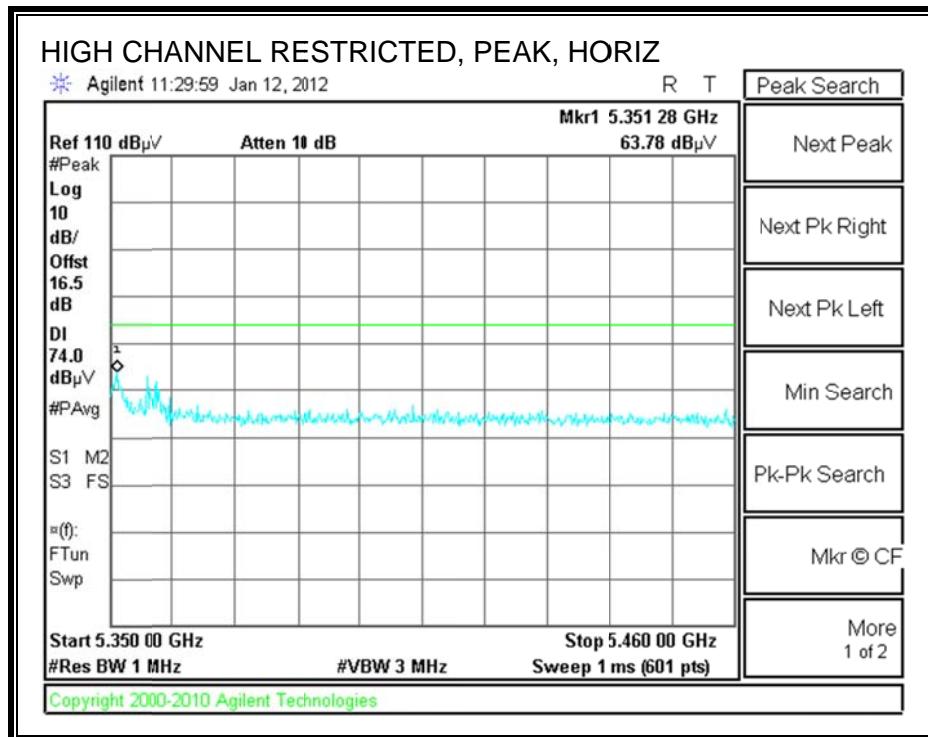
f GHz	Dist (m)	Read dBuV	AF dB/m	CL	Amp dB	D Corr dB	Fltr	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. PoL V/H	Det. P/A/QP	Notes
<b>Low Ch, 5260MHz</b>													
15.780	3.0	47.0	39.2	11.5	-32.2	0.0	0.0	65.4	74.0	-8.6	V	P	
15.780	3.0	31.6	39.2	11.5	-32.2	0.0	0.0	50.0	54.0	-4.0	V	A	
15.780	3.0	48.0	39.2	11.5	-32.2	0.0	0.0	66.4	74.0	-7.6	H	P	
15.780	3.0	33.1	39.2	11.5	-32.2	0.0	0.0	51.5	54.0	-2.5	H	A	
<b>Mid Ch, 5300MHz</b>													
10.600	3.0	44.7	38.4	9.0	-34.3	0.0	0.0	57.9	74.0	-16.1	V	P	
10.600	3.0	32.5	38.4	9.0	-34.3	0.0	0.0	45.6	54.0	-8.4	V	A	
15.900	3.0	48.4	38.9	11.5	-32.2	0.0	0.0	66.6	74.0	-7.4	V	P	
15.900	3.0	33.8	38.9	11.5	-32.2	0.0	0.0	52.0	54.0	-2.0	V	A	
10.600	3.0	50.5	38.4	9.0	-34.3	0.0	0.0	63.6	74.0	-10.4	H	P	
10.600	3.0	36.6	38.4	9.0	-34.3	0.0	0.0	49.7	54.0	-4.3	H	A	
15.900	3.0	52.0	38.9	11.5	-32.2	0.0	0.0	70.1	74.0	-3.9	H	P	
15.900	3.0	35.3	38.9	11.5	-32.2	0.0	0.0	53.4	54.0	-0.6	H	A	
<b>High Ch, 5320MHz</b>													
10.640	3.0	43.7	38.4	9.1	-34.2	0.0	0.0	57.0	74.0	-17.0	V	P	
10.640	3.0	31.5	38.4	9.1	-34.2	0.0	0.0	44.7	54.0	-9.3	V	A	
15.960	3.0	45.9	38.7	11.5	-32.2	0.0	0.0	64.0	74.0	-10.0	V	P	
15.960	3.0	31.3	38.7	11.5	-32.2	0.0	0.0	49.3	54.0	-4.7	V	A	
10.640	3.0	46.0	38.4	9.1	-34.2	0.0	0.0	59.3	74.0	-14.7	H	P	
10.640	3.0	32.2	38.4	9.1	-34.2	0.0	0.0	45.4	54.0	-8.6	H	A	
15.960	3.0	41.9	38.7	11.5	-32.2	0.0	0.0	59.9	74.0	-14.1	H	P	
15.960	3.0	27.7	38.7	11.5	-32.2	0.0	0.0	45.7	54.0	-8.3	H	A	

Rev. 4.1.2.7

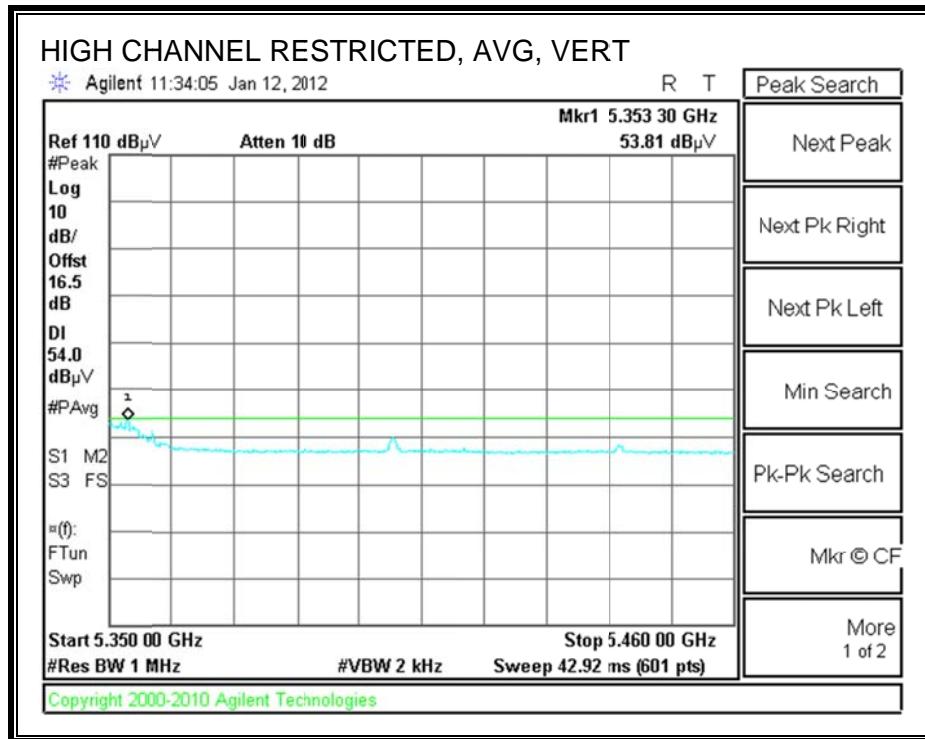
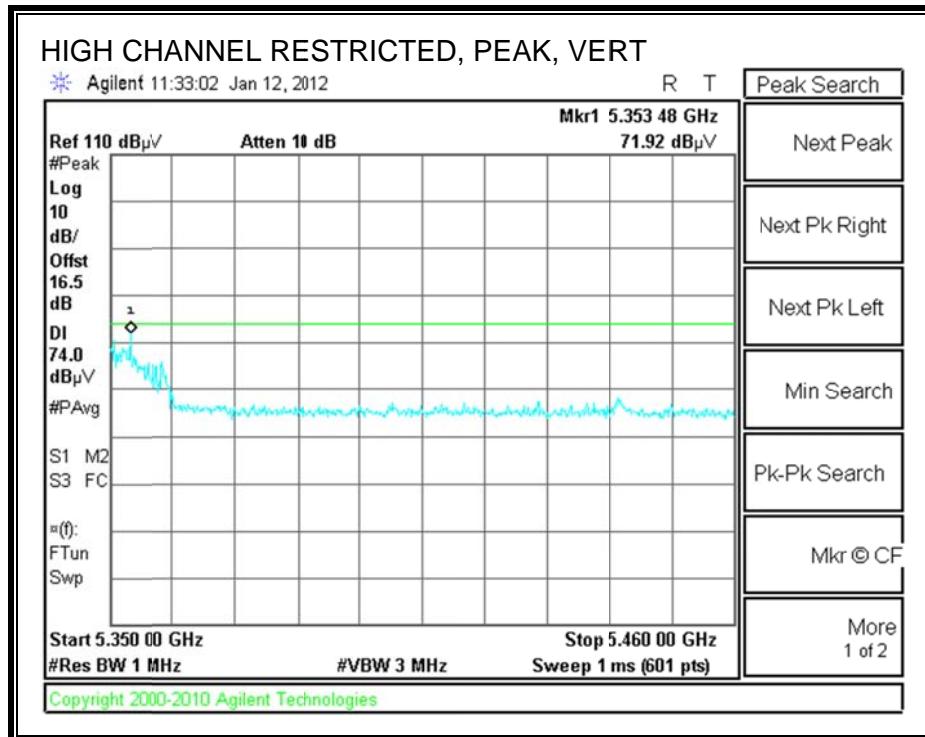
Note: No other emissions were detected above the system noise floor.

### 8.2.5. 802.11n HT20 MODE IN 5.3GHz BAND

#### RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

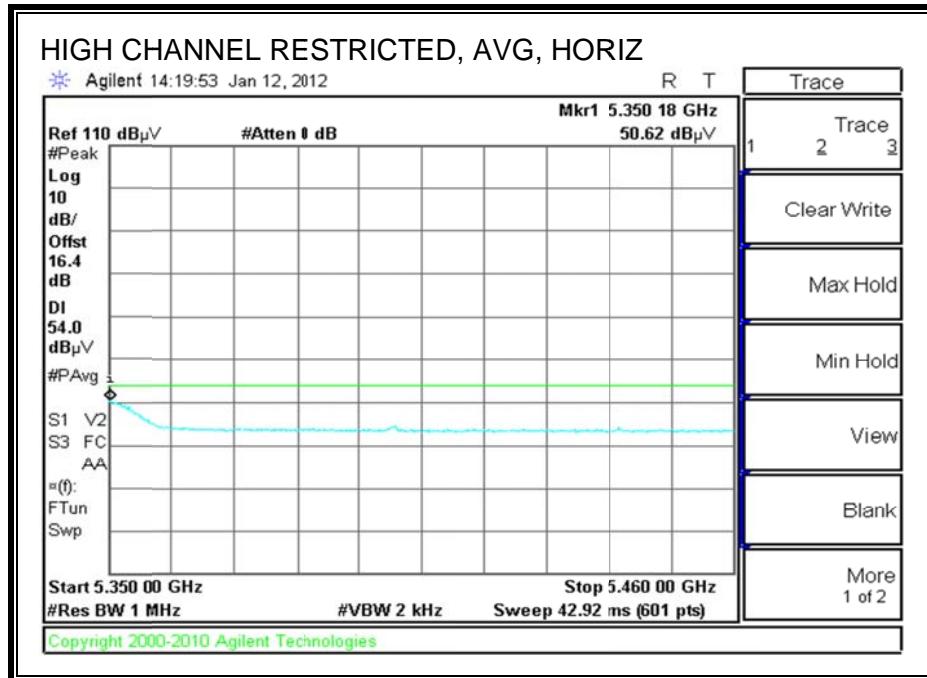
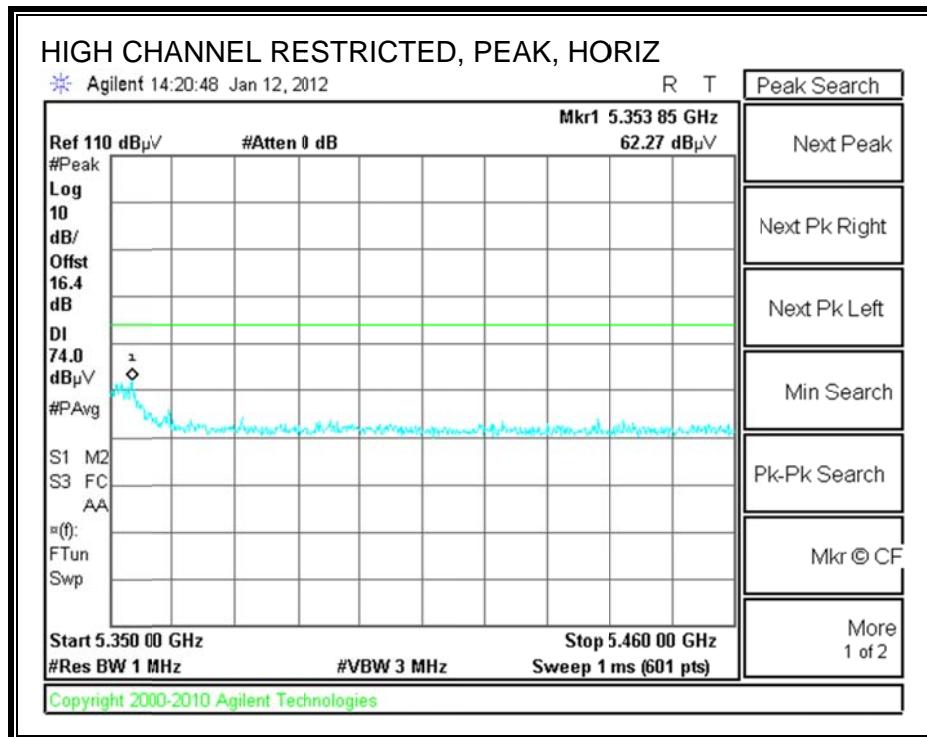


## HARMONICS AND SPURIOUS EMISSIONS

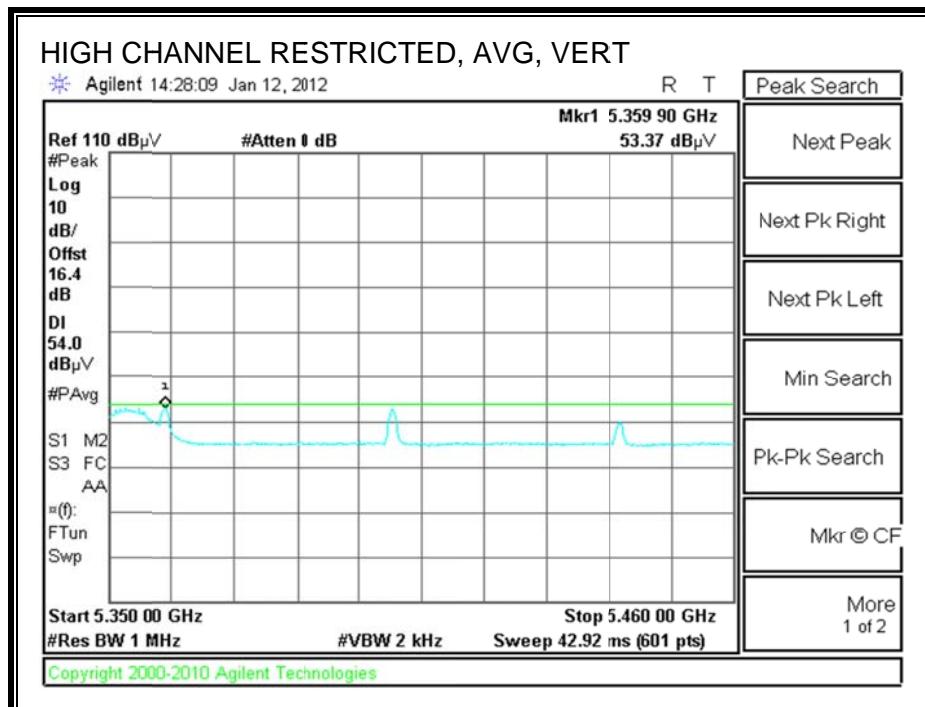
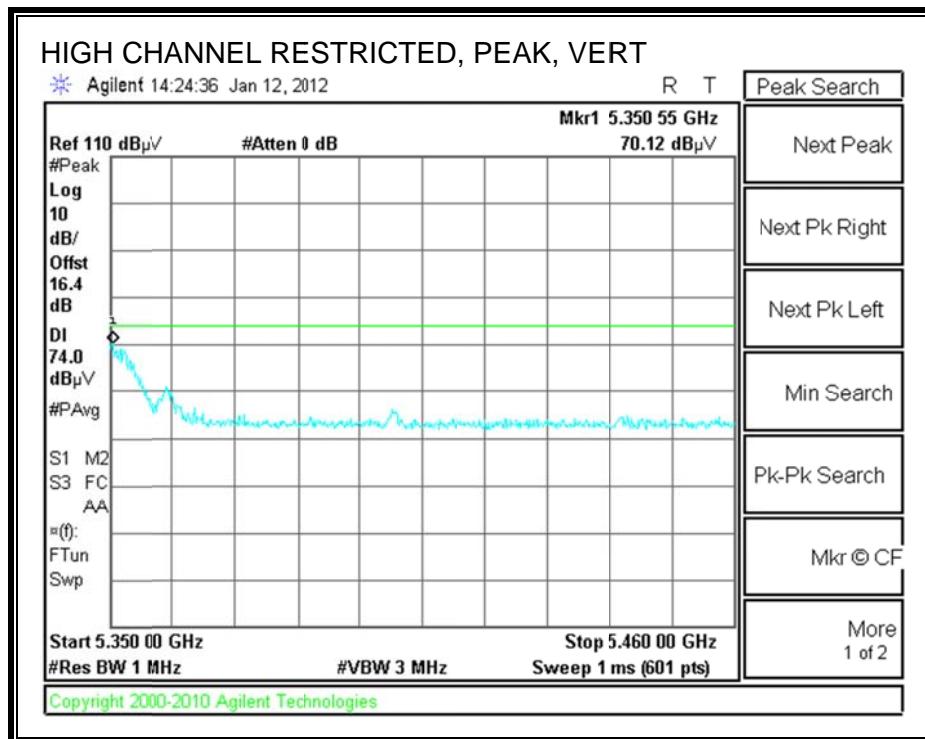
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber														
Test Engr:	Chin Pang													
Date:	01/05/12													
Project#:	11U14110													
Company:	Fluke Networks													
Test Target:	FCC 15.407													
Mode Oper:	5.3GHz, HT20													
f	Measurement Frequency	Amp	Preamp Gain											Average Field Strength Limit
Dist	Distance to Antenna	D	Corr	Distance Correct to 3 meters										Peak Field Strength Limit
Read	Analyzer Reading	Avg		Average Field Strength @ 3 m										Margin vs. Average Limit
AF	Antenna Factor	Peak		Calculated Peak Field Strength										Margin vs. Peak Limit
CL	Cable Loss	HPF		High Pass Filter										
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP		Notes
<b>Low Ch, 5260MHz</b>														
15.780	3.0	46.6	39.2	11.5	-32.2	0.0	0.0	65.0	74.0	-9.0	H	P		
15.780	3.0	30.6	39.2	11.5	-32.2	0.0	0.0	49.0	54.0	-5.0	H	A		
15.780	3.0	45.5	39.2	11.5	-32.2	0.0	0.0	63.9	74.0	-10.1	V	P		
15.780	3.0	30.0	39.2	11.5	-32.2	0.0	0.0	48.4	54.0	-5.6	V	A		
<b>Mid Ch, 5300MHz</b>														
10.600	3.0	47.0	38.4	9.0	-34.3	0.0	0.0	60.2	74.0	-13.8	H	P		
10.600	3.0	33.9	38.4	9.0	-34.3	0.0	0.0	47.0	54.0	-7.0	H	A		
15.900	3.0	48.6	38.9	11.5	-32.2	0.0	0.0	66.8	74.0	-7.2	H	P		
15.900	3.0	34.2	38.9	11.5	-32.2	0.0	0.0	52.3	54.0	-1.7	H	A		
10.600	3.0	46.6	38.4	9.0	-34.3	0.0	0.0	59.7	74.0	-14.3	V	P		
10.600	3.0	33.0	38.4	9.0	-34.3	0.0	0.0	46.2	54.0	-7.8	V	A		
15.900	3.0	47.8	38.9	11.5	-32.2	0.0	0.0	65.9	74.0	-8.1	V	P		
15.900	3.0	32.3	38.9	11.5	-32.2	0.0	0.0	50.5	54.0	-3.5	V	A		
<b>High Ch, 5320MHz</b>														
10.600	3.0	50.3	38.4	9.0	-34.3	0.0	0.0	63.4	74.0	-10.6	H	P		
10.600	3.0	36.4	38.4	9.0	-34.3	0.0	0.0	49.6	54.0	-4.4	H	A		
15.900	3.0	49.3	38.9	11.5	-32.2	0.0	0.0	67.5	74.0	-6.5	H	P		
15.900	3.0	33.5	38.9	11.5	-32.2	0.0	0.0	51.7	54.0	-2.3	H	A		
15.960	3.0	44.9	38.7	11.5	-32.2	0.0	0.0	63.0	74.0	-11.0	H	P		
15.960	3.0	30.6	38.7	11.5	-32.2	0.0	0.0	48.6	54.0	-5.4	H	A		
10.640	3.0	40.7	38.4	9.1	-34.2	0.0	0.0	53.9	74.0	-20.1	V	P		
10.640	3.0	28.1	38.4	9.1	-34.2	0.0	0.0	41.3	54.0	-12.7	V	A		
15.960	3.0	44.4	38.7	11.5	-32.2	0.0	0.0	62.5	74.0	-11.5	V	P		
15.960	3.0	30.1	38.7	11.5	-32.2	0.0	0.0	48.1	54.0	-5.9	V	A		
Rev. 4.1.2.7														
Note: No other emissions were detected above the system noise floor.														

### 8.2.6. 802.11n HT40 MODE IN 5.3GHz BAND

#### RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

### **High Frequency Measurement** **Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Chin Pang  
Date: 01/06/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.3GHz, HT40

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HFF	High Pass Filter	

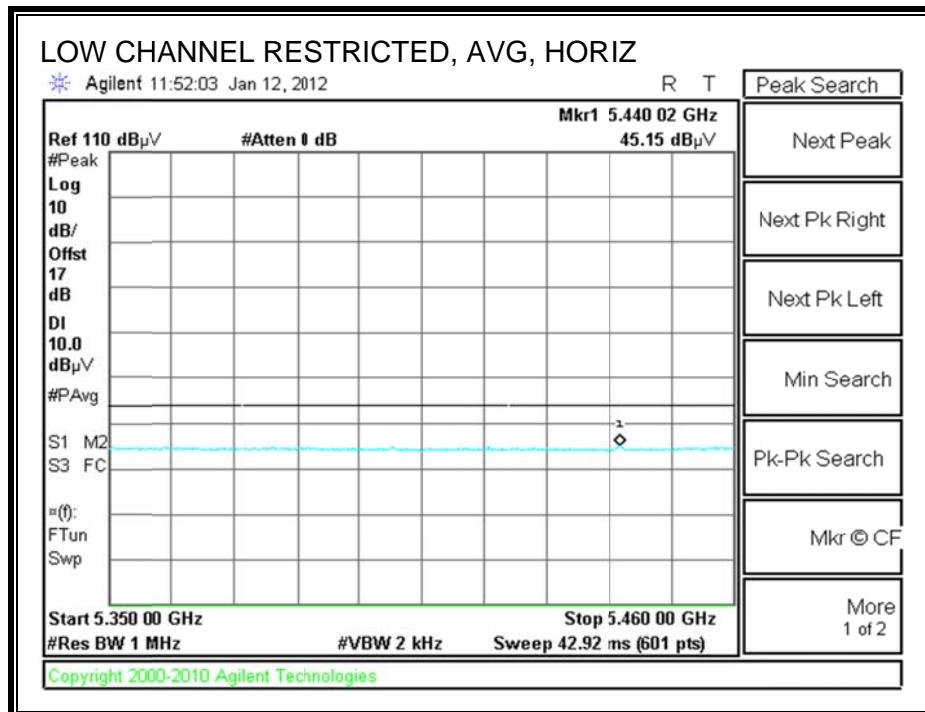
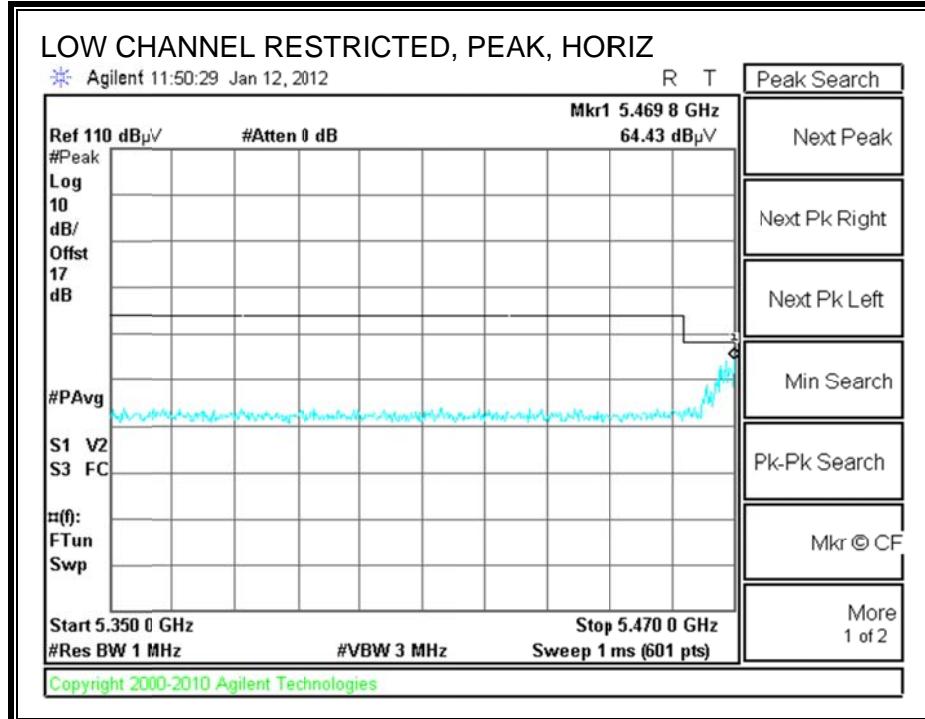
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
<b>Low Ch, 5270MHz</b>													
15.810	3.0	47.7	39.1	11.5	-32.2	0.0	0.7	66.7	74.0	-7.3	V	P	
15.810	3.0	33.5	39.1	11.5	-32.2	0.0	0.7	52.6	54.0	-1.4	V	A	
15.810	3.0	48.9	39.1	11.5	-32.2	0.0	0.7	68.0	74.0	-6.0	H	P	
15.810	3.0	34.1	39.1	11.5	-32.2	0.0	0.7	53.1	54.0	-0.9	H	A	
<b>High Ch, 5310MHz</b>													
10.620	3.0	37.7	38.4	9.1	-34.3	0.0	0.8	51.7	74.0	-22.3	V	P	
10.620	3.0	25.3	38.4	9.1	-34.3	0.0	0.8	39.3	54.0	-14.7	V	A	
15.930	3.0	33.4	38.8	11.5	-32.2	0.0	0.7	52.3	74.0	-21.7	V	P	
15.930	3.0	21.2	38.8	11.5	-32.2	0.0	0.7	40.0	54.0	-14.0	V	A	
10.620	3.0	37.3	38.4	9.1	-34.3	0.0	0.8	51.3	74.0	-22.7	H	P	
10.620	3.0	25.9	38.4	9.1	-34.3	0.0	0.8	39.9	54.0	-14.1	H	A	
15.930	3.0	33.4	38.8	11.5	-32.2	0.0	0.7	52.3	74.0	-21.7	H	P	
15.930	3.0	21.2	38.8	11.5	-32.2	0.0	0.7	40.0	54.0	-14.0	H	A	

Rev. 4.1.2.7

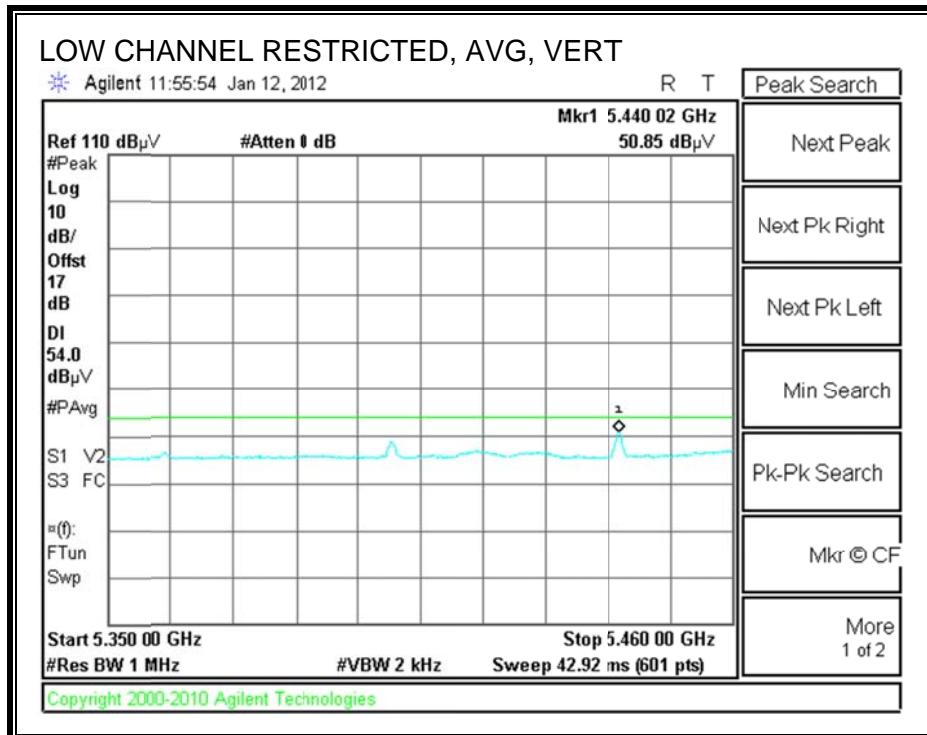
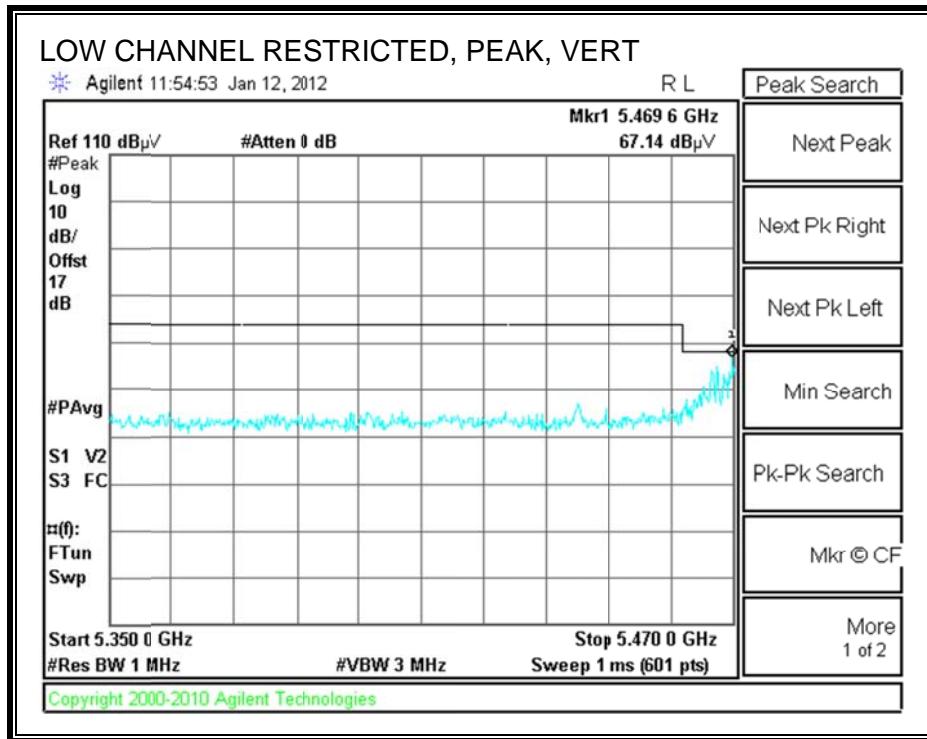
Note: No other emissions were detected above the system noise floor.

### 8.2.7. 802.11a MODE IN 5.6 GHz BAND

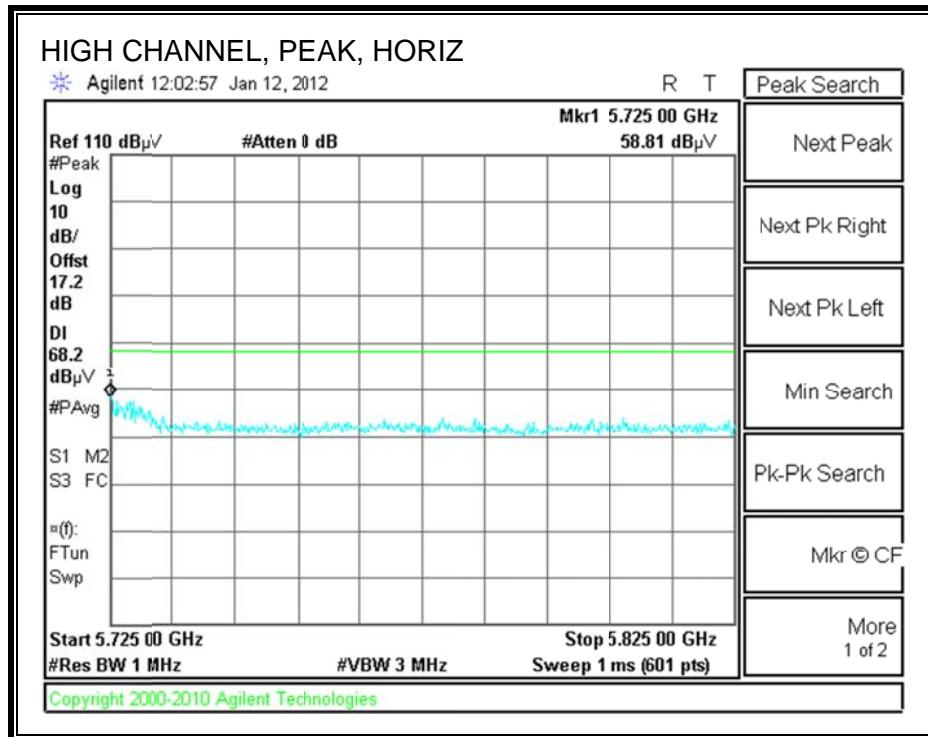
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



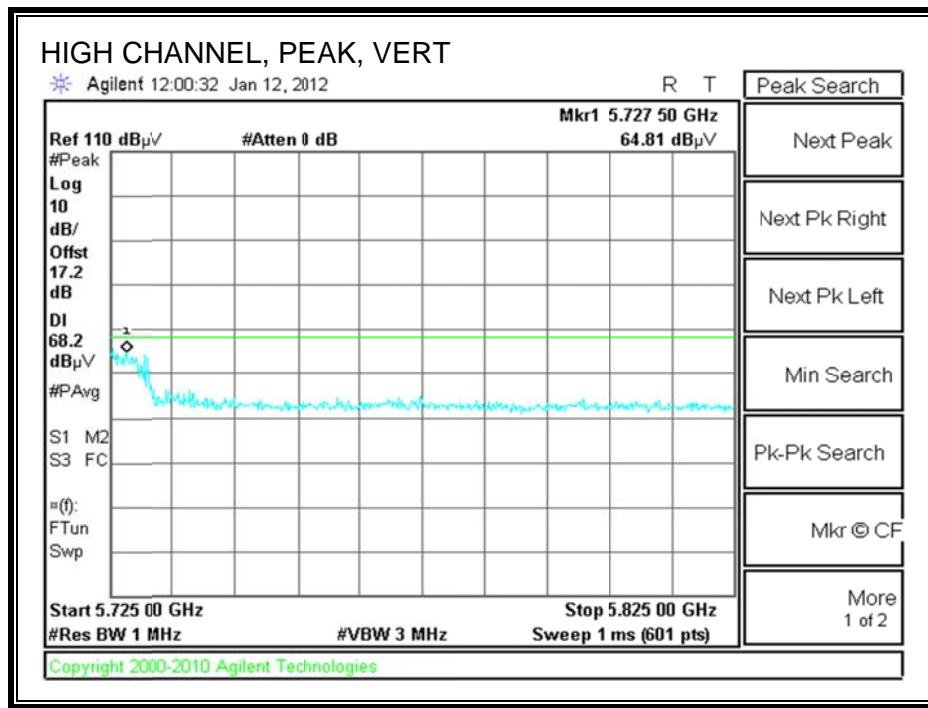
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**  
**Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Chin Pang  
Date: 01/06/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.6Ghz, a mode

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	DCorr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

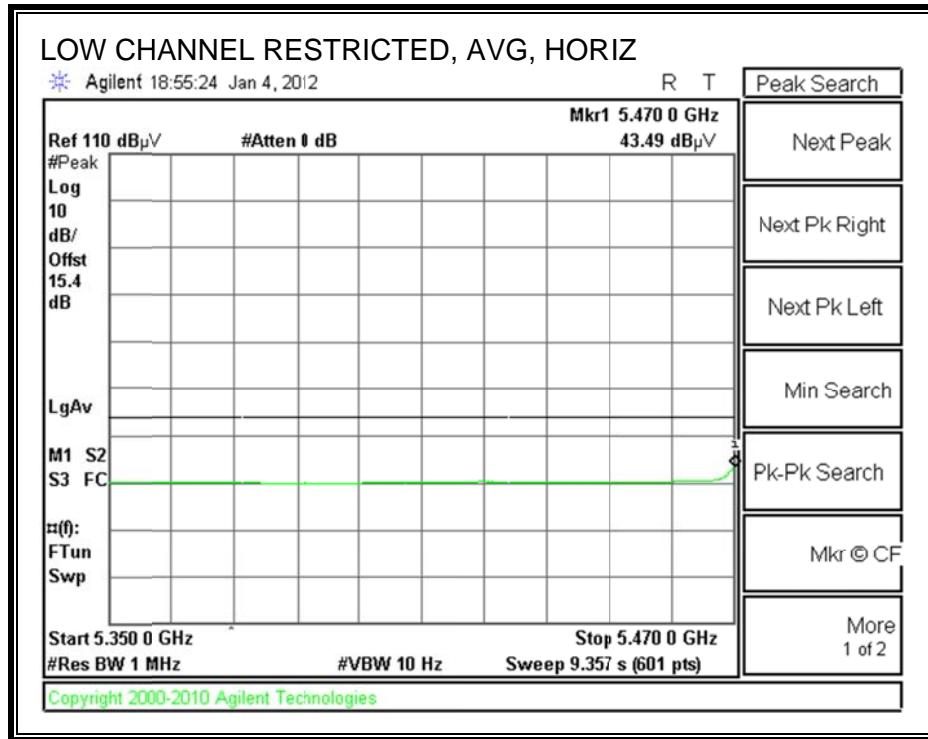
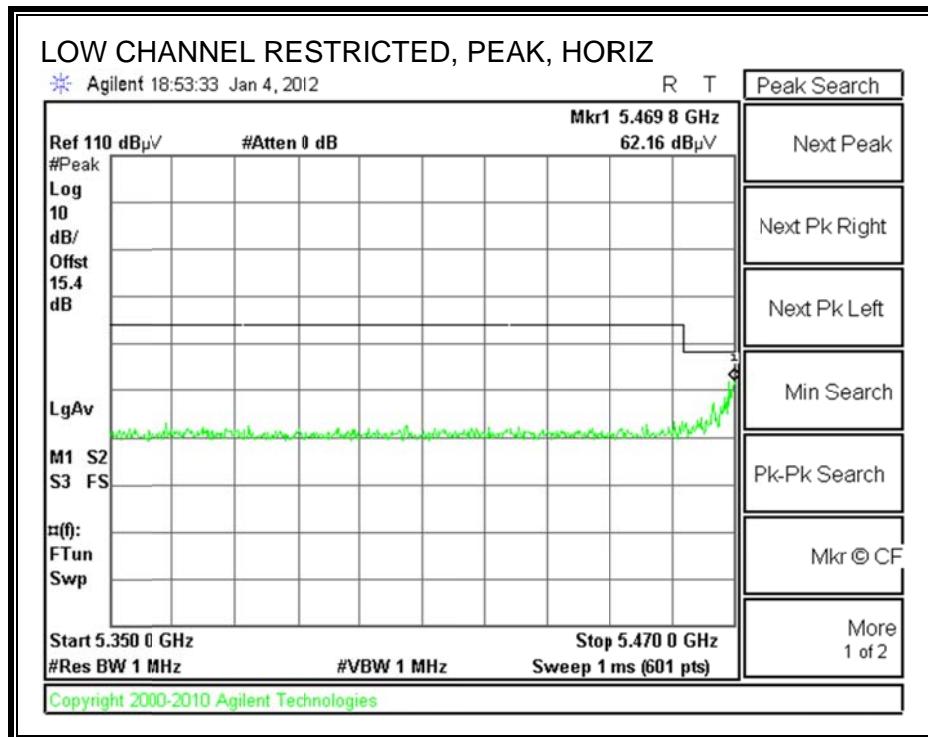
f GHz	Dist (m)	Read dBuV	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>Low Ch, 5500MHz</b>													
11.000	3.0	48.0	38.7	9.2	-33.8	0.0	0.7	62.9	74.0	-11.1	V	P	
11.000	3.0	34.0	38.7	9.2	-33.8	0.0	0.7	49.0	54.0	-5.0	V	A	
11.000	3.0	48.7	38.7	9.2	-33.8	0.0	0.7	63.6	74.0	-10.4	H	P	
11.000	3.0	34.5	38.7	9.2	-33.8	0.0	0.7	49.4	54.0	-4.6	H	A	
<b>Mid Ch, 5580MHz</b>													
11.160	3.0	51.0	38.9	9.3	-33.5	0.0	0.7	66.5	74.0	-7.5	V	P	
11.160	3.0	37.8	38.9	9.3	-33.5	0.0	0.7	53.3	54.0	-0.7	V	A	
11.160	3.0	50.2	38.9	9.3	-33.5	0.0	0.7	65.7	74.0	-8.3	H	P	
11.160	3.0	37.1	38.9	9.3	-33.5	0.0	0.7	52.6	54.0	-1.4	H	A	
<b>High Ch, 5700MHz</b>													
11.400	3.0	43.5	39.1	9.4	-33.2	0.0	0.7	59.5	74.0	-14.5	V	P	
11.400	3.0	29.7	39.1	9.4	-33.2	0.0	0.7	45.7	54.0	-8.3	V	A	
11.400	3.0	42.5	39.1	9.4	-33.2	0.0	0.7	58.5	74.0	-15.5	H	P	
11.400	3.0	30.2	39.1	9.4	-33.2	0.0	0.7	46.2	54.0	-7.8	H	A	

Rev. 4.1.2.7

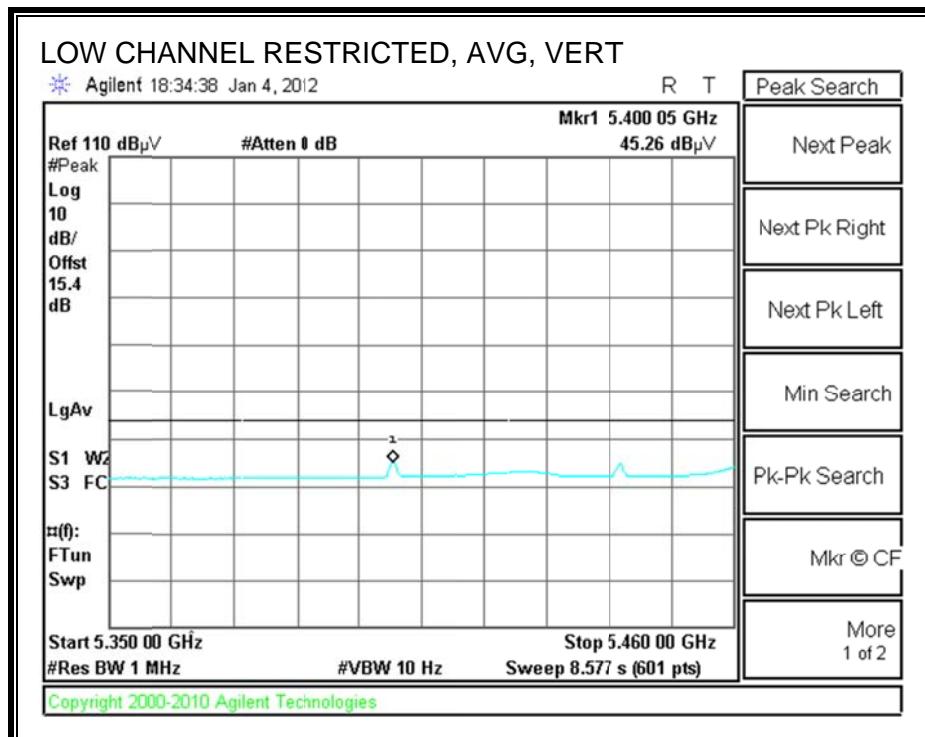
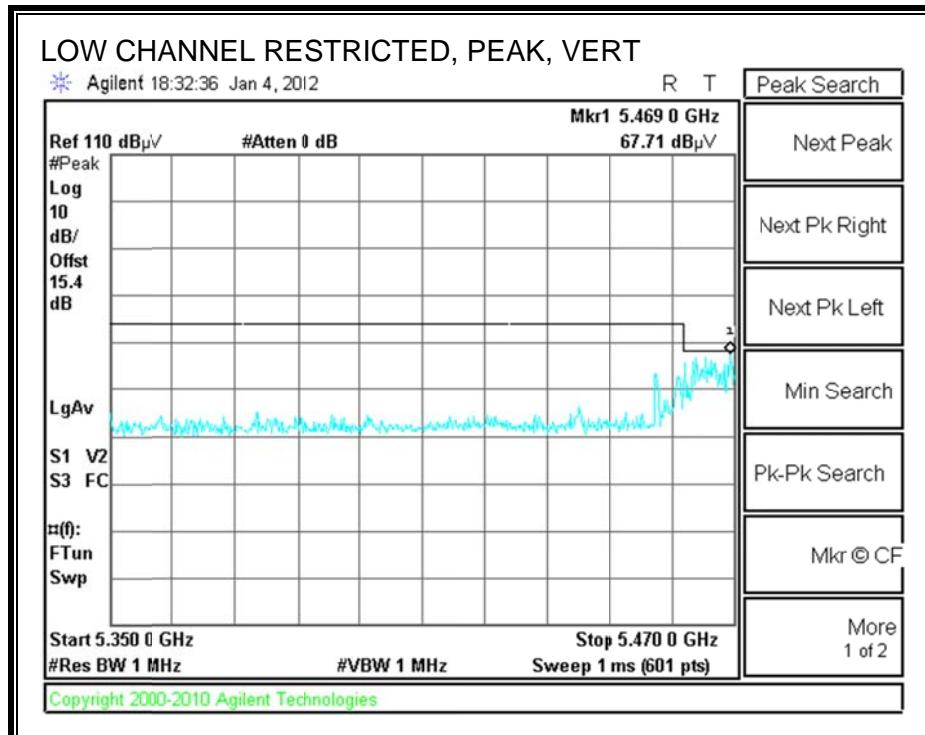
Note: No other emissions were detected above the system noise floor.

### 8.2.8. 802.11n HT20 MODE 5.6 GHz BAND

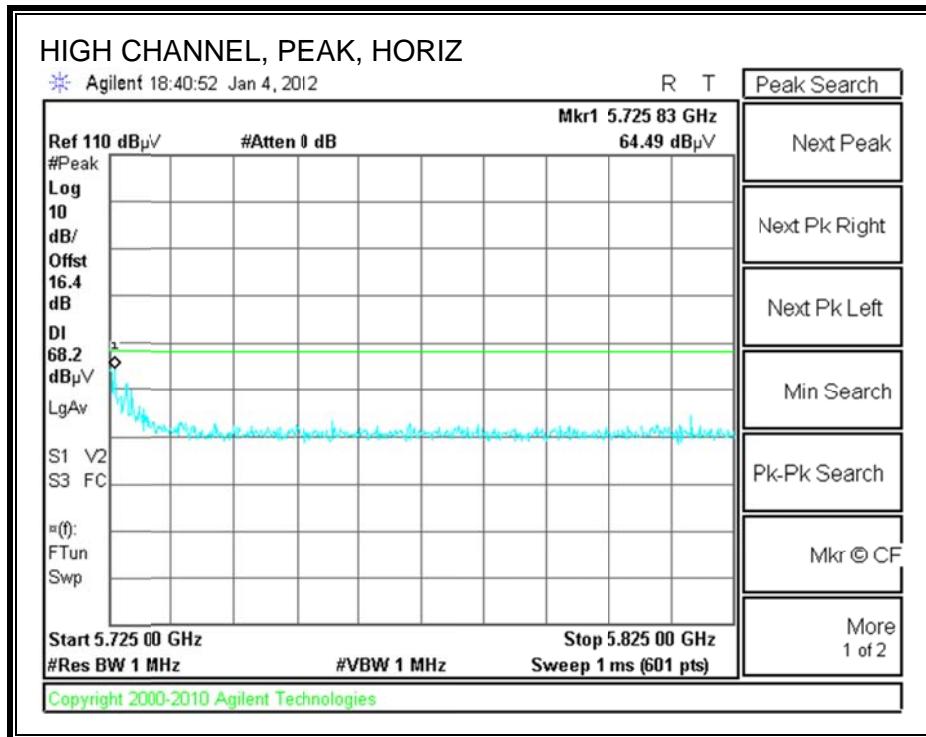
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



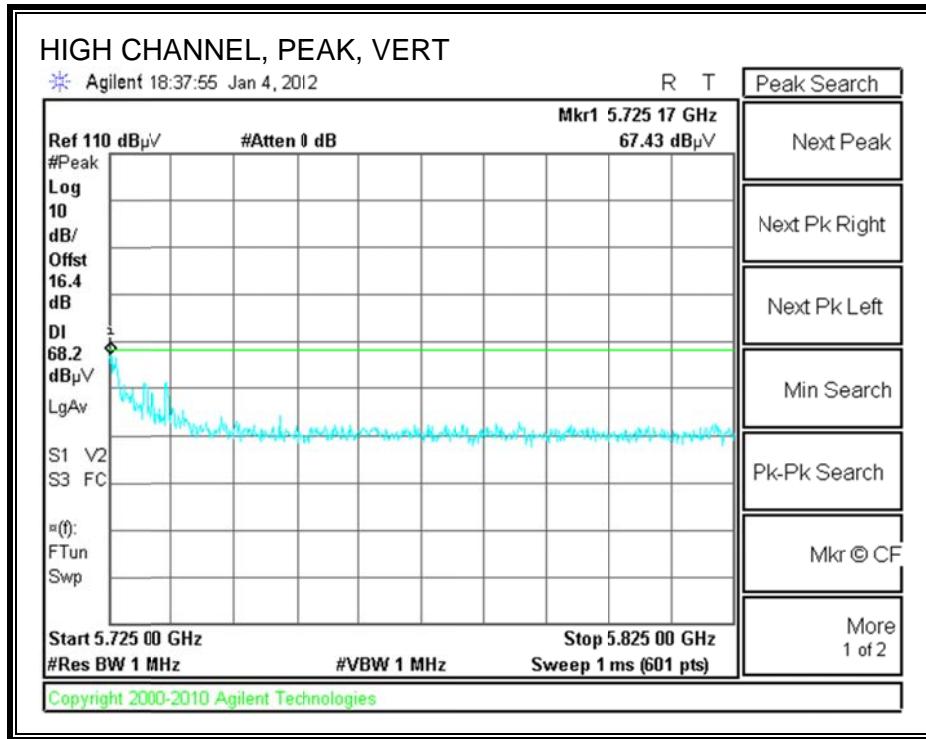
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



## HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**  
**Compliance Certification Services, Fremont 5m Chamber**

Test Engr: Chin Pang  
Date: 01/06/11  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.6GHz Band, HT20

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HFF	High Pass Filter	

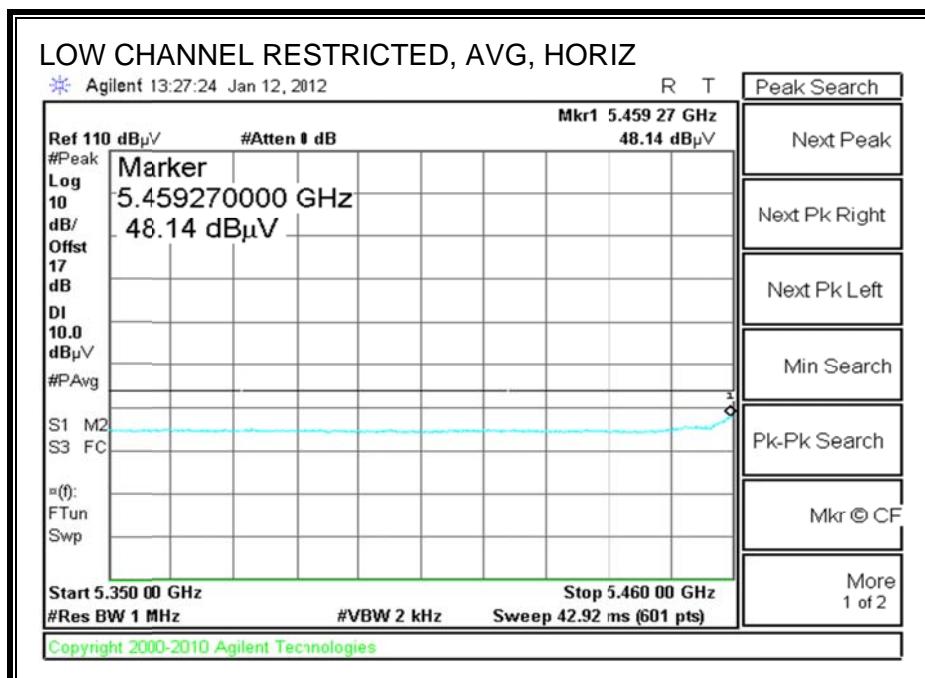
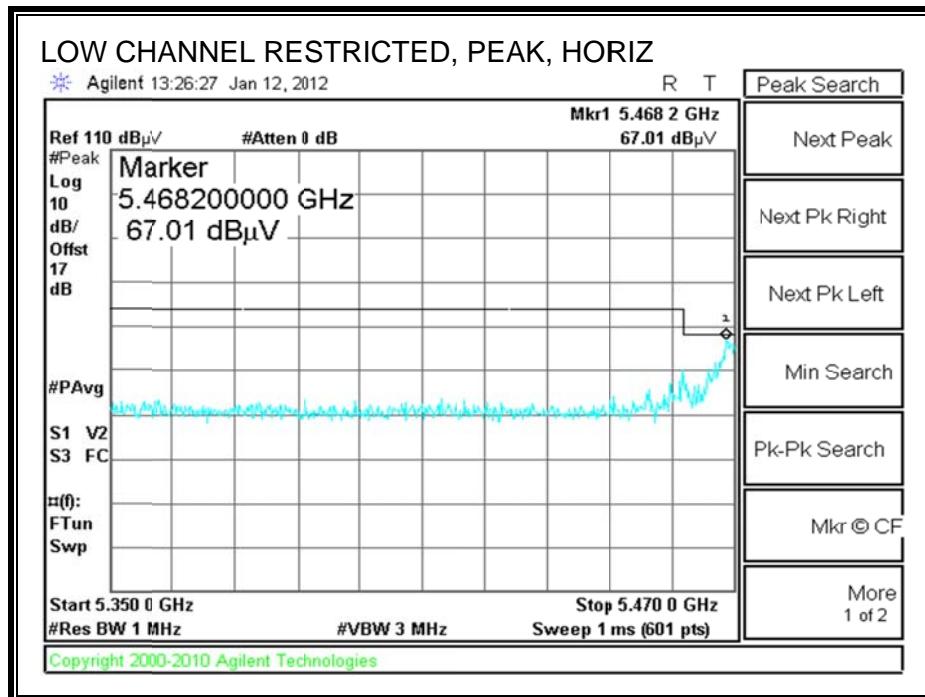
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>Low Ch, 5500MHz</b>													
11.000	3.0	45.7	38.4	10.5	-32.6	0.0	0.7	62.7	74.0	-11.3	H	P	
11.000	3.0	30.9	38.4	10.5	-32.6	0.0	0.7	48.0	54.0	-6.0	H	A	
11.000	3.0	45.7	38.4	10.5	-32.6	0.0	0.7	62.7	74.0	-11.3	V	P	
11.000	3.0	32.8	38.4	10.5	-32.6	0.0	0.7	49.8	54.0	-4.2	V	A	
<b>Mid Ch, 5580MHz</b>													
11.160	3.0	43.7	38.6	10.8	-32.6	0.0	0.7	61.2	74.0	-12.8	H	P	
11.160	3.0	31.5	38.6	10.8	-32.6	0.0	0.7	49.0	54.0	-5.0	H	A	
11.160	3.0	47.7	38.6	10.8	-32.6	0.0	0.7	65.3	74.0	-8.7	V	P	
11.160	3.0	35.3	38.6	10.8	-32.6	0.0	0.7	52.8	54.0	-1.2	V	A	
<b>High ch, 5700MHz</b>													
11.400	3.0	40.8	38.8	11.1	-32.5	0.0	0.7	58.8	74.0	-15.2	H	P	
11.400	3.0	28.7	38.8	11.1	-32.5	0.0	0.7	46.7	54.0	-7.3	H	A	
11.400	3.0	43.6	38.8	11.1	-32.5	0.0	0.7	61.6	74.0	-12.4	V	P	
11.400	3.0	29.8	38.8	11.1	-32.5	0.0	0.7	47.8	54.0	-6.2	V	A	

Rev. 4.1.2.7

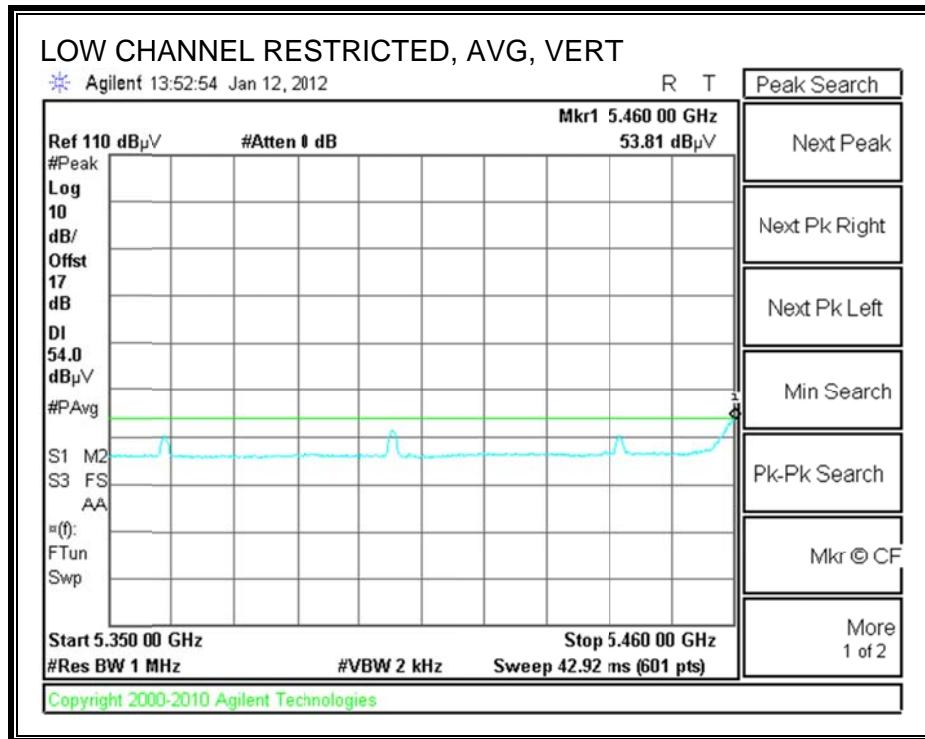
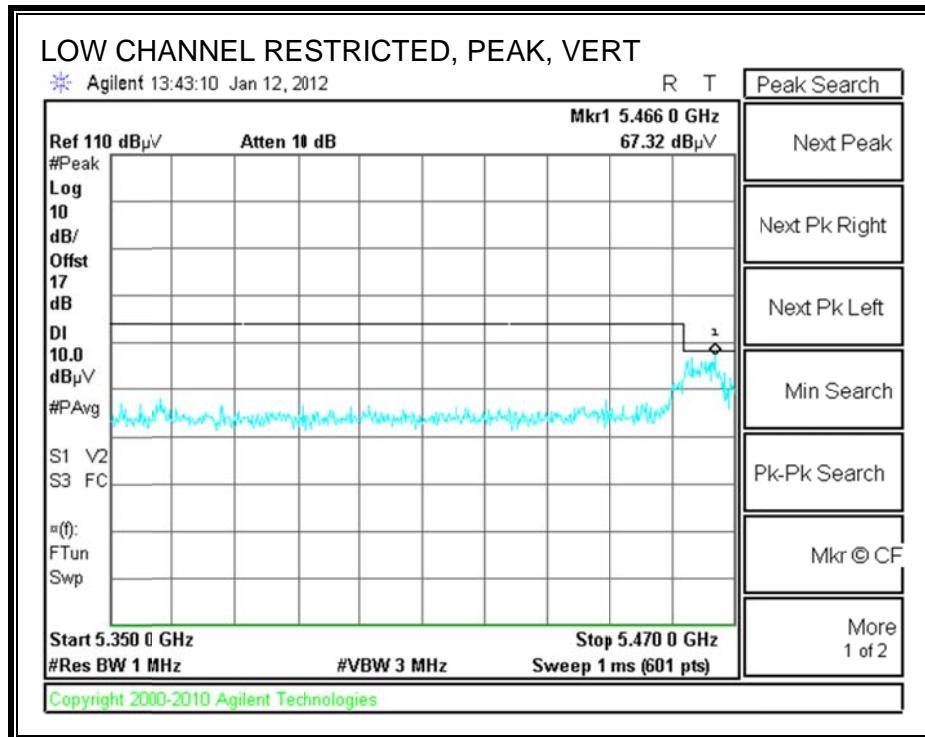
Note: No other emissions were detected above the system noise floor.

### 8.2.9. 802.11n HT40 MODE 5.6 GHz BAND

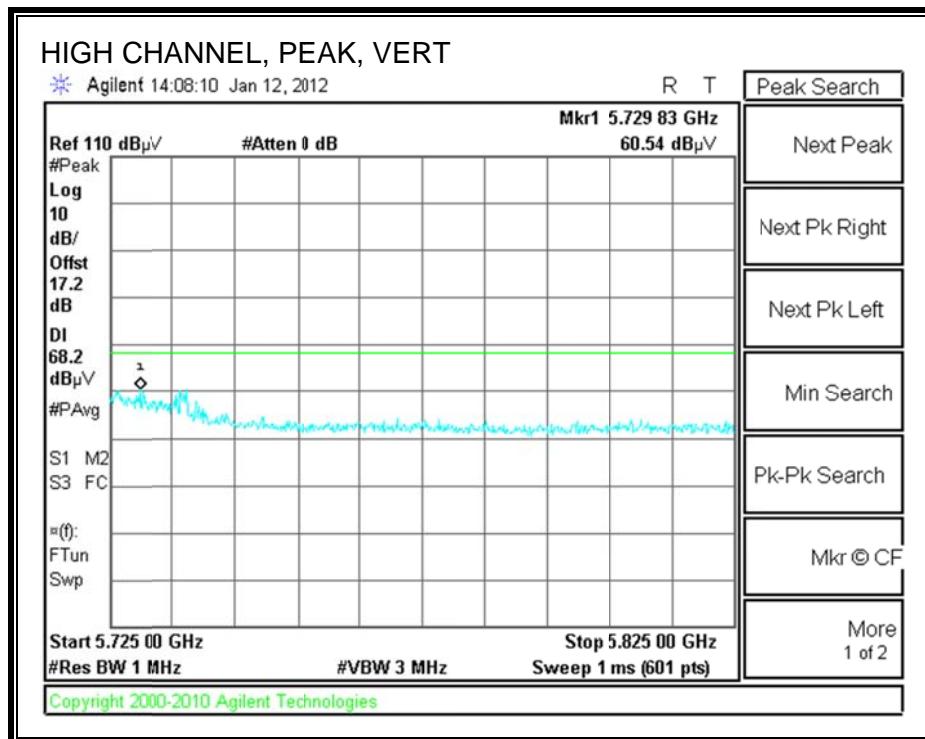
#### RESTRICTED BANEDGE (LOW CHANNEL, HORIZONTAL)



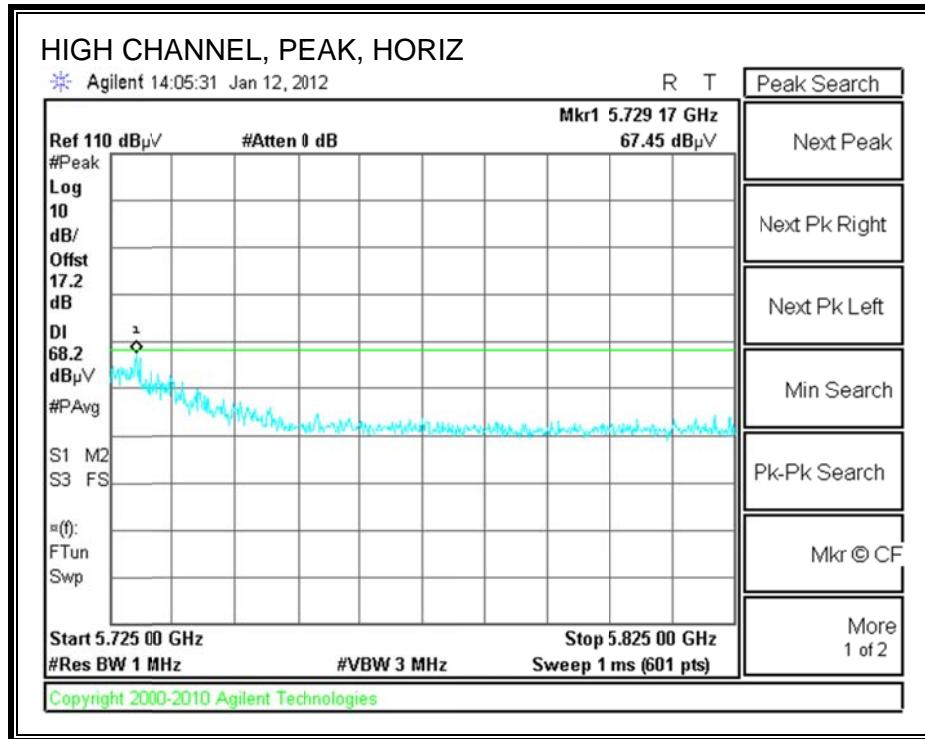
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



## HARMONICS AND SPURIOUS EMISSIONS

### High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang  
Date: 01/06/12  
Project #: 11U14110  
Company: Fluke Networks  
Test Target: FCC 15.407  
Mode Oper: 5.6GHz, HT40

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>Low Ch, 5510MHz</b>													
11.020	3.0	40.8	38.4	10.5	32.6	0.0	0.7	57.8	74.0	-16.2	H	P	
11.020	3.0	28.0	38.4	10.5	32.6	0.0	0.7	45.1	54.0	-8.9	H	A	
11.020	3.0	40.9	38.4	10.5	32.6	0.0	0.7	58.0	74.0	-16.0	V	P	
11.020	3.0	28.0	38.4	10.5	32.6	0.0	0.7	45.1	54.0	-8.9	V	A	
<b>Mid Ch, 5590MHz</b>													
11.180	3.0	44.0	38.6	10.8	32.6	0.0	0.7	61.4	74.0	-12.6	H	P	
11.180	3.0	30.3	38.6	10.8	32.6	0.0	0.7	47.8	54.0	-6.2	H	A	
11.180	3.0	47.7	38.6	10.8	32.6	0.0	0.7	65.1	74.0	-8.9	V	P	
11.180	3.0	35.4	38.6	10.8	32.6	0.0	0.7	52.9	54.0	-1.1	V	A	
<b>High Ch, 5670MHz</b>													
11.340	3.0	39.0	38.7	11.0	32.6	0.0	0.7	56.9	74.0	-17.1	H	P	
11.340	3.0	26.7	38.7	11.0	32.6	0.0	0.7	44.6	54.0	-9.4	H	A	
11.340	3.0	43.4	38.7	11.0	32.6	0.0	0.7	61.3	74.0	-12.7	V	P	
11.340	3.0	31.2	38.7	11.0	32.6	0.0	0.7	49.0	54.0	-5.0	V	A	

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

## 8.3. RECEIVER ABOVE 1 GHz

### 8.3.1. FOR 20 MHz BANDWIDTH

High Frequency Measurement Compliance Certification Services, Fremont 3x Chamber																																																																					
<p>Company: Fluke Networks Project #: 11U14110 Date: 1/6/2012 Test Engineer: Chin Pang Configuration: EUT/Antenna Mode: RX, 5GHz Band, HT20</p>																																																																					
<p><u>Test Equipment:</u></p> <table border="1"><tr><td>Horn 1-18GHz</td><td>Pre-amplifier 1.26GHz</td><td>Pre-amplifier 26-40GHz</td><td colspan="4">Horn &gt; 18GHz</td><td>Limit</td></tr><tr><td>T60; S/N: 2238 @3m</td><td>T34 HP 8449B</td><td></td><td colspan="4"></td><td>FCC 15.209</td></tr><tr><td colspan="18"><p>Hi Frequency Cables</p><table border="1"><tr><td>3' cable 22807700</td><td>12' cable 22807600</td><td>20' cable 22807500</td><td colspan="2">HPF</td><td>Reject Filter</td><td colspan="3">Peak Measurements RBW=VBW=1MHz</td></tr><tr><td>3' cable 22807700</td><td>12' cable 22807600</td><td>20' cable 22807500</td><td colspan="2"></td><td></td><td colspan="3">Average Measurements RBW=1MHz ; VBW=10Hz</td></tr></table></td></tr></table>																		Horn 1-18GHz	Pre-amplifier 1.26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit	T60; S/N: 2238 @3m	T34 HP 8449B						FCC 15.209	<p>Hi Frequency Cables</p> <table border="1"><tr><td>3' cable 22807700</td><td>12' cable 22807600</td><td>20' cable 22807500</td><td colspan="2">HPF</td><td>Reject Filter</td><td colspan="3">Peak Measurements RBW=VBW=1MHz</td></tr><tr><td>3' cable 22807700</td><td>12' cable 22807600</td><td>20' cable 22807500</td><td colspan="2"></td><td></td><td colspan="3">Average Measurements RBW=1MHz ; VBW=10Hz</td></tr></table>																		3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF		Reject Filter	Peak Measurements RBW=VBW=1MHz			3' cable 22807700	12' cable 22807600	20' cable 22807500				Average Measurements RBW=1MHz ; VBW=10Hz		
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3' cable 22807700	12' cable 22807600	20' cable 22807500				Average Measurements RBW=1MHz ; VBW=10Hz																																																															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)																																																						
1.660	3.0	54.0	35.5	27.0	1.6	-36.8	0.0	0.0	47.8	29.3	74	54	-26.2	-24.7	H																																																						
2.340	3.0	62.0	37.0	28.5	1.5	-35.8	0.0	0.0	59.1	34.1	74	54	-14.9	-19.9	H																																																						
3.000	3.0	52.0	43.0	30.3	1.1	-35.3	0.0	0.0	52.1	43.1	74	54	-21.9	-10.9	H																																																						
1.660	3.0	56.0	35.0	27.0	1.6	-36.8	0.0	0.0	49.8	28.8	74	54	-24.2	-25.2	V																																																						
2.320	3.0	56.8	36.0	28.5	1.4	-35.8	0.0	0.0	53.9	33.1	74	54	-20.1	-20.9	V																																																						
3.000	3.0	54.0	48.8	30.3	1.1	-35.3	0.0	0.0	54.1	48.9	74	54	-19.9	-5.1	V																																																						
6.000	3.0	42.0	33.0	34.7	1.9	-34.0	0.0	0.0	50.7	41.7	74	54	-23.3	-12.3	V																																																						
Rev. 07.08.11																																																																					
f	Measurement Frequency			Amp	Preamp Gain						Avg Lim	Average Field Strength Limit																																																									
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters						Pk Lm	Peak Field Strength Limit																																																									
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m						Avg Mar	Margin vs. Average Limit																																																									
AF	Antenna Factor			Peak	Calculated Peak Field Strength						Pk Mar	Margin vs. Peak Limit																																																									
CL	Cable Loss			HPF	High Pass Filter																																																																

### 8.3.2. FOR 40 MHz BANDWIDTH

High Frequency Measurement Compliance Certification Services, Fremont 3m Chamber															
Company: Fluke Networks Project #: 11U14110 Date: 1/6/2012 Test Engineer: Chin Pang Configuration: EUT/Antenna Mode: RX, 5Ghz Band, HT40															
<u>Test Equipment:</u>															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit			
T60; S/N: 2238 @3m			T34 HP 8449B									FCC 15.209			
HF Frequency Cables															
3' cable 22807700			12' cable 22307600			20' cable 22807500			HPF			Reject Filter			
3' cable 22807700			12' cable 22807600			20' cable 22807500									
<b>Peak Measurements:</b> RBW=VBW=1MHz <b>Average Measurements:</b> RBW=1MHz, VBW=10Hz															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.660	3.0	53.5	34.5	27.0	3.6	-36.8	0.0	0.0	47.3	28.3	74	54	-26.7	-25.7	H
2.340	3.0	60.0	39.0	28.5	4.5	-35.8	0.0	0.0	57.1	36.1	74	54	-16.9	-17.9	H
3.000	3.0	47.0	45.2	30.3	5.1	-35.3	0.0	0.0	47.1	45.3	74	54	-26.9	-8.7	H
1.653	3.0	56.6	36.2	26.9	3.6	-36.8	0.0	0.0	50.3	29.9	74	54	-23.7	-24.1	V
2.325	3.0	52.0	33.0	28.5	4.4	-35.8	0.0	0.0	49.1	30.1	74	54	-24.9	-23.9	V
3.000	3.0	50.5	46.5	30.3	5.1	-35.3	0.0	0.0	50.6	46.6	74	54	-23.4	-7.4	V
6.000	3.0	41.5	32.8	34.7	7.9	-34.0	0.0	0.0	50.2	41.5	74	54	-23.8	-11.5	V
Rev. 07.08.11															
f Measurement Frequency Dist Distance to Antenna Read Analyzer Reading AF Antenna Factor CL Cable Loss					Amp Preamp Gain D Corr Distance Correct to 3 meters Avg Average Field Strength @ 3 m Peak Calculated Peak Field Strength HPF High Pass Filter					Avg Lim Average Field Strength Limit Pk Lim Peak Field Strength Limit Avg Mar Margin vs. Average Limit Pk Mar Margin vs. Peak Limit					

## 8.4. WORST-CASE BELOW 1 GHz

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

#### VERTICAL AND HORIZONTAL DATA

Wlan, 5GHz Band ( Worst Case )								
11U14110								
Tested By Chin Pang								
17-Jan-12								
Range 1 30 - 1000MHz								
Frequency	Reading	Detector	Ant Gain	[Ant Factor]	dBuV/m	Part 15B	Margin	Height [Polarity]
54.6183	50.15 PK		-29	7.9	29.05	40	-10.95	200 Horz
124.984	52.39 PK		-28.3	13.8	37.89	43.5	-5.61	200 Horz
432.0344	42.72 PK		-27	15.6	31.32	46	-14.68	200 Horz
458.9788	42.62 PK		-27	16.1	31.72	46	-14.28	200 Horz
617.1563	45.48 PK		-26.6	18.4	37.28	46	-8.72	200 Horz
750.1339	45 PK		-25.7	20.1	39.4	46	-6.6	100 Horz
Range 2 30 - 1000MHz								
Frequency	Reading	Detector	Ant Gain	[Ant Factor]	dBuV/m	Part 15B	Margin	Height [Polarity]
39.3046	48.37 PK		-29.2	14.6	33.77	40	-6.23	100 Vert
133.5132	48.13 PK		-28.2	13.5	33.43	43.5	-10.07	100 Vert
166.4668	50.37 PK		-27.9	10.4	32.87	43.5	-10.63	100 Vert
374.8501	41.87 PK		-26.8	14.6	29.67	46	-16.33	100 Vert
566.9504	46.47 PK		-26.6	17.8	37.67	46	-8.33	100 Vert